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22.0 HUMAN HEALTH

22.1 Introduction

22.1.1 This chapter of the Environmental Statement (ES) identifies the potential impacts and effects on human health that have been considered as part of the Environmental Impact Assessment (EIA) of the Proposed Development. The assessment has been undertaken in accordance with best practice guidance from the Institute of Environmental Management and Assessment (IEMA) Determining Significance for Human Health in Environmental Impact Assessment (IEMA, 2022a).

22.1.2 This chapter relies on the findings of other technical assessments completed and presented within Chapter 8: Air Quality, Chapter 11: Noise and Vibration, Chapter 15: Traffic and Transport, Chapter 18: Socio-economics and Land Use, Chapter 19: Climate Change, and Chapter 20: Major Accidents and Disasters (ES Volume I, EN070009/APP/6.2), which are all relevant to human health.

22.2 Legislation, Planning Policy Context and Other Guidance

22.2.1 This section identifies and describes legislation, planning policy and guidance that is of relevance to the assessment of human health effects.

Legislative Background

22.2.2 The effects on human health that have been considered in this ES relate to those arising from emissions to air (Chapter 8: Air Quality), noise and vibration (Chapter 11: Noise and Vibration), traffic (Chapter 15 Traffic and Transport), socio-economics (Chapter 18: Socio-economics and Land Use), climate change (Chapter 19: Climate Change), and major accidents (Chapter 20: Major Accidents and Disasters) (ES Volume I, EN070009/APP/6.2). The relevant legislation relating to each of these disciplines is presented in the respective chapters.

EIA Directive 2014/52/EU of the European Parliament and of the Council (European Parliament and of the Council, 2014) and Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (HM Government, 2017)

22.2.3 The EIA Directive 2014 (Directive 2014/52/EU of the European Parliament and of the Council) (European Parliament and of the Council, 2014) and the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (HM Government, 2017) provide the legislative background regarding the assessment of the effects of certain public and private projects on the environment. These specifically include a requirement that the EIA must identify, describe, and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on human health (Regulation 5(2)(a)).

Health and Care Act (2022)

22.2.4 In April 2022, the Government passed a new Health and Care Act 2022 (HM Government, 2022). The Act proposes new health reforms in England, removes existing competition rules and formalises Integrated Care Systems (ICS). It also

grants the health secretary authority over the health service. It emphasises the importance of health and care for the future and development of the country.

22.2.5 The Act aims to support the development of ICS and integration of all health bodies, by requiring them to strive towards the collective aims of better care for all patients; better health for everyone; and sustainable use of National Health Service (NHS) resources.

22.2.6 There are 42 ICSs across England (previously in April 2021, over 100 Clinical Commissioning Groups (CCGs) existed across the country), and each has been established with four strategic purposes:

- improve population health and healthcare;
- tackling unequal outcomes and access;
- enhance productivity and value for money; and
- helping the NHS to support broader social and economic development.

Control of Electromagnetic Fields at Work Regulations (2016)

22.2.7 Electromagnetic Field (EMF) effects must be controlled in accordance with the Health and Safety Executive's (HSE) Control of Electromagnetic Fields at Work Regulations 2016 (HM Stationery Office, 2016), which sets out how employers must make and implement action plans to ensure compliance with the defined exposure limits (in Part 2 of the Schedule). Regulation 7(2) states that *"the action plan must include consideration of, where relevant –*

- other working methods that entail lower exposure to electromagnetic fields;
- replacement equipment designed to reduce the level of exposure;
- technical measures to reduce the emission of electromagnetic fields, including, where necessary, the use of interlocks, screening or similar health protection mechanisms;
- demarcation and access control measures;
- maintenance programmes for work equipment, workplaces and workstation systems;
- the design and layout of workplaces and workstations;
- limitations on the duration and intensity of exposure; and
- the availability of suitable personal protective equipment."

Planning Policy Context

National Planning Policy

Overarching National Policy Statement for Energy (EN-1)

22.2.8 Planning policy for Nationally Significant Infrastructure Projects (NSIPs) is primarily contained in National Policy Statements (NPSs). The Overarching NPS for Energy

(EN-1) (Department for Energy Security and Net Zero (DESNZ), 2023a) requires the decision maker to consider potential benefits of development proposals including:

"*the potential to impact on the health and well-being of the population.*"

22.2.9 Section 4.4 'Health' states that an assessment should consider all relevant human health impacts, which may include the following:

- the direct impacts on health including increased traffic, air or water pollution, dust, odour, hazardous waste and substance, noise, exposure to radiation, and increases in pests; and

22.2.10 In addition, paragraph 4.4.3 notes that:

"*New energy infrastructure may also affect the composition and size of the local population, and in doing so have indirect health impacts, for example if it in some way affects access to key public services, transport, or the use of open space for recreation and physical activity.*"

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

22.2.11 Taken together with the 'Overarching National Policy Statement for Energy' (EN-1), EN-4 (DESNZ, 2023b) provides the primary policy for decisions by the Secretary of State on applications it receives for natural gas supply infrastructure and gas and oil pipelines.

22.2.12 In regard to human health, it advises that developments should follow generic considerations on gas emissions set out in EN-1. In particular, Section 5.2 of EN-1 which provides guidance on the effects of emissions on air quality (which can have implications for human health).

National Policy Statement for Electrical Networks Infrastructure (EN-5)

22.2.13 NPS EN-5 (DESNZ, 2023c) provides specific policy in relation to EMF resulting from electricity networks and their known and potential effects on health, stating in EN-5 at paragraph 2.9.46 and 2.9.47:

"All overhead power lines produce EMFs, and these tend to be highest directly under a line, and decrease to the sides at increasing distance. Although putting cables underground eliminates the electric field, they still produce magnetic fields, which are highest directly above the cable. EMFs can have both direct and indirect effects on human health, aquatic and terrestrial organisms.

The direct effects occur In terms of impacts on the central nervous system resulting in its normal functioning being affected. Indirect effects occur through electric charges building up on the surface of the body producing a microshock on contact with a grounded object, or vice versa, which, depending on the field strength and other exposure factors, can range from barely perceptible to being an annoyance or even painful."

22.2.14 For the Proposed Development, it is likely that all electrical and control system cables will be installed below ground or at ground level with no new overhead transmission lines proposed. Electrical cables will not be installed directly below or

near to residential properties, as can be seen from the Works Plans (EN070009/APP/2.4).

The National Planning Policy Framework (2023)

22.2.15 The Department for Levelling Up, Housing and Communities (DLUHC)) (Previously called the Ministry of Housing, Communities and Local Government (MHCLG) issued the revised National Planning Policy Framework (NPPF) (DLUHC, 2023) in December 2023, which sets out the Government's planning policies for England. The NPPF contains policies that are applicable to human health.

22.2.16 Section 8 of the NPPF 'Promoting healthy and safe communities' states that policies should aim to achieve healthy, inclusive, and safe places which: promote social inclusion; are safe and accessible; and enable and support healthy lifestyles. In order to do this, paragraphs 96 and 101 of the NPPF says that planning policies and decisions should:

- "plan positively for the provision of [...] local services to enhance the sustainability of communities and residential environments;
- take into account and support the delivery of local strategies to improve health, social and cultural well-being for all sections of the community;
- guard against the unnecessary loss of valued facilities and services, particularly where this would reduce the community's ability to meet its day-to-day needs;
- ensure that established shops, facilities, and services are able to develop and modernise, and are retained for the benefit of the community;
- ensure an integrated approach to considering the location of housing, economic uses and community facilities and services; and
- promote public safety and take into account wider security and defence requirements by anticipating and addressing possible malicious threats and natural hazards...This includes appropriate and proportionate steps that can be taken to reduce vulnerability, increase resilience and ensure public safety and security."

Planning Practice Guidance (2019)

22.2.17 The national Planning Practice Guidance (PPG) (DLUHC; MHCLG, 2019) 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
- The links between health and wellbeing and planning.

22.2.18 The PPG suggests 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 (taking into account the changing needs of the population).

22.2.19 Engagement between plan-making bodies and relevant organisations will help ensure that local strategies to improve health and wellbeing and the provision of the required health infrastructure are supported and considered in plans (including in the preparation of strategic policies for community facilities).

22.2.20 It also states that a healthy place *"is one which supports and promotes healthy behaviours and environments and a reduction in health inequalities for people of all ages. It will provide the community with opportunities to improve their physical and mental health, and support community engagement and wellbeing".*

NHS Long Term Plan (2019)

22.2.21 The NHS Long Term Plan (NHS, 2019) sets out a ten-year programme of phased improvements to the NHS. It provides an insight into the priorities of the country regarding health (such as reducing health inequalities, obesity, smoking, and air pollution) which can also be used to guide development decisions.

22.2.22 The plan outlines how the NHS will attempt to reduce health inequalities through wider preventative action in deprived areas and improved 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 General Practice (GP) consultations to provide more options and better support for patients.

22.2.23 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. There will be a focus on population health which involves a new system hierarchy involving primary care networks, local authorities and larger integrated care systems. The NHS Long Term Plan (NHS, 2019) stresses the importance of the NHS and the built environment sector continuing to work together to improve health and wellbeing.

Public Health England Strategy 2020 to 2025 (2020)

22.2.24 Public Health England (PHE) (now the UK Health Security Agency (UKHSA)) released the PHE Strategy 2020 to 2025 (PHE, 2020) in 2020. It sets out how the organisation will work to improve public health and reduce health inequalities. The key aims for the five-year period are as follows:

- build and embed universal approaches to programme and project pipeline planning, reporting, and resource planning for use across PHE;
- improve governance structures around projects and programmes to support decision making, help identify barriers to progressing projects and ensuring that projects are properly evaluated throughout and closed when complete; and
- embed capacity planning within all programmes across PHE and, where relevant, agile approaches to bring greater flexibility and innovation to the work they do.

Spatial Planning for Health: An Evidence Resource for Designing Healthier Places (2017)

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

22.2.26 The review addresses the relationship which exists between public health and the built environment. It identifies five aspects of the built and natural environment which can be influenced by local planning policy:

- neighbourhood design;
- housing;
- healthier food;
- natural and sustainable environment; and
- transport.

22.2.27 For each aspect identified above, the review provides the evidence base underpinning why they are important determinants of public health. It also sets out principles which public health professionals and planners should follow to ensure healthier places.

22.2.28 The two aspects deemed most relevant to the Proposed Development are 'neighbourhood design' and 'natural and sustainable environment'. For 'neighbourhood design', the review states that:

"neighbourhoods are places where people live, work, and play and have a sense of belonging. The design of a neighbourhood can contribute to the health and well-being of the people living there. Several aspects of neighbourhood design (walkability and mixed land use) can also maximise opportunities for social engagement and active travel. Neighbourhood design can impact on our day-to-day decisions and therefore have a significant role in shaping our health behaviours."

22.2.29 For the 'natural and sustainable environment', the review states that:

"there is a very significant and strong body of evidence linking contact and exposure to the natural environment with improved health and wellbeing. For the purpose of this review, the natural and sustainable environment is comprised of neighbourhood ecosystems and the resulting co-benefits between the environment and health. Protecting the natural environment is essential to sustaining human civilization."

