Botley West Solar Farm

Environmental Statement

Volume 1

Chapter 16: Human Health

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Glossary

Term	Meaning
The Applicant	SolarFive Ltd
Health	State of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity.
Health outcome	Change in health status of an individual, group or population attributable to a planned intervention or series of interventions, regardless of whether such an intervention was intended to change health status.
Health risk factor	A social, economic or biological status, or behaviours or environments which are associated with or that cause increased susceptibility to a specific disease, ill health or injury.
Likely health effect	This effect is one that, with reference to the scientific literature, shows a plausible theoretical link between source-pathway-receptor; and the occurrence of which is judged as probable, in a specific context.
Mental health	State in which every individual realises his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community.
Population health	The health outcomes of a group of individuals, including the distribution of such outcomes within the group.
The Project	The Botley West Solar Farm (Botley West) Project
Significant health effect	An effect triggered by the Project that is judged in EIA methodology terms to be important for public health (a positive or negative effect), highly desirable for public health (a positive effect) or unacceptable for public health (a negative effect).
Vulnerable groups or subpopulations	Sensitive to changes in health a determinant in a given context. Can include groups such as children and young people, ethnic minorities, people with disabilities, people with existing poor health, people who are homeless, people living in poverty, those who experience social disadvantage, those struggling with addiction and substance abuse, and isolated older people.
Wider determinants of health	Bio-physical, behavioural, social, economic, or institutional environmental factors which contribute to the health status of individuals or populations.

Abbreviations

Abbreviation	Meaning
DCO	Development Consent Order
EIA	Environmental Impact Assessment
EMF	Electric and magnetic fields

Abbreviation	Meaning
ES	Environmental Statement
FTE	Full time equivalent
GHG	Greenhouse gas emissions
GP	General Practitioner
HDD	Horizontal Directional Drilling
HIA	Health Impact Assessment
IAIA	International Association for Impact Assessment
IAQM	Institute of Air Quality Management
ICNIRP	International Commission on Non-ionizing Radiation Protection
IEMA	Institute of Environmental Management and Assessment
IPC	Infrastructure Planning Commission
IPH	Institute of Public Health
JSNA	Joint Strategic Needs Assessment
KSI	Killed and Seriously Injured
LSOA	Lower layer Super Output Area
NEET	Not in education, employment or training
NGET	National Grid Electricity Transmission
NHS	National Health Service
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
OCC	Oxfordshire County Council
OEP	The Office for Environmental Protection
OHID	Office of Health Improvement and Disparities
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
PM	Particulate matter
PRoW	Public Rights of Way
PVDP	Photovolt Development Partners GmbH
QOF	Quality and Outcomes Framework
SAR	Standardised Admission Ratio
UK	United Kingdom

Abbreviation	Meaning
UKHSA	UK Health Security Agency
VWHDC	Vale of White Horse District Council
WHO	World Health Organization
WODC	West Oxfordshire District Council

Units

Unit	Description
%	Percentage
dB(A)	A-weighted decibel
ha	Hectare
kV	Kilovolt
MWe	Megawatt electric - – electric output capability of the Project
MWp	Megawatt peak - maximum power output of a solar PV system under ideal conditions

16 Human Health

16.1 Introduction

Overview

16.1.1 This chapter of the ES sets out the approach to the assessment of likely significant effects, of the Project, upon human health receptors. The application for development consent is being made to the Planning Inspectorate (PINS) under the Planning Act 2008. The proposal is to install and operate approximately 840MWe of solar generation in parts of West Oxfordshire, Cherwell and Vale of White Horse Districts, within the county of Oxfordshire (the Project).

16.1.2 This chapter of the Environmental Statement (ES) has been prepared by RPS for Photovolt Development Partners GmbH (PVDP) on behalf of SolarFive Ltd (the Applicant).

16.1.3 SolarFive is the 'special purpose vehicle' (SPV) for the Project and has been awarded a generation licence by Ofgem and offered a grid connection by National Grid Electricity Transmission (NGET) from October 2027. SolarFive is a licence holder under the Electricity Act 1989, and is also a company registered in England and Wales (company no. 12602740).

16.1.4 This ES Chapter has been prepared in accordance with the approach set out in the Scoping Report and subsequent Preliminary Environmental Information Report (PEIR). The chapter meets both the statutory EIA requirements for Human Health and local Health Impact Assessment (HIA) guidance for assessing major development in Oxfordshire (Oxfordshire County Council, 2021).

16.1.5 This Human Health chapter identifies and assesses the potential for likely significant effects (both adverse and beneficial) of the Project on population health.

16.1.6 Health is "a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity" (WHO, 1948). Mental health is "a state of mental well-being that enables people to cope with the stresses of life, to realize their abilities, to learn well and work well, and to contribute to their communities" (World Health Organization, 2022). 'Population health' refers to health outcomes of a group of individuals, including the distribution of such outcomes within the group. (Kindig & Stoddart, 2003).

16.1.7 This assessment considers how the Project affects different aspects of the environment that influence population health. This includes changes to the social, economic, and bio-physical environment.

16.1.8 Health in EIA takes a public health approach, meaning it reaches conclusions on population health outcomes, rather than the clinical health outcomes of individuals, The guidance that explains this approach is set out in **section 16.4**.

16.1.9 In this assessment the terms health and wellbeing are used interchangeably, and parity is given to considering both physical and mental health outcomes.

16.1.10 This chapter considers appropriate actions to avoid or mitigate health risks and promote health opportunities including targeting measures to respond to health inequalities for vulnerable groups. A key aspect of the Project this health chapter responds to is the maintenance of physical activity and active travel opportunities for access routes affected by the Project, including behavioural factors associated with the quality and accessibility of those routes.

16.1.11 This chapter also assesses the cumulative effects of the Project on health and wellbeing.

16.1.12 The chapter follows guidance and good practice, giving the public health perspective of impacts. In doing so, the chapter:

- delivers an embedded comprehensive HIA;
- takes a population health approach to assessing physical and mental health outcomes;
- considers the wider determinants of health that may be significantly affected directly or indirectly;
- assesses the potential for health inequalities to vulnerable groups; and
- considers opportunities to improve population health.

16.1.13 The assessment presented is informed by the following technical chapters:

- Chapter 6: Project Description **[EN010147/APP/6.3];**
- Chapter 8: Landscape and Visual Resources **[EN010147/APP/6.3];**
- Chapter 10: Hydrology and Flood Risk **[EN010147/APP/6.3];**
- Chapter 11: Ground Conditions **[EN010147/APP/6.3];**
- Chapter 12: Traffic and Transport **[EN010147/APP/6.3];**
- Chapter 13: Noise and Vibration **[EN010147/APP/6.3];**
- Chapter 14: Climate Change **[EN010147/APP/6.3];**
- Chapter 15: Socio Economics **[EN010147/APP/6.3];**
- Chapter 17: Agricultural Land Use and Public Rights of Way **[EN010147/APP/6.3]**; and
- Chapter 19: Air Quality **[EN010147/APP/6.3]**.

16.1.14 This chapter also draws upon information contained within:

- EIA Scoping Report (Volume 3, Appendix 4.1) **[EN010147/APP/6.5]**; and
- Scoping Opinion (Volume 3, Appendix 4.2) **[EN010147/APP/6.5]**.
- Consultation Report **[EN010147/APP/5.1]**

16.1.15 Plans and figures that have informed the health assessment include but are not limited to:

- Operational Development Areas Plans **[EN010147/APP/7.3.2**]
- Landscape, Ecology & Amenities Layer Plans **[EN010147/APP/7.3.3]**

- Figure 8.9-8.11 - Representative Viewpoint and Photomontage Locations **[EN010147/APP/6.4]**
- Figure 8.12-8.127 - Representative Viewpoint Photographs (winter) **[EN010147/APP/6.4]**
- Figure 8.128 to 8.243 Representative Viewpoint Photographs (Summer) **[EN010147/APP/6.4]**
- Figure 8.248 to 8.371 Photomontages (Winter and Summer) **[EN010147/APP/6.4]**
- Figure 17.5 - PRoW and Other Promoted Routes **[EN010147/APP/6.4]**
- Temporary Facilities Plans **[EN010147/APP/7.3.4]**
- Outline Code of Construction Practice (inc Outline Dust Management, Outline Soil Management, Outline Public Rights of Way Management Strategy, Outline Site Resources and Waste Management Plan, Outline Construction Traffic Management Plan) **[EN010147/APP/7.6.1]**
- Outline Operational Management Plan **[EN010147/APP/7.6.2]**
- Outline Landscape and Ecology Management Plan **[EN010147/APP/7.6.3]**
- Outline Decommissioning Plan **[EN010147/APP/7.6.4]**
- Outline Layout and Design Principles **[EN010147/APP/7.7]**

16.1.16 A summary of the consultation and engagement that has informed this health assessment, including with local communities and the Oxford County Council (OCC) public health team, is set in Volume 3, Appendix 16.1: Human Health Consultation and Engagement **[EN010147/APP/6.5]**.

16.1.17 An alignment review against the criteria of the Oxfordshire Health Impact Assessment Toolkit (Oxfordshire County Council, 2021) is set out in Volume 3, Appendix 16.2: Oxfordshire HIA Toolkit Alignment Review **[EN010147/APP/6.5]**. This includes a statement of how the HIA process has positively influenced the Project in favour of public health and reduced health inequalities.

16.2 Legislative and Policy Context

Legislation

16.2.1 The following legislation has been considered in the human health assessment:

- The Environment Act 2021 established The Office for Environmental Protection (OEP) as a public body in England and Northern Ireland. The OEP sets targets and takes enforcement action to prevent, or mitigate, serious damage to the natural environment or to human health. This includes reducing adverse impacts on public health. The OEP (Office for Environmental Protection) objective is for environmental law (including EIA legalisation) and its implementation to be well designed and delivered,

so that positive outcomes for the environment and people's health and wellbeing are achieved.

- The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 set out the topics to be assessed within the EIA process, including at section 5: *"The EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors – population and human health…"*
- The Air Quality Standards Regulations 2010 (amended in 2016) set out statutory health protection standards on ambient air quality.
- The Environment Act 1995 sets provisions for protecting certain environmental conditions of relevance to health in the UK. Part II covers contaminated land and Part IV covers air quality.
- The Environmental Protection Act 1990 (as amended), Part IIA covers contaminated land and Part III manages the control of emissions (including dust, noise and light) that may be prejudicial to health or a nuisance.
- Control of Pollution Act 1974 makes provisions in relation to waste disposal, water pollution, noise, atmospheric pollution and public health. It describes licencing of certain activities to avoid danger to public health or serious detriment to the amenity of the locality affected. It also covers control of, and consent for, noise on construction sites (sections 60 and 61), including defining 'best practicable means' (section 72).
- The Health and Safety at Work etc Act 1974 places duties on employers to ensure, 'so far as is reasonably practicable': the health, safety and welfare at work of all their employees; and that persons not in their employment are not exposed to risks to their health or safety as a result of the activities undertaken.

Planning policy context

National Policy Statements

16.2.2 There are currently six designated energy National Policy Statements (NPSs), EN-1, EN-2, EN-3, EN-4, EN-5 and EN-6. The 2023 revised NPSs (EN-1 to EN-5) came into force on 17 January 2024. The 2011 version of the NPS for Nuclear Power Generation (EN-6) remains in force, but is not relevant to this Project.

16.2.3 NPS EN-1 includes guidance on what matters are to be considered in the assessment. **Table 16.1** sets out a summary of the policies within NPS EN-1, relevant to Human Health. NPS EN-1 also highlights a number of factors relating to the determination of an application and in relation to mitigation. These are summarised in **Table 16.2**.

16.2.4 NPS EN-3 provides the primary policy for decisions regarding nationally significant renewable energy infrastructure including Solar Photovoltaic

Generation. **Table 16.3** sets out a summary of the policies within NPS EN-3 relevant to Human Health.

16.2.5 NPS EN-5 provides the primary basis for decisions regarding electricity networks infrastructure (DESNZ, 2023). **Table 16.4** sets out a summary of the policies within NPS EN-5 relevant to Human Health.

Table 16.1: Summary of designated NPS EN-1 requirements relevant to this chapter

Summary of NPS Requirement	How and where considered in the ES
"4.3.1 All proposals for projects that are subject to the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations) must be accompanied by an Environmental Statement (ES) describing the aspects of the environment likely to be significantly affected by the project. *4.3.2 The Regulations specifically refer to effects on population, **human health**, biodiversity, land, soil, water, air, climate, the landscape, material assets and cultural heritage, and the interaction between them.* *4.3.3 The Regulations require an assessment of the **likely significant effects** of the proposed project on the environment, covering **the direct effects and any indirect, secondary, cumulative, transboundary, short, medium, and long-term, permanent and temporary, positive and negative effects at all stages of the project**, and also of the **measures envisaged for avoiding or mitigating significant adverse effects**."* (p. 59).	This chapter provides the health assessment. The effects to population health, including the potential for adverse effects and opportunities to enhance health and wellbeing, are considered in the assessment section, see **section 16.9**. Cumulative health effects are addressed in section 16.11. As per the scoping report, it was concluded that the Project is unlikely to have a significant effect either alone or cumulatively on the environment in a European Economic Area State (EEA states) and therefore a transboundary assessment is not proposed in the ES. Mitigation and enhancement measures adopted as part of the Project are discussed in **section 16.8**.
*"4.3.4 To consider the potential effects, including benefits, of a proposal for a project, **the applicant must** set out information on the likely significant **environmental**, social and economic effects of the development, and show how any likely significant negative effects would be avoided, **reduced**, mitigated or **compensated for, following the mitigation hierarchy**. This information could include matters such as […] **health and well-being**."* (p. 60)	The effects to population health, including the potential for adverse effects and opportunities to enhance health and wellbeing, are considered in the assessment section, see **section 16.9**. Well-being is an integral consideration throughout this chapter, reflecting that the WHO define health in terms of states of wellbeing.
*"4.4.1 **Energy infrastructure** has the potential to impact on the **health and well-being** ("health") of the population. Access to energy is clearly beneficial to society and to our **health** as a whole. However, **the construction of energy infrastructure** and the production, distribution and use of energy may have*	Open space, leisure and play, transport and traffic, air quality (including construction dust effects), noise and vibration and public understanding of EMF risk are considered in the assessment sections (see **section 16.9**). Physical activity is an important determinant of health. However, to avoid duplication this issue is addressed under 'open space, leisure and play' (see **section 16.9**).

Summary of NPS Requirement	How and where considered in the ES
*negative impacts on some people's **health**.* *4.4.2 The direct impacts on **health** may include increased traffic, air or water pollution, dust, odour, hazardous waste and substances, noise, exposure to radiation, and increases in pests.* *4.4.3 New energy infrastructure may also affect the composition and size of the local population, and in doing so have indirect **health impacts**, for example if it in some way affects access to key public services, transport, or the use of open space for recreation and physical activity."* (p. 63)	Issues relating to hazardous waste and substances are scoped out, see **section 16.4**. Water quality is scoped out, see section 16.4. Effects that could influence public open space, public rights of way (PRoW) and recreational activities are informed by Volume 1, Chapter 17: Agricultural Land Use and Public Rights of Way of the ES **[EN010147/APP/6.3]** and considered in **section 16.9**.
*"4.4.4 As described in the relevant sections of this NPS and in the technology specific NPSs, where the proposed project has an effect on **humans**, the ES should assess these effects for each element of the project, identifying any potential **adverse health impacts**, and identifying measures to avoid, reduce or compensate for these impacts as appropriate.* *4.4.5 The impacts of more than one development may affect people simultaneously, so the applicant should consider the **cumulative impact on health** in the ES where appropriate.* *4.4.6 Opportunities should be taken to mitigate indirect impacts, by promoting local improvements to encourage **health and wellbeing**, this includes potential impacts on vulnerable groups within society and impacts on those with protected characteristics under the Equality Act 2010, i.e. those groups which may be differentially impacted by a development compared to wider society as a whole."* (p. 63-64).	Relevant vulnerable population groups are considered within this assessment (**section 16.5**). Mitigation measures embedded into the Project are stated in **section 16.8**, and further mitigation and enhancement measures are discussed within each health determinant in **section 16.9**. Cumulative health effects are addressed in section 16.11.
*"4.12.2 Pollution control is concerned with preventing pollution through the use of measures to prohibit or limit the releases of substances to the environment from different sources to the lowest practicable level. It also ensures that **ambient air, water, and land quality** meet standards that guard against impacts to the environment or **human health**."* (p. 87).	Potential health effects relating to air quality are informed by Volume 1, Chapter 19: Air Quality of the ES **[EN010147/APP/6.3]** and assessed in **16.9**. Water quality and land quality are scoped out, see section 16.4.
"5.2.7 Proximity to emission sources can have significant impacts on sensitive receptor sites for air quality, such as education or healthcare sites, residential	Air quality health effects are informed by Volume 1, Chapter 19: Air Quality of the ES **[EN010147/APP/6.3]** and addressed in **section 16.9**.

Summary of NPS Requirement	How and where considered in the ES
use or sensitive or protected ecosystems." (p. 96).	
"5.11.6 The government's policy is to ensure there is adequate provision of high quality open space and sports and recreation facilities to meet the needs of local communities. ***Connecting people*** *with open spaces, sports and recreational facilities all help to underpin people's quality of life and have a vital role to play in* ***promoting healthy living****.* *5.11.7 Green and blue infrastructure can also enable developments to provide positive environmental, social,* ***health*** *and economic benefits."* (p. 148-149).	Population health effects of access to open space, leisure and play (including effects on PRoWs) are assessed within this chapter (see **section 16.9**, Open space, leisure and play). This has been informed by consultation with local health stakeholders and Volume 1, Chapter 8: Landscape and Visual Resources and Volume 1, Chapter 17: Agricultural Land Use and Public Rights of Way **[EN010147/APP/6.3]**. The health assessment has influenced the design of new PRoW provision and enhancements to existing routes.
"5.12.1 Excessive noise can have wide-ranging impacts on the ***quality of human life and health such as annoyance, sleep disturbance, cardiovascular disease and mental ill-health****. It can also have an impact on the environment and the use and enjoyment of areas of value such as quiet places and areas with high landscape quality."* (p. 154).	Potential health effects relating to noise and vibration are informed by Volume 1, Chapter 13: Noise and Vibration of the ES **[EN010147/APP/6.3]** and considered in **16.9**. Community identity, culture, resilience and influence are informed by Volume 1, Chapter 8: Landscape and Visual Resources of the ES **[EN010147/APP/6.3]** and considered in **16.9**.
"5.12.6 Where noise impacts are likely to arise from the proposed development, the applicant should include the following in the noise assessment: an assessment of the effect of predicted changes in the noise environment on any noise-sensitive receptors, including an assessment of any likely impact on ***health and quality of life*** */* ***well-being*** *where appropriate, particularly among those disadvantaged by other factors who are often disproportionately affected by noise-sensitive areas; all reasonable steps taken to mitigate and minimise potential adverse effects on health and quality of life."* (p. 155).	Potential health effects relating to noise and vibration are informed by Chapter 13: Noise and Vibration of the ES **[EN010147/APP/6.3]** and considered in assessments sections (see **16.9**). Relevant vulnerable population groups are considered within the assessment (see **section 16.5**).
"5.12.17 The Secretary of State should not grant development consent unless they are satisfied that the proposals will meet the following aims, through the effective management and control of noise: avoid significant ***adverse impacts on health and quality of life*** *from noise; mitigate and minimise other adverse* ***impacts on health and quality of life*** *from noise; where possible, contribute to* ***improvements to health and quality of life*** *through the effective management and control of noise."* (p. 158).	Potential health effects relating to noise and vibration are informed by Chapter 13: Noise and Vibration of the ES **[EN010147/APP/6.3]** and considered in **16.9**.

Summary of NPS Requirement	How and where considered in the ES
"5.16.2 During the construction, operation, and decommissioning phases, development can lead to increased demand for water, involve discharges to water, and cause adverse ecological effects resulting from physical modifications to the water environment. There may also be an increased risk of spills and leaks of pollutants to the water environment. These effects could lead to adverse ***impacts on health*** *or on protected species and habitats (see Section 4.3) and could result in surface waters, groundwaters or protected areas failing to meet environmental objectives established under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 and the Marine Strategy Regulations 2010."* (p. 166).	Water quality health effects are scoped out. See section 16.4.

Table 16.2: Summary of NPS-EN1 policy on decision making relevant to human health

Summary of NPS Requirement	How and where considered in the ES
"4.4.7 Generally, those aspects of energy infrastructure which are most likely to have a significantly detrimental impact on health are subject to separate regulation (for example for air pollution) which will constitute effective mitigation of them, so that it is unlikely that health concerns will either by themselves constitute a reason to refuse consent or require specific mitigation under the Planning Act 2008." (p. 64).	Impacts that are governed by separate regulation have been considered when scoping, see **section 16.4.** Where relevant the health assessment has regard to non-threshold effects that occur even below regulatory standards.
"4.4.8 However, ***not all potential sources of health impacts will be mitigated in this way and the Secretary of State may want to take account of health concerns*** *when setting requirements relating to a range of impacts such as noise."* (p. 64).	Addressed as above for paragraph 4.4.7 of the current EN-1.

Table 16.3: Summary of designated EN-3 requirements relevant to this chapter

Summary of NPS Requirement	How and where considered in the ES
"2.5.2 Proposals for renewable energy infrastructure should demonstrate ***good design, particularly in respect of***	The visual impact of the solar farm and substation on health effects are informed by Volume 1, Chapter 8: Landscape and Visual Resources of the ES **[EN010147/APP/6.3]** and considered in **section 16.9** of this chapter.

Summary of NPS Requirement	How and where considered in the ES
***landscape and visual amenity**, opportunities for co-existence/co-location with other marine and terrestrial uses, and in the design of the project **to mitigate impacts such as noise** and effects on ecology and heritage."* (p.15).	Health effects related to noise are informed by Volume 1, Chapter 13: Noise and Vibration of the ES **[EN010147/APP/6.3]** and considered in **section 16.9**.
*"2.10.32 Where sited on agricultural land, consideration may be given as to whether the proposal allows for **continued agricultural use** and/or can be co-located with other […] to maximise the efficiency of land use."* (p. 92).	The impacts of land-take, including on diet and nutrition, on population health are informed by Volume 1, Chapter 17: Agricultural Land Use and Public Rights of Way of the ES **[EN010147/APP/6.3]** and discussed in **section 16.9**.
*"2.9.32 Applications should include the full extent of the **access routes** necessary and an assessment of their effects."* (p. 84).	Health effects of provision of alternative space and access routes is informed by Volume 1, Chapter 12: Traffic and Transport of the ES **[EN010147/APP/6.3]** and discussed in **section 16.9**.
*"2.10.35 Applicants will need to consider the **suitability of the access routes** to the proposed site for both the construction and operation of the solar farm with the former likely to raise more issues."* (p. 92).	Health effects from changes to transport nature and flow rates are informed by Volume 1, Chapter 12: Traffic and Transport of the ES **[EN010147/APP/6.3]** and assessed in **section 16.9**.
"2.10.36 Given that potential solar farm sites are largely in rural areas, access for the delivery of solar arrays and associated infrastructure during construction can be a significant consideration for solar farm siting. *2.10.37 Developers will usually need to construct on-site access routes for operation and maintenance activities, such as **footpaths, earthworks, or landscaping**.* *2.10.38 In addition, sometimes **access routes** will need to be constructed to connect solar farms to the **public road network**."* (p. 93).	Health effects from changes to transport nature and flow rates are informed by Volume 1, Chapter 12: Traffic and Transport of the ES **[EN010147/APP/6.3]** and assessed in **16.9**[OB].
*"2.10.42 Applicants are encouraged to design the layout and appearance of the site to ensure continued **recreational***	Health effects from the provision of alternative space and access routes, including the enhancements to PRoWs and the creation of new permissive routes[1], is informed by Volume 1, Chapter 17: Agricultural Land Use and Public Rights of Way of the ES **[EN010147/APP/6.3]**

[1] A permissive path is a route which the landowner permits the public to use, with the intention that it should not become a public right of way.

Summary of NPS Requirement	How and where considered in the ES
use of public rights of way *where possible during construction, and in particular during operation of the site.* *2.10.43 Applicants are encouraged where possible to* ***minimise the visual impacts*** *of the development for those using existing public rights of way, considering the impacts this may have on any other visual amenities in the surrounding landscape.* *2.10.44 Applicants should consider and maximise opportunities to facilitate* ***enhancements to the public rights of way*** *and the inclusion, through site layout and design of access, of new opportunities for the public to access and cross proposed solar development sites (whether via the adoption of new public rights of way or the creation of permissive paths), taking into account, where appropriate, the views of landowners.* *2.10.45 Applicants should set out detail on how public rights of way would be managed to ensure they are safe to use in an outline Public Rights of Way Management Plan."* (p. 93-94).	and Volume 1, Chapter 8: Landscape and Visual Resources of the ES **[EN010147/APP/6.3]**, which is discussed in **section 16.9**.

Table 16.4: Summary of designated NPS EN-5 requirements relevant to this chapter

Summary of NPS Requirement	How and where considered in the ES
"2.9.9 New substations, sealing end compounds (including terminal towers), and other above-ground installations that serve as connection, switching, and voltage transformation points on the electricity network may also give rise to adverse landscape and visual impacts. *2.9.10 Cumulative adverse landscape, seascape and visual impacts may arise where new overhead lines are required along with other related developments such as substations, wind farms, and/or other new sources of generation."* (p. 18).	The visual impact of the Project on human health is informed by Volume 1, Chapter 8: Landscape and Visual Resources of the ES **[EN010147/APP/6.3]** and discussed in 16.9.

Summary of NPS Requirement	How and where considered in the ES
*"2.9.46 EMFs can have **both direct and indirect effects on human health**, aquatic and terrestrial organisms."* (p. 25). *"2.9.56 The balance of scientific evidence over several decades of research has not proven a causal link between EMFs and cancer or any other disease."* (p. 27).	This chapter considers public understanding of EMF exposure in terms of mental health outcomes associated with concern, acknowledging that actual risks are unlikely to be significant for public health (see **section 16.9**).
*"2.9.48 To prevent these known effects, the **International Commission on Non-Ionizing Radiation Protection (ICNIRP) developed health protection guidelines in 1998** for both public and occupational exposure[…]"* (p. 26).	As stated in **section 16.8**, the Project adopts the ICNIRP guidelines.
"2.9.51 The levels of EMFs produced by power lines in normal operation are usually considerably lower than the ICNIRP 1998 reference levels. For electricity substations, the EMFs close to the sites tend to be dictated by the overhead lines and cables entering the installation, not the equipment within the site." (p. 26).	This chapter notes the importance of providing the public with relevant non-technical information in order to mitigate against levels of concern about EMF, which could affect mental health.
"2.10.13 Where EMF exposure is within the relevant public exposure guidelines, re-routeing a proposed overhead line purely on the basis of EMF exposure or undergrounding a line solely to further reduce the level of EMF exposure are unlikely to be proportionate mitigation measures." (p. 30).	This chapter acknowledges the value of such information in reassuring the public that further design modification in relation to EMF would not be proportionate.
"2.11.9 The government has developed with the electricity industry a Code of Practice, 'Power Lines: Demonstrating compliance with EMF public exposure guidelines – a voluntary Code of Practice' […] that specifies the evidence acceptable to show compliance with ICNIRP 1998 guidelines." (p. 32)	As stated in **section 16.8**, the Project adopts the Power Lines: Demonstrating compliance with EMF public exposure guidelines – a voluntary Code of Practice.

The National Planning Policy Framework

16.2.6 The National Planning Policy Framework (NPPF) was published in 2012 and updated in 2018, 2019, 2021 and twice in 2023 (Department for Levelling Up, Housing & Communities, 2023). The NPPF sets out the Government's planning policies for England.

16.2.7 **Table 16.5** sets out a summary of the NPPF policies relevant to this chapter.

Table 16.5: Summary of NPPF requirements relevant to this chapter

Policy	Key Provisions	How and where considered in the ES
6. Building a strong, competitive economy	*"85. Planning policies and decisions should help create the conditions in which businesses can invest, expand and adapt. Significant weight should be placed on the need to support economic growth and productivity, taking into account both local business needs and wider opportunities for development."* (p.24)	Employment is informed by Volume 1, Chapter 15: Socio Economics of the ES **[EN010147/APP/6.3]** and considered within this chapter in **section 16.9.**
8. Promoting healthy and safe communities	*"96. Planning policies and decisions should aim to achieve healthy, inclusive and safe places which:* *a) promote social interaction, including opportunities for meetings between people who might not otherwise come into contact with each other – for example through… street layouts that allow for easy pedestrian and cycle connections;* *b) are safe and accessible, so that crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion – for example through the use of…pedestrian and cycle routes, and high quality public space; and* *c) enable and support healthy lifestyles, especially where this would address identified local health and well-being needs – for example through the provision of safe and accessible green infrastructure, sports facilities, local shops, access to healthier food, allotments and layouts that encourage walking and cycling."* (p. 28)	Wider societal benefits are addressed is **section 16.9**. Transport effects are informed by Volume 1, Chapter 12: Traffic and Transport of the ES **[EN010147/APP/6.3]** and considered in **section 16.9**. Effects relating to Open space and Recreation are informed by Volume 1, Chapter 8: Landscape and Visual Resources, Chapter 12: Traffic and Transport and Chapter 17: Agricultural Land Use and Public Rights of Way of the ES **[EN010147/APP/6.3]** and considered in **section 16.9**. This includes design features and PRoW enhancements (including greenways and new permissive paths) that encourage walking and cycling. The effects to population health, including the potential for adverse effects and opportunities to enhance health and wellbeing, are considered throughout **section 16.9**. Effects relating to diet and nutrition are informed by Volume 1, Chapter 17: Agricultural Land Use and Public Rights of Way of the ES **[EN010147/APP/6.3]** and discussed **16.9**[OBJ].

Policy	Key Provisions	How and where considered in the ES
9. Promoting transport	*"108. Transport issues should be considered from the earliest stages of plan-making and development proposals, so that:* *a) the potential impacts of development on transport networks can be addressed;* *b) opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised;* *c) opportunities to promote walking, cycling and public transport use are identified and pursued;* *d) the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account; and* *e) patterns of movement, streets, parking and other transport considerations are integral to the design of schemes, and contribute to making high quality places."* (p. 31).	Transport effects are informed by Volume 1, Chapter 12: Traffic and Transport of the ES **[EN010147/APP/6.3]** and considered in **16.9**. Effects relating to Open space and Recreation are informed by Volume 1, Chapter 8: Landscape and Visual Resources, Chapter 12: Traffic and Transport and Chapter 17: Agricultural Land Use and Public Rights of Way of the ES **[EN010147/APP/6.3]** and considered in **16.9**. This includes design features and PRoW enhancements (including greenways, upgrading of some existing route sections to cycling paths and new permissive paths) that encourage walking and cycling.
11. Making effective use of land	*"123. Planning policies and decisions should promote an effective use of land in meeting the need for homes and other uses, while safeguarding and improving the environment and ensuring safe and healthy living conditions..."* (p. 36).	The use of land for renewable electricity generation has been considered in the assessment (see **section 16.9**).
14. Meeting the challenge of climate change, flooding and coastal change	*"157. The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, support renewable and low carbon energy and associated infrastructure."* (p. 46)	Effects associated with climate change, informed by Volume 1, Chapter 14: Climate Change of the ES **[EN010147/APP/6.3]**, are scoped in. See **section 16.9**.

