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17. Population and Human Health

17.1 Introduction

- 17.1.1 This Environmental Statement (ES) chapter contains an assessment of the likely potential impacts and significant environmental effects of the Proposed Development with respect to Population and Human Health during the construction, operation (including maintenance), and decommissioning phases.

17.2 Legislation, Planning Policy and Guidance

- 17.2.1 Legislation, planning policy, and guidance relating to Population and Human Health and pertinent to the Proposed Development are listed below:

Legislative Background

EIA Directive (2014) and Infrastructure Planning Regulations (2017)

- 17.2.2 The EIA Directive 2014 (Directive 2014/52/EU of the European Parliament and of the Council) and the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 ('EIA Regulations') provide the legislative background regarding the assessment of the effects of certain public and private projects on the environment. These specifically include a requirement that the Environmental Impact Assessment (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 human health (Regulation 5(2)(a)).

Health and Care Act (2022)

- 17.2.3 In April 2022, the Government passed a new Health and Care Act 2022. The Act proposes new health reforms in England, removes existing competition rules and formalises Integrated Care Systems (ICS). It also grants the health secretary authority over the health service. It emphasises the importance of health and care for the future and development of the country.
- 17.2.4 The Act aims to support the development of ICS and integration of all health bodies, by requiring them to strive towards the collective aims of better care for all patients; better health for everyone; and sustainable use of National Health Service (NHS) resources.

- 17.2.5 There are 42 ICSs across England (previously in April 2021, over 100 Clinical Commissioning Groups (CCGs) existed across the country), and each has been established with four strategic purposes:
- Improve population health and healthcare;
 - Tackling unequal outcomes and access;
 - Enhance productivity and value for money; and
 - Helping the NHS to support broader social and economic development.

National Planning Policy

Overarching National Policy Statement for Energy (EN-1) (2023)

- 17.2.6 Planning policy for Nationally Significant Infrastructure Projects (NSIPs) is primarily contained in National Policy Statements (NPSs). In November 2023, the Department for Energy Security and Net Zero (DESNZ) published an updated version of EN-1 (originally published in 2011). On 24 April 2025, DESNZ launched a consultation on further proposed revisions to the NPS EN-1. This consultation on the material amendments concluded on 29 May 2025, and draft revisions have since been published (DESNZ, 2023a). The outcomes from the consultation have not resulted in any material changes to the conclusions of this chapter.
- 17.2.7 Section 4.4.1 of EN-1 states that “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 negative impacts on some people’s health” It states that “the direct impacts on health may include:
- increased traffic;
 - air or water pollution;
 - dust, odour;
 - hazardous waste and substances;
 - noise;
 - exposure to radiation; and
 - and increases in pests”.
- 17.2.8 In addition, paragraph 4.3.3 notes that “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”.

National Policy Statement for Gas Supply Infrastructure and Oil and Gas Pipelines (EN-4) (2023)

- 17.2.9 In November 2023, an update was made to NPS EN-4 (originally published in 2011) (DESNZ, 2023b). Taken together with EN-1, it provides the primary policy for decisions by the Secretary of State on applications it receives for natural gas supply infrastructure and gas and oil pipelines.
- 17.2.10 In regard to human health, it advises that developments should follow generic considerations on emissions on air quality set out in EN-1. In particular, Section 5.2 of EN-1 which provides guidance on the effects of emissions on air quality (which can have implications for human health).

National Policy Statement for Electricity Networks Infrastructure (EN-5) (2023)

- 17.2.11 In 2023, an update was made to NPS EN-5 (originally published in 2011). On 24 April 2025, DESNZ launched a consultation on further proposed revisions to the NPS EN-5. This consultation on the material amendments concluded on 29 May 2025, and draft revisions have since been published (DESNZ, 2023c). The outcomes from the consultation have not resulted in any material changes to the conclusions of this chapter.
- 17.2.12 NPS EN-5 provides specific policy in relation to electro-magnetic fields (EMF) resulting from electricity networks and their known and potential effects on health, stating in EN-5 at paragraph 2.9.46 and 2.9.47: *“All overhead power lines produce EMFs, and these tend to be highest directly under a line, and decrease to the sides at increasing distance. Although putting cables underground eliminates the electric field, they still produce magnetic fields, which are highest directly above the cable. EMFs can have both direct and indirect effects on human health.”* 2.9.47 confirms that *“the direct effects occur in terms of impacts on the central nervous system resulting in its normal functioning being affected. Indirect effects occur through electric charges building up on the surface of the body producing a microshock on contact with a grounded object, or vice versa, which, depending on the field strength and other exposure factors, can range from barely perceptible to being an annoyance or even painful.”*

National Planning Policy Framework (2024)

- 17.2.13 The National Planning Policy Framework (NPPF) sets out the national government planning policies for England and how these are expected to be applied. This revised framework published in December 2024 replaces the previous NPPF (UK Government, 2025). It provides a framework within which local people and their relevant councils produce their own local and neighbourhood plans. The NPPF contains policies that are applicable to human health.

- 17.2.14 Section 8 of the NPPF ‘Promoting healthy and safe communities’ states that policies should aim to achieve healthy, inclusive, and safe places which: promote social interaction; are safe and accessible; and enable and support healthy lifestyles. In order to do this, paragraph 98 of the NPPF says that planning policies and decisions should:
- “Plan positively for the provision of... local services to enhance the sustainability of communities and residential environments;
 - Take into account and support the delivery of local strategies to improve health, social and cultural well-being for all sections of the community;
 - Guard against the unnecessary loss of valued facilities and services, particularly where this would reduce the community’s ability to meet its day-to-day needs;
 - Ensure that established shops, facilities, and services are able to develop and modernise, and are retained for the benefit of the community; and
 - Ensure an integrated approach to considering the location of housing, economic uses and community facilities and services.”
- 17.2.15 Paragraph 102 goes on to state that “planning policies and decisions should promote public safety and take into account wider security and defence requirements by anticipating and addressing possible malicious threats and natural hazards...this includes appropriate and proportionate steps that can be taken to reduce vulnerability, increase resilience and ensure public safety and security.”
- National Planning Practice Guidance (PPG) (2024)**
- 17.2.16 Accompanying the NPPF, the National Planning Practice Guidance (PPG) (February 2024 update) provides guidance on planning and provides a web-based resource in support of the NPPF (UK Government, 2024). The PPG offers guidance on health and wellbeing in planning and planning obligations, and covers:
- The role of health and wellbeing in planning; and
 - The links between health and wellbeing and planning.
- 17.2.17 The guidance states that the health status and needs of the local population should be accounted for by plan-making authorities. Within the PPG under “Plan-making” guidance category, paragraph 46 states that authorities will also need to ‘assess the quality and quantity of, and accessibility to, green infrastructure, education, sports, recreation and places of worship including expected future changes, and any information about the relevant barriers to improving health and wellbeing’.

- 17.2.18 The PPG for health and safe communities covers the role of positive planning on healthier communities and how the design and use of the built and natural environments, including green infrastructure, are major determinants of health and wellbeing. The guidance states that ‘planning and health need to be considered together in two ways: in terms of creating environments that support and encourage healthy lifestyles, and in terms of identifying and securing the facilities needed for primary, secondary and tertiary care, and the wider health and care system’.
- 17.2.19 The PPG for open space, sports and recreation facilities, PRoW (public right of way) and local green space provides additional guidance on those designations and how they should be taken into consideration in planning. The guidance mentions that planning should consider proposals that may affect existing open space as they provide health and recreational benefits to people living and working nearby. It is for local planning authorities to assess the need for open space and, when doing so, should have regard to the duty to cooperate where open space serves a wider area.
- 10 Year Health Plan for England: Fit for the Future (2025)**
- 17.2.20 The ‘Fit for the Future 10-Year Health Plan’ (UK Government, 2025) sets out the government’s 10 Year Health Plan for England. The plan sets out a bold vision to transform the NHS into a more responsive, preventative, and patient-centred service, to meet the challenges of the next decade It outlines proposals to adapt the NHS to changing population needs, workforce challenges, and advances in technology. It recognises that demand is increasing, health outcomes vary between areas and groups, and resources are under pressure. The Plan sets a long-term direction aimed at ensuring services remain sustainable, accessible, and responsive to public health priorities.
- 17.2.21 The Plan identifies three main areas for reform: shifting more care from hospitals into community and neighbourhood settings; improving digital capability and use of innovation, including artificial intelligence, genomics, and remote monitoring; and increasing focus on prevention and early intervention.
- 17.2.22 The plan describes a programme of change focused on a new operating model that promotes devolution, with improvements in care driven by greater transparency and public scrutiny. It proposes a new workforce model that enables frontline staff to innovate and contribute to service improvement. The approach sets out how the NHS will create new collaborations with commercial partners, universities, councils and mayors.

Health Equity in England: The Marmot Review 10 Years On (2020)

- 17.2.23 The Marmot Review: Fair Society, Healthy Lives was published in February 2010 (Marmot M, 2010) and outlined the scale of health inequalities in England and the actions required to reduce them. Following this original review, the Health Equity In England 10 Years On report highlights the growth in health inequality over the preceding 10 years, especially for those living in more deprived districts and regions (Institute of Health Equity, 2020). The report calls upon the Government to make health and wellbeing a central policy goal which will in turn create a better society, with better health and wellbeing equality.

Public Health England Strategy 2020 to 2025 (2020)

- 17.2.24 Public Health England (PHE) (now the UK Health Security Agency (UKHSA)) released the PHE Strategy 2020 to 2025 (PHE, 2020) in 2020. It sets out how the organisation will work to improve public health and reduce health inequalities. The key aims for the five-year period are as follows:
- Build and embed universal approaches to programme and project pipeline planning, reporting, and resource planning for use across PHE;
 - Improve governance structures around projects and programmes to support decision making, help identify barriers to progressing projects and ensuring that projects are properly evaluated throughout and closed when complete; and
 - Embed capacity planning within all programmes across PHE and, where relevant, agile approaches to bring greater flexibility and innovation to the work they do.

- 17.2.25 Approaching the end of the Plan period, no further updates are proposed. The 2025 10-Year Health Plan (see Paragraph 17.2.20 to 17.2.22) serves as the main guiding document for NHS and public health policy.

Spatial Planning for Health (2017)

- 17.2.26 In 2017, PHE published 'Spatial Planning for Health: An Evidence Resource for Designing Healthier Places' (PHE, 2017b). The resource is an evidence base to explore the link between spatial planning and health in the current available literature. The review provided public health planners and local communities with evidence informed principles for designing healthy places.