Local Planning Policy

Redcar and Cleveland Local Plan (2018)

22.2.30 The Redcar and Cleveland Local Plan (Redcar and Cleveland Borough Council (RCBC), 2018) sets out the vision and overall development strategy for Redcar and Cleveland, and how it will be achieved for the period until 2032. The borough has

faced significant challenges, such as the decline in its traditional employment base and the cessation of steel making in Redcar, a reducing population and increasing urban disadvantage. The Local Plan provides the policy framework to meet these challenges and to deliver sustainable development across the borough.

22.2.31 Under Policy SD 4 (General Development Principles), the Plan states that development will be permitted where it avoids locations that would put the environment, or human health or safety, at unacceptable risk. Development must also be designed, constructed and managed in ways that improve health and promote healthy lifestyles to help to reduce health inequalities.

22.2.32 The Plan also states at paragraph 2.31 that where a development is anticipated to have significant implications for people's health and wellbeing, a Health Impact Assessment (HIA) should be considered. The findings of a HIA are used to make recommendations as to how any positive health impacts of a development may be increased and any negative impacts reduced.

Stockton-on-Tees Local Plan (2019)

22.2.33 The Local Plan sets out the Stockton-on-Tees Borough Council's (STBC) policies and proposals to guide planning decisions and establishes the framework for the sustainable growth and development of the Borough up to 2032.

22.2.34 Within the Plan, a number of Strategic Priorities are established to work towards. Priorities relevant to human health are as follows:

- Strategic Priority 6: To promote equality and diversity whilst ensuring all of STBC's residents live in strong, prosperous, cohesive and sustainable communities in a safe, healthy and attractive environment; and
- Strategic Priority 10: To achieve a healthy, vibrant and successful low carbon community, resilient to the challenges of climate change and resource pressures.

22.2.35 In addition, it is noted at paragraph 4.75 that public safety is of key importance in the development process. This should be considered in terms of the impact on human health from new development, in particular installations in the North Tees and Billingham areas.

Hartlepool Local Plan (2018)

22.2.36 The Hartlepool Local Plan (Hartlepool Borough Council (HBC), 2018) sets out the spatial vision and strategic objectives for the Borough for the next 15 years. The plan contains a suite of policies to assist in delivering the spatial vision and objectives–- all of the policies contained within the plan are considered to be strategic policies.

22.2.37 Although no policies in the Plan relate directly to human health, one of the 'Hartlepool's Ambition' themes is "*Strengthening Communities, Community Safety, Housing, Health and Wellbeing*". The objectives within this theme include:

- to encourage healthier and more sustainable lives;

- to strengthen social cohesion and reduce inequalities; and
- to make Hartlepool a safer place.

Other Guidance

Determining Significance for Human Health in Environmental Impact Assessment (IEMA, 2022a)

22.2.38 Where a project is subject to statutory or voluntary EIA, a HIA may be merged into the EIA or undertaken as a standalone reporting process.

22.2.39 In November 2022, IEMA published guidance on assessing human health as part of EIA. Previously, there was no consolidated methodology or practice for the assessment of effects on human health. If a change in a wider determinant of health is likely due to a proposed development, it should be scoped into the human health assessment. The assessment must present the 'likely significant' human health effects of the applicable development.

22.2.40 The human health assessment undertaken for the Proposed Development in Section 22.6 is based on IEMA guidance and considers the potential effects for each phase of the development – construction, operation and decommissioning.

22.3 Assessment Methodology and Significance Criteria

Study Area

22.3.1 The study area for the human health assessment is defined to include features likely to be at risk from possible direct and indirect impacts that might arise from the Proposed Development. The study area is based on the extent and characteristics of the Proposed Development and the communities / wards directly and indirectly affected by the Proposed Development. It is determined that human health impacts are likely to occur in an area which is composed of the following seven wards, which are together referred to as the 'study area'. These wards are the geographies that the Proposed Development Site and Connection Corridors intersect:

- Fens and Greatham, and Seaton, in Hartlepool District;
- Billingham East and Billingham South, in Stockton-on-Tees District; and
- Dormanstown, Grangetown, and South Bank, in Redcar and Cleveland District.

22.3.2 Dependent on the human health indicator being analysed, some ward level data is available from the 2021 Census (Office for National Statistics (ONS), 2022a) which has been used as the preferred dataset where possible. It is important to note that the electoral ward boundaries have changed in recent years and although the geographic extents of these may differ, both the historic ward boundaries and the revised ward boundaries provide an indication of local health in proximity to the Proposed Development Site and are therefore considered suitable for assessing the existing baseline conditions for human health.

22.3.3 Where ward level data is not available, land within the boundaries of RCBC, STBC and HBC have been used as the study area, as referenced in the text.

Impact Assessment Methodology

22.3.4 The World Health Organisation (WHO) Europe defines health as a "*state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity*" (WHO, 2022). Public health therefore encompasses general wellbeing, not just the absence of illness.

22.3.5 The health and wellbeing of individuals is determined by a broad range of individual constitutional and behavioural factors (or 'determinants'), as well as broader environmental, social and economic factors. Some factors are direct and obvious, whilst others are indirect.

22.3.6 The determinants scoped into the assessment are as follows:

- risk-taking behaviour;
- open space, leisure, and play;
- transport modes, access, and connections;
- community safety;
- community identity, culture, resilience, and influence;
- social participation, interaction, and support;
- employment and income;
- housing;
- education and training;
- health and social care services;
- climate change mitigation and adaptation;
- air quality;
- noise and vibration; and
- radiation.

22.3.7 Please note that the 'housing' and 'radiation' determinants were sought to be scoped out in the Scoping Report. After due consideration and consultation, it was deemed appropriate to include them in the assessment scope. This was because the potential for significant effects was raised during consultation (see Appendix 1E (ES Volume III, EN070009/APP/6.4)).

22.3.8 The following determinants were scoped out of the EIA in the Scoping Report (Appendix 1A, ES Volume III, EN070009/APP/6.4) as they are deemed not relevant to the Proposed Development:

- Diet and nutrition: the Proposed Development will not affect access to food or good nutrition.
- Relocation: The Proposed Development will not require relocation of residents or loss of housing.

22.3.9 Although previously being scoped in as determinants at the Scoping Report stage, the following determinants are captured within the assessment of other determinants or chapters (in line with IEMA guidance) or are considered unlikely to have a significant effect on the environment:

- Physical activity: effects relate most directly to open space and transport and so are captured within the assessment of those determinants.
- Water quality or availability: water environment is assessed within Chapter 9: Surface Water, Flood Risk and Water Resources (ES Volume I, EN070009/APP/6.2), however, as noted in Chapter 9, the Proposed Development Site is not within a Drinking Water Protected Area or Drinking Water Safeguard Zone and consequently there is no prospect of human health receptor impacts.
- Land quality: ground conditions are assessed within Chapter 10: Geology, Hydrogeology and Contaminated Land (ES Volume I, EN070009/APP/6.2). There is no prospect of human health receptor impacts and therefore no prospect of significant impacts to human health.
- Wider societal infrastructure and resources: considerations such as wider contributions to economic development are assessed under the 'employment and income', and 'education and skills' determinants.
- Built environment: considerations such as access to health and social care services, educational facilities are assessed under the 'transport modes, access, and connections', and 'health and social care' determinants.

22.3.10 The assessment of potential human health effects uses the effect significance terms and definitions as described within IEMA guidance.

22.3.11 The human health assessment follows the general impact assessment methodology set in IEMA guidance (IEMA, 2022a). The specific impact magnitude and impact sensitivity criteria for this assessment have been set out below.

22.3.12 Effects are defined as follows:

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

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

22.3.14 'Significance' reflects the relationship between the scale of effect (impact magnitude) and the sensitivity of the affected receptor. As such, the significance

criteria of human health effects have been assessed based on the expert judgment and professional experience of the authors, and relies on the following considerations:

- Sensitivity of receptors: specific values in terms of sensitivity are not attributed to human health receptors due to their diverse nature and scale; however, the assessment takes account of the qualitative (rather than quantitative) sensitivity of relevant populations and sub-populations and their ability to respond to change; and
- Magnitude of impact: this entails consideration of the size of the impact on people or receptors in the context of the area in which impacts will be experienced.

22.3.15 The following criteria have been set to assess the effects on human health receptors. Table 22-1 identifies the sensitivity criteria that have been used.

Table 22-1: Sensitivity Criteria

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

Source: IEMA (2022a). Determining Significance for Human Health in Environmental Impact Assessment.

22.3.16 Table 22-2 identifies the magnitude of impact criteria which have been used.

Table 22-2: Magnitude Criteria

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

Source: IEMA (2022a). Determining Significance for Human Health in Environmental Impact Assessment.

22.3.17 Human health effects, both beneficial or adverse, reflect the relationship between the sensitivity of the affected receptor (Table 22-1) and the magnitude of the impact (Table 22-2) in accordance with Table 22-3.

Table 22-3: Classification of Effect Matrix

		SENSITIVITY			
		HIGH	MEDIUM	LOW	VERY LOW
MAGNITUDE	HIGH	Major	Major/ Moderate	Moderate/ Minor	Minor/ Negligible
	MEDIUM	Major/ Moderate	Moderate	Minor	Minor/ Negligible
	LOW	Moderate/ Minor	Minor	Minor	Negligible
	NEGLIGIBLE	Minor/ Negligible	Minor/ Negligible	Negligible	Negligible

Source: IEMA (2022a). Determining Significance for Human Health in Environmental Impact Assessment.

22.3.18 In accordance with the methodology set out in IEMA guidance (IEMA, 2022a) and Chapter 2: Assessment Methodology (ES Volume I, EN070009/APP/6.2), Major and Moderate effects are classed as Significant, whilst Minor and Negligible effects are classed as Not Significant.

Cumulative Human Health Effects

22.3.19 An assessment of cumulative human health effects has been undertaken and is detailed within Chapter 23: Cumulative and Combined Effects (ES Volume I, EN070009/APP/6.2).

22.3.20 The assessment of cumulative effects follows the methodology described in Advice Note Seventeen (The Inspectorate, 2019a), for more information refer to Chapter 23: Cumulative and Combined Effects (ES Volume I, EN070009/APP/6.2).

Sources of Information / Data

22.3.21 The following sources of information have been reviewed and have informed the assessment:

- Census 2021 (ONS, 2022a);
- Claimant Count (ONS, 2022b);
- Population Estimates (ONS, 2022c);
- Indices of Multiple Deprivation 2019 (MHCLG, 2019);
- Local Health Profiles (PHE, 2022);
- The Electric and Magnetic Fields and Health website (EMFS.info, 2024); and
- The International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines (ICNIRP, 2020).
- Field survey data underpinning the assessments in Chapter 8: Air Quality, Chapter 11: Noise and Vibration, Chapter 15: Traffic and Transport, Chapter 18: Socio-economics and Land Use, Chapter 19: Climate Change, and Chapter 20: Major Accidents and Disasters (ES Volume I, EN070009/APP/6.2).