16.2.8 The National Planning Practice Guidance (PPG) (Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government, 2023) supports the NPPF and provides guidance across a range of topic areas, including 'healthy and safe communities'. As stated in the

NPPG, planning and health need to be considered firstly in terms of creating environments that support and encourage healthy lifestyles, and secondly in terms of healthcare capacity. In addition, we have undertaken consultation with the Oxfordshire County Council Public Health Team to ensure local public health strategies and priorities and any inequalities are considered appropriately. A summary of this consultation relevant is outlined in **Table 16.6.**

Local planning policy

16.2.9 The relevant local planning policies applicable to human health based on the extent of the study areas for this assessment are summarised in **Table 16.6**.

Table 16.6: Summary of local planning policy relevant to this chapter

Policy	Key Provisions	How and where considered in the ES
Cherwell Local Plan 2011-2031 (Part 1)		
Policy PSD 1: Presumption in Favour of Sustainable Development	The Council will always work proactively with applicants to jointly find solutions which mean that proposals can be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in the area.	Wider societal infrastructure and resources and climate change are informed by Volume 1, Chapter 15: Socio Economics of the ES **[EN010147/APP/6.3]** and Volume 1, Chapter 14: Climate Change of the ES **[EN010147/APP/6.3]**, and discussed in **section 16.9**.
West Oxfordshire Local Plan 2031		
Policy OS3: Prudent use of natural resources	All development proposals…will be required to show consideration of the efficient and prudent use and management of natural resources, including: making the most efficient use of land…whilst having regard to the character of the locality.	Land use is an influential wider determinant of population health. The use of land for renewable electricity generation has been considered in the assessment, see **section 16.9**.
Policy T1: Sustainable transport	Priority will be given to locating new development…where the need to travel by private car can be minimised, due to opportunities for walking, cycling and the use of public transport, particularly where this would help to reduce traffic congestion on the routes.	Active travel is an influential wider determinant of population health. Transport effects are informed by Volume 1, Chapter 12: Traffic and Transport of the ES **[EN010147/APP/6.3]** and considered in **section 16.9**.
Policy T3: Public Transport, walking and cycling	New development will be located and designed to maximise opportunities for walking, cycling and the use of public transport. Where opportunities for walking, cycling and using public transport are…limited, other measures will be sought to help	Active travel is an influential wider determinant of population health. Transport effects are informed by Volume 1, Chapter 12: Traffic and Transport of the ES **[EN010147/APP/6.3]** and considered in **section 16.9.**

Policy	Key Provisions	How and where considered in the ES
	reduce car use as appropriate (e.g., measures to promote home working). New development will be expected to contribute towards the provision of new and/or enhanced public transport, walking and cycling infrastructure to…promote healthier lifestyles with particular regard to be given to safe and convenient routes to school.	
Policy EH5: Sport, recreation and children's play	New development should not result in the loss of open space, sports and recreational buildings and land unless up to date assessment shows the asset is surplus to requirements or the need for and benefits of the alternative land use clearly outweigh the loss and equivalent replacement provision is made. Where appropriate, development will be expected to provide or contribute towards the provision of necessary improvements to open space, sports and recreational buildings and land.	Open space, leisure and play are influential wider determinants of population health. Effects that could influence public open spaces, PRoW and recreational activities are informed by Volume 1, Chapter 12: Traffic and Transport of the ES **[EN010147/APP/6.3]** and discussed in **section 16.9**.
Policy EH6: Decentralised or low carbon energy development (excepting wind turbines)	Renewable or low-carbon energy development should be located and designed to minimise any adverse impacts, with particular regard to conserving the District's high valued landscape and historic environment. …the following local issues will need to be considered and satisfactorily addressed: • impacts on landscape, historic environment, agricultural land, residential amenity, highway safety and fuel/energy security, including their cumulative and visual impacts. • potential benefits to host communities (including job creation and income generation).	Climate change effects relevant to human health are informed by Volume 1, Chapter 14: Climate Change of the ES **[EN010147/APP/6.3]** and considered in **section 16.9**. Transport effects relevant to human health are informed by Volume 1, Chapter 12: Traffic and Transport of the ES **[EN010147/APP/6.3]** and addressed in **section 16.9**. Community identity is an influential wider determinant of population health. The visual impact of the Project is informed by Volume 1, Chapter 8: Landscape and Visual Resources of the ES **[EN010147/APP/6.3]** and discussed in **section 16.9**. Employment effects relevant to human health are informed by Volume 1, Chapter 15: Socio Economics of the ES **[EN010147/APP/6.3]** and considered in **section 16.9**.

Policy	Key Provisions	How and where considered in the ES
		Cumulative human health effects of the Project are considered in **section 16.11**.
Policy EH8: Environmental protection	The air quality within West Oxfordshire will be managed and improved in line with National Air Quality Standards, the principles of best practice and the Air Quality Management Area Action Plans for Witney and Chipping Norton. Where appropriate, developments will need to be supported by an air quality assessment. Noise sensitive development should not take place in areas where the occupants would experience significant noise disturbance from existing or proposed development. New development should not take place in areas where it would cause unacceptable nuisance to the occupants of nearby land and buildings from noise or disturbance.	Health effects from changes to air quality are informed by Volume 1, Chapter 19: Air Quality of the ES **[EN010147/APP/6.3]** and assessed in **section 16.9**. Potential health effects related to noise and vibration are informed by Volume 1, Chapter 13: Noise and vibration of the ES **[EN010147/APP/6.3]** and considered in **section 16.9**.
Vale of White Horse Local Plan 2031		
Core Policy 33: Promoting Sustainable Transport and Accessibility	The Council will work…to: ensure that the impacts of new development on the strategic and local road network are minimised; ensure that developments are designed in a way to promote sustainable transport access; support improvements for accessing Oxford; ensure that transport improvements are designed to minimise any effects on the amenities, character and special qualities of the surrounding area; and promote and support improvements to the transport network that increase safety, improve air quality and/or make our towns and villages more attractive.	Transport modes, access and connections are influential wider determinants of population health. Health effects from changes to transport are informed by Volume 1, Chapter 12: Traffic and Transport of the ES **[EN010147/APP/6.3]** and addressed in **section 16.9**.
Core Policy 35: Promoting Public Transport, Cycling and Walking	The Council will work…to: encourage the use of sustainable modes of transport and support measures that enable a shift to public transport, cycling and walking; ensure new	Active travel is an influential wider determinant of population health. Health effects from changes to transport are informed by Volume 1, Chapter 12: Traffic and Transport of

Policy	Key Provisions	How and where considered in the ES
	development is located close to, or along, existing strategic public transport corridors; ensure that new development is designed to encourage walking as the preferred means of transport; ensure that new development encourages and enables cycling seek to support the provision of new cycling routes; ensure proposals for major development are supported by a Transport Assessment and Travel Plan; and ensure adequate parking is delivered on new developments in accordance with Oxfordshire County Council's published standards	the ES **[EN010147/APP/6.3]** and addressed in **section 16.9**.
Core Policy 41: Renewable Energy (excluding wind energy)	The Council encourages schemes for renewable and low carbon energy generation. Planning applications for renewable and low carbon energy generation will be supported, provided that they do not cause a significantly adverse effect to landscape…biodiversity…the historic environment, the visual amenity…local residential amenity, and the safe movement of traffic and pedestrians.	Community identity is an influential wider determinant of population health. The visual impact of the Project on community identity is informed by Volume 1, Chapter 8: Landscape and Visual Resources of the ES **[EN010147/APP/6.3]** and discussed in **section 16.9**. Health effects from changes to transport modes, access and connection are informed by Volume 1, Chapter 12: Traffic and Transport of the ES **[EN010147/APP/6.3]** and addressed in **section 16.9**.

Local Health Priorities

16.2.10 In meeting the requirements of a comprehensive HIA delivered by this chapter specific regard has been given to local health priorities and evidence.

Joint Strategic Needs Assessment 2024

16.2.11 The JSNA for Oxfordshire County Council identifies six priority areas (see **section 16.6**) (Oxfordshire County Council 2024a).

16.2.12 The Oxfordshire Health and Wellbeing Strategy 2024-2030 (Oxfordshire County Council, 2024b) 10 priorities built around a "life course approach" to wellbeing. These 10 priorities are centred on starting well, living well and ageing well.

- Priority 1: The best start in life, all children in Oxfordshire should experience a healthy start to life and be ready for school, especially in most deprived communities.

- Priority 2: Children and young people's emotional wellbeing and mental health, more children and young people in Oxfordshire should experience good mental health and emotional wellbeing.
- Priority 3: Healthy people and healthy places, the length and quality of people's lives in Oxfordshire should not be negatively impacted by exposure to tobacco, alcohol, or unhealthy weight. People in Oxfordshire should live in healthy environments where they can thrive free from these harms.
- Priority 4: Physical activity and active travel, residents of Oxfordshire should be able to remain active throughout their lives, especially in our most deprived areas
- Priority 5: Maintain independence, provide support more older residents to remain independent and healthy, for longer and ensuring they are always treated with dignity and are fully valued.
- Priority 6: Strong social relationships, everyone in Oxfordshire should be able to flourish by building, maintaining, and re-establishing strong social relationships. The aim is to reduce levels of loneliness and social isolation, especially in rural areas.
- Priority 7: Financial wellbeing and healthy jobs, all of Oxfordshire's people should have good living standards and financial wellbeing. The local economy should be inclusive, equitable, and fair and everyone should be able to contribute through life-long learning and good quality and stable work.
- Priority 8: Climate change and health, the health and care system in Oxfordshire should take action to reduce climate change and the impacts of climate change on people's health.
- Priority 9: Healthy homes, everyone should have access to quality, affordable, and energy efficient homes which support their health and wellbeing. Social, private rented, and new build homes should be of a good material standard and maintained to prevent health issues.
- Priority 10: Thriving communities, the aim is to provide support and enable all communities to play their key role delivering better health and wellbeing for people across Oxfordshire.

16.2.13 All these priorities are important and have informed this assessment but for this Project the most relevant are Priority 4 in terms of active travel opportunity and Priority 8 in terms of taking action to reduce climate change.

Woodstock Neighbourhood Plan 2020 – 2031

16.2.14 The neighbourhood plan (Woodstock Town Council, 2023)notes the importance of green space with guidance from National Policy including the NPPF and the NPPG in improving economic growth and regeneration, reinforcing and enhancing local landscape character and contributing to a sense of place. It can also help to improve the health and well-being of a community, providing opportunities for residents and visitors to exercise, interact with one another experience nature, get involved in their community

through activities like food growing and gardening, all of which bring physical and mental health benefits.

16.2.15 The neighbourhood plan notes that most of the open space in Woodstock is dominated by institutional sports grounds, consequently, leaving very little public open space in Woodstock.

Oxfordshire County Council Outcomes Framework 2022 – 2023

16.2.16 This assessment has also been informed by the OCC Outcomes Framework (Oxfordshire County Council, 2022). The framework identifies strategic priorities and measures to improve health and outcomes in the County which are listed below:

- Put action to address the climate emergency at the heart of our work. This includes supporting and promoting a shift towards active travel (walking, cycling and use of public transport), reducing the need for private cars across the county and building a greener, more resilient, fairer renewable energy network.
- Tackle inequalities in Oxfordshire- this includes creating a more inclusive and sustainable Oxfordshire through addressing the drivers and impact of disadvantage and working with the communities most at risk of poor health to improve local residents' health, gathering insight to understand the causes of poor health and developing funded action plans.
- Prioritise the health and wellbeing of residents including promoting better mental wellbeing across the whole life-course and preventing self-harm and suicide.
- Support carers and the social care system including focusing resources on areas of high deprivation to tackle social isolation and reduce health inequalities.
- Invest in an inclusive, integrated and sustainable transport network- Prioritise active travel and public transport interventions on the existing and planned highway network to support healthy lifestyles and address inequalities in transport.
- Preserve and improve access to nature and green spaces including to improve the amount and distribution of accessible and safe natural green space within Oxfordshire and ensuring public rights of way network are safe and effectively maintained.
- Create opportunities for children and young people to reach their full potential including to support the emotional mental health and wellbeing of children and young people by increasing the number of interventions in schools and places which young people frequent.

Director of Public Health annual report on Climate Change 2023-24

16.2.17 The OCC Director of Public Health annual report on climate change (DPH report) (Oxfordshire County Council, 2023) has also been considered in this assessment. Overall, the report highlights the health co-benefits of climate

action in Oxfordshire County. There are efforts to promote active, more sustainable travel across the Oxfordshire County.

16.2.18 These initiatives have benefits for both physical and mental health, directly through increased physical activity and indirectly through cleaner, less polluted air. The DPH report recognises the importance of greener neighbourhoods and exposure to green space including better self-assessed general and mental health; reduced all cause and cardiovascular mortality; reduced stress; reduced incidence of low birth weight and healthier weight.

16.2.19 Food and nutrition are also implicitly linked to health. The DPH report notes the importance of accessible, healthy and sustainable food in reducing the burden of cardiovascular disease, type 2 diabetes and several cancers. As highlighted in the report, one third of children in year 6 in Oxfordshire are identified as overweight with the burden of obesity being higher in the most deprived wards of the county.

16.3 Consultation and Engagement

16.3.1 The consultation and engagement processes for the Project relevant to human health are outlined in Volume 3, Appendix 16.1: Human Health Consultation and Engagement **[EN010147/APP/6.5]**, in accordance with the Planning Act 2008 and the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

16.3.2 The consultation process ensures that key stakeholders, including local communities, statutory consultees and relevant agencies, were engaged throughout the pre-application phase. Responses from the following consultations are reported in Volume 3, Appendix 16.1: Human Health Consultation and Engagement **[EN010147/APP/6.5]**:

- Scoping Opinion;
- Statutory consultation
  - Section 42 consultation with statutory consultees
  - Section 47 consultation with the local community
- Additional consultation with the OCC public health team.

16.3.3 Volume 3, Appendix 16.1: Human Health Consultation and Engagement **[EN010147/APP/6.5]** also provides a record of issues that have been scoped out of the health assessment. These were set out in the Scoping Report and agreed in the Scoping Opinion.

16.3.4 Additional detail on the Project consultation that has informed the health assessment is set out in the Consultation Report EN010147/APP/5.1.

16.4 Assessment Methodology

Relevant Guidance

16.4.1 The Human Health chapter has followed the guidance set out in Volume 1, Chapter 4: Approach to Environmental Assessment. Specific to human health impact assessment, the following guidance documents have also been considered:

- Institute of Environmental Management and Assessment (IEMA) 2022 guidance on health in EIA series: effective scoping (Pyper, Lamming, et al., 2022) and determining significance (Pyper, Waples, et al., 2022).
- The Oxfordshire Health Impact Assessment Toolkit (Oxfordshire County Council, 2021).
- Institute of Public Health (IPH) Guidance, Standalone Health Impact Assessment and health in environmental assessment, 2021 (Institute of Public Health, 2021).
- International Association for Impact Assessment (IAIA) and European Public Health Association. A reference paper on addressing Human Health in EIA (Cave et al., 2020) and academic discussion of the same (Cave et al., 2021).
- Public Health England. Advice on the content of Environmental Statements accompanying an application under the Nationally Significant Infrastructure Planning (NSIP) Regime (Public Health England, 2021).
- Public Health England, Health Impact Assessment in spatial planning (Public Health England, 2020).
- World Health Organisation (WHO) guidelines on air quality and noise (Berglund et al., 1999; Guski et al., 2017; WHO, 2009; World Health Organization, 2021).

Scope of the Assessment

16.4.2 The scope of this ES has been developed in consultation with relevant statutory and non-statutory consultees as detailed in Volume 3, Appendix 16.1: Human Health Consultation and Engagement **[EN01047/APP/6.5].**

16.4.3 The Scoping Report and Scoping Opinion provide a comprehensive justification for the scoping of determinants in and out of the assessment. The determinants scoped in are listed below and assessed in **section 16.9**:

- Diet and nutrition
- Open space, leisure and play (including physical activity)
- Transport modes, access and connections
- Community identity, culture, resilience and influence
- Education and training
- Employment and income

- Climate change and adaptation
- Air quality
- Noise and vibration
- Public under
- Wider societal infrastructure and resources

16.4.4 Effects which are not considered likely to be significant have been scoped out of the assessment. The justification for these scoping decisions is set out in Volume 3, Appendix 16.1: Human Health Consultation and Engagement **[EN010147/APP/6.5]**.

Study area

16.4.5 The Project will be located in the county of Oxfordshire, across an area of approximately 1,400 ha. The Project extends from an area of land in the north, situated between the A4260 and the Dorn River Valley near Tackley and Wootton, through a central section, situated broadly between Bladon and Cassington, and connecting to a section further south near to Farmoor Reservoir and north of Cumnor, where the Project will connect to the National Grid transmission network. The name 'Botley West' is derived from the location of the grid connection point.

16.4.6 The Project lies within the administrative areas of Cherwell (CDC), West Oxfordshire (WODC) and Vale of White Horse (VWHDC) District Councils, and Oxfordshire County Council (OCC). The majority of the Project lies within West Oxfordshire.

16.4.7 The human health study area has been defined on the basis of relevant human populations that may be affected directly or indirectly by the Project.

16.4.8 As study areas do not necessarily define the boundaries of potential health effects, particularly mental health effects, the health chapter uses study areas to broadly define representative population groups, including in relation to sensitivity, rather than to set boundaries on the extent of potential effects. The human health study areas represent the locations that would drive any likely significant population health effect, i.e. where the great majority of the impact is anticipated to occur. Any effects beyond these study areas would not change the conclusions reached in relation to the likely significant population health effects of the Project.

16.4.9 The health assessment has regard to the zones of influence defined by other ES chapters. Those chapters provide data inputs to the health assessment. Those zones of influence are relevant and inform the health chapter's consideration of effect magnitude.

16.4.10 The following study areas are used in the assessment:

- The site specific population is defined using the following wards[2]:
  - For the arrays and cable corridor a '5 ward area' is identified:
    - E05006646 Stonesfield and Tackley
    - E05006653 Woodstock and Bladon
    - E05010933 Kidlington West
    - E05006639 Eynsham and Cassington (representative of higher (worse) community deprivation)
    - E05006640 Freeland and Hanborough
  - For the substation:
    - E05011714 Cumnor
- The local population is defined using the district areas of:
  - Cherwell and West Oxfordshire (for the arrays and cable corridors)
  - Vale of White Horse (for the substation)
- The regional population is defined using the area of the South East.
- The national areas are England, the wider UK for benefits of electricity input to the national grid and the global population for climate related effects.

16.4.11 The site specific and local study areas are illustrated in Volume 2 Figure 16.1: Human Health Study Area **[EN010147/APP/6.4]**.

Methodology for Baseline Studies

Desk studies

16.4.12 Information on human health and wellbeing within the study area has been collected through a detailed review of existing studies and datasets. These are summarised in Table 16.7.

Table 16.7: Summary of desk study sources used

Title	Source	Year	Author	Date Accessed
Small area health mapping	Local Health	2011-2024	Office of Health Improvement and Disparities (OHID)	03 May 2024
Public Health indicators, England	Fingertip's resource	2011-2024	OHID	03 May 2024
Small area deprivation mapping	Index Of Multiple Deprivation	2019	Department for Levelling Up, Housing & Communities	03 May 2024

[2] Only a small area of Launton and Otmoor ward is affected by the project. Relevant baseline data for Woodstock and Bladon ward is considered sufficiently indicative of the part of the population of Launton and Otmoor ward that may be affected by the Project. High sensitivity is assumed for the vulnerable group population in the relevant part of Launton and Otmoor ward.

Title	Source	Year	Author	Date Accessed
Joint Strategic Needs Assessment	Oxfordshire Health and Wellbeing Board	2023	Oxfordshire County Council	03 May 2024
Oxfordshire Insights	Oxfordshire County Council	2024	Oxfordshire County Council	03 May 2024

16.5 Assessment Criteria and Assignment of Significance

Overview

16.5.1 The significance of an effect is an evidence-based professional judgement informed by the sensitivity of a receptor and the magnitude of an impact. This section describes the criteria applied in this chapter to characterise the sensitivity of receptors and magnitude of potential impacts. The terms used to define magnitude and sensitivity are based on IEMA Guidance (Pyper, Waples, et al., 2022).

16.5.2 Judgments are based on most relevant criteria in Table 16.9, Table 16.10 and Table 16.11. These are as set out by the IEMA guidance (Pyper, Waples, et al., 2022). It is likely in any given analysis that some criteria will span score categories.

Receptor Sensitivity

16.5.3 The criteria for defining sensitivity in this chapter are outlined in **Table 16.8** below.

Table 16.8: Definition of terms relating to the sensitivity of the receptor [emphasis added based on IEMA Guidance]

Sensitivity	Indicative criteria
High	**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	**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	**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	**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

Sensitivity	Indicative criteria
	independent (not a carer or dependant); people with **good** health status; and/or people with a **very high** capacity to adapt.

Magnitude of impact

16.5.4 The criteria for defining magnitude in this chapter are outlined in **Table 16.9** below.

Table 16.9: Impact magnitude criteria

Magnitude of impact	Indicative criteria
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.

Significance of effect

16.5.5 The significance of the effect upon human health has been determined by correlating the sensitivity of the receptor and the magnitude of the impact. The particular method employed for this assessment is presented in **Table 16.10**. Where a range of significance levels is presented, the final assessment for each effect is based upon expert judgement.

16.5.6 In all cases, the evaluation of receptor sensitivity, impact magnitude and significance of effect has been informed by professional judgement and is underpinned by narrative to explain the conclusions reached.

16.5.7 For the purpose of this assessment, any effects with a significance level of minor or less are not considered to be significant in terms of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

Table 16.10: Matrix used for the assessment of significance of the effect

Sensitivity of Receptor	Magnitude of Impact			
	Negligible	Low	Medium	High
Very Low	Negligible	Negligible	Negligible or Minor	Minor
Low	Negligible	Minor	Minor	Minor or Moderate
Medium	Negligible or Minor	Minor	Moderate	Moderate or Major
High	Negligible or Minor	Minor or Moderate	Moderate or Major	Major

16.5.8 The IEMA guidance requires that the conclusions, reached using sensitivity and magnitude, are then explained for the public health audience with a suitable concise narrative. The narrative summarises key considerations and supporting evidence. The guidance sets out the criteria for doing so, see **Table 16.11**.

Table 16.11: Explanation of Population Health Significance

Level	Indicative criteria
Major (significant)	The narrative explains that this is significant for public health because: • Changes, due to the project, have a **substantial** effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size (magnitude and sensitivity scores), and as informed by consultation themes among stakeholders, particularly public health stakeholders, that show **consensus** on the importance of the effect. • Change, due to the project, could result in a regulatory threshold or statutory standard being **crossed** (if applicable). • There is likely to be a **substantial** change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is a **causal relationship** between changes that would result from the project and changes to health outcomes. • In addition, health priorities for the relevant study area are of **specific relevance** to the determinant of health or population group affected by the project.
Moderate (significant)	The narrative explains that this is significant for public health because: • Changes, due to the project, have an **influential** effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size, and as informed by consultation themes among stakeholders, which may show **mixed** views. • Change, due to the project, could result in a regulatory threshold or statutory standard being **approached** (if applicable). • There is likely to be a **small** change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is a **clear** relationship between changes that would result from the project and changes to health outcomes.

Level	Indicative criteria
	• In addition, health priorities for the relevant study area are of **general relevance** to the determinant of health or population group affected by the project.
Minor (not significant)	The narrative explains that this is not significant for public health because: • Changes, due to the project, have a **marginal** effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size of limited policy influence and/or that **no relevant consultation themes** emerge among stakeholders. • Change, due to the project, would be **well within** a regulatory threshold or statutory standard (if applicable); but could result in a guideline being crossed (if applicable). • There is likely to be a **slight** change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is only a **suggestive relationship** between changes that would result from the project and changes to health outcomes. • In addition, health priorities for the relevant study area are of **low relevance** to the determinant of health or population group affected by the project.
Negligible (not significant)	The narrative explains that this is not significant for public health because: • Changes, due to the project, are **not related** to the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size or lack of relevant policy, and as informed by the project having **no responses** on this issue among stakeholders. • Change, due to the project, would **not affect** a regulatory threshold, statutory standard or guideline (if applicable). • There is likely to be a **very limited** change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is an **unsupported relationship** between changes that would result from the project and changes to health outcomes. • In addition, health priorities for the relevant study area are **not relevant** to the determinant of health or population group affected by the project.

16.5.9 The temporal scope of this chapter used the following summary terms:

- ‘Very short term’ relates to effects measured in hours, days or weeks
- ‘Short term’ relates to effects measured in months (up to 23 months duration)
- ‘Medium term’ relates to effects measured in years (2 years and more)
- ‘Long term’ relates to effects measured in decades (10 years or more).

16.5.10 Health and wellbeing are influenced by a range of factors, termed the ’wider determinants of health’ (Dahlgren & Whitehead, 1991). Determinants of health span environmental, social, behavioural, economic and institutional factors. Determinants therefore reflect a mix of influences from society and environment on population and individual health.

16.5.11 Impacts of the Project that result in a change in determinants have the potential to cause beneficial or adverse effects on health, either directly or indirectly. The degree to which these determinants influence health varies, given the degree of personal choice, location, mobility, and exposure.

16.5.12 A change in a determinant of health affects does not equate directly to a change in population health. Rather the change in a determinant alters risk factors for certain health outcomes. The assessment considers the degree and distribution of change in these pathways. The analysis of health pathways focuses on the risk factors and health outcomes that are most relevant to the determinants of health affected by the Project. As there are both complex and wide-ranging links between determinants of health, risk factors and health outcomes, it would not be proportionate or informative for an assessment to consider every interaction.

16.5.13 Typically, the change in a risk factor may need to be large, sustained and widespread within a population for there to be a significant influence on public health outcomes (Pyper, Waples, et al., 2022).

16.5.14 Following IEMA guidance (Pyper, Lamming, et al., 2022), regard has been given to a range of health determinants and have been scoped in or out based on relevance. The list of issues scoped into the assessment and justification for their inclusion is reported in **section 16.4, Scope of the Assessment**. The issues scoped out of the assessment including justification, is reported in Table 1.5 of Volume 3, Appendix 16.1: Human Health Consultation and Engagement.

Vulnerable groups

16.5.15 Of the vulnerable population groups identified in IEMA guidance (Pyper, Lamming, et al., 2022), the following relevant groups are considered within the assessment. People falling into more than one group may be especially sensitive:

- Young age: Children and young people (including pregnant women and unborn children).
- Low income: People on low income, who are economically inactive or unemployed/workless.
- Poor health: People with existing poor health; those with existing long-term physical or mental health conditions or disability that substantially affects their ability to carry out normal day-to-day activities.
- Social disadvantage: People who suffer discrimination or other social disadvantage, including relevant protected characteristics under the Equality Act 2010 or groups who may experience low social status or social isolation for other reasons.
- Access and geographical factors: People experiencing barriers in access to services, amenities and facilities and people living in areas known to exhibit high deprivation or poor economic and/or health indicators.

16.5.16 The following characterisations of how the general population may differ from vulnerable group populations were considered when scoring sensitivity:

- Heightened vulnerability is rarely due to a single cause and people may experience multiple forms of vulnerability due to intersecting social processes that result from inequalities (e.g., socioeconomic status and income).
- As all development has the potential for adverse effects to some particularly vulnerable individuals, the role of EIA significance conclusions is not to set a threshold of 'no harm' from development, but to show where, at a population level, the harm should weigh strongly in the balance alongside the development's benefits for health and other outcomes.
- In some situations, an effect may only be relevant to a few individuals, indicating that a population health effect would not occur. As stated by guidance: *"Where the effect is best characterised as only affecting a few individuals, this may indicate that a population health effect would not occur. Such individuals should still be the subject of mitigation and discussion, but in EIA and public health terms the effect may not be a significant population health change"* (Pyper, Waples, et al., 2022).

16.5.17 The assessment covers these populations within two groups. The general population for the geographical area, notably local residents, and the vulnerable group population for the area. The latter is a sub-population comprised of the vulnerabilities listed above. The differentiation of these two groups allows a discussion of any potentially significant health inequalities and the targeting of any mitigation.

16.5.18 For the purposes of the assessment the sensitivity score of the vulnerable group population is used to ensure that the potential for health inequalities is taken into account in the population health significance conclusions.

16.5.19 The vulnerable groups identified above (**paragraph 16.5.15**) align with priority areas identified by the JSNA (see section 16.6).

16.5.20 The following establishments in the site specific population study area (see section 16.4, Study area) have been identified as facilities associated with relevant vulnerable groups, and effects to them have been taken into account:

- Schools:
  - Botley School
  - North Hinksey Primary School
  - Matthew Arnold School
  - St. Edward's School
  - St. Frideswide CE Primary School
  - Marlborough C of E School
  - Wootton By Woodstock Primary School
  - Bladon C of E Primary School
  - Eynsham Primary School
  - Woodstock C of E School

  - LVS Oxford Special Needs School
  - Church Hanborough School
- Nursing Homes
  - Green Gates Nursing Home
  - Lake House Residential Care Home
  - Oxford Beaumont Care Community
  - Chilterns Court Care Centre
  - OSJCT Spencer Court
- Healthcare Facilities
  - Botley Medical Centre
  - North Hinksey Surgery
  - Jericho Health Centre
  - Kennington Health Centre
  - Nuffield Health The Manor Hospital
- Other Vulnerable Populations
  - Age UK Oxfordshire
  - Donnington Doorstep Family Centre
  - Oxfordshire Mind
  - Oxfordshire Young Carers Service
  - Oxfordshire Homeless Pathways
  - North Oxfordshire Crematorium
  - Woodstock Lawn Cemetery

16.5.21 The most relevant receptors in close proximity to Project are:

- Botley School
- North Hinksey Primary School
- Matthew Arnold School
- Botley Medical Centre
- North Hinksey Surgery
- Green Gates Nursing Home
- Oxford Beaumont Care Community
- LVS Oxford Special Needs School

16.5.22 Other facilities such as St. Edward's School, Lake House Residential Care Home, and Nuffield Health The Manor Hospital are further away from the immediate vicinity of Botley West Solar Farm.

Assumptions and limitations of the assessment

16.5.23 This assessment is based on publicly available statistics and evidence sources. No new primary research or bespoke analysis of non-public data was undertaken for the assessment.

16.5.24 The health assessment partially draws from and build upon, the technical outputs from inter-related technical disciplines set out in paragraph 16.1.13.

16.5.25 As a consequence, the assumptions and limitations of those assessments also apply to any information used in this chapter. It is, however, considered that the information available provides a suitable basis for assessment.

16.5.26 Whilst not all uncertainty can be removed, the following steps have been taken to allow confidence in the health assessment conclusions:

- Methods are used that triangulate evidence sources and professional perspectives.
- The scientific literature reviews undertaken give priority to high quality study design, such as systematic reviews and meta-analysis, and strength of evidence.
- Quantitative inputs for other assessments have been used, which included model validation, as described in other chapters.
- The health assessment has been cautious, with conservative assessments, for example in taking account of non-threshold effects and vulnerable group findings.
- The need for monitoring and adaptive management has been considered.
- The health assessment has been transparent in its analysis and follows good practice.

16.5.27 It is also noted that a number of assumptions have been made on the required workforce of the Project which are detailed in Volume 1, Chapter 15: Socio-economics.

16.5.28 Regarding the application of the precautionary principle in public health, this is discussed by the WHO (WHO, 2004) . The WHO note how the precautionary principle is a two-stage test, requiring both uncertainty and serious threats to health, i.e. large effect sizes indicated by available evidence. The WHO describe health impact assessments (such as this health assessment) as a “compass to guide public health decisions under uncertainty” and that “a centrepiece of precautionary assessment is environment and health assessment, which weighs the science of hazards and exposure. In this step, evidence of risk and uncertainty is examined to determine the possibility (and plausibility) of a significant health threat and the need for precautionary action.” Such an approach has been taken by this health assessment, which considers levels of exposure, extent of the population exposed and the scale of change in relevant risk factors for health outcomes.

