NORTH FALLS

Offshore Wind Farm

ENVIRONMENTAL STATEMENT

Chapter 28 Human Health

Document Reference:	3.1.30
Volume:	3.1
APFP Regulation:	5(2)(a)
Date:	July 2024
Revision:	0

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Project	North Falls Offshore Wind Farm
Document Title	Environmental Statement Chapter 28 Human Health
Document Reference	3.1.30
APFP Regulation	5(2)(a)
Supplier	Royal HaskoningDHV
Supplier Reference No	PB244-RHD-ES-ON-RP-ON-0212

Revision	Date	Status/Reason for Issue	Originator	Checked	Approved
0	July 2024	Submission	Ben Cave Associates Ltd	NFOW	NFOW

Contents

Tables

Plates

Figures (Volume 3.2)

Appendices (Volume 3.3)

Glossary of Acronyms

µT	Microtesla
AHAH	Access to Health Assets & Hazards
AIL	Abnormal Indivisible Loads
BESS	Battery energy storage scheme
BSS	Basic Safety Standards
CEA	Cumulative Effects Assessment
CEMP	Construction Environmental Management Plan
CNS	Central nervous system
CoCP	Code of Construction Practice
COPD	Chronic Obstructive Pulmonary Disease
CRCE	Centre for Radiation, Chemical and Environmental Hazards
CTMP	Construction Traffic Management Plan
DC	Direct Current
DCO	Development Consent Order
DECC	Department of Energy and Climate Change
DEMP	Decommissioning Environmental Management Plan
DESNZ	Department for Energy Security and Net Zero
DfT	Department for Transport
DWPA	Drinking Water Protected Area
EA	Environment Agency
EC	European Commission
EEAST	East of England Ambulance Service Trust
EIA	Environmental Impact Assessment
ELF	Extremely low frequency
EMF	Electric and Magnetic Field
EN-1	Overarching NPS for Energy
EN-3	NPS for Renewable Energy Infrastructure
EN-5	NPS for Electricity Networks Infrastructure
EPA	Environmental Protection Act
EPUT	Essex Partnership University Trust
EqIA	Equality Impact Assessment

ES	Environmental Statement
ESNEFT	East Suffolk North East Foundation Trust
ETG	Expert Topic Group
EU	European Union
EUPHA	European Public Health Assessment
GHG	Greenhouse gas
GP	General Practitioner
GVA	Gross Value Added
GW	Gigawatt
HDD	Horizontal Directional Drilling
HEE	Health Education England
HGV	Heavy Goods Vehicle
HIA	Health Impact Assessment
HMSO	His Majesty's Stationery Office
HPA	Health Protection Agency
HUDU	Healthy Urban Development Unit
HVAC	High Voltage Alternating Current
IAIA	International Association for the Impact Assessment
ICNIRP	International Commission on Non-ionizing Radiation Protection
ICRP	International Commission on Radiological Protection
IDACI	Income deprivation in children
IDAOPI	Income deprivation in older people
IEMA	Institute of Environmental Management and Assessment
IMD	Index of Multiple Deprivation
IPC	Infrastructure Planning Commission
IPH	Institute of Public Health
JHWS	Joint Health and Wellbeing Strategy
JSNA	Joint Strategic Needs Assessment
kv	kilovolt
LSOA	Lower Level Super Output Area
LTLA	Lower Tier Local Authority
MARPOL	International Convention for the Prevention of Pollution from Ships

MHCLG	Ministry of Housing, Communities & Local Government
MHRA	Medicines and Healthcare Products Regulatory Agency
MPS	Marine Policy Statement
MSOA	Middle Level Super Output Area
mT	Millitesla
MWIA	Mental Well-being Impact Assessment
NCN	National Cycle Network
NEET	Not in Education, Employment or Training
NFOW	North Falls Offshore Wind Farm Limited
NHSE	NHS England
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NRMM	Non-Road Mobile Machinery
NRPB	National Radiological Protection Board
NSIP	Nationally Significant Infrastructure Project
O&M	Operation and maintenance
OCoCP	Outline Code o Construction Practice
OCTMP	Outline Construction Traffic Management Plan
ONS	Office for National Statistics
OPRoWMP	Outline Public Rights of Way Management Plan
PEIR	Preliminary Environmental Information Report
PHE	Public Health England
PPG	Planning Practice Guidance
PRoW	Public Right of Way
PTS	Patient Transport Services
RWE	Renewables UK Swindon Limited
SAGE	Stakeholder Advisory Group on ELF EMFs
SSER	Renewables Offshore Windfarm Holdings Limited
SPZ	Special Protection Zone
TCC	Temporary Construction Compound
UKHSA	UK Health Security Agency
UTLA	Upper Tier Local Authority

V/m	Volt per metre
VCSE	Voluntary, Community and Social Enterprise
WFD	Water Framework Directive
WHIASU	Wales Health Impact Assessment Support Unit
WHO	World Health Organisation

Glossary of Terminology

400kV onshore cable route	Onshore route within which the onshore substation to National Grid connection point onshore export cables and associated infrastructure would be located
Bentley Road improvement works	Works involving the widening and improvement of the carriageway along Bentley Road, required to facilitate heavy goods vehicle and abnormal indivisible load access to the onshore cable route and the onshore substation.
Cable circuit (onshore)	The onshore export cables are comprised of cable 'circuits'. Each cable circuit is typically comprised of three power cables, as well as fibre cables and earth cables. It is expected that each circuit would compromise up to seven cables in total.
Cable ducts	Housing for the onshore export cables, typically comprising plastic high-density polyethylene (HDPE) pipes buried underground. Each cable circuit will potentially comprise up to seven individual ducts (i.e. one per cable).
Haul road	The track along the onshore cable route used by construction traffic to access different sections of the onshore cable route.
Horizontal directional drill (HDD)	Trenchless technique to bring the offshore export cables ashore at landfall. The technique will also be the primary trenchless technique used for installation of the onshore export cables at sensitive areas of the onshore cable route.
Jointing bay	Underground structures, constructed at regular intervals along the onshore cable route to connect the sections of cable together so that each cable is a continuous length, as well as facilitating the installation of the cables into the buried cable ducts.
Landfall	The location where the offshore export cables come ashore at Kirby Brook.
Landfall compound	Compound at landfall within which horizontal directional drill (HDD) or other trenchless techniques would take place.
Link boxes	Underground chambers or above ground cabinets next to the onshore export cables housing low voltage electrical earthing links.
Milliampere per metre squared (mA/m^2)	The ampere is the unit of electric current in the International System of Units (SI). One milliampere per metre squared represents a current of 1 mA glowing through a conductor with a cross-sectional area of 1m.
Millitesla (mT) / Microtesla (μT)	Units of measurement of magnetic flux density.
National Grid connection point	The grid connection location for the Project. National Grid are proposing to construct new electrical infrastructure (a new substation) to allow the Project to connect to the grid, and this new infrastructure will be located at the National Grid connection point.
National Grid substation connection works	Infrastructure required to connect the Project to the National Grid connection point.
Onshore cable corridor(s)	Onshore corridor(s) considered at PEIR within which the onshore cable route, as assessed at ES, is located.
Onshore cable route	Onshore route within which the onshore export cables and associated infrastructure would be located.