Consultation

Scoping Opinion

22.3.22 An EIA Scoping Opinion was requested from the Inspectorate on 6 April 2023. A response was received on 17 May 2023. For the Scoping Opinion and the Applicant's responses to them, refer to Appendix 1E (ES Volume III, EN070009/APP/6.4).

Statutory Consultation

22.3.23 The PEI Report was published for consultation on 14 September 2023 and the consultation period ended on 26 October 2023. For full consultation responses and the Applicant's responses to them, refer to the Consultation Report (EN070009/APP/5.1).

Use of the Rochdale Envelope

22.3.24 To ensure a robust assessment of the likely significance of the environmental and social effects of the Proposed Development, the EIA is being undertaken adopting the principles of the 'Rochdale Envelope' approach where appropriate in line with the Planning Inspectorate's ('the Inspectorate's') Advice Note 9 (The Inspectorate, 2018).

22.3.25 In this chapter, the maximum scenario will be assessed for impacts on open space, transport, housing, access to healthcare services, air quality, noise, and radiation, as these are envisioned to be adverse impacts. In contrast, minimum parameters for impacts on other receptors such as employment and training will be assessed, whereby the worst-case scenario is considered as the effect of the Proposed Development is expected to be a beneficial impact.

22.3.26 Due to construction phasing, there may be a period following opening of Phase 1 where Phase 1 will be operational and Phase 2 in construction. Within the framework of this chapter's assessment, the worst-case scenario for construction and operation concurrently has been defined and assessed, resulting in Phase 1 being considered a more robust (worst-case) construction stage evaluation. This conclusion is drawn from the increased construction activity in Phase 1 compared to a combined assessment involving Phase 1 operational and Phase 2 construction. The operational stage worst case commences on completion of Phase 2.

22.3.27 Given the above, this assessment presents a reasonable worst-case approach.

Assumptions and Limitations

Assumptions

22.3.28 It is assumed that all electrical and control system cables will be installed below ground or at ground level with no new overhead transmission lines proposed. No electrical cables will be installed near to residential properties, as can be seen on the Works Plans (EN070009/APP/2.4).

Limitations

22.3.29 The assessment of the significance of effects has been carried out against a benchmark of current human health baseline conditions in the vicinity of the Proposed Development Site, as far as is possible within the limitations of such a dataset. Baseline data is also subject to a time lag between collection and publication. As with any dataset, these conditions may be subject to change over time which may influence the findings of the assessment.

22.3.30 The assessment of likely health effects arising from the Proposed Development is based on professional judgement, drawing on relevant guidance as set out in Section 22.2.

22.3.31 Effects on human health draw upon other ES chapters, namely Chapter 8: Air Quality, Chapter 11: Noise and Vibration, Chapter 15: Traffic and Transport, Chapter 18: Socio-economics and Land Use, Chapter 19: Climate Change, and Chapter 20: Major Accidents and Disasters (ES Volume I, EN070009/APP/6.2). Relevant

assumptions and limitations are set out in the respective chapters and as such are not repeated here.

22.4 Baseline Conditions

Existing Baseline

22.4.1 This section describes the baseline characteristics for the Proposed Development Site and the defined study area, with specific reference to human health.

22.4.2 Firstly, a demographic and health profile of the local population is set out. Secondly, existing local infrastructure relevant to the health assessment is summarised; this draws largely on Chapter 18: Socio-economics and Land Use (ES Volume I, EN070009/APP/6.2) and also includes health provision.

Demographic Profile

Age

22.4.3 According to the most recent Census (ONS, 2022a), the total population of the Study Area in 2021 was 43,145. Within this population, the proportion of working age residents (aged 16 to 64) was 59.8%, slightly lower than in the North East (61.9%) and England as a whole (63.0%). The study area has a slightly higher proportion of children (20.4%) compared to regional (17.7%) and national (18.6%) levels. However, the share of residents aged 65 and over in the study area (19.8%) is broadly in line with the comparator geographies (20.4%, and 18.4%). This is illustrated in Plate 22-1.

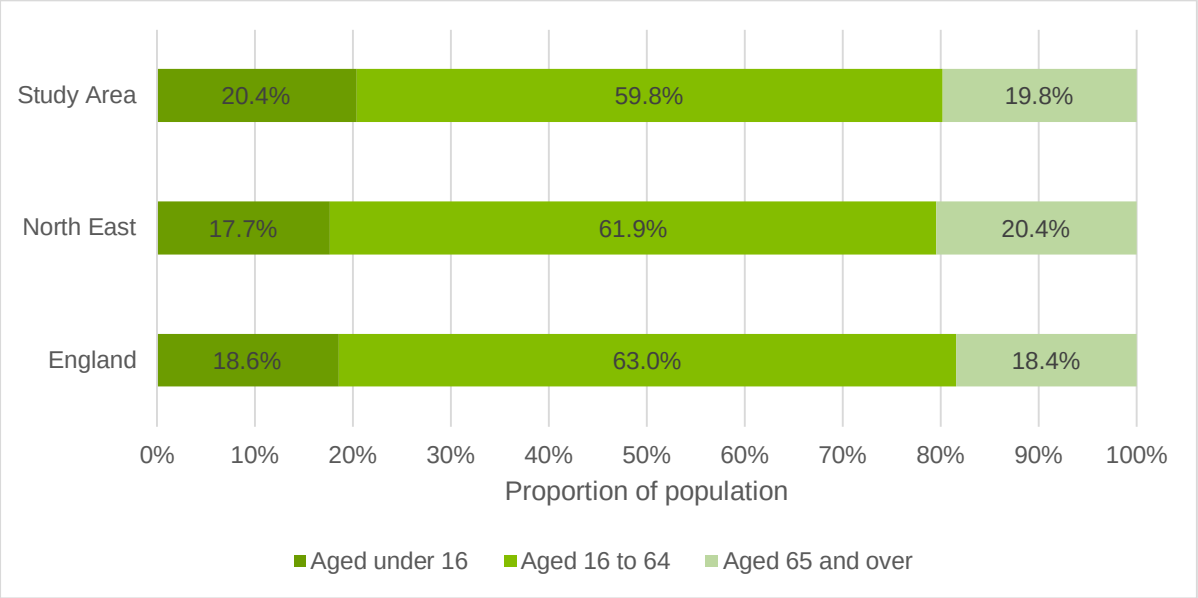

Plate 22-1: Age Breakdown (%) for the Study Area, North East Region and England

Ethnic Group

22.4.4 With regards to ethnic group, Table 22-4 shows that 96.9% of residents in the study area are White, a higher proportion than the North East (93.0%), and considerably higher than in England (81.0%) (ONS, 2022a). There is also a lower proportion of all

ethnic minority groups in the study area compared to regional and national figures. For example, 1.5% of residents in the study area are within the Asian, Asian British, or Asian Welsh group, compared to 3.7% in the North East, and 9.6% in England. People from minority ethnic groups may have a higher sensitivity to health effects arising from changes to social cohesion.

Table 22-4: Ethnic Group Breakdown (%) for the Study Area, North East Region and England

ETHNIC GROUP (%)	STUDY AREA	NORTH EAST	ENGLAND
Asian, Asian British or Asian Welsh	1.5	3.7	9.6
Black, Black British, Black Welsh, Caribbean or African	0.3	1.0	4.2
Mixed or Multiple ethnic groups	0.8	1.3	3.0
White	96.9	93.9	81.0
Other ethnic group	0.5	1.0	2.2

Education

22.4.5 In 2021, the proportion of residents aged 16 or over who had gained a level 4 qualification (degree-level or equivalent) or above in the study area was 21.6% (ONS, 2022a). This was lower than the proportion seen in the North East (28.6%) and particularly lower than the average for England (33.9%). In addition, 24.7% of residents in the study area have no qualifications, a higher rate than in the North East (20.3%) and nationally (18.1%).

Economic Activity

22.4.6 According to the Census (ONS, 2022a), in 2021 the economic activity rate (amongst 16-to-64-year-olds) was 54.5% in the study area, similar to the rate in the North East (55.9%), but slightly lower than that across England as a whole (60.9%).

22.4.7 Claimant count data measures of the number of people claiming benefits principally for the reason of being unemployed. In January 2023, the claimant count for residents (as a proportion of residents aged 16 to 64) in the study area was 5.5%, higher than the rates in the North East (4.2%) and across England (3.7%) (ONS, 2022b).

Income

22.4.8 Gross Disposable Household Income (GDHI) is the amount of money that individuals in the household sector can spend or save after income distribution measures. Data at ward level is unavailable for GDHI and so, data for the local authorities of Hartlepool, Redcar and Cleveland, and Stockton-on-Tees have been used to inform the baseline for this indicator. GDHI in the study area in 2020 was £17,205, in line with the average for the North East (£17,416) but lower than the national average (£21,962) (ONS, 2023). This is illustrated in Plate 22-2.

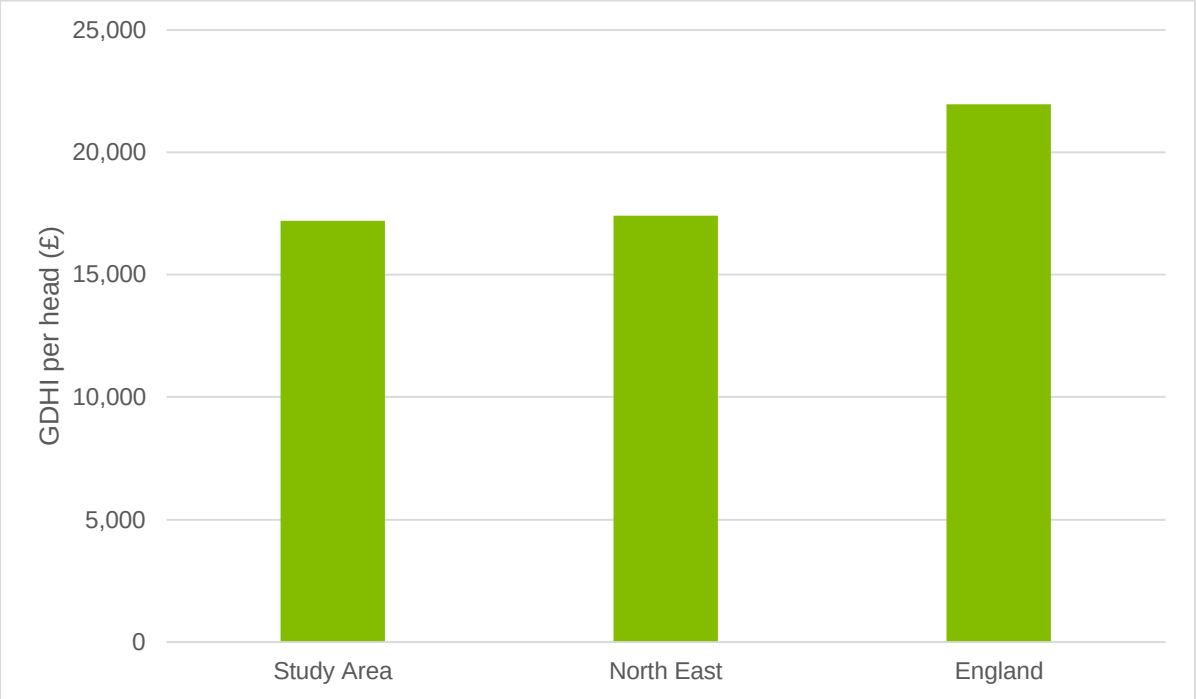

Plate 22-2: Gross Disposable Household Income (GDHI) per head (£) for the Study Area, North East Region and England

Deprivation

22.4.9 The 2019 Indices of Deprivation (IoD) (MHCLG, 2019) provide a set of relative measures of deprivation for local authorities across England. Ward level data is not available within this dataset and therefore, the local authorities of Hartlepool, Redcar and Cleveland, and Stockton-on-Tees have again been used to inform the baseline for this indicator.

22.4.10 In terms of overall deprivation (multiple deprivation), Hartlepool is the 25th most deprived, Redcar and Cleveland is the 62nd most deprived, and Stockton-on-Tees is the 113th most deprived local authority in England (where 1st is most deprived). This places all of these local authorities within the top 40% most deprived in the country.

22.4.11 The IoD also assess health deprivation as a domain. This domain measures the risk of premature death and the impairment of quality of life through poor physical or mental health. In regard to this, Hartlepool is the 21st most deprived, Redcar and Cleveland is the 26th most deprived, and Stockton-on-Tees is the 48th most deprived local authority in England. This places each local authority within the top 20% most health deprived in the country.

22.4.12 Furthermore, the IoD contains data relating to barriers to housing and services as a domain. This measures the physical and financial accessibility of housing and local services. Hartlepool is the 284th most deprived, Redcar and Cleveland is the 283rd most deprived, and Stockton-on-Tees is the 286th most deprived local authority. This means that each local authority is within the top 15% least deprived in England in regard to this domain.

22.4.13 More granular deprivation data is available at the Lower layer Super Output Area (LSOA) level[1]. Of the LSOAs that are located within the seven wards of the Study Area, 43% are within the top 10% most deprived nationally (for overall deprivation), representing a high level of deprivation in the Study Area.

Community Cohesion

22.4.14 According to the Community Life Survey (Department for Digital, Culture, Media and Sport, 2020), in the North East (the most granular level of data) 69% of respondents felt like they belonged strongly or fairly strongly to their immediate neighbourhood. This is higher than the average for England (63%).

Health Profile

22.4.15 This section provides a human health profile of the study area, focusing on key determinants of health relevant to the assessment criteria. This local health baseline has been used to assess the potential health effects of the Proposed Development.

General Health

22.4.16 As part of the Census (ONS, 2022a), respondents are asked to self-assess the state of their health, both physical and mental. Data for this shows that 76.0% of residents in the study area believed that they were living in 'good' or 'very good' health, a similar proportion to that in the North East (78.0%), but slightly lower than in England (82.8%). Further, 7.8% of the population in the study area rated their health as 'bad' or 'very bad', again similar to that in the North East (7.8%) but higher than nationally (5.2%). This is illustrated in Plate 22-3.

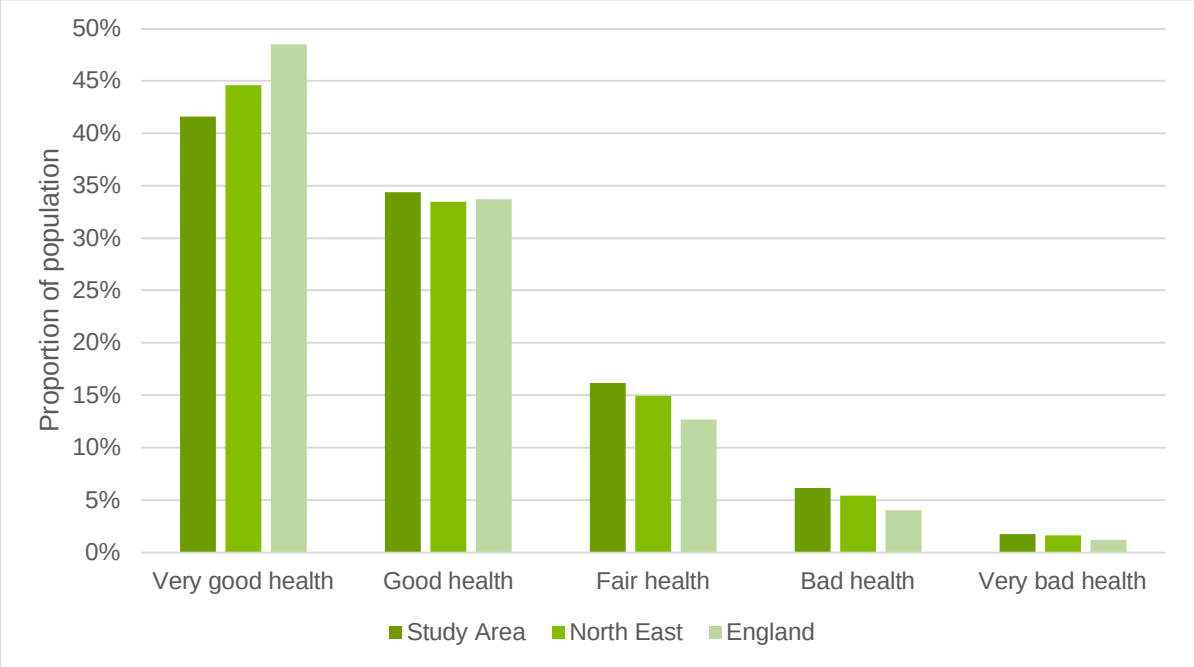

Plate 22-3: Self-Assessed Health for the Study Area, North East Region and England

[1] LSOAs are ONS-defined small geographic areas across England designed to allow data reporting across small areas. Each LSOA in England is of a similar population size, with an average of 1,500 residents of 650 households.

Mental Health

22.4.17 Mental health and well-being profiles produced by PHE (PHE, 2022) provide a summary of the mental health of people within local authority areas and a comparison of local mental health with average values for all areas of England. The most recent data published is from 2017 and is detailed in Table 22-5. Data at ward level is unavailable for this indicator and so, the local authorities of Hartlepool, Redcar and Cleveland, and Stockton-on-Tees have been used to inform the baseline for this indicator.

22.4.18 Table 22-5 shows that the prevalence of mental health problems in the study area is higher than the average for both the North East and England (PHE, 2022).

Table 22-5: Mental Health Disorder Prevalence in the Study Area, North East Region and England

LOCAL AUTHORITY	PEOPLE ESTIMATED TO HAVE ANY COMMON MENTAL HEALTH DISORDER (%)
Study Area	18.1
North East	16.9
England	16.9

22.4.19 Engagement with Public Health South Tees (covering Redcar and Cleveland district) also provided an insight into more localised mental health data. Data produced by North of England Commissioning Support Unit Business Intelligence Team (NECS, 2024) shows that in the prevalence of people estimated to have a common mental health disorder in Dormanstown is 17.5 per 1,000 people, in Grangetown is 14.4, and in South Bank is 9.5. These figures are in line with or below the averages shown in Table 22-5.

Disability

22.4.20 The Census (ONS, 2022a) in Table 22-6 contains information relating to disability is. In 2021, 22.6% of residents in the study area were classed as disabled under the Equality Act 2010 (HM Government, 2010), a similar proportion to that in the North East (21.4%), and higher than that in England as a whole (17.3%). 11.1% of residents believed that their day-to-day activities were limited a lot, a higher rate than regionally (9.9%) and nationally (7.3%).

Table 22-6: Disability Information for the Study Area, North East Region and England

	STUDY AREA	NORTH EAST	ENGLAND
Disabled under the Equality Act (%)	22.6	21.4	17.3
Disabled under the Equality Act: Day-to-day activities limited a lot (%)	11.1	9.9	7.3

	STUDY AREA	NORTH EAST	ENGLAND
Disabled under the Equality Act: Day-to-day activities limited a little (%)	11.5	11.5	10.0
Not disabled under the Equality Act (%)	77.4	78.6	82.7
Not disabled under the Equality Act: Has long term physical or mental health condition but day-to-day activities are not limited (%)	6.3	7.1	6.8
Not disabled under the Equality Act: No long term physical or mental health conditions (%)	71.1	71.5	75.9

Wider Determinants of Health

22.4.21 Wider determinants of health can also be insightful in building the health profile of an area. The following indicators are also compared to regional and national figures to illustrate how the study area performs:

22.4.22 Life expectancy: Between 2016 and 2020, the average life expectancy at birth in the study area for females was 80.2 years and for males it was 76.2. This was slightly lower than life expectancy in the North East (81.5 and 77.6) and lower than in England (83.2 and 79.5 respectively) (PHE, 2022).

22.4.23 Childhood obesity: The average proportion of children in reception school year who were obese in the study area in 2021 was 12.4%. This was slightly higher than the proportions in the North East (11.4%) and England (9.9%) (PHE, 2022).

22.4.24 Smoking prevalence: In the study area, an average of 14.4% of adults were regular smokers in 2021, compared to 14.8% in the North East, and 13.0% for England as a whole (PHE, 2022).

22.4.25 Mortality rate from Chronic Obstructive Pulmonary Disease (COPD)[2]: In 2019, the mortality rate was on average 73.3 per 1,000 people, higher than the rate for the North East (54.8) England as a whole (52.8) (PHE, 2022).

22.4.26 Physically inactive adults (as defined by Sport England, 2023)[3]: On average, 29.2% of adults in the study area were 'physically inactive' in 2021. This was a higher proportion than in the North East (25.0%) and across England (23.4%) (PHE, 2022).

Healthcare Facilities

22.4.27 The nearest hospital (with an accident and emergency department) to the Proposed Development Site is James Cook University Hospital, located approximately 5 km south of the Proposed Development Site.

[2] Please note that ward level data is not available for this indicator. The study area has been formed of Hartlepool, Redcar and Cleveland, and Stockton-on-Tees.
[3] Physical inactivity is defined as engaging in less than 30 minutes of physical activity per week in the Active Lives Adult Survey.

22.4.28 There are six GP surgeries within 2 km of the Proposed Development Site, the majority of which are located in Middlesbrough and Redcar and are detailed in Table 22-7.

Table 22-7: General Practice (GP) Surgeries within 2 km of the Proposed Development Site

GP SURGERY	DISTANCE FROM THE PROPOSED DEVELOPMENT SITE (APPROX. km)
The Eston Surgery	1.6
South Grange Medical Centre	1.6
Normanby Medical Centre	1.6
Kingsway Medical Centre	1.7
Bentley Medical Practice	1.9
The Green House Surgery	2.0

22.4.29 The latest GP data published by NHS Digital (NHS Digital, 2024) indicates that the total patients registered at the GP surgeries in Table 22-7 was 71,103 in November 2023. Across these GP surgeries, there were 39 GPs working, averaging at 1,823 patients per GP, which is in line with the Royal College of General Practitioners target of 1,800 patients per GP.

Social Infrastructure

22.4.30 Chapter 18: Socio-economics and Land Use (ES Volume I, EN070009/APP/6.2) details the educational facilities located in close proximity of the Proposed Development Site (refer to Section 18.4 therein). These are clustered in Redcar, Middlesbrough, Billingham, and Stockton-on-Tees.

22.4.31 Police stations in the vicinity of the Proposed Development Site include:

22.4.32 Cleveland Police Redcar, located approximately 0.8 km east of the Proposed Development Site;

22.4.33 Cleveland Police South Bank Station, located approximately 1.5 km south-west of the Proposed Development Site;

22.4.34 Cleveland Police Redcar Town Station, located approximately 2.5 km east of the Proposed Development Site; and

22.4.35 Cleveland Police Middlesbrough HQ located approximately 2.9 km south of the Proposed Development Site.

22.4.36 There is one fire station located adjacent to the Proposed Development Site Boundary, namely Billingham Community Fire Station. Grangetown Community Fire Station is located approximately 1 km south-east of the Proposed Development Site, whilst Redcar Community Fire Station is located approximately 1.1 km east of the Proposed Development Site, with Cleveland Fire Brigade Headquarters located approximately 1.5 km north-west of the Proposed Development Site.

Community and Recreational Facilities

22.4.37 There is a range of community and recreational facilities located in proximity to the Proposed Development Site, including churches, open spaces, public houses and hotels. These are detailed in Chapter 18: Socio-economics and Land Use (ES Volume I, EN070009/APP/6.2).

Public Rights of Way

22.4.38 Information relating to ProWs located within the vicinity of the Proposed Development Site can be found in Chapter 18: Socio-economics and Land Use (ES Volume I, EN070009/APP/6.2).

Future Baseline

Age

22.4.39 According to ONS population projections (ONS, 2022c), the study area[4] is projected to experience a slight net age increase of 0.08% between 2021 and 2041 – refer to Table 22-8. Proportional losses are expected within the 0-15 age group, whilst the elderly population is expected to grow. These trends reflect both regional and national projections for which the total populations are likely to experience a slight net age increase, with decreases in younger populations and increases in the 65 and over category.

[4] Please note that the study area for population projections is made up of the local authorities of Hartlepool; Redcar and Cleveland; and Stockton-on-Tees due to small area data being unavailable.

Table 22-8: Population Projections in the Study Area, North East Region, and England

GEOGRAPHY	AGE GROUP	2021	2026	2031	2036	2041	COMPOUND ANNUAL GROWTH RATE (%)
STUDY AREA	All ages	430,610	433,983	435,171	435,894	437,074	0.08
	Aged 0 to 15	82,475	79,073	74,041	72,032	72,546	-0.67
	Aged 16-64	259,969	257,848	253,675	249,439	248,799	-0.23
	Aged 65+	88,167	97,065	107,459	114,421	115,727	1.44
NORTH EAST	All ages	2,681,149	2,709,320	2,731,853	2,747,811	2,761,406	0.16
	Aged 0 to 15	478,426	464,573	444,960	438,689	444,895	-0.38
	Aged 16-64	1,655,303	1,644,688	1,627,470	1,609,950	1,610,401	-0.14
	Aged 65+	547,424	600,060	659,431	699,167	706,105	1.35
ENGLAND	All ages	56,989,572	58,297,239	59,389,107	60,377,811	61,353,966	0.39
	Aged 0 to 15	10,913,822	10,739,627	10,387,050	10,307,811	10,524,366	-0.19
	Aged 16-64	35,406,739	35,880,054	36,056,306	36,052,368	36,228,027	0.12
	Aged 65+	10,668,992	11,677,597	12,945,733	14,017,594	14,601,606	1.67

22.5 Proposed Development Design and Impact Avoidance

22.5.1 The EIA process aims to avoid, prevent, reduce or offset potential environmental and social effects through design and / or management measures. These are measures that are inherent in the design and construction of the Proposed Development (also known as 'embedded measures').

22.5.2 The following impact avoidance measures have either been incorporated into the design or are standard construction or operational practices. These measures have, therefore, been taken into account during the impact assessment and will be secured through the draft DCO.

Construction

22.5.3 The Framework Construction Environmental Management Plan (CEMP) (EN070009/APP/5.12) sets out the key measures to be employed during the construction of the Proposed Development, to control and minimise the impacts on the environment. The CEMP will set out how impacts upon human health will be managed during construction. A Final CEMP(s) will be prepared by the EPC Contractor(s) in accordance with the Framework CEMP prior to construction. The submission, approval, and implementation of the Final CEMP(s) is secured by a Requirement of the Draft DCO (EN070009/APP/4.1).

22.5.4 In particular, during the detailed design of works for the Electrical Connection Corridor, potential electromagnetic interference effects would be identified and mitigated though the application of electromagnetic compatibility industry accepted practice. In accordance with good safety management principles, risks due to EMF from relevant sources including the substation and electrical connections will be reduced using the 'as low as reasonably practicable' (ALARP) principle.

22.5.5 Measures for the protection of workers from potential EMF effects will therefore include engineering and administrative controls, personal protection programmes, and medical surveillance in accordance with the relevant legislation and guidance. In particular, appropriate protective measures will be implemented if exposure in the workplace is predicted to result in the basic restrictions set out within International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines (ICNIRP, 1988) being exceeded.

Operation

22.5.6 The human health assessment assumes that the Hydrogen Production Facility will require an Environmental Permit and will comply with this under the Environmental Permitting (England and Wales) Regulations 2016 (HM Government, 2016). In addition, the Proposed Development will be operated in line with appropriate standards, whilst the operator will implement and maintain an Environment Management System (EMS) which will attested to International Standards Organisation (ISO) 14001 (ISO, 2015). The EMS will outline requirements and procedures required to ensure that the Proposed Development Site is operating to the appropriate standard.

Decommissioning

22.5.7 A Decommissioning Plan Environmental Management Plan (DEMP) would be produced pursuant to a DCO Requirement. The DEMP would consider in detail all potential environmental and social risks on the Proposed Development Site and contain guidance on how risks can be removed or mitigated. This will include details of how surface water drainage should be managed during decommissioning and demolition. The DEMP would be secured by a Requirement of the Draft DCO (EN070009/APP/4.1), if granted. The DEMP would also include an outline programme of works.

22.6 Impacts and Likely Significant Effects

22.6.1 This section sets out the potential health and wellbeing impacts associated with the Proposed Development during its construction, operation and decommissioning. These effects are described in accordance with the methodology as set out in Section 22.3.

Construction

22.6.2 Construction of the Proposed Development is anticipated to commence in Q3 2025 and be split into two phases. Phase 1 will last no more than approximately three years, and Phase 2 will commence thereafter, lasting approximately three years, with overall construction expected to be completed by 2030. For the purposes of this assessment, Phase 1 is considered a more robust (worst-case) construction stage evaluation. This conclusion is drawn from the increased construction activity in Phase 1 compared to a combined assessment involving Phase 1 operational and Phase 2 construction. The operational stage worst case commences on completion of Phase 2.

Risk Taking Behaviour

22.6.3 Construction activity has the potential to lead to risk taking behaviour by its workforce. It is expected that the construction workforce will be employed by contractors who hold high health and safety standards which employees are required to follow. Therefore, the sensitivity of these receptors is assessed to be Low.

22.6.4 As detailed in Section 22.5, the construction works would be undertaken in accordance with the Final CEMP(s) which will set out how construction activities will be managed and controlled in compliance with accredited health and safety and environmental management systems, relevant legislation and environmental permits, consents and licences. In addition, Chapter 20: Major Accidents and Disasters (ES Volume I, EN070009/APP/6.2) assesses various risk events such as ground instability, structural collapse, domino effect, utility strike, and road traffic accident, which could have impacts to human health. It finds that mitigation measures such as ground investigation and adherence to the Final CEMP(s) will reduce any residual risks to Tolerable or Tolerable if ALARP. Therefore, the magnitude of impact for risk taking behaviour by the workforce is assessed as Low.

22.6.5 Overall, the likely effect on human health arising from impacts on risk taking behaviour during the Proposed Development construction phase is assessed as Minor Adverse (Not Significant).

Open Space, Leisure and Play

22.6.6 The population of the study area contains a high proportion of children, and a higher-than-average proportion of 'physically inactive' adults. These groups may be more sensitive to changes to open space and therefore, sensitivity of the local population is assessed to be Medium.

22.6.7 As discussed in Chapter 18: Socio-economics and Land Use (ES Volume I, EN070009/APP/6.2), construction of the Proposed Development has the potential to result in temporary and permanent loss of open space. With regard to PRoWs, two PRoWs within Cowpen Bewley Woodland Park will close temporarily during construction. However, the nature of the works will be short term, and the affected PRoWs will not be closed concurrently to allow for a route of access for users within the Park.

22.6.8 One PRoW (England Coast Path) will also be temporarily closed at two different points during construction. Each closure will be for six months. In addition, another PRoW (Teesdale Way LDR) will also be closed for a period of six months.

22.6.9 In addition, a temporary loss of land at Coatham Marsh nature reserve (which is also used as open space) will be required during the construction phase whilst a water connection is being built. The temporary loss will be 37,531m2, equating to 5.8% of the reserve but the loss of land does not interfere with key characteristics or activities within the nature reserve such as local walkways.

22.6.10 A permanent loss of open space is also expected, with the loss of 18,615m2 at Cowpen Bewley Woodland Park due to the installation of the Above Ground Infrastructure (AGI) and associated pipeline. The loss of open space represents approximately 6.2% of the Country Park. Whilst this will constitute a permanent loss of open space, it will not interfere with key characteristics or activities of the park such as the Wildlife Lake or local walkways and there are also no activities formally held on the impacted section of the park. Given the construction works, there could be some potential disruption to users of the park, although no significant effects to users of Cowpen Bewley Woodland Park have been identified from a landscape and visual, air quality, or noise perspective. . Therefore, the magnitude of impact on Open Space, Leisure and Play from a human health perspective is assessed to be Medium.

22.6.11 Overall, the effect of the Proposed Development on open space, leisure, and play from a human health perspective is assessed to be Moderate Adverse (Significant) given the temporary and permanent loss of open space and temporary loss of ProW.

Transport Modes, Access, and Connections

22.6.12 An assessment of transport impacts during the Proposed Development's construction phase is provided in Chapter 15: Traffic and Transport (ES Volume I, EN070009/APP/6.2).

22.6.13 The Proposed Development has the potential to impact access to healthcare services, educational facilities and other social infrastructure if traffic were to increase due to construction. As noted in the baseline conditions section (section 22.4.28), there are six GP surgeries and multiple schools and community facilities in proximity to the Proposed Development Site. In addition, the study area presents lower than average rates of good health and educational attainment levels. Therefore, the local population may be more reliant on access to these services. Due to this, sensitivity is assessed as Medium.

22.6.14 As noted in Chapter 15: Traffic and Transport (ES Volume I, EN070009/APP/6.2), additional traffic predicted to be generated by the construction activities associated with the Proposed Development (both the Main Site and the Connection Corridors) will result in small, temporary increases of traffic flows which are unlikely to affect access to services and social infrastructure. In addition, a number of traffic management measures will be implemented during construction of the Proposed Development to minimise traffic impacts upon the local road network. These are set out in the Framework Construction Traffic Management Plan (EN070009/APP/5.16) and include a HGV routing plan, use of standard construction hours, and provision of 24-hour contact details for road users to find out further information. Therefore, the magnitude of impact is assessed as Low.

22.6.15 Therefore, the overall likely effect on human health arising from impacts on transport modes, access and connections during the Proposed Development construction phase is assessed to be Minor Adverse (Not Significant).

Community Safety

22.6.16 Following Statutory Consultation, it was suggested by stakeholders that the Proposed Development could impact mental health through real and perceived safety risks posed by the Proposed Development such as the manufacture, storage and transportation of H2 and other hazardous substances.

22.6.17 In regard to mental health, Section 22.4 finds that the proportion of people estimated to have a common mental health concern is slightly higher in the study area than across the region and country. Therefore, the sensitivity of the population to actual or perceived community safety effects is considered to be Medium.

22.6.18 As noted in Chapter 20: Major Accidents and Disasters (ES Volume I, EN070009/APP/6.2), the use of suitably experienced contractors, risk assessments, working method statements, operating procedures and personnel training will minimise the risk of accidental scenarios occurring during Proposed Development construction. A Framework CEMP has been prepared to accompany the ES submitted with the DCO Application (EN070009/APP/5.12). This will set out how construction activities will be managed and controlled in compliance with accredited health and safety and environmental management systems, relevant legislation and environmental permits, consents and licences. This document will be available to the public meaning that those that have concerns will be able to access information regarding risks posed by construction of the Proposed Development and how the Applicant has reduced these as low as practicably

possible. The setting for the majority of construction activity is an area that is already heavily industrialised. In addition, the Framework CEMP (EN070009/APP/5.12) outlines that the Applicant will conduct a public awareness campaign prior to the construction of the Proposed Development to increase knowledge of the associated safety risks and how these will be managed effectively. Therefore, the magnitude of community safety impacts in terms of risk perception and understanding is assessed to be Low.

22.6.19 Overall, the likely effect on community safety arising from real and perceived risks during construction is assessed to be Minor Adverse (Not Significant).

Community Identity, Culture, Resilience and Influence

22.6.20 Baseline data shows that a higher proportion of people in the North East feel like they belong strongly or fairly strongly to their immediate neighbourhood, compared to the proportion in England (Department for Digital, Culture, Media and Sport, 2020). This suggests a stronger than average sense of community in the area, compared to the rest of the country. Due to this, the sensitivity of the local population in relation to community identity, culture, resilience, and influence is assessed as High.

22.6.21 Through the Proposed Development, the Applicant aims to support local people and help to reverse the impact of recent industrial closures in the region. The Applicant is actively collaborating with local authorities, charities, educational institutions and industry bodies to support community development in Teesside with a focus on skills and education (bp, 2023). The Applicant is also currently working with local authorities and educators to support social mobility and enable a just transition that engages the local community and the DCO requires a skills and employment strategy to be developed post-consent.

22.6.22 However, it is recognised that communities around the Proposed Development Site could be affected if construction activities impact on the character of their towns and villages. As assessed under 'Open Space, Leisure and Play', some temporary disruption to PRoWs is expected, while a temporary closure of a section of Coatham Marsh nature reserve and permanent closure of a section of Cowpen Bewley Woodland Park are expected. From a noise and vibration and air quality perspective (see Chapter 11: Noise and Vibration, and Chapter 8: Air Quality (ES Volume I, EN070009/APP/6.2)), no significant effects are likely to be experienced by the local communities such as those arising from construction noise and dust impacts.

22.6.23 The magnitude of impact is assessed as Low. This grading considers the benefits to local people provided by the Proposed Development and the potential disruption they may face.

22.6.24 The overall likely effect on human health arising from impacts on community identity, culture, resilience and influence during the Proposed Development construction phase is assessed to be Minor Adverse (Not Significant).

Social Participation, Interaction and Support

22.6.25 The sensitivity of the local population in relation to social participation, interaction and support is assessed as High due to the stronger than average sense of community in the Study Area (22.4.14).

22.6.26 Roads bordering the Proposed Development Site may be used by construction traffic which could impact on travel between settlements and cause community severance. Severance could affect access to community and social facilities, and also make it unsafe for people to travel between neighbouring communities due to having to navigate crossing busier roads. However, as discussed in Chapter 15: Traffic and Transport (ES Volume I, EN070009/APP/6.2), changes in traffic during construction would be limited and severance impacts on all links are unlikely. Therefore, the magnitude of impact on this determinant of human health is assessed as Negligible.

22.6.27 The overall likely effect on human health arising from impacts on social participation, interaction and support during the Proposed Development construction phase is assessed to be Minor Adverse (Not Significant).

Employment and Income

22.6.28 An assessment of the number of jobs created during the Proposed Development's construction phase is provided in Chapter 18: Socio-economics and Land Use (ES Volume I, EN070009/APP/6.2). It is estimated that the Proposed Development will support a minimum of 800 full-time employment construction jobs per annum5 (although this could rise up to 1300 workers during peak periods). Once leakage, displacement and multiplier effects have been accounted for, this results in a net total of 780 jobs during the construction phase, 585 of which are expected to be taken up by residents within the Travel to Work Area (TTWA). This will also generate approximately £38.1m Gross Value Added (GVA) per annum during the construction phase, of which £28.6m will be generated within the TTWA.

22.6.29 There is evidence that employment matters to health, not only from an economic standpoint, but also in terms of quality of life (PHE, 2019). Good quality work protects against social exclusion through the provision of income, social interaction, a core role and identity and purpose. Therefore, the generation of jobs is assessed to be a beneficial outcome.

22.6.30 In line with Chapter 18, the sensitivity of the local workforce to employment and income changes has been assessed as High, due to the higher-than-average claimant count and lower-than-average GDHI in the area.

22.6.31 The jobs arising from the construction phase of the Proposed Development will be temporary, over the five-year construction period. This will represent local job growth (creating an estimated 585 jobs for workers living with a 60-minute drive time in a worst-case scenario), although the overall change will be small in the

[5] As stated in Chapter 5: Construction Programme and Management (ES Volume I, EN070009/APP/6.2), Section 5.3, the number of workers on site during the construction period will go up or down depending on the intensity of construction activity during this time. The peak workforce will range from 800 – 1300 staff during the construction phase.

context of the overall number of jobs available locally. Therefore, the magnitude of impact is assessed to be Low.

22.6.32 Overall, the likely effect on human health arising from impacts on employment and income during the construction phase of the Proposed Development is assessed to be Moderate Beneficial (Significant).

Housing

22.6.33 An increase in the number of workers required during the construction phase could have implications for local housing demand if some workers require temporary accommodation. An assessment of the effect of construction employment on local housing market is provided in Chapter 18: Socio-economics and Land Use (ES Volume I, EN070009/APP/6.2). Using the peak construction employment figure as a worst-case scenario, it finds that up to 317 employees could be sourced from outside of the TTWA and may require temporary accommodation.

22.6.34 To estimate the effect on housing need, Chapter 18 finds that 5% of the private-rented dwellings in the TTWA are likely to be available to rent, translating to 1,575 properties that could potentially be occupied by the worst-case 317 construction workers. In addition, Chapter 18 states that demand from workers is typically also met by bed and breakfast accommodation for shorter stays, providing a further option for accommodating construction worker need. Analysis of the hotel and bed and breakfast accommodation sector is also undertaken, and it is concluded that after typical occupancy, approximately 17% of rooms would be available for construction workers. The chapter concludes that there are no likely significant effects on this basis.

22.6.35 Receptor sensitivity is considered to be Medium, given the capacity of the private-rented housing and tourism sectors to meet the worst-case potential demand for accommodation.

22.6.36 Given the extent of the construction workforce required to temporarily move to the local area and the duration of the construction phase, the magnitude of the impact on local availability is considered to be Low.

22.6.37 Therefore, the likely effect on human health arising from impacts on housing need during the construction phase of the Proposed Development is assessed to be Minor Adverse (Not Significant).

Education and Training

22.6.38 Jobs created by the Proposed Development will be in the low carbon energy sector. As such, they will contribute to the development of skills needed for the UK's transition to net zero. Where possible, there will be a preference for local staffing. The contractor will be required to develop an employment, skills and training plan for local residents as a requirement under the DCO.

22.6.39 Baseline data shows that the population of the study area is generally educated to a lower level than regional and national levels, suggesting a need for local education and training provision. Therefore, sensitivity is assessed as High.

22.6.40 The Applicant is actively collaborating with local authorities, charities, educational institutions and industry bodies to support community development in Teesside with a focus on skills and education.

22.6.41 The Proposed Development will create a number of jobs and training opportunities, with a considerable proportion going to people in the local area, representing a beneficial impact (up to net 780 jobs to be created during construction, of which 585 are expected to go to residents in the TTWA once leakage, displacement and multiplier effects have been accounted for). These will be secured through an employment, and skills plan, the development of which is secured by DCO Requirement.

22.6.42 However, these will be temporary during the construction period. Therefore, the magnitude of impact anticipated with respect to education and training during the construction phase is assessed as Low due to this temporary nature of the jobs.

22.6.43 Overall, the likely effect on human health arising from impacts on education and training during the Proposed Development construction phase is assessed as Minor Beneficial (Not Significant).

Health and Social Care Services

22.6.44 As discussed in Chapter 18: Socio-economics and Land Use (ES Volume I, EN070009/APP/6.2) and Chapter 5: Construction Programme and Management (ES Volume I, EN070009/APP/6.2), the Proposed Development will create a minimum of 800 and a peak of 1,300 gross direct full-time equivalent (FTE) jobs during construction6. These construction workers working on the Proposed Development may place extra demand on health and social care services if they move to the area, or if emergency treatment is required.

22.6.45 Baseline analysis shows that GP practices local to the Proposed Development Site are, on average, operating in line with benchmark patient to GP ratios. The study area also generally experiences low levels of deprivation with respect to the Indices of Multiple Deprivation (IMD) barriers to housing and services domain. Despite this, levels of poor health among the local population are higher than average. Therefore, existing healthcare services and their users have been assessed as Medium sensitivity.

22.6.46 Workers already residing locally will be registered at a local GP and will not therefore place additional demand for services upon local GPs. As assessed in Chapter 18: Socio-economics and Land Use (ES Volume I, EN070009/APP/6.2), it is not expected that many workers will move to live in the immediate area and therefore need to access the surgeries located within 2 km of the Proposed Development Site (Table 22-7). Due to the limited impact expected upon healthcare services, the magnitude of these impacts is assessed to be Low.

[6] The number of workers on site during the construction period will go up or down depending on the intensity of construction activity during this time. On a typical month during the construction phase, the minimum number of workers present on site will be approximately 800 staff. There will be no more than 1,300 workers on site during the construction phase at any given time.

22.6.47 Overall, the likely effect on human health arising from impacts on health and social care services during the Proposed Development construction phase is assessed as Minor Adverse (Not Significant).

Climate Change Mitigation and Adaptation

22.6.48 An assessment of potential climate change effects of the Proposed Development during construction is provided in Chapter 19: Climate Change (ES Volume I, EN070009/APP/6.2).

22.6.49 As discussed in the baseline conditions section, the study area contains a higher-than-average mortality rate from COPD and higher than average proportion of residents who are in poor health generally. COPD can affect breathing and the respiratory system and therefore, the local population may be more susceptible to impacts arising from greenhouse gas (GHG) emissions. As noted in Chapter 19, GHG impacts could include emissions from any fuel consumption for transportation of materials, energy (electricity, fuel etc.) consumption from plant and vehicles, generators on site and construction workers commuting, and emissions from the disposal and treatment of wastewater. These emissions could all contribute to worsened breathing for those with COPD. Consequently, the local population has been assessed as having Medium sensitivity.

22.6.50 As detailed in Chapter 19: Climate Change (ES Volume I, EN070009/APP/6.2), the Proposed Development construction phase will result in some GHG emissions as a result of relevant construction activities such as worker commuting, transport of materials, fuel, and electricity use. However, emissions during construction will be limited such that the magnitude of impact is assessed as Low.

22.6.51 Therefore, the overall likely effect on human health arising from impacts on climate change, mitigation and adaptation during the Proposed Development construction phase is assessed to be Minor Adverse (Not Significant).

Air Quality

22.6.52 An assessment of potential air quality effects during the construction of the Proposed Development is provided in Chapter 8: Air Quality (ES Volume I, EN070009/APP/6.2).

22.6.53 As discussed in the baseline conditions section, the Study Area contains a higher-than-average COPD mortality rate which affects breathing and the respiratory system. Therefore, the sensitivity of the general population is assessed as Medium.

22.6.54 Chapter 8: Air Quality (ES Volume I, EN070009/APP/6.2) assesses the impact of construction dust and construction traffic on air quality. For dust, there could be a short-term adverse (albeit not significant) impact of emissions on human health. The more at-risk human health receptors are residential properties in Dormanstown. However, appropriate mitigation measures for managing these risks are set out in the Framework CEMP (EN070009/APP/5.12). Through the implementation of these measures, dust effects on sensitive receptors are considered to be Not Significant. For traffic, despite there being some sensitive human receptors along roads where construction traffic will be present, the largest

change in traffic flow will occur on an unnamed road that connects the Proposed Development Site with the road network where there are no adjacent human receptors. Therefore, the magnitude of impact from a health perspective will be Low.

22.6.55 Therefore, the overall likely effect on human health arising from impacts on air quality during the Proposed Development construction phase is assessed to be Minor Adverse (Not Significant).

Noise and Vibration

22.6.56 An assessment of potential noise and vibration effects during the construction of the Proposed Development is provided in Chapter 11: Noise and Vibration (ES Volume I, EN070009/APP/6.2).

22.6.57 The IEMA guidance (IEMA, 2022a) states "Areas with a poor health status are typically of higher sensitivity." The study area contains a high proportion of children and proportionally suffers more from poor health than the wider region and country. Therefore, the general population is assessed to have a Medium sensitivity to change given the relationship between poor health and sensitivity to noise and vibration.

22.6.58 Chapter 11: Noise and Vibration (ES Volume I, EN070009/APP/6.2) finds that noise impacts could arise from activities such as construction of the Main Site and the Connection Corridors, and construction traffic. Impacts to receptors depend on severable variables such as the level of noise generated, distance between the receptor and the noise source, and the time of day or night that works are undertaken. However, following the application of embedded mitigation including the application of the Final CEMP(s), these effects will not be significant. Therefore, the magnitude of impact from a health perspective will be Low.

22.6.59 Therefore, the overall likely effect on human health arising from impacts on noise and vibration during the Proposed Development construction phase is assessed to be Minor Adverse (Not Significant) although it is noted that there may be a slightly greater effect on some of the more vulnerable members of the population (children and the elderly) given these groups are likely to be more sensitive to noise and vibration changes.

Radiation – Electromagnetic Fields

22.6.60 Due to the Electrical Connection Corridor, the Proposed Development has the potential to expose local residents to EMF radiation. In addition, as suggested by the IEMA, concerns about actual and perceived exposure to major electrical infrastructure can also lead to mental health impacts (IEMA, 2022b).

22.6.61 The IEMA guidance (IEMA, 2022a) states "Areas with a poor health status are typically of higher sensitivity." In terms of physical health, Section 22.4 illustrates residents in the study area generally suffer from slightly worse health than across England as a whole. Therefore, the sensitivity of the population to change is considered to be Medium given the relationship between poor health and sensitivity to noise and vibration.

22.6.62 It is assumed that whilst the Electrical Connection Corridor is under construction, there will be no EMFs produced by the Proposed Development as it will not be operational. Therefore, the magnitude of impact during the construction phase is Negligible.

22.6.63 Overall, the likely effect on human health arising from potential exposure to EMF during the construction phase is assessed to be Negligible (Not Significant).

Operation

22.6.64 The Phase 1 and Phase 2 Production Facilities will each have a design life of 25 years and both phases will operate at the same time. For the purposes of this assessment, the worst-case scenario has been considered which is the full 25-year operational life of the Proposed Development plus flexibility in case the operational life is longer due to potential changes in market conditions and plant condition.

Risk Taking Behaviour

22.6.65 Once the Proposed Development is operational, it is expected that the workforce required will be much smaller than in the construction phase. It is expected that the operational workforce will be employed with contracts that hold high health and safety standards which employees are required to follow. Therefore, the sensitivity of this receptor is assessed as Very Low.

22.6.66 Chapter 20: Major Accidents and Disasters (ES Volume I, EN070009/APP/6.2) assesses various risk events during the operational phase. It states that the production of a COMAH (Control of Major Accident Hazards) Safety Report and adherence to Pipeline Safety Regulations (HM Government, 1996) will reduce any residual risks to Tolerable or Tolerable if ALARP and so no significant effects are expected during the operational phase of the Proposed Development. Therefore, the magnitude of impact is assessed as Low.

22.6.67 Overall, the effect on human health arising from impacts on risk taking behaviour during the operational phase of the Proposed Development is assessed as Negligible (Not Significant).

Open Space, Leisure and Play

22.6.68 There are no additional impacts on open space, leisure and play identified during the operational phase.

Transport Modes, Access and Connections

22.6.69 An assessment of the risk of transport impacts during the operational phase of the Proposed Development is provided in Chapter 15: Traffic and Transport (ES Volume I, EN070009/APP/6.2).

22.6.70 The Proposed Development has the potential to impact on access to healthcare services, educational facilities, and other social infrastructure. In addition, the study area presents lower than average rates of good health and educational attainment levels. Therefore, the local population may be more reliant on access to these services. Due to this, sensitivity is assessed as Medium.

22.6.71 Chapter 15: Traffic and Transport (ES Volume I, EN070009/APP/6.2) states that the generation of traffic during the operation of the Proposed Development is not considered to be severe and therefore has not been assessed. Therefore, the magnitude of impact is assessed as Negligible.

22.6.72 Overall, the effect on human health arising from impacts on transport modes, access, and connections during the Proposed Development operational phase is assessed to be Negligible (Not Significant).

Community Safety

22.6.73 Following Statutory Consultation, it was suggested by stakeholders that the Proposed Development could impact mental health through real and perceived safety risks posed by the Proposed Development associated with the manufacture, storage and transportation of H2 and other hazardous substances.

22.6.74 In regard to mental health, Section 22.4 finds that the proportion of people estimated to have a common mental health concern is slightly higher in the study area than across the region and country. Therefore, considering mental health, the sensitivity of the population to community safety effects is considered to be Medium.

22.6.75 As noted in Chapter 20: Major Accidents and Disasters (ES Volume I, EN070009/APP/6.2), the Proposed Development is anticipated to be an Upper Tier Control of Major Accident Hazards (COMAH) installation due to the expected inventory of dangerous substances that will be present on-site. This means that the Proposed Development will have to comply with COMAH regulations. The HSE publish public information on establishments subject to COMAH regulations meaning that those that have concerns will be able to access information regarding risks posed by the Proposed Development and how the Applicant has reduced these as low as reasonably practicable. The setting for the majority of the Proposed Development is an area that is already heavily industrialised. In addition, the Applicant will conduct a public awareness campaign prior to the construction of the Proposed Development to increase knowledge of the associated safety risks and how these will be managed effectively. Therefore, the magnitude of mental health impacts through real and perceived risks is assessed to be Low.

22.6.76 Overall, the likely effect on community safety arising from risk perception and understanding during operation is assessed to be Minor Adverse (Not Significant).

Community Identity, Culture, Resilience and Influence

22.6.77 The sensitivity of the local population in relation to community identity, culture, resilience and influence is assessed as High, due to the stronger than average sense of community in the area compared to the rest of the country.

22.6.78 The magnitude of impact is assessed as Low beneficial, due to the commitment of the Applicant to supporting local communities through various activities (bp, 2022a).

22.6.79 Therefore, the overall likely effect on human health arising from impacts on community identity, culture, resilience and influence during the operational phase of the Proposed Development is assessed to be Minor Beneficial (Not Significant).

Social Participation, Interaction and Support

22.6.80 The sensitivity of the local population to changes in social participation, interaction and support is assessed as High, due to the stronger than average sense of community in the Study Area.

22.6.81 As discussed in the sub-section 'Transport modes, Access and Connection' it is expected that the Proposed Development will not affect current access to community assets and meeting places during operation. Therefore, the magnitude of impact is assessed as Negligible.

22.6.82 Overall, the likely effect on human health arising from impacts on social participation, interaction, and support, during the Proposed Development operational phase is assessed to be Negligible (Not Significant).

Employment and Income

22.6.83 As set out in Chapter 18: Socio-economics and Land Use (ES Volume I, EN070009/APP/6.2), operational employment is assessed at a minimum level for both Phases of the Proposed Development. The Proposed Development will generate 60 direct gross jobs, it is assumed that the Proposed Development will support an estimated minimum of 60 full-time employment jobs per annum during the operational phase. Once leakage, displacement and multiplier effects have been accounted for, this results in a net total of 58 jobs during the operational phase, 44 of which are expected to be taken up by residents within the Travel to Work Area (TTWA).

22.6.84 The sensitivity of the local population with respect to employment and income is assessed to be Medium.

22.6.85 Direct jobs created will represent local job growth (a beneficial impact), although the overall change will be small in the context of the total number of jobs available locally. Therefore, the magnitude of impact is assessed as Low.

22.6.86 Overall, the likely effect on human health arising from impacts on employment and income during the Proposed Development operational phase is assessed to be Minor Beneficial (Not Significant).

Housing

22.6.87 An increase in the number of workers required during the operational phase could have implications for local housing demand if some workers require temporary or permanent accommodation. An assessment of the employment effects is provided in Chapter 18: Socio-economics and Land Use (ES Volume I, EN070009/APP/6.2). It states that the peak number of operational workers required on site will be 130 across Phases 1 and 2. Based on professional judgement, the majority of operational workers will be sourced from the local area or eventually relocate to the area given the duration of the Proposed Development. In addition, operational

employment could increase during period of maintenance to around 400 workers. However, this will be infrequent and will be managed through the adoption of a planned routine turnaround (TAR) plan, secured by the DCO.

22.6.88 Receptor sensitivity is considered to be Medium, given the capacity of the housing market and private-rented housing to meet the worst case potential demand for accommodation.

22.6.89 Given the extent of the operational workforce, the magnitude of the impact on local housing availability is considered to be Negligible.

22.6.90 Therefore, the likely effect on human health arising from impacts on housing need during the construction phase of the Proposed Development is assessed to be Negligible (Not Significant).

Education and Training

22.6.91 The Proposed Development will create long term employment and training opportunities during its operation. Many of these employment and training opportunities are expected to be offered to local residents.

22.6.92 The sensitivity of the local population to education and training changes has been assessed as High, due to the lower-than-average educational attainment levels in the area.

22.6.93 Despite the small number of jobs created in the context of the wider job market, the Applicant will invest in wider community development, including skills and education initiatives during the operational life of the Proposed Development. These initiatives will be informed by collaborating and engaging with local authorities, charities, education institutions and industry bodies (bp, 2022b). Taking a worst-case approach, the magnitude of impact is assessed to be Low.

22.6.94 Overall, the likely effect on human health arising from impacts on education and training during the Proposed Development operational phase is assessed to be Minor Beneficial (Not Significant).

Health and Social Care Services

22.6.95 With respect to health and social care services, GP practices are operating in line with benchmark patient to GP ratios and the study area experiences low levels of barriers to housing and services deprivation. However, there are higher than average levels of poor health in the study area. Therefore, sensitivity is assessed as Medium.

22.6.96 The Proposed Development will generate an estimated peak of 130 jobs during the operational phase, across Phases 1 and 2. As discussed in Chapter 18: Socio-economics and Land Use (ES Volume I, EN070009/APP/6.2), the majority of operational jobs are likely to be taken by residents living inside of the TTWA as well as workers eventually moving to the area given the duration of the Proposed Development. As such it is unlikely that significant numbers of operational staff will relocate to the study area and so there will be minimal additional demand

placed on health and social care services around the Proposed Development. Therefore, the magnitude of the impact is assessed as Negligible.

22.6.97 Overall, the likely effect on human health arising from impacts on health and social care services during the Proposed Development operational phase is assessed to be Negligible (Not Significant).

Climate Change Mitigation and Adaptation

22.6.98 The study area contains a higher than regional and national average mortality rate from COPD and higher than average proportion of residents who are in poor health generally. Therefore, the local population may be more susceptible to impacts arising from GHG emissions and so has been assessed as Medium sensitivity.

22.6.99 As detailed in Chapter 19: Climate Change (ES Volume I, EN070009/APP/6.2), the GHG emissions from the Proposed Development could produce an adverse (albeit not significant) effect when viewing the Proposed Development Site in isolation. However, when looking at the H_2 produced and its ability to enable a transition to a lower carbon economy, the Proposed Development has a benefit due to its reduced footprint vs natural gas or other fuels such as diesel or coal. Therefore, the magnitude of impact is assessed as Low. and its ability to enable a transition to a lower carbon economy, the Proposed Development has a benefit due to its reduced footprint vs natural gas or other fuels such as diesel or coal. Therefore, the magnitude of impact is assessed as Low.

22.6.100 Overall, the likely effect on human health arising from impacts on climate change mitigation and adaptation during the Proposed Development operational phase is assessed to be Minor Beneficial (Not Significant).

Air Quality

22.6.101 During the operational phase of the Proposed Development, the general population is assessed as having Medium sensitivity with respect to changes in air quality.

22.6.102 As stated in Chapter 8: Air Quality (ES Volume I, EN070009/APP/6.2), operational traffic flows are not anticipated to produce significant air quality impacts on human health receptors. The chapter also states that guidance on emerging techniques for hydrogen production with carbon capture has been released (EA, 2023) and will be considered as the Environmental Permit required for the operation of the Proposed Development is developed.. This will manage air quality emissions from the Proposed Development. Therefore, the magnitude of impact from a human health perspective is assessed to be Negligible.

22.6.103 Overall, the likely effect on human health arising from impacts on air quality during the operational phase is assessed to be Negligible (Not Significant).

Noise and Vibration

22.6.104 The IEMA guidance (IEMA, 2022a) states “Areas with a poor health status are typically of higher sensitivity.” As with the construction phase, the general population is assessed as having Medium sensitivity with respect to changes in noise and vibration due to levels of poor health and a high proportion of children in

the study area. These types of vulnerable groups tend to be more susceptible to noise and vibration impacts relative to the general population.

22.6.105 Chapter 11: Noise and Vibration (ES Volume I, EN070009/APP/6.2) contains an assessment of noise and vibration associated with the operation of the Proposed Development. It states that the Proposed Development has the potential for some Adverse (Not Significant) effects on some residential properties during operation. Following the application of appropriate mitigation including limits on noise emissions from plant equipment, effects are likely to remain not significant. Therefore, magnitude of impact from a health perspective is assessed to be Low.

22.6.106 Overall, the likely effect on human health arising from impacts on noise and vibration during the Proposed Development operational phase is assessed to be Minor Adverse (Not Significant).

Radiation - Electromagnetic Fields

22.6.107 Due to the Electrical Connection Corridor, the Proposed Development has the potential to expose local residents to radiation. In addition, as suggested by IEMA (IEMA, 2022b), concerns about actual and perceived exposure to major electrical infrastructure can also lead to mental health impacts.

22.6.108 In terms of physical health, Section 22.4 illustrates that residents in the study area generally suffer from worse health than across England as a whole. In regard to mental health, Section 22.4 finds that the proportion of people estimated to have a common mental health disorder is also slightly higher in the study area than across the region and country. Therefore, considering both physical and mental health, the sensitivity of the population to EMF effects is considered to be Medium.

22.6.109 It is likely that all electrical and control system cables will be installed below ground or at ground level with no new overhead transmission lines proposed. High-voltage underground cables can produce higher magnetic fields directly above them than an overhead line would produce at ground level, because the physical distance from the underground cable is smaller. However, the field falls more rapidly with distance to the sides, and they produce no external electric field. Such cables are not normally located beneath buildings (Energy Networks Association, 2012). Electrical cables will not be installed directly below or near to residential properties, as can be seen from the Works Plans (EN070009/APP/2.4).

22.6.110 As a result of the location of the Electrical Connection Corridor and its distance from residential areas, the magnitude of impact is considered to be Low.

22.6.111 Overall, the likely effect on human health arising from potential exposure to EMF during the operational phase is assessed to be Minor Adverse (Not Significant).

Decommissioning

22.6.112 As outlined in Chapter 8: Air Quality, Chapter 11: Noise and Vibration, Chapter 15: Traffic and Transport, Chapter 18: Socio-economics and Land Use, Chapter 19: Climate Change, and Chapter 20: Major Accidents and Disasters (ES Volume I, EN070009/APP/6.2), effects during the decommissioning phase of the Proposed

Development are anticipated to be no worse than those experienced during the construction phase.

22.7 Essential Mitigation and Enhancement Measures

Construction

Essential Mitigation

22.7.1 The Applicant intends to mitigate the permanent loss of land at Cowpen Bewley Woodland Park with a replacement area of land that would be of at least the same standard as the land required by the project. The Applicant will work with Stockton-on-Tees Borough Council to agree the layout and planting of this land. This is secured through the DCO.

Enhancement Measures

22.7.2 No enhancement measures related to human health are proposed at this stage.

Operation

Essential Mitigation

22.7.3 No further or additional mitigation measures related to human health are proposed.

Enhancement Measures

22.7.4 No enhancement measures related to human health are proposed at this stage.

Decommissioning

Essential Mitigation

22.7.5 No further or additional mitigation measures related to human health are proposed.

Enhancement Measures

22.7.6 No enhancement measures related to human health are proposed at this stage.

22.8 Summary of Residual Effects

22.8.1 The Applicant intends to mitigate the permanent loss of open space at Cowpen Bewley Woodland Park with a replacement area of land that would be of at least the same size and standard as the land required by the project. This will downgrade the magnitude of impact of the Proposed Development on the open space, leisure and play health determinant to Low. Overall, the residual effect of the Proposed Development on open space, leisure, and play from a human health perspective is assessed to be Minor Adverse (Not Significant).

22.8.2 The summary of residual effects is detailed in Table 22-9.

Table 22-9: Summary of Residual Effects

HEALTH DETERMINANT	SENSITIVITY	MAGNITUDE OF IMPACT	SIGNIFICANCE OF EFFECT
CONSTRUCTION (AND DECOMMISSIONING)			
Risk taking behaviour	Low	Low	Minor Adverse (Not Significant)
Open space, leisure and play	Medium	Low	Minor Adverse (Not Significant)
Transport modes, access and connections	Medium	Low	Minor Adverse (Not Significant)
Community safety	Medium	Low	Minor Adverse (Not Significant)
Community identity, culture, resilience and influence	High	Low	Minor Adverse (Not Significant)
Social participation, interaction, and support	High	Low	Minor Beneficial (Not Significant)
Employment and income	Medium	Low	Moderate Beneficial (Significant)
Housing	Medium	Low	Minor Adverse (Not Significant)
Education and training	High	Low	Minor Beneficial (Not Significant)
Health and social care services	Medium	Low	Minor Adverse (Not Significant)
Climate change and adaptation	Medium	Low	Minor Adverse (Not Significant)
Air quality	Medium	Low	Minor Adverse (Not Significant)
Noise and vibration	Medium	Low	Minor Adverse (Not Significant)
Radiation – Electromagnetic Fields	Medium	Negligible	Negligible (Not Significant)

HEALTH DETERMINANT	SENSITIVITY	MAGNITUDE OF IMPACT	SIGNIFICANCE OF EFFECT
OPERATION			
Risk taking behaviour	Very Low	Low	Negligible (Not Significant)
Transport modes, access, and connections	Medium	Negligible	Negligible (Not Significant)
Community safety	Medium	Low	Minor Adverse (Not Significant)
Community identity, culture, resilience and influence	High	Low	Minor Beneficial (Not Significant)
Social participation, interaction and support	High	Negligible	Negligible (Not Significant)
Employment and income	Medium	Low	Minor Beneficial (Not Significant)
Housing	Medium	Negligible	Negligible (Not Significant)
Education and training	High	Low	Minor Beneficial (Not Significant)
Health and social care services	Medium	Negligible	Negligible (Not Significant)
Climate change and adaptation	Medium	Low	Minor Beneficial (Not Significant)
Air quality	Medium	Negligible	Minor Adverse (Not Significant)
Noise and vibration	Medium	Low	Negligible (Not Significant)
Radiation – Electromagnetic Fields	Medium	Low	Minor Adverse (Not Significant)

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