16.6 Baseline Environment Conditions

16.6.1 Different communities have varying susceptibilities to health impacts and benefits as a result of social and demographic structure, behaviour and relative economic circumstances. The aim of the following information is primarily to put into context the local health circumstances of the communities surrounding the Project site, drawing from available statistics.

16.6.2 Where possible, information has been collected for the 'site specific study area' comprising of the 6 wards described in **section 16.4**. Where ward level data is not available, local authority data describing the 'local population' has been used to compare with the national average.

16.6.3 Volume 3, Appendix 16.3: Community Health Profile **[EN010147/APP/6.5]** provides additional baseline health information at the community level that has been taken into account.

Population Profile

Table 16.12: Site specific and local population profiles compared against regional and national

Population	Site specific	Local			County	Region	National
Indicator Name	**6 wards**	**West Oxfordshire**	**Cherwell**	**Vale of White Horse**	**Oxfordshire**	**South-East**	**England**
Sex							
Male	48.6	49.1	49.6	49.6	49.4	48.9	51.0
Female	51.4	50.9	50.4	50.4	50.6	51.1	49.0
Age							
aged 0 to 15	17.3	17.9	18.9	19.1	18.0	18.6	18.5
aged16 to 64	58.5	60.5	63.7	61.2	64.1	62.0	62.9
aged 65 and over	24.1	21.7	17.4	19.8	17.9	19.4	18.6
Long term health problem or disability							
Disabled under the Equality Act: Day-to-day activities limited a lot or little	14.5	15.1	14.5	14.7	14.5	16.1	17.3
Not disabled under the Equality Act: Has long term physical or mental health condition but day-to-day activities are not limited	8.2	8.2	7.6	8.2	7.9	7.5	6.8
Not disabled under the Equality Act: No long term physical or mental health conditions	77.3	76.7	77.9	77.1	77.6	76.3	75.9
Lower Income							
Income Deprivation	4.7	5.9	7.6	5.7	6.9	9.1	12.9
Language proficiency							

Population	Site specific	Local			County	Region	National
Indicator Name	**6 wards**	**West Oxfordshire**	**Cherwell**	**Vale of White Horse**	**Oxfordshire**	**South-East**	**England**
Population who cannot speak English well or at all	0.5	0.4	1.1	0.4	0.9	0.9	1.7
Ethnicity							
Asian, Asian British or Asian Welsh	3.5	1.7	6.0	4.0	6.4	7.0	9.6
Black, Black British, Black Welsh, Caribbean or African	1.0	0.6	1.8	1.7	2.1	2.4	4.2
Mixed or Multiple Ethnic groups	2.5	1.9	2.9	2.5	3.1	2.8	3.0
White	91.8	95.2	88.1	90.8	86.9	86.3	81.0
Other ethnic group	1.1	0.6	1.3	1.1	1.6	1.5	2.2

16.6.4 The site specific population has a proportion of people aged 0-15 years of 17.3% which is lower than the regional average of 18.6% and the national average of 18.5%. For the working age group, the 6-ward site specific population has a proportion of 58.5% which is lower than the regional average of 62.0% and the national average of 62.9%. The 6-ward site specific population has a proportion of people who are aged 65 and over of 24.1% which is higher than the regional average of 19.4% and the national average of 18.6%.

16.6.5 The majority of the site specific population reported no disability or long-term condition. The site specific population has a proportion of people with no disability or long-term condition of 69.8% which is slightly higher than the regional average of 76.3% and the national average of 75.9%. The site specific population has a proportion of disabled people who are limited in their day to day activities of 14.5% which is lower than the regional average of 16.1% and the national average of 17.3%. Of those who are not disabled but reported a long-term condition which does not limit them, the site specific population has a proportion of 8.2% which is slightly higher than the regional average of 7.5% and the national average of 6.8%.

16.6.6 Income deprivation is notably lower in the site specific population as compared to the national average. The site specific population has a proportion of people in income deprivation of 4.7% which is lower than the regional average of 9.1% and the national average of 12.9%.

16.6.7 Considering language proficiency, the site specific population has a proportion of the population who cannot speak English well or at all of 0.5% which is lower than the regional average of 0.9% and the national average of 1.7%.

16.6.8 The majority of the site specific study area population is white, consistent with the regional and national averages. The site specific population has a proportion of white people of 91.8% which is higher than the regional average of 86.3% and the national average of 81.0%. The proportion of people who are Asian in the site specific area is 3.5% which is lower than the regional average of 7.0% and the national average of 9.6%. The site specific population has 1.0% of people who are black which is lower than the regional average of 2.4% the national average of 4.2%. The specific population has a proportion of people of mixed ethnicities of 2.5% which is similar to the regional average of 2.8% and the national average of 3.0%.

Table 16.13: Baseline summary indicators relevant to diet and nutrition health outcomes

Population	Site specific	Local			County	Regional	National
Indicator Name	**6 wards**	**West Oxfordshire**	**Cherwell**	**Vale of White Horse**	**Oxfordshire**	**South-East**	**England**
Percentage of adults aged 16 and over meeting the '5-a-day' fruit and vegetable consumption recommendations (new method) (Persons, 16+ years)	n/a	38.5	35.2	37.1	39.7	35.2	32.5
Reception: Prevalence of overweight (Including obesity) (4-5 years)	n/a	19.7	20.1	20.1	19.2	20.1	21.3
Year 6: Prevalence of overweight (including obesity) (10-11 years)	n/a	27.8	32.4	30.3	30.6	33.0	36.6
Percentage of adults (aged 18+) classified as overweight or obese (18+ years)	n/a	67.7	64.6	59.1	60.0	62.7	63.8

Legend

	Better than England average
	Similar to England average
	Worse than England average

16.6.9 As shown in **Table 16.13** the local population overall performs better than its national comparator. It is noted there are no statistics reported for the site specific wards.

16.6.10 For the local population, the percentage of adults meeting the '5-a-day' fruit and vegetable consumption recommendations is higher in West Oxfordshire and Vale of White Horse districts than the regional and national averages. The percentage is comparable in Cherwell to the regional and national averages. Data shows better performance in healthy behaviours in the local population compared to England as a whole.

16.6.11 Similarly, data shows the local population performs better than England in children's weight as the proportion of children aged 4-5 and 10-11 years diagnosed as either overweight or obese is lower (better) in all the three districts than the national average. However, a different trend is observed in adults; the proportion of adults classified as overweight or obese in West Oxfordshire and Cherwell is higher than the national average suggesting high sensitivity to changes in diet and nutrition in the local area. In Vale of White Horse district, the proportion of adults classified as overweight or obese is lower than the national average.

Health and Wellbeing Effects from Changes to Open Space

Table 16.14: Baseline summary indicators relevant to open space, leisure and play

Population	Site specific	Local			County	Regional	National
Indicator Name	**6 wards**	**West Oxfordshire**	**Cherwell**	**Vale of White Horse**	**Oxfordshire**	**South-East**	**England**
Utilization of outdoor space for exercise/health reasons (16+ years)	n/a	n/a	n/a	n/a	24.4	18.2	17.9
Percentage of physically active children and young people (5-16 years)	n/a	45.8	46.8	n/a	46.6	46.4	47.2
Percentage of physically active adults (19+ years)	n/a	71.2	68.6	72.6	73.4	73.4	67.3
Emergency hospital admissions for coronary heart disease (SAR)	65.4	69.9	83.5	66.6	71.9	78	100.0

Population	Site specific	Local			County	Regional	National
Indicator Name	**6 wards**	**West Oxfordshire**	**Cherwell**	**Vale of White Horse**	**Oxfordshire**	**South-East**	**England**
Emergency hospital admissions for Myocardial Infarction (heart attack) (SAR)	75.3	81.4	93.6	74.6	81.0	85.5	100.0
Emergency hospital admissions for intentional self-harm (SAR)	39.1	96.0	92.4	95.6	98.9	73.4	100.0

Legend	
	Better than England average
	Similar to England average
	Worse than England average

16.6.12 As shown in **Table 16.14**, the site specific and the local population performs better in most indicators than the national averages. It is also noted there are fewer statistics reported in the site specific wards.

16.6.13 Considering physical activity, and the sensitivity of the local population to changes in open space and recreation, the proportion of physically active children and young people in West Oxfordshire, Cherwell and Vale of White Horse, is lower (worse) than the regional and national averages. On the other hand, the proportion of physically active adults in the local population area is higher (better) than the national average. Data suggests high localised sensitivity in children and young people and less sensitivity in adults to changes in open space, leisure and play in the local study area.

16.6.14 In relation to hospital admissions in the site specific and local population, emergency hospital admissions due to coronary heart disease and myocardial infarction (heart attack) are all significantly lower (better) in the site specific population and three districts compared to the regional and national averages, noting physical activity is only one contributing factor to these metrics. Data suggests generally less sensitivity in the site specific population to changes in open space.

16.6.15 Considering the sensitivity of the population to mental health influences, noting that change in open space and recreation is only one contributing factor to these mental health metrics, the rate of emergency hospital admissions for intentional self-harm is significantly lower in all the three districts than the national average.

Table 16.15: Baseline summary indicators relevant to transport health outcomes

Population	Site specific	Local			County	Regional	National
Indicator Name	6 wards	West Oxfordshire	Cherwell	Vale of White Horse	Oxfordshire	South-East	England
Killed and seriously injured (KSI) casualties on England's roads	n/a	n/a	n/a	n/a	71.8	97.7	95.6
Percentage of physically active children and young people (5-16 years)	n/a	45.8	46.8	n/a	46.6	48.1	47.2
Percentage of physically active adults (19+ years)	n/a	71.2	68.6	72.6	73.4	70.5	65.9
Percentage of adults walking for travel at least three days per week (16+ years)	n/a	10.7	8.7	11.7	15.3	14.9	15.1
Percentage of adults cycling for travel at least three days per week (16+ years)	n/a	4.4	3.8	3.9	6.6	2.4	2.3
Depression: QOF prevalence (18+ years)	n/a	13.0	13.4	13.8	12.5	13.2	12.7
Self-reported wellbeing: people with a high anxiety score (16+ years)	n/a	n/a	n/a	n/a	20.2	22.3	22.6

Legend

	Better than England average
	Similar to England average
	Worse than England average

16.6.16 **Table 16.15** shows overall, health and wellbeing outcomes related to transport are variable compared to the national average. It is noted there are no statistics available for the site specific population.

16.6.17 Considering the local population, the percentage of the population killed and seriously injured on roads is not reported in the local area however in the County of Oxfordshire it is lower than the regional and national averages, also noting that the regional average performs worse than the national average.

16.6.18 Considering physical activity, and the sensitivity of the local population to changes in transport and access to health promoting services, the proportion of physically active children and young people in all the three districts, West Oxfordshire, Cherwell and Vale of White Horse, is lower (worse) than the regional and national averages. Inversely, the proportion of physically active adults in the local population area is higher (better) than the national average. Data suggests higher sensitivity in children and young people and lower sensitivity in adults to changes in transport modes, access and connections in the local study area.

16.6.19 Considering active travel, local public health data shows worse performance in walking and better performance in cycling in the three districts compared to the regional and national averages. The percentage of the population who walks for travel at least three times a week in West Oxfordshire, Cherwell and Vale of White Horse is relatively lower than the regional and national averages, with the county performing similar to England but better than the regional average. On the other hand, the percentage of people who cycle for travel at least three times a week is higher in West Oxfordshire, Cherwell and Vale of White Horse compared to the South East region and England. A mixed picture is shown in the sensitivity of the local population to changes in transport modes, access and connections regarding active travel, as data suggests higher sensitivity in walking and lower sensitivity in cycling.

16.6.20 Considering the sensitivity of the population to mental health influences, noting that change in transport is only one contributing factor to these mental health metrics, the proportion of the population diagnosed with depression in all the three local districts of the study area is higher compared to the national average, suggesting high sensitivity in the local population to mental health influences. On the other hand, the proportion of people with a high self-reported anxiety score is not available at the district level, however the proportion is lower in the County of Oxfordshire than the regional and national averages.

Table 16.16: Baseline health outcomes relevant to wider societal benefits and climate change

Population	Site specific	Local			County	Regional	National
Indicator Name	**6 wards**	**West Oxfordshire**	**Cherwell**	**Vale of White Horse**	**Oxfordshire**	**South-East**	**England**
Households in fuel poverty (%)	6.2	7.3	7.8	7.1	8.1	8.6	13.2
Winter mortality index[3] (%)	n/a	28.3	39.0	12.8	29.8	34.5	36.2

Legend	
	Better than England average
	Similar to England average
	Worse than England average

16.6.21 As shown in **Table 16.16**, the health and wellbeing outcomes related to wider societal benefits and climate change in the study area are generally better than the national averages.

16.6.22 The percentage of households that are in fuel poverty in the site specific wards, West Oxfordshire, Cherwell and Vale of White Horse districts and Oxfordshire County is lower than the regional and national averages.

16.6.23 In relation to climate change and adaptation in the local study area, the percentage of excess deaths during winter in West Oxfordshire and Vale of White Horse districts is lower (better) than the regional and national averages, notably in Vale of White Horse District, which is 64% lower than the average of England. In contrast, the percentage of excess winter deaths in Cherwell District is relatively higher than the regional and national comparators suggesting higher sensitivity in the district to climate change. In the county area, the winter mortality index performs better than the regional and national averages.

[3] The Winter mortality index is a measure expressed as a ratio of the difference in all-cause mortality during winter months (Dec-Mar) compared to the average in the non-winter months (the preceding Aug-Nov and following Apr-Jul).

Table 16.17: Baseline health outcomes relevant to socio-economic health outcomes

Population	Site specific	Local			County	Regional	National
Indicator Name	**6 wards**	**West Oxfordshire**	**Cherwell**	**Vale of White Horse**	**Oxfordshire**	**South-East**	**England**
Inequality in life expectancy at birth	n/a	1.5	6.7	4.25	5.0	6.95	8.8
Income deprivation (%)	4.9	5.9	7.6	5.7	6.9	9.1	12.9
Child Poverty Income Deprivation Affecting Children (%)	6.7	7.9	10.5	8	10.1	12.4	17.1
Older People in poverty Income deprivation affecting older people (%)	5.5	7.1	8.8	6.5	8.1	10.2	14.2
16-to-17-year old's not in education, employment, or training (NEET) or whose activity is not known (%)	n/a	n/a	n/a	n/a	3.8	5.4	4.7
19–24-year old's not in education, employment, or training (%)	n/a	n/a	n/a	n/a	n/a	11.8	13.2
Percentage of people in employment (16-64 years)	n/a	82.4	81.4	80.3	79.1	78.1	75.4
Average Attainment 8 score (15-16+ years)	n/a	49.9	48.5	49.2	49.9	49.9	48.7
Households in fuel poverty (%)	6.2	7.3	7.8	7.1	8.1	8.6	13.2

Population	Site specific	Local			County	Regional	National
Indicator Name	**6 wards**	**West Oxfordshire**	**Cherwell**	**Vale of White Horse**	**Oxfordshire**	**South-East**	**England**
Winter mortality index[4] (%)	n/a	28.3	39.0	12.8	29.8	34.5	36.2

Legend	
	Better than England average
	Similar to England average
	Worse than England average

16.6.24 As shown in **Table 16.17**, the health and wellbeing outcomes related to socio-economic opportunity in the study area are better than the national averages. It is noted there are fewer statistics available for the site specific population.

16.6.25 Local public health data on life expectancy at birth suggests that inequalities between the most and least deprived in all the three local districts are lower than the regional and national averages. Similarly, total income deprivation including child poverty income deprivation and income deprivation affecting older people in the site specific and local population is lower (better) compared to the regional and national averages suggesting less sensitivity to socio-economic opportunity in the study area.

16.6.26 In relation to employment, the overall percentage of people in employment in West Oxfordshire, Cherwell and Vale of White Horse districts, is higher (better) than the national average. In addition, the average educational attainment score is higher (better) in West Oxfordshire and Vale of White Horse districts, with Cherwell performing similar to England. Similar to deprivation, data suggests less sensitivity to socio-economic opportunity in the study area.

Health and Wellbeing Effects from Changes to Air Quality

Table 16.18: Baseline summary indicators relevant to air quality health outcomes

Population	Site specific	Local			County	Regional	National
Indicator Name	**6 wards**	**West Oxfordshire**	**Cherwell**	**Vale of White Horse**	**Oxfordshire**	**South-East**	**England**
Fraction of mortality attributable to	n/a	5.2	5.5	5.4	5.5	5.4	5.5

[4] The Winter mortality index is a measure expressed as a ratio of the difference in all-cause mortality during winter months (Dec-Mar) compared to the average in the non-winter months (the preceding Aug-Nov and following Apr-Jul).

Population	Site specific	Local			County	Regional	National
Indicator Name	6 wards	West Oxfordshire	Cherwell	Vale of White Horse	Oxfordshire	South-East	England
particulate air pollution (new method) (30+ years)							
Air pollution: fine particulate matter (new method - concentrations of total $PM_{2.5}$)	n/a	7.4	7.9	7.6	7.8	7.3	7.5
Emergency hospital admissions for coronary heart disease (Standardised Admission Ratio[5])	65.4	69.9	83.5	66.6	71.9	78	100.0
Emergency hospital admissions for stroke (SAR)	78.1	76.4	88.8	75.7	80.3	90.2	100.0
Emergency hospital admissions for Myocardial Infarction (heart attack) (SAR)	75.3	81.4	93.6	74.6	81.0	85.5	100.0
Emergency hospital admissions for Chronic Obstructive Pulmonary Disease (COPD) (SAR)	39.1	45.8	83.4	43.4	63.5	73.4	100.0

Legend	
	Better than England average
	Similar to England average

[5] SAR - The Standardised Admission Ratio is a summary estimate of admission rates relative to the national average and takes into account differences in population's age, sex and socioeconomic deprivation.

16.6.27 **Table 16.18** shows overall, air quality related health outcomes in the site specific and local population are better compared to the national averages.

16.6.28 For the site specific population, emergency hospital admissions due to coronary heart disease, stroke, myocardial infarction (heart attack) and chronic obstructive pulmonary disease (COPD), are all significantly lower (better) in the six wards compared to the regional and national averages, noting air quality is only one contributing factor to these. To note is the average rate of emergency hospital admissions for COPD in the electoral wards, which is 60% lower than the average of England, indicating significantly better performance in this respiratory disease in the site specific area. Data suggests generally less sensitivity in the site specific population to changes in air quality.

16.6.29 In relation to indicators reported at the district level and above, the fraction of mortality attributable to particulate air pollution ($PM_{2.5}$) in West Oxfordshire, Cherwell and Vale of White Horse districts is similar to the average of England. Similarly, concentrations of fine particulate matter ($PM_{2.5}$), as an indicator of air pollution in the local area, are similar to the South East region and England. There is no significant difference that can be noted in the performance of the local population area compared to the regional and national averages.

Health and Wellbeing Effects from Changes to Noise

Table 16.19: Baseline summary indicators relevant to noise health outcomes

Population	Site specific	Local			County	Regional	National
Indicator Name	**6 wards**	**West Oxfordshire**	**Cherwell**	**Vale of White Horse**	**Oxfordshire**	**South-East**	**England**
The rate of complaints about noise	n/a	3.3	7.9	3.6	5.6	7.5	12.0
The percentage of the population exposed to road, rail, and air transport noise of 65dB(A) or more, during the daytime	n/a	n/a	n/a	n/a	3.8	4.9	5.5
The percentage of the population exposed to road, rail, and air transport noise of 55 dB(A) or more	n/a	n/a	n/a	n/a	5.7	8.6	8.5

Population	Site specific	Local			County	Regional	National
Indicator Name	**6 wards**	**West Oxfordshire**	**Cherwell**	**Vale of White Horse**	**Oxfordshire**	**South-East**	**England**
during the night-time							
Self-reported wellbeing: people with a high anxiety score (16+ years)	n/a	n/a	n/a	n/a	20.2	22.3	22.6
Under 75 mortality rate from cardiovascular diseases considered preventable (2021 definition)	n/a	17.7	23.3	17.9	19.7	24.2	30.2
Hypertension: QOF prevalence (all ages)	n/a	16	13	14	n/a	14.1	14.0
Depression: QOF prevalence (18+ years)	n/a	13.0	13.4	13.8	12.5	13.2	12.7
Emergency hospital admissions for intentional self-harm (SAR)	92.6	96	92.4	95.6	98.9	108.7	100.0

Legend

	Better than England average
	Similar to England average
	Worse than England average

16.6.30 As shown in **Table 16.19** there are fewer statistics available for the site specific population. Overall, health outcomes in site specific population are better and those in the local population area are variable as compared to the regional and national averages.

16.6.31 The rate of complaints about noise in West Oxfordshire, Cherwell and Vale of White Horse is lower (better) than the national average, with the rate being significantly lower in West Oxfordshire and Vale of White Horse as compared to the regional and national averages. Considering transport noise, the percentage of population exposed to elevated road, rail and air transport noise

during the daytime and night-time is lower in the County of Oxfordshire than the regional and national comparatives, notably during the daytime which the local public health data reports as significantly better than England. Data shows better performance in the local area in terms of noise.

16.6.32 In relation to the sensitivity of the local population to noise, measured by the mental health outcomes of the population; the percentage of people diagnosed with depression in all West Oxfordshire, Cherwell and Vale of White Horse districts is relatively higher than England suggesting high localised sensitivity to noise, noting that it is only one contributing factor to this mental health metric. On the other hand, emergency hospital admissions for intentional self-harm in the 6-ward area and the West Oxfordshire, Cherwell and Vale of White Horse districts are lower than the regional and national averages, also noting that the regional population performs worse than the national average. Overall, local public health data shows a mixed picture in the sensitivity of the local population to mental health influences.

16.6.33 In relation to measures relevant to physiological effects of noise, the under 75 mortality rate from cardiovascular diseases considered preventable is lower in West Oxfordshire, Cherwell and Vale of White Horse districts as compared to the national average. On the other hand, the proportion of the population with a hypertension diagnosis (high blood pressure) is higher in West Oxfordshire District; lower in Cherwell District and similar in Vale of White Horse compared to the national average. Data therefore shows a mixed picture in the sensitivity of the local population to physical health influences.

Health and Wellbeing Effects from Changes to Risk (Risk Perception)

Table 16.20: Baseline - summary indicators relevant to understanding of risk health outcomes

Population	Site specific	Local			County	Regional	National
Indicator Name	**6 wards**	**West Oxfordshire**	**Cherwell**	**Vale of White Horse**	**Oxfordshire**	**South-East**	**England**
Population who cannot speak English well or at all (%)	0.6	0.4	1.1	0.4	0.9	0.9	1.7
Self-reported wellbeing: people with a high anxiety score (16+ years)	n/a	n/a	n/a	n/a	20.2	22.3	22.6
Depression: QOF prevalence (18+ years)	n/a	13.0	13.4	13.8	12.5	13.2	12.7

Population	Site specific	Local			County	Regional	National
Indicator Name	6 wards	West Oxfordshire	Cherwell	Vale of White Horse	Oxfordshire	South-East	England
Emergency hospital admissions for intentional self-harm (SAR)	39.1	45.8	83.4	43.4	63.5	73.4	100.0

Legend	
	Better than England average
	Worse than England average

16.6.34 **Table 16.20** shows health and wellbeing outcomes related to understanding of risk (risk perception). Overall, the health and wellbeing outcomes in the site specific population are better than regional and national averages. It is noted there are fewer statistics reported for the site specific wards.

16.6.35 Regarding the local population, the rate of emergency hospital admissions for intentional self-harm, as a general indicator relevant to mental health, is significantly lower across the three districts than the national average. Inversely, the percentage of the population with a clinical diagnosis of depression is slightly higher in West Oxfordshire, Cherwell and Vale of White Horse districts as compared to the national average. The percentage of people who cannot speak English well or at all is lower than the national average, an indicator relevant to the extent to which the actual risks of the Project may be understood by the population. The data suggests generally lower sensitivity to changes in mental health associated with public understanding of risk in the local study area.

Baseline Healthcare Capacity

16.6.36 Both local context and the scientific literature (Santos et al., 2017) are informative in determining appropriate distances over which to assess primary healthcare capacity. The 2017 study by Santos et al., based in the East Midlands of England, found that the average (mean) distance to a patient's chosen practice was 1.877 km (1.2 mile), which was further than the average of the nearest GP practice, 1.197 km (0.74 mile). The difference reflected patient choices and preferences, including driven by clinical quality. Santos et al. note that 91.5% of those in urban areas choose a GP practice within 3 km (1.9 mile) and 91.9% of residents in rural areas choose a practice within 7 km (4.3 mile).

16.6.37 A location from the centre of the site (postcode: OX29 4DZ), situated within the central section of the Project, has been used as a conservative approach (given the site is largely farmland), and generally represents the furthest distance from settlements where workers may be located. If measured from the site boundaries, work compounds or access roads, the distance to GP

practices in the vicinity will be shorter, and a larger number of practices will be included in the catchment area.

16.6.38 The NHS Digital General Practice Workforce September 2024 (NHS Digital, 2024) data release provides information on existing capacity. There are five GP practices within 7km of the aforementioned location[6] (**Table 16.21**), that are currently accepting new patients. Collectively these practices serve 64,983 patients with 44 full time equivalent (FTE) GPs. This is a collective ratio of 1,470 patients per GP which is within the recommended patient to GP ratio of 1,800 patients per FTE GP (a commonly applied benchmark that is indicative but often exceeded in practice[7]) (HUDU, 2019). It is noted that Woodstock Surgery is above this ratio and that GP to patient ratios may not always reflect particular local context in terms of capacity. The data does however give a broad indication of sensitivity to any changes in demand.

Table 16.21: GP primary care capacity close to the Project site – September 2024 data release

GP Practice	Patients	GP FTE	GP Patient ratio	Distance (km)	Accepting new patients?
Woodstock Surgery	9680	4.41	2,194.68	3.7	Yes
The Key Medical Practice	12921	7.33	1,761.95	4.1	Yes
Eynsham Medical Group	16299	15.77	1,033.33	4.0	Yes
Gosford Hill Medical Centre	7456	6.77	1,100.79	4.7	Yes
Wolvercote Surgery (Summertown Health Centre Group)	18627	9.92	1,877.72	5.3	Yes
Total	**64,983**	**44**	**1,470**		

16.6.39 Whilst the Project does not rely on local primary care capacity, it is noted that the data suggests that 14,596 additional patients could be registered before reaching the 1,800 patients per GP ratio benchmark. As stated in Chapter 15: Socio Economics **[EN010147/APP/6.3]**, the Project is estimated to require a net direct employment of 344 annual construction workers. On the basis that the Project workforce numbers are therefore going to substantially less than the additional capacity in the local primary care providers, there are unlikely to be population health effects from changes in demand for healthcare capacity.

Future baseline conditions

16.6.40 Population health data presents a snapshot at a particular time. It is well recognised that population health is subject to continuing influences, both at the individual and community level. Influences may be environmental, such as seasonal variation in wellbeing and communicable diseases, they may also

[6] Using NHS service search for postcode OX29 4DZ.

[7] London's Healthy Urban Development Unit (HUDU) uses the 1,800 people per GP as a default benchmark, based on guidance from the Royal College of GPs.

respond to socio-economic factors, such as migration and the availability of jobs.

16.6.41 Longer term trends and interventions in population health may influence the future baseline. Health and social care, public health initiatives and government policies aim to reduce inequalities and improve quality of life. The historic success of such interventions is increasingly challenged by national trends such as an aging population, rising levels of obesity and the COVID-19 pandemic. The implications of COVID-19 for public health will take years to be reflected within statistical data releases, but it is expected that the pandemic will have exacerbated public health challenges. The pandemic disproportionately affected vulnerable groups, including due to age and ill-health.

16.6.42 Climate change may also exacerbate physical and mental health risk factors. These noted impacts on the future human health baseline are summarised below and taken into account by the assessment.

- Without adaptation, heat and cold-related deaths are forecasted to rise in the UK due to climate change and sociodemographic factors. Mortality risk from extreme temperatures rises with age, and despite fewer cold days expected mortality due to moderate cold is projected to increase with the ageing population with heat-related mortality increasing over time (UKHSA, 2023b).
- Weather pattern shifts, notably in temperature, rainfall, and wind speed, are anticipated to influence the dispersion and concentration of air pollutants like PM and O_3. Implementing climate change mitigation strategies to cut greenhouse gas emissions will aid in lowering air pollution levels, thus enhancing health outcomes. While long-term exposure to $PM_{2.5}$ and NO_2 is forecasted to decrease by around 25% to 37% compared to 2018 levels, localized urban increases in O_3 could heighten health risks (UKHSA, 2023c).
- Climate has a significant impact on infectious diseases, influencing pathogen behaviour, human susceptibility, and transmission periods. Warmer temperatures can expand disease distribution and transmission windows. Weather and climate also play a significant role in influencing the presence and activity of disease-carrying ticks and mosquitoes. Rising temperatures are extending their range and activity periods, affecting the spread of pathogens and their habitats including potential expansion of tick species like *Ixodes ricinus*, which spread Lyme disease and tick-borne encephalitis, and invasive mosquitoes like *Aedes albopictus*, capable of transmitting diseases such as dengue and Zika. Climate change also increases the risk of diseases like West Nile virus in the UK, highlighting the need for collaborative efforts across sectors to address these climate-related public health challenges (UKHSA, 2023d).
- Climate change poses a threat to food supplies, increasing the risk of public health issues as the UK becomes more reliant on climate-vulnerable food-producing countries. This dependence on imports, especially plant-based foods, may lead to shortages of nutritious options and unhealthy dietary changes unless local production is strengthened.

While initial benefits like crop diversification and extended growing seasons may occur due to warmer, drier conditions, inadequate adaptation measures could decrease overall yields in the long run. As climate impacts intensify, fluctuations in food imports and prices may make it challenging to access healthy foods and follow dietary guidelines (UKHSA, 2023e).

16.6.43 It would not be proportionate (or consistent with the qualitative assessment approach taken) to quantitatively model the population's future health. This reflects the complexities of interactions between the wider determinants of health, as well as the potential for macro-economic changes in the next decade that are hard to predict. Any predication would have such wide error margins that it would greatly limit the value of the exercise. Annual national population health trend forecasting is undertaken as a government public health activity(Department of Health and Social Care, 2023; Office for National Statistics, 2021) and has been taken into account by the health assessment.

Key receptors

16.6.44 **Table 16.22** identifies the receptors taken forward into the assessment.

Table 16.22: Key receptors taken forward to assessment

Receptor	Description	Sensitivity/value
General population of each study area	The general population comprises groups including: current and future residents; project workforces; service providers; visitors to the area; road users; and users of the project's electricity.	Generally of lower sensitivity, with actual sensitivity assessed for each determinant of health in **section 16.9**.
Vulnerable group population of each study area	Vulnerability, or increased sensitivity, many be due to a factors including: young age; old age; low income; poor health; social disadvantage; and access and geographical factors. See section 16.8.5 for further details.	Generally of higher sensitivity, with actual sensitivity assessed for each determinant of health in **section 16.9**.

Local Healthcare Needs

16.6.45 The JSNA for Oxfordshire identifies six priority areas:

- Young age: The JSNA identifies priorities for this population group, including child and adolescent mental health; children with special education need of social, emotional and mental health; children living in income deprivation/poverty; children prone to domestic crimes involving children and young people prone to rape; young people classified as Not in Education, Employment or Training; young carers; children with physical and developmental disabilities including autism and vulnerability to lack of green spaces, traffic safety risks, dentin decay and poor mental health; children with asthma and vulnerability to poor air quality. Regard has been given to looked-after children, children with special needs. An

estimated 49,300 children in Oxfordshire schools are not doing enough physical activity.