- 17.2.27 The review addresses the relationship which exists between public health and the built environment. It identifies five aspects of the built and natural environment which can be influenced by local planning policy:
- Neighbourhood design;
 - Housing;
 - Healthier food;
 - Natural and sustainable environment; and
 - Transport.
- 17.2.28 For each aspect identified above, the review provides the evidence base underpinning why they are important determinants of public health. It also sets out principles which public health professionals and planners should follow to ensure healthier places.
- 17.2.29 The two aspects deemed most relevant to the Proposed Development are ‘neighbourhood design’ and ‘natural and sustainable environment’. For ‘neighbourhood design’, the review states that:
- “Neighbourhoods are places where people live, work, and play and have a sense of belonging. The design of a neighbourhood can contribute to the health and well-being of the people living there. Several aspects of neighbourhood design (walkability and mixed land use) can also maximise opportunities for social engagement and active travel. Neighbourhood design can impact on our day-to-day decisions and therefore have a significant role in shaping our health behaviours.”
- 17.2.30 For the ‘natural and sustainable environment’, the review states that:
- “There is a very significant and strong body of evidence linking contact and exposure to the natural environment with improved health and wellbeing. For the purpose of this review, the natural and sustainable environment is comprised of neighbourhood ecosystems and the resulting co-benefits between the environment and health. Protecting the natural environment is essential to sustaining human civilization.”
- [Local Planning Policy](#)
- North Lincolnshire Core Strategy Local Plan (2011)**
- 17.2.31 The North Lincolnshire Core Strategy Local Plan was originally adopted in June 2011 and sets out the long term spatial planning framework for the development of North Lincolnshire up to 2026 (NLC, 2011). It details 27 strategic policies, of which CS24: Health Care Provision is the most relevant. The strategic policy aims to improve the health of residents

through safeguarding and enhancing open space, facilities for sports and recreation and improving walking and cycling routes.

- 17.2.32 The relevant excerpt from the policy states that “Developers will be expected to make an appropriate contribution towards necessary improvements, additional provision improvements or additional provision for health care services and facilities arising from their development proposals, in accordance with the Planning Obligations policy and Developer Contributions SPD. The implementation of new facilities supported by this policy will be permitted subject to other relevant plan policies”.

North Lincolnshire Draft Local Plan 2020 to 2038 (2021)

- 17.2.33 North Lincolnshire Council are at an advanced stage of adopting a new Local Plan to 2036. The new Local Plan was submitted to the Planning Inspectorate in November 2022, but examination hearings are yet to take place (NLC, 2021a). The revised Plan will replace the current Local Plan and Core Strategy once formally adopted.

- 17.2.34 The Spatial Vision states that “Alongside improving the quality of place, people’s quality of lives and their health and wellbeing will be improved. Local people will have good access to quality open spaces, play and sporting facilities, better access to the countryside, increased opportunities for cycling and walking, and good quality health facilities”

Yorkshire and the Humber Climate Action Plan (2024)

- 17.2.35 The Yorkshire and the Humber Climate Action Plan (Yorkshire and Humber Climate Commission, 2024) provides an update to the Plan published in 2021, and highlights the role of climate change response and mitigation (including encouraging renewable energy generation) to tackle poverty, improve public health and create and protect jobs. It sets out four pillars of climate action, including rapid emissions reduction; climate adaptation and resilience; nature restoration; and a just transition.

North Lincolnshire Council’s health and wellbeing strategy 2021 – 2026 (2021)

- 17.2.36 North Lincolnshire Council’s Health and Wellbeing Strategy (NLC, 2021b)) has 5 underpinning principles behind the strategy:
- work from the evidence;
 - build on our assets;
 - work for all ages and communities;
 - act for now and the future; and
 - be fair.

- 17.2.37 Aiming to complete 6 targets; keep North Lincolnshire safe and well, babies, infants, and young people to have the best start in life, enjoy healthy lives, let people experience equity of access to support their health and wellbeing, enable communities to be healthy and resilient, as well as have the best systems and enablers to effect the change.

17.3 Assessment Methodology and Significance Criteria

Consultation

- 17.3.1 The consultation undertaken with statutory consultees to inform this chapter, including a summary of comments raised via the formal Scoping Opinion (**ES Volume II Appendix 1B (Application Document Ref. 6.4)**) and in response to the formal consultation and other pre-application engagement, is summarised in **Table 17-1**.

Table 17.1: Consultation Summary Table

Consultee or organisation approached	Date and nature of consultation	Summary of consultee response	How comments have been addressed in this chapter
Planning Inspectorate	Scoping opinion (10 June 2024)	<p>The Scoping Report proposes to scope out housing as a population and human health determinant. Impacts to the availability of housing is required to be scoped into the socio-economics chapter of the ES. On this basis and given the nature and context of the Proposed Development, the Inspectorate is content for this determinant to be scoped out.</p>	<p>The potential health effects related to housing is accordingly scoped out of the Population and Human Health Chapter. ES Volume I Chapter 16: Socioeconomics (Application Document Ref. 6.2) addresses this matter in Section 16.7.</p>
		<p>The Scoping Report proposes to scope out health effects related to radiation for all phases of the Proposed Development but no justification is provided. The Proposed Development includes an electrical connection corridor to a 400kV substation or a new 132kV connection. In line with relevant guidance (DECC Power Lines: Demonstrating compliance with EMF public exposure guidelines, A Voluntary Code of Practice 2012), cables above 132kV have</p>	<p>The potential EMF effects associated with the 400kV connection on human health receptors including residential and recreational receptors, are considered and scoped into the Population and Human Health Chapter. This is assessed within Section 17.7, with consideration of impact avoidance measures signposted in 17.6, and mitigation measures signposted in Section 17.8.</p>

Consultee or organisation approached	Date and nature of consultation	Summary of consultee response	How comments have been addressed in this chapter
		<p>potential to cause electric and magnetic fields (EMF) effects. The Inspectorate is content that an assessment of cables/ substations up to and including 132kV can be scoped out further assessment. The ES should provide an assessment of any potentially significant effect on human health receptors arising from EMF from cables/ substations above 132kV. This should consider residential and recreational receptors. The ES should describe any necessary mitigation measures relevant to EMF (for example a minimum depth for cable burial) and explain how such measures are secured through the DCO or other legal mechanism.</p>	
		<p>The Inspectorate agrees that it is unlikely that the Proposed Development will give rise to any potentially significant effects on diet and nutrition, risk-taking behaviour, relocation, and community safety determinants and agrees that these can be scoped out of the ES.</p>	<p>The impact of diet and nutrition, risk-taking behaviour, relocation, and community safety is accordingly scoped out of the Population and Human Health Chapter.</p>

Consultee or organisation approached	Date and nature of consultation	Summary of consultee response	How comments have been addressed in this chapter
		<p>A consistency point around decommissioning being “no worse” than construction. For topics where construction is scoped in further description of decommissioning will be needed in the ES. This is applicable to all topics and decommissioning should be defined and assessed in detail rather than comparing to construction effects.</p>	<p>The ES provides a proportionate description of the decommissioning and the anticipated duration in ES Volume I Chapter 4: The Proposed Development (Application Document Ref. 6.2). The activities involved in the decommissioning process for the Proposed Development are not yet known in detail, as it has a design life of 25 years and an operational life that could extend longer than that. As such, Population and Human Health effects associated with the decommissioning stage is anticipated to be no worse or less than the construction stage, as set out in this Chapter within Section 17.7. A Decommissioning Environmental Management Plan (DEMP) will be included as a Requirement of the Draft DCO (Application Document Ref. 3.1).</p>
		<p>The Scoping Report states that where relevant standards do not exist, professional experience and expert judgement will be applied and justified in the assessment. Where</p>	<p>Clear explanation and evidence is provided within this Chapter where professional judgement is used in this assessment of Population and Human</p>

Consultee or organisation approached	Date and nature of consultation	Summary of consultee response	How comments have been addressed in this chapter
		professional judgement is used this should be clearly expanded upon in the ES and supported with evidence on how decisions have been reached.	Health effects. This is considered throughout Section 17.7.
		The Inspectorate advises that impacts on health and wellbeing and health inequalities of the Proposed Development may have impacts on vulnerable or sensitive populations, including those that fall within the list of protected characteristics. These receptors, if present, should therefore be included in the scope of assessment.	The assessment within the Population and Human Health Chapter takes account of the qualitative sensitivity of relevant populations and potentially vulnerable sub-populations and their ability to respond to change. This is considered throughout Section 17.7.
UK Health and Security Agency (HSA)	Statutory consultation response (17 February 2025)	UK HSA confirms they are satisfied with the approach taken in preparing the EIA and the conclusions drawn.	Noted
		The PEI Report does not consider any risks or impacts that might arise as a result of EMF associated with the connection of the Proposed Development to the national grid. UK HSA notes they would prefer to see this included in the application.	The potential EMF effects associated with the 400kV connection on human health receptors including residential and recreational receptors, are considered and scoped into the Population and Human Health Chapter. This is assessed within Section 17.7, with consideration

Consultee or organisation approached	Date and nature of consultation	Summary of consultee response	How comments have been addressed in this chapter
			of impact avoidance measures signposted in 17.6, and mitigation measures signposted in Section 17.8.

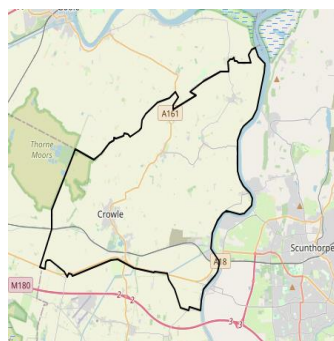
Extent of Study Area

17.3.2 The study area for the Population and Human Health assessment is defined to include features likely to be at risk from possible direct and indirect impacts that might arise from the Proposed Development (**Plate 17.1**). The study area is based on the extent and characteristics of the Proposed Development and the communities/wards directly and potentially indirectly affected. It is determined that human health impacts are likely to occur in the following geography:

- Axholme North Ward (Direct Impact Area / Study Area)

17.3.3 The following geographies are included in the assessment as comparator areas:

- North Lincolnshire Local Authority (Wider Impact Area / District Comparator)
- Yorkshire and the Humber (Regional Comparator)
- England (National Comparator)



Axholme North Ward



North Lincolnshire



Yorkshire and The

Plate 17.1: Study Area

17.3.4 Dependent on the indicator being analysed, some ward level data is available from the 2021 Census which has been used as the preferred dataset where possible. It is important to note that the electoral ward boundaries have changed in recent years and although the geographic extents of these may differ, both types of wards provide an indication of local health in proximity to the Proposed Development and are therefore considered suitable for assessing the existing baseline conditions for Population and Human Health.

- 17.3.5 Where ward level data is not available, North Lincolnshire (Wider Impact Area) has been used as the Study Area, as referenced in the text.