Onshore export cables	The cables which take the electricity from landfall to the onshore substation. These comprise High Voltage Alternative Current (HVAC) cables, buried underground.
Onshore project area	The boundary within which all onshore infrastructure required for the Project will be located (i.e. landfall; onshore cable route, accesses, construction compounds; onshore substation and cables to the National Grid substation)
Onshore scoping area	The boundary in which all onshore infrastructure required for the Project will be located, as considered within the North Falls EIA Scoping Report.
Onshore substation	A compound containing electrical equipment required to transform and stabilise electricity generated by the Project so that it can be connected to the National Grid.
Onshore substation construction compound	Area set aside to facilitate construction of the onshore substation. Will be located adjacent to the onshore substation.
Onshore substation works area	Area within which all temporary and permanent works associated within the onshore substation are located, including onshore substation, construction compound, access, landscaping, drainage and earthworks.
Temporary construction compound	Area set aside to facilitate construction of the onshore cable route. Will be located adjacent to the onshore cable route, with access to the highway where required.
The Applicant	North Falls Offshore Wind Farm Limited (NFOW).
The Project Or 'North Falls'	North Falls Offshore Wind Farm, including all onshore and offshore infrastructure.
Transition joint bay	Underground structures that house the joints between the offshore export cables and the onshore export cables.
Trenchless crossing	Use of a technique to install limited lengths of cable below ground without the need to excavate a trench from the surface, used in sensitive areas of the onshore cable route to prevent surface disturbance. Includes techniques such as HDD.
Trenchless crossing compound	Areas within the cable corridor which will house trenchless crossing (e.g. HDD) entry or exit points.
Volt per metre (V/m)	The standard unit of electric field strength.

28 Human Health

28.1 Introduction

1. This chapter of the Environmental Statement (ES) considers the likely significant effects of the North Falls offshore wind farm (hereafter 'North Falls' or 'the Project') on human health (herein referred to as 'health'). The chapter provides an overview of the existing environment for the proposed onshore project area, followed by an assessment of likely significant effects for the construction, operation, and decommissioning phases of the Project.

2. This chapter has been written by Ben Cave Associates Ltd and Royal HaskoningDHV, with the assessment undertaken with specific reference to the relevant legislation and guidance, of which the Principal policy documents with respect to Nationally Significant Infrastructure are the National Policy Statements (NPS). Details of these and the methodology used for the Environmental Impact Assessment (EIA) and Cumulative Effects Assessment (CEA) are presented in Section 28.4.

3. The assessment should be read in conjunction with following linked chapters:

   - Chapter 19 Ground Conditions and Contamination (Document Reference 3.1.21);
   - Chapter 20 Onshore Air Quality (Document Reference: 3.1.22);
   - Chapter 21 Water Resources and Flood Risk (Document Reference: 3.1.23);
   - Chapter 26 Noise and Vibration (Document Reference: 3.1.28);
   - Chapter 27 Traffic and Transport (Document Reference: 3.1.29);
   - Chapter 31 Socio-economics (Document Reference: 3.1.33);
   - Chapter 32 Tourism and Recreation (Document Reference: 3.1.34); and
   - Chapter 33 Climate Change (Document Reference: 3.1.35).

4. Additional information to support the health baseline and assessment includes:

   - Appendix 28.1 Health Baseline Statistics (Document Reference: 3.3.68).

5. Relevant information on health is brought together in this chapter, including assessing the findings and conclusions of other chapters within this ES. This chapter explains the public health implications of these determinants of health, as well as considering other determinants which may affect health and wellbeing.

28.2 Consultation

6. Consultation with regard to health has been undertaken in line with the general process described in ES Chapter 6 EIA Methodology (Document Reference: 3.1.8). The key elements to date have included feedback received through the 'Seascape, landscape and visual impact, land use, health and socio-economics and tourism' pre-scoping Expert Topic Group (ETG) held in July 2021 and in the Scoping Opinion (The Planning Inspectorate, 2021) on the Scoping Report

(North Falls Offshore Wind Limited, 2021) submitted for the Project. The feedback received has been considered in preparing the ES.

7. Table 28.1 provides a summary of how the consultation responses received to date have influenced the approach that has been taken.

8. This chapter has been updated following the consultation on the Preliminary Environmental Information Report (PEIR) in order to produce the final assessment submitted within the Development Consent Order (DCO) application. Full details of the consultation process are also presented in the Consultation Report as part of the DCO application.

9. Consultation responses by other technical topic area stakeholders that are relevant to health, e.g. discussing environmental exposures to people as receptors, have been outlined in the applicable chapters of the ES and have informed this assessment.

Table 28.1 Consultation responses

Consultee	Date / Document	Comment	Response / where addressed in the ES
The Planning Inspectorate	26/08/2021 / response to Scoping Report	Interference with users of footpath, cycleway and bridleway during operation. The Scoping Report does not present definitive information about the potential impact to existing PRoWs, cycleways and bridleways during operation, and it is noted that paragraph 786 references potential for permanent closure, although it is stated that the Applicant would seek to avoid placing onshore infrastructure on PRoWs. The Inspectorate considers that there is insufficient information from which to scope this matter out of the ES, and an assessment should be included where significant effects are likely to occur.	The assessment of impacts associated with the diversion and temporary/ permanent closure of Public Rights of Way (PRoWs) and impacts to cycle routes are considered in ES Chapter 32 Tourism and Recreation (Document Reference: 3.1.34) and Section 28.6 of this chapter.
		Stress/disturbance associated with construction activities during operation. Limited information is presented in the Scoping Report about the potential for stress / disturbance from activities associated with operational maintenance of onshore components of the Proposed Development. However, given the nature of these components, e.g. an unmanned substation and underground cabling, the Inspectorate agrees that there is unlikely to be a level of activity for their maintenance that would generate traffic, noise, vibration or visual impacts of a degree to cause stress or disturbance to human health. The Inspectorate therefore agrees that this matter can be scoped out of the ES.	Noted.
		Degradation of local air quality during operation. On the basis that emissions from operational traffic, plant and machinery are expected to be small and limited in duration, the Inspectorate agrees that this matter can be scoped out of the ES.	Noted. The air quality assessment for the Project is presented in ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22) and scopes out operational air quality effects.
		Land contamination giving rise to health effects during operation. The Inspectorate notes that operational impacts to human health from on and off site contamination sources are scoped into the ground conditions and contamination assessment (see Section 3.1 of the Scoping Report), particularly in relation to the potential for leakages of stored materials or spillages of materials. This matter should	Noted. This has been considered in ES Chapter 19 Ground Conditions and Contamination (Document Reference: 3.1.21), and cross referenced and summarised in Section 28.6.1.3.

Consultee	Date / Document	Comment	Response / where addressed in the ES
		therefore also be assessed in the ES in respect of the assessment of human health, but this could be through use of cross referencing to avoid duplication.	
		Vulnerable groups. The Scoping Report states that baseline health data will be collected in respect of general and vulnerable groups, and for air pollutants the impact assessment will also consider effects to vulnerable groups. For human health matters scoped into the ES, the assessment should include consideration of the potential for vulnerable groups to experience particular effects and identify any mitigation measures accordingly. The Applicant should make effort to agree the relevant vulnerable groups with relevant consultation bodies and the ES should explain how vulnerable groups have been identified.	Noted. The air quality assessment for the Project is presented in ES Chapter 20 Onshore Air Quality (Document Reference:3.1.22). The vulnerable groups considered in this health assessment are detailed in Section 28.3.2.1.2. The assessment for air quality and human health is in Section 28.6.1.2.
		Approach to data collection. The Applicant should identify all footpaths, cycleways and bridleway networks that may be affected by the Proposed Development and seek to agree with relevant consultation bodies those that will be included within the assessment. In doing so, the Applicant should refer to Essex County Council's Highway's Information Map, which identifies PRoWs and NCNs (see Appendix 2 of this Scoping Opinion).	These networks are identified and considered in ES Chapter 32 Tourism and Recreation (Document Reference: 3.1.34) and Section 28.6 of this chapter. A full list of Public Right of Ways (PRoWs) crossed by the Project and an Outline Public Right of Way Management Plan (OPRoWMP) detailing measures proposed to manage impacts to PRoW (Document reference: 7.17) is submitted alongside the DCO.
		Electric and magnetic fields (EMF) The Scoping Report does not make any reference to the potential for impacts associated with EMF arising from the Proposed Development to human health, including onshore substation, electrical cables and associated infrastructure. The ES should include an assessment of this matter where significant effects are likely to occur or provide a justification for why this matter is not likely to give rise to significant effects.	A justification as to why electric and magnetic fields (EMF) will not give rise to significant effects is provided in Section 28.6.3.2.

Consultee	Date / Document	Comment	Response / where addressed in the ES
Essex County Council	20/08/2021 / response to Scoping Report	The North East Essex Clinical Commissioning Group (CCG) has consulted the following Health system Partners as part of its preparation for this response and confirm that all future responses in relation to the DCO process will be made in partnership with; East Suffolk North East Foundation Trust (ESNEFT) Essex Partnership University Trust (EPUT) East of England Ambulance Service Trust (EEAST) NHS England – East of England Region (NHSE) Collectively known as the Trusts for purposes of reference.	A consultation meeting was held in September 2023 with the NHS Suffolk and North East Essex ICB jointly with the Five Estuaries Offshore Wind Farm (Five Estuaries). Meetings have been held with EEAST (26 March 2024 and 28 May 2024) and NHS Suffolk and North East Essex Integrated Care Board (ICB) (23 May 2024). Discussions are ongoing with the intention of reaching a jointly agreed Statement of Common Ground.
NHS – North East Essex Clinical Commissioning Group	11/08/2021 / response to Scoping Report	The CCG acknowledges the references to a Health Impact Assessment to be undertaken, as well as the impact on Human Health and safety, the CCG requests that the Health Impact Assessment also looks at the disruption of access to healthcare facilities and emergency services of the local road network during construction including an understanding of any temporary additional residents should the development require a workforce to be temporarily located for a period of time. This will enable the impact on Primary Care, Acute Care, Mental Health and Emergency services to be ascertained and appropriate mitigation sought from the applicant.	Traffic and transport effects of the Project (including driver delay to all vehicle users) have been considered in ES Chapter 27 Traffic and Transport (Document Reference: 3.1.29) and in Section 28.6.1.5. Effects on local onshore infrastructure and services (housing and health) are considered in ES Chapter 31 Socio-economics (Document Reference: 3.1.33) and ES Chapter 27 Traffic and Transport (Document Reference: 3.1.29). Effects on health services are presented in Section 28.6.1.5. Meetings have been held with EEAST (26 March 2024 and 28 May 2024) regarding likely significant effects on ambulance services. Discussions are ongoing with the intention of reaching a jointly agreed Statement of Common Ground.

Consultee	Date / Document	Comment	Response / where addressed in the ES
		The CCG also acknowledges that the scoping report clearly indicates the opportunities for improvement to human health including job opportunities and the CCG asks that the applicant considers these opportunities with the North East Essex Health and Wellbeing Alliance partners (which includes Tendring District Council, Essex County Council, the named trusts within this response and voluntary sector organisations) to seek opportunities to improve the wider determinants of health of the local population where it is evidenced that the source of employment would benefit the local community.	Employment effects are considered in ES Chapter 31 Socio-economics (Document Reference: 3.1.33) and in Section 28.6.2.1.
		The CCG will work with colleagues at Essex County Council and PHE in review of the human health impacts following the EA and will look to work with the applicant on any negative impacts that may be identified.	Meetings have been held NHS Suffolk and North East Essex Integrated Care Board (ICB) (23 May 2024). Discussions are ongoing with the intention of reaching a jointly agreed Statement of Common Ground.
		The CCG requested the Trusts to provide individual comment should they feel any specific immediate measures or concerns at this stage should be highlighted. To this end the CCG details below the response from EEAST; At the moment EEAST do not have any comments to add. Obviously further down the process, our concerns would be to address: Emergency service liaison and site access in relation on-shore development during all phases e.g. construction, site active and decommissioning Any emergency services transport delays due to increased traffic and movement of abnormal indivisible loads (AIL) during construction and decommissioning Any patient transport service delays due to increased traffic and movement of AILs (where we are commissioned to provide patient transport services (PTS)) Any impact on emergency services as a result of construction worker housing accommodation.	Traffic and transport effects of the Project (including driver delay to all vehicle users) have been considered in ES Chapter 27 Traffic and Transport (Document Reference: 3.1.29) and in Section 28.6.1.5. Effects on local onshore infrastructure and services (housing and health) are considered in ES Chapter 31 Socio-economics (Document Reference:3.1.33) and ES Chapter 27 Traffic and Transport (Document Reference: 3.1.29). Effects on journey times or accessibility to amenities/services, particularly healthcare (emergency and non-emergency) are presented in Section 28.6.1.5. Meetings have been held with EEAST (26 March 2024 and 28 May 2024) regarding

Consultee	Date / Document	Comment	Response / where addressed in the ES
			likely significant effects on ambulance services. Discussions are ongoing with the intention of reaching a jointly agreed Statement of Common Ground.
		This concludes our expectations for the EIA and the CCG will continue to manage future responses on behalf of Health partners as the Development Consent Order continues through the planning process.	Noted.
PHE (now OHID)	13/08/2021 / response to Scoping Report	PHE exists to protect and improve the nation's health and wellbeing and reduce health inequalities; these two organisational aims are reflected in the way we review and respond to Nationally Significant Infrastructure Project (NSIP) applications. The health of an individual or a population is the result of a complex interaction of a wide range of different determinants of health, from an individual's genetic make-up to lifestyles and behaviours, and the communities, local economy, built and natural environments to global ecosystem trends. All developments will have some effect on the determinants of health, which in turn will influence the health and wellbeing of the general population, vulnerable groups and individual people. Although assessing impacts on health beyond direct effects from for example emissions to air or road traffic incidents is complex, there is a need to ensure a proportionate assessment focused on an application's significant effects. Having considered the submitted scoping report we wish to make the following specific comments and recommendations:	Noted.
		We welcome the promoter's proposal to include a health section. We believe the summation of relevant issues into a specific section of the report provides a focus which ensures that public health is given adequate consideration. The section should summarise key information, risk assessments, proposed mitigation measures, conclusions and residual impacts, relating to human health. Compliance with the requirements of National Policy Statements and relevant guidance and standards should also be highlighted.	This chapter presents the health assessment for the Project, and summarises key information, risk assessments, proposed mitigation measures, conclusions and residual impacts, relating to human health, along with compliance with the NPSs and relevance guidance.

Consultee	Date / Document	Comment	Response / where addressed in the ES
		In terms of the level of detail to be included in an Environmental Statement (ES), we recognise that the differing nature of projects is such that their impacts will vary. The attached appendix (see below) summarises PHE's requirements and recommendations regarding the content of and methodology used in preparing the ES.	Noted, this methodology has been taken into account in the preparation of this chapter. Relevant information on health is brought together in this chapter, including assessing the findings and conclusions of other chapters within this ES.
		It is noted that the proposed development includes provision for onshore electrical cables and associated infrastructure, so the developer will need to assess the potential public health impact of the electric and magnetic fields produced by this equipment. (see further guidance in the annex to this letter).	A consideration of EMF is presented in Section 28.6.3.2.
		Human Health and Wellbeing This section of PHE's response, identifies the wider determinants of health and wellbeing we expect the ES to address, to demonstrate whether they are likely to give rise to significant effects. PHE has focused its approach on scoping determinants of health and wellbeing under four themes, which have been derived from an analysis of the wider determinants of health mentioned in the National Policy Statements. The four themes are: Access Traffic and Transport Socioeconomic Land Use	These themes have been taken into the consideration in Section 28.6 of this health assessment.
		Vulnerable populations An approach to the identification of vulnerable populations has been provided but does not make links to the list of protected characteristics within an Equality Impact Assessment (EqIA). The impacts on health and wellbeing and health inequalities of the scheme may have particular effect on vulnerable or disadvantaged populations,	Vulnerable groups have been defined with reference to IEMA guidance (2022a; 2022b) in addition to WHIASU guidance, Institute of Public Health (IPH) (2021) and International Association for the Impact Assessment (IAIA) and European Public Health Assessment

Consultee	Date / Document	Comment	Response / where addressed in the ES
		including those that fall within the list of protected characteristics. The ES and any Equalities Impact Assessment should not be completely separated. The identification of vulnerable populations should reference the list provided by the Welsh Health Impact Assessment Support Unit (WHIASU (2020). Health Impact Assessment – A Practical Guide). The identification of vulnerable populations should be influenced by WHISU guidance and the findings of any Equalities Impact Assessment (EqIA). Findings from the EqIA should be cross referenced to ensure the comprehensive assessment of potential impacts for health and inequalities and where resulting mitigation measures are mutually supportive.	(EUPHA) (2020). Vulnerable groups considered in the assessment are identified in Section 28.4.3.1.1. The approach taken in this chapter aligns with international and national good practice.
		Housing and affordability and availability The presence of significant numbers of workers could foreseeably have an impact on the local availability of affordable housing, particularly that of short term tenancies and affordable homes for certain communities. The cumulative impact assessment will need to consider this across the wider study area but also identify the potential for any local (ward-level) effects that may affect the capacity of sectors to respond to change, and where there could be knock-on effects on access to accommodation for residents with the least capacity to respond to change (for example, where there may be an overlap between construction workers seeking accommodation in the private rented sector, and people in receipt of housing benefit seeking the same lower-cost accommodation). The scoping report does not identify the peak number of construction workers. The peak numbers of construction workers and non home-based workers should be established and a proportionate assessment undertaken on the impacts for housing availability and affordability and impacts on any local services. Any cumulative impact assessment should consider the impact on demand for housing by construction workers and the likely numbers of non home-based workers required across all schemes.	Impacts on accommodation including rental accommodation, are considered in ES Chapter 31 Socio-economics (Document Reference:3.1.33). The impact on changes in demographic and requirements of accommodation of non-home-based workers is also assessed in ES Chapter 31 and in Chapter 32 Tourism and Recreation (Document Reference: 3.1.33 and 3.1.34). The peak numbers of construction workers and non-resident workers are presented and have been assessed in ES Chapter 31 Socio-economics (Document Reference: 3.1.33). The likely significant effects of the non-local workforce are presented in Section 28.6.1.5.
		Appendix – PHE's recommendations to applicants regarding EIA	Noted. The guidelines which have been used in this chapter are described in Section

Consultee	Date / Document	Comment	Response / where addressed in the ES
		PHE provides advice relating to EIA within this document and during the NSIP consultation stages. It is the role of the applicant to prepare the ES. When preparing an ES the applicant should give consideration to best practice guidance such as the Government's Handbook for scoping projects: environmental impact assessment, and Guidance: on Environmental Impact Assessment. The Planning Inspectorate's Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements also provide guidance to applicants and other persons with interest in the EIA process as it relates to NSIPs. It is important that the submitted ES identifies and assesses the potential public health impacts of the activities at, and emissions from, the development.	28.4.1.2, and are aligned with the approach proposed by PHE (now OHID).
		Applicants are reminded that Section 5(2)(a) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 specifically includes 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 population and human health. PHE is of the opinion that this requirement encompasses the wider determinants of public health, as well as chemicals, poisons and radiation. Further information on PHE's recommendations and requirements is included below.	The assessment methodology and findings for human health are set out in Section 28.4 of this chapter. The wider determinants of public health are integral to this assessment. This follows guidance for assessing health in EIA (IEMA, 2022a; 2022b; IPH, 2021; IAIA and EUPHA, 2020) in addition to HIA guidance (WHIASU, 2012). ES Chapter 19 Ground Conditions and Contamination (Document Reference: 3.1.21) and ES Chapter 21 Water Resources and Flood Risk (Document Reference: 3.1.23) have assessed the impact of chemical and exposure risks (accidental poisoning), the results are summarised and assessed in Section 28.5.4 of this chapter.
		PHE understands that there may be separate sections of the ES covering the assessment of impacts on air, land, water and so on, but expects an ES to include a specific section summarising potential impacts on population and health. This section	Relevant information on health is brought together in this chapter, including assessing the findings and conclusions of other

Consultee	Date / Document	Comment	Response / where addressed in the ES
		should bring together and interpret the information from other assessments as necessary. The health, wellbeing and population impacts section should address the following steps. 1. Screening: Identify any significant effects. a. Summarise the methodologies used to identify health impacts, assess significance and sources of information b. Evaluate any reference standards used in carrying out the assessment and in evaluating health impacts (e.g., environmental quality standards) c. Where the applicant proposes the 'scoping out' of any effects a clear rationale and justification should be provided along with any supporting evidence. 2. Baseline Survey: a. Identify information needed and available, evaluate quality and applicability of available information b. Undertake assessment 3. Alternatives: a. Consideration of alternatives (including alternative sites, choice of process, and the phasing of construction) is widely regarded as good practice. Ideally, the EIA process should start at the stage of site selection, so that the environmental merits of practicable alternatives can be properly considered. Where this is undertaken, the main alternatives considered should be outlined in the ES. 4. Design and assess possible mitigation a. Consider and propose suitable corrective actions should mitigation measures not perform as effectively predicted. 5. Impact Prediction: Quantify and Assess Impacts: a. Evaluate and assess the extent of any positive and negative effects of the development. Effects should be assessed in terms of likely health outcomes, including those relating to the wider determinants of health such as socio- economic outcomes, in addition to health outcomes resulting from exposure to environmental hazards.	chapters ES Chapter 19 Ground Conditions and Contamination, ES Chapter 20 Onshore Air Quality, ES Chapter 21 Water Resources and Flood Risk, ES Chapter 26 Noise and Vibration, ES Chapter 27 Traffic and Transport, ES Chapter 31 Socio-economics, ES Chapter 32 Tourism and Recreation, and ES Chapter 33 Climate Change) within this ES. This chapter explains the public health implications of these determinants of health, as well as considering other determinants which may affect health and wellbeing. The health assessment methodology is presented in Section 28.4.3 and the assessment of significance is presented in Section 28.6. The methodology used in this chapter is informed by IEMA 2022a and 2022b as appropriate (and other guidance documents as noted above). The steps presented by PHE have been followed in the design of the Project. 1: Screening: likely significant effects on human health have been identified through the Scoping Opinion (Document Reference 7.25) and PEIR (see Section 28.3). 2: Baseline Survey: a baseline has been prepared for the existing environment (see Section 28.5). 3: Consideration of alternatives: Full details on the site selection process are described in

Consultee	Date / Document	Comment	Response / where addressed in the ES
		Mental health effects should be included and given equivalent weighting to physical effects. b. Clearly identify any omissions, uncertainties and dependencies (e.g., air quality assessments being dependant on the accuracy of traffic predictions) c. Evaluate short-term impacts associated with the construction and development phase d. Evaluate long-term impacts associated with the operation of the development e. Evaluate any impacts associated with decommissioning of the development f. Evaluate any potential cumulative impacts as a result of the development, currently approved developments which have yet to be constructed, and proposed developments which do not currently have development consent. 6. Monitoring and Audit a. Identify key modelling predictions and mitigation impacts and consider implementing monitoring and audit to assess their accuracy / effectiveness. Any assessments undertaken to inform the ES should be proportionate to the potential impacts of the proposal, therefore we accept that, in some circumstances particular assessments may not be relevant to an application, or that an assessment may be adequately completed using a qualitative rather than quantitative methodology. In cases where this decision is made, the applicant should fully explain and justify their rationale in the submitted documentation.	ES Chapter 4 Site Selection and Assessment of Alternatives (Document Reference: 3.1.6). 4: Design and assess possible mitigation: embedded mitigation relevant to the health assessment, which has been incorporated into the design of North Falls is presented in Table 28.5. Other mitigation measures are presented in the impact assessment in Section 28.6. Table 28.30 presents a summary of the health effects assessed within this ES chapter, any mitigation and the residual effects. 5: Impact prediction: The assessment focusses on identifying the likely significant effects on human health as per Section 14 para 1(2b) of the Infrastructure Planning (Environmental Impact Assessment) Regulations. The assessment of significance is presented in Section 28.6 of this chapter. 6: Monitoring and audit: Section 28.7 details monitoring requirements in relation to human health. Monitoring for other impacts which relate to human health, such as traffic and transport (Chapter 27, Document Reference: 3.1.29) and socio-economics (Chapter 31, Document Reference: 3.1.33), are detailed within the relevant chapter. Section 28.4.3.4 sets out how the EIA health assessment is a qualitative analysis, following the IEMA (2022a) and IPH (2021) guidance approach, which draws on

Consultee	Date / Document	Comment	Response / where addressed in the ES
			qualitative and quantitative inputs from other EIA topic chapters.
		Human and environmental receptors The applicant should clearly identify the development's location and the distance of the development to off-site receptors that may be affected by emissions from, or activities at, the development. Off-site receptors may include people living in residential premises; people working in commercial, and industrial premises and people using transport infrastructure (such as roads and railways), recreational areas, and publicly-accessible land. Identify and consider impacts on residential areas and sensitive receptors (such as schools, nursing homes and healthcare facilities, as well as other vulnerable population groups such as those who are young, older, with disabilities or long-term conditions, or on low incomes) in the area(s) which may be affected by emissions, this should include consideration of any new receptors arising from future development. Consideration should also be given to environmental receptors such as the surrounding land, watercourses, surface and groundwater, and drinking water supplies such as wells, boreholes and water abstraction points.	Health receptors considered in relation to potential emissions from, or activities at, the Project are detailed in Section 28.6. Further detail on the impact of the Project due to emissions and activities (on both human and environmental receptors) is provided throughout this ES. Relevant information on health is brought together in this chapter, including assessing the findings and conclusions of other chapters: ES Chapter 19 Ground Conditions and Contamination, ES Chapter 20 Onshore Air Quality, ES Chapter 21 Water Resources and Flood Risk, ES Chapter 26 Noise and Vibration, ES Chapter 27 Traffic and Transport, ES Chapter 31 Socio-economics, ES Chapter 32 Tourism and Recreation, and ES Chapter 33 Climate Change within this ES.
		Impacts arising from construction and decommissioning Any assessment of impacts arising from emissions or activities due to construction and decommissioning should consider potential impacts on all receptors and describe monitoring and mitigation during these phases. Construction and decommissioning will be associated with vehicle movements and cumulative impacts should be accounted for. We would expect the applicant to follow best practice guidance during all phases from construction to decommissioning to ensure appropriate measures are in place to mitigate any potential negative impact on health from emissions (point source, fugitive	Further details on construction and decommissioning are provided in Chapter 5 Project Description (Document Reference: 3.1.7) and Sections 28.6.1, 28.6.2 and 28.6.4.

Consultee	Date / Document	Comment	Response / where addressed in the ES
		and traffic-related) and activities. An effective Construction Environmental Management Plan (CEMP) (and Decommissioning Environmental Management Plan (DEMP)) will help provide reassurance that activities are well managed. The applicant should ensure that there are robust mechanisms in place to respond to any complaints made during construction, operation, and decommissioning of the facility.	
		Electromagnetic fields (EMF) This advice relates to electrical installations such as substations and connecting underground cables or overhead lines. PHE advice on the health effects of power frequency electric and magnetic fields is available on the Gov.UK website.14 There is a potential health impact associated with the electric and magnetic fields around substations, overhead power lines and underground cables. The field strengths tend to reduce with distance from such equipment. The following information provides a framework for considering the health impact associated with the electric and magnetic fields produced by the proposed development, including the direct and indirect effects of the electric and magnetic fields as indicated above. Exposure Guidelines PHE recommends the adoption in the UK of the EMF exposure guidelines published by the International Commission on Non-ionizing Radiation Protection (ICNIRP). Formal advice to this effect, based on an accompanying comprehensive review of the scientific evidence, was published in 2004 by the National Radiological Protection Board (NRPB), one of PHE's predecessor organisations. Updates to the ICNIRP guidelines for static fields have been issued in 2009 and for low frequency fields in 2010. However, Government policy is that the ICNIRP guidelines are implemented as expressed in the 1999 EU Council Recommendation on limiting exposure of the general public (1999/519/EC). Static magnetic fields For static magnetic fields, the ICNIRP guidelines published in 2009 recommend that acute exposure of the general public should not exceed 400 mT (millitesla), for any part of the body, although the previously recommended value of 40 mT is the value	We thank PHE for the detailed summary of requirements concerning Electromagnetic fields (EMF) covering exposure guidelines; static magnetic fields; power frequency electric and magnetic fields; long term effects; the SAGE and ionising radiation. We have reviewed the sources cited in the PHE consultation response (Council of the European Union, 2013; Council of the European Union, 1999; Environment Agency, 2012; HM Government of Great Britain & Northern Ireland, 1993; HM Government of Great Britain & Northern Ireland, 1999; HM Government of Great Britain & Northern Ireland, 2016; ICNIRP, 2009; ICNIRP, 2010; ICNIRP,1998; McKinlay, A.F., et al. 2004a; 2004b; Stakeholder Advisory Group on ELF EMFs, 2007, 2010). The guidelines which have been used in this chapter are described in Section 28.4.1.2. The consideration of EMFs is presented in Section 28.6.3.2.

Consultee	Date / Document	Comment	Response / where addressed in the ES
		used in the Council Recommendation. However, because of potential indirect adverse effects, ICNIRP recognises that practical policies need to be implemented to prevent inadvertent harmful exposure of people with implanted electronic medical devices and implants containing ferromagnetic materials, and injuries due to flying ferromagnetic objects, and these considerations can lead to much lower restrictions, such as 0.5 mT. Power frequency electric and magnetic fields At 50 Hz, the known direct effects include those of induced currents in the body on the central nervous system (CNS) and indirect effects include the risk of painful spark discharge on contact with metal objects exposed to electric fields. The ICNIRP guidelines published in 1998 give reference levels for public exposure to 50 Hz electric and magnetic fields, and these are respectively 5 kV m−1 (kilovolts per metre) and 100 μT (microtesla). The reference level for magnetic fields changes to 200 μT in the revised (ICNIRP 2010) guidelines because of new basic restrictions based on induced electric fields inside the body, rather than induced current density. If people are not exposed to field strengths above these levels, direct effects on the CNS should be avoided and indirect effects such as the risk of painful spark discharge will be small. The reference levels are not in themselves limits but provide guidance for assessing compliance with underlying basic restrictions and reducing the risk of indirect effects. Long term effects There is concern about the possible effects of long-term exposure to extremely low frequency electric and magnetic fields, from power lines. In the NRPB advice issued in 2004, it was concluded that the studies that suggest health effects, including those concerning childhood leukaemia in relation to power frequency magnetic fields, could not be used to derive quantitative guidance on restricting exposure. However, the results of these studies represented uncertainty in the underlying evidence base, and taken together with people's concerns, provided a basis for providing an additional recommendation for Government to consider the need for further precautionary measures, particularly with respect to the exposure of children to power frequency magnetic fields.	

Consultee	Date / Document	Comment	Response / where addressed in the ES
		The Stakeholder Advisory Group on ELF EMFs (SAGE) SAGE was set up to explore the implications for a precautionary approach to extremely low frequency electric and magnetic fields (ELF EMFs), which include power frequency fields, and to make practical recommendations to Government. Relevant here is SAGE's 2007 First Interim Assessment, which made several recommendations concerning high voltage power lines. In responding, Government supported the implementation of low cost options such as optimal phasing to reduce exposure; however it did not support the option of creating corridors around power lines in which development would be restricted on health grounds, which was considered to be a disproportionate measure given the evidence base on the potential long term health risks arising from exposure. The Government response to SAGE's First Interim Assessment is available on the national archive website. The Government also supported calls for providing more information on power frequency electric and magnetic fields, which is available on the PHE web pages. Ionising radiation Particular considerations apply when an application involves the possibility of exposure to ionising radiation. In such cases it is important that the basic principles of radiation protection recommended by the International Commission on Radiological Protection (ICRP) are followed. PHE provides advice on the application of these recommendations in the UK. The ICRP recommendations are implemented in the Euratom Basic Safety Standards (BSS) and these form the basis for UK legislation, including the Ionising Radiation Regulations 1999, the Radioactive Substances Act 1993, and the Environmental Permitting Regulations 2016. As part of the EIA process PHE expects applicants to carry out the necessary radiological impact assessments to demonstrate compliance with UK legislation and the principles of radiation protection. This should be set out clearly in a separate section or report and should not require any further analysis by PHE. In particular, the important principles of justification, optimisation and radiation dose limitation should be addressed. In addition compliance with the Euratom BSS and UK legislation should be clear.	

Consultee	Date / Document	Comment	Response / where addressed in the ES
		When considering the radiological impact of routine discharges of radionuclides to the environment PHE would, as part of the EIA process, expect to see a full radiation dose assessment considering both individual and collective (population) doses for the public and, where necessary, workers. For individual doses, consideration should be given to those members of the public who are likely to receive the highest exposures (referred to as the representative person, which is equivalent to the previous term, critical group). Different age groups should be considered as appropriate and should normally include adults, 1 year old and 10 year old children. In particular situations doses to the fetus should also be calculated. The estimated doses to the representative person should be compared to the appropriate radiation dose criteria (dose constraints and dose limits), taking account of other releases of radionuclides from nearby locations as appropriate. Collective doses should also be considered for the UK, European and world populations where appropriate. The methods for assessing individual and collective radiation doses should follow the guidance given in 'Principles for the Assessment of Prospective Public Doses arising from Authorised Discharges of Radioactive Waste to the Environment August 2012. It is important that the methods used in any radiological dose assessment are clear and that key parameter values and assumptions are given (for example, the location of the representative persons, habit data and models used in the assessment). Any radiological impact assessment, undertaken as part of the EIA, should also consider the possibility of short-term planned releases and the potential for accidental releases of radionuclides to the environment. This can be done by referring to compliance with the Ionising Radiation Regulations and other relevant legislation and guidance. The radiological impact of any solid waste storage and disposal should also be addressed in the assessment to ensure that this complies with UK practice and legislation; information should be provided on the category of waste involved (e.g. very low level waste, VLLW). It is also important that the radiological impact associated with the decommissioning of the site is addressed.	

Consultee	Date / Document	Comment	Response / where addressed in the ES
		Of relevance here is PHE advice on radiological criteria and assessments for land-based solid waste disposal facilities. PHE advises that assessments of radiological impact during the operational phase should be performed in the same way as for any site authorised to discharge radioactive waste. PHE also advises that assessments of radiological impact during the post operational phase of the facility should consider long timescales (possibly in excess of 10,000 years) that are appropriate to the long-lived nature of the radionuclides in the waste, some of which may have half-lives of millions of years. The radiological assessment should consider exposure of members of hypothetical representative groups for a number of scenarios including the expected migration of radionuclides from the facility, and inadvertent intrusion into the facility once institutional control has ceased. For scenarios where the probability of occurrence can be estimated, both doses and health risks should be presented, where the health risk is the product of the probability that the scenario occurs, the dose if the scenario occurs and the health risk corresponding to unit dose. For inadvertent intrusion, the dose if the intrusion occurs should be presented. It is recommended that the post-closure phase be considered as a series of timescales, with the approach changing from more quantitative to more qualitative as times further in the future are considered. The level of detail and sophistication in the modelling should also reflect the level of hazard presented by the waste. The uncertainty due to the long timescales means that the concept of collective dose has very limited use, although estimates of collective dose from the 'expected' migration scenario can be used to compare the relatively early impacts from some disposal options if required.	
		Wider Determinants of Health The World Health Organization (WHO's) defines health as "a state of complete physical, mental and social well-being and not merely an absence of disease or infirmity" (WHO, 1948).	The Wider Determinants of Health are integral to the methodology of the assessment as set out in Section 28.4.

Consultee	Date / Document	Comment	Response / where addressed in the ES
		The health and wellbeing of an individual or a population is the result of a complex interaction of a wide range of different determinants of health, from an individual's genetic make-up to lifestyles and behaviours, and the communities, local economy, built and natural environments to global ecosystem trends. All developments will have some effect on the determinants of health, which in turn will influence the health and wellbeing of the general population, vulnerable groups and individual people. PHE recognises that evaluating an NSIP's impacts on health through the wider determinants is more complex than assessing a project's direct impacts against clearly defined regulatory protections. The 2017 EIA Regulations clarify that the likely significant effects of a development proposal on population and human health must be assessed. PHE's expectations are that the proponent of an NSIP will conduct a proportionate and evidence- based assessment of the anticipated direct and indirect effects on health and wellbeing in line with the relevant regulatory and policy requirements. Consideration should be given to impacts during the construction, operation and decommissioning phase of NSIPs. Consideration should be given to the avoidance or mitigation of any negative impacts, as well as to how the NSIP could be designed to maximise potential positive benefits. We accept that the relevance of wider determinants and associated impacts will vary depending on the nature of the proposed development. PHE has focused its approach on scoping determinants of health and wellbeing under four themes, which have been derived from an analysis of the wider determinants of health mentioned in the National Policy Statements. The four themes are: • Access • Traffic and Transport • Socioeconomic • Land Use PHE has developed a list of 21 determinants of health and wellbeing under these four broad themes. These determinants should be considered within any scoping report	

Consultee	Date / Document	Comment	Response / where addressed in the ES
		and if the applicant proposes to scope any areas out of the assessment, they should provide clear evidence-based reasoning and justification. Appendix 2 provides greater detail on the nature of each determinant.	
		Methodology PHE will expect assessments to set out the methodology used to assess impacts on each determinant included in the scope of the assessment. In some instances, the methodologies described may be established and refer to existing standards and/or guidance. In other instances, there may be no pre-defined methodology, which can often be the case for the wider determinants of health; as such there should be an application of a logical evidence based impact assessment method that: • identifies the temporal and geographic scope of assessment • identifies affected sensitive receptors (general population and vulnerable populations) to impacts from the relevant determinant • establishes the current baseline situation • identifies the NSIP's potential direct and indirect impacts on each population • if impacts are identified, evaluates whether the potential effect is likely to be significant in relation to the affected population • identifies appropriate mitigation to eliminate or minimise impacts or the subsequent effects on health and inequalities • identifies opportunities to achieve benefits from the scheme for health and inequalities • considers any in combination or cumulative effects • identifies appropriate monitoring programmes	The health assessment methodology is presented in Section 28.4.3 and the assessment of significance is presented in Section 28.6.
		Methodology Currently there is no standard methodology for assessing the population and human health effects of infrastructure projects, but a number of guides exist, including: • Institute of Environmental Management and Assessment, 2017: Health in Environmental Assessment, a primer for a proportionate approach;	Since the Section 42 responses were submitted IEMA has issued guidance for the UK on scoping population and human health within Environmental Impact Assessment and on determining significance for human health (2022a, 2022b). These, and other relevant, guidelines have been used in this

Consultee	Date / Document	Comment	Response / where addressed in the ES
		• NHS London Healthy Urban Development Unit (HUDU), 2015. Healthy Urban Planning Checklist and Rapid Health Impact Assessment Tool; • Wales Health Impact Assessment Unit, 2012: HIA a practical guide; • National Mental Wellbeing Impact Assessment Development Unit 2011: Mental Wellbeing Impact Assessment Toolkit; PHE expects assessments to follow best practice from these guides and from methodologies adopted within other successful health/environmental impacts assessments.	chapter and are described in Section 28.4.1.2.
		Determining significant effects Neither the EIA regulations nor the National Policy Statements provide a definition of what constitutes a 'significant' effect, and so PHE have derived a list of factors which it will take into consideration in the assessment of significance of effects, as outlined below. These list of factors should be read in conjunction with guidance from the above guides. 1. Sensitivity Is the population exposed to the NSIP at particular risk from effects on this determinant due to pre-existing vulnerabilities or inequalities (for example, are there high numbers in the local population of people who are young, older, with disabilities or long-term conditions, or on a low income)? Will the NSIP widen existing inequalities or introduce new inequalities in relation to this determinant? 2. Magnitude How likely is the impact on this determinant to occur? If likely, will the impact affect a large number of people / Will the impact affect a large geographic extent? Will the effects be frequent or continuous? Will the effects be temporary or permanent and irreversible? 3. Cumulative effects	The methodology used in this health assessment for determining likely significant effects is detailed in Section 28.4.3 and is based on the EIA health assessment methodology scoring of sensitivity and magnitude from IEMA (2022a) guidance. 1. Sensitivity: please see Table 28.10; 2. Magnitude: please see Table 28.11; 3. Cumulative effects: please see Section 28.4.4; 4. Importance: please see para 60 and Table 28.13; and 5. Acceptability: please see para 60 and Table 28.13.

Consultee	Date / Document	Comment	Response / where addressed in the ES
		Will the NSIP's impacts on this determinant combine with effects from other existing or proposed NSIPs or large-scale developments in the area, resulting in an overall cumulative effect different to that of the project alone? What are the cumulative effects of the impacts of the scheme on communities or populations. Individual impacts individually may not be significant but in combination may produce an overall significant effect. 4. Importance Is there evidence for the NSIP's effect on this determinant on health? Is the impact on this determinant important in the context of national, regional or local policy? 5. Acceptability What is the local community's level of acceptance of the NSIP in relation to this determinant? Do the local community have confidence that the applicants will promote positive health impacts and mitigate against negative health effects? 6. Opportunity for mitigation If this determinant is included in the scope for the EIA is there an opportunity to enhance any positive health impacts and/or mitigate any negative health impacts?	
		Vulnerable groups Certain parts of the population may experience disproportionate negative health effects as a result of a development. Vulnerable populations can be identified through research literature, local population health data or from the identification of pre-existing health conditions that increase vulnerability. The effects on health and wellbeing and health inequalities of the scheme will have particular effect on vulnerable or disadvantaged populations, including those that fall within the list of protected characteristics. Some protected groups are more likely to have elevated vulnerability associated with social and economic disadvantages. Consideration should be given to language or lifestyles that influence how certain populations are affected by impacts of the proposal, for example non- English	Noted. The vulnerable groups considered in this assessment were identified through the scoping and PEIR process and are detailed in Section 28.3.2.1.2.

Consultee	Date / Document	Comment	Response / where addressed in the ES
		speakers may face barriers to accessing information about the works or expressing their concerns. Equality Impact Assessments (EqIA) are used to identify disproportionate effects on Protected Groups (defined by the Equality Act, 2010), including health effects. The assessments and findings of the Environmental Statement and the EqIA should be crossed referenced between the two documents, particularly to ensure the assessment of potential impacts for health and inequalities and that resulting mitigation measures are mutually supportive.	
		Vulnerable groups The Wales Health Impact Assessment Support Unit (WHIASU), provides a suggested guide to vulnerable groups Age related groups • Children and young people • Older people Income related groups • People on low income • Economically inactive • Unemployed/workless • People who are unable to work due to ill health Groups who suffer discrimination or other social disadvantage • People with physical or learning disabilities/difficulties • Refugee groups • People seeking asylum • Travellers • Single parent families • Lesbian, gay or transgender people • Black and minority ethnic groups • Religious groups	Noted. The vulnerable groups considered in this assessment were identified through the scoping and PEIR process and are detailed in Section 28.3.2.1.2. - Children and young people; • Older people (particularly those suffering with dementia); • People living in deprivation (including those experiencing income and/or access/geographic vulnerability); • People with heightened sensitivity e.g. spending more time in affected dwellings (e.g. due to low economic activity, home working, shift work, retirement, or ill health) and/or neurological conditions; and • People with existing poor health (physical and mental health).

Consultee	Date / Document	Comment	Response / where addressed in the ES
		Geographical groups • People living in areas known to exhibit poor economic and/or health indicators • People living in isolated/over-populated areas • People unable to access services and facilities	
		Mental Health PHE supports the use of the broad definition of health proposed by the World Health Organisation (WHO). Mental well-being is fundamental to achieving a healthy, resilient and thriving population. It underpins healthy lifestyles, physical health, educational attainment, employment and productivity, relationships, community safety and cohesion and quality of life. NSIP schemes can be of such scale and nature that they will impact on the over-arching protective factors, which are: • Enhancing control • Increasing resilience and community assets • Facilitating participation and promoting inclusion. There should be parity between mental and physical health, and any assessment of health impact should include the appreciation of both. A systematic approach to the assessment of the impacts on mental health, including suicide, is required. The Mental Well-being Impact Assessment (MWIA) could be used as a methodology. The assessment should identify vulnerable populations and provide clear mitigation strategies that are adequately linked to any local services or assets. Perceptions about the proposed scheme may increase the risk of anxiety or health effects by perceived effects. “Estimation of community anxiety and stress should be included as part of every risk or impact assessment of proposed plans that involve a potential environmental hazard.”	Likely significant effects on mental health have been considered throughout this chapter. The vulnerable populations considered in the assessment are detailed in Section 28.3.2.1.2.
		Evidence base and baseline data	Baseline health statistics are provided in ES Appendix 28.1 Human Health Statistics (Document Reference: 3.3.68) and

Consultee	Date / Document	Comment	Response / where addressed in the ES
		Baseline population / community health data (quantitative and qualitative) should be sufficient to represent current health status and identify areas or groups with poor health or inequalities. This should provide sufficient information on the physical and mental health and wellbeing and social determinants of health for the affected populations and any vulnerable groups identified. A baseline health assessment could include: • General population data (including size, density, age, gender, income and employment, socio-economic status, crime and disorder etc, health status.) • Environmental information (housing, transport, access to services, provision and access to green space, tranquillity or sound environment) • Data on behaviour, such as levels of physical activity, smoking, car usage, walking and cycling • Surveys of local conditions • Local concerns and anxieties (where documented) • Secondary analysis of existing local data • Resident surveys or consultations • Health status, particularly of the population groups already identified as vulnerable and likely to benefit or be harmed by the proposal. This should include mental health and suicide. • Quality of life indicators (if available / relevant) • Local people's views of the area and of the services provided (community engagement exercises) There will be a range of publicly available health data including: • National datasets such as those from the Office of National Statistics, • PHE, including the fingertips data sets, • Non-governmental organisations, • Local public health reports, such as the Joint Strategic Needs Assessment and Health and Wellbeing Strategies; • Consultation with local authorities, including public health teams • Information received through public consultations, including community engagement exercises	referenced throughout this chapter. The datasets used to inform this chapter are listed in Section 28.4.2.

Consultee	Date / Document	Comment	Response / where addressed in the ES
		There should be a narrative which interprets the data collected in the context of the project. A list of tables and data is not sufficient, so the report should consider: • Are particular groups or vulnerable groups likely to be impacted more than others and is this clearly described and explained? • What