- Old age: With regards to this population group, the assessment has given priority to: older people living with dementia; income deprivation/poverty; long term conditions; sensory impairments; frailty; and end of life care. The high risk associated with health impacts of air pollution, isolation, falls, and fractures is also noted.
- Low income: The identified priorities related to this needs area include: low-income families; Jobseeker's allowance claimants; unpaid carers; unemployment; housing costs; and equitable opportunities for secure income and housing.
- Poor health: Discrimination and/or isolation: The identified priorities related to poor health include people in lower social class with high rates of complex mental and physical health issues, children with special needs and long-term conditions and older people living with multiple conditions. This includes social and behavioural disabilities for children and mobility issues for adults.
- Social disadvantage: The identified priorities related to social disadvantage include: Lesbian, Gay, Bisexual and Trans (LGBT) communities experiencing discrimination in sexual health services; children with special educational needs and those who live in poverty or deprivation; and women, people from minority ethnic backgrounds or people with disabilities who are less likely to be in well-paid professional employment.
- Access and geographical factors: People living in the identified most deprived areas, and people living in rural areas.

16.6.46 The JSNA identifies priority groups by locale, these are:

- Eynsham: The JSNA identifies Eynsham as one of the areas in West Oxfordshire with the highest prevalence of obesity for Reception Children (Eynsham and Stanton Court 12%).
- West Oxfordshire: The JSNA identifies priority groups for this District including Armed Forces veterans, travellers, adults classified as overweight or obese, and young people disproportionately affected by the COVID-19 pandemic and those facing mental health issues.

16.7 Key Parameters for Assessment

Maximum design scenario

16.7.1 The Human Health assessment uses the conclusions set out by the other technical chapters as the basis for assessment, as laid out in paragraph 16.1.13. As such, the maximum design scenarios described in the other technical chapters are inherent to the assessment for human health. These scenarios have been selected from the Project Design Envelope provided in Volume 1, Chapter 6: Project Description of the ES **[EN010147/APP/6.3]**. Any other development scenario is considered to have less significant effects,

based on details within the Project Design Envelope (e.g. different infrastructure layout), to that assessed here being taken forward in the final design scheme. To avoid duplication, the human health assessment does not repeat these here.

16.8 Mitigation and Enhancement Measures Adopted as Part of the Project

16.8.1 The design process for the Project has been heavily influenced by the findings of early environmental appraisals and the EIA process. The Project has had several measures incorporated into the design to avoid or minimise environmental impacts.

16.8.2 The key aspects where the design has evolved are described in ES Volume 1, Chapter 5: Alternatives Considered **[EN010147/APP/6.3]**. These include measures required for legal compliance, as well as measures that implement the requirements of good practice guidance documents. The assessment has been undertaken on the basis that these measures are incorporated in the design and construction practices (i.e. they are 'embedded mitigation').

16.8.3 Embedded mitigation measures for the construction phase are set out in the ES Volume 1, Chapter 6: Project Description **[EN010147/APP/6.3]**, Appendix 6.1: Project Mitigation Measures and Commitments Schedule **[EN010147/APP/6.5]** and the various management plans outlined in this chapter **[EN010147/APP/7.6]**.

16.8.4 Implementation of embedded mitigation relied upon in the assessment will be secured in the DCO, including by ensuring the works described in Schedule 1 of the DCO are restricted to their corresponding works areas shown on the Works Plans **[EN010147/APP/2.3]**, a DCO requirement requiring compliance of detailed design of the Project to accord with the Outline Design Principles **[EN010147/APP/7.7]**, or through specific DCO requirements requiring compliance with a management strategy, plan, or other requirement document.

16.8.5 Consideration has been given to any ‘additional mitigation’ over and above the embedded mitigation that may be required and has the potential to mitigate any significant adverse effects identified following the assessment of the Project inclusive of its embedded mitigation. Where significant effects remain following the implementation of embedded mitigation and achievable further measures could lower the identified effect, the topic chapter identifies additional mitigation and explains how the additional mitigation is secured, for example via a specific DCO requirement, via a management plan, or document secured by a DCO requirement like the Project Mitigation Measures and Commitments Schedule **[EN010147/APP/6.5]**.

16.8.6 To the extent any likely significant effects are anticipated following the assessment of the Project after the implementation of embedded and additional mitigation, each topic chapter will report these as residual effects. Residual effects for all topics are summarised in Chapter 21: Summary of Significant Environmental Effects of the ES **[EN010147/APP/6.3]**.

16.8.7 Where relevant, measures have also been identified that may result in enhancement of environmental conditions. Enhancement measures are not

required to mitigate significant effects of the Project and are not factored into the determination of residual effects. They are further measures which would have additional beneficial outcomes should they be implemented.

16.8.8 Both embedded and additional mitigation measures relevant to this chapter are summarised in **Table 16.23**.

Table 16.23: Mitigation measures intended to be adopted as part of the Project

Commitment number	Measure adopted	How the measure will be secured
Embedded Mitigation		
16.1	As far as reasonably practicable (e.g., subject to standards and security checks) work with local employment schemes (e.g. Job Centre) to support opportunities to provide local unemployed adults with access to interviews for construction, operation and maintenance and decommissioning job opportunities. This may include advertising and interviewing for jobs locally and using approaches that facilitate access for people with disabilities or social disadvantage.	Appendix 15.2: Outline Skills, Supply Chain & Employment Plan **[EN010147/APP/6.5]**
16.2	To use landscaping, in combination with layout and design, to minimise visibility of electrical infrastructure (other than arrays and substations) close to PRoWs, in order to reduce perceptions of risk.	Proposed to be secured as a requirement of the DCO - via Outline Landscape and Ecology Management Plan **[EN010147/APP/7.6.3].**
16.3	Providing and maintaining new permissive paths, cycle paths and the parts of the footpaths and bridleways that run through the arrays, within the Order Limits, to a specification to be agreed via the detailed oLEMP. Routes to include signs and information boards, including in formats that respond to visual impairments, with appropriate maintenance, as required. New routes to where reasonably practicable include access that supports people of all ages, including those with mobility and/or sensory needs.	Proposed to be secured as a requirement of the DCO - via Outline Landscape and Ecology Management Plan **[EN010147/APP/7.6.3].**
16.4	Periodic monitoring (years 1, 5, and 15, as set out within oLEMP) of PRoW use aligned with the methodologies used for the baseline surveys that are reported within the ES would determine if measures to avoid widespread behavioural change in use of PRoWs were effective and if necessary, with any additional action arising to reduce access barriers, to be agreed via the detailed LEMP.	Outline Operational Management Plan **[EN010147/APP/7.6.2]**.
16.5	Provide open and covered space in the solar farm for use by school field trips. An educational area could provide local schools with the basic facilities – benches and a covered area to undertake their own learning activities. Potential to walk to the educational site and potential for guided access to array	Proposed to be secured as a requirement of the DCO - via Outline Operational Management Plan **[EN010147/APP/7.6.2]**. Location, size and scale will be finalised during detailed design phase and included

Commitment number	Measure adopted	How the measure will be secured
	areas would support both physical activity and learning outcomes for population health. Indicative layout (as set out with Outline Operational Management Plan (EN010147/APP/7.6.2)) Includes toilet (compost) and minibus parking (either provided or existing).	within the detailed Operational Management Plan.
16.6	Continued community consultation and sharing of non-technical information relating to the project (e.g. explaining compliance with public exposure guidelines, actual risks associated with the project), to allow people to express concerns and gain awareness of actual health effects. This will partially be met through the DCO application process. Non-technical information and a point of contact for community liaison to be provided on the project website.	Outline Operational Management Plan **[EN010147/APP/7.6.2**]
16.7	Compliance with exposure standards set out in Department for Energy and Climate Change (DECC) Voluntary Code of Practice (Department for Energy Security and Net Zero, 2012) including compliance with the International Commission on Non-Ionising Radiation Protection (ICNIRP) public exposure guidelines (ICNIRP, 1998, 2010).	In relation to construction: through the outline Code of Construction Practice (CoCP) **[EN010147/APP/7.6.1]**. In relation to operation: through DCO requirement secured through Outline Operational Management Plan **[EN010147/APP/7.6.2]**
16.8	The construction and decommissioning workforces' healthcare support provision would, as a minimum, comply with the Health and Safety (First-Aid) Regulations 1981 and the UK Health and Safety Executive guidance L74 (Third edition) Published 2013 and updated in 2024. The Health and Safety (First-Aid) Regulations 1981 require employers to provide adequate and appropriate equipment, facilities and personnel to ensure their employees receive immediate attention if they are injured or taken ill at work.	Through the outline Code of Construction Practice (CoCP) **[EN010147/APP/7.6.1]**.

16.9 Assessment of effects

16.9.1 The impacts of the construction (assumed duration 24 months), operation and maintenance (assumed duration 37.5 years), and decommissioning (assumed duration 24 months) phases of the Project have been assessed in this section. Maximum design scenarios have been assessed to consider the greatest population health effects, whether beneficial or adverse.

16.9.2 A description of the potential for a likely significant effect on receptors (populations) caused by each identified impact is given below.

Diet and nutrition

Construction, Operation and Maintenance, Decommissioning phases

16.9.3 This section considers the effects of the Project on access to affordable local healthy food which may impact on diet and nutrition. Construction, operation and maintenance, and decommissioning activities have the potential to result in temporary but long-term change of use of agricultural land (including a potential change in the mix of arable and livestock farming) which has the potential to impact food production and availability at a local context.

16.9.4 The scientific literature indicates that there is an association between agricultural land use changes, food security and diet and nutrition. Agricultural activities impact local household abilities to purchase and consume more, better and affordable food including improved household diets (Hawkes & Ruel, 2006). The literature establishes the importance of healthy diet in the protection against malnutrition and noncommunicable diseases including diabetes, heart diseases, stroke, cancer and related mental health conditions (WHO, 2020). A healthy diet has also been established to improve individual mental health issues including higher levels of optimism, self-efficacy, reduced psychological distress and ambiguity and protect against depressive symptoms (Głąbska et al., 2020).

16.9.5 Loss of agricultural land affects food security and has both direct and indirect impacts on the availability and access to healthy food. The direct impacts include reduced agricultural produce which in turn may impact the diversity, quality, price and distribution of food in communities (Hawkes & Ruel, 2006; Mogge & Sonntag, 2017). The quantity of agricultural produce affects availability, affecting prices and access to food. The quality and diversity of food outputs influence access to micronutrients and dietary diversity (Hawkes & Ruel, 2006). It is also noted in the literature that the extent of impact of loss of agricultural land is determined by the dependence of the local population on the affected lands (Jones et al., 2015).

16.9.6 This section has been informed by Volume 1 Chapter 17: Agricultural Land Use and Public Rights of Way, which sets out relevant assessment findings and mitigation measures that have been taken into account.

- The installation of the Project will lead to the removal of land from intensive arable agricultural use during the construction period. However, the Project includes the retention on agricultural use within the area of the PV panels as part of the Outline Landscape and Ecology Management Plan **[EN010147/APP/7.3.3]**. The land within this area would be used for conservation grazing with sheep.
- The location of the substations as part of the scheme could affect a maximum of approximately 5.5 ha of agricultural land[8]. The loss of this area from any of the farm holdings affected is assessed to have a permanent negligible effect.

[8] Maximum of 6 small substations x approximately 180 m² (total of approximately 0.05 ha); main substation (approximately 1 ha); National Grid Substation (approximately 3.8 ha); and 156 Power Converter Stations (PCS) locations (total of approximately 0.65 ha).

- The construction would be likely to temporarily affect the attributes of individual land holdings but would not affect the operation and viability of those farms affected. It is assessed that the loss of land during construction would have a long-term temporary minor adverse effect on the agricultural land holdings that form part of the Project.
- Following the implementation of the Outline Soil Management Plan as part of the Project there would be a medium-term temporary minor adverse effect on agricultural land quality and soils during the construction period. It is likely that there would be benefits to soil structure during the operational period due to no tillage and the deposition and build-up of organic matter.
- It is assessed that the small areas of permanent land lost would have a permanent negligible effect on the land holdings that form part of the Project.

16.9.7 The health assessment takes into account the issues raised during consultation, including with the public (Section 47 consultation), as set out in Volume 3, Appendix 16.1: Human Health Consultation and Engagement **[EN010147/APP/6.5]**.

16.9.8 The potential health effect is considered likely because there is plausible source-pathway-receptor relationship:

- The source is potential disruption to agricultural land, including at work areas and cable corridors;
- The pathway is reduced availability and access to affordable local healthy food; and
- Receptors are residents in the local community.

16.9.9 Furthermore, the potential effect is probable as no highly unusual conditions are required for the source-pathway-receptor linkage.

16.9.10 The population groups relevant to this assessment are:

- The ‘site specific’ geographic population of:
  - For the arrays and cable corridors, five wards of:
    - E05006646 Stonesfield and Tackley
    - E05006653 Woodstock and Bladon
    - E05010933 Kidlington West
    - E05006639 Eynsham and Cassington (representative of higher (worse) community deprivation)
    - E05006640 Freeland and Hanborough
  - For the substation:
    - E05011714 Cumnor Ward
- The local population of Cherwell, West Oxfordshire and Vale of White Horse (as the relevant parts of any County wide effect on sustainable food production).

- The sub-population vulnerable due to:
  - Young age vulnerability (children and young people), including due to the importance of good diet and nutrition in developmental stages.
  - Old age vulnerability (older people), including due to established behaviours in accessing local food options and benefits of good diet and nutrition to maintain good health and independence.
  - Low income, specifically people with limited access to alternative sources of healthy food.
  - Poor health, specifically conditions where access to healthy food physical activity would be beneficial to physical or mental health.
  - Access and geographical factors, specifically the population who are reliant on the affected agricultural lands.

Sensitivity of the receptor

16.9.11 The sensitivity of the general population is **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account and are listed in **section 16.5,** Vulnerable groups. This reflects most people are *not reliant* on agricultural produce from the local area and would only make *limited use* of the affected agricultural lands. The general population also comprise those members of the community with *low* levels of deprivation and a *high* capacity to adapt noting that the members of this sub-population have greater resources to respond to change. Given the socio-economic status of the majority of residents in the local community, most people would be able to acquire healthy food from other *alternative* sources.

16.9.12 The sensitivity of the vulnerable group is **high.** Vulnerability in this case relates to the potential for there to be people who *rely* on the affected agricultural lands for affordable and accessible healthy food. This sub-population may include a high representation of dependants including children, elderly and those receiving care due to poor health, as well as those that may have *fewer resources* and *less capacity* to adapt to changes. For these groups there is greater likelihood that disruption or disturbance in their sources of healthy food could affect healthy eating behaviours. Vulnerability may be increased in areas of higher deprivation. Deprived populations may already have *fewer* resources compared to the general population and therefore be more sensitive to healthy food access changes. Low incomes may compound access barriers by limiting adaptive response.

Magnitude of impact

16.9.13 The Project has a total area of approximately 1,418 ha (see Volume 2, Figure 1.1 – 'Site Location and Order Limits'), with the installation of solar panels across approximately 839 ha. As set out in Chapter 17: Agricultural Land Use and Soils Table 17.16 the total farmed area of the three districts of Cherwell, Vale of the White Horse and West Oxfordshire is 144,859 ha. Local food markets are not restricted to these areas. The national farming (8,975,549 ha

in England) as well as international food markets are likely to dominate local nutrition.

16.9.14 The magnitude of change due to the Project is **low**. This reflects the Volume 1, Chapter 17: Agricultural Land Use and Soils **[EN010147/APP/6.3]** assessment that the change in agricultural land availability would be very small in the regional and national context. Furthermore, it has not been identified that the affected agricultural land plays an influential role in local food markets. In terms of population health, the change in agricultural lands is anticipated to only relate to a *very small scale* of change in food price or availability. Such events would be *continuous* over the *long-term* (albeit not permanent). The slight change in food price or availability would only affect at most a *small minority* of the population. The reduction in agricultural land would be temporary and any impact would be expected to *gradually reverse* on decommissioning of the Project. The literature suggests solar farms do not destroy the fundamental qualities of agricultural land and can be eventually returned to full agricultural production following decommissioning (Hassanpour Adeh et al., 2018; Jones et al., 2015). Goldberg (2023) argues solar farms built on agricultural land preserve the farmland for future agricultural use. Potentially the resting of the agricultural land may increase its productivity for food production in the future. It has been assumed (as a worse case) that affected agricultural land contributes to the availability of local healthy food options. The change in food price and availability is therefore likely to be associated with *very minor changes in morbidity and quality of life* due to reduced access to healthy foods.

Significance of the effect

16.9.15 The significance of the population health effect for this determinant of heath is at most **minor adverse** (not significant). The score reflects the association in the literature between the availability of agricultural land and access to healthy food. It also reflects that the impact would be temporary and that any impact would gradually reverse after operation of the Project. Any change in the health baseline due to the Project is likely to be *slight*, with at most a *marginal effect* on health inequalities and delivery of health policy.

Further (secondary) mitigation and residual effect

16.9.16 The following additional mitigation and enhancements are proposed, to be secured through DCO mitigation measures:

- Provide space for at least two food growing community groups (up to 30ha) to operate on the Site.

16.9.17 This targeted local measure will particularly benefit vulnerable groups and not only help with access to fresh produce, but also provide training to support growers, education opportunities for children about food production and growing, and support mental and physical health benefits through mindfulness and physical activity in nature. It will therefore support positive health outcomes through several health determinants. This will be secured via the outline Operational Management Plan **[EN010147/APP/7.6.2]**.

16.9.18 The residual effect, taking account of this measure is expected to be a **negligible** (not significant) population health effect.

Open space, leisure and play

16.9.19 The Landscape, Ecology and Amenities Plan **[EN010147/APP/7.3.3]** shows existing and proposed landscape elements, including PRoW routes, hedgerows and other vegetative screening. This is a useful reference figure in combination with Chapter 17: Agricultural Land Use and Public Rights of Way Figure 17.5 **[EN010147/APP/6.4]**, which shows the PRoW network numbers. The oLEMP **[EN010147/APP/7.6.3]** shows indicative cross-sections of the PRoWs to illustrate how these could provide greenways through the solar array areas within the Order Limits. The cross-sections provide indicative visualisations at years 1, 5 and 15 to show how newly planted hedging maturing to provide screening.

Construction and Decommissioning phases

16.9.20 The construction stage is in total expected to take place over 24 months. There is potential that works associated with the construction and decommissioning for the Project may lead to temporary disturbance of public open spaces and disruption of PRoW, potentially affecting recreational activities.

16.9.21 The scientific literature identifies the following associations relating to recreation, leisure and human health. Time spent near green and blue space can positively affect mental wellbeing (Rojas-Rueda et al., 2021). The evidence suggests an inverse association between surrounding greenness and all-cause mortality (Yang et al., 2021). The health benefits of recreation and leisure include physical activity as well as mental wellbeing. Health outcomes include physical health (e.g., cardiovascular health) and mental health (e.g., decreased stress, anxiety or depression).

16.9.22 Use of places of recreation may be affected by not only physical barriers but also changes in the amenity or setting of the destination. There are positive associations between access to green space and physical activity (Yang et al., 2021). The availability of a natural environment, attractive views of nature and people's experiences using greenspace can enhance attitudes toward physical activity and perceived behavioural control via stress-relieving effects, leading to firmer intentions to engage in physical activity (Calogiuri & Chroni, 2014).

16.9.23 This section has been informed by Volume 1, Chapter 17: Agricultural Land Use and Public Rights of Way **[EN010147/APP/6.3]** which sets out relevant assessment findings and mitigation measures that have been taken into account. The health assessment also takes into account the issues raised during consultation, including with the public (Section 47 consultation), as set out in Volume 3, Appendix 16.1: Human Health Consultation and Engagement. **[EN010147/APP/6.5]**

16.9.24 Suitable pedestrian access will be maintained for diversions of any temporary route closures and appropriate wayfinding information for temporary diversions during construction and decommissioning would be provided. Disturbance to PRoWs will be temporary where reasonably practicable and PRoWs will be reinstated as soon as reasonably practical. This mitigation measure would be

developed in accordance with the Outline PRoW Management Strategy, which is to be submitted with the ES. The PRoW Management Strategy would be implemented via an Outline CoCP **[EN010147/APP/7.6.1]**, which forms a requirement of the DCO application for the Project.

16.9.25 A potential population health effect is considered likely because there is a plausible source-pathway-receptor relationship:

- The source is potential disruption to public open spaces and PRoWs, including at work areas and cable corridors;
- The pathway is behavioural change in leisure and recreational activities affecting physical activity and mental wellbeing;
- Receptors are residents in the local communities and visitors to the area.

16.9.26 Furthermore, the potential effect is probable as no highly unusual conditions are required for the source-pathway-receptor linkage.

16.9.27 The population groups relevant to this assessment are:

- The 'site specific' geographic population of:
  - For the arrays and cable corridors, five wards of:
    - E05006646 Stonesfield and Tackley
    - E05006653 Woodstock and Bladon
    - E05010933 Kidlington West
    - E05006639 Eynsham and Cassington (representative of higher (worse) community deprivation)
    - E05006640 Freeland and Hanborough
  - For the substation:
    - E05011714 Cumnor Ward
- The local population of West Oxfordshire, Cherwell, and Vale of White Horse districts.
- The sub-population vulnerable due to:
  - young age, specifically children who are overweight or who have low physical activity levels.
  - older age, specifically the elderly for whom familiar routes with appropriate mobility considerations play a part in regular exercise.
  - low income, specifically people with limited access to alternative physical activity opportunities or means of transport.
  - poor health, specifically conditions where physical activity would be beneficial to physical or mental health, including routes suited to additional mobility and sensory needs.
  - access and geographical factors, specifically the population who have limited access to natural green space accessed by the routes affected by the Project.

Sensitivity of the receptor

16.9.28 The sensitivity of the general population is **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account and are listed in **section 16.5,** Vulnerable groups**.** The general population comprise those members of the community in good physical and mental health and with greater resources to respond to change. Given the rural context, whilst many residents are unlikely to make regular use of the public footpaths affected by the Project, most people would likely also have a high capacity to adapt by selecting alternative routes or physical activity opportunities to avoid any temporary disruption or disturbance.

16.9.29 The sensitivity of the vulnerable group population is **high**. This reflects that the sub-population includes a high representation of dependants, including children, elderly and those receiving care due to poor health. This sub-population may have fewer resources and less capacity to adapt to changes. The population may therefore be more reliant on the affected routes with greater likelihood that any disruption or disturbance could affect physical activity behaviours.

Magnitude of impact

16.9.30 Volume 3, Appendix 16.4: Human Health PRoW Analysis **[EN010147/APP/6.5]** of the ES contains an analysis of impacts to PRoW as a result of the Project. A summary is given below.

16.9.31 No lengthy temporary diversions of PRoW are proposed, and should temporary diversions be required during the construction period these would be likely to be less than 50m in length. PRoW are expected to remain in situ or close to their current alignments during construction of the Project and measures to be included in the Outline PRoW Management Plan as part of the OCoCP would minimise the potential impacts of construction works and the duration of the temporary impact of disruption during construction of the Project.

16.9.32 The magnitude of change due to the Project is **low**. As reported in Volume 1, Chapter 17: Agricultural Land Use and PRoW of the ES **[EN010147/APP/6.3]**, the Shakespeare Way Long Distance Path, and National Cycle Route (NCR) five routes would be similar in distance and in quality of access, with minor adverse effects during construction. Oxford Greenbelt Way Long Distance Path is assessed by Chapter 17 to have a moderate adverse effect during construction, reflecting, conservatively, that disruption could take place across the 24 month construction period.

16.9.33 Volume 1, Chapter 17 of the ES **[EN010147/APP/6.3]** also notes that some local PRoW (bridleways[9]) may be subject to moderate adverse effects, reflecting limited alternative bridleway routes available during periods of temporary construction disruption. Construction effects to other PRoW

[9] Bridleways can be used for walking, horse riding, bicycles, mobility scooters or powered wheelchairs.

(footpaths[10]) are assessed by Chapter 17 **[EN010147/APP/6.3]** as minor adverse, reflecting that alternative routes are available within the wider PRoW network.

16.9.34 The Chapter 17 PRoW accessibility **[EN010147/APP/6.3]** conclusions on significance relate to a DMRB methodology LA112, (Highways England et al., 2019, 2020), which has specific sensitivity thresholds relating to the potential for route substitution and magnitude thresholds related to diversion distances. For public health, determining significance uses different methods (IEMA, see (Pyper, Waples, et al., 2022)), with different factors informing the professional judgement as to the effect of changes in route accessibility on population health. As they assess different outcomes with different criteria, the conclusions of public health significance under IEMA 2022 may therefore differ to route accessibility significance conclusions under DMRB LA112.

16.9.35 Project construction is anticipated to impact PRoWs connecting communities, isolated farm dwellings and recreational routes. Appendix A of the Outline PRoW Management Strategy **[EN010147/APP/7.6.1]** provides measures proposed for the management of affected PRoW and other promoted routes within the Study Area. All construction access crossings would be managed to minimise impacts. Affected communities include Wootton, Tackley, Shipton-on-Cherwell and Thrupp, Woodstock, Bladon, Kidlington, Begbroke, Church Hanborough, Cassington, Yarnton, Eynsham and Cumnor.

16.9.36 As shown in Table 16.24, four PRoWs running between Wootton and Tackley are anticipated to be impacted by temporary construction access crossings for the Project and one PROW will be permanently diverted with the diversion route longer than the existing by approximately 26m.

16.9.37 There are four PRoWs between Shipton-on-Cherwell and Thrupp, Tackley and Woodstock falling within the Project boundary. Two PRoWs would be affected by temporary construction access crossings.

16.9.38 In Bladon, three PRoWs would be impacted by temporary construction access crossings for the Project. Between Bladon and Begbroke, there are three existing PRoWs that could be affected by the Project activities, including three temporary construction access crossings, one temporary diversion and one permanent diversion.

16.9.39 From Church Hanborough to Bladon and Cassington, there are two existing footpaths that would be affected by three temporary construction access crossings. Between Cassington and Yarnton, there is one existing footpath within the Project boundary, that would be affected by a permanent diversion and one managed crossing. From Eynsham to Cumnor, there are two existing footpaths falling within the Project boundary that will be affected by two temporary diversions. The diversion routes would be longer than the existing PRoWs. In Cumnor, three existing footpaths will be affected by Project changes including 3 temporary managed crossings and one permanent diversion at Oxford Green Belt Way.

[10] Footpaths can be used for walking, running, mobility scooters or powered wheelchairs.

16.9.40 The health implication of the above is that there would be a change in the experience of using routes of public footpaths and bridleways that currently pass through or adjacent to the site. The scale of change in PRoW network access opportunity is considered *small*. This reflects that routes would remain available, many routes benefit from existing hedgerow or other vegetative screening and works are expected to be sequenced rather than affecting all parts of the network simultaneously. A minor change in the quality of the physical activity opportunity would be expected for a small minority of the population due to the temporary disruption during any rerouting and proximity to construction works. Any adverse effect on health behaviours and outcomes would be short-term and, as routes remain open, are likely to reverse on completion of the construction work in the great majority of cases.

Table 16.24: Summary of construction impacts to PRoW

Community connections	PRoWs affected	Summary of construction impacts
Wootton and Tackley	3 existing promoted footpath sections; 1 existing promoted bridleway section	• 4 managed crossings of construction access at: – 416/11/20; 416/11/30; 416/24/10 • 1 Permanent diversion at footpath 416/24/10 (diversion route longer by 26.11m)
Shipton-on-Cherwell and Thrupp to Tackley (east)/ Shipton-on-Cherwell and Thrupp to Woodstock (south)	1 existing promoted bridleway section; 1 existing footpath section	• 2 managed crossings of construction access at: – 342/1/10; – 342/6/10
Bladon	3 existing footpath sections	• 3 managed crossings of construction access at: – 265/34/10; 132/2/10; 265/26/10
Bladon to Begbroke	2 existing footpath sections; 1 existing bridleway section	• Temporary diversion of a section of footpath 132/4/10 (diversion route longer by 30.19m) • Permanent diversion at 132/4/10 (diversion route longer by 0.72m) • 5 managed crossings of construction access at; – 132/4/10; 124/5/10; 124/4/10
Church Hanborough to Bladon (east)/ Church Hanborough to Cassington (south)	2 existing footpath sections	• 3 managed crossings of construction access at: – 152/7/10 and 238/5/20
Cassington to Yarnton	1 existing footpath section	• Permanent diversion at 152/8/10 • 1 managed crossing of construction access at 152/8/10
Eynsham to Cumnor	1 existing footpath section and 1 existing bridleway section	2 temporary diversions at • footpath 206/5/30 (diversion route longer by 10.75m) and • bridleway 206/23/30 (diversion route longer by 30.92m)
Cumnor	3 existing footpath sections;	3 managed crossings of construction access at: • 184/15/20, 184/29/10, 184/15/30 1 permanent diversion at 184/15/30

Significance of effect

16.9.41 The significance of the population health effect for this determinant of health is **minor adverse** (not significant). The professional judgment is that there would, at most, be a *slight* adverse change in the health baseline for the local population. This conclusion reflects that physical activity is a local public health priority and the scientific literature on the benefits of physical activity and use of outdoor routes to physical and mental health is well established; however, the level of change in route availability and quality due to the Project is *low* and is appropriately mitigated by standard good practice construction management measures that minimise disruption and disturbance. The change is unlikely to result in significant differential effects between the general population (low sensitivity) and the vulnerable sub-population (high sensitivity). Consequently, no widening of health inequalities would be expected, and no influence is expected on the ability to deliver local or national health policy. Whilst there would likely be some delays during some journeys, such as banksmen managing construction vehicle crossings, and visual change from views of the construction works, the degree of change is not expected to be so great that people forgo use of the PRoW network. The nature of the network is that in most cases there are alternative routes (see Chapter 17: Agricultural Land Use and Public Rights of Way Figure 17.5) or the sections affected by the project are comparatively short or benefit from existing hedgerows or other screening vegetation, for example routes 416/11/20, 416/11/30, 413/5/30, 413/5/50. Where there are limited alternatives, such as in relation to cyclists using bridleways, the generally relatively faster speed of cyclists would be a factor in the periods of time spent on these sections. It is noted that an Outline Public Rights of Way Management Plan which sits within the Outline Code of Construction Practice [EN010147/APP/7.6.1] is submitted alongside the ES and has been developed to provide measures to reduce, as far as possible, potential disruption to the network of PRoW during the construction period.

Further (secondary) mitigation and residual effect

16.9.42 No additional mitigation measures are considered necessary. Therefore the residual effect remains **minor adverse** (not significant).

Operation and maintenance

16.9.43 There is potential that works associated with the operational and maintenance phases for the Project may lead to adverse effects of temporary but long-term change of context of some existing routes that may cause population level behavioural change in recreation. To avoid this outcome, the Project maintains a series of greenways between communities on footpaths and bridleways that run through the solar array installation areas within the Order Limits. The health assessment takes into account the issues raised during consultation, including with the public (Section 47 consultation), as set out in Volume 3, Appendix 16.1: Human Health Consultation and Engagement **[EN010147/APP/6.5]**.