[Impact Assessment Methodology](#)

- 17.3.6 The World Health Organisation (WHO) Europe defines health as a “*state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity*”. Public health therefore encompasses general wellbeing, not just the absence of illness (WHO, 1946).
- 17.3.7 The health and wellbeing of individuals is determined by a broad range of individual constitutional and behavioural factors (or ‘determinants’), as well as broader environmental, social and economic factors. Some factors are direct and obvious, whilst others are indirect.
- 17.3.8 Within a population there can also be health inequalities, defined by the WHO as “differences in health status or in the distribution of health determinants between different population groups. For example, differences in mobility between elderly people and younger populations or differences in mortality rates between people from different social classes”.
- 17.3.9 The Population and Human Health assessment follows the general impact assessment methodology as set out in Institute of Environmental Management and Assessment (IEMA) guidance.
- 17.3.10 ‘Significance’ reflects the relationship between the scale of effect (impact magnitude) and the sensitivity of the affected receptor. As such, the significance criteria of Population and Human Health effects have been assessed based on the expert judgement and professional experience of the authors, and relies on the following considerations:
- Sensitivity of human health receptors including general populations and potentially vulnerable sub-populations: the assessment takes account of the qualitative (rather than quantitative) sensitivity of relevant populations and sub-populations and their ability to respond to change (Table 17.2); and
 - Magnitude of impact: this entails consideration of the scale of the exposure of the population to an impact; whether the impact is one-off or continuous; the likely nature of the human health impact; the permanence of the change; and the proportion of the relevant study area population that would be affected (Table 17.3Table 17.33).

Table 17.2 Sensitivity/ Value Criteria for Population and Human Health

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

Source: Adapted from: IEMA Guide to Determining Significance for Health, 2022

Table 17.33 Magnitude Criteria for Population and Human Health

Magnitude	Magnitude Criteria
High	High exposure or scale; long-term duration or permanent change; 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; gradual reversible; 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; rapid reversible; 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; immediate reversible; 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.

Source: Adapted from: IEMA Guide to Determining Significance for Health, 2022

- 17.3.11 Population and Human Health effects reflect the relationship between the sensitivity of affected receptors and the magnitude of the impact in accordance with Table 17.4. This follows guidance set out in the IEMA Guide to Determining Significance for Health (IEMA, 2022a).

Table 17.4 Classification of Effect Matrix

		Sensitivity			
		Major	Major/ Moderate	Moderate/ Minor	Minor/ Negligible
Magnitude	High	Major	Major/ Moderate	Moderate/ Minor	Minor/ Negligible
	Medium	Major/ Moderate	Moderate	Minor	Minor/ Negligible
	Low	Moderate/ Minor	Minor	Minor	Negligible
	Negligible	Minor/ Negligible	Minor/ Negligible	Negligible	Negligible

Source: IEMA Guidance for Determining Significance for Human Health

17.3.12 Effects are defined as follows:

- Beneficial classifications of significance indicate an advantageous or positive effect on an area, which may be minor, moderate or major;
- Negligible classifications of significance indicate imperceptible effects on an area;
- Adverse classifications of significance indicate a disadvantageous effect on an area, which may be minor, moderate or major; and
- No effect classifications of significance indicate that there are no effects on an area.

17.3.13 Duration of effect is also considered, with more weight given to permanent changes than to temporary, reversible changes.

17.3.14 In accordance with the methodology set out in IEMA guidance (IEMA, 2022a), Major and Moderate effects are classed as Significant, whilst Minor and Negligible effects are classed as Not Significant.

Sources of Information

17.3.15 Baseline data illustrating the existing health conditions surrounding the Proposed Development have been collected through a desk-based

research exercise using publicly available sources, documents, and web-based applications. These sources include:

- Census 2021 (ONS, 2022);
- Claimant Count 2024 (ONS, 2024);
- Public Health England Office for Health Improvement and Disparities (2024);
- Population Projections (ONS, 2020);
- Indices of Multiple Deprivation 2019 (MHCLG, 2019);
- Local Health Profiles (PHE, 2024);
- Annual Survey of Hours and Earnings (2023) (ONS, 2022);
- Community Life Survey (2021) (DDCMS, 2021);
- Public Health England Mental Health Profiles (2017) (PHE, 2017a);
- Regional Gross Disposable Household Income (ONS, 2023).

17.4 Use of the Rochdale Envelope

17.4.1 In order to ensure a robust assessment of the likely significance of the environmental effects of the Proposed Development, the ES is being undertaken adopting the principles of the 'Rochdale Envelope' approach in line with The Planning Inspectorate's Advice Note 9 (PINS, 2012). This involves assessing the maximum (or where relevant, minimum) parameters for the elements where flexibility needs to be retained. These parameters have been used to inform the representative worst-case scenario that has been assessed in this chapter, in order to provide a robust assessment of the impacts and likely significance of environmental effects of the Proposed Development at its current stage of design.

17.4.2 In particular, focused use of the Rochdale Envelope has been adopted for the following aspects:

- The worst case scenario has been assessed for impacts on access to healthcare services, transport, air quality, noise, open space, and water, as these are envisioned to be adverse impacts. This means the assessment assumes the greatest potential for adverse effects in terms of scale, intensity, or duration to assess the worst-case scenario.
- The worst case scenario for impacts on other receptors such as employment and income, and education and training have been assessed, whereby the worst-case scenario is considered as the effect of the Proposed Development is expected to be a beneficial impact. This means the assessment considers conservative assumptions

regarding number of jobs created or level of training provision that could arise from the development to assess the worst-case scenario.

17.5 Baseline Conditions

Existing Baseline

- 17.5.1 The Population and Human Health baseline profile focuses on key indicators identified by PHE (now the Office for Health Improvement and Disparities (OHID)) at ward level including a comparison with district, regional, and national averages. The Proposed Development is located within the Axholme North Ward (Direct Impact Area / Study Area). The other comparator areas analysed are North Lincolnshire Local Authority, Yorkshire and the Humber, and England. This section describes the baseline environmental characteristics for the Proposed Development, with specific reference to indicators deemed relevant to likely health impacts of the Proposed Development. Wherever possible, the most recently available data is presented at all geographical levels relevant to the study area.

Population

- 17.5.2 Axholme North has a population of 8,251, approximately 4.9% of North Lincolnshire's 169,674 population based on ONS Census 2021 data (ONS, 2022). As shown in Plate 17.2 below, Axholme North has the smallest proportion of individuals aged 0-15 of the four geographies (17.3%), as well as the joint lowest proportion of individuals aged 15-64 (60.2%). Furthermore, Axholme North has the largest proportion of individuals aged 65+ (22.6%), higher than the comparator geographies. From these statistics, it is evident that Axholme North has a generally older population on average compared to the comparator geographies. This vulnerable sub-population are overrepresented in the study area and could be more sensitive to changes to their environment and may have a higher reliance on health services and social infrastructure. This will be assessed in the assessment of likely impacts.

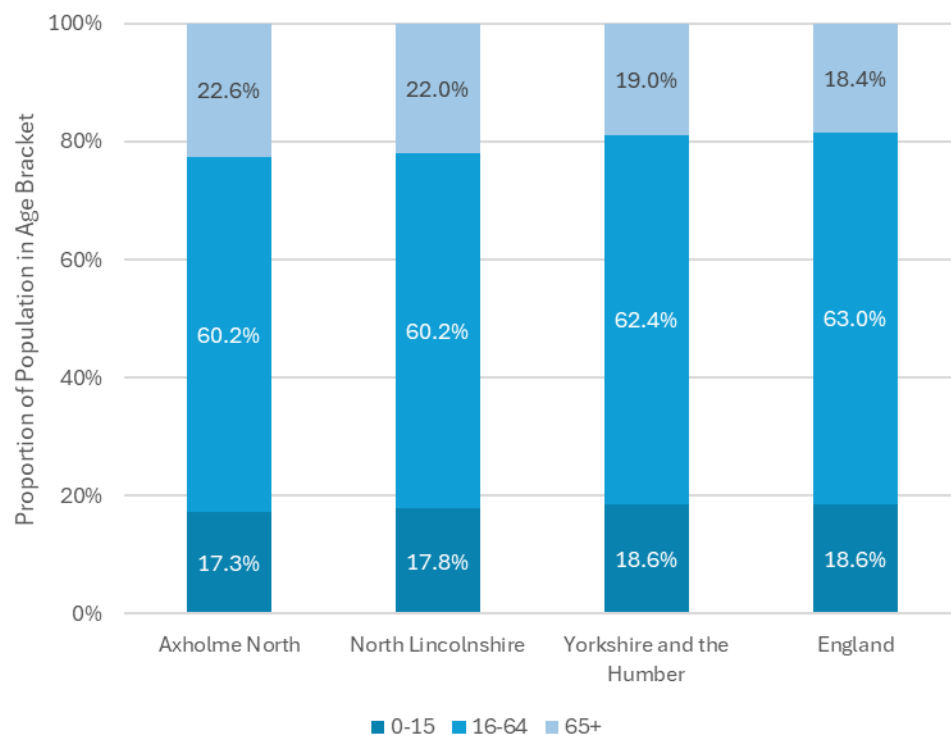


Plate 17.2: Population Demographics

Source: ONS, (2022); Census 2021.

Ethnicity

- 17.5.3 The Census 2021 contains data on the ethnicity demographics of the four geographies; these statistics are summarised below in Table 17. 5. Axholme North has a predominantly white population (98.5%), significantly higher than the other geographies; for example, 81% of England is white. The second largest ethnic group in Axholme North was the mixed or multiple ethnic groups category, constituting 0.7% of the population. North Lincolnshire and Yorkshire and the Humber have a more diverse population than Axholme North, with the white ethnic group comprising 94.3% and 85.4% of their respective populations. However, these proportions are still greater than the England average (81%).

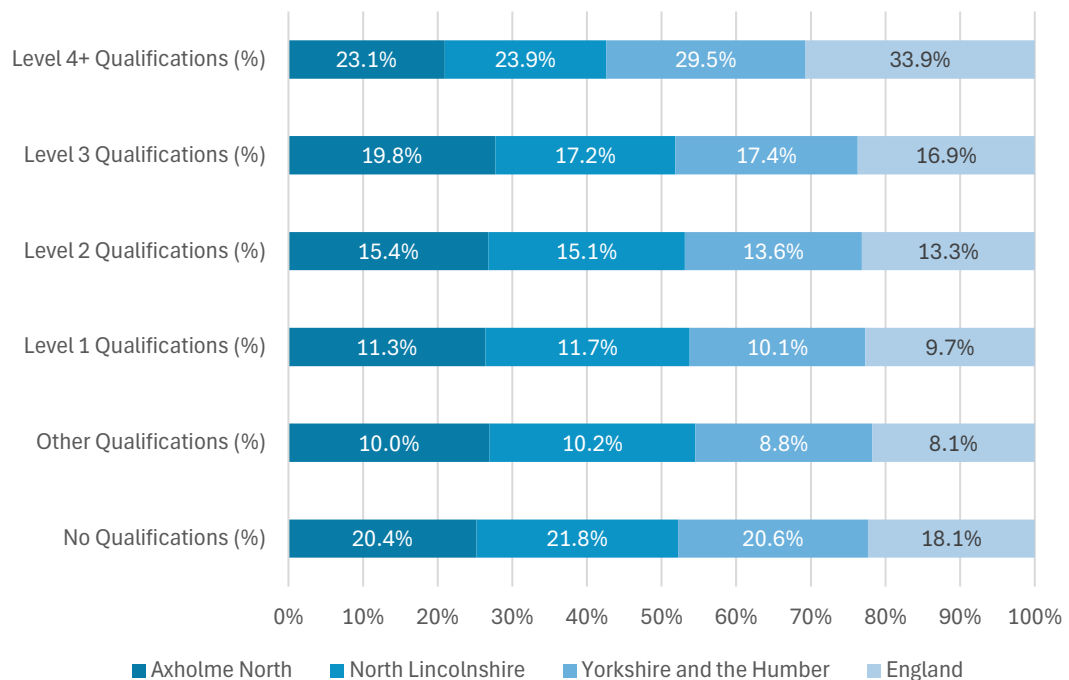
Table 17. 5 Ethnicity

Ethnic Group	Axholme North	North Lincolnshire	Yorkshire and the Humber	England
Asian, Asian British or Asian Welsh (%)	0.5	3.3	8.9	9.6
Black, Black British, Black Welsh, Caribbean or African (%)	0.1	0.5	2.1	4.2
Mixed or Multiple ethnic groups (%)	0.7	1.1	2.1	3
White (%)	98.5	94.3	85.4	81
Other ethnic group (%)	0.2	0.8	1.4	2.2

Source: ONS, (2022); Census 2021.

Qualifications

- 17.5.4 Data on qualifications is available from ONS in the 2021 Census. Plate 17.3below showcases the qualifications distributions between the four geographies. Axholme North has the lowest proportion of individuals qualified to level 4+ (23.1%) of the four geographies. Conversely, Axholme North has the largest population percentage qualified to level 3 (19.8%), the largest population percentage qualified to level 2 (15.4%) and the second largest proportion of individuals qualified to level 1 (11.3%). Axholme North has a predominantly intermediate skilled workforce, with 56.5% population holding level 1, level 2, level 3 or other qualifications.



Source: ONS, (2022); Census 2021.

Plate 17.3: Qualifications

Economic Activity

17.5.5

Data on economic activity and unemployment is available in the 2021 Census. Table 17.6 showcases this data. Of the four geographies, North Lincolnshire has the lowest proportion of economically active individuals (57.7%) and the highest proportion of economically inactive individuals (42.3%). Axholme North has the second lowest proportion of economically active individuals (58%) only marginally greater than North Lincolnshire (57.7%), however Axholme North has the lowest unemployment rate (2.5%) of the four geographies.

Table 17.6 Economic Activity

Economic Activity Status	Axholme North	North Lincolnshire	Yorkshire and the Humber	England
Economically Active (%)	58	57.7	58.6	60.9
Employee: Part-Time (%)	12.9	13.2	13.7	13.1
Employee: Full-Time (%)	33.4	34.5	33.3	34.6
Self-Employed (%)	9.2	6.9	8.1	9.6
Unemployed (%)	2.5	3	3.4	3.5
Economically Inactive (%)	42	42.3	41.4	39.1

Source: ONS, (2022); Census 2021.

Claimant Count

17.5.6 The Office for National Statistics provides monthly data on the number of people claiming benefits principally for the reason of being unemployed. In June 2024, Axholme North had the lowest proportion of claimants as a proportion of residents aged 16-64 (2.4%). Yorkshire and the Humber had the highest proportion of claimants (4.4%), followed by England (4.1%) and North Lincolnshire (3.7%). These statistics can be found below in Table 17.7.

Table 17.7 Claimant Count

Geography	Claimants as a Proportion of Residents Aged 16-64 (%)
Axholme North	2.4
North Lincolnshire	3.7
Yorkshire and the Humber	4.4
England	4.1

Source: Office for National Statistics, (2024); Claimant Count.

Deprivation

- 17.5.7 Based upon the 2019 Indices of Multiple Deprivation (IMD), in 2019, 11.1% of LSOAs¹ in North Lincolnshire were in the lowest decile; these are the 10% most deprived LSOAs in England. The average decile across North Lincolnshire was 5, indicating that North Lincolnshire has a relatively average deprivation score and is neither highly deprived or highly advantaged. Furthermore, the average LSOA deprivation rank in North Lincolnshire was 15,651; there are 32,844 LSOAs, providing more evidence of North Lincolnshire's average level of deprivation.
- 17.5.8 Data from the annual survey of hours and earnings shows that in 2023, the median weekly income in North Lincolnshire was £560.40. This is less than the average across England of £576.90.

Gross Disposable Household Income

- 17.5.9 The Office for National Statistics provides data between 1997 and 2021 for the Gross Disposable Household Income (GDHI) in ITL regions across the UK, displayed below in Table 17.8. Data is only available for North Lincolnshire together with North East Lincolnshire and has therefore been collected at this level. In both 1997 and 2021, North and North East Lincolnshire has a lower GDHI per person in England. In 2021, England's GDHI per person was £22,213, 26.8% higher than North and North East Lincolnshire's £17,515. Furthermore, in the 1997 to 2021 period, GDHI per person grew by a larger proportion in England than in North and North East Lincolnshire, with respective growths of 104.8% and 93%.

Table 17.8 Gross Disposable Household Income

	North and North East Lincolnshire 1997	North and North East Lincolnshire 2021	England 1997	England 2021
GDHI per Person in Current Prices (£)	9,076	17,515	10,847	22,213

Source: Office for National Statistics, (2023); Gross Disposable Household Income: All ITL Level Regions

¹ An LSOA is a lower layer super output area, a geographical area consisting of approximately 1,500 people.

Community Cohesion

- 17.5.10 According to the Community Life, in Yorkshire and the Humber (the most granular level of data) 67% of respondents in 2021 felt like they belonged strongly or fairly strongly to their immediate neighbourhood. This is higher than the average for England (65%).

General Health

- 17.5.11 The 2021 Census provides data on self-assessed general health which can be seen for the four geographies in Table 17.9 below. Axholme North and North Lincolnshire have relatively low proportions of individuals assessing their health as very good, with respective proportions of 43% and 42.9%. This is significantly lower than the average across England (48.5%). Conversely, Axholme North and North Lincolnshire have a relatively high proportion of individuals assessing their health as good, with respective proportions of 35.6% and 35.9%. This is greater than Yorkshire and the Humber (34.3%) and England (33.7%). Of the four geographies, Axholme North had the largest proportion of individuals with bad health (5.1%). There was little variance across all four geographies in the very bad health category, ranging from 1.2% to 1.3% of the populations.

Table 17.9 General Health

General health	Axholme North	North Lincolnshire	Yorkshire and the Humber	England
Very good health (%)	43	42.9	46.2	48.5
Good health (%)	35.6	35.9	34.3	33.7
Fair health (%)	15.1	15.1	13.7	12.7
Bad health (%)	5.1	4.7	4.5	4
Very bad health (%)	1.2	1.3	1.3	1.2

Source: ONS, (2022); Census 2021.

Mental Health

- 17.5.12 Mental health and well-being profiles produced by PHE provide a summary of the mental health of people within local authority areas and a comparison of local mental health with average values for all areas of England. The most recent data published is from 2017. Data at ward level is unavailable for this indicator and so, the local authority of North Lincolnshire has been used. In North Lincolnshire, 16.8% of the over 16 population were found to have a common mental health disorder. This is

lower than Yorkshire and the Humber (17.6%) and the England average (16.9%).

Disability

17.5.13 Data on disabilities, physical conditions and mental conditions is available from the 2021 Census and is presented below in **Table 17.9**. Axholme North has the greatest proportion of individuals whose day-to-day activities are limited a lot, comprising 8.9% of the population compared to 7.3% in England. Of the four geographies, Axholme North also had the lowest proportion of individuals with no long term physical or mental condition (72.9%).

Table 17.10 Disabilities

Disability	Axholme North	North Lincolnshire	Yorkshire and the Humber	England
Day-to-day activities limited a lot (%)	8.9	8.6	8.1	7.3
Day-to-day activities limited a little (%)	11	11.1	10.5	10
Long term physical or mental health condition but day-to-day activities are not limited (%)	7.1	6.8	6.9	6.8
No long term physical or mental health conditions (%)	72.9	73.6	74.4	75.9

Source: ONS, (2022); Census 2021.

Wider Determinants of Health

17.5.14 PHE publishes local authority health profiles on an annual basis detailing health outcomes against 32 different indicators. The indicators are updated regularly to reflect the latest data, with life expectancy data most recently updated in February 2024.

17.5.15 North Lincolnshire's performance on different health indicators varies widely, as set out below.

- Life expectancy
 - Female life expectancy in North Lincolnshire (82.9 years) is marginally higher than in England (82.8 years), whereas male life expectancy in North Lincolnshire (78.4 years) is lower than the average across England (78.9 years).
 - Life expectancy is 10.9 years lower for men and 8.1 years lower for women in the most deprived areas of North Lincolnshire than in the least deprived areas.
- Child health
 - In Primary School Year 6 or equivalent, 22.3% of children in North Lincolnshire are classified as obese, slightly better than the average across England (22.7%).
 - The rate for alcohol-specific hospital admissions among those under 18 in North Lincolnshire is 19.5 per 100,000, better than the average for England (26 per 100,000).
 - GCSE attainment (mean attainment 8 score) is 43.8 in North Lincolnshire, lower than the average across England (46.2).
 - Rates of smoking during pregnancy were significantly worse in North Lincolnshire (15.6%) than the average in England (8.8%).
- Adult health
 - 71.1% of adults in North Lincolnshire are overweight or obese, significantly higher than in England (64%).
 - 65.3% of adults are physically active in North Lincolnshire, lower than the proportion across England (67.1%).
 - The rate for alcohol-related hospital admissions among adults in North Lincolnshire is 487 per 100,000, worse than the average for England (475 per 100,000).
 - The proportion of adults in North Lincolnshire who are active smokers (15.4%) is worse than in England (12.7%).
 - The under-75 circulatory disease mortality rate per 100,000 people is 100.5 in North Lincolnshire, much greater than the rate across England (77.8).
 - The rate of hip fractures per 100,000 people in the over 65 population is worse in North Lincolnshire (642) than England (558).

Healthcare Facilities

- 17.5.16 There is one GP surgery near the Proposed Development, this being Trent View Medical Practice which is approximately 1.1 km southeast of the Site. The nearest hospital (with an accident and emergency department) to the Site is Scunthorpe General Hospital, which is located approximately 5.7 km east.
- 17.5.17 The latest GP data published by NHS (NHS England, 2024) indicates that the total patients registered at Trent View Medical Practice was 11,148 in May 2024. The GP Surgery has 4 full time equivalent (FTE) working GPs, averaging at 2,789 patients per GP, which is above the Royal College of General Practitioners target of 1,800 patients per GP.
- 17.5.18 Overall, there is limited GP surgeries near to the Proposed Development, which contain a high patient to GP ratio which could limit access to health services for local people. However, it is noted that Trent View Medical Practice is accepting new patients.

Social Infrastructure, Community and Recreational facilities

- 17.5.19 There is a range of community, recreational and social infrastructure facilities located in proximity to the Proposed Development including educational facilities, local businesses and residential settlements. These are detailed in **ES Volume I Chapter 16: Socio-Economics (Application Document Ref. 6.2)**.

Public Rights of Way

- 17.5.20 A number of Public Rights of Way (PRoW) are located within and in close proximity to the Site. These are detailed in **ES Volume I Chapter 13: Landscape and Visual Amenity (Application Document Ref. 6.2)**.

Future Baseline

- 17.5.21 The Office for National Statistics provides data on population projections at the local authority level (ONS, 2020). The population of North Lincolnshire is projected to grow between 2021 and 2040, from 173,668 to 177,729, representing a 2.3% increase. This is significantly less than the projected growth rate in England; between 2021 and 2040, England's population is projected to rise 7.3% from 56,989,572 to 61,157,877.
- 17.5.22 North Lincolnshire's age profile is also expected to shift, as displayed below in **Plate 17.4**. In 2021, 21.9% of the population in North Lincolnshire was over 65; this proportion is expected to significantly increase to 28.3% in 2040. A similar trend is observed in England, with the over 65

population growing from 18.7% to 23.8% between 2021 and 2040, a 1.3% less change than that in North Lincolnshire. In both England and North Lincolnshire, the proportion of the population aged 15-64 and 0-15 is projected to decrease between 2021 and 2040. Overall, North Lincolnshire's age demographics are projected to shift, with an aging population forecasted. This is in line with the trend in England.

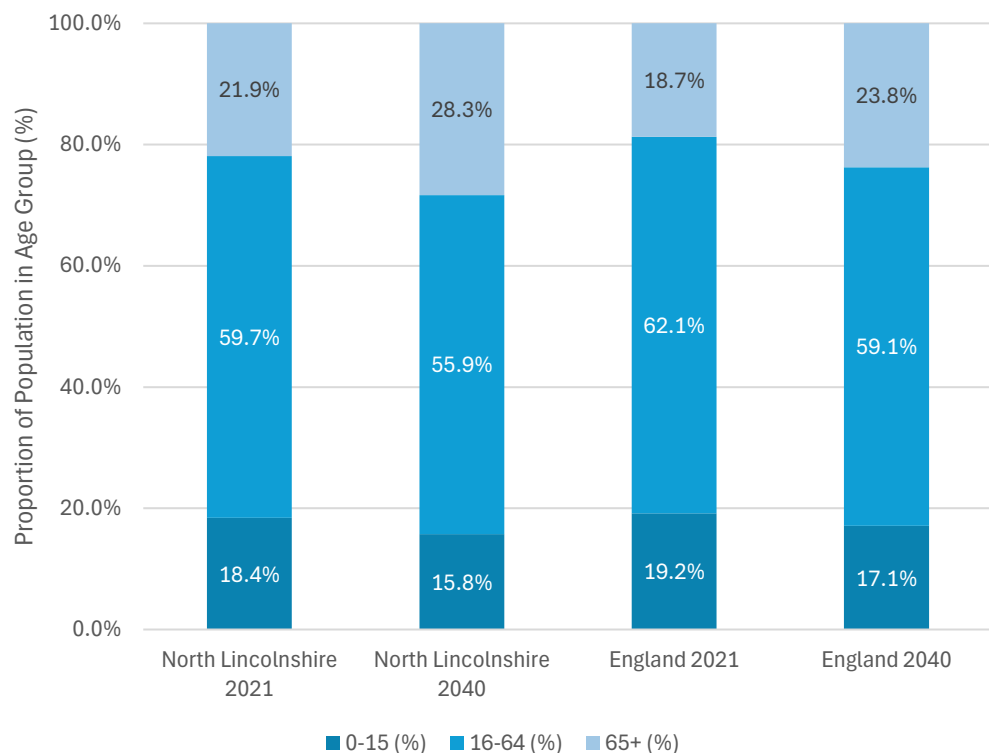


Plate 17.4: Population Projections

Source: Office for National Statistics, (2020); Population Projections

17.6 Development Design and Impact Avoidance

17.6.1 Impact avoidance measures have been identified within **ES Volume I Chapters 8 – 20 (Application Document Ref. 6.2)** and associated Appendices (**ES Volume III, Application Document Ref. 6.3**) to avoid, minimise or reduce potential adverse environmental effects. Project-wide development design and impact avoidance is discussed further in **ES Volume I Chapter 4: The Proposed Development (Application Document Ref. 6.2)** and **ES Volume I Chapter 5: Construction Programme and Management (Application Document Ref. 6.2)**.

17.6.2 The potential health effects of EMFs are to be mitigated through careful design, ensuring that the cable connection is laid at a suitable depth below

ground level where necessary (including in areas outside the operational site in publicly accessible areas). This will be designed in line with indicative guidance from the Transmission and Distribution specialists, based on the National Grid Technical Specification for the Laying of High Voltage Cables (NG TS 3.05.07) (National Grid, 2011) standard for 400kV high-voltage cables.

17.7 Likely Impacts and Effects

Effects During the Construction Phase

Health and Social Care Services

- 17.7.1 In a worst-case scenario it is anticipated that peak construction numbers would be approximately 1,050 workers. Chapter 16: Socio-economics (ES Volume I) calculates that in a worst case during peak construction, 331.5 net workers could be sourced from outside the study area. These additional construction workers may place extra demand on health and social care services if they move to the area, or if emergency treatment is required.
- 17.7.2 Sensitivity of the general population is **medium**. This reflects that GP practices local to the Proposed Development are, on average, operating above benchmark patient to GP ratios however routine self-reported census statistics indicate that 78.6% of the study area population rate their health status as 'good' or 'very good'. Based on professional judgement, the population is considered to have a moderate capacity to adapt to change in relation to access to health and social care services.
- 17.7.3 The average proportion of the population aged 65 and over within the study area is above that in the Wider Impact Area, Yorkshire and Humber, and England. In addition to this, there are likely to be some more vulnerable sub-populations within this; for example, those experiencing high deprivation or with pre-existing health conditions, within the small pockets of deprivation identified in the baseline. Therefore, the elderly and more vulnerable sub-populations are likely to have higher reliance on health services and have been assessed as having a **high** sensitivity to changes to accessing healthcare services.
- 17.7.4 Workers already residing locally will be registered at a local GP and will not therefore place additional demand for services upon local GPs. It is not expected that many workers will move to live in the immediate area and access the surgeries located in the vicinity of the Proposed Development. In addition, the GP surgery in proximity to the Proposed Development is accepting new patients. Due to the limited impact expected upon

healthcare services, the magnitude of these impacts is assessed to be **low**.

- 17.7.5 Overall, the likely effect on Population and Human Health arising from impacts on health and social care services during the Proposed Development construction phase is assessed as **minor adverse (not significant)**. For the more vulnerable sub-population, a **minor adverse (not significant)** effect would also result because of the additional demand on local GP surgeries. This effect is considered minor rather than moderate (in line with Table 17-4) as the anticipated increase in service use is deemed to be manageable within existing capacity. Professional judgement supports that any pressures will not result in significant disruption to care access or quality for vulnerable groups.

Employment and Income

- 17.7.6 There is evidence that employment matters to health, not only from an economic standpoint, but also in terms of quality of life. Good quality work protects against social exclusion through the provision of income, social interaction, a core role and identity and purpose. Therefore, the generation of jobs is assessed to be a beneficial outcome.
- 17.7.7 Baseline data with respect to employment and income indicates that there is a relatively low claimant count in the study area and a relatively low average GDHI in North and North East Lincolnshire compared to England. Therefore, the local labour force in the study area is assessed to be of **medium** sensitivity due to its assessed capacity to benefit from additional employment and income opportunities.
- 17.7.8 As set out in **ES Volume I Chapter 16: Socio-economics (Application Document Ref. 6.2)**, the Applicant estimates that the Proposed Development would require an average of 478 gross direct full-time equivalent (FTE) jobs on-site over the construction period. The jobs arising over the construction period would be temporary. After accounting for displacement, leakage and multiplier effects, the Proposed Development will support, on average, 663 net additional jobs during the construction period. Of these, 331.5 jobs per annum are expected to be taken-up by residents within the study area.
- 17.7.9 The additional jobs within the study area would represent local job growth and additional income that could lead to beneficial impacts in terms of protecting against social exclusion. However, the overall change would be small in the context of the overall number of jobs locally. Overall, the impact of construction on employment and income, which is of **medium** sensitivity, has been assessed as having a **low** magnitude which results in a **minor beneficial** effect, which is considered to be **not significant**.

Education and Training

- 17.7.10 Baseline data shows that the population of the study area is generally educated to a lower level than regional and national levels, suggesting a need for local education and training provision. Therefore, sensitivity is assessed as **medium**.
- 17.7.11 As set out in **ES Volume I Chapter 16 (Application Document Ref. 6.2)**, the Proposed Development will create a number of jobs (approximately 478 gross jobs on average, across the construction period). Employment, skills and training development initiatives are proposed (and are currently in place as part of the Keadby Power Station operation) to help local residents and unemployed workers into roles, which have the potential to lead on to training for roles at the Proposed Development. The skills and employment initiatives are secured by a requirement of the **Draft DCO (Application Document Ref. 3.1)**. The magnitude of impact anticipated on education and training during the construction phase is assessed as **low**.
- 17.7.12 Overall, the Proposed Development could provide opportunities to provide good quality education and training opportunities which are beneficial to health. The impact of construction on education and training, which is of **medium** sensitivity, has been assessed as having a magnitude of **low** which results in a **minor beneficial** effect, which is **not significant**.

Transport Modes, Access, and Connections

- 17.7.13 Residents of properties in the towns and villages surrounding the Proposed Development attempting to access healthcare and community facilities are likely to use the same strategic roads as construction traffic associated with the Proposed Development. Increased traffic flows and severance effects may inhibit the ability of local residents to access these facilities.
- 17.7.14 Baseline data shows that the study area experiences lower rates of good health and educational attainment compared to Yorkshire and Humber, and England as a whole. The sensitivity of the general population is therefore assessed to be **medium**. Sensitivity of the vulnerable sub-population is also assessed to be **high**. This reflects that the sub-population includes a high representation of elderly people who may be more reliant on transport to access health and social care services and educational facilities. Based on professional judgement, this sub-population may have limited capacity to adapt to change in relation to access to healthcare and community facilities.

- 17.7.15 **ES Volume I Chapter 10: Traffic and Transport (Application Document Ref. 6.2)** sets out a reasonable worst-case assessment of the traffic and transport effects of the Proposed Development during the construction phase. The additional traffic due to the Proposed Development construction activities will result in some increases in traffic flows, including HGVs, albeit is assessed to be considerably less than 30% on each link road (very low impact). This assesses the overall construction traffic effects on all road links and junctions within the study area as negligible. Given this, and that the duration of impact is short-term and that there is potential for only minor changes to traffic patterns, the overall magnitude of impact on Human Health and Population is assessed to be **negligible**.
- 17.7.16 Overall, for the general population (with a **medium** sensitivity), it is judged that a **negligible** effect would result, which is **not significant**. This is judged to be negligible and not minor (in line with Table 17-4) due to the predicted increase in traffic flows being low and short-term, and the general population having greater capacity to adapt to minor changes in access. For the more vulnerable sub-population, with a **high** sensitivity, a **minor adverse (not significant)** effect would result. This is judged to be minor rather than negligible (in line with Table 17.4) to reflect the increased reliance on transport and capacity to adapt within the vulnerable sub-population.
- Open Space, Leisure, and Play**
- 17.7.17 Construction activities of the Proposed Development may intersect, or otherwise impact upon, the accessibility of open space and Public Rights of Way (PRoW) in the study area, which could impact the health and wellbeing of local residents.
- 17.7.18 A number of Public Rights of Way (PRoW) are located within the study area, and there are several bridleways and footpaths in close proximity to the study area. KEAD9 and KEAD10 lie north of the Site, crossing through Keadby Wind Farm. CROW12 and CROW13 lie to the west of the Site and CROW11 runs along the North Soak Drain to the west of the Site. Given this network of PRoWs within the study area, the sensitivity of the population to PRoW closure is assessed to be **medium**.
- 17.7.19 An assessment of PRoW impacts is set out in **ES Volume I Chapter 16: Socio-economics (Application Document Ref. 6.2)**. This concludes that no PRoWs will be altered or closed during the construction phase, and no perceptible difference from baseline conditions is expected. Therefore, the magnitude of impact is assessed to be **negligible** in terms of potential impact on health and wellbeing of local residents.

- 17.7.20 Overall, the effect on Population and Human Health arising from impacts on open space, leisure and play of the Proposed Development in the construction phase is assessed to be **negligible**, which is **not significant**. This is judged to be negligible and not minor (in line with Table 17.4) due to the absence of any perceptible disruption, the limited and short-term nature of construction activities.

Air Quality

- 17.7.21 The activities of the Proposed Development have the potential to reduce air quality, due to construction dust or increased NO₂ and particulate matter concentrations from vehicle emissions, which could lead to adverse health effects on residents.
- 17.7.22 Baseline data indicates that residents in the study area experiences lower rates of good health and educational attainment compared to Yorkshire and Humber, and England as a whole. The sensitivity of the general population with respect to air quality is therefore assessed to be **low**. Sensitivity of the vulnerable sub-population is assessed to be **medium**. This reflects that the sub-population includes a high representation of people over 65 years old. The elderly population are more susceptible to the impacts arising from air quality, as their respiratory systems may be more at risk of health conditions.
- 17.7.23 An assessment of potential air quality effects during the construction of the Proposed Development is set out in **ES Volume I Chapter 8: Air Quality (Application Document Ref. 6.2)**. The construction dust risk assessment undertaken for the determined that the worst-case risk of dust effects would be 'low to medium' for human health receptors, but with the implementation of mitigation measures, effects are considered to be not significant. The assessment of the construction vehicle emissions found that the impact at all human receptors can be considered negligible. Given the available data, considering that residents across the study area would experience no significant effects on air quality after implementation of appropriate mitigation, the magnitude of impact is expected to be **low** during the construction phase.
- 17.7.24 Overall, for the general population (with a **low** sensitivity), it is judged that a **minor adverse** effect would result, which is **not significant**. For the more vulnerable sub-population, which has a **medium** sensitivity, a **minor adverse (not significant)** effect also would result based on professional judgement.

Noise and Vibration

- 17.7.25 The construction activities of the Proposed Development have the potential to lead to increases in noise and vibration, which could lead to

adverse health and wellbeing effects in terms of annoyance and/or disrupt local amenities.

- 17.7.26 An assessment of the risk of noise and vibration impacts during construction is provided in **ES Volume I Chapter 9: Noise and Vibration (Application Document Ref. 6.2)**. The Proposed Development will be located within and in the vicinity of existing industrial facilities, including Keadby 1 Power Station, Keadby 2 Power Station, the 400kV National Grid substation and the operational Keadby Windfarm. There are residential receptors and potentially sensitive ecological sites which have the potential to be impacted by noise and vibration emissions. The sensitivity of the general population is therefore considered to be **medium**.
- 17.7.27 For construction noise and vibration, **ES Volume I Chapter 9 (Application Document Ref. 6.2)** assessed that construction noise effects on residential Noise Sensitive Receptors (NSRs) are not significant within core daytime hours and, if applicable, Saturdays (during the day and evening) and Sundays during the morning. A significant effect would be exhibited at one NSR in the event that night-time working would be required, where additional mitigation would be required to minimise impact. Residual effects after mitigation (which includes specific measures which have been defined in the **Outline CEMP (Application Document Ref. 7.4)**) are thereby considered to be not significant when noise levels are reduced to the North Lincolnshire Council criterion (no greater than +3 dB excess of *rating level* over the *background sound level*) which is below the Lowest Observable Adverse Effect Level (LOAEL) (no greater than +5 dB excess of *rating level* over the *background sound level*), which is below the threshold at which adverse health effects are observed.
- 17.7.28 In specific regard to construction traffic, no change or very low change in road traffic noise due to traffic flows along the construction traffic routes of the Proposed Development is expected, which is also assessed to be not significant in terms of noise impacts on human NSRs. Given the temporary and localised nature of the construction activities, along with controlled noise and vibration exposure, the magnitude of change anticipated with respect to noise and vibration impacts on health and wellbeing during construction is assessed to be **low**.
- 17.7.29 Overall, the impact of construction on noise and vibration, which is of **medium** sensitivity, has been assessed as having a magnitude of **low** which results in a **minor adverse** effect which is **not significant**.

Climate Change, Mitigation and Adaptation

- 17.7.30 As discussed in **ES Volume I Chapter 18: Climate Change (Application Document Ref. 6.2.18)**, the total greenhouse gas (GHG) emissions from

the Proposed Development during the construction phase are calculated to be 101,433tCO₂e. Emissions related to construction are anticipated to occur between 2027 – 2030, with the majority of emissions attributable to the production of the raw materials used for the construction of the Proposed Development.

- 17.7.31 Sensitivity of the general population is **medium**. The self-reported health of the of the study area population indicates 78.6% rate their health status as 'good' or 'very good'. This indicates that the majority of the local population are healthy, however, this is below the regional and national levels recorded, and there is still a percentage that will suffer from respiratory illness. Individuals with respiratory illnesses are more susceptible to the impacts arising from GHG emissions.
- 17.7.32 Sensitivity of the elderly and vulnerable sub-population is **high**. This reflects that in terms of life stage, the sub-population includes a high representation of over 65 year olds. Older people are more susceptible to the impacts arising from GHG, as their respiratory systems are at higher risk of health conditions. As outlined in **ES Volume I Chapter 18: Climate Change (Application Document Ref. 6.2)**, GHG impacts could include emissions from the production of the raw materials, material transport, construction activities, waste, and worker transport. These emissions could contribute to worsened breathing of this vulnerable sub-population.
- 17.7.33 As outlined in **ES Volume I Chapter 18: Climate Change (Application Document Ref. 6.2)**, the emissions during the construction phase will comprise 0.006% of the UK Carbon Budget for the period 2028 to 2032 (relevant for the Proposed Development construction period). Therefore, it can be assessed that the magnitude of impact is assessed as **negligible**.
- 17.7.34 Overall, for the general population (with a **medium** sensitivity), it is judged that a **negligible** effect would result, which is **not significant**. This is judged to be negligible and not minor (in line with Table 17.4) based on professional judgement reflecting the small contribution of the Proposed Development's construction emissions and generally good health status of the majority of the population, indicating limited potential for measurable health impacts. For the more vulnerable sub-population, which has a **high** sensitivity, a **minor adverse (not significant)** effect would result. This is judged to be minor and not negligible (in line with Table 17.4) to reflect the increased susceptibility to respiratory issues and other health impacts within the vulnerable sub-population.

Water Quality and Availability

- 17.7.35 Where construction works are undertaken within or in proximity to surface watercourses and groundwater there is potential for adverse impacts on water quality due to deposition or spillage of soils, sediment, oils, fuels, or other construction chemicals. There may also be indirect water quality impacts to downstream receptors, as contaminated water can propagate down to receiving water courses. This section will assess impacts to drinking water quality and quantity from a human health perspective. Sensitivity of the population to change is assessed as **high** due to the high reliance on drinking water for human health.
- 17.7.36 **ES Volume I Chapter 12: Water Environment and Flood Risk (Application Document Ref. 6.2)** contains an assessment of impacts on ground and surface water contamination and quality. It finds that there are some slight adverse effects for receptors including the River Trent and Stainforth and Keadby Canal in addition to a number of drains as a result of the potential to receive suspended fine sediments or chemical spillages, though given the implementation of mitigation measures, these impacts on surface and ground water are not considered significant. Specifically, prior to construction starting on-site, a final CEMP will be prepared by the Contractor(s) and would outline the measures necessary to avoid, prevent and reduce adverse effects where possible on the local surface water and groundwater environment in accordance with the **Outline CEMP (Application Document Ref. 7.4)**. Additionally, a final Water Management Plan (WMP) will be implemented that will provide greater detail regarding the mitigation to be implemented to protect the water environment from adverse effects during construction. An Outline WMP has been prepared and is appended to the **Outline CEMP (Application Document Ref. 7.4)**. Therefore, magnitude is assessed as **low**.
- 17.7.37 Overall, the impact of construction on water quality or availability, which is of **high** sensitivity, has been assessed as having a magnitude of **low** which results in a **minor adverse** effect which is **not significant**. This is judged to be minor and not moderate (in line with Table 17.4) accounting for the mitigation measures in place to prevent significant contamination or depletion.

Community Identity and Social Participation

- 17.7.38 Baseline data shows that a higher proportion of people in Yorkshire and Humber feel like they belong strongly or fairly strongly to their immediate neighbourhood, compared to the proportion in England. This suggests a stronger sense of community in the area, compared to the rest of the country. Due to this, the sensitivity of the local population in relation to community identity and social participation is assessed as **medium**.

- 17.7.39 Keadby Hydrogen Power North Limited (The Applicant) has an established Community Liaison Officer in place for the existing operational site at Keadby. SSE intends to maintain this role as the Applicant's (Keadby Next Generation Limited) point of contact for the community throughout both the construction and operational phase of the Proposed Development. In addition, SSE hosts a Community Liaison Forum, fostering dialogue with local parish council representatives and ward councillors. Furthermore, SSE manages a community fund derived from another project, supporting local initiatives, alongside ongoing educational outreach efforts with the nearby school. These initiatives are assumed to continue, ensuring sustained and meaningful engagement with the community during construction and operation of the Proposed Development.
- 17.7.40 The magnitude of the impact is therefore assessed as **medium**. This is due to the level of community engagement expected by the Applicant during construction of the Proposed Development, which will be permanent through the construction and operational phase.
- 17.7.41 The overall likely effect on Population and Human Health arising from impacts on community identity and social participation during the Proposed Development construction phase is assessed to be **moderate beneficial**, which is **significant**.
- Built Environment**
- 17.7.42 As set out in Section 17.5, a summary of social infrastructure in the local area is assessed in **ES Volume I Chapter 16: Socio-Economics (Application Document Ref. 6.)**. Construction workers (net total of 663 on average, 331.5 of which are likely to come from outside of study area, with peak numbers being approximately 1,050 people per day) may place extra demand on these facilities if they move to the area, though in reality, many will likely stay in temporary accommodation and travel back to their permanent residence at the weekend.
- 17.7.43 There are generally average levels of deprivation in the study area with respect to the IMD barriers to housing and services domain, however, there are lower rates of good health amongst the local population. Therefore, existing social infrastructure services and their users have been assessed as having a **medium** sensitivity.
- 17.7.44 It is possible that local residents could experience adverse impacts due to increased demand for services and increased traffic flows. However, the construction of the Proposed Development will result in small, temporary increases of traffic flows (assessed as very low impact) which is unlikely to affect access to services and infrastructure. Therefore, the magnitude of impact is assessed as **negligible**.

- 17.7.45 Therefore, the overall likely effect on Population and Human Health arising from impacts on the built environment during the Proposed Development construction phase is assessed to be **minor adverse** based on professional judgement, which is **not significant**. This is judged to be minor and not negligible (in line with Table 17.4) as while impacts are small and temporary, the additional demand from construction workers on social infrastructure and medium sensitivity of services justify this minor effect based on cautious professional judgement.

Radiation – Electromagnetic Fields

- 17.7.46 Due to the potential for the 400kV connection to be located partly within or alongside Chapel Lane, the Proposed Development has the potential to expose road users to EMF radiation. In addition, as suggested by the IEMA, concerns about actual and perceived exposure to major electrical infrastructure can also lead to mental health impacts (IEMA, 2022b).
- 17.7.47 The self-reported health of the of the study area population indicates 78.6% rate their health status as ‘good’ or ‘very good’. This indicates that the majority of the local population are healthy, however, this is below the regional and national levels recorded. In terms of mental health, a lower proportion of the over 16 population in the Wider Impact Area were found to have a common mental health disorder compared to the regional and national average. This suggests that, relative to broader benchmarks, the local population may experience fewer mental health challenges. Therefore, the sensitivity of the population to EMF effects is considered to be **low**, as the majority of residents report good general health, and the incidence of common mental health disorders is comparatively lower than in surrounding regions.
- 17.7.48 It is assumed that whilst the 400kV connection is under construction, there will be no EMFs produced by the Proposed Development. Therefore, the magnitude of impact during the construction phase is **negligible**.
- 17.7.49 Overall, the likely effect on Population and Human Health arising from potential exposure to EMF during the construction phase is assessed to be **negligible (not significant)**.

Effects During the Operational Phase

Health and Social Care Services

- 17.7.50 The Proposed Development will generate an estimated 58 net jobs created during the operational phase, 8 of which could go to residents outside of the study area. These 8 operational staff may place extra demand on health and social care services if they move to the area, or if emergency treatment is required. It is unlikely that all operational staff will

relocate to the study area and so there will be minimal additional demand placed on health and social care services. Therefore, the magnitude of the impact is assessed as **negligible**.

- 17.7.51 Sensitivity of the general population is **medium**. This reflects that GP practices local to the Proposed Development are, on average, operating above benchmark patient to GP ratios however routine self-reported census statistics indicate that 78.6 of the Wider Impact Area population rate their health status as 'good' or 'very good'. Based on professional judgement, the population is considered to have a moderate capacity to adapt to change in relation to access to health and social care services.
- 17.7.52 The elderly and more vulnerable sub-populations are likely to have higher reliance on health services and have been assessed as having a **high** sensitivity to changes to accessing healthcare services.
- 17.7.53 Overall, the likely effect on Population and Human Health arising from impacts on health and social care services during the Proposed Development operational phase is assessed as **negligible (not significant)**. For the more vulnerable sub-population, a **negligible (not significant)** effect would also result as a result of the additional demand on local GP surgeries based on professional judgement. These effects are considered negligible rather than minor (in line with Table 17.4) as the anticipated increase in service use is deemed to be manageable within existing capacity. Professional judgement supports that any pressures will not result in significant disruption to care access or quality for the general population or vulnerable groups.

Employment and Income

- 17.7.54 Baseline data with respect to employment and income indicates that there is a relatively low claimant count and a relatively low GDHI in the study area compared to England. Therefore, the local labour force in the study area is assessed to be of **medium** sensitivity due to its capacity to benefit from additional employment and income opportunities.
- 17.7.55 As set out in **ES Volume I Chapter 16: Socio-economics (Application Document Ref. 6.2)** the Applicant estimates that the Proposed Development would require an average of 50 gross direct FTE jobs on-site over the operational period. After accounting for displacement, leakage and multiplier effects, the Proposed Development would support, on average, 58 net additional jobs during the operational period. Of these, 50 jobs per annum would be expected to be taken-up by residents within the study area.

- 17.7.56 Direct jobs created would represent local job growth (a beneficial impact), although the overall change will be very small in the context of the total number of jobs available locally. Therefore, the magnitude of impact is assessed as **negligible**.
- 17.7.57 Overall, the impact in the operational phase on employment and income, which is **of medium** sensitivity, has been assessed as having a magnitude of **negligible** which results in a **minor beneficial** effect based on professional judgement, which is **not significant**. This is considered minor rather than negligible (in line with Table 17.4) as although the net increase in employment is small relative to total local employment, there is deemed to be minor beneficial effect on the local labour market.

Education and Training

- 17.7.58 Baseline data shows that the population of the study area is generally educated to a lower level than regional and national levels, suggesting a need for local education and training provision. Therefore, sensitivity is assessed as **medium**.
- 17.7.59 As set out in **ES Volume I Chapter 16: Socio-economics (Application Document Ref. 6.2)**, the Proposed Development would create a number of operational jobs, and the Applicant intends to provide an employment, skills and training development programme to help local residents and unemployed workers into roles, which have the potential to lead on to training for roles at the Proposed Development. The skills and employment programme is secured by a requirement of the **Draft DCO (Application Document Ref. 3.1)**. The magnitude of impact anticipated with respect to education and training during the operational phase is assessed as **low**.
- 17.7.60 Overall, the Proposed Development could provide opportunities to provide good quality education and training opportunities which are beneficial to health. The impact on education and training results in a **minor beneficial** effect, which is **not significant**.

Transport Modes, Access, and Connections

- 17.7.61 The Proposed Development has the potential to impact on access to healthcare services, educational facilities, and other social infrastructure.
- 17.7.62 Baseline data shows that the study area experiences lower rates of good health and educational attainment compared to Yorkshire and Humber, and England as a whole. The sensitivity of the general population is therefore assessed to be **medium**. Sensitivity of the vulnerable sub-population is assessed to be **high**. This reflects that the sub-population

includes a high representation of elderly people who may be more reliant on transport to access health and social care services and educational facilities.

- 17.7.63 **ES Volume I Chapter 10: Traffic and Transport (Application Document Ref. 6.2)** sets out a reasonable worst-case assessment of the traffic and transport effects of the Proposed Development during the operational phase. The additional traffic associated with day-to-day operations and maintenance activities of the Proposed Development will result in some increases in traffic flows, including HGVs, albeit is assessed to be considerably less than 30% on each link road (very low impact). This assesses the overall construction traffic effects on all road links and junctions within the study area as negligible. Therefore, the magnitude of impact is assessed as **negligible**.
- 17.7.64 Overall, the effect on Population and Human Health arising from impacts on transport modes, access, and connections during the Proposed Development operational phase is assessed to be **negligible**, which is **not significant**. This is judged to be negligible and not minor (in line with Table 17-4) due to the predicted increase in traffic flows being low and short-term, and the general population having greater capacity to adapt to minor changes in access. For the more vulnerable sub-population, with a **high** sensitivity, a **minor adverse (not significant)** effect would result based on professional judgement. This is judged to be minor rather than negligible (in line with Table 17.4) to reflect the increased reliance on transport and capacity to adapt within the vulnerable sub-population.
- Open Space, Leisure, and Play**
- 17.7.65 As set out in 0, a number of Public Rights of Way (PRoW) are located within the study area. On the basis of this network of PRoWs within the study area, the sensitivity of the population to PRoW closure is assessed to be **medium**.
- 17.7.66 However, as assessed in **ES Volume I Chapter 16: Socio-economics (Application Document Ref. 6.2)** no PRoWs will be diverted or during the operational phase and there will be no impacts to users. Therefore, the magnitude of the impact is assessed as **negligible**.
- 17.7.67 Overall, the likely effect on Population and Human Health arising from impacts on open space, leisure and play during the Proposed Development operational phase is assessed to be **negligible (not significant)**. This is judged to be negligible and not minor (in line with Table 174) due to the absence of any perceptible disruption, the limited and short-term nature of construction activities.

Air Quality

- 17.7.68 Baseline data indicates that residents in the study area experience lower levels of good and bad health compared to Yorkshire and Humber, and England. The sensitivity of the general population with respect to air quality is therefore assessed to be **low**. Sensitivity of the vulnerable sub-population is assessed to be **medium**, given that the elderly population are more susceptible to the impacts arising from air quality, as their respiratory systems may be more at risk of health conditions.
- 17.7.69 An assessment of potential air quality effects of the Proposed Development is set out in **ES Volume I Chapter 8: Air Quality (Application Document Ref. 6.2)**. This concludes that the environmental effects from operation of the Proposed Development have been identified as not significant at all human health receptors. Given this, the magnitude of impact is expected to be **low** during the operational phase.
- 17.7.70 Overall, for the general population (with a **low** sensitivity), it is judged that a **minor adverse** effect would result, which is **not significant**. For the more vulnerable sub-population, which has a **medium** sensitivity, a **minor adverse (not significant)** effect also would result based on professional judgement.

Noise and Vibration

- 17.7.71 The operational activities of the Proposed Development have the potential to lead to increases in noise and vibration, which could lead to adverse health and wellbeing effects in terms of annoyance and/or disrupt local amenities.
- 17.7.72 An assessment of the risk of noise and vibration impacts during the operational phase is provided in **ES Volume I Chapter 9: Noise and Vibration (Application Document Ref. 6.2)**. Owing to the baseline conditions set out in 0, the sensitivity of the general population is considered to be **medium**.
- 17.7.73 For operational noise, it is assessed that effects on residential NSR's range from not significant to significant, and mitigation would be required to achieve operational sound levels at the North Lincolnshire Council criteria and below the Significant Observed Adverse Effect Level (SOAEL) and LOAEL at various NSRs. This is proposed to include practical sound mitigation to reduce relevant noise at source, and during detailed design, an operational noise control scheme (including agreed noise limits) will be prepared, secured by a Requirement of the DCO, which would demonstrate use of Best Available Techniques for the control of noise for the Environmental Permit. As a result, **ES Volume I Chapter 9**

(**Application Document Ref. 6.2**) concludes that residual effects after mitigation are considered to be not significant in terms of noise impacts on human NSRs. Taking this into account, the magnitude of change anticipated with respect to noise and vibration impacts on health and wellbeing during operation is assessed to be **low**.

- 17.7.74 Overall, the impact of the Proposed Development operation on noise and vibration results in a **minor adverse** effect which is **not significant**.

Climate Change, Mitigation, and Adaptation

- 17.7.75 As stated in paragraph 0, sensitivity of the general population is **medium** owing to the context that the majority of the local population are healthy, however, self-reported 'good' or 'very good' health is lower than the regional and national average, and there is still a percentage that will suffer from respiratory illness. Individuals with respiratory illnesses are more susceptible to the impacts arising from GHG emissions.
- 17.7.76 Sensitivity of the elderly and vulnerable sub-population is **high**. This reflects that in terms of life stage, the sub-population includes a high representation of over 65 year olds. Older people are more susceptible to the impacts arising from GHG, as their respiratory systems are at higher risk of health conditions.
- 17.7.77 As outlined in **ES Volume I Chapter 18: Climate Change** (from paragraph 18.6.57) (**Application Document Ref. 6.2**), in the expected operational scenarios (referred to in Chapter 18 as scenarios A-E, which consider a range of durations for use of natural gas, blended fuel and hydrogen, all achieving 100% hydrogen firing at some point in the operational life) the Proposed Development would result in a minor adverse impact which is not significant. Scenarios F and G (relating to late partial decarbonisation and full lifetime natural gas) result in moderate adverse effects which is significant. However, these scenarios would only be realised if sufficient hydrogen supply is not available for the lower-carbon scenarios to be realised, and are considered highly unlikely given the clear policy ambitions for hydrogen supply to be available in the future.
- 17.7.78 On this basis, the magnitude of change anticipated with respect to climate change impacts on health and wellbeing during operation is assessed to be **low**. Overall, for the general population (with a **medium** sensitivity), it is judged that a **minor** effect would result, which is **not significant**. For the more vulnerable sub-population, which has a **high** sensitivity, a **minor adverse (not significant)** effect also would result (but this is deemed to be minor opposed to moderate in line with Table 17-4 given the expected transition to lower-carbon fuels over the operational life of the Proposed Development in line with the UK's net zero trajectory).

Water Quality and Availability

- 17.7.79 The Proposed Development has the potential to impact water quality and availability during operation. Due to the high reliance of the local population on safe drinking water as a resource, sensitivity is assessed as **high**.
- 17.7.80 **ES Volume I Chapter 12: Water Environment and Flood Risk (Application Document Ref. 6.2)** outlines that impacts to surface and ground water could include surface water routine runoff and accidental spillages. The assessment predicts a negligible impact on Keadby Common Drain from surface water drainage. If the outfall to the River Trent is used instead, a slight adverse impact would be expected due to the high importance of this waterbody. However, the proposed surface water drainage system is to include the use of sustainable drainage systems (SuDS) to provide treatment of runoff from urban areas where there is a low risk of contamination by any chemicals used by the energy generation processes to ensure potential adverse effects on water quality and habitat of receiving water bodies are avoided. The Drainage Strategy developed at the detailed design stage is secured by a Requirement in the **Draft DCO (Application Document Ref. 3.1)** and will ensure that suitable treatment is provided prior to discharge to any watercourse in order to not adversely impact water quality of receiving waterbodies. Therefore, magnitude is assessed as **low**.
- 17.7.81 Overall, the impact of operation of the Proposed Development on water quality or availability, which is of **high** sensitivity, has been assessed as having a magnitude of low which results in a **minor adverse** effect which is **not significant**. This is judged to be minor and not moderate (in line with Table 17.4) accounting for the mitigation measures in place to prevent significant contamination or depletion.

Community Identity and Social Participation

- 17.7.82 The sensitivity of the local population in relation to community identity and social participation is assessed as **medium**, due to the stronger than average sense of community in the area compared to the rest of the country.
- 17.7.83 As stated in Section 17.7, the Applicant has an established community engagement strategy which is expected to be a permanent activity implemented in the construction phase and across operation of the Proposed Development. As stated, the magnitude of the impact is therefore assessed as **medium** due to the high level of community engagement during operation of the Proposed Development.

- 17.7.84 The overall likely effect on Population and Human Health arising from impacts on community identity and social participation during the Proposed Development operational phase is assessed to be **moderate beneficial**, which is **significant**.

Built Environment

- 17.7.85 There are generally average levels of deprivation in the study area with respect to the IMD barriers to housing and services domain, however, there are higher than average levels of poor health among the local population. Therefore, existing social infrastructure services and their users have been assessed as having a **medium** sensitivity.
- 17.7.86 The Proposed Development will generate an estimated maximum of 58 net FTE jobs during the operational phase. This is expected to place a low level of additional demand on the roads and is unlikely to impact access to services, as per the assessment in **ES Volume I Chapter 10: Traffic and Transport (Application Document Ref. 6.2)** of operational traffic effects on all road links and junctions within the study area being negligible. The magnitude of impact has therefore been assessed to be **negligible**.
- 17.7.87 Overall, the likely effect on the built environment during the Proposed Development operation phase is assessed to be **minor adverse** based on professional judgement, which is **not significant**. This is judged to be minor and not negligible (in line with Table 17.4) as while impacts are small and temporary, the additional demand from construction workers on social infrastructure and medium sensitivity of services justify this minor effect based on cautious professional judgement.

Radiation – Electromagnetic Fields

- 17.7.88 Due to the potential for the 400kV connection to be located partly within or alongside Chapel Lane, the Proposed Development has the potential to expose local residents to EMF radiation. In addition, as suggested by the IEMA, concerns about actual and perceived exposure to major electrical infrastructure can also lead to mental health impacts.
- 17.7.89 The self-reported health of the of the study area population indicates 78.6% rate their health status as 'good' or 'very good'. This indicates that the majority of the local population are healthy, however, this is below the regional and national levels recorded. In terms of mental health, a lower proportion of the over 16 population in the Wider Impact Area were found to have a common mental health disorder compared to the regional and national average. This suggests that, relative to broader benchmarks, the local population may experience fewer mental health challenges. Therefore, the sensitivity of the population to EMF effects is considered to be **low**, as the majority of residents report good general health, and the

incidence of common mental health disorders is comparatively lower than in surrounding regions.

- 17.7.90 As set out in Section 17.6, the potential health effects of EMFs are to be mitigated through careful design, ensuring that the cable connection is laid at a suitable depth below ground level such that EMF levels will not exceed threshold limits following the National Grid guidance (National Grid, 2011) standard for 400kV high-voltage cables. The standard laying depth typically ranges between 0.8m and 1.2m; the required depth of cover will be confirmed at the detailed design stage using EMF calculations as an integral part of cable system design.
- 17.7.91 As a result of the embedded design and impact avoidance measures, considering the potential location of the 400kV connection, the magnitude of impact is considered to be **low**.
- 17.7.92 Overall, the likely effect on human health arising from potential exposure to EMF during the operational phase is assessed to be **minor adverse (not significant)**.

Effects During the Decommissioning Phase

- 17.7.93 The ES provides a proportionate description of the decommissioning and the anticipated duration in **ES Volume I Chapter 4: The Proposed Development (Application Document Ref. 6.2)**. The activities involved in the decommissioning process for the Proposed Development are not yet known in detail, as it has a design life of 25 years and an operational life that could extend longer than that.
- 17.7.94 As such, the Population and Human Health effects during decommissioning are expected to be no greater than those experienced during the construction phase. On this basis, the worst-case scenario assumes impacts comparable to those identified for construction.
- 17.7.95 To manage potential impacts, a Decommissioning Environmental Management Plan (DEMP) will be included as a Requirement of the **Draft DCO (Application Document Ref. 3.1)** to ensure appropriate mitigation measures are implemented.

17.8 Mitigation, Monitoring and Enhancement Measures

- 17.8.1 Additional mitigation measures as set out in **ES Volume I Chapter 8: Air Quality, ES Volume I Chapter 9: Noise and Vibration, ES Volume I Chapter 10: Traffic and Transport, ES Volume I Chapter 12: Water Environment and Flood Risk, ES Volume I Chapter 14: Landscape and**

Visual Amenity, **ES Volume I Chapter 16: Socio-economics and Chapter 18: Climate Change (Application Document Ref 6.2)** to reduce other environmental effects as applicable, will in turn mitigate the impacts from a Population and Human Health perspective.

17.9 Limitations or Difficulties

- 17.9.1 The assessment of the significance of effects has been carried out against a benchmark of current Population and Human Health baseline conditions in the vicinity of the Proposed Development, as far as is possible within the limitations of such a dataset. Baseline data is also subject to a time lag between collection and publication. As with any dataset, these conditions may be subject to change over time which may influence the findings of the assessment.
- 17.9.2 The assessment of likely Population and Human Health effects arising from the Proposed Development is based on professional judgement, drawing on relevant guidance as set out in Section 17.2.
- 17.9.3 Effects on Population and Human Health draw upon other ES chapters, namely **ES Volume I Chapter 8: Air Quality, ES Volume I Chapter 9: Noise and Vibration, ES Volume I Chapter 10: Traffic and Transport, ES Volume I Chapter 12: Water Environment and Flood Risk, ES Volume I Chapter 14: Landscape and Visual Amenity, ES Volume I Chapter 16: Socioeconomics and Chapter 18: Climate Change (Application Document Ref. 6.2)**. Relevant assumptions and limitations are set out in the respective chapters and as such are not repeated here.

17.10 Summary of Likely Significant Residual Effects

- 17.10.1 There are no anticipated adverse significant residual Population and Human Health effects associated with the Proposed Development following the application of additional mitigation. Likely beneficial significant residual effects are summarised in Table 17.10.

Table 17.11 Likely Significant Residual Population and Health Effects

Phase	Environmental impact (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation
Construction	Community identity and social participation	Moderate beneficial (significant)	None required	Moderate beneficial (significant)
Operation	Community identity and social participation	Moderate beneficial (significant)	None required	Moderate beneficial (significant)

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