Immingham Green Energy Terminal

Environmental Impact Assessment

Preliminary Environmental Information Report

Volume II – Main Report

Chapter 24: Human Health and Wellbeing

Associated British Ports

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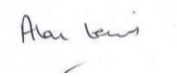
Signed		Date	20/12/2022
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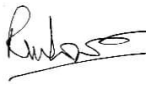
Signed		Date	20/12/2022
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Table of contents

Plates

Tables

24 Human Health and Wellbeing

24.1 Introduction

24.1.1 This chapter presents the preliminary findings of the assessment of the likely effects of the Project on human health and wellbeing during the construction, operation and decommissioning phases. For more details about the Project, refer to **Chapter 2: The Project** of this Preliminary Environmental Information (PEI) Report.

24.1.1 The assessment draws on technical assessments across this PEI Report of relevance to human health and wellbeing and its wider determinants, including:

a. **Chapter 6: Air Quality;**

b. **Chapter 7: Noise and Vibration;**

c. **Chapter 11: Traffic and Transport;**

d. **Chapter 19: Climate Change;** and

e. **Chapter 23: Socio-economics.**

24.1.2 A number of other technical assessments across this PEI Report assess impacts of potential relevance to human health but have been scoped out of this assessment, as measures are expected to be established to manage risk and ensure there are no significant effects on human health. These aspects will be monitored during the preparation of the ES, and where potential health effects are identified, these will be considered in the human health chapter as relevant and appropriate:

a. **Chapter 18: Water Quality, Coastal Protection, Flood Risk and Drainage**; and

b. **Chapter 22: Major Accidents and Disasters**.

24.2 Approach to Assessment

Scope and Methods

24.2.1 A scoping exercise was undertaken in August 2022 to establish the form and nature of the human health and wellbeing assessment, and the approach and methods to be followed.

24.2.2 The EIA Scoping Report (**Appendix 1.A** of PEI Report, Volume IV) records the findings of the scoping exercise and details the technical guidance, standards, best practice and criteria being applied in the assessment to identify and evaluate the likely significant effects of the Project on human health and wellbeing.

24.2.3 Following receipt of the Scoping Opinion, **Table 24.1** presents the requirements that will be taken into account as part of the ongoing Human Health and Wellbeing assessment:

Table 24.1: Summary of consultation undertaken to date for Human Health and Wellbeing

Consultee	Summary of Response	How comments have been addressed in this chapter
Planning Inspectorate	The effect of odour during operation has not been scoped into the assessment or reasons provided why this has been scoped out. This matter should be considered as part of the assessment made for air quality effects, as well as part of the health and well-being assessment, should significant effects be likely to occur.	An assessment of human health and wellbeing impacts arising from emissions of dust, noise, vibration and odours during the construction, operation and decommissioning phases of the Project is set in this Chapter and draws on assessments set out in **Chapter 6: Air Quality** and **Chapter 7: Noise and Vibration**. This is presented in **Table 24.12**.
Environment Agency	Emissions of dust, noise, vibration, and odours are only scoped in for assessment during construction and decommissioning. Odour during operation could potentially be an issue that needs to be scoped in; however, it may be appropriate to consider this under Chapter 5 Air Quality, as it does not appear to be covered elsewhere in the Report. The guidance that the Applicant will be expected to follow for environmental permitting can be accessed at Environmental permitting: H4 odour management - GOV.UK (www.gov.uk). We highlight the importance of the consideration of these issues in light of the close proximity of the residential properties mentioned under Chapter 3 above.	
Planning Inspectorate	The Scoping Report seeks to scope out this matter [PRoW impacts during operation] on the grounds that no adverse effects are expected as no direct effects are anticipated on public rights of way (PRoW) and no open space has been identified in the vicinity of the Proposed Development. Given the user experience of the PRoW during project operation would not be dissimilar to what it is currently, the Inspectorate agrees that this matter can	Noted. The effects of any impact on human health and wellbeing arising from impacts on PRoW during the construction and decommissioning phases is assessed in this Chapter and draws on the findings of **Chapter: 23 Socio-economics**. The health and wellbeing assessment is presented in **Table 24.13.**

Consultee	Summary of Response	How comments have been addressed in this chapter
	be scoped out of the assessment. See also impacts to PRoW during operation in Chapter 22: Socio-economics.	
Planning Inspectorate	The Scoping Report does not refer to potential local public concern through perception of risk from the transportation of hydrogen gas from the site. The Inspectorate considers that this matter should be scoped in to the assessment of human health and well-being.	An assessment of potential human health and wellbeing impacts arising from local public concern and perception of risk is set out below. The human health and wellbeing assessment is presented in **Table 24.15.**
UK Health Security Agency / Office for Health Improvement and Disparities	The scoping report does not make reference to the potential for local public concern through understanding of risk / risk perception. It should be noted that HyNet North West Hydrogen Pipeline Project has this potential impact scoped-in under 'Concern over hydrogen safety'. The effects related to people and communities in the near vicinity of the Project should be identified and addressed through targeted communications and mitigation programmes. For the wider public, general communication programmes in relation to the Project should provide a source of clear and objective information to increase knowledge and awareness. This approach has been accepted by PINS in the SoS Scoping Opinion.	
UK Health Security Agency / Office for Health Improvement and Disparities	The ES should consider potential effects on mental health through risk perception / understanding of risk posed by the handling and processing of hazardous materials. When estimating community anxiety and stress in particular, a qualitative assessment maybe most appropriate. Robust and meaningful consultation with the local community will be an important mitigation measure, in addition to informing the assessment and subsequent mitigation measures. This may involve conducting resident surveys but also information received through public consultations, including community engagement exercises. The Mental Well-being Impact Assessment Toolkit (MWIA) contains key principles that should be demonstrated in a project's community engagement and impact assessment. We would also encourage you to consult with the	

Consultee	Summary of Response	How comments have been addressed in this chapter
	local authority's public health team who are likely to have Health Intelligence specialists who will have knowledge about the availability of local data. The Mental Well-being Impact Assessment Toolkit (MWIA), could be used as a methodology. The assessment should identify vulnerable populations and provide clear mitigation strategies that are adequately linked to any local services or assets. Baseline indicators the assessment would benefit from including social cohesion/connectedness, satisfaction with local area and quality of life indicators owing to their established links to mental health and wellbeing. In terms of sources, we would draw your attention to the following: •PHE Fingertips –Mental Health and Wellbeing JSNA-Area profiles with various indicators on common mental disorders (including anxiety) and severe mental illness which can be benchmarked with other local areas as well as regional and national data •Office for National Statistics -Wellbeing Indicators-Range of datasets related to wellbeing available including young people's wellbeing measures, personal wellbeing estimates and loneliness rates by local authority.	
Immingham Town Council	The proximity of this hazardous site to existing premises seems too close.	An assessment of potential human health and wellbeing impacts of the Project on existing homes is assessed below, drawing on findings of **Chapter 6: Air Quality**, **Chapter 7: Noise and Vibration**, **Chapter 22: Major Accidents and Disasters** and **Chapter 23: Socio-economics**. This is presented in **Table 24.12** and **Table 24.15.**
UK Health Security Agency / Office for Health	Our position is that pollutants associated with road traffic or combustion, particularly particulate matter and oxides of nitrogen are non-threshold, i.e. an exposed population is likely to be subject to potential harm at any level and that reducing public exposure to non-threshold pollutants (such as particulate matter and nitrogen dioxide) below air quality standards will have	An assessment of potential human health and wellbeing impacts arising from air quality impacts during the construction, operation, and decommissioning phases of

Consultee	Summary of Response	How comments have been addressed in this chapter
Improvement and Disparities	potential public health benefits. We support approaches which minimise or mitigate public exposure to non-threshold air pollutants, address inequalities (in exposure) and maximise co-benefits (such as physical exercise). We encourage their consideration during development design, environmental and health impact assessment, and development consent.	the Project is set out below, drawing on **Chapter 6: Air Quality**. This is presented in **Table 24.12.**
UK Health Security Agency / Office for Health Improvement and Disparities	It is noted that the current proposals do not appear to consider possible health impacts of Electric and Magnetic Fields (EMF). We request that the ES clarifies this and if necessary, the proposer should confirm either that the proposed development does not impact any receptors from potential sources of EMF; or ensure that an adequate assessment of the possible impacts is undertaken and included in the ES.	An assessment of potential human health and wellbeing impacts arising from EMFs is scoped out of this assessment. No major sources of EMF are anticipated to arise from the Project. All cabling associated with the Project will be 132kV or below cables, and underground. The Applicant will ensure full compliance with relevant policies and procedures on EMF exposure limits are in place at the design phase. This will include ensuring worker exposure to any EMF risks are managed through adherence to standard working practices during any cable installation and commissioning works. Therefore, no impacts on human health and wellbeing are anticipated.
UK Health Security Agency / Office for Health Improvement and Disparities	The scoping report does not identify the approach to the identification of vulnerable populations. The impacts on health and wellbeing and health inequalities of the scheme may have particular effect on vulnerable or disadvantaged populations, including those that fall within the list of protected characteristics. The identification of vulnerable populations and sensitive populations should be considered. Baseline health data should be provided, which is adequate to identify any local sensitivity or specific vulnerable populations. The identification of vulnerable populations should be based on the list provided by the Welsh Health Impact Assessment Support Unit and the International Association of Impact Assessment (IAIA)	An assessment of the human health and wellbeing baseline, including analysis of health indicators among the population living locally, is set out below. The human health and wellbeing baseline includes data on population, age, ethnicity, deprivation, health deprivation, self-assessment of health, and a number of wider health determinant indicators. These indicators align with WHIASU vulnerable populations list (age related groups, income related groups, groups who suffer discrimination or other social advantage, geographical groups). Additional socio-economic data relating to the local population is set out in **Chapter 23: Socio-economics**.

Consultee	Summary of Response	How comments have been addressed in this chapter
UK Health Security Agency / Office for Health Improvement and Disparities	It is noted that Chapter 23 is drafted with reference to the Healthy Urban Development Unit (HUDU) and the Welsh Health Impact Assessment Support Unit (WHIASU) guidance and as such no assessment of significance is provided for human health. The lack of an assessment of significance does not conform to the requirements of The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (2017 Regulations) and as such an assessment of significance should form part of the Environmental Statement. HUDU and WHIASU are guidance to support health impact assessments and are not specifically designed to address health within an Environmental Impact Assessment (EIA). The ES must provide an assessment of significance for those health determinants scoped into the population and human health chapter. As there is currently not a defined approach to the assessment of significance for population and human health, it is strongly advised that any proposed approach is agreed with OHID/UKHSA and the local public health team. The guidance issued by the International Association of Impact Assessment (IAIA) could be used as a basis for the assessment of significance.	The assessment of human health and wellbeing impacts below uses Healthy Urban Development Unit (HUDU) guidance to carry out the assessment. A qualitative assessment is therefore made of whether effects are likely to be positive, negative or neutral with respect to health. Where negative effects are identified, suitable mitigation measures are identified. It is possible that where positive or negative effects are reported below, this could ultimately result in a significant effect with respect to health and wellbeing, but this will depend on further assessment. The final outcomes of the assessment, which will identify any likely significant effects of the Project on human health and wellbeing will be reported within the Environmental Statement and will take into account the latest IEMA guidance “Determining Significance for Human Health in Environmental Impact Assessment”, recently published in November 2022 (Ref 24-1).

Methodology

24.2.4 There is no industry-wide consolidated methodology or practice for the assessment of effects on human health. Best practice principles are provided in NHS England's Healthy Urban Development Unit's (HUDU) Rapid Health Impact Assessment (HIA) Toolkit 2019 (Ref 24-1). This guidance forms the basis of the approach adopted to assess impacts on health and wellbeing in this chapter. In addition, consideration has been given to the Health and Wellbeing checklist of the Wales Health Impact Assessment Support Unit (WHIASU) (Ref 24-3) to help with the identification of relevant health determinants. Based on this, the impacts of the Project on human health and wellbeing are assessed qualitatively using professional judgment and best practice, and drawing upon other assessments within the PEI Report. Therefore, the assessment does not follow the methodology for determining significant effects which is outlined in **Chapter 5: EIA Approach**. The methodology for the assessment is outlined below.

24.2.5 This qualitative assessment of human health effects considers the following health and wellbeing determinants of relevance to the Project:

a. Access to healthcare services and other social infrastructure;
b. Emissions of dust, noise, vibration, and odours;
c. Air/noise pollution linked with traffic;
d. Accessibility to open space, and on active travel;
e. Access to employment and training, particularly for local residents;
f. Contribution to social cohesion and engagement with existing communities to encourage social interaction and support mental health, including perception of risk; and
g. Climate change.