16.9.44 The relevant health assessment mitigation is providing and maintaining new permissive paths, proposed cycling paths and the parts of the footpaths and

bridleways that run through the solar arrays, within the Order Limits, to a specification to be agreed via the detailed LEMP that provides a greenway (with width, hedges, trees and trail/signage). The greenway concept is illustratively shown in the cross-sections of Figure 7.6.3.2, within the oLEMP. Routes to include signs and information boards, including in formats that respond to visual impairments, with appropriate maintenance, as required. New routes to where reasonably practicable include access that supports people of all ages, including those with mobility and/or sensory needs. Proposed to be secured as a requirement of the DCO - via oLEMP. In this regard, make retained and new routes through the arrays appealing to people to encourage their use by providing information boards (with details of new routes); wildflowers and hedgerows (for visual screening); children's fun trails and education boards (e.g., on wildlife, heritage and solar energy). Committed within the Project design set out in Outline Layout and Design Principles document **[EN010147/APP/7.7]**.

16.9.45 The health assessment has reviewed the affected routes and worked with the landscape team to identify where there are existing hedgerows and other screening vegetation, or where new or reinforced hedgerows are needed. Consideration has also been given to providing appropriate greenway route widths where new hedgerow planting is proposed, as well as information boards and wayfinding signposts. There is also potential for beneficial effects due to new recreational routes, including new permissive paths and new sections of cycle path.

16.9.46 Further details of these impacts are summarised in Table 16.25 below, and full details are given in Volume 3, Appendix 16.4: Human Health PRoW Analysis of the ES **[EN010147/APP/6.5]**.

16.9.47 The health benefits of recreation and leisure include physical activity as well as mental wellbeing. Health outcomes include physical health (e.g., cardiovascular health) and mental health (e.g., decreased stress, anxiety or depression). Use of places of recreation may be encouraged by the provision of new routes and affected by the changes of context of existing routes.

16.9.48 This section has been informed by Volume 1, Chapter 17: Agricultural Land Use and Public Rights of Way and Volume 1, Chapter 8: Landscape and Visual Resources, which set out relevant assessment findings and mitigation measures that have been taken into account.

16.9.49 Volume 1, Chapter 17: Agricultural Land Use and Public Rights of Way **[EN010147/APP/6.3]** concludes that no adverse impacts to PRoW accessibility are anticipated during operation.

16.9.50 Volume 1, Chapter 8: Landscape and Visual Resources concludes that:

- Of the 55 Representative Viewpoints assessed, it is concluded that there will be 12 major adverse (significant) visual effects at winter Year 1 at Representative Viewpoints 5b, 5c, 13, 17, 25, 26, 32, 33, 38, 39, 50 and 54. These effects would diminish other time, with no residual significant visual effects predicted at summer Year 15.
- However, it is reasonable to assume that these effects would start to diminish by year 5. As it is anticipated that new hedgerow planting, planted at a height of 60-90 cm, would achieve a growth rate of

approximately 30 cm per year. Therefore, by year 5 of the Project, it is anticipated that newly established hedgerows, if suitably manged, would have achieved a height of approximately 2 to 3 metres and therefore screen views to much of the Project.

- Discussion of visual impacts from PRoW is set out in Volume 1, Chapter 8: Landscape and Visual Resources **[EN010147/APP/6.3]** paragraphs 8.9.109 to 8.9.118. Representative Viewpoint locations photomontages are set out in Figures 8.248 to 8.371) **[EN010147/APP/6.4]**.

16.9.51 The Landscape Masterplan (Drawing Number prj-01-0401 to prj-01-0407) illustrates the landscape and ecological strategy for implementation and long term maintenance and management of the Botley West Solar Farm. These measures are also designed to avoid or minimise adverse visual effects and adverse effects on landscape character. Measures include reinforcement of existing field boundary hedgerows; planting of lengths of new hedgerows along lengths of PRoWs and where existing hedgerows require more extensive infilling; and planting of individual trees where appropriate. These measures would be secured as a requirement of the DCO, committed via the oLEMP **[EN010147/APP/7.6.3]**.

16.9.52 A potential population health effect is considered likely because there is a plausible source-pathway-receptor relationship:

- The source is potential changes to the quality and quantity of PRoW running through the site;
- The pathway is behavioural change in use of leisure and recreational activities affecting physical activity and mental wellbeing;
- Receptors are residents in the local community and visitors to the area.

16.9.53 Furthermore, the potential effect is probable as no highly unusual conditions are required for the source-pathway-receptor linkage.

16.9.54 The population groups relevant to this assessment are:

- The ‘site specific’ geographic population of:
  - For the arrays and cable corridors, five wards of:
    - E05006646 Stonesfield and Tackley
    - E05006653 Woodstock and Bladon
    - E05010933 Kidlington West
    - E05006639 Eynsham and Cassington (representative of higher (worse) community deprivation)
    - E05006640 Freeland and Hanborough
  - For the substation:
    - E05011714 Cumnor Ward
- The local population of West Oxfordshire, Cherwell, and Vale of White Horse districts.
- The sub-population vulnerable due to:

- young age, specifically children who are overweight or who have low physical activity levels.
- older age, specifically the elderly for whom familiar routes with appropriate mobility considerations play a part in regular exercise.
- low income, specifically people with limited access to alternative physical activity opportunities or means of transport.
- poor health, specifically conditions where physical activity would be beneficial to physical or mental health.
- access and geographical factors, specifically the population who have limited access to natural green space accessed by the routes affected by the Project.

Sensitivity of receptor

16.9.55 During operation and maintenance, the sensitivity of the general population remains **low** and the sensitivity of the vulnerable population remains **high**, as detailed in paragraphs 16.9.3.8 to 16.9.3.9 (Construction and Decommissioning phase).

Magnitude of impact

16.9.56 As reported in Volume 1, Chapter 6: Project Description and Chapter 17 Agricultural Land Use and Public Rights of Way **[EN010147/APP/6.3]**, the Project is anticipated to impact PRoWs connecting communities, isolated farms and dwellings. Affected communities include Wootton, Tackley, Shipton-on-Cherwell and Thrupp, Woodstock, Bladon, Begbroke, Church Hanborough, Cassington, Yarnton and Cumnor. As shown in Table 16.25, nine PRoW sections running between Wootton and Tackley are anticipated to be running either fully or partially through arrays. One PRoW section (413/5/10) near Sansom's Farm would run fully outside the Project boundary and would be affected by Project changes including a permanent diversion and improvements in relation to cycling.

16.9.57 There are four PRoW sections between Shipton-on-Cherwell and Thrupp, Tackley and Woodstock falling within the Project boundary. Three will run fully or partially through arrays, and one route will run along one edge of the arrays. Proposed mitigation to the two PRoW sections running either fully or partially through arrays will provide greenways with appropriate width, signage and hedges and trees for visual screening from the arrays.

16.9.58 Near Bladon, there are nine existing PRoW sections falling within Project boundary that could be impacted by the operation of the Project. These will run fully or partially through arrays, and mitigation will provide greenways including hedges and trees for visual screening. One existing PRoW section will be enhanced to be suitable for cycling.

16.9.59 Between Bladon and Begbroke, there are three existing PRoW sections that could be affected by the Project. The three routes will run fully or partially through the arrays and mitigation will provide greenways including appropriate width, hedges, trees and signage.

16.9.60 From Church Hanborough to Bladon and Cassington, there are five existing PRoW sections falling within the Project boundary. One PRoW section will be enhanced to be suitable for cycling, and three routes running through the arrays will have mitigation that will provide greenways with appropriate width, and hedges and trees for screening from the arrays.

16.9.61 Between Cassington and Yarnton, there are two existing PRoW sections falling within the Project boundary. The two routes will fully run through the arrays and mitigation will provide greenways including new hedges and tree planting for visual screening from the arrays.

16.9.62 There are seven PRoW sections near Cumnor, within the Project boundary that would be affected by Project changes. All the seven routes near Cumnor will have mitigation to provide greenways including hedges and trees for visual screening from Project infrastructure.

16.9.63 The following health assessment analysis is provided in relation to the 12 significant adverse effects for users of PRoWs discussed in Volume 1, Chapter 8: Landscape and Visual Resources **[EN010147/APP/6.3]**. These are considered to be the PRoW sections and locations with the greatest potential to influence recreational behavioural change due to the Project. Commentary is provided on the context of distances, existing and new screening and on the extent to which the network includes alternative more screened route options for the periods when new hedging is maturing. Indicative time spent passing through the affected sections is also provided, these are illustrative only to allow context and comparison. It is acknowledged that vulnerable groups are likely in many cases to have slower walking speeds, which has been taken into account by the assessment.

16.9.64 Representative Viewpoint 5b looks along PRoW 416/5/20, part of a route between Wootton and Tackley. The route between Wootton and Tackley is approximately 4km (approximately 50-minute walk at an average walking speed of 4.8km per hour). Figure 8.257 shows Viewpoint 5b in Year 1 with no planting, Figure 8.259 shows the viewpoint in Year 15 with planting fully matured. The section through the solar arrays is approximately 670 m (approximately 8-minute walk at an average walking speed of 4.8km per hour). PRoW 416/5/20 has no existing vegetative screening so has open views of the solar arrays in Year 1. New hedging planted is anticipated to grow to create a greenway by Year 5. The open views of the solar arrays between Year 1 and Year 5 suggest potential for behavioural change. Whilst PRoW connectively is maintained, Chapter 17: Agricultural Land Use and Public Rights of Way **[EN010147/APP/6.5]** Figure 17.5 **[EN010147/APP/6.4]** shows that, should users prefer, there is a visually screened alternative PRoW route between Wootton and Tackley via the 416/21/10, 416/21/20 and 379/1/30. This alternative is approximately 5.3 km, which at an average walking speed of 4.8km per hour is an approximate 1 hour 6-minute journey time for a more screened route (an additional 16 minutes).

16.9.65 Representative Viewpoint 5c looks along PRoW 416/5/10, part of a route between Wootton and Tackley. The section through the solar arrays is approximately 875 m (approximately 11-minute walk at an average walking speed of 4.8km per hour). This is an open route in Year 1 that will have new hedging planted which is anticipated to grow to create a greenway by Year 5.

The open views of the solar arrays suggest potential for behavioural change. In addition to the alternative discussed in relation to viewpoint 5b, if travelling from Wootton to join Dormford Lane and travel north, there is, if users prefer, a further existing alternative visually screened route via PRoW 416/21/10 and PRoW 416/11/30 that adds approximately 0.4 km as an alternative. At an average walking speed of 4.8km per hour, this is an additional approximate 5 minutes to journey time for a more screened route.

16.9.66 Representative Viewpoint 13 looks along PRoW 342/1/10, part of a route between Woodstock and Enslow. The route between Woodstock and Enslow is approximately 3.6 km (approximately 45-minute walk at an average walking speed of 4.8km per hour). Figure 8.277 shows Viewpoint 13 in Year 1 with no planting, Figure 8.279 shows the viewpoint in Year 15 with planting fully matured. The section through the solar arrays is approximately 640 m (approximately 8-minute walk at an average walking speed of 4.8km per hour). PRoW 342/1/10 has existing vegetative screening on one side and in Year 1 has open views of the solar arrays on the other side. New hedging would be planted which is anticipated to grow to create a greenway by Year 5. The open views of the solar arrays on one side suggest some potential for behavioural change, albeit the good screening on one side exists and the route length affected is relatively short within the overall inter-community connection. No alternative screened route is identified.

16.9.67 Representative Viewpoint 17 looks west along PRoW 265/26/10 (which connects onwards to PRoW 132/2/10), part of a route between Bladon and Kidlington. The route between Bladon and north Kidlington (via Langford Lane) is approximately 4 km (approximately 50-minute walk at an average walking speed of 4.8km per hour). Figure 8.288 shows Viewpoint 17 in Year 1 with no planting, Figure 8.290 shows the viewpoint in Year 15 with planting fully matured. The section through the solar arrays along PRoWs 265/26/10 and 132/2/10 is approximately 1,090 m (approximately 14-minute walk at an average walking speed of 4.8km per hour). PRoW 265/26/10 and 132/2/10 have existing vegetative screening on one side that would be reinforced and in Year 1 would have open views of the solar arrays on the other side. New hedging would be planted which is anticipated to grow to create a greenway by Year 5. The open views of the solar arrays on one side suggest some potential for behavioural change. Whilst PRoW connectively is maintained, Chapter 17: Agricultural Land Use and Public Rights of Way Figure 17.5 **[EN010147/APP/6.4]** shows that, should users prefer, there is a more visually screened alternative PRoW route between Bladon towards Begbroke and Kidlington via Heath Lane, the 132/5/10 and 124/4/10 (the latter having reinforced hedging and new planting on one side for approximately 450 m). This alternative is approximately 4.5 km between Begbroke and west Kidlington (via Begbroke and Partridge Place), which at an average walking speed of 4.8km per hour is an approximate 56-minute journey time for a more screened route (an additional 6 minutes).

16.9.68 Representative Viewpoint 25 (and the reciprocal Viewpoint 26) looks along PRoW 238/5/20, part of a route between Church Hanborough and Cassington. The route between Church Hanborough and Cassington is approximately 4.2 km (approximately 53-minute walk at an average walking speed of 4.8km per hour). Figure 8.309 shows Viewpoint 25 in Year 1 with no planting, Figure

8.311 shows the viewpoint in Year 15 with planting fully matured. The section through the solar arrays is approximately 390 m (approximately 5-minute walk at an average walking speed of 4.8km per hour). PRoW 238/5/20 has existing vegetative screening on one side and in Year 1 has open views of the solar arrays on the other side. New hedging would be planted which is anticipated to grow to create a greenway by Year 5. The open views of the solar arrays on one side suggest some potential for behavioural change, albeit the good screening on one side exists and the route length affected is relatively short within the overall inter-community connection. No alternative screened route is identified.

16.9.69 Representative Viewpoint 32 looks west along PRoW 124/5/10 (which connects onwards to PRoW 132/4/10), part of a route between Bladon and Begbroke. The route between Bladon (Heath Lane) and Begbroke is approximately 1,660 km (approximately 21-minute walk at an average walking speed of 4.8km per hour). Figure 8.325 shows Viewpoint 17 in Year 1 with no planting, Figure 8.327 shows the viewpoint in Year 15 with planting fully matured. The section through the solar arrays along PRoWs 124/5/10 and 132/4/10 is approximately 1,160 m (approximately 15-minute walk at an average walking speed of 4.8km per hour). PRoW 124/5/10 and 132/4/10 have no existing vegetative screening so would have open views in Year 1. New hedging will be planted, which is anticipated to grow to create a greenway by Year 5. The open views of the solar arrays between Year 1 and Year 5 suggest potential for behavioural change. Whilst PRoW connectively is maintained, Chapter 17: Agricultural Land Use and Public Rights of Way Figure 17.5 **[EN010147/APP/6.4]** shows that, should users prefer, there is a more visually screened alternative PRoW route between Bladon and Begbroke via the 132/5/10 and 124/4/10 (the latter having reinforced hedging and new planting on one side for approximately 450 m). This more screened alternative is a very similar distance and travel time. The Project is also including a short stretch of permissive path between PRoWs 124/5/10 and 124/4/10, which gives users additional flexibility.

16.9.70 Representative Viewpoint 33 looks southeast along PRoW 152/7/10, part of a route between Bladon (Manor Road) and Yarnton. The route between Bladon and Yarnton is approximately 4,200 km (approximately 53-minute walk at an average walking speed of 4.8km per hour). The section through the solar arrays along PRoWs 152/7/10 is approximately 1,010 m (approximately 13-minute walk at an average walking speed of 4.8km per hour). PRoW 152/7/10 has existing vegetative screening on one side along most of the section through the solar arrays and in Year 1 has open views of the solar arrays on the other side. New hedging would be planted which is anticipated to grow to create a greenway by Year 5. The open views of the solar arrays on one side suggest some potential for behavioural change, albeit the good screening on one side exists and the route length affected is relatively short within the overall inter-community connection. Whilst PRoW connectively is maintained, Chapter 17: Agricultural Land Use and Public Rights of Way Figure 17.5 **[EN010147/APP/6.4]** shows that, should users prefer, there is a more visually screened alternative PRoW route between Bladon and Yarnton via Heath Lane, the 132/5/10 and 124/4/10 (the latter having reinforced hedging and new planting on one side for approximately 450 m). This more screened alternative

is approximately 4.5 km between Bladon and Yarnton, which at an average walking speed of 4.8km per hour is an approximate 56-minute journey time for a more screened route (an additional 3 minutes).

16.9.71 Representative Viewpoint 38 looks west along PRoW 152/6/10, part of a potential route between Church Hanborough and Cassington. The Project is proposing a permissive path between Church Hanborough and PRoW 152/6/10, which would make the connection through to Cassington. The route, including the new permissive path, between Church Hanborough and Cassington is approximately 4.5 km (approximately 56-minute walk at an average walking speed of 4.8km per hour). Figure 8.337 shows Viewpoint 38 in Year 1 with no planting, Figure 8.339 shows the viewpoint in Year 15 with planting fully matured. The section through the solar arrays (from Purwell Farm north then west along the 152/6/10 is approximately 630 m (approximately 8-minute walk at an average walking speed of 4.8km per hour). PRoW 152/6/10 has existing vegetative screening on one side, which would be reinforced in places, and in Year 1 has open views of the solar arrays on the other side. New hedging would be planted which is anticipated to grow to create a greenway by Year 5. The open views of the solar arrays on one side suggest some potential for behavioural change, albeit the good screening on one side exists and the route length affected is relatively short within the overall inter-community connection. No alternative screened route is identified.

16.9.72 Representative Viewpoint 39 looks southeast along another part of PRoW 152/6/10 that is closer to Cassington, this continues to be part of the potential route between Church Hanborough and Cassington (4.5 km or approximately 56-minute walk). The section through the solar arrays from Purwell Farm south along the 152/6/10 is approximately 925 m (approximately 12-minute walk at an average walking speed of 4.8km per hour). On this stretch, PRoW 152/6/10 has existing hedgerow vegetative screening on both sides for approximately half the route (nearest Cassington) and then hedgerow vegetative screening on just one side (which would be reinforced in places). For the stretch with existing screening on only one side there would in Year 1 be open views of the solar arrays on the other side. New hedging would be planted which is anticipated to grow to create a greenway by Year 5. The open views of the solar arrays on one side along half the route suggest some potential for behavioural change; albeit there is good screening from existing hedges on one or both sides, and the route length affected is relatively short within the overall inter-community connection. No alternative screened route is identified.

16.9.73 Representative Viewpoint 50 looks southeast from PRoW 184/50/20 towards PRoW 184/30/40 and the Main Substation, part of a route between Farmoor or Filchampstead and Cumnor. The route between Filchampstead and Cumnor (along the south east of Farmoor Resevoir and via Leys Road) is approximately 2,560 km (approximately 32-minute walk at an average walking speed of 4.8km per hour). The section past the Main Substation along PRoWs 184/50/10, 184/50/20 and 184/29/10 is approximately 950 m (approximately 12-minute walk at an average walking speed of 4.8km per hour). Although the route has some vegetative screening, even with the additional planting the Project will undertake, the Main Substation will be a visible feature. Figure 8.361 shows Viewpoint 50 in Year 1 with no planting, Figure 8.363 shows the viewpoint in Year 15 with planting fully matured. The NGET Substation would

also be a dominant visual feature on this stretch of the route. Whilst PRoW connectively is maintained, Chapter 17: Agricultural Land Use and Public Rights of Way Figure 17.5 **[EN010147/APP/6.4]** shows that, should users prefer, there is a more visually screened alternative PRoW route between Filchampstead and Cumnor via the 184/15/20 and 184/15/30 (the latter having existing vegetative screening along one side and new hedging to be planted along the other side for approximately 590 m). This more screened alternative is a very similar distance and travel time.

16.9.74 Representative Viewpoint 54 looks north along PRoW 184/16/20, part of a route between Cumnor and Botley. The route between Cumnor and Botley is approximately 2.55 km (approximately 32-minute walk at an average walking speed of 4.8km per hour). Figure 8.369 shows Viewpoint 54 in Year 1 with no planting, Figure 8.371 shows the viewpoint in Year 15 with planting fully matured. The section through the solar arrays is approximately 500 m (approximately 6-minute walk at an average walking speed of 4.8km per hour). PRoW 184/16/20 has no existing vegetative screening so has open views of the solar arrays in Year 1. New hedging planted is anticipated to grow to create a greenway by Year 5. The open views of the solar arrays suggest potential for behavioural change. Whilst PRoW connectively is maintained, Chapter 17: Agricultural Land Use and Public Rights of Way Figure 17.5 **[EN010147/APP/6.4]** shows that, should users prefer, there is a more visually screened alternative PRoW route between Cumnor and Botley via the 184/15/30 and 184/22/20 (the latter having existing vegetative screening along one side and new hedging to be planted along the other side for approximately 590 m). This more screened alternative is a very similar distance and travel time.

16.9.75 For public health the magnitude of beneficial change due to the Project's new permissive paths and upgrading of some existing route sections to be suitable for cycling is **low**. The scale of change from the above is considered a *small* enhancement of the existing footpath and cycle network. The new permissive paths would facilitate a *long-term* increase in physical activity opportunity whilst in effect. The new routes would be expected to support *minor improvements* in morbidity related physical and mental health outcomes for a *small minority* of the study area population.

16.9.76 For public health the magnitude of adverse change due to the Project in the short term is **medium**. This is driven by the scale of actual and perceived changes due to the Project. These changes would contribute to the subjective quality of the physical activity opportunity of the PRoW network, and thus its level of use. The scale of actual change varies across the PRoW network, as described in Volume 1, Chapter 8: Landscape and Visual Resources, but for this health assessment is characterised as a *medium* scale of change overall, reflecting the limited locations where there are unscreened near views despite the large area of the Project. Behavioural change effects would relate to *frequent* to *occasional* use of routes. The impacts may contribute to *minor* changes in morbidity related physical and mental health outcomes for a *large minority* of the study area population. On routes (and route alternatives) with existing mature planting smaller scales of change would be expected.

16.9.77 In the medium and long term as planting matures it is expected that the public health magnitude of change would reduce to **low**. Behavioural change effects would relate to *frequent* to *occasional* use of routes on the PRoW network. Once mitigation such as new planting, information boards and wayfinding signage on the new greenways, is established, this is anticipated to result in positive outcomes in terms of uptake of PRoW use. However, in the short- to medium-term areas of new planting would provide less screening initially and therefore the scale of the visual change would be low adverse, shifting to low beneficial in the medium- to long-term. The expectation is that it would take approximately 5 years to achieve appropriate hedgerow screening across the majority of routes. The overall effect is expected to contribute to *minor* changes (initially adverse then beneficial) in morbidity related physical and mental health outcomes for a *large minority* of the study area population.

Table 16.25: Summary of Project impacts to PRoW during operations and maintenance

Community connections	PRoW sections affected	Summary of operational impacts	Proposed mitigation
Wootton and Tackley	3 existing footpath sections, with 1 being enhanced to a cycling path (1 promoted); 7 existing bridleway sections (5 promoted)	• 3 routes will run partially through the arrays • 7 routes will run fully through the arrays. • 1 route will run fully outside of the Project boundary.	The permissive path, 3 footpaths and 7 bridleways to be mitigated to provide sections of greenway on the sections through the solar arrays within the Order Limits, with appropriate width, hedges, trees and trail/signage, as appropriate.
Shipton-on-Cherwell and Thrupp to Tackley (east)/ Shipton-on-Cherwell and Thrupp to Woodstock (south)	3 existing bridleway sections (2 promoted); 1 existing footpath section	• 2 routes will pass fully or partially along one edge of the arrays. • 2 routes will run fully through the arrays.	1 footpath and 1 bridleway to be mitigated to provide sections of greenway on the sections through the solar arrays within the Order Limits, with appropriate width, hedges, trees and trail/signage, as appropriate.
Bladon	9 existing footpath sections with 1 being enhanced to a cycling path	• 2 routes will run fully along one edge of the arrays. • 4 routes will run partially through the arrays. • 3 routes will run fully through the arrays	8 footpaths to be mitigated to provide sections of greenway on the sections through the solar arrays within the Order Limits, with appropriate width, hedges, trees and trail/signage, as appropriate.
Bladon to Begbroke	2 existing footpath sections; 1 existing bridleway section	• 1 route will run partially through the arrays. • 2 routes will run fully through the arrays	2 footpaths and 1 bridleway to be mitigated to provide sections of greenway on the sections through the solar arrays within the Order Limits, with appropriate width, hedges, trees and trail/signage, as appropriate.
Church Hanborough to Bladon (east)/ Church Hanborough to Cassington (south)	5 existing footpath sections with 1 being enhanced to a cycling path	• 1 route will run fully along one edge of the arrays. • 2 routes will run partially through the arrays. • 2 routes will run fully through the arrays.	5 footpaths to be mitigated to provide sections of greenway on the sections through the solar arrays within the Order Limits, with appropriate width, hedges, trees and trail/signage, as appropriate.

Community connections	PRoW sections affected	Summary of operational impacts	Proposed mitigation
		• 2 routes will run fully outside of and not adjacent to the Project boundary.	
Cassington to Yarnton	2 existing footpath sections	• 2 routes will run fully through the arrays.	2 footpaths to be mitigated to provide sections of greenway on the sections through the solar arrays within the Order Limits, with appropriate width, hedges, trees and trail/signage, as appropriate.
Cumnor	7 existing footpath sections (2 promoted);	• 3 routes will pass partially along one edge of the arrays. • 1 route will run fully along one edge of the arrays. • 1 route will run fully outside of and not adjacent to the Project boundary. • 2 routes will run close to project infrastructure other than arrays (main and secondary substation)	7 footpaths (including 2 promoted footpaths) to be mitigated to provide sections of greenway on the sections through the solar arrays within the Order Limits, with appropriate width, hedges, trees and trail/signage, as appropriate.

Significance of effect

16.9.78 The significance of the population health effect for this determinant of health is as follows.

16.9.79 Firstly, a **minor beneficial** (not significant) effect is expected from the new permissive paths and cycle routes. The connectivity of the cycle routes will be a matter of post-submission further discussion, and as such limited benefit has been assigned at this stage. The permissive path between Church Hanborough and PRoW 152/6/10, which would make the connection through to Cassington, is noted as being a notable improvement in the current network. These new recreational routes (permissive paths and cycleways) would be beneficial in the promotion of recreation and leisure activities. The professional judgement is that there would be a slight beneficial change in the health baseline for the local population related to long-term use of the new and improved routes.

16.9.80 Secondly, in relation to the setting of routes and potential for behavioural change in use of the existing PRoW network, there is the potential for a **moderate adverse** (significant) effect in the short-term. This conclusion is driven by community concern about the Project, which is likely to influence perceptions of the PRoW network at the start of the operational period, irrespective on the actual degrees of visual change along the affected routes.

16.9.81 The potential for a lasting moderate adverse effect is considered to be avoided. This reflects that although there is visual change across a wide area of the PRoW network linking multiple communities; the specific context of those routes has been reviewed and the potential for people to forgo use of the PRoW network or derive significantly less benefit from it is considered unlikely. This reflects the presence of existing full or partial screening on many routes, or route alternatives, or for the unscreened sections to be comparatively short within the context of the inter-community journey. The professional judgment is that weighing community feedback that raises concerns, the actual context of the affected routes and the extensive mitigation to establish greenways on the PRoW that pass through the solar arrays within the Order Limits, the public health implication of the changes in the setting of PRoWs due to the Project would be a **minor adverse** (not significant) population health effect in the medium term. This takes into account an initial greater degree of change in the first years of operation, with the level of effect reducing thereafter. The locations of greatest visual change have been reviewed and the specific context of those routes has been taken into account. It is acknowledged that there is likely to be some behavioural change prior to planting maturing and this will be across multiple routes linking communities. However, health outcome changes on a scale to significantly affect public health are considered unlikely.

16.9.82 Once the planting matures to provide appropriate screening of the arrays along the greenway sections within the Order Limits, there is expected to be a **minor beneficial** (not significant) effect in the medium to long term.

16.9.83 These conclusions acknowledge that perceptions of the Project and the visual changes across a large area of PRoW networks and surrounding views may discourage use of routes for some people. However, supported by the health

assessment, the Project has included substantial mitigation to provide screening and other route enhancements. The network also affords a range of route options in most cases, as well as existing full or partial screening on many of the relevant sections of these routes. Taking account of the Project's mitigation measures and the PRoW network context, there is considered to be limited potential for lasting widespread behavioural change in recreational use of the PRoW network at the population level, including in relation to vulnerable groups.

16.9.84 There may be a *small* reduction in the local health baseline in the short term, reducing to a *slight* reduction in the medium term. Such an effect could for these periods be *influential* to public health policy to promote physical activity and reduce obesity, including potentially widening inequalities. However, the Project includes extensive mitigations to affected PRoWs where they pass through the solar arrays within the Order Limits to provide greenways, with visual screening, information boards and signage, including responding the needs of vulnerable groups. Once the benefit of these measures is established, this is likely to result in longer-term positive outcomes in the recreational use of these parts of the PRoW network. These long-term changes that promote inter-community PRoW connections are anticipated to result in *slight* improvements to the local health baseline, and will contribute to positively influencing public health policy that promotes physical activity.

16.9.85 These conclusions reflect that physical activity is a local public health priority and the scientific literature on the benefits of physical activity to health is well established.

Further mitigation and residual effects

16.9.86 No additional mitigation measures are considered necessary. Therefore, the residual effects remain in relation to route setting: **moderate adverse** (significant) in the short term; **minor adverse** (not significant) in the medium term; and **minor beneficial** (not significant) in the long term. There would also be **minor beneficial** (not significant benefits) in the short, medium and long term associated with the new permissive paths and new sections for cycling.

16.9.87 There would be periodic monitoring (years 1, 5, and 15, as set out within oLEMP) of PRoW use aligned with the methodologies used for the baseline surveys that are reported within the ES to determine if measures to avoid widespread behavioural change in use of PRoWs were effective and if necessary, with any additional action arising to reduce access barriers, to be agreed via the detailed LEMP. Secured in the Outline Operational Management Plan **[EN010147/APP/7.6.2]**.

Transport modes, access and connections

Construction and Decommissioning phases

16.9.88 This section considers how construction and decommissioning affects public health through changes in road safety and accessibility, including travel times for road users or emergency services, and access to health promoting goods and services. There is potential that construction works including cable laying

and construction vehicles may disrupt local vehicle traffic (private and public transport) as well as active travel along highways (pedestrians and cyclists).

16.9.89 This section has been informed by Volume 1, Chapter 12: Traffic and Transport **[EN010147/APP/6.3]** which sets out relevant assessment findings and mitigation measures that have been considered.

16.9.90 The scientific literature identifies the following general points relating to the association between transport including active transport and human health. The primary function of transport is the movement of people and goods between places, enabling access to employment, economic, and social opportunities as well as to essential services. Transport which is affordable and accessible may be viewed as an important determinant of health by facilitating access to key socio-economic opportunities (Thomson et al., 2008). Active transportation (i.e. walking or cycling) has been directly related to increased residential density, street connectivity, mixed land use and amenities within a walkable distance (Thomson et al., 2008). Walking and cycling for transportation (i.e. active transportation) provides substantial health benefits from increased physical activity (Mueller et al., 2015). Health gains exceed detrimental effects of traffic incidents and air pollution exposure. For example, active transport to work or school is significantly associated with improved cardiovascular health and lower body weight (Xu et al., 2013).

16.9.91 Volume 1, Chapter 12: Transport and Traffic:

- The impact on driver delays resulting from daily traffic flows associated with construction (including temporary delays to public transport services) is negligible to minor adverse.
- The impact on non-motorised user delay caused by construction work or construction traffic is negligible to minor adverse.
- The impact on non-motorised user amenity (fear and intimidation) caused by construction works or construction traffic is negligible to minor adverse.
- The impact on community severance caused by construction works or construction traffic is negligible to minor adverse.
- The impact on road safety caused by construction works or construction traffic is negligible to minor adverse.
- The impact of abnormal indivisible loads (AILs) on the safety of users of the local road network, strategic road network and other transport receptors is negligible to minor adverse.

16.9.92 For road safety, health effects may be associated with the severity or frequency of road traffic incidents. For accessibility, health effects may be associated with emergency response times or non-emergency treatment outcomes associated with delays or non-attendance.

16.9.93 The construction stage is in total expected to take place over 24 months. The construction activities comprise several distinct activities. Some of these activities are sequential and some are concurrent. The effects at any given location are therefore typically of a much shorter duration. The assessment

takes into account where different sections of a route may be affected at different times, with localised effects influencing the overall route.

16.9.94 The health assessment takes into account the issues raised during consultation, including with the public (Section 47 consultation), as set out in Volume 3, Appendix 16.1: Human Health Consultation and Engagement **[EN010147/APP/6.5]**.

16.9.95 The potential effect is considered likely because there is plausible source-pathway-receptor relationship:

- The source is the presence of construction vehicle and traffic restrictions on the existing network, including at work areas and cable corridors.
- The pathway is disruptions to active travel and changes in driver delay, accidents and safety. These factors also influence emergency response times.
- Receptors are local road users, including motor vehicles, pedestrians and cyclists, as well as emergency services.

16.9.96 Furthermore, the potential effect is probable as no highly unusual conditions are required for the source-pathway-receptor linkage.

16.9.97 The population groups relevant to this assessment are:

- The 'site specific' geographic population of:
  - For the arrays and cable corridors, five wards of:
    - E05006646 Stonesfield and Tackley
    - E05006653 Woodstock and Bladon
    - E05010933 Kidlington West
    - E05006639 Eynsham and Cassington (representative of higher (worse) community deprivation)
    - E05006640 Freeland and Hanborough
  - For the substation:
    - E05011714 Cumnor Ward
- The local population of West Oxfordshire, Cherwell, and Vale of White Horse districts.
- The sub-population vulnerable due to:
  - Young age vulnerability (children and young people are potentially more vulnerable road users)
  - Old age vulnerability (older people are potentially more vulnerable road users)
  - Poor health vulnerability (people with existing poor physical and mental health in relation to health trip journey times)
  - Access and geographical vulnerability (people who experience existing access barriers or who rely on the affected routes, including for healthcare and other amenities).

16.9.98 Specific facilities and receptors situated within the site specific populations that are relevant to the health assessment (such as schools, healthcare facilities and nursing homes) are identified in **section 16.5.20** and are relevant to this assessment section.

16.9.99 The scientific literature indicates that there is an association between the transport changes, road safety and accessibility. The literature does not identify particular thresholds for effects. The assessment has had regard to the population groups identified in the literature that may be particularly sensitive. For example, children, pregnant women and cyclists (particularly older cyclists) are generally more vulnerable in terms of road safety. People with lower socio-economic status typically face more transportation barriers in accessing healthcare.

Sensitivity of the receptor

16.9.100 The sensitivity of the general population is **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account and are listed in **section 16.5,** Vulnerable groups**.** This reflects that most people in the site specific and local area would have many alternative routes in the road network to the affected sections. It also includes those who would only make occasional use of the affected sections of the road network. The general population comprise those members of the community with a high capacity to adapt to changes in access, including changes in healthcare access, for example due to greater resources and good physical and mental health.

16.9.101 The sensitivity of the vulnerable group is **high**. The vulnerable sub-population includes dependants, such as children, elderly and those receiving care due to poor health. This sub-population may have *fewer resources* and *less* capacity to adapt to changes. The population may therefore be more *reliant on the affected routes* with greater likelihood that any disruption or disturbance could affect safety or access to health supporting services. Vulnerability is linked to mode of travel, including pedestrians and cyclists being more sensitive to road safety changes. It also relates to age (young people and older people) being more vulnerable to accident severity, as well as to those who are reliant on services accessed on affected sections of the road network (e.g. traveling to schools). Vulnerability may be increased in areas of higher deprivation. Deprived populations may already face more access barriers compared to the general population and therefore be more sensitive to access changes. Low incomes may compound access barriers by limiting the ability to adapt. Vulnerability also includes those accessing health services (emergency or non-emergency) at times and locations affected by congestion. Ambulance services (and the recipients of their care) are particularly sensitive to delays in response times (time taken to arrive and stabilise the patient). People in poor or very poor health may be more frequent users of healthcare service and therefore be more sensitive to access changes.

Magnitude of impact

16.9.102 As reported in Volume 1, Chapter 12: Traffic and Transport of the ES, an outline construction plan (OCTMP) **[EN010147/APP/7.6.1]** is submitted with

the application for development consent. CTMP(s) will be developed in accordance with the OCTMP prior to construction. The CTMP will set out traffic management measures to maintain access and provide early notice of any route changes. Construction of the Project would generate traffic of an average of 125 total heavy goods vehicle (HGV) movements per day to/from the construction compounds and the affected highways include the A34, A40, A44 and other local road networks.

16.9.103 Adoption of a CTMP which will set out any restrictions that may be required on HGV operating hours, for example along sections of the highway network that provide access to local schools. The CTMP is secured as a requirement of the DCO via the Code of Construction Practice. An Outline CTMP is set out in the Outline CoCP **[EN010147/APP/7.6.1]** and detailed fully in the Detailed CoCP secured as a requirement of the DCO.

16.9.104 The magnitude of impact on population health due to the Project is considered to be **low**.

16.9.105 With regard to health-related travel times and accessibility the scale of change in delays is expected to be *small.* The frequency with which health related journeys may be affected is likely to be *occasional* for most people though for a few people, severity could relate to a *small change* in risk for morbidity or mortality. Even with the delays described in Volume 1, Chapter 12: Traffic and Transport, the priority given to ambulances travelling under blue lights would be expected to reduce any changes in journey times. The temporary nature of the work and ability for people to adapt to known planned diversions or delays means there is unlikely to be a significant change to population health outcomes associated with active travel and access to social infrastructure such as shops, employment and educational facilities.

16.9.106 In relation to road safety at the population level the scale of change in accidents would be *small*. The frequency of any incidents would be *occasional*, with severity related to a very *minor change* in risk of injury or mortality (though with outcome reversal gradual or permanent). Additionally, mitigation such as strict traffic management and warning signage will be used to further minimise potential risks. The expectation is that *very few* people would be affected, with no or slight implications for healthcare services.

16.9.107 The scale of change is therefore considered *small*, and *medium-term*, though there would be limited duration at any given location on the road network due to the transitory nature of construction works, e.g. to lay cables. There is the potential for *minor adverse changes* in morbidity for a *small minority* of the population. Most adverse effects on health behaviours and outcomes would be expected to reverse on completion of the construction works. Outcome reversal may be *rapid* once full access is reinstated, with slight service quality implications.

Significance of the effect

16.9.108 The significance of the population health effect due to this Project is **minor adverse** which is not significant. The magnitude of the impact is low, and the sensitivity of the vulnerable group population is high.

16.9.109 The professional judgment is that there would, at most, be a *slight adverse* change in the health baseline. This conclusion reflects that road safety and access to health supporting services are public health priorities and there is causal association that is supported by the scientific literature. However, the level of change due to the Project is *small* and is appropriately *mitigated* by standard good practice measures (secured through the OCTMP **[EN010147/APP/7.6.1]**) that minimise disruption and disturbance. The change is unlikely to result in significant differential or disproportionate effects between the general population (low sensitivity) and the vulnerable sub-population (high sensitivity). Consequently, *no widening of health inequalities* would be expected, and no influence is expected on the ability to deliver local or national health policy.

Further (secondary) mitigation and residual effect

16.9.110 Additional mitigation includes ensuring that early and ongoing information sharing with road users and emergency and healthcare services with regard to any temporary road closures, diversions or lane closures, secured through the OCTMP **[EN010147/APP/7.6.1]**. The residual effect of such mitigation measures is expected to be a **negligible** (not significant) population health effect.

Community identity, culture, resilience and influence

Operation and maintenance phase

16.9.111 This section considers the potential for likely significant effects to community identity from the visual impact of the operational solar farm. Community identity is a determinant of wellbeing and is influenced by aesthetic elements of the landscape. A range of responses may be expected depending on people's outlook. Some people may experience positive effects due to the Project's associations with addressing climate change and energy security. Other people may experience negative effects due to a greater degree of built form within their views. To take a conservative approach this section considers the latter response.

16.9.112 This section has been informed by Volume 1, Chapter 8: Landscape and Visual Resources which sets out relevant assessment findings and mitigation measures that have been taken into account. The health assessment also takes into account the issues raised during consultation, including with the public (Section 47 consultation), as set out in Volume 3, Appendix 16.1: Human Health Consultation and Engagement **[EN010147/APP/6.5]**.

- The potential health effect is considered likely because there is a plausible source-pathway-receptor relationship:The source is the solar arrays, substation (main substation and national grid electricity transmission (NGET) substation) and supporting infrastructure as a new visual element;The pathway is visual change triggering psychological responses; and

- Receptors are local communities with frequent near views of the Project, particularly from dwellings (users of PRoWs are discussed above under the Open space, leisure and play determinant).

16.9.113 Furthermore, the potential effect is probable as no highly unusual conditions are required for the source-pathway-receptor linkage.

16.9.114 The population groups relevant to this assessment are:

- The 'site specific' geographic population of:
  - For the arrays and cable corridors, five wards of:
    - E05006646 Stonesfield and Tackley
    - E05006653 Woodstock and Bladon
    - E05010933 Kidlington West
    - E05006639 Eynsham and Cassington (representative of higher (worse) community deprivation)
    - E05006640 Freeland and Hanborough
  - For the substation:
    - E05011714 Cumnor Ward.
- The sub-population vulnerable due to:
  - low income, specifically people who have fewer resources to adapt to change.
  - poor health, specifically people with existing health conditions or high stress or anxiety levels who feel strongly about the changes associated with the Project.
  - access and geographical factors, specifically the population with the greatest visual change due to proximity.

Sensitivity of the receptor

16.9.115 The sensitivity of the general population is **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account and are listed in **section 16.5,** Vulnerable groups. The general population comprise those members of the community in good physical and mental health and with greater resources to respond to change. Given the topography and low-lying nature of the built elements of the Project, the visual impacts would not affect most residents. Occasional or passing views of the solar arrays are not expected to affect population health.

16.9.116 The sensitivity of the vulnerable group is **high**. This reflects that the sub-population includes those with existing poor mental health or who have high degrees of concern or uncertainty about the Project. This sub-population also includes those who have less capacity to adapt to the changes due to near views of the Project from their homes. This vulnerable sub-population may experience disproportionate effects.

Magnitude of impact

16.9.117 For the health assessment, the magnitude of the change due to the Project is **low**.

16.9.118 Relevant Project parameters include solar panel heights up to 2.3 m high; PCS heights of 3.5 m; NGET substation height of 12.5 m; main Project substation height of 11 m and secondary Project substation height of 6 m.

16.9.119 Volume 1, Chapter 8: Landscape and Visual Resources states that due to the low level of the Project, particularly the solar arrays, and proposed mitigation, there is no potential for any private views to be adversely affected to an extent that would result in a substantial level of harm. As such, private views are not considered further in Chapter 8. Mitigation includes a minimum 25 m offset from the outer edges of residential properties. Volume 1, Chapter 8 also concludes that there will be no significant visual effects on landscape character areas within 5km of the Project.

16.9.120 As reported in Volume 1, Chapter 8: Landscape and Visual Resources **[EN010147/APP/6.3]**, the scale of the visual change within the majority of views is small, with only users of the public footpaths crossing the site experiencing greater visual changes of the arrays (see the Open space, leisure and play determinant above for assessment of PRoW users in terms of physical and mental health outcomes. This issue is not assessed here to avoid double counting). Further detail on visible infrastructure and measures taken to reduce visibility are given in Volume 1, Chapter 6: Project Description **[EN010147/APP/6.3]**. Occasional and partial views from vantage points or of a transitory nature whilst passing the solar farm are not expected to affect population health outcomes related to community identity. Although the visual change would be experienced over the *long-term* on a *continuous* basis (albeit not permanent), visual effects will diminish over time as a result of mitigation, and no changes are anticipated in near views from dwellings to a degree that would indicate the potential for a population level effect. There is potential, at most, for a *minor* change in quality of life for *very few* people within the population. A degree of adaptation to views would be expected over time (albeit not this is not relied on), and *no health service implications* would be expected.

Significance of the effect

16.9.121 The significance of the population health effect for this determinant of health is **minor adverse** (not significant). The professional judgement is that there would be a *very limited* adverse change in the health baseline for the local population reflecting that *very few* people are affected from residential near views or the arrays, substation or other Project infrastructure, and the level of visual change is limited by the site context (low level, as detailed above). This conclusion reflects that whilst the scientific literature establishes that there can be an association between visual change and health outcomes, the Project would not result in a scale of changes that would affect the delivery of local or national health policy on this issue. The degree of visual change is not disproportionately greater for more health deprived populations, so no change in health inequalities is expected.

Further (secondary) mitigation and residual effect

16.9.122 No additional mitigation measures are considered necessary. Therefore the residual population health effect remains **minor adverse** (not significant).

Education and training

Construction, Operations and maintenance and Decommissioning phases

16.9.123 This section discusses changes to education and training during the construction, operation and decommissioning phases of the Project. The project provides opportunities for career development and upskilling, as well as education on solar energy generation.

16.9.124 The scientific literature identifies the following associations relating to socioeconomic opportunity and human health. Increased educational attainment is associated with better health outcomes and delayed mortality. Education is associated with life expectancy, morbidity, health behaviours and educational attainment plays an important role in health by shaping opportunities, employment and income (The Lancet Public Health, 2020). Yu-Tzu Wu and colleagues show in their study that, differences in educational attainment and wealth are strongly associated with disparities in healthy ageing across a large population of older people (Wu et al., 2020)). Education is therefore an important indicator of socioeconomic status that plays an important role in reducing inequalities and in improving income, employment, social networks, and behaviours (Byhoff et al., 2017).

16.9.125 This section has been informed by Volume 1, Chapter 15: Socio-economic **[EN010147/APP/6.3]** which sets out relevant assessment findings and mitigation measures that have taken into account.

16.9.126 A potential population health effect is considered likely because there is a plausible source-pathway-receptor relationship:

- The source is education, upskilling and career development opportunity.
- The pathway is good quality education and skills development which is influential for health.
- Receptors are local communities particularly young people and people of working age.

16.9.127 Furthermore, the potential effect is probable as no highly unusual conditions are required for the source-pathway-receptor linkage.

16.9.128 The population groups relevant to this assessment are:

- The local population of West Oxfordshire, Cherwell, and Vale of White Horse districts
- The regional population of South East England
- The sub-population vulnerable due to:
  - Young age vulnerability (young people), particularly young adults early in their career.

- Poor health vulnerability (people with existing poor physical and mental health) who would disproportionally benefit from access to opportunities.
- Low-income vulnerability (people living in deprivation, including those on low incomes for whom upskilling and career development may be particularly beneficial).

Sensitivity of the receptor

16.9.129 The sensitivity of the general population is **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account are listed in **section 16.5,** Vulnerable groups. This reflects that most people in the local area would make use of alternative educational or training opportunities or have existing educational attainment appropriate to their vocation and career progression.

16.9.130 The sensitivity of the vulnerable group population is **high**. Vulnerability in this case relates to young adults, in relation to apprenticeship opportunities, and children or young people, in relation to educational support initiatives. For both these groups those who are from disadvantaged backgrounds would be particularly sensitive to educational interventions that provide knowledge, new skills or personal development. Young people leaving education or early in their careers may have the most to gain from an increase in training opportunities as a pathway into good quality local employment.

Magnitude of impact

16.9.131 Volume 1, Chapter 15: Socio-economic concludes:

- The impact on education and skills is direct through on the job training provided as part of an employment and skills plan. Further details on the actual level of skills and training to be provided is outlined in the Volume 3, Appendix 15.2: Outline Skills, Supply Chain & Employment Plan **[EN010147/APP/6.5]** of the ES.
- The impact on education and training over the construction and decommissioning stages is considered to be minor beneficial.
- An educational area with basic facilities – benches and a covered area will be provided for schools to undertake learning activities. This will provide early stage solar-specific skills to young people studying in the area. The resulting effect on improved skills and qualification during operation is considered to be minor beneficial.

16.9.132 As outlined in Volume 1, Chapter 15: Socioeconomic of the ES **[EN010147/APP/6.3]**, the associated identified skill needs will be communicated to local education and training providers. The project team will work alongside the Local Enterprise Partnership, Local Authorities and relevant public sector agencies, as well as businesses in the supply chain, to ensure that relevant stakeholders are well informed about the labour requirements associated with the Project. Furthermore, any particular gaps in the skills base of the local population that are identified, will also be

communicated to relevant stakeholders to help ensure that local people have a good chance of accessing opportunities that arise in the area.

16.9.133 Supported by the health assessment relevant Project commitments include:

- Provide open and covered space in the solar farm for use by school field trips. An educational area could provide local schools with the basic facilities – benches and a covered area to undertake their own learning activities. Potential to walk to the educational site and potential for guided access to array areas would support both physical activity and learning outcomes for population health. Indicative layout (as set out with Outline Operational Management Plan [EN010147/APP/7.6.2]. Includes toilet (compost) and minibus parking (either provided or existing). Secured as a requirement of the DCO - via oOMP [EN010147/APP/7.6.2]. Location, size and scale will be finalised during detailed design phase and included within the detailed Operational Management Plan. The educational area is illustratively shown in Figure 16.2: Illustrative 3D Views of Educational Facility **[EN010147/APP/6.4]**. The expectation is that there will be post-consent community involvement in the refinement of design and selection of an appropriate location.
- Work with local education and training providers to support opportunities to provide local adult learning linked to construction, operation and maintenance and decommissioning job opportunities relevant to disadvantaged adults facing skills barriers to employment opportunities. Secured through Appendix 15.2: Outline Skills, Supply Chain & Employment Plan **[EN010147/APP/6.5]**.
- As far as reasonably practicable (e.g. subject to standards and security checks) provide a targeted scheme of access to construction, operation and maintenance and decommissioning training schemes and apprenticeships for young people in the local and regional area who are Not in Education, Employment, or Training (NEET). Secured through Appendix 15.2: Outline Skills, Supply Chain & Employment Plan **[EN010147/APP/6.5]**.

16.9.134 The magnitude of change due to the Project is **medium**. These training and educational opportunities are considered to be of *medium* scale. This reflects that the upskilling and training opportunities are likely to be frequent to occasional over the long-term, associated with *minor changes* in morbidity and quality of life for a *small minority* of the population due to improved socio-economic status.

Significance of the effect

16.9.135 The significance of the population health effect for this determinant of health is **moderate beneficial** (significant). The professional judgment is that there would be a *small* beneficial change in the health baseline for the local population. This conclusion reflects that the scientific literature establishes a *clear relationship* between career development and factors that promote health or are protective against poor health, particularly mental health. The scale and nature of young peoples' education and career development is expected to be

influential in narrowing health inequalities locally, and more generally *supporting delivery* of health policy to improve local population health.

Further (secondary) mitigation and residual effect

16.9.136 No additional mitigation measures are considered necessary. Therefore the residual effect remains **moderate beneficial** (significant).

Employment and income

Construction, Operations and maintenance and Decommissioning phases

16.9.137 This section discusses changes to employment and income during the construction, operation and decommissioning phases of the Project. The project provides opportunities for good quality employment.

16.9.138 Changes in direct and indirect employment opportunities have socio-economic effects that impact upon health and mental well-being. There is strong evidence for a protective effect of employment on depression and general mental health (van der Noordt et al., 2014). The long-term unemployed carry a markedly higher burden of disease, particularly mental illness, than employed persons and those who are unemployed only for a short time.

16.9.139 Improvements in indicators like income, education, employment status and racial inclusion, could result in a reduction in mortality and morbidity outcomes improving overall population health. Improving more than one indicator simultaneously results in a greater health improvement (Salgado et al., 2020). Socioeconomic position is consistently associated with children's nutrition knowledge, parent modelling, home food availability and accessibility. Socioeconomically disadvantaged children are at higher risk of consuming poor diets, in particular less fruits and vegetables and more non-core foods and sweetened beverages (Zarnowiecki et al., 2014).

16.9.140 This section has been informed by Volume 1, Chapter 15: Socio-economic **[EN010147/APP/6.3]** which sets out relevant assessment findings and mitigation measures that have been taken into account at this stage of the application.

16.9.141 A potential population health effect is considered likely because there is a plausible source-pathway-receptor relationship:

- The source is changes in direct and indirect jobs and economic activity.
- The pathway is good quality employment and income providing more health supporting resources.
- Receptors are people of working age (and their dependants).

16.9.142 Furthermore, the potential effect is probable as no highly unusual conditions are required for the source-pathway-receptor linkage.

16.9.143 The population groups relevant to this assessment are:

- The local population of West Oxfordshire, Cherwell, and Vale of White Horse districts

- The regional population of South East England
- The sub-population vulnerable due to:
  - Young age vulnerability (children and young people who are dependants, as well as young adults early in their careers)
  - Old age vulnerability (older people who are dependants)
  - Poor health vulnerability (people with existing poor physical and mental health, including for employment opportunities and as dependants)
  - Low-income vulnerability (people living in deprivation, including those on low incomes for whom good quality employment may be particularly beneficial)
  - Access and geographical vulnerability (people for whom other job opportunities may be limited due to access and geographical limitations).

Sensitivity of the receptor

16.9.144 The sensitivity of the general population is **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account are listed in **section 16.5,** Vulnerable groups. This reflects that most people would already be within stable employment that would be unaffected by the Project (or being a dependant of such a person).

16.9.145 The sensitivity of the vulnerable group population is **high**. Vulnerability in this case relates to people and their dependants who are on low incomes, have poor job security, poor working conditions or who are unemployed. Future young or older people may also come to rely on those employed.

Magnitude of impact

16.9.146 Volume 1, Chapter 15: Socio-economic concludes:

- The impact of reduced unemployment levels is both direct through construction, operational and decommissioning jobs created as part of the Project and also indirect through jobs created in the supply chain or local economy. Less direct jobs are projected to be created during the operational and maintenance stage than at construction stage with a higher level of displacement also expected. It is likely the number of indirect jobs created in the supply chain during decommissioning will be reduced.
- The Project is anticipated to result in an overall net gain of 191 local FTE jobs during construction, and 13 direct local FTE jobs during operation. The number of construction jobs created by the decommissioning phase is considered to be similar to that of the construction phase. The resulting impact on employment during the construction and decommissioning phases is moderate beneficial, and during operation is minor beneficial.

- The impact on economic output is both direct through capital investment in the project during the construction and decommissioning phases; and business rate spending during operation and maintenance and also indirect through the GVA of jobs created by the construction, operational and decommissioning works.
- The impact due to the Project on economic output over the construction, operation and decommissioning phases is considered to be minor beneficial.

16.9.147 Supported by the health assessment relevant Project commitments include:

- As far as reasonably practicable (e.g., subject to standards and security checks) work with local employment schemes (e.g. Job Centre) to support opportunities to provide local unemployed adults with access to interviews for construction, operation and maintenance and decommissioning job opportunities. This may include advertising and interviewing for jobs locally and using approaches that facilitate access for people with disabilities or social disadvantage. Secured through the Volume 3, Appendix 15.2: Outline Skills, Supply Chain & Employment Plan of the ES **[EN010147/APP/6.5]**.
- Engage in the ethical procurement of the supply chain. Secured through Volume 3, Appendix 15.2: Outline Skills, Supply Chain & Employment Plan of the ES **[EN010147/APP/6.5]**.

16.9.148 For population health, the magnitude of change due to the Project is **medium**. This reflects a *medium scale of change* within the context of the study area employment market. The employment would be *medium-term* for construction and decommissioning and *long-term* for operation and maintenance and on a *continuous basis*, whether full-time or part-time. Such jobs are likely to be associated with *minor changes* in morbidity and quality of life for a *small minority* of the population due to improved socio-economic status and increased spending on health supporting resources and activities (including through indirect benefits to dependants).

Significance of the effect

16.9.149 The significance of the population health effect for this determinant of health is **moderate beneficial** (significant). The effect is characterised as being beneficial in direction and due to *direct* and *indirect* health pathways. The professional judgment is that there would be a *small* beneficial change in the health baseline for the local population. This conclusion reflects that the scientific literature establishes a *clear relationship* between good quality employment and factors that promote health or are protective against poor health, particularly mental health. The scale and nature of employment is expected be *influential* in narrowing health inequalities locally, and more generally *supporting delivery of health policy* to improve local population health.

Further (secondary) mitigation and residual effect

16.9.150 No additional mitigation measures are considered necessary. Therefore the residual effect remains **moderate beneficial** (significant).

16.9.151 Monitoring of this benefit would be undertaken, including of the proportion of local people (particularly within the local study area) who are not in employment, education or training (NEET), unemployed, have high job instability or low-income characteristics who access training and apprenticeship or good quality stable employment opportunities related to the Project. Monitoring would allow the benefit to be confirmed, support engagement of NEET populations with any relevant opportunities, and also allow further tailoring to target local vulnerable groups if required. Secured through Appendix 15.2: Outline Skills, Supply Chain & Employment Plan **[EN010147/APP/6.5]**.

Climate change and adaptation

Operations and maintenance phase

16.9.152 Renewable energy generation supports avoiding adverse health effects associated with climate change. Negative health effects associated with climate change include heat-related disorders (e.g., heat stress and lower work capacity), respiratory disorders (e.g., worsened asthma), infectious diseases, food insecurity (e.g., lower crop yields) and injury and mental stress associated with natural disorders (e.g., flooding or fires). These effects relate to the UK population, but also the global population, particularly deprived populations in low- and middle-income countries.

16.9.153 Renewable energy generation and subsequent reduced greenhouse gas emissions supports avoiding adverse health effects associated with climate change. These include extreme temperature and climatic effects related to infectious diseases occurrence, food insecurity, injury and death (UKHSA, 2023a). These effects are relevant to the UK population, but also the global population, particularly deprived populations in low- and middle-income countries. There are important global inequalities in the effects of climate change, with the greatest adverse effects on health expected in the some of the poorest and least economically developed populations. In contrast, populations that benefit from rapid social and economic development are expected to experience reduced (but not eliminated) adverse effects to health from climate change (Costello et al., 2009). Changes in health outcomes related to climate change are therefore expected to be relatively small in the UK. When considering health and well-being, there is a global responsibility to reduce the effect of climate-altering pollutants that are expected to reduce health outcomes. The Intergovernmental Panel on Climate Change states that there are opportunities to achieve co-benefits from actions that reduce emissions of climate altering pollutants and at the same time improve health (IPCC, 2014).

16.9.154 This section has been informed by Volume 1, Chapter 14: Climate Change **[EN010147/APP/6.3]** which sets out the relevant assessment.

16.9.155 The potential health effect is considered likely because there is a plausible source-pathway-receptor relationship:

- Source: renewable energy generation;
- Pathway: avoiding climate altering emissions;
- Receptor: national and global population, particularly deprived populations in low- and middle-income countries.

16.9.156 Furthermore, the potential effect is probable as no highly unusual conditions are required for the source-pathway-receptor linkage.

16.9.157 The population groups relevant to this assessment are:

- The 'national' area is England, the UK and international for global effects.
- The sub-population vulnerable due to low incomes, including where this overlaps with being a dependant (children, older adults and people with poor health requiring care) and/or other social disadvantage or deprivation.

Sensitivity of the receptor

16.9.158 The sensitivity of the general population is **low**. Common factors that differentiate that sensitivity of the general population and the vulnerable group population have been taken into account and are listed in **section 16.5,** Vulnerable groups. The general population comprise those members of the community in good physical and mental health and with greater resources to respond to climate adaptation.

16.9.159 The sensitivity of the vulnerable group population is **high**. This reflects the sub-population on low incomes for whom climate adaptation or the adverse effects of climate change pose a greater risk. This is particularly the case for dependants on issues such as health risks of temperature extremes, including heatwaves and cold weather.

Magnitude of impact

16.9.160 As reported in Volume 1, Chapter 14: Climate Change, the operational phase of the Project would:

- Enable the generation of renewable energy and thereby assist in the decarbonisation of grid electricity and the displacement of fossil fuels as a generation source.
- By reducing the need for electricity generation from existing sources with a higher carbon intensity, the Project will indirectly result in green house gas (GHG) emissions that would otherwise have occurred to be avoided. This would result in a net reduction of GHG emissions released into the atmosphere, considered to be a beneficial effect.

16.9.161 The magnitude of change due to the Project's 840Mwe of renewable electricity is **low**.

16.9.162 The score reflects the contribution to reducing global climate change health effects, which is a *very small scale* of change in the context of the wider energy

sector, but with implications for a *global population*. Avoiding adverse effects of climate change provide a *minor* reduction in risks for population mortality (e.g., reducing excess winter deaths) and morbidity (e.g., reducing exacerbation of respiratory and mental health conditions). Such effects may bring *small benefits* to healthcare services by reducing capacity burdens.

Significance of the effect

16.9.163 The significance of the population health effect for this determinant of health is **minor beneficial** (not significant). The professional judgment is that the Project provides a protective effect on the health baseline and, although *slight* in the context of many climate related emission sources, this would be important for public health. This conclusion reflects the scientific literature establishes *clear associations* between climate change and health outcomes. The *Project supports health policy*, including being influential for local public health and wider sustainability agendas. The Project contributes to *narrowing inequalities* that are at risk of widening due to reduced national energy security and global climate change.

Further (secondary) mitigation and residual effect

16.9.164 No further enhancement is considered necessary for the operational stage in relation to population health outcomes. Therefore the residual effect remains **minor beneficial** (not significant).

Air quality

Construction and Decommissioning phases

16.9.165 This section discusses changes to local air quality during construction and decommissioning of the Project, and related effects on human health. Construction activities such as earthworks, handling and disposal of spoil, wind-blown particulate material from stockpiles and movement of vehicles; have the potential to result in localised dust emissions.

16.9.166 The scientific literature indicates that there is an association between air quality emissions and health and wellbeing effects. The link is primarily between particulate matter and health effects (Cesaroni et al., 2014; Meo & Suraya, 2015). Whilst the literature supports there being thresholds set for health protection purposes, it also acknowledges that for PM there are non-threshold health effects (i.e. when there is no known exposure threshold level below which adverse health effects may not occur) (World Health Organization, 2021). There are population groups that may be particularly sensitive to air quality effects. For example, young children are particularly susceptible to air pollution because of their developing lungs, high breathing rates per bodyweight, and amount of time spent exercising outdoors. Other vulnerable groups include the sick (e.g. people with type 2 diabetes), the elderly, and pregnant women.

16.9.167 This section has been informed by Volume 1 Chapter 19: Air Quality **[EN010147/APP/6.3]** (doc. Ref 6.3), which sets out the relevant assessment findings and mitigation measures that have been taken into account.

16.9.168 Potential effects on human health are considered likely because there is a plausible source-pathway-receptor relationship:

- The source is air pollutants (particularly Nitrogen Dioxide (NO_2) and particulate matter ($PM_{2.5}$ and PM_{10}) [11]) from construction activities, including at work areas and cable corridors.
- The pathway is diffusion through the air; and
- Receptors are residents and long-term occupiers of nearby properties and community buildings, as well as short-term users of nearby PRoW.

16.9.169 Furthermore, the potential effect is probable as no highly unusual conditions are required for the source-pathway-receptor linkage.

16.9.170 The population groups relevant to this assessment are:

- The 'site specific' geographic population of:
  - For the arrays and cable corridors, 5 wards of:
    - E05006646 Stonesfield and Tackley
    - E05006653 Woodstock and Bladon
    - E05010933 Kidlington West
    - E05006639 Eynsham and Cassington (representative of higher (worse) community deprivation)
    - E05006640 Freeland and Hanborough
  - For the substation:
    - E05011714 Cumnor Ward
- The sub-population vulnerable due to:
  - Young age vulnerability (children and young people);
  - Old age vulnerability (older people);
  - Poor health vulnerability (people with existing poor respiratory or cardiovascular health); and
  - Access and geographical vulnerability (people for whom close proximity to Project change increases sensitivity).

16.9.171 Construction activities that produce dust tend to relate to the coarser fractions of PM_{10} and potential nuisance from dust deposition on property. The great majority of anthropogenic $PM_{2.5}$ health effects relate to combustion related processes, particularly changes in transport patterns, solid fuel burning from space heating or industrial processes that use fossil fuels.

16.9.172 Whilst the focus of discussion in this health chapter differentiates between coarse PM during construction and fine PM during operation, the health outcomes of PM_{10} and $PM_{2.5}$ are not distinguished in this assessment. This reflects that both are typically present (though the relative proportions change) and that the evidence base does not consistently distinguish their effects

[11]Particulate matter that is less than or equal to 10 µm in diameter (PM10), less than or equal to 2.5 µm (PM2.5)

particularly given that $PM_{2.5}$ is a subset of PM_{10}. However, generally, elevated concentrations of $PM_{2.5}$ are considered of greater concern due to their greater potential to interact within the body.

16.9.173 Environmental air pollution is associated with increased risk of respiratory and cardiovascular diseases. Environmental pollution exerts its detrimental effects on the heart by developing pulmonary inflammation, systemic inflammation, oxidative stress, endothelial dysfunction and prothrombotic changes (Meo & Suraya, 2015). The adverse effects on health of PM and NO_2 indicates that the effects occur at air pollution concentrations lower than those in guidelines (WHO, 2013b). Long term exposure to particulate matter is associated with incidence of coronary events, and this association persists at levels of exposure below the current limit values (Cesaroni et al., 2014). The magnitude of the long-term effects of NO_2 on mortality is at least as important as that of $PM_{2.5}$.

16.9.174 For construction dusts, the main health outcomes are likely to relate to exacerbation of existing conditions, such as asthma or COPD (i.e. airway inflammation by coarse PM) and to reductions in wellbeing associated with annoyance or reduced amenity. Whilst other outcomes (e.g. cardiovascular events) may be relevant in the event of brief high concentrations, such elevated exposures are expected to be avoided though the use of standard good practice mitigation that would be secured through the Institute of Air Quality Management (IAQM) dust guidance as discussed in Volume 1, Chapter 19: Air Quality of the ES **[EN010147/APP/6.5]** .

Sensitivity of the receptor

16.9.175 The sensitivity of the general population is **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group have been taken into account and are listed in **section 16.5,** Vulnerable groups of this report. The general population comprise those members of the community who live, work and study at a distance where high levels of dispersion and deposition would greatly limit the effects any change in exposure due to the Project. Furthermore, most people enjoy *good* respiratory health (e.g. do not have asthma) and are not a life stage (e.g. infant or frail elderly) with particular sensitivity to air quality.

16.9.176 The sensitivity of the vulnerable group population is high. This reflects that the sub-population includes a high representation of dependants, both children, elderly and those receiving care due to poor health. For example, existing respiratory conditions including asthma and COPD and type 2 diabetes would increase sensitivity. People likely to be most affected by the Project are those either living or working close to the construction sites (see receptors listed in Volume 1, Chapter 19: Air Quality of the ES **[EN010147/APP/6.5]**).

Magnitude of impact

16.9.177 Volume 1, Chapter 19: Air Quality of the ES **[EN010147/APP/6.3]** states that:

- During peak construction activity, the dust emission magnitude as a result of HGV movement is classified as large.

- The results of the risk assessment of construction dust impacts undertaken using the IAQM dust guidance, indicates that before the implementation of mitigation and controls, the risk of dust impacts would be high. Implementation of mitigation measures described in the IAQM construction dust guidance would be expected to reduce the residual dust effects to a level categorised as negligible. The resulting air quality effect of the Project is therefore considered to be not significant overall.
- In relation to the Project's construction traffic emissions, the impact on the surrounding area from NO_2, PM_{10}, and $PM_{2.5}$ is considered to be negligible.

16.9.178 For population health, the magnitude of change due to the Project is low. As reported in Volume 1, Chapter 19: Air Quality of the ES **[EN010147/APP/6.5]**, construction traffic, construction activity and construction compound dust impacts on the identified sensitive receptors are predicted to be of *short* to *medium-term duration.* A comprehensive set of mitigation measures and dust monitoring as according to the IAQM dust guidance will be implemented during the construction phase, to further minimise construction dust impacts. This will be secured through the oCoCP **[EN010147/APP/7.6.1]**.

16.9.179 Occasionally, weather conditions may coincide with construction activities to generate higher levels of dust. This can cause temporary annoyance, and for people with existing poor health, higher levels of coarse dust in the air can exacerbate some conditions (e.g. asthma). PM is larger and heavier and so it is deposited more quickly. This means that the concentration of coarse PM in the air reduces rapidly as it gets further from the source.

16.9.180 Overall, the potential for nuisance-type dust effects is expected to be limited in extent. At these levels it is unlikely that there would be discernible changes in the risk of developing a new health condition or of exacerbating an existing condition. Such changes would be *short-term*, with a *very minor influence* on quality of life and/or morbidity risk for respiratory and cardiovascular conditions for a *very few people*. Most effects would *rapidly reverse*, with *no discernible* influence for healthcare services. These changes are not anticipated to be materially different for users of PRoW, who will also experience more *infrequent* and intermittent impacts from construction activities. In relation to construction traffic emissions, any health effect would relate to *negligible to very low* changes in exposure to NO_2, PM_{10} and $PM_{2.5}$, which are anticipated to occur on a *frequent* basis over the *medium-term* (medium-term relates to construction activities). Additional exposure due to the Project would represent an incremental addition to the existing baseline conditions resulting in a *very minor* change in morbidity and mortality related population health risk, e.g. associated with respiratory and cardiovascular health outcomes. Any health effect due to a very slight change in risk factors is likely limited to a *small minority* of the study area population and the effect on routine health service planning is likely *negligible*. The potential for non-threshold effects of NO_2 and $PM_{2.5}$ (even below WHO advisory guidelines and UK statutory standards) to population health has been taken into account in determining the magnitude of the change in health outcomes and the significance of potential air quality effects on population health.

Significance of the effect

16.9.181 Construction air quality effects are considered **minor adverse** (not significant). The minor adverse (rather than negligible) score represents a conservative assessment finding given scientific uncertainty (and emerging evidence) about non-threshold health effects of NO_2, and $PM_{2.5}$. The score takes into account WHO advisory guidelines, the updated $PM_{2.5}$ standards and also reflects that air pollution is a specific local public health priority. The level of change in the health baseline due to the Project is likely to be *very limited*, with at most a *marginal effect* on the delivery of health policy and inequalities. This is a public health acknowledgement of the very small incremental contribution to air pollution that the Project would make, but also recognition that at the Project level this should not be considered a significant effect on population health or health inequalities.

Further (secondary) mitigation and residual effect

16.9.182 No additional mitigation measures are considered necessary. Therefore the residual effect remains **minor adverse** (not significant).

Noise and Vibration

Construction and Decommissioning phases

16.9.183 Construction and decommissioning activities may result in changes to noise during the day and at night. Some specific activities such as concrete pouring require periods of night-time working, however the majority of works would occur during normal daytime construction working hours. There is also the potential for operational noise effects associated with the substations.

16.9.184 In general, the scientific literature suggests the potential for annoyance with an indication of further stress due to exposure to environmental noise including aviation noise (Guski et al., 2017). Annoyance describes negative reactions such as disturbance, irritation, dissatisfaction, and nuisance (Guski, 1999). Environmental noise can initiate physiological stress responses in an individual that leads to a cascade of effects including a rise in heart rate and in levels of stress hormones(Guski et al., 2017). Night-time noise may disrupt the total sleep time and the required physiological and mental restoration in an individual even at low levels (Guski et al., 2017).

16.9.185 Whilst the literature supports there being thresholds at which effects (such as annoyance and sleep disturbance) are likely, it also acknowledges the subjective nature of responses to noise. In this regard noise effects can be considered to have non-threshold effects, with characteristics other than sound levels also determining the influence on health outcomes (WHO, 2018). The assessment has regard to the population groups identified in the literature that may be particularly sensitive. For example, children, the elderly, the chronically ill, people with a hearing impairment, shift-workers and people with mental illness (e.g., schizophrenia or autism).

16.9.186 This section has been informed by Volume 1, Chapter 13: Noise and Vibration **[EN010147/APP/6.3]**, which sets out relevant assessment findings and mitigation measures that have been taken into account.

16.9.187 A potential population health effect is considered likely because there is a plausible source-pathway-receptor relationship:

- The source is noise and vibration generated by construction and decommissioning activities, including at work areas and cable corridors.
- The pathway is pressure waves through the air and ground vibrations.
- Receptors are residents and long-term occupiers of nearby properties and community buildings, as well as PRoW users.

16.9.188 Furthermore, the potential effect is probable as no highly unusual conditions are required for the source-pathway-receptor linkage.

16.9.189 The population groups relevant to this assessment are:

- The 'site specific' geographic population of:
  - For the arrays and cable corridors, 5 wards of:
    - E05006646 Stonesfield and Tackley
    - E05006653 Woodstock and Bladon
    - E05010933 Kidlington West
    - E05006639 Eynsham and Cassington (representative of higher (worse) community deprivation)
    - E05006640 Freeland and Hanborough
  - For the substation:
    - E05011714 Cumnor Ward;
- The sub-population vulnerable due to:
  - Young age vulnerability (children and young people are more vulnerable for disturbances to learning environments)
  - Old age vulnerability (older people are potentially more vulnerable for cardiovascular effects of noise)
  - Poor health vulnerability (people with existing poor physical and mental health)
  - Social disadvantage (people with limited resources to adapt to Project changes)
  - Access and geographical vulnerability (for example, people who live in close proximity to construction activities or the Project substations).

Sensitivity of the receptor

16.9.190 The sensitivity of the population is considered to be **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account and are listed in **section 16.5,** Vulnerable groups. The general population comprise those members of the community in good physical and mental health and with resources that enable a high capacity to adapt to change. Additionally, most people live, work or

study at a distance from the substations, construction and decommissioning works where noise and vibration would be unlikely to be a source of concern.

16.9.191 The sensitivity of the vulnerable group population is **high**. The sub-population more sensitive to noise includes children, elderly and those receiving care due to poor health. This sub-population may experience existing widening inequalities due to living in areas with increased noise and elevated deprivation, with limited capacity to adapt to changes. Vulnerability particularly relates to those living close to the substations, construction and decommissioning activities, including those spending more time in affected dwellings, e.g., due to low economic activity, shift work or poor health. People who are concerned or have high degrees of uncertainty about noise and its effect on their wellbeing may be more sensitive to changes in noise.

Magnitude of impact

16.9.192 As reported in Volume 1, Chapter 13: Noise and Vibration, **[EN010147/APP/6.3]** construction and decommissioning would involve activities that are mobile (i.e., only temporarily taking place at a given location during the construction period), such as trenching for cable laying; and activities that are static such as construction of the substations. Mobile works will impact receptors for short periods of time, whereas static works will last longer.

16.9.193 Volume 1, Chapter 13: Noise and Vibration concludes:

- During construction, noise impacts due to the preparation and use of the construction compounds are considered to be minor adverse.
- During construction, noise and vibration impacts due to solar PV modules pile driving[12] are considered to be minor adverse.
- During construction, the noise and vibration impacts due to HDD (Horizontal Directional Drilling) are considered to be minor adverse.
- During construction, noise impacts due to open cut trenching along the cable route is minor adverse.
- During construction, noise and vibration impacts due to the construction of the main substation and NGET substation is assessed to be minor adverse.
- During construction, noise impacts due to additional vehicle movements on local highway network are minor adverse.
- The noise impacts due to additional vehicle movements on local highway networks.
- During decommissioning, the export cable will either remain in situ or be removed from link boxes and joint bays. No new trenching or drilling is

[12] Solar pile driving is a construction process where piles are driven into the ground to provide a stable foundation for ground-mounted solar panels.

anticipated. Link boxes remain in situ. The effect will, therefore, be minor adverse.

16.9.194 In terms of population health, the magnitude of change due to the proposed construction and decommissioning works is considered to be **low**. The *small* scale of change in noise and vibration levels is likely to predominantly relate to a *minor* change in quality of life and/or cardiovascular and mental wellbeing morbidity for a *small minority* of the population. The changes would be of *medium-term* duration in relation to construction and decommissioning related noise exposures. These changes are not anticipated to be materially different for users of PRoW, who will also experience more *infrequent* and intermittent impacts from construction activities. Prolonged periods of construction and decommissioning noise at night or daytime disruption of educational activities at schools are not anticipated.

Significance of the effect

16.9.195 Noise and vibration impacts from construction activities and construction traffic will be mitigated through the use of appropriate construction hours and best practice measures agreed through the Outline Construction Noise Management Plan which has been prepared as part of the Outline CoCP with the CoCP to be secured as DCO requirement, as detailed in Volume 1, Chapter 13: Noise and Vibration.

16.9.196 The effects are considered to be of **minor adverse** (not significant). Based on these mitigation measures, the residual effect is characterised as being *adverse* in direction, *direct, medium-term* (or *short-term* at a given location) for construction and decommissioning phases effects. Although the scientific literature indicates a *clear association* between elevated and sustained noise and vibration disturbance and reduced health outcomes, the changes would result in a very *limited* effect in the health baseline of the population. The distribution of effects is not expected to affect health inequalities. The level of effect is not expected to affect the ability to deliver local or national health policy.

Further (secondary) mitigation and residual effect

16.9.197 No additional mitigation measures are considered necessary. Therefore the residual effect remains **minor adverse** (not significant).

Operations and maintenance phase

16.9.198 This section discusses the operational changes in noise exposure from the Project that may be detrimental to population health.

16.9.199 This section has been informed by Volume 1, Chapter 13: Noise and Vibration **[EN010147/APP/6.3]**, which sets out relevant assessment findings and mitigation measures that have been taken into account.

16.9.200 A potential population health effect is considered likely because there is a plausible source-pathway-receptor relationship:

- The source is noise generated by operation of the substations.

- The pathway is pressure waves through the air and ground vibrations.
- Receptors are residents and long-term occupiers of nearby properties and community buildings, as well as PRoW users near the substations.

16.9.201 Furthermore, the potential effect is probable as no highly unusual conditions are required for the source-pathway-receptor linkage.

16.9.202 The population groups relevant to this assessment are the same as those listed in paragraphs 16.9.189 and 16.9.190.

Sensitivity of the receptor

16.9.203 The sensitivity of the population is considered to be **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account and are listed in **section 16.5,** Vulnerable groups. The general population comprise those members of the community in good physical and mental health and with resources that enable a high capacity to adapt to change. Additionally, most people live, work or study at a distance from the substations, where noise and vibration would be unlikely to be a source of concern.

16.9.204 The sensitivity of the vulnerable group population is **high**. The sub-population more sensitive to noise includes children, elderly and those receiving care due to poor health. This sub-population may experience existing widening inequalities due to living in areas with increased noise and elevated deprivation, with limited capacity to adapt to changes. Vulnerability particularly relates to those living close to the substations, including those spending more time in affected dwellings, e.g., due to low economic activity, shift work or poor health. People who are concerned or have high degrees of uncertainty about noise and its effect on their wellbeing may be more sensitive to changes in noise.

Magnitude of impact

16.9.205 Volume 1, Chapter 13: Noise and Vibration concludes:

- During the operation of the Project, noise impacts are assessed to be minor adverse. Sources of noise during operation include the main substation site and the NGET substation, both located in the Southern Site.

16.9.206 In terms of population health, the magnitude of change due to the proposed construction and decommissioning works is considered to be **low**. The *small* scale of change in noise and vibration levels is likely to predominantly relate to a *minor* change in quality of life and/or cardiovascular and mental wellbeing morbidity for a *small minority* of the population. The changes would be *long-term* for noise impacts from the substations. The greatest potential for effects is likely for the few people living close to the substations. These changes are not anticipated to be materially different for users of PRoW, who will also experience more *infrequent* impacts when using PRoW located near the substations.

Significance of the effect

16.9.207 Noise impacts from operation and maintenance of the substations will be mitigated through Best Practicable Means implemented through the design of the substations. This will be detailed within the Outline Code of Construction Practice **[EN010147/APP/7.6.1]**.

16.9.208 The effects are considered to be of **minor adverse** (not significant) for population health. Based on these mitigation measures, the residual effect is characterised as being *adverse* in direction, *direct,* and *long-term* in duration. Although the scientific literature indicates a *clear association* between elevated and sustained noise and vibration disturbance and reduced health outcomes, the changes would result in a very *limited* effect in the health baseline of the population. The distribution of effects is not expected to affect health inequalities. The level of effect is not expected to affect the ability to deliver local or national health policy.

Further (secondary) mitigation and residual effect

16.9.209 No additional mitigation measures are considered necessary. Therefore the residual effect remains **minor adverse** (not significant).

Public understanding of EMF risk

Operation and maintenance phase

16.9.210 This section presents findings on the potential for a population health effect related to concern about electromagnetic fields (EMF), affecting mental health and wellbeing, rather than the likelihood of an actual risk to public health. The health assessment takes into account the issues raised during consultation, including with the public (Section 47 consultation), as set out in Volume 3, Appendix 16.1: Human Health Consultation and Engagement **[EN010147/APP/6.5]**.

16.9.211 All electrical systems, including natural processes and living organisms generate EMF. EMF effects diminish rapidly with distance, often requiring only a few metres, or less, to reach background levels.

16.9.212 As noted in Table 16.23 the Project adopts and would comply with the exposure standards set out in Department for Energy and Climate Change (DECC) Voluntary Code of Practice (Department for Energy Security and Net Zero, 2012) including compliance with the International Commission on Non-Ionising Radiation Protection (ICNIRP) public exposure guidelines (ICNIRP, 1998, 2010). In relation to construction this is secured through the outline Code of Construction Practice (CoCP) **[EN010147/APP/7.6.1]**. In relation to operation this is secured through DCO requirement secured through outline operational management plan **[EN010147/APP/7.6.2]**.

16.9.213 ICNIRP is the internationally recognised independent non-profit organization that provides scientific advice and guidance on the health and environmental effects of non-ionizing radiation. This includes the ICNIRP being formally recognised by the WHO, and the WHO state: "*The main conclusion from the WHO reviews is that EMF exposures below the limits recommended in the*

ICNIRP international guidelines do not appear to have any known consequence on health." (WHO, 2006)

16.9.214 The Projects electrical infrastructure is set out in Table 6.3 of Volume 1, Chapter 6: Project Description **[EN010147/APP/6.3]**. It is noted that the majority of electrical infrastructure detailed in Table 6.3 would operate under 132kV. In most cases well under, at 33 kV. Statements of compliance by design regarding the operation of such overhead and underground cables are as follows:

- Overhead cables operating at 132 kV and below (Energy Networks Association, 2024a)[13]
- Underground cables operating at 132 kV and below (Energy Networks Association, 2024b)[14]

16.9.215 For the avoidance of doubt, all the Project's electrical infrastructure would be designed to comply with the DECC Voluntary Code of Practice (Department for Energy Security and Net Zero, 2012) and ICNIRP public exposure guidelines (ICNIRP, 1998, 2010). This includes electrical infrastructure operating above 132kV (for example at 275 kV and 400 kV), such as the Project secondary and main substations, the NGET substation and cabling connecting theses. Consequently, all electrical infrastructure would comply with the relevant health protection standard set out in Government policy.

16.9.216 The focus of this assessment section is therefore not on the actual risk, which is considered appropriately mitigated, but on people's understanding of risks (risk perception). This relates to the potential for community concern about their proximity to the electrical infrastructure, including underground cables and substations, to affect mental health, even where relevant public EMF exposure guideline limits are met. Further detail on the electrical infrastructure relating to the Project is given in Volume 1, Chapter 6: Project Description **[EN010147/APP/6.3]**.

16.9.217 Project features and expectations about a project can be understood in different ways by different people. This assessment considers these views, ways that health and well-being might be affected and a course of action. The aim is to find a way to address and allay concerns that people might have, inform communications and consultation elements of the Project, and contribute towards reducing anxiety.

16.9.218 A potential population mental health effect is considered likely because there is a plausible source-pathway-receptor relationship:

13 https://www.emfs.info/sites/g/files/atxybb296/files/Statement%20of%20Compliance%20of%20overhead%20lines%20at%20132kV%20and%20below.pdf

14 https://www.emfs.info/sites/g/files/atxybb296/files/Statement%20of%20Compliance%20of%20underground%20cables%20at%20132kV%20and%20below.pdf

- Source: public understanding of risks related to the Project's electrical infrastructure and cable corridors can differ from the actual risks that are derived from scientific studies.
- Pathway: anxiety, stress and a sense of powerlessness can have adverse effects on health and mental well-being while a sense of control is beneficial to health and well-being.
- Receptor: people living and working close to the Project's electrical infrastructure, notably the substations, who may perceive a risk.

16.9.219 Furthermore, the potential mental health effects are probable as no highly unusual conditions are required for the source-pathway-receptor linkage. An effect on the population's physical health associated with the actual exposures or risks is unlikely as mitigation breaks the pathway between sources and receptors.

16.9.220 The population groups relevant to this assessment are:

- The 'site specific' geographic population of:
  - For the arrays and cable corridors, 5 wards of:
    - E05006646 Stonesfield and Tackley
    - E05006653 Woodstock and Bladon
    - E05010933 Kidlington West
    - E05006639 Eynsham and Cassington (representative of higher (worse) community deprivation)
    - E05006640 Freeland and Hanborough
  - For the substation:
    - E05011714 Cumnor Ward; noting that this is indicative because concern on an issue is not geographically bounded in the same way as actual risk.
- The local population of West Oxfordshire, Cherwell, and Vale of White Horse districts.
- The sub-population vulnerable due to:
  - Low-income vulnerability (people with fewer resources may feel less able to adapt to changes that concern them).
  - Poor health vulnerability (people with existing poor mental health may be more sensitive to changes that concern them).
  - Access and geographical vulnerability (people for whom close proximity increases sensitivity).

16.9.221 The scientific literature identifies the following general points relevant to potential effects and health outcomes. The way risks are understood has important influences on health behaviour (Ferrer & Klein, 2015). Awareness of risk can affect mental, physical and emotional wellbeing, and can be worse when it is accompanied by uncertainty (Luria et al., 2009).

16.9.222 The ultimate goal of dialogue between regulators and communities is to produce an informed public (Sinisi, 2004). Trust, credibility, competence, fairness and empathy are of great importance (Sinisi, 2004) and the routine monitoring and clear communication of results can greatly increase trust, empower people and reduce fear (WHO, 2013a).

16.9.223 The views that people hold can be associated with low-grade illnesses (e.g., headaches or hypertension) and can be exacerbated when there is uncertainty (Luria et al., 2009).

Sensitivity of the receptor

16.9.224 The sensitivity of the general population is **low**. Most people in the study area live, work or travel at a separation distance from the Project's infrastructure and activities, including electrical infrastructure where they would not be concerned about the potential for risks. This group also includes that proportion of the population who are *ambivalent* or *not concerned* about EMF.

16.9.225 The sensitivity of the vulnerable sub-population is **high**. This reflects that the sub-population includes people who may be *uncertain* or *concerned* about EMF and this may exacerbate existing mental health conditions or be a source of stress and anxiety in itself. This may particularly be the case for people with near views and/or who live in close proximity to the Project's electrical infrastructure. Low incomes or existing deprivation may contribute to a limited sense of control and *reduced capacity* to obtain further information.

Magnitude of impact

16.9.226 To reduce community concern in relation to EMF the Project commits to:

- Continued community consultation and sharing of non-technical information relating to the project (e.g. explaining compliance with public exposure guidelines), to allow people to express concerns and gain awareness of actual health effects. This will partially be met through the DCO application process (for example the discussion of the issue within this chapter and the non-technical summary). Non-technical information and a point of contact for community liaison will also be provided on the project website. Secured through the Outline Operational Management Plan **[EN010147/APP/7.6.2]**.
- To use landscaping, in combination with layout and design, to minimise visibility of electrical infrastructure (other than arrays and substations) close to PRoWs, in order to reduce perceptions of risk. Proposed to be secured as a requirement of the DCO - via oLEMP.

16.9.227 The magnitude of change due to the Project is **low**. The level of actual risk exposure is negligible as stated above, however the scale of change that may contribute to community concern is *medium*, *continuous* and *long-term*. The severity of the health outcome relates predominantly to a *minor change* in mental health related morbidity for *a very few people* within the population. Such individual level effects are *unlikely* to have implications for health service capacity. For many people there is likely to be a *rapid* reversal of effects should their concerns be responded to and resolved to their satisfaction.

Significance of the effect

16.9.228 The significance of the population health effect is **negligible to minor adverse** (not significant). The professional judgment is that there could be a *very limited* adverse change in the health baseline for the surrounding population. This conclusion reflects scientific understanding of the impact of *uncertainty* or *concern* about environmental risks on mental health. It also reflects that the actual risks would be *well within* regulatory standards and that most members of the public would expect this to be the case. At most the Project change may have a *marginal* influence on population health inequalities. Any effect is likely to be greatest at the start of the operational period, reducing as planting that provides screening matures, reducing visual cues.

Further (secondary) mitigation and residual effect

16.9.229 No additional mitigation measures are considered necessary. Therefore the residual effect remains **negligible to minor adverse** (not significant).

Wider societal infrastructure and resources

Operation and maintenance phase

16.9.230 The electricity produced by the Project would enable many aspects of everyday life that either protect or promote good health.

16.9.231 UK energy security is important for maintaining continuous and affordable electricity which supports many aspects of public health. This includes power to safely cook and refrigerate food, regulate the temperature and lighting of homes and schools, operate health and social care services, maintain economic productivity and employment, and operate technologies that improve quality of life and social support. Sustained interruption of supply or rapid increases in costs would be expected to result in reductions in health and well-being outcomes. Increases in the cost of electricity, particularly in the context of rising costs of living, can cause some people to prioritise essential costs (e.g. food, shelter) over electricity demands (e.g. heating a home).

16.9.232 Energy insecurity is a public health concern particularly for vulnerable populations (low-income, children, elderly). It is associated with hazardous exposures, heat stress, cold stress, asthma, chronic disease, poor mental health, parental fear and stigma, family disruption and residential instability (Hernández, 2016). In children, energy insecurity has been shown to affect development, hospitalisation and overall child health (Cook et al., 2008).

16.9.233 The potential health effect is considered likely because there is a plausible source-pathway-receptor relationship:

- Source: renewable electricity generation;
- Pathway: energy security whilst avoiding climate altering emissions;
- Receptor: population connected to the national power grid.

16.9.234 Furthermore, the potential effect is probable as no highly unusual conditions are required for the source-pathway-receptor linkage.

16.9.235 The population groups relevant to this assessment are:

- The 'national' population of England and the wider UK
- The sub-population vulnerable due to low incomes, including where this overlaps with being a dependant (children, older adults and people with poor health requiring care) and/or other social disadvantage or deprivation.

Sensitivity of the receptor

16.9.236 The sensitivity of the general population is considered to be **low.** Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account and are listed in **section 16.5.** The general population comprise those members of the community in good physical and mental health and with greater resources to respond to the costs of energy or to interruptions in supply.

16.9.237 The sensitivity of the vulnerable population is considered to be **high.** The sub-population on low incomes, for whom energy security and interruption of energy supplies are more sensitive, pose a greater risk. This is particularly the case for dependants at risk during temperature extremes, including heatwaves and cold weather, as well as people in poor health, including when accessing healthcare.

Magnitude of impact

16.9.238 The magnitude is considered to be **medium**. The impact is predicted to be of national spatial extent, with direct and indirect effects to population health. The Project will have an anticipated generation capacity of approximately 840 MWe (AC output - total installed capacity approximately 936,000 kVA), providing secure and clean energy to the equivalent of approximately 330,000 homes. Project generation of renewable electricity (operation of would have continuous public health benefits to energy security (subject to weather conditions and maintenance), despite the scale of contribution being relatively small within the national energy generation context. The protective effect on public health through energy security is likely to provide a minor reduction in risks for population mortality (e.g. reducing excess winter deaths) and morbidity of physical and mental health outcomes related to standard of living and access to health supporting infrastructure. Such an effect may extend via the national grid to the national population. Such effects may bring small benefits to healthcare service quality by reducing capacity burdens.

Significance of the effect

16.9.239 The effect is judged to be **moderate beneficial** which is significant in EIA terms. The Project provides a protective effect on the health baseline and that this would be important for public health. This conclusion reflects the scientific literature which establishes a *clear* association between energy security and health outcomes. The Project is likely to be *influential* to delivering health policy, including in *narrowing* inequalities that are at risk of widening due to reduced national energy security and rising costs of living.

Further (secondary) mitigation and residual effect

16.9.240 No additional measures are considered necessary. The residual effect remains **moderate beneficial** (significant).

Future monitoring

16.9.241 Table **16.26** below outlines the proposed monitoring commitments.

Table 16.26: Monitoring commitments

Commitment number	Measure adopted	How the measure will be secured
1	Periodic monitoring (years 1, 5, and 15, as set out within oLEMP) of PRoW use aligned with the methodologies used for the baseline surveys that are reported within the ES would determine if measures to avoid widespread behavioural change in use of PRoWs were effective and if necessary, with any additional action arising to reduce access barriers, to be agreed via the detailed LEMP.	Outline Operational Management Plan **[EN010147/APP/7.6.2]**.
2	Monitor supply chain and employment records. Monitoring of the proportion of local people (particularly within the local study area) who are not in employment, education or training (NEET), unemployed, have high job instability or low-income characteristics who access training and apprenticeship or good quality stable employment opportunities related to the Project. Monitoring would allow the benefit to be confirmed, support engagement of NEET populations with any relevant opportunities, and also allow further tailoring to target local vulnerable groups if required.	Appendix 15.2: Outline Skills, Supply Chain & Employment Plan **[EN010147/APP/6.5]**

16.10 Cumulative Effects

16.10.1 The Cumulative Effects Assessment (CEA) takes into account the impact associated with the Project together with other projects and plans. The projects and plans selected as relevant to the CEA presented within this chapter are based upon the results of a screening exercise (see Volume 3 Appendix 20.1: CEA Longlist and Shortlist **[EN010147/APP/6.5]**). Each project has been considered on a case by case basis for screening in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved.

16.10.2 The human health CEA methodology has followed the methodology set out in Volume 1, Chapter 4: Approach to Environmental Assessment. As part of the assessment, all projects and plans considered alongside the Project have

been allocated into ‘tiers’ reflecting their current stage within the planning and development process, these are listed below.

- Tier 1
  - Under construction
  - Permitted application
  - Submitted application
  - Those currently operational that were not operational when baseline data were collected, and/or those that are operational but have an ongoing impact
- Tier 2
  - Scoping report has been submitted
- Tier 3
  - Scoping report has not been submitted
  - Identified in the relevant Development Plan
  - Identified in other plans and programmes.

16.10.3 This assessment is followed by all other relevant projects, identified by tier.

16.10.4 This tiered approach is adopted to provide a clear assessment of the Project alongside other projects, plans and activities.

16.10.5 The projects, plans and activities scoped into the CEA are informed by:

- Assessment presented in the Volume 1 technical chapters (see paragraph 16.1.14).
- Volume 3 Appendix 4.2: Scoping Opinion **[EN010147/APP/6.5]**.

16.11 Cumulative effects assessment

16.11.1 A description of the significance of cumulative effects upon population health arising from each identified impact is given below.

16.11.2 Cumulative health assessment extends the analysis of each determinant of health. This means for each determinant of health the relevant reasonably foreseeable cumulative projects are listed and a professional judgement is made as to the combined level of effect and its implications for public health. Following IEMA 2022 guidance, sensitivity of the relevant populations is unchanged from the main assessment in section 16.6 (Pyper, Waples, et al., 2022). Magnitude is however appraised in light of the combined effect of multiple projects.

16.11.3 As set out in IEMA 2022 guidance for human health, a combined public health effect is most likely where a population is affected by multiple determinants of health and a large proportion of the same individuals within that population experience the combination of effects (Pyper, Waples, et al., 2022).

16.11.4 A high degree of spatial proximity is required for there to be the potential for cumulative effects for localised changes in determinants of health, e.g., dust from a construction site. In contrast, where there are more far-reaching effects

in a determinant of health, e.g., job creation or noise along shared transport corridors, there is greater opportunity for cumulative interactions between projects.

16.11.5 For each of the determinants in the main assessment the cumulative assessment considers the potential for pathways to the same population from other large-scale developments that are similar in location and timing. The assessment is qualitative, following the approach set out in **section 16.4**, and considers the potential for combined magnitudes of effect to the same populations.

16.11.6 This chapter is informed by cumulative assessment conclusions set out in other chapters (as listed in **section 16.1**). The health assessment does not duplicate detail set out in those chapters. Distinctions between Tier 1 and Tier 2 projects follow other assessment chapters. Tier 1 being those projects where levels of uncertainty are lower, due to being more advanced in the planning process.

16.11.7 The following sections provide a CEA on issues with sufficient information and the potential for likely significant population health cumulative effects. The specific projects, plans and activities scoped into the CEA are outlined in **Table 16.27**..

Table 16.27: List of other projects, plans and activities considered within the CEA

Project/Plan	Status	Distance from the Project (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Project
Tier 1						
20/01734/OUT – Salt Cross Garden Village	Pending	Adjacent	2,200 dwellings and 40ha of employment land	N/A	N/A	Yes
EW2 West – Eynsham Strategic Development Area	Approved	1.5	1,000 dwellings	N/A	N/A	N/A
15/00761/FUL – West Eynsham Strategic Development Area (Eynsham Nursery)	Permitted	1.5	77 dwellings (allowed at appeal)	N/A	N/A	Yes
18/01009/RES – West Eynsham Strategic Development Area (Land west of Thornbury Road)	Under construction	1.5	160 dwellings	N/A	N/A	Yes
16/01364/OUT – Land east of Woodstock	Under construction	Adjacent	300 residential dwellings, up to 1100sqm of A1/A2/B1/D1 floorspace. 17ha in size.	N/A	N/A	N/A
21/00189/FUL – Land north of Hill Rise, Woodstock – 180 dwellings	Pending	1.0	Land north of Hill Rise, Woodstock. 180 dwellings. 10.7 ha in size.	N/A	N/A	N/A
21/00217/OUT –	Pending	0.3	225 dwellings. 16.9ha in size.	N/A	N/A	N/A

Project/Plan	Status	Distance from the Project (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Project
Land north of Banbury Road, Woodstock						
14/1234/P/OP – Land south of Witney Road, Long Hanborough	Operational	1.9	Erection of up to 169 dwellings, with new Doctors Surgery (allowed at appeal)	N/A	N/A	N/A
722302 – Land at Pinsley Wood	Pending	Adjacent	600 dwellings (call for sites - strategic promotion)	N/A	N/A	N/A
17/03155/RES – Land South East of Pinsley Farm	Operational	Adjacent	120 dwellings	N/A	N/A	N/A
19/02516/FUL – Twelve Acre Farm - Solar Farm	Permitted	2.5	31.9 MW peak. Up to 10 batteries in shipping containers. Up to 10 inverters in shipping containers. Internal access tracks, perimeter fence, cctv cameras.	16 weeks	40 years	Yes
20/01817/FUL – Land Between Woodstock Sewage Works And B4027 – Solar Farm	Permitted	Adjacent	5MW generating capacity on 9.1ha of land	N/A	N/A	N/A
13/1277/P/FP – Salutation Farm – Solar Farm	Operational	3.4	13.2MW. 52,800 free standing solar panels	N/A	N/A	N/A
22/00747/OUT – Land at Bicester Road, Kidlington	Pending	3.0	Outline planning application for the development of up to 370 homes, public open space (including play areas and woodland planting), sports pitches and pavilion, drainage and engineering works, with all matters reserved (appearance, landscaping, layout and scale) except for vehicular and emergency accesses to Bicester Road	N/A	N/A	N/A

Project/Plan	Status	Distance from the Project (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Project
21/03522/OUT – West of Rutten Lane Yarnton	Pending	Adjacent	The erection of up to 540 dwellings (Class C3), up to 9,000sqm GEA of elderly/extra care residential floorspace (Class C2), a Community Home Work Hub (up to 200sqm)(Class E), alongside the creation of two locally equipped areas for play, one NEAP, up to 1.8 hectares of playing pitches and amenity space for the William Fletcher Primary School, two vehicular access points, green infrastructure, areas of public open space, two community woodland areas, a local nature reserve, footpaths, tree planting, restoration of historic hedgerow, and associated works. All matters are reserved, save for the principal access points. (APPEAL LODGED)	N/A	N/A	N/A
23/00517/F - New Science Park West of junction with The Boulevard, Oxford Airport, Langford Lane	Permitted	Adjacent	Redevelopment of the site to include the demolition of existing buildings and development of new accommodation across 5 buildings for employment uses (Class E(g)(ii) and (iii)) plus ancillary amenity building, outdoor amenity space, car parking, cycle parking, landscaping and associated works	N/A	N/A	N/A
23/01233/OUT - OS Parcel 4347 East of Pipal Cottage, Oxford Road, Kidlington	Pending	4.0	Outline application (with all matters except access reserved) for up to 800 dwellings, two form entry primary school, a local centre, business uses and public open space, new access and associated transport infrastructure	N/A	N/A	N/A
14/00786/F - Flit Solar Farm, off Woodstock Road, Yarnton	Operational	2.0	Construction of a Solar Farm with on site equipment rooms and plant, access improvement and on-site tracks, security fencing and thermal	N/A	N/A	N/A

Project/Plan	Status	Distance from the Project (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Project
			imaging system, landscaping and associated works			
23/02098/OUT - Multi-phased residential-led mixed used development	N/A	Adjacent	Up to 215,000 square metres gross external area of residential floorspace (or c.1,800 homes which depending on the housing mix could result in a higher or lower number of housing units) within Use Class C3/C4 and large houses of multiple occupation (Sui Generis); Supporting social infrastructure including secondary school/primary school(s) (Use Class F1); health, indoor sport and recreation, emergency and nursery facilities (Class E(d)-(f)). Supporting retail, leisure and community uses, including retail (Class E(a)), cafes and restaurants (Class E(b)), commercial and professional services (Class E(c)), a hotel (Use Class C1), local community uses (Class F2), and other local centre uses within a Sui Generis use including public houses, bars and drinking establishments (including with expanded food provision), hot food takeaways, venues for live music performance, theatre, and cinema. Up to 155,000 net additional square metres (gross external area) of flexible employment uses including research and development, office and workspace and associated uses (Use E(g)), industrial (Use Class B2) and storage (Use Class B8) in connection with the expansion of Begbroke Science Park; Highway works, including new vehicular, cyclist and pedestrian roads and paths.	N/A	N/A	N/A
P23/V0306/SCR – Cumnor Solar Farm	Positive screening	1.5	Request for an EIA Screening Opinion prior to the submission of an application for the installation of	N/A	N/A	N/A

Project/Plan	Status	Distance from the Project (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Project
			a 13MW solar photovoltaic array and battery storage facility			
18/02065/OUTFUL - Hybrid application for Northern Gateway	Approved	3	87,000sqm business space, 550 sqm community spoace, up to 2,500sqm retail and foodm 180 bed hoteal and up to 480 residential units	N/A	N/A	N/A

Diet and nutrition

Tier 1 and Tier 2

Construction, Operation and maintenance and Decommissioning phases

16.11.8 This section has been informed by Volume 1, Chapter 17: Agricultural Land Use and Public Rights of Way **[EN010147/APP/6.3]** which sets out relevant cumulative assessment findings and mitigation measures that have been taken into account.

16.11.9 As noted in Volume 1, Chapter 17: Agricultural Land Use and Public Rights of Way of the ES **[EN010147/APP/6.3]** the cumulative permanent loss of land from farm holdings is assessed to be permanent minor adverse.

16.11.10 The cumulative schemes would be unlikely to impact the on availability of local, county, regional and national food markets for the population.

16.11.11 On this basis, the population groups, sensitivity, magnitude and significance conclusions relevant to the cumulative health assessment are not new or materially different to those listed for the Project assessment in **section 16.9**, Diet and nutrition.

Open space, leisure and play

Tier 1 and Tier 2

Construction, Operations and maintenance and Decommissioning phases

16.11.12 This section has been informed by Volume 1, Chapter 17: Agricultural Land Use and Public Rights of Way of the ES **[EN010147/APP/6.3]** which sets out relevant cumulative assessment findings and mitigation measures that have been taken into account.

16.11.13 As stated in Volume 1, Chapter 17: Agricultural Land Use and Public Rights of Way **[EN010147/APP/6.3]**:

- The effect on PRoW (bridleways) during construction of the Project is assessed to be temporary moderate adverse.
- The effect on Oxford Greenbelt Way Long Distance Path during construction of the Project is assessed to be temporary minor adverse.
- The effect on Shakespeare Way Long Distance Path during construction of the Project is assessed to be temporary minor adverse.
- The effect on NCR 5 during construction of the Project is assessed to be temporary minor adverse.
- No additional adverse effects on PRoW are assessed during the operational phase of the Project.
- On a precautionary basis, it is assessed that the implementation of the decommissioning plan would require similar PRoW management

measures to be adopted as those identified during the construction phase of the Project. It is therefore assessed that the effects of decommissioning on PRoW would be the same as for those during the construction period.

16.11.14 It is noted that there is potential for the Saltcross residential development (north of Eynsham) cycleway to the railway station, to be facilitated by the Project. This is the proposed cycle route parallelled with Lower Road that the Project would provide an off-highway option for. This forms part of the main assessment (see section) and is not double counted here.

16.11.15 The PRoW network is considered to have capacity for both current and future residents of cumulative housing developments (see Table 16.27). The population demographic profiles of new developments is not known, but it is anticipated that there would be a range of vulnerable groups represented. The Projects mitigations and enhancements to the PRoW network are likely to deliver their intended benefits, in maintaining access to and the amenity of the PRoW network, for both current and future residents, including vulnerable groups. The new educational area as part of the Project would be particularly likely to benefit younger residents, existing and those moving to the area under cumulative schemes. People moving to the area may have less established routes on the PRoW network so may more readily select alternatives on the network that meet their preferences in terms of views of the Project. It is not considered that the activities of cumulative schemes or additional populations associated with cumulative schemes would not result in new or materially different population health effects conclusions to those reached for the Project in isolation in **section 16.9**, Open space, leisure and play.

Transport modes, access and connections

Tier 1 and Tier 2

Construction and Decommissioning phases

16.11.16 This section has been informed by Volume 1, Chapter 12: Traffic and Transport of the ES **[EN010147/APP/6.3]** which sets out relevant cumulative assessment findings and mitigation measures that have been taken into account.

16.11.17 As noted in Volume 1, Chapter 12: Traffic and Transport:

- The impact on non-motorised delay caused by cumulative development traffic will be negligible adverse.
- The impact on fear and intimidation (non-motorised user amenity) caused by cumulative development traffic will be negligible adverse.
- The impact on severance caused by cumulative development traffic will be negligible adverse.
- The impact on road safety caused by cumulative development traffic will be negligible adverse.

16.11.18 The population groups, and sensitivity conclusions relevant to the cumulative health assessment are not new or materially different to those listed for the Project assessment in **section 16.10.**

16.11.19 In terms of magnitude, the combined effect of the projects means the scale of change is considered to be *medium*, with more frequent disruptions and greater combined risks. Disruption is still likely to be *occasional*, but more frequent than the individual project level effect. Though more frequent disruption can affect physical activity, this is not expected to be of a scale that could affect population health. The conclusions of significance therefore remain as stated in the individual assessment in **section 16.9**, Transport modes, access and connections.

Community identity, culture, resilience and influence

Tier 1 and Tier 2

Construction, Operations and maintenance and Decommissioning phases

16.11.20 This section has been informed by Volume 1, Chapter 8: Landscape and Visual Resources of the ES which sets out relevant cumulative assessment findings and mitigation measures that have been taken into account. As noted in Volume 1, Chapter 8: Landscape and Visual Resources of the ES **[EN010147/APP/6.3]** concludes:

- There are potential impacts of the Project upon Landscape and Visual resources and receptors within the 5 km study area in combination with the identified cumulative schemes.
- It is concluded that there will be no significant cumulative effects from the Project alongside other projects/plans outlined in Table 16.27.

16.11.21 The population groups, sensitivity, magnitude and significance conclusions relevant to the cumulative health assessment are not new or materially different to those listed for the Project assessment in **section 16.9.**.

Education and training

Tier 1 and Tier 2

Construction, Operations and maintenance and Decommissioning phases

16.11.22 In combination with other projects assessed cumulatively, the Project has the potential to provide further education and training opportunities. Sensitivity of the population remains unchanged as does the overall magnitude.

16.11.23 On this basis, the population groups, sensitivity, magnitude and significance conclusions relevant to the cumulative health assessment are not new or materially different to those listed for the Project assessment in **section 16.9**, Education and training.

Employment and income

Tier 1 and Tier 2

Construction, Operations and maintenance and Decommissioning phases

16.11.24 This section has been informed by Volume 1, Chapter 15: Socio-economic of the ES **[EN010147/APP/6.3]**, which sets out relevant cumulative assessment findings and mitigation measures that have been taken into account.

16.11.25 As stated in Volume 1, Chapter 15: Socio-economic of the ES **[EN010147/APP/6.3]**:

- It is estimated there to be a total net additional direct 1,436 annual construction workers (978 from solar developments, 322 from residential developments and 136 from commercial developments) across all 30 cumulative schemes.
- It is highly unlikely that construction workers will need to come from outside the Study Area or the general Oxfordshire region at large, meaning there will be less pressure on need for temporary workers accommodation.
- Although a total of 1,635 annual net direct construction workers has been identified as a result of the cumulative developments (1,436) and Botley West Solar Farm (199), Oxfordshire has a total of nine times as many construction workers meaning it is possible that all workers could come from within the Study Area and thus wouldn't require any temporary accommodation.
- Oxfordshire has a significant supply of accommodation to temporarily house construction workers employed in connection with the Project or other cumulative developments.

16.11.26 The combined effect is driven by the interaction of the Project with other relevant local development projects contributing to a cumulative effect on employment.

16.11.27 On this basis, the population groups, sensitivity, magnitude and significance conclusions relevant to the cumulative health assessment are therefore not new or materially different to those listed for the Project assessment in **section 16.9**, Employment and income.

Climate change and adaptation

Tier 1 and Tier 2

Operation and maintenance phase

16.11.28 The Project in combination with other local renewable energy generating projects will contribute towards wider energy sector transition to renewable energy which reduces the severity of climate change.

16.11.29 Cumulatively these projects have a greater magnitude of effect. In the context of effects on global atmospheric conditions, rather than localised effects, the cumulative effect is arguably inclusive of all energy projects currently being consented, and likely much broader than just this one sector. Such a broad cumulative assessment is not within the scope of project level EIA.

16.11.30 On this basis the cumulative effect is noted as greater, but for this subset of Tier 1 projects the population groups, sensitivity, magnitude and significance conclusions relevant to the cumulative health assessment are not new or materially different to those listed for the Project assessment in **section 16.9**, Climate change and adaptation.

Air quality

Tier 1 and Tier 2

Construction and Decommissioning phase

16.11.31 This section has been informed by Volume 1, Chapter 19: Air Quality of the ES **[EN010147/APP/6.3**] which sets out relevant cumulative assessment findings and mitigation measures that have been taken into account.

16.11.32 It is noted that the combined effect is driven by the interaction of the Project with other developments which contribute to the reduction in air quality.

16.11.33 Volume 1, Chapter 19: Air Quality **[EN010147/APP/6.3]** concludes there should be no residual cumulative air quality effect, assuming that all developments implement dust mitigation and controls proportionate to the level of risk.

16.11.34 The population groups, sensitivity, magnitude and significance conclusions relevant to the cumulative health assessment are not new or materially different to those listed for the Project assessment in **section 16.9**, Air quality.

Noise and vibration

Tier 1 and Tier 2

Construction, Operations and maintenance and Decommissioning phases

16.11.35 This section has been informed by Volume 1, Chapter 13: Noise and Vibration **[EN010147/APP/6.3]**, which sets out relevant cumulative assessment findings and mitigation measures that have been taken into account. Volume 1, Chapter 13: Noise and vibration **[EN010147/APP/6.3]** concludes that there will be no significant cumulative effects from the Project alongside other projects/plans.

16.11.36 The population groups relevant to the cumulative health assessment are the same as those listed for the Project assessment in **section 16.10.**

16.11.37 As no significant cumulative effects are identified in Volume 1, Chapter 13: Noise and vibration of the ES **[EN010147/APP/6.3]**, the cumulative effect is predicted to be similar to the individual effect described in **section 16.10.**

Public understanding of EMF risk

Tier 1 and Tier 2

Operation and maintenance phase

16.11.38 For the purposes of this assessment, the cumulative electrical infrastructure developments identified within Volume 3, Appendix 20.1: CEA Longlist and Shortlist **[EN010147/APP/6.5]**, specifically the three proposed solar farms (Twelve Acre Solar Farm, Land Between Woodstock Sewage Works and B4027 - Solar Farm, and Salutation Solar Farm), are not anticipated to include their own substations. On this basis, cumulative effects in terms of actual risks or public understanding of risk from visual or auditory stimuli, are not expected.

Wider societal infrastructure and resources

Tier 1 and Tier 2

Operation and maintenance phase

16.11.39 In combination with other projects assessed cumulatively, the Project will provide enhanced energy security. The national context of such energy security has been considered and the individual effects are not expected to be collectively greater. Sensitivity of the population remains unchanged as does the overall magnitude. On this basis the cumulative effect would remain **moderate beneficial**, which is significant in EIA terms.

16.12 Transboundary effects

16.12.1 A screening of transboundary impacts has been carried out and has identified that there was no potential for significant transboundary effects with regard to human health from the Project upon the health of populations in other states.

16.13 Inter-related effects

16.13.1 Inter-relationships are the impacts and associated effects of different aspects of the Project on the same receptor. These are as follows.

- Project lifetime effects: Assessment of the scope for effects that occur throughout more than one phase of the Project (construction, operation and maintenance, and decommissioning), to interact to potentially create a more significant effect on a receptor than if just assessed in isolation in these three phases (e.g., construction noise effects from piling of the Solar PV Module Mounting Structure, operational substation noise, and decommissioning disturbance).
- Receptor led effects: Assessment of the scope for all effects (including inter-relationships between environmental topics) to interact, spatially and temporally, to create inter-related effects on a receptor. As an example, all effects on human health, such as changes in access changes in community identity, changes in employment and benefits from renewable energy security, may interact to produce a different, or

greater effect on this receptor than when the effects are considered in isolation. Receptor-led effects may be short term, temporary or transient effects, or incorporate longer term effects.

16.13.2 A description of the likely interactive effects arising from the Project on human health is provided in Volume 1, Chapter 20: Cumulative Effects and Inter-relationships of the ES.

16.13.3 The population health effects identified and assessed in this chapter have the potential to interact with each other. The areas of potential interaction between effects for a given geographic population are presented in Table 16.28**.** Vulnerable group effects are expected across all geographic populations, so are not listed separately.

Table 16.28: Interaction between health determinants by geographic populations.

	Site specific	Local	Regional	National	International
	Site specific study area*	**Cherwell, West Oxfordshire, Vale of White Horse**	**South-East**	**England**	**Global**
Diet and nutrition	✓	✓			
Open space, leisure and play	✓	✓			
Transport modes, access and connections	✓	✓			
Community identity, culture, resilience and influence	✓	✓			
Education and training		✓	✓		
Employment and income		✓	✓		
Climate change and adaptation	(✓)	(✓)	(✓)	✓	✓
Air quality	✓				
Noise and vibration	✓				
Public understanding of EMF risk	✓	✓			
Wider societal resources	(✓)	(✓)	(✓)	✓	

Key	Positive (green)	Positive as a component within wider area assessment (light green)	Negative (blue)	Negative and positive (orange)

*Site specific study area includes: For array and cable corridor: Stonesfield and Tackley, Woodstock and Bladon, Kidlington West, Kidlington East, Eynsham and Cassington, Freeland and Hanborough and for the substation: Cumnor (see section 16.4.3.6).

16.13.4 **Table 16.29** lists the inter-related effects (project lifetime effects) that are predicted to arise during the construction, operational and maintenance and decommissioning phases of the Project, and also the inter-related effects (receptor-led effects that are predicted to arise for human health receptors).

Table 16.29: Summary of likely significant inter-related effects

Description of impact	Phase C	Phase O	Phase D	Likely significant inter-related effects	Significance
Receptor-led effects					
Combination of reduced access to healthy foods and effects on open space locally.		✓		A small minority of the population may experience a slight reduction in access to healthy foods from loss of agricultural lands and a decrease in physical activity opportunity due to changes in accessibility of PRoW. These combined effects are likely during the operational phase. This may particularly affect vulnerable groups with existing poor health. Despite both changes affecting cardiovascular, mental health and obesity outcomes, the scale of the individual residual effects is very small and the number of people affected to a high degree by both changes is anticipated to be very low. At a population level it is not expected that the combination of effects would interact in a way that would significantly reinforce health outcomes or exacerbate health inequalities. No greater effect is therefore likely.	No change.
Combined effect of changes to community identity and public understanding of EMF risk		✓		Changes to the visual landscape have the potential to affect an individual's sense of wellbeing associated with community identity. Some individuals may also experience mental wellbeing effects associated with perception of risk from the Project. This may particularly affect vulnerable populations with existing poor mental wellbeing. Whilst both changes affect mental health outcomes, the scale of the individual residual effects is very small and the number of people affected to a high degree by both changes is anticipated to be very low. The combined effect of both determinants is not expected to be greater than the effect of each individual determinant and at a	No change.

Description of impact	Phase C	Phase O	Phase D	Likely significant inter-related effects	Significance
				population level, would not exacerbate health inequalities.	
Combination of public understanding of EMF risk and the uptake of active travel		✓		As identified above, the proximity of substations and other visible electrical infrastructure to some PRoW have the potential to increase perceived risks, and thereby deter physical activity and active travel on these routes. However, visual screening and other PRoW enhancement measures are anticipated to improve this over time, and alternative routes are available, therefore the scale of the combined effect is anticipated to be low. The combined effect of both determinants is not expected to be greater than the individual effects.	No change.
Combination of air quality, noise and transport effects.	✓		✓	Construction and decommissioning activities may create effects for air quality, noise and transport access particularly for populations near the Project boundary, and users of PRoW located near or within the Project boundary. At a population level it is not expected that the combination of effects would interact in a way that would reinforce health outcomes or exacerbate health inequalities. No greater effect is therefore likely.	No change.
Combined national population benefits relating to climate change and wider societal resources		✓		Nationally the population would benefit both from a reduction in the severity of health effects associated with climate change and from the benefits to public health of energy security. Effects would be greatest for vulnerable groups, particularly those on low incomes less able to adapt or afford alternatives. As the effects associated with climate change are expected to be driven by the benefit to deprived populations globally, the combined effect in the UK of these health determinants is not expected to be greater than the individual effects.	No change.

16.14 Summary of impacts, mitigation measures and monitoring

16.14.1 Information on human health within the study area was collected by a review of relevant public health evidence sources, including scientific literature, baseline data, health policy, local health priorities and health protection standards with reference to corresponding chapters as set out in **section 16.2.**

16.14.2 **Table 16.31** presents a summary of the potential impacts, measures adopted as part of the Project and residual effects in respect to human health. The impacts assessed include:

- diet and nutrition;
- open space, leisure and play;
- transport modes, access and connections;
- community identity, culture, resilience and influence;
- education and training;
- employment and income;
- climate change and adaptation;
- air quality;
- noise and vibration;
- public understanding of EMF risk; and
- wider societal infrastructure and resources.

16.14.3 Overall, it is concluded that there will be no significant adverse effects on human health during the construction, operation and maintenance or decommissioning phases of the Project. This conclusion is supported by the contribution of the assessment in securing new recreational routes, including permissive paths, cycleways and greenways, to mitigate potential adverse effects on public health associated with changes in the use of the PRoW network.

16.14.4 The following beneficial effects have been identified (further detail in section **16.9**):

- The HIA identified specific PRoW routes to provide greenways based on criteria such as connectivity to key community areas and potential for enhancing active travel and recreational opportunities (See **Table 16.25**). By promoting safer and more accessible routes, greenways contribute to improved physical and mental health.
- Additionally, the inclusion of an outdoor educational area and growing spaces offers further public health benefits. These areas provide opportunities for community engagement, environmental education, and access to fresh produce, further enhancing overall well-being and fostering a healthier lifestyle for the local population over time. The provision of enhanced PRoWs and permissive routes has the potential to result in minor beneficial effects for population health, which are not significant in EIA terms.
- Education and training in relation to apprenticeships and other training opportunities during construction of the Project, particularly for NEET populations, has the potential to result in moderate beneficial effects for population health, which is significant in EIA terms.
- Employment and income in relation to temporary construction and decommissioning employment opportunities, particularly for NEET

populations, has the potential to result in moderate beneficial effects for population health during construction and decommissioning of the Project, which is significant in EIA terms.

- Climate change and adaptation in relation to renewable energy generation and subsequent reduced greenhouse gas emissions will have a minor beneficial effect for population health during operation and maintenance of the Project, which is not significant in EIA terms.
- Wider societal infrastructure and resources in relation to renewable energy generation will have a moderate beneficial effect for population health, which is significant in EIA terms.

16.14.5 Table 16.30 presents a summary of the potential cumulative impacts, mitigation measures and residual effects.

16.14.6 The cumulative impacts assessed include:

- diet and nutrition;
- open space, leisure and play;
- transport modes, access and connections;
- community identity, culture, resilience and influence;
- education and training;
- employment and income;
- climate change and adaptation;
- air quality;
- noise and vibration;
- public understanding of EMF risk; and
- wider societal infrastructure and resources.

16.14.7 Overall, it is concluded that there will be no significant cumulative or inter-related effects from the Project alongside other projects/plans.

16.14.8 No potential transboundary impacts have been identified in regard to effects of the Project on human health of populations in other states.

Table 16.30: Summary of potential environmental effects, mitigation and monitoring.

Description of impact	Phase C	Phase O	Phase D	Commitment number	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
Diet and nutrition	✓	✓	✓	15.8	C: low O: low D: low	C: high O: high D: high	Minor adverse (not significant)	Provide space for at least two food growing community groups (up to 30ha) to operate on the Site.	Negligible (not significant)	None proposed
Open space, leisure and play	✓		✓		C; low D: low	C: high D: high	Minor adverse (not significant)	No further mitigation.	Unchanged	None proposed
Open space, leisure and play *Permissive paths and cycle routes*		✓		16.3, 16.4	O: low	O: high	Minor beneficial (not significant)	No further mitigation	Unchanged	Periodic monitoring (years 1, 5, and 15, as set out within oLEMP) of PRoW use
Open space, leisure and play *PRoW*		✓		16.3, 16.4	O: low	O: high	Moderate adverse (significant) to minor beneficial (not significant)	No further mitigation	Unchanged	
Transport modes, access and connections	✓		✓		C: low D: low	C: high D: high	Minor adverse (not significant)	Ensure that early and ongoing information sharing with road users and emergency and healthcare services with regard to any temporary road closures, diversions or lane closures, secured through the OCTMP **[EN010147/APP/6.5]**	Negligible (not significant)	None proposed

Description of impact	Phase C	Phase O	Phase D	Commitment number	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
Community identity, culture, resilience and influence		✓			O: low	O: low	Minor adverse (not significant)	No further mitigation	Unchanged	None proposed
Education and training	✓	✓	✓		C: medium O: medium D: medium	C: high O: high D: high	Moderate beneficial (significant)	No further mitigation	Unchanged	None proposed
Employment and income	✓	✓	✓		C: medium O: medium D: medium	C: high O: high D: high	Moderate beneficial (significant)	No further mitigation	Unchanged	Monitoring of this benefit would be undertaken, including of the proportion of local people (particularly within the local study area) who are NEET, unemployed, have high job instability or low-income characteristics who access training and apprenticeship or good quality stable employment opportunities related to the

Description of impact	Phase C	Phase O	Phase D	Commitment number	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
										Project. Secured through Appendix 15.2: Outline Skills, Supply Chain & Employment Plan [EN010147/APP/6.].
Climate change and adaptation		✓			O: low	O: high	Minor beneficial (not significant)	No further mitigation	Unchanged	None proposed
Air quality	✓		✓		C: low D: low	C: high D: high	Minor adverse (not significant)	No further mitigation	Unchanged	None proposed
Noise and Vibration	✓	✓	✓		C: low O: low D: low	C: high O: high D: high	Minor adverse (not significant)	No further mitigation	Unchanged	None proposed
Public understanding of EMF risk		✓			O: low	O: high	Negligible to minor adverse (not significant)	No further mitigation	Unchanged	None proposed
Wider societal infrastructure and resources		✓			O: medium	O: high	Moderate beneficial (significant)	No further mitigation	Unchanged	None proposed

[a] C=construction, O=operational and maintenance, D=decommissioning

Table 16.31: Summary of potential cumulative environmental effects, mitigation and monitoring.

Description of effect	Phase C	Phase O	Phase D	Commitment number	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
Tier 1 and Tier 2										
Diet and nutrition	✓	✓	✓		No change	No change	No change	No further mitigation	No change	None proposed
Open space, leisure and play	✓	✓	✓		No change	No change	No change	No further mitigation	No change	None proposed
Transport modes, access and connections	✓		✓		No change	No change	No change	No further mitigation	No change	None proposed
Community identity, culture, resilience and influence	✓	✓	✓		No change	No change	No change	No further mitigation	No change	None proposed
Education and training	✓	✓	✓		No change	No change	No change	No further mitigation	No change	None proposed
Employment and income	✓	✓	✓		No change	No change	No change	No further mitigation	No change	None proposed
Climate change and adaptation		✓			No change	No change	No change	No further mitigation	No change	None proposed
Air quality	✓		✓		No change	No change	No change	No further mitigation	No change	None proposed
Noise and Vibration	✓	✓	✓		No change	No change	No change	No further mitigation	No change	None proposed
Public understanding of EMF risk		✓			No change	No change	No change	No further mitigation	No change	None proposed

Description of effect	Phase C O D	Commitment number	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
Wider societal infrastructure and resources	✓		No change	No change	No change	No further mitigation	No change	None proposed

[a] C=construction, O=operational and maintenance, D=decommissioning

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