24.2.6 The assessment has considered the potential consequences for health and wellbeing from construction, operation, and decommissioning phases of the Project and draws upon the information and conclusions reported within the air quality assessment (**Chapter 6: Air Quality**), noise and vibration assessment (**Chapter 7: Noise and Vibration**), traffic and transport assessment (**Chapter 11: Traffic and Transport**), climate change assessment (**Chapter 19: Climate Change**), and socio-economic assessment (**Chapter 23: Socio-economics**).

24.2.7 There is no accepted definition of significance for health effects. The description of the changes to health determinants, the characteristics and sensitivity of the receptor population, and the likelihood of negative or positive health effects has been undertaken in accordance with HUDU and WHIASU guidance. The assessment provides qualitative information to inform stakeholders and decision makers of the likely direction of change in terms of human health and wellbeing outcomes. Therefore, in line with current knowledge and methods of assessment, the consideration of health outcomes reports effects as being positive, negative, or neutral, rather than indicating a level of significance.

24.2.8 The potential health effects during construction, operation, and decommissioning are described using the criteria outlined in **Table 24.2.** Where an impact is

identified, actions have been proposed to mitigate any negative impact on health, or to realise opportunities to create health benefits. It should be noted that in many cases, mitigation is embedded within the Project and the implementation of this is an underlying assumption of the assessment (see **Section 24.4.4**).

Table 24.2: Human health and wellbeing impact categories

Impact Category	Impact Symbol	Description
Positive	+	A beneficial impact is identified
Neutral	0	No discernible health impact is identified
Negative	-	An adverse impact is identified
Uncertain	?	Where uncertainty exists as to the overall impact

Legislation, Policy and Guidance

24.2.9 **Table 24.3** presents the legislation, policy and guidance relevant to the human health and wellbeing assessment and details how their requirements will be met assessment

Table 24.3: Relevant legislation, policy and guidance regarding human health and wellbeing

Legislation / Policy / Guidance	Consideration within the PEI Report
National Policy Statement for Ports (NPSfP)	
The National Policy Statement for Ports (NPSfP) (Ref 24-4) provides the framework for decisions on proposals for new port development. It is recognized that ports have a vital role in the import and export of energy supplies. It states that ensuring security of energy supplies through our ports will be an important consideration and that ports need to be responsible both to changes in the types of energy supplies needed and changes in the geographical pattern of demand for fuel. Within the document, it recognises that ports have the potential to affect the health, well-being and quality of life of the population through direct impacts on health and indirect impacts resulting from alterations to local populations. It highlights that these impacts can result from: Waste management Water quality and resources Air quality and emissions Noise and vibration Land use	Provides guidance on the likely impact pathways between port development and operation, and human health impacts. These align with the themes considered in the assessment of effects (**Section 24.6**) which, as set out in **Section 24.2**, considers: a) Access to healthcare services and other social infrastructure; b) Emission of dust, noise, vibration, and odours; c) Air/noise pollution linked with traffic; d) Accessibility to open space, and on active travel; e) Access to employment and training, particularly for local residents; and f) Contribution to social cohesion and engagement with existing communities to encourage social interaction and support mental health, including perception of risk.

Legislation / Policy / Guidance	Consideration within the PEI Report
Economic impacts, including access to public services.	
National Planning Policy Framework (NPPF)	
The latest National Planning Policy Framework (Ref 24-5) was published and adopted in July 2021. The NPPF consolidates the Government's economic, environmental and social planning policies for England into a single document and describes how it expects these to be applied. It provides overarching guidance on the Government's development aims. At the heart of the NPPF is a presumption in favour of sustainable development, which the Government states should be seen as a common theme running through plan-making and decision-taking. The NPPF states that the purpose of the planning system is to contribute to the achievement of sustainable development. The United Kingdom has agreed to pursue the 17 Global Goals for Sustainable Development in the period to 2030. These goals address social progress, economic wellbeing and environmental protection. The NPPF places emphasis on achieving sustainable development including by supporting *"strong, vibrant and healthy communities"*. Chapter 8: 'Promoting healthy and safe communities' outlines the key role that planning policy has in ensuring the health and wellbeing of communities through considerations such as the availability of school places, public safety and security, and the promotion of social interaction and community cohesion. Within this chapter, the NPPF identifies key principles that local planning authorities should ensure they consider in order to achieve this aim, including: Paragraph 92 c) which states policies should aim to *"enable and support healthy lifestyles, especially where this would address identified local health and well-being needs – for example through the provision of safe and accessible green infrastructure, sports facilities, local shops, access to healthier food, allotments and layouts that encourage walking and cycling"*; and Paragraph 93 b) which notes planning decisions should *"take into account and support the delivery of local strategies to improve health, social and cultural well-being for all sections of the community".* Paragraph 105 continues the theme of how planning policy, through the promotion of sustainable transport, can improve the health and well-being of the community. To achieve this objective, *"significant*	Provides guidance on the promotion of safe and healthy communities, which aligns with the themes considered in the assessment of effects (**Section 24.6**).

Legislation / Policy / Guidance	Consideration within the PEI Report
development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help reduce congestion and emissions and improve air quality and public health". Paragraph 130 demonstrates that well-designed places can improve the health and well-being of the local community. Planning policies and decisions should aim to *"create places that are safe, inclusive and accessible and which promote health and well-being, with a high standard of amenity for existing and future users; and where crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion".* Paragraph 185 illustrates that planning policies must conserve and enhance the natural and local environment and therefore, planning decisions on new developments should account for noise pollution. In doing so, planning policies and decisions should attempt to *"mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and quality of life".*	
NHS Long Term Plan (2019)	
The NHS Long Term Plan (Ref 24-6) sets out a ten-year programme of phased improvements to the NHS. The plan outlines how the NHS will attempt to reduce health inequalities through wider preventative action in deprived areas and improvements to integrated community-based care systems. This includes funding support to programmes which help to reduce smoking, obesity and air pollution in vulnerable communities. There will also be an increased focus on digital GP consultations to provide more options and better support for patients. Increases in NHS funding and the establishment of a new NHS Assembly are planned to help achieve better care quality and outcomes as well as helping to reduce workforce pressures. The NHS Long Term Plan stresses the importance of the NHS and the built environment sector continuing to work together to improve health and wellbeing.	Provides context to the assessment of the Project's impacts on access to local healthcare facilities, as set out in **Section 24.6**.
Health and Care Act (2022)	
In April 2022, the Government passed a new Health and Care Act 2022 (Ref 24-7). The new Act proposes health reforms in England, removes existing	Provides context to the assessment (**Section 24.6**) of access to local healthcare facilities (**Section 24.3**).

Legislation / Policy / Guidance	Consideration within the PEI Report
competition rules and formalises Integrated Care Systems (ICS). It also grants the health secretary authority over the health service. Previously ICS held an informal role and operated as shadow boards, however they now can be held accountable and are able to govern NHS finances at a local level. An ICS consists of two parts: the Integrated Care Board (ICB) and the Integrated Care Partnership (ICP). ICBs are responsible for NHS functions, have both a chief executive and chair and are accountable to NHS England for spending and performance. ICPs oversee the wider public and population health efforts. They have a broader focus and operate as a statutory committee between the ICB and each of the local authorities in the ICS area. ICS are described to be a key part of helping the NHS understand and respond to challenges at the local level, supporting people to get personalised care and seeking to ensure best value for public money. The Act also 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 and wellbeing for everyone; and sustainable use of NHS resources. There are 42 ICSs across England (previously in April 2021, over 100 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.	
Health and Social Care Act (2012)	
The Health and Social Care Act (Ref 24-8) was introduced following the Health and Social Care Bill, to safeguard the future of the NHS through modernisation. The Act intended to put clinicians at the centre of commissioning, free up providers, empower patients and give a new focus to public health. The document focused on the regulation of the NHS at the national and local level and set out the abolition of Primary Care Trusts (PCTs) and replacement of them with Clinical Commissioning Groups (CCGs). These have now been replaced in the 2022 Act with Integrated Care Systems (ICSs).	Provides context to the assessment (**Section 24.6**) of access to local healthcare facilities (**Section 24.3**).

Legislation / Policy / Guidance	Consideration within the PEI Report
Levelling Up the United Kingdom (February 2022) White Paper	
The Levelling Up the United Kingdom document (Ref 24-9) contains 12 specific missions which are set out as key objectives for the Government to deliver against. One of these missions includes that: *'By 2030, the gap in Healthy Life Expectancy (HLE) between local areas where it is highest and lowest will have narrowed, and by 2035 HLE will rise by five years'.* The goal is for the Government to tackle the existing disparities in health outcomes across the UK, ensuring that people have the opportunity to have long healthy lives wherever they live. It is stated that *'on average, people living in the most deprived communities in England have over 18 years less of their lives in good general health than those living in the least deprived areas'.* It is also recognised that COVID-19 has made disparities starker, with hospital admission and mortality rates higher among the more deprived groups. Early evidence has also suggested that self-reported 'long Covid' is also higher among those living in the more deprived areas. There also appear to be disparities in access to healthcare in the most deprived areas, with longer waiting lists in more deprived areas. The Government has also committed to increasing its programme of hospital building upgrades and to increase GP appointments. This is supported by investment in health and the NHS, part funded by the new Health and Social Care Levy. The UK government has also committed to maintaining the Public Health Grant in real terms, enabling local authorities to invest in prevention and front line services. The policy programme is focused around three key areas: Improving public health; Supporting people to change their food and diet; and Tackling diagnostic backlogs.	Provides context to stated governmental ambitions to reduce health disparities and provides justification for highlighting vulnerable groups and existing deprivation within the baseline conditions (**Section 24.3**).
Planning Practice Guidance (2019)	
The national Planning Practice Guidance (PPG) (Ref 24-10) was first produced in November 2016 and most recently updated in October 2019. It provides a web-based resource in support of the NPPF and offers guidance on health and wellbeing in planning and planning obligations. It covers both: The role of health and wellbeing in planning; and	Health and wellbeing impacts have been assessed in **Section 24.6**.

Legislation / Policy / Guidance	Consideration within the PEI Report
The links between health and wellbeing and planning. The PPG suggests that local authority planners should consult with the Director of Public Health on mitigation measures for any planning applications that are likely to have a significant impact on the health and wellbeing of the local population or particular groups. A health impact assessment is a useful tool to use when assessing expected significant impacts. The guidance states that: *"plan-making authorities may work with public health leads and health organisations to understand and take account of the health status and needs of the local population, including the quality, quantity of and accessibility to healthcare and the effect any planned growth may have on this. Authorities should also assess quality, quantity of and accessibility to green infrastructure, sports, recreation and places of worship including expected future changes, and any information about relevant barriers to improving health and well-being".* 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".* The PPG for open space, sports and recreation facilities, PRoW (Public Rights of Way) and local green space provides additional guidance on those designation 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.	
Public Health England Strategy 2020 to 2025	
The Public Health England Strategy 2020 to 2025 (Ref 24-11) sets out how the organisation will work to improve public health and reduce health inequalities. The key objectives for the next five years are quoted below:	Provides guidance on the relationship between the development of the built environment and health improvement priorities. The impact of the Project on health and wellbeing is assessed in **Section 24.6**.

Legislation / Policy / Guidance	Consideration within the PEI Report
"build and embed universal approaches to programme and project pipeline planning, reporting, and resource planning for use across Public Health England; 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 Public Health England and, where relevant, agile approaches to bring greater flexibility and innovation to the work they do". The most relevant of the stated priorities are set out below: The most relevant of the ten priorities for focus of PHE over the next five years are set out below: '1) Smoke free society: take steps towards a smoke-free society by 2030; 2) Healthier diets, healthier weights: help make the healthy choice the easy choice to improve diets and rates of childhood obesity; 3) Cleaner air: Develop and share advice on how best to reduce air pollution levels and people's exposure to polluted air; 4) Better mental health: Promote good mental health and contribute to the prevention of mental illness; 5) Best start in life: work to improve the health of babies, children and their families to enable a happy, healthy childhood and provide the foundations of good health into adult life; 6) Effective responses to major incidents: Enhance the ability to respond to major incidents (including pandemic influenza), by strengthening our health protection system; 7) Reduced risk from antimicrobial resistance: work to help contain, control and mitigate the risk of antimicrobial resistance; 8) Predictive prevention: utilise technology to develop targeted advice and interventions and support personalised public health and care at scale; and 9) Enhanced data and surveillance capabilities: improve the data capability and strengthen the approach to disease surveillance using new tools and techniques. In 2020, Public Health England published 'Using the planning system to promote healthy weight	

Legislation / Policy / Guidance	Consideration within the PEI Report
environments'. This document provides strategic information on the use of the planning system to promote local healthy weight environments, supporting local businesses and workplaces to provide healthier food and drink to help enable people access to healthier food and active environments. Supporting healthy diets and a healthier weight is a priority in the PHE Strategic Plan 2020-2025. In 2017, Public Health England published 'Spatial Planning for Health: An evidence resource for designing healthier places', where the role of effective neighbourhood design for improving health outcomes was highlighted. The evidence presented in this report underpins the 2020 to 2025 strategy, with attention paid to the planning of housing, transport, and the natural environment in promoting good health.	
A Green Future: 25 Year Plan to Improve Our Environment (2018)	
The Government's 25-year Plan to Improve the Environment (Ref 24-12) outlines proposed action to protect the environment and economy simultaneously. Chapter 3 which focuses on government plans to improve the connection between people and the environment in order to promote health and wellbeing. This includes the following objectives: "*Helping people to improve their health and wellbeing by using green spaces"* – there will be a renewed reliance on green spaces to help address issues such as isolationism and loneliness, something which is becoming increasingly prevalent with an ageing population and increased reliance on technology. It will also help to tackle obesity and act as a preventative and therapeutic approach to mental health. Encouraging children to be close to nature, in and out of school, with a focus on disadvantaged areas. The government will launch 'Nature Friendly Schools Programmes' to help communities create *"the kind of school grounds that will support learning about the natural worlds and keep children happy and healthy".* There will also be greater support for pupil contact with local natural spaces by making it easier for schools to take pupils on regular trips.	Provides guidance on the relationship between the development of the built environment and health improvement priorities. The impact of the Project on health and wellbeing is assessed in **Section 24.6**.
Health Equity in England: The Marmot Review 10 Years On (2020)	
A follow up Marmot Review, Health Equity in England 10 Years On (Ref 24-13), was published in February 2020. The report highlighted the growth in health inequality over the preceding 10 years, especially for people living in more deprived districts and regions,	Provides context to stated governmental ambitions to reduce health disparities and provides justification for highlighting vulnerable groups and existing deprivation within the baseline conditions (**Section 24.3**).

Legislation / Policy / Guidance	Consideration within the PEI Report
and that for the population as a whole, health is declining. The report argues that greater levels of government intervention are required and that those areas who are most deprived should receive investment first and at higher levels. As well as this, it calls upon the Government to create a health inequalities strategy with clear targets and to create a Cabinet-level cross-departmental committee. It calls upon the government to re-order national priorities and to make wellbeing a central goal of policy, which will in turn create a better society, with better health and health equity.	
Build Back Fairer: The COVID-19 Marmot Review (2020)	
An update to the Marmot Review 10 Years On report, Build Back Fairer: The COVID-19 Marmot Review (Ref 24-14) was published in December 2020 to investigate how the pandemic has affected health inequalities in England. The COVID-19 pandemic has exposed and amplified the inequalities highlighted in the Marmot Review 10 Years On report. The report proposes that commitment to social justice and equity of health and wellbeing is at the heart of all policy-making, nationally, regionally and locally and that the economic harm caused by measures to control the virus may cause further damage to health and widening of health inequalities.	Provides context to stated governmental ambitions to reduce health disparities in the context of the COVID-19 pandemic, and provides justification for highlighting vulnerable groups and existing deprivation within the baseline conditions (**Section 24.3**).
The Marmot Review (2010)	
The Marmot Review (2010) (Ref 24-15) argues that serious avoidable health inequalities exist across England and shows these inequalities to be determined by a wide range of socio-economic factors. Health is linked to both individuals and communities. The following policy objectives are identified: "*Give every child the best start in life;* *Enable all children, young people and adults to maximise their capabilities and have control over their lives;* *Create fair employment and good work for all;* *Ensure a healthy standard of living for all;* *Create and develop healthy and sustainable places and communities; and* *Strengthen the role and impact of ill health prevention".*	Provides context to stated governmental ambitions to reduce health disparities and provides justification for highlighting vulnerable groups and existing deprivation within the baseline conditions (**Section 24.3**).

Legislation / Policy / Guidance	Consideration within the PEI Report
NHS England's Healthy Urban Development Unit (HUDU) Rapid Health Impact Assessment (HIA) Tool	
NHS England's HUDU HIA Tool (Ref 24-2) identifies eleven broad determinants of health that are likely to be influenced by specific development proposals and can be influenced through design and management measures. It provides an assessment checklist against which the likely impacts of new developments can be assessed.	The assessment of health and wellbeing is conducted in line with this guidance.
Wales Health Impact Assessment Support Unit (WHIASU) Health Impact Assessment (HIA): A practical guide	
WHIASU's guidance on HIA, including HIA: A practical guide (Ref 24-5), provides guidance on best practice approach to carrying out health impact assessment.	The assessment of health and wellbeing is conducted with regard to this guidance.
Joint Health and Wellbeing Strategy for Lincolnshire	
The role of the Lincolnshire's Health and Wellbeing Board is to bring together key people from the health and care system to work together to reduce inequalities and improve the health and wellbeing of the people of Lincolnshire. The Health and Wellbeing Board has identified a number of common aims which emerged during the engagement process which form the basis of the overarching aspirations and aims for the Joint Health and Wellbeing Strategy for Lincolnshire (Ref 24-16). These include the need for the Joint Health and Wellbeing Strategy to: Have a strong focus on prevention and early intervention; Ensure a focus on issues and needs which will require partnership and collective action across a range of organisation to deliver; Deliver transformational change through shifting the health and care system towards preventing rather than treating ill health and disability; and Focus on tackling inequalities and equitable provision of services that support and promote health and wellbeing.	Provides local policy context for the consideration of health and wellbeing in the population likely to be affected by the Project. An assessment of the health and wellbeing impacts arising from the Project on local populations is shown in **Section 24.6**.
North East Lincolnshire Local Plan 2013 to 2032	
The North East Lincolnshire Local Plan (Ref 24-17) sets out aspirations to address social inequality which may be caused by health disparities. The Plan makes reference to the development of the local authority	Provides local policy context for the consideration of health and wellbeing in the population likely to be affected by the Project. An assessment of the health and wellbeing

Legislation / Policy / Guidance	Consideration within the PEI Report
area and how this is likely to, or is able to, positively influence health outcomes. 'Policy SO5: Social and health inequality' addresses promoting healthier lifestyles and providing access to healthcare and community facilities.	impacts arising from the Project on local populations is shown in **Section 24.6**.
North Lincolnshire Local Development Framework	
The North Lincolnshire Local Development Framework (Ref 24-18) sets out aspirations to promote community health and wellbeing in the local authority area. Objective 8: Promoting Community Health and Wellbeing aspires to 'promote an improvement in health and wellbeing of North Lincolnshire's people by maintaining and providing quality open spaces, play and sports facilities, better access to the countryside and improved health facilities.	Provides local policy context for the consideration of health and wellbeing in the population likely to be affected by the Project. An assessment of the health and wellbeing impacts arising from the Project on local populations, including neighbourhood amenity and access to local facilities, is shown in **Section 24.6**.
Central Lincolnshire Local Plan	
The Central Lincolnshire Local Plan (Ref 24-19) adopted in April 2017 makes reference to health in the following policies: Policy LP9: Health and Wellbeing: this states that the potential for achieving positive and physical health outcomes will be taken into account when considering all development proposals; Policy LP13: Accessibility and Transport: this states that development proposals should contribute towards an efficient and safe transport network, where the use of sustainable transport modes are maximised; Policy LP15: Community Facilities: this states that all development proposals should recognise the community facilities as an integral component in achieving and maintaining sustainable, well integrated and inclusive development; Policy LP18. Climate Change and Low Carbon Living: this states that development proposals will be considered more favourably if the scheme would make a positive and significant contribution towards one or more of the following: reducing demand; resource efficiency; energy production; and carbon off-setting; Policy LP19: Renewable Energy Proposals: this states that proposals for non-wind renewable technology will be assessed on their merits, with the impacts considered against the benefits of the Scheme; and Policy LP20: Green Infrastructure Network: this states that the Central Lincolnshire Authorities will aim to maintain and improve the green infrastructure network	Provides local policy context for the consideration of health and wellbeing in the population likely to be affected by the Project. An assessment of the health and wellbeing impacts arising from the Project on local populations, including neighbourhood amenity and access to local facilities, is shown in **Section 24.6.**

Legislation / Policy / Guidance	Consideration within the PEI Report
by enhancing, creating and managing multifunctional green space within and around settlements that are well connected to each other and the wider countryside.	

Stakeholder Engagement

24.2.10 A range of stakeholders have been engaged as part of the scoping process to obtain their views on the Project and the scope of the human health and wellbeing assessment, the results of which are presented within the Scoping Opinion (**Appendix 1-A** of PEI Report, Volume IV), and have been taken into account with regard to the ongoing human health and wellbeing assessment.

Limitations and Assumptions

24.2.11 This assessment is based on baseline and Project design information obtained and evaluated at the time of reporting. A full assessment will be undertaken as part of the EIA and will be reported in the Environmental Statement (ES) that will be submitted with the Development Consent Order (DCO) Application.

24.2.12 The assessment of likely human health effects has been carried out against a benchmark of current human health and wellbeing baseline conditions prevailing around the Project, as far as is possible within the limitations of such a dataset. Baseline data is 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. Baseline conditions reported in **Section 24.3** regarding human health and wellbeing are based on latest data available at the time of writing.

24.2.13 This assessment is based on professional judgment and considers both the adverse and beneficial impacts that the Project will have on the surrounding receptors. It provides an indication of human health and wellbeing effects on people and the local community.

24.2.14 Effects of human health and wellbeing during the construction, operation and decommissioning phases are based on preliminary assessments taking into consideration the results from the relevant environmental studies. These studies comprise **Chapter 6: Air Quality, Chapter 7: Noise and Vibration**, **Chapter 11: Traffic and Transport**, **Chapter 19: Climate Change**, and **Chapter 23: Socio-economics**. These will be further investigated and reported in the ES when completed assessments are available. The findings of the preliminary assessments in each of the respective chapters are subject to change as the design of the Project is developed and refined further, and further research and investigative surveys are completed to fully understand the Project's potential effects. However, the information available at the time of writing is sufficient to enable this preliminary assessment of the effect of the Project on human health and wellbeing.

24.2.15 The transport assessment (as set out in **Chapter 11: Traffic and Transport**) presents information obtained and evaluated at the time of reporting and is based

on the emerging design for the Project and the maximum likely extents of land required for its construction and operation. The traffic data used for the assessment is based on secondary data from surveys undertaken on behalf of the Applicant, but does not include data for Laporte Road which was unavailable and therefore this link has been excluded. An Automated Traffic Count is intended to be undertaken in advance of the preparation of the ES. An operational assessment has not been included as the traffic flows are significantly less than the construction phases.

24.2.16 The noise assessment methodology set out in **Chapter 7: Noise and Vibration** is based on the maximum likely extent of land required for the Project construction, operation and subsequent decommissioning. Detailed information about the construction programme is not yet available and therefore the noise assessment is regarded as indicative.

24.2.17 The air quality assessment methodology set out in **Chapter 6: Air Quality** is informed by the traffic data set out in **Chapter 11: Traffic and Transport** and is to that extent subject to the limitations and assumptions within that chapter (see also above). The assessment is informed by onsite emissions source characteristics and data available at the time of writing. Where there is uncertainty over operational emissions, precautionary assumptions have been made. With respect to vessel emissions data, actual emissions data is not known at this stage and an appropriate estimate of likely vessel emissions has been made. Meteorological data has been sourced from the nearest monitoring site which is 13km from the site. Where there is uncertainty about the exact location and dimensions of onsite buildings and structures, modelling has considered grouped, larger collective structures in order to undertake the assessment. In the absence of alternative data, Defra background data and Air Pollution Information Service (APIS) background data has been used to represent background pollutant concentration data in the study area.

24.2.18 This assessment has also considered the socio-economic assessment which has been carried out against a benchmark of current socio-economic baseline conditions prevailing around the Project, as far as is possible within the limitations of such datasets, as set out in **Chapter 23: Socio-economics**. Baseline data is subject to a time lag between collection and publication and, as with any dataset, these conditions may be subject to change over time which may influence the findings of the assessments. Additionally, it is not possible to confirm at this stage with certainty the length of time each PRoW may be closed, and as such the assessment is based on the worst-case assumption that PRoWs will be closed within the Site for the entire length of the construction and decommissioning periods, however this preliminary assessment will be refined in advance of the preparation of the ES. Finally, the assessment of the number of workers needed from outside the local area during the construction, operation, and decommissioning phases are based on assessments of whether current capacity can accommodate demand arising from the workforce created as a result of the Project.

24.2.19 The temporary impacts during construction are assessed as occurring simultaneously and for the programme set out in **Chapter 2: The Project**. The

same approach is assumed for decommissioning for the terrestrial parts of the Project. Whilst a phased construction (or decommissioning) programme may be possible, assuming a continuous 10 year construction duration means that the likely 'worst case' is assessed. This may result in the overestimate of predicted adverse health effects but is considered a robust approach to the assessment. Should the construction phase be extended or delivered in phases, as set out in **Chapter 2: The Project**, the predicted effects would be the same or less than those outlined in the chapter.

24.2.20 It is assumed that the jetty (the NSIP) would become part of the long- term port infrastructure and would not be decommissioned. Decommissioning of the terrestrial elements of the Project (the hydrogen production facility representing the Associated Development) is assessed as occurring after 25 years of operation and for the purposes of this assessment is treated as taking place no earlier than 2060, based on a 25-year design life. It is also possible that the hydrogen production facility will be operational for a longer period of time and or that certain elements of it may be decommissioned in advance of the main decommissioning phase and then the predicted effects would be the same or less than those outlined in this chapter. Similar to the construction period, the assessment of a ten year decommissioning period therefore represents a realistic worst case.

24.2.21 The findings of this preliminary assessment may be subject to change as the design of the Project is developed and refined further through the assessment and consultation processes, and as further research and investigative surveys are completed to fully understand its potential effects.

Study Area

24.2.22 The study area for the human health and wellbeing assessment varies by the type of impact being assessed:

a. The community human health and wellbeing baseline study area comprises an area of four local wards in which the Project is located in or in close proximity to. This includes: Immingham, and Wolds wards in North East Lincolnshire; Ferry in North Lincolnshire; and Yarborough in West Lindsey[1]. Where data is not available at the ward level, local authority level data is provided for North East Lincolnshire, North Lincolnshire, and West Lindsey.

b. The study areas for assessing the health and wellbeing impacts of the Project are influenced by the geographic extent of the relevant technical assessments. The assessment therefore refers to the study areas identified by the relevant technical chapters.

[1] Depending on the human health indicator being analysed, ward level data is available from the 2011 Census wards or 2018 electoral wards. Whilst the geographical extent of the 2011 Census and 2018 electoral wards differ, both extents provide an indication of local health in proximity to the Project and are therefore considered suitable for assessing the existing baseline conditions for human health. Where ward level data is not available, the local authorities of North Lincolnshire, West Lindsey, and North East Lincolnshire have been used as the study area referenced in the text.

24.3 Baseline Conditions

Current Baseline

24.3.1 This section describes the human health baseline environmental conditions within the human health and wellbeing study area, compared, where relevant, to wider geographical areas of the Yorkshire and the Humber region and England and Wales as a whole[2].

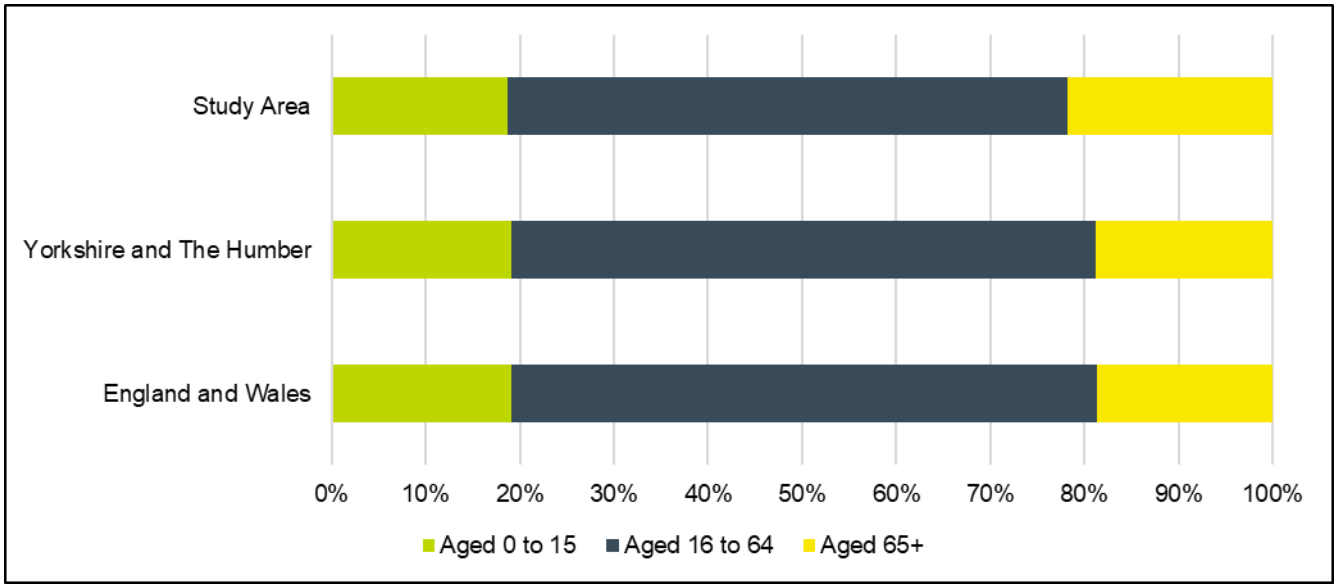
Demographic profile

24.3.2 The total population of the study area, according to mid-year population estimates in 2020, is 42,470, comprised of 11,485 in Ferry, 11,728 in Immingham, 7,700 in Wolds, and 11,557 in Yarborough (Ref 24-20).

24.3.3 In 2020, the average proportion of working age residents (aged 16 to 64) in the study area was 59.6% which is slightly lower than is typical for the Yorkshire and The Humber region (62.1%) and across England and Wales as a whole (62.2%). This is shown in **Plate 24-1**.

24.3.4 Additionally, the average proportion of residents aged 65 and over in the study area is 21.8%, which is slightly greater than is typical for the Yorkshire and The Humber region (18.9%) and across England and Wales as a whole (18.6%).

Plate 24-1: Age Breakdown by Geography



Source: Office for National Statistics, (2020); Mid-Year Population Estimates

24.3.5 The proportion of residents who self identify as of White ethnicity within the study area (98.5%) is far greater than is typical for the Yorkshire and The Humber region (88.8%), and across England and Wales (86.0%). Accordingly, the

[2] Data for the Yorkshire and the Humber region is presented for comparison purposes, and in order to contextualise the study area data, and thus does not form part of the assessment.

proportion of residents of other ethnic groups is below the equivalent regional and national rate. For example, whereas Asian/Asian British residents comprise 0.9% of the study area population, this ethnic group represents 7.3% of the population of the Yorkshire and Humber region, and 7.5% of the population of England and Wales. A breakdown of self-identified ethnicity within the study area, and regional and national averages is shown in **Table 24.4** (Ref 24-21).

Table 24.4: Ethnic Group by Geography

Ethnic Group	Study Area	Yorkshire and The Humber region	England and Wales
White	98.1%	88.8%	86.0%
Mixed/multiple ethnic groups	0.6%	1.6%	2.2%
Asian/Asian British	0.9%	7.3%	7.5%
Black/African/Caribbean/Black British	0.2%	1.5%	3.3%
Other ethnic group	0.1%	0.8%	1.0%

Source: Office for National Statistics, (2011); Census 2011.

Deprivation

24.3.6 The 2019 Indices of Deprivation (Ref 24-22) provide a set of relative measures of deprivation for local authorities and Lower Super Output Areas (LSOAs)[3] across England. The indices are comprised of a number of sub-domains of deprivation, including 'health'. An overall indication of deprivation of an area, appreciating all domains, is also reported. The local authorities which are included in the study area are North East Lincolnshire, North Lincolnshire and West Lindsey. North East Lincolnshire is the 66th most deprived local authority of 317 in England (where 1st is most deprived). North Lincolnshire is the 120th most deprived in England. West Lindsey is the 146th most deprived local authority in England.

24.3.7 Further detailed breakdown of indices of deprivation in each of the considered local authorities is given in **Table 24.5**. This shows that, in terms of overall deprivation, half of the LSOAs within North East Lincolnshire are ranked amongst the 30% most deprived LSOAs nationally. In North Lincolnshire the incidence of overall deprivation is lower as only approximately 30% (28%) of LSOAs are ranked among the 30% most deprived nationally. In West Lindsey 24% of LSOAs are ranked among the 30% most deprived nationally.

[3] Lower Layer Super Output Areas (LSOAs) are small geographical units designed to improve the reporting of small area statistics in England and Wales. Lower Layer Super Output Areas are built from groups of contiguous Output Areas and have been automatically generated to be as consistent in population size as possible.

24.3.8 Information is also provided in **Table 24.5** below regarding the incidence of deprivation in the health domain. It is shown that there is a high incidence of deprivation in the health domain in North East Lincolnshire whereby almost half (47%) of all LSOAs rank amongst the 30% most deprived LSOAs nationally. The equivalent incidence of deprivation in the health domain in North Lincolnshire is lower, whereby only 32% of LSOAs rank among the 30% most deprived nationally. In West Lindsey approximately 23% of LSOAs rank among the 30% most deprived nationally.

Table 24.5: Indices of Deprivation

Decile	Relative Deprivation	North East Lincolnshire		North Lincolnshire		West Lindsey	
		Overall Index of Depriv-ation	Health domain	Overall Index of Depriv-ation	Health domain	Overall Index of Depriv-ation	Health domain
0-10%	Most deprived	30%	15%	11%	11%	8%	4%
10-20%	↑	8%	17%	9%	8%	10%	0%
20-30%		12%	15%	8%	13%	6%	17%
30-40%		8%	10%	9%	12%	10%	13%
40-50%		5%	12%	15%	14%	13%	12%
50-60%		5%	15%	11%	25%	13%	15%
60-70%		12%	9%	15%	11%	12%	13%
70-80%	↓	7%	3%	11%	7%	8%	23%
80-90%		10%	2%	10%	0%	15%	2%
90-100%	Least deprived	3%	2%	3%	0%	6%	0%

Source: Ministry of Housing, Communities and Local Government, (2019); Indices of deprivation.

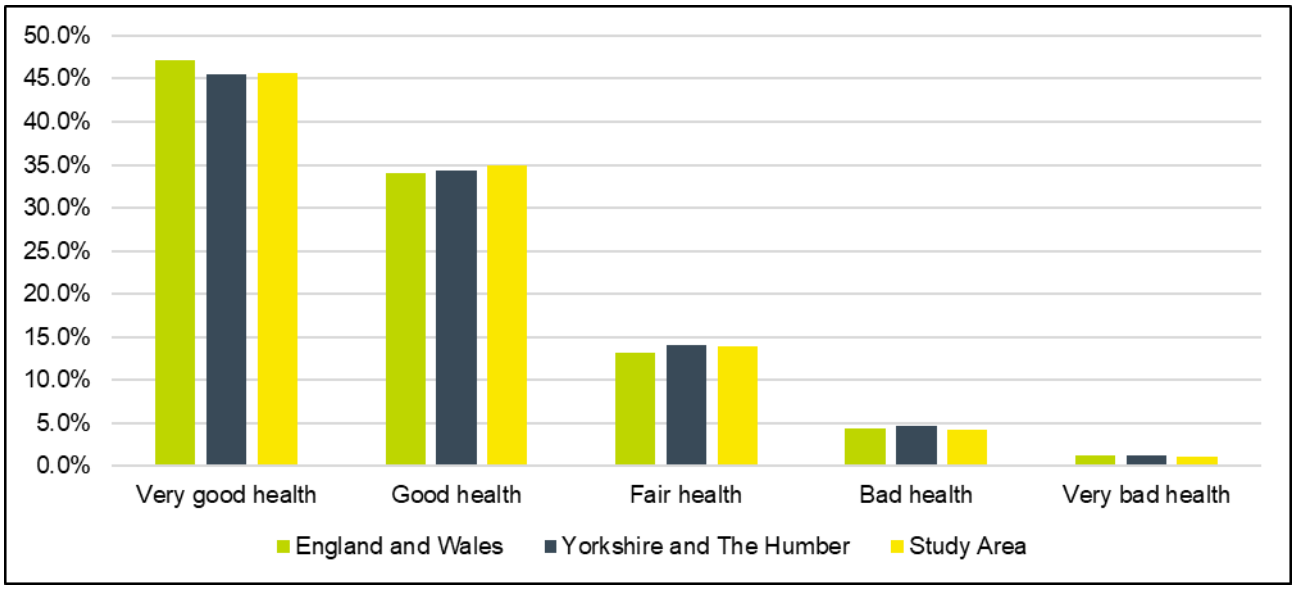
Health Profile

24.3.9 This section provides a human health profile of the study area, focussing on key determinants of health relevant to the assessment criteria provided within the HUDU/NHS England guidance (Ref 24-1). This local health baseline will be used to inform the assessment of potential health effects of the Project.

24.3.10 Based on 2011 Census data (Ref 24-21), which is the latest dataset available for self-assessment of health, 5.4% of residents of the study area consider their health to be ‘bad’ or ‘very bad’. This is broadly in line with the equivalent proportion of residents in the Yorkshire and The Humber region (6.0%) and

across England and Wales (5.6%). Self-reported health in each of the considered geographies is shown in **Plate 24-2**.

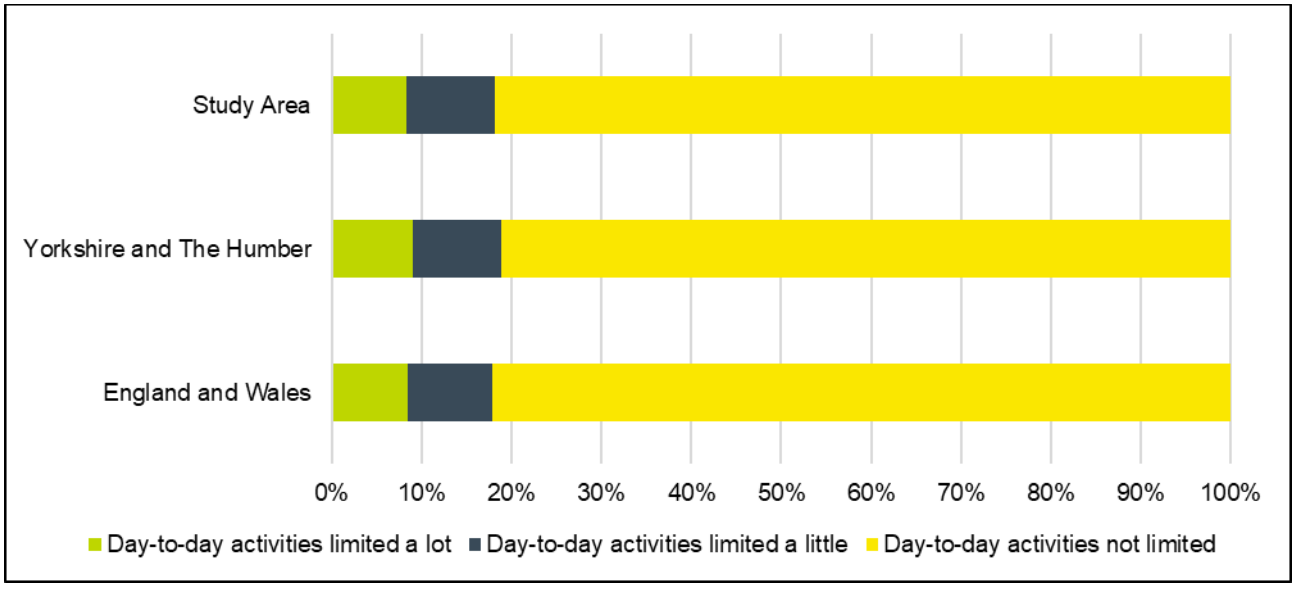
Plate 24-2: Self-assessment of Health



Source: Office for National Statistics, (2012); Census 2011.

24.3.11 Additionally, **Plate 24-3** illustrates a self-assessment of long-term health or disability, whereby a health problem limits a person's daily activities and has lasted at least 12 months. The proportion of residents within the study area who experience limitations to their daily activities arising from a long-term health condition or disability ('a little' or 'a lot') is 18.1%, which is broadly in line with the regional (18.8%) and national (17.9%) equivalent rates.

Plate 24-3: Self-assessment of Long-term Health or Disability



Source: Office for National Statistics, (2012); Census 2011.

24.3.12 Wider determinants of overall health can also provide insight into the health profile of an area. A number of indicators of health within the relevant local authority areas, derived from OHID (Office for Health Improvement and Disparities) data (Ref 24-23) and (Ref 24-24) is provided in **Table 24.6**. A comparison with regional and national data is also provided, where applicable. In summary:

a. Male and female life expectancies in North Lincolnshire and North East Lincolnshire are broadly in line with the regional average, albeit slightly lower than the national average. Male and female life expectancies in West Lindsey are higher than the regional and national average (Ref 24-23).

b. The under 75 mortality rates from all causes is lower in North Lincolnshire and West Lindsey than the regional average, although in North East Lincolnshire the rate is higher; this is also true when considering the under 75 mortality rates from cardiovascular diseases and cancer (Ref 24-23).

c. In terms of risk determinants, there is a higher prevalence of smoking in the relevant local authority areas than is recorded regionally and nationally. A similar proportion of adults are physically active in North East Lincolnshire and West Lindsey when compared to the region and England as a whole, yet in North Lincolnshire the proportion is notably lower. A higher proportion of adults are classified as overweight or obese within the considered local authority areas than across Yorkshire and The Humber, and England as a whole (Ref 24-23).

d. Health outcomes in the relevant local authorities exhibit worse incidence and prevalence than is typical of England. For example, there is a greater prevalence of CHD (coronary heart disease), a greater prevalence of stroke, a greater prevalence of heart failure, and a greater prevalence of chronic obstructive pulmonary disease (Ref 24-24). However, the incidence of tuberculosis is notably lower in the relevant local authorities compared to the national rate.

Table 24.6: Wider Determinants of Health

Determinant of health	Year	Age Range	Unit	North Lincolnshire	North East Lincolnshire	West Lindsey	Yorkshire and The Humber	England
Life expectancy at birth - male	2018 - 2020	n/a	Years	78.7	78.0	79.5	78.4	79.4
Life expectancy at birth - female	2018 - 2020	n/a	Years	82.7	82.2	83.4	82.2	83.1
Under 75 mortality rates from all causes	2018 - 2020	<75 yrs	No. per 100,000	367.7	387.0	309.2	372.7	336.5

Determinant of health	Year	Age Range	Unit	North Lincolnshire	North East Lincolnshire	West Lindsey	Yorkshire and The Humber	England
Under 75 mortality rates from all cardiovascular diseases	2017 - 2019	<75 yrs	No. per 100,000	72.2	92.0	66.3	80.2	70.4
Under 75 mortality rate from cancer	2017 - 2019	<75 yrs	No. per 100,000	136.9	152.6	125.8	137.5	129.2
Smoking Prevalence in adults (18+) - current smokers (APS)	2019	18+ yrs	%	17.8	16.5	15.5	12.9	12.1
Physically active adults	2020/21	19+ yrs	%	58.3	63.7	67.1	65.2	65.9
Adults (aged 18+) classified as overweight or obese	2020/21	18+ yrs	%	67.6	67.6	67.3	66.5	63.5
TB incidence (three-year average)	2018 - 2020	All ages	No. per 100,000	3.5	1.7	1.1	5.9	8.0
Estimated prevalence of CHD	2015	55 – 79 yrs	No. per 100,000	8.1	8.2	7.6	n/a	7.9
Estimated prevalence of stroke	2015	55 – 79 yrs	No. per 100,000	3.9	3.9	3.7	n/a	3.7
Estimated prevalence of heart failure	2015	>16 yrs	No. per 100,000	1.6	1.6	1.9	n/a	1.4
Estimated prevalence of COPD	2015	All ages	No. per 100,000	3.5	3.9	3.4	n/a	3.0

Source: Office for Health Improvements and Disparities, (2022); Local Authority Health Profiles. Office for Health Improvements and Disparities, (2022); Modelled Prevalence Estimates.

Healthcare Facilities

24.3.13 As detailed in **Chapter 23: Socio-economics**, the nearest hospitals (with an accident and emergency department) to the Project are St.Hugh's Hospital and Diana, Princess of Wales Hospital, located approximately 9km from the Project.

24.3.14 There are two GP surgeries within 5km of the Site: The Roxton Practice in Immingham and Killingholme Surgery in South Killingholme. The latest General Practice data (August 2022) published by NHS Digital (Ref 24-25) (Ref 24-26) indicates that these GP surgeries have a total of 17.9 GPs (FTE) and provides care to 34,974 patients. This corresponds to 1,953 patients per GP, which exceeds the Royal College of General Practitioners target (Ref 24-27) of 1,800 patients per GP.

Table 24.7: GP Surgery Patient List Size and Workforce

General Practice surgery	Number of patients	Number of GPs (FTE)	GP:Patient Ratio
The Roxton Practice	33,452	16.5	2,027
The Killingholme Surgery	1,522	1.40	1,087
Total	**34,452**	**17.9**	**1,953**

Source: NHS Digital, (2022); Patients Registered at a GP Practice – July 2022. NHS Digital, (2022); General Practice Workforce.

24.3.15 As set out in **Chapter 23: Socio-economics**, the GP surgeries shown in **Table 24.7** are within the NHS Humber and North Yorkshire Sub-ICB (Integrated Care Board) areas 03K and 03H. Information on the ratio of patients to GPs (FTE) is shown in **Table 24.8**. In both instances, it is shown that the ratio of patients to GPs (FTE) exceeds the Royal College of General Practitioners target of 1,800 patients per GP.

Table 24.8: Sub-ICB Patient List Size and Workforce

Sub-ICB	Number of patients	Number of GPs (FTE)	GP:Patient Ratio
NHS Humber and North Yorkshire ICB 03K	183,781	42.37	2,360
NHS Humber and North Yorkshire ICB 03H	172,095	40.11	2,493

Source: NHS Digital, (2022); Patients Registered at a GP Practice – August 2022. NHS Digital, (2022); General Practice Workforce.

Social Infrastructure

24.3.16 There is one primary school near to the Site. This is The Canon Peter Hall C of E Primary School located approximately 1km west of the site.

24.3.17 There is one police station in proximity to the site, located in Immingham, approximately 1.5km west of the site. Additionally, Immingham East Fire Station is located less than 1km from the site.

Community and Recreational Facilities

24.3.18 In addition to the social infrastructure facilities outlined above, there is a range of community and recreational facilities within the study area. **Table 24.9** illustrates these facilities and their distances from the site boundary.

Table 24.9: Community and Recreational Facilities

Receptor	Description	Approximate distance from red line boundary (km)
Community Recycling Facility	Utilities facility	<500m
Woodlands Sports Ground	Recreation facility	1.5km
Petrol Station	Community facility	1.0km
Immingham Fire Station	Community facility	1.0km
Large supermarket	Community facility	1.5km
Immingham East Fire Station	Emergency Services facility	1km
Homestead Park	Publicly accessible open space	1.5km
The Canon Peter Hall C of E Primary School	Primary school	1km
Eastfield Primary School	Primary school	1.5km
Killingholme Primary School	Primary school	5km
Goxhill Primary School	Primary school	11km
Keelby Primary Academy	Primary school	5.5km
Stallingborough C of E Primary School	Primary school	3km

Public Rights of Way

24.3.19 As set out in **Chapter 23: Socio-economics**, there are two PRoWs of relevance to the Project. These are shown in **Table 24.10**.

Table 24.10 Public Rights of Way within 500m of the Site

PRoW	Type	Approximate distance from red line boundary (m)
Public Bridleway 36	Bridleway – forms part of the recreational route known as England's Coastal Path (which was established as a National Trail in 2020)	0m
Public Footpath 32	Footpath	<100m

Residential Properties

24.3.20 As set out in **Chapter 23: Socio-economics**, the area is mostly industrial and relatively sparsely populated. The closest residential properties are located on Queens Road, which lie within the Site boundary in the western part of the Site. This consists of a cluster of terraced properties and a detached dwelling. A large number of residential properties are also located approximately 500m to the west of the Site boundary on the edge of the town of Immingham.

24.3.21 As explained in **Table 22.2** of **Chapter 22: Major Accidents and Disasters**, further assessment is required of the consequences of the operation of the hydrogen production facility on surrounding land uses in terms of major hazard planning. It is currently anticipated that the continued residential use of seven properties on the west side of Queens Road will need to cease, as residential use is unlikely to be compatible with the operation of the hydrogen production facility on the West Site. A number of businesses are also present in the same area on the west side of Queens Road. It is likely that those businesses are compatible with the operation of the hydrogen production facility. as part of HSE advice on the hazardous substance consent application will determine if there are relevant impacts on these buinesses. Whilst it is possible that powers to compulsorily acquire the properties or undertake appropriate works may be sought as part of the DCO, this is currently considered unlikely The Applicant is currently in discussions with the landowners / occupiers of the seven residential properties with a view to negotiating their acquisition. Where it is not possible to acquire those properties through negotiation, acquisition powers for these properties will be sought through the DCO.

24.4 Potential Impacts

24.4.1 The preliminary assessment has identified that construction, operation and decommissioning will potentially result in positive, neutral, and negative impacts on human health and wellbeing.

Construction

24.4.2 These impacts are associated with:

a. Access to healthcare services and other social infrastructure;

b. Emission of dust, noise, vibration, and odours;

c. Air/noise pollution linked with traffic;

d. Accessibility to open space, and active travel;

e. Access to employment and training, particularly for local residents;

f. Contribution to social cohesion and engagement with existing communities to encourage social interaction and support mental health including perception of risk; and

g. Climate change.

Operation

24.4.3 These impacts are associated with:

a. Access to healthcare services and other social infrastructure;

b. Air/noise pollution linked with traffic;

c. Access to employment and training, particularly for local residents;

d. Contribution to social cohesion and engagement with existing communities to encourage social interaction and support mental health, including perception of risk; and

e. Climate change.

Decommissioning

24.4.4 These impacts are associated with:

a. Access to healthcare services and other social infrastructure;

b. Emission of dust, noise, vibration, and odours;

c. Air/noise pollution linked with traffic;

d. Accessibility to open space, and on active travel;

e. Access to employment and training, particularly for local residents; and

f. Contribution to social cohesion and engagement with existing communities to encourage social interaction and support mental health, including perception of risk.

24.5 Design, Mitigation and Enhancement Measures

24.5.1 The Project has been designed, as far as possible, to avoid and minimise impacts and effects on health and wellbeing through the process of design development, and by embedding mitigation measures into the design.

24.5.2 Relevant design, mitigation and enhancement measures have been identified in the relevant related chapters (**Chapter 6: Air Quality, Chapter 7: Noise and Vibration, Chapter 11: Traffic and Transport, Chapter 19: Climate Change**, and **Chapter 23: Socio-economics**). No further design, mitigation and enhancement measures have been identified which are solely related to health and wellbeing.

24.6 Assessment of Effects

24.6.1 **Table 24.11** to **Table 24.16** below set out the potential health and wellbeing impacts associated with the Project during construction, once the Project is operational, and during decommissioning. The potential health and wellbeing impacts are described in accordance with the methodology as set out in **Section 24.2**.

24.6.2 In the tables below, the term 'n/a' indicates that an assessment of the health criteria is not applicable to a particular phase.

24.6.3 It is possible that where positive or negative effects are reported below, this could ultimately result in a significant effect with respect to health and wellbeing, but this will depend on further assessment. The final outcomes of the assessment, which will identify any likely significant effects of the Project on human health and wellbeing will be reported within the Environmental Statement and will take into account the latest IEMA guidance "Determining Significance for Human Health in Environmental Impact Assessment", published in November 2022 (Ref 24-1).

Table 24.11: Access to Healthcare Services and Other Social Infrastructure

Assessment Criteria	Relevant to the Project?	Details and Evidence	Potential Health Impact	Further Action or Mitigation Recommended
Does the proposal assess the impact on healthcare services?	Yes (during construction, operation and decommissioning)	<u>During construction</u> As identified within **Chapter 23: Socio-economics**, the construction workers required to build the Project may place some demand on healthcare services temporarily if they move to the area during the construction phase, or if emergency treatment is required. The construction of the Project is anticipated to require an average of 700 workers during the construction period (although in practice the number will vary). Workers who reside locally already are likely to be registered at a practice currently and will therefore not be expected to place additional demand on local GP services. The current level of patients per GP located within 5km of the Project exceeds the recommended level. However, **Chapter 23: Socio-economics** concludes that additional demand arising from the Project would not be likely to significantly affect the current access to healthcare scenario in terms of GP:patient ratio and the effect on local healthcare would therefore be negligible. In terms of access to healthcare services, **Chapter 11: Traffic and Transport** assesses the potential impact of construction traffic on the local road network. Residents in villages surrounding the Project are likely to use the same strategic roads (including the A180, A160, and A1173) as construction traffic associated with the Project and workers attempting to access the Site. **Chapter 11: Traffic and Transport** concludes	**0** during construction **-** during operation **0** during decommissioning	<u>During construction</u> Implementation of measures set out in CTMP. <u>During operation</u> None recommended. <u>During decommissioning of the hydrogen production facility</u> Implementation of measures set out in a decommissioning plan prepared in accordance with the statutory requirements at the time.

Assessment Criteria	Relevant to the Project?	Details and Evidence	Potential Health Impact	Further Action or Mitigation Recommended
		the presence of this additional traffic is expected to have negligible effects on severance, which will not be significant. It is therefore considered the Project is unlikely to affect local residents' ability to access healthcare facilities. A Framework Construction Traffic Management Plan (CTMP) will be secured through the DCO submission. The CTMP will set out any relevant mitigation measures to address potential severance impacts during the construction phase. Based on the above, the potential health impact on access to healthcare services during the construction period is assessed to be **neutral**. <u>During operation</u> As identified in **Chapter 23: Socioeconomics**, the operational employment associated with the Project, in a worst-case scenario that all workers register at a local GP practice, would be likely to have a minor adverse effect on local provision, which would not be significant. **Chapter 11: Traffic and Transport** sets out that during the operational phase local severance effects will be negligible and therefore will not be significant. Based on above, the potential health impact on access to healthcare services during the operational phase is assessed to be **negative**. <u>During decommissioning of the hydrogen production facility</u>		

Assessment Criteria	Relevant to the Project?	Details and Evidence	Potential Health Impact	Further Action or Mitigation Recommended
		As identified in **Chapter 23: Socioeconomics,** the employment associated with the decommissioning of the Project is expected to be less than the construction phase, given that decommissioning will only be of the hydrogen production facility. Therefore, in a worst case scenario that all of the workers associated with this phase register at GP surgeries locally, the access to healthcare impact in terms of GP:patient ratio will be equal to or lower than that resulting from the construction phase. Therefore, the impact on access to healthcare during the decommissioning phase is expected to be negligible. This assumption is based on current levels of provision and it is likely that both provision of healthcare and registered patients will be different in future. **Chapter 11: Traffic and Transport** explains that traffic flows cannot be accurately forecasted for over 25 years in the future (noting that despite the 25 year operation period it is likely that certain elements of the Project will be operational for a longer period of time). However, the Project's impact on local residents' ability to access healthcare facilities in the decommissioning phase is expected to be the same or less as during construction, based on the expected similar number of trips and duration of these phases. Based on above, the potential health impact on access to healthcare facilities during decommissioning is therefore assessed to be **neutral**.		

Assessment Criteria	Relevant to the Project?	Details and Evidence	Potential Health Impact	Further Action or Mitigation Recommended
Does the proposal assess the capacity, location, and accessibility of other social infrastructure, e.g. schools, social care and community facilities?	Yes (during construction, operation and decommissioning)	<u>During construction</u> Details of community facilities within the study area are set out in **Table 24.9**. In terms of capacity of services, as set out in **Chapter 23: Socio-economics** it is anticipated that construction workers will either already live within the local area, or will live temporarily within the area in temporary accommodation such as hotels (likely within Grimsby) during the construction phase. It is considered unlikely that a high proportion of workers will move to the local area with their families for the duration of the estimated 10 year construction period, and therefore there is unlikely to be an impact on the capacity of local social infrastructure. In terms of access to social infrastructure, as outlined above, **Chapter 11: Traffic and Transport** sets out an assessment of the likely impact of additional traffic on severance and concludes effects during the construction phase will be negligible (not significant). As above, a CTMP will be secured as part of the next stage of review, within the ES for the DCO. This will consider measures to manage construction traffic resulting from the Project in order to limit any potential disruptions and implications on the wider transport network, as well as for existing road users. Therefore, at this stage, the potential health impact on access to social infrastructure during the construction period is assessed to be **neutral**.	**0** during construction **0** during operation **0** during decommissioning	<u>During construction</u> Implementation of measures set out in CTMP. <u>During operation</u> None recommended. <u>During decommissioning of the hydrogen production facility</u> Implementation of measures set out in a decommissioning plan prepared in accordance with the statutory requirements at the time.

Assessment Criteria	Relevant to the Project?	Details and Evidence	Potential Health Impact	Further Action or Mitigation Recommended
		<u>During operation</u> During the operational phase, there are expected to be 144 full time staff working within the Site boundary per day. These workers are expected to have a negligible impact on demand for social infrastructure (excluding healthcare) locally. **Chapter 11: Traffic and Transport** concludes that there will be negligible (not significant) effects in terms of severance during the operation phase. Therefore, the potential health impact on access to social infrastructure during operation is assessed to be **neutral**. <u>During decommissioning of the hydrogen production facility</u> **Chapter 11: Traffic and Transport** explains that traffic flow cannot be accurately forecasted for over 25 years in the future, however the Project's impact on local residents' ability to access social infrastructure in the decommissioning phase is expected to be the same as during construction, based on the expected similar number of trips and duration of these phases. The potential health effect on access to social infrastructure during the decommissioning phase is assessed to be **neutral**.		

Table 24.12: Air Quality, Noise and Neighbourhood Amenity

Assessment Criteria	Relevant to the Project?	Details and Evidence	Potential Health Impact	Further Action or Mitigation Recommended
Does the proposal minimise construction impacts such as dust, noise, vibration, and odours?	Yes (during construction and decommissioning)	<u>During construction</u> An assessment of the risk of dust, site plant and NRMM emissions, vessel emissions and traffic emissions during the construction phase is provided in **Chapter 6: Air Quality** of the PEI Report. The assessment considers residual air quality effects on all sensitive receptors are unlikely to be significant. IAQM recommended mitigation measures will be implemented including: implementation of a stakeholder communications plan including community engagement before work commences on site; display of contact details of person(s) accountable for air quality and dust issues, and the head or regional office contact information on the site boundary; implementation of a Dust Management Plan (DMP); appropriate management of dust and air quality complaints; recording of exceptional dust and air quality emissions incidents; liaison with other high risk construction sites close by; daily inspections of receptors and other on- and off-site monitoring measures; measures to reduce impacts on sensitive receptors including appropriate site layout, screens and barriers; ensure vehicles comply with relevant emissions standards; and implementation of a Construction Logistics Plan (CLP); and, implementation of a Travel Plan to encourage travel to the site by means that reduce emissions. An assessment of the impact of the construction phase of the Project on noise and vibration is provided in **Chapter 7: Noise and Vibration**. It is assessed that following impact avoidance measures and additional noise specific measures, the noise	**-** during construction **n/a** during operation (see operational phase assessment below) **-** during decommissioning	<u>During construction</u> Implementation of IAQM recommended dust and particulate matter mitigation measures where appropriate, including implementation of a DMP, CLP and Travel Plan. Implementation of noise and other mitigation measures set out in the Construction Environmental Management Plan (CEMP). <u>During operation</u> **n/a** (see operational assessment below). <u>During decommissioning of the hydrogen production facility</u>

Assessment Criteria	Relevant to the Project?	Details and Evidence	Potential Health Impact	Further Action or Mitigation Recommended
		effects at residential Noise Sensitive Receptors (NSRs) on Queens Road (in the worst case scenario that these properties remain during the construction phase). Based on above, the potential health impact resulting from construction impacts such as dust, noise, vibration, and odours is likely to be **negative**. <u>During operation</u> Not applicable as this assessment criteria refers to construction impacts (see operational assessment below). <u>During decommissioning of the hydrogen production facility</u> An assessment of the impact of the decommissioning of the Project on air quality has been scoped out of the assessment as no significant effects are considered likely, as set out in **Chapter 6: Air Quality**. An assessment of the impact of decommissioning of the Project on noise and vibration is provided in **Chapter 7: Noise and Vibration**. The assessment concludes that the impact of the decommissioning of the hydrogen production facility is likely to be similar to the construction period and therefore the assessment considers residual noise effects to be up to major adverse, which is considered significant. Therefore, the potential health impact resulting from the decommissioning impacts such as dust, noise, vibration, and odours is likely to be **negative**.		Implementation of noise mitigation measures.

Assessment Criteria	Relevant to the Project?	Details and Evidence	Potential Health Impact	Further Action or Mitigation Recommended
Does the proposal minimise air pollution during the operational phase?	Yes (during operation)	<u>During construction</u> Not applicable as the assessment criteria refers to operational impacts. Air pollution impacts related to the construction phase are assessed above. <u>During operation</u> An assessment of the risk of onsite marine-side vessel emissions and landside combustion and process emissions, road traffic emissions and odour emissions impacts during the operation phase is provided in **Chapter 6: Air Quality.** The assessment concludes that the effects on human health sensitive receptors as a result of normal operation of the site, are likely to be negligible. Although a significant odour effect is considered to be unlikely, to demonstrate good practice and compliance with its Environmental Permit, an Odour Management Plan will be implemented. This will set out: odour control requirements beyond those incorporated in the Project design; best practice processes; appropriate responsibilities; and odour monitoring processes. <u>During decommissioning of the hydrogen production facility</u> Not applicable as the assessment criteria refers to operational impacts. Noise pollution impacts related to the decommissioning phase are assessed above.	**n/a** during construction **0** during operation **n/a** during decommissioning	<u>During construction</u> n/a <u>During operation</u> Implementation of Odour Management Plan. <u>During decommissioning of the hydrogen production facility</u> n/a
Does the proposal minimise noise pollution during the operational phase?	Yes (during operation)	<u>During construction</u> Not applicable as the assessment criteria refers to operational impacts. Potential health and wellbeing impacts arising from air pollution during the construction phase are assessed above.	**n/a** during construction **-** during operation	<u>During construction</u> n/a <u>During operation</u>

Assessment Criteria	Relevant to the Project?	Details and Evidence	Potential Health Impact	Further Action or Mitigation Recommended
		<u>During operation</u> An assessment of the impact of operation of the Project on noise levels is provided in **Chapter 7: Noise and Vibration**. This sets out that, if unmitigated, there could be up to major adverse effects on homes on Queens Road, which is considered significant. It is assessed that minor adverse or negligible effects on homes on the eastern edge of Immingham could be expected, which is not considered significant. Mitigation measures for any significant noise effects in Immingham will be developed and reported in the ES. Part of this DCO is to request powers to acquire properties on Queens Road and therefore the noise assessment represents a worst case scenario. Therefore, the human health effect of the Project as a result of operational noise pollution is likely to be **negative**. <u>During decommissioning of the hydrogen production facility</u> Not applicable as the assessment criteria refers to operational impacts. Noise pollution impacts related to the decommissioning phase are analysed above.	**n/a** during decommissioning	Implementation of operational noise control scheme which would demonstrate use of best available techniques <u>During decommissioning of the hydrogen production facility</u> n/a

Table 24.13: Accessibility and Active Travel

Assessment Criteria	Relevant to the Project?	Details and Evidence	Potential Health Impact	Further Action or Mitigation Recommended
Does the proposal prioritise and encourage walking (such as through shared spaces)?	Yes (during construction, operation and decommissioning)	<u>During construction</u> As set out in **Chapter 23: Socio-economics**, there are two PRoW within 500m of the Site boundary. Public Footpath 32 will be unaffected by the construction of the Project, therefore there will be no interruption of access or the ability to use this route for active travel, such as walking. It is assessed that in a worst case scenario, Public Bridleway 36 will be temporarily closed for the duration of the construction period. Due to the temporary loss of this PRoW in terms of accessibility for walking, , **Chapter 23: Socio-economics** concludes there will be a potential major adverse effect on users of PRoW during the construction of the Project, which is considered signficant, although a more detailed assessment will be undertaken at ES stage. As set out in **Chapter 11: Traffic and Transport**, it is concluded that during the construction phase (peak construction year) there will be no significant effects on pedestrian amenity, fear and intimidation, or highway safety. Based on above, the potential human health and wellbeing impact arising from potential impact on walking routes during the construction phase is assessed to be **negative**. <u>During operation</u> As set out in **Chapter 23: Socio-economics**, impacts on PRoW during the operational phase are considered to be	**-** during construction **0** during operation **-** during decommissioning	<u>During construction</u> Temporary diversion of Public Bridleway 36, resulting in no severance or journey time effects. <u>During operation</u> None required. <u>During decommissioning of the hydrogen production facility</u> None required.

Assessment Criteria	Relevant to the Project?	Details and Evidence	Potential Health Impact	Further Action or Mitigation Recommended
		unlikely. An assessment of impacts on PRoW during the operational phase is therefore scoped out of the EIA. As set out in **Chapter 11: Traffic and Transport**, it is concluded that during the operation phase there will be no significant effects on pedestrian amenity, fear and intimidation, or highway safety. The potential human health and wellbeing impact arising from potential impact on walking routes during the operation phase is therefore assessed to be **neutral**. <u>During decommissioning of the hydrogen production facility</u> As set out in **Chapter 23: Socio-economics**, it is assessed that in a worst case scenario Public Bridleway 36 will be temporarily closed for the duration of the decommissioning of the hydrogen production facility. Thus, the impact on users of PRoW for active travel such as walking is assessed to be major adverse, which is significant, although a more detailed assessment will be undertaken at ES stage Therefore the potential human health and wellbeing impact arising from potential impact on walking routes during the decommissioning phase is assessed to be **negative**.		

Table 24.14: Access to Work and Training

Assessment Criteria	Relevant to the Project?	Details and Evidence	Potential Health Impact	Further Action or Mitigation Recommended
Does the proposal provide access to local employment and training opportunities, including temporary construction and permanent end-use jobs?	Yes (during construction)	<u>During construction</u> An assessment of the number of jobs created during the construction phase is provided in **Chapter 23: Socio-economics**. It is estimated that the Project will support, on average, approximately 700 full-time employment construction jobs on Site during the construction period. Once leakage, displacement, and multiplier effects have been accounted for, this number rises to 788 net jobs during the construction period of the Project. Of these, 552 jobs will be expected to be taken up by residents within North East Lincolnshire. The implementation of local supply chain initiatives would maximise the potential for local benefits arising from the Project. For example making sure that local businesses have the opportunity to tender for appropriate contracts. Whilst some of the equipment is specialized and will not be sourced locally sourcing strategy will take account of commodities and services that can be sourced locally. The potential health and wellbeing impact arising from the local employment opportunities generated during the construction phase is therefore assessed to be **positive**. <u>During operation</u> As set out in **Chapter 23: Socio-economics**, there are currently a small number of existing jobs (approximately 82 FTE jobs) within the Site associated with the small	**+** during construction **+** during operation **+** during decommissioning	<u>During construction</u> Local employment benefits could be enhanced through local employment and training initiatives. <u>During operation</u> Relocation Strategy to support existing businesses displaced by the Project. Local employment benefits could be enhanced through local employment and training <u>initiatives. During decommissioning of the hydrogen production facility</u> Local employment benefits could be enhanced through local employment and training initiatives.

Assessment Criteria	Relevant to the Project?	Details and Evidence	Potential Health Impact	Further Action or Mitigation Recommended
		businesses and potentially employment generating space on Queens Road. There is expected to be employment loss as a result of the Project associated with these businesses. **Chapter 23: Socio-economics** concludes this would be a significant adverse effect. An estimated 144 jobs will be directly generated by the Project when operational, which will potentially provide local employment opportunities in the form of permanent jobs. When existing employment activity and additionality effects are accounted for, the total net employment generated during operation is assessed to be 80 FTE jobs. As above, the implementation of local supply chain initiatives would maximise the potential for local benefits arising from the Project. For example, making sure that local businesses have the opportunity to tender for appropriate contracts. Whilst some of the services are is specialized a wide range of support services businesses already exist in the area. Supporting local procurement of new emerging businesses supporting new technology could include for example supporting local maintenance of fuel cell power vehicles. Given, the net additional jobs generated, the overall potential health and wellbeing impact associated with these additional employment opportunities is assessed to be **positive**. <u>During decommissioning of the hydrogen production facility</u>		

Assessment Criteria	Relevant to the Project?	Details and Evidence	Potential Health Impact	Further Action or Mitigation Recommended
		An assessment of the number of jobs created during the decommissioning phase is provided in **Chapter 23: Socio-economics**. The assessment concludes that employment generated will be lower in magnitude and of a shorter duration than during the construction phase. Although it is not possible to state the amount of employment generated per annum, a proportion of employment will be expected to be taken up by residents within North East Lincolnshire. As above, the implementation of local supply chain initiatives would maximise the potential for local benefits arising from the Project. Whilst some of the equipment is specialized and will not be sourced locally sourcing strategy will take account of commodities and services that can be sourced locally. The potential health and wellbeing impact associated with the employment opportunities during decommissioning is assessed to be **positive**.		
Does the proposal include opportunities for work for local people via local procurement arrangements?	Yes (during construction, operation and decommissioning)	<u>During construction</u> An assessment of the number of jobs created during the construction phase is provided in **Chapter 23: Socio-economics** of the PEI Report. It is estimated that the Project will support, on average, approximately 700 full-time construction jobs per annum. Once leakage, displacement and multiplier effects have been accounted for, this number rises to 788 total net jobs per annum during the construction period of the Project. Of	**+** during construction **+** during operation **+** during decommissioning	<u>During construction</u> Implementation of local supply chain initiatives to support local businesses to benefit from opportunities arising from the Project. <u>During operation</u>

Assessment Criteria	Relevant to the Project?	Details and Evidence	Potential Health Impact	Further Action or Mitigation Recommended
		these, 552 jobs per annum will be expected to be taken up by residents of North East Lincolnshire. The implementation of local supply chain initiatives would maximise the potential for local benefits arising from the Project. For example making sure that local businesses have the opportunity to tender for appropriate contracts. Whilst some of the equipment is specialized and will not be sourced locally, the sourcing strategy will take account of commodities and services that can be sourced locally. The potential health and wellbeing impact during construction should local procurement initiatives be implemented is assessed to be **positive**. <u>During operation</u> As above, the implementation of local supply chain initiatives would maximise the potential for local benefits arising from the Project. For example, making sure that local businesses have the opportunity to tender for appropriate contracts. Whilst some of the services are is specialized a wide range of support services businesses already exist in the area. Supporting local procurement of new emerging businesses supporting new technology could include for example supporting local maintenance of fuel cell power vehicles. The potential health and wellbeing impact during construction should local procurement initiatives be implemented is assessed to be **positive**.		Implementation of local supply chain initiatives to support local businesses to benefit from opportunities arising from the Project. <u>During decommissioning of the hydrogen production facility</u> Implementation of local supply chain initiatives to support local businesses to benefit from opportunities arising from the Project.

Assessment Criteria	Relevant to the Project?	Details and Evidence	Potential Health Impact	Further Action or Mitigation Recommended
		<u>During decommissioning of the hydrogen production facility</u> As above, the implementation of local supply chain initiatives would maximise the potential for local benefits arising from the Project. The potential health and wellbeing impact during construction should local procurement initiatives be implemented is assessed to be **positive**.		

Table 24.15: Social Cohesion and Lifetime Neighbourhoods

Assessment Criteria	Relevant to the Project?	Details and Evidence	Potential Health Impact	Further Action or Mitigation Recommended
Does the proposal consider health inequalities by addressing local needs through community engagement?	Yes (all phases)	<u>All phases</u> In response to the EIA Scoping Report issued in August 2022, the Planning Inspectorate (PINS) raised the potential mental health impact among local communities during the operational phase of the Project, arising from potential public safety concerns relating to the transportation of hydrogen via road within the local area. As explained in **Chapter 2: The Project**, liquid hydrogen will be produced on site. Liquid ammonia will be shipped to the jetty and then converted within the new production facilities into gaseous hydrogen which will then be turned into liquid through a hydrogen liquefier so it is easier to safely store and transport. With respect to potential public safety risks, **Chapter 22: Major Accidents and Disasters** sets out an assessment of safety risk and states that all risks will be mitigated to be As Low As Reasonably Possible (ALARP), all operations will be subject to authorisation by the Competent Authority (Health and Safety Executive (HSE) and Environment Agency (EA)), and all safety and regulatory requirements will be met in full, including obtaining of hazardous substance consent which will itself require local planning authority consent and will go through a local consultation process. In terms of public perception of risk, a statutory consultation, under the requirements of the Planning Act 2008, is being undertaken in January 2023-February 2023 to facilitate public	**-** during all phases	<u>All phases</u> Implementation of planned safety measures and public consultation. Operational phase Provision of information for inclusion in the local authority emergency plan

Assessment Criteria	Relevant to the Project?	Details and Evidence	Potential Health Impact	Further Action or Mitigation Recommended
		understanding of, and listen and respond to questions about, the Project, including the hydrogen production process. This will include the sharing of Preliminary Environmental Information (in the form of this report and an accompanying non-technical summary which will explain this report in layman's terms). The consultation will also include: in-person consultation events (which will include materials setting out information about the proposed project, including safety and regulatory information), a public website and online consultation room; feedback forms, available both online and at in-person events; a freephone line; a postal address; and, an email address. This will ensure specific concerns are provided with a response. These consultation channels will be advertised to the consultation radius outlined in the Statement of Community Consultation. The channels available throughout the Statutory Consultation period will give the public many opportunities to raise questions and concerns. The website, phone line, postal address, and email address will continue to be monitored outside of these dates, however comments shared after 20 February 2023 will be noted but may not be able to be taken into account as part of the Statutory Consultation period. Further details are set out in the Statement of Community Consultation. The Project will operate in line with best practice with regard to safety, and significant public information will be made available to respond to queries on the safety aspects of the Project. However, given perception and mental health are by their nature subjective, it is possible there could be **negative**		

Assessment Criteria	Relevant to the Project?	Details and Evidence	Potential Health Impact	Further Action or Mitigation Recommended
		impacts on local mental health arising from safety concerns during all phases of the Project.		
Does the proposal connect with existing communities, i.e. layout and movement which avoids physical barriers and severance, and land uses and spaces which encourage social interaction?	Yes (during construction, operation and decommissioning)	<u>During construction</u> As set out in **Chapter 23: Socio-economics**, it is assessed that in a worst case scenario, there will be a significant effect on PRoW during the construction phase, and therefore it is assessed that there will be a human health and wellbeing impact in terms of severance of pedestrian routes that connect existing communities such as Immingham and Grimbsy. This preliminary assessment is to be refined at ES stage. As set out in **Chapter 11: Traffic and Transport**, it is concluded that during the construction phase (peak construction year of 2025) there will be no significant effects on severance, pedestrian amenity, fear and intimidation, or highway safety. A CTMP will be prepared as part of the next stage of the application process, as part of the Environmental Statement. This will consider measures to manage construction traffic resulting from the Project at peak hours in order to limit any potential disruptions and implications on the wider transport network as well as for existing road users. Therefore, there is forecast to be limited impact on pedestrian and cyclist facilities during construction. The likely health impact arising from impacts during the construction phase would therefore be **negative**.	**-** during construction **0** during operation **-** during decommissioning	<u>During construction</u> Implementation of measures set out in CTMP. <u>During operation</u> None required. <u>During decommissioning of the hydrogen production facility</u> None required.

Assessment Criteria	Relevant to the Project?	Details and Evidence	Potential Health Impact	Further Action or Mitigation Recommended
		<u>During operation</u> As set out above, **Chapter 11: Traffic and Transport** concludes no significant severance effects are anticipated during the operational phase. In addition, no impacts are anticipated affecting PRoW during the operational phase. The likely human health and wellbeing effect arising from connections between local communities during the operational phase is therefore assessed to be **neutral**. <u>During decommissioning of the hydrogen production facility</u> As set out in **Chapter 23: Socio-economics**, it is assessed in a worst case scenario that temporary closure of Public Bridleway 36 for the duration of the decommissioning phase may take place, and therefore there will be a significant effect on severance of communities via disruption to users of PRoW. This preliminary assessment is to be refined at ES stage. The human health and wellbeing impact on community connectivity is therefore assessed to be **negative**.		

Table 24.16: Climate Change

Assessment Criteria	Relevant to the Project?	Details and Evidence	Potential Health Impact	Further Action or Mitigation Recommended
Does the proposal incorporate renewable energy?	Yes (during construction and operation)	**Chapter 19: Climate Change** of this PEI report sets out an assessment of the likely impact of direct and indirect greenhouse gas (GHG) emissions arising from the Project on the climate, including how it would affect the ability of the UK to meet its carbon reduction targets. During construction **Chapter 19: Climate Change** sets out the construction phase of the Project is likely to have an adverse impact with respect to GHG emissions, the majority of which will arise from embodied carbon in construction materials. However, given the role the Project will eventually play in reducing the UK's carbon footprint, in context the emissions generated in the construction phase are assessed to be of Minor Adverse significance. The human health and wellbeing impact arising from the likely GHG emissions during the construction phase is likely to be **negative**. During operation One of the key drivers for the Project is to assist the UK in meeting its net zero targets through the handling and production of green hydrogen to help decarbonise the transportation sector and to help facilitate the use of carbon capture and storage. The purpose of the jetty (the NSIP) is to facilitate the import and export of liquid bulk materials which support the green energy and carbon capture sectors. The hydrogen production facility (associated development) will enable green hydrogen to be produced from imported ammonia to support the transition to net	**-** during construction **-** during operation **n/a** during decommissioning	During construction n/a During operation Implementation of appropriate mitigation measures to reduce GHG emissions associated with the operational phase of the Project During decommissioning of the hydrogen production facility n/a

Assessment Criteria	Relevant to the Project?	Details and Evidence	Potential Health Impact	Further Action or Mitigation Recommended
		zero, by providing a zero carbon fuel for the transport sector. The ammonia will be produced using renewable energy sources. GHG emissions during the operational phase of the Project will be associated with utilities and transport, the majority of which will be associated with shipping emissions (although in the future, a gradual switch in the shipping fleet to the use of decarbonised fuel is expected). The following mitigation measures to avoid or minimise operational emissions are being considered and will be developed further and included in the ES: future transition of Very Large Gas Container (VLGC) fleet to sustainable low carbon fuels over time (over the long term, a similar transition can be expected across the wider marine fleet, to include similar vessels in the carbon capture sector); energy and heat/ cold integration measures including potential reuse of process tail gas as fuel; use of best available techniques for energy management as part of the Environmental permit; use of energy efficient lighting; future use of biogas and or hydrogen to replace natural gas fuel; and, use of Advanced fleet scheduling and supply chain optimisation for distribution will reduce the impact of vehicle movements. The preliminary assessment concludes these emissions are assessed to be Minor Adverse. These emissions should be in the context of the potential national emissions reductions the Project will facilitate through decarbonisation of UK transport. Based on above, the preliminary assessment of the human health and wellbeing impact arising from the likely GHG emissions during the operational phase is likely to be **negative**. During decommissioning of the hydrogen production facility		

Assessment Criteria	Relevant to the Project?	Details and Evidence	Potential Health Impact	Further Action or Mitigation Recommended
		n/a – an assessment of GHG emissions during the decommissioning of the Project is scoped out of this PEI Report, as set out in **Chapter 19: Climate Change.**		

24.7 Summary of Preliminary Assessment

24.7.1 This assessment has followed guidance set out by the HUDU Rapid Health Impact Assessment Toolkit' and has regard to WHIASU guidance in order to assess the potential effects on human health and wellbeing arising from the Project. The assessment has considered health impacts arising from determinants of health including:

a. **Access to healthcare services and other social infrastructure** – it is unlikely that there will be any severance between local residents and healthcare facilities or other social infrastructure during the construction, operation or decommissioning phases of the Project. This is because no severance effects are anticipated arising from traffic or transport. There may be some additional demand on healthcare services and other social infrastructure during the construction, operation and decommissioning phases, should workers move to the area to work on the Project. **Chapter 23: Socio-economics** sets out this effect is anticipated to be negligible during the construction and decommissioning phases and an adverse (not significant) effect during the operational phase.

   i. During construction, the likely impact on human health and wellbeing regarding access to healthcare services and other social infrastructure is assessed as: neutral.

   ii. During operation, the impact on human health and wellbeing regarding access to healthcare services and other social infrastructure is assessed as: negative.

   iii. During decommissioning, the impact on human health and wellbeing regarding access to healthcare services and other social infrastructure is assessed as: neutral.

b. **Air quality, noise and neighbourhood amenity** – suggested mitigation measures include implementation of a CEMP, DMP, CLP, Odour Management Plan, operational noise control scheme and Travel Plan. Following implementation of mitigation measures, it is assessed that air quality impacts during construction, operation and decommissioning of the Project will be negligible. It is assessed that following implementation of impact avoidance measures, noise impacts during the construction, operation and decommissioning of the Project on homes on Queens Road would be up to major adverse, which is considered a significant noise effect.

   i. During construction, the impact on human health and wellbeing in relation to air quality, noise and neighbourhood amenity is assessed as: negative.

   ii. During operation, the impact on human health and wellbeing in relation to air quality, noise and neighbourhood amenity is assessed as: negative.

   iii. During decommissioning, the impact on human health and wellbeing in relation to air quality, noise and neighbourhood amenity is assessed as: negative.

c. **Accessibility and active travel** – in all phases of the Project, it is assessed that there will be no significant impact on pedestrian safety, fear or intimidation, and as such no resulting human health and wellbeing impact as a result of these considerations. However, as a result of the preliminary assessment that temporary closure of PRoW for the duration of construction and decommissioning phases will be required, and therein a major adverse socio-economics effect would result, there is likely to be a negative human health and wellbeing impact on accessibility and active travel.

   i. During construction, the impact on human health and wellbeing in relation to accessibility and active travel is assessed as: negative.

   ii. During operation, the impact on human health and wellbeing in relation to accessibility and active travel is assessed as: neutral.

   iii. During decommissioning, the impact on human health and wellbeing in relation to accessibility and active travel is assessed as: negative.

d. **Access to work and training** – the construction of the Project is expected to generate construction-related employment on Site, and within the supply chain and local economy. Additionally, the operation and decommissioning of the Project would also be expected to generate employment. There will be some loss of employment on Site due to the displacement of existing businesses within the Site boundary. Overall there is expected to be a net increase in employment opportunities locally arising from the Project.

   i. During construction, the impact on human health and wellbeing in relation to access to work and training is assessed as: positive.

   ii. During operation, the impact on human health and wellbeing in relation to access to work and training is assessed as: positive.

   iii. During decommissioning, the impact on human health and wellbeing in relation to access to work and training is assessed as: positive.

e. **Social cohesion and lifetime neighbourhoods –** perception of risk will be managed through the adoption of best practice community engagement measures, however given the subjective nature of perception and mental health, it is possible that negative impacts could arise in a worst-case scenario. With regard to community severance, no health and wellbeing impact is likely during the operation phase of the Project, however due to the preliminary assessment that temporary closure of PRoW for the duration of the construction and decommissioning periods will be required in a worst case scenario and a major adverse socio-economics effect would result, there is likely to be a negative human health and wellbeing impact.

   i. During construction, with regard to perception of risk, the potential impact on human health and wellbeing is assessed as: negative.

   ii. During construction, with regard to community severance, the impact on human health and wellbeing is assessed as: negative.

   iii. During operation, with regard to perception of risk the potential impact on human health and wellbeing is assessed as: negative.

iv. During operation, with regard to community severance, the impact on human health and wellbeing is assessed as: neutral.

v. During decommissioning, the potential impact with regard to perception of risk on human health and wellbeing is assessed as: negative.

vi. During decommissioning, with regard to community severance, the impact on human health and wellbeing is assessed as: negative.

f. **Climate change** – **Chapter 19: Climate Change** sets out the construction phase of the Project is likely to generate GHG emissions, the majority of which will arise from embodied carbon in construction materials. The Project is also likely to generate GHG emissions during the operational phase, the majority of which will be associated with shipping emissions. A key driver for the Project is to assist the UK in meeting its net zero targets. It will achieve this through the handling and production of green hydrogen to help decarbonise the transportation sector and to help facilitate the use of carbon capture and storage. However, the direct impact of the emissions generated by the Project would be expected to have a negative impact on health.

i. During construction, the impact on human health and wellbeing with regard to climate change is assessed as: negative.

ii. During operation, the impact on human health and wellbeing with regard to climate change is assessed as: negative.

24.8 References

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Ref 24-12 HM Government, (2018); A Green Future: Our 25 Year Plan to Improve the Environment.

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Ref 24-18 North Lincolnshire Council, (2011); North Lincolnshire Local Development Framework Core Strategy.

Ref 24-19 Central Lincolnshire Joint Strategic Planning Committee (2019); Central Lincolnshire Local Plan.

Ref 24-20 ONS, (2020); Mid-Year Population Estimates.

Ref 24-21 Office for National Statistics (2011); 2011 Census.

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Ref 24-27 Royal College of General Practitioners, (2005); Information Paper. Royal College of General Practitioners.

24.9 Abbreviations and Glossary of Terms

Table 24.17: Glossary and Abbreviations

Term	Acronym	Meaning
Healthy Urban Development Unit	HUDU	Organisation working on behalf of the NHS to provide specialist expertise and planning guidance in order to improve health and wellbeing
Health Impact Assessment	HIA	Process to estimate the health impacts of a development intervention on a population
Wales Health Impact Assessment Support Unit	WHIASU	Organisation which provide specialist expertise and planning guidance on conducting health impact assessments
National Planning Policy Framework	NPPF	Overarching document outlining the government's planning policies
National Policy Statement	NPS	Overarching policy statements produced by government
Electromagnetic Field(s)	EMF	Radiation associated with electrical power infrastructure
Air Pollution Information Service	APIS	Body which publishes publicly available maps of background pollutant data across the UK
Institute of Air Quality Management	IAQM	The professional body for air quality practitioners
Health and Safety Executive	HSE	UK Health and Safety Regulator and statutory consultee
Environment Agency	EA	Non-departmental public body, established in 1996 and sponsored by the United Kingdom government's Department for Environment, Food and Rural Affairs, with responsibilities relating to the protection and enhancement of the environment in England.
Lower Super Output Area	LSOA	Small geographical units with broadly similar populations used for the reporting of statistics to allow comparison between areas at a granular scale.
Office for Health Improvement and Disparities	OHID	Successor to Public Health England focusing on health priorities, a part of Department for Health and Social Care
Coronary Heart Disease	CHD	A health condition affecting the heart
Chronic Obstructive Pulmonary Disease	COPD	A health condition affecting the pulmonary system

Term	Acronym	Meaning
Tuberculosis	TB	A contagious infection affecting the lungs, and other organs
General Practitioner	GP	A medical professional who provides primary care
Integrated Care Board	ICB	Established statutory bodies responsible for the delivery of healthcare within an area
Construction Traffic Management Plan	CTMP	Sets out mitigation measures relating to construction traffic associated with a Project
Dust Management Plan	DMP	A Dust Management Plan manages dust emissions generated within the project area, so that the appropriate dust criteria is met during both the construction and operational stages of the Project
Noise Sensitive Receptors	NSR	Receptors which are potentially sensitive to noise. These comprise mainly residential buildings, but also include educational buildings, hospitals and places of worship
As Low As Reasonably Possible	ALARP	Condition of being as low as reasonably possible
Greenhouse Gas	GHG	Term used by UK Regulatory Authorities and throughout industry to denote that risk is reduced to a level which is a low as practically achievable with existing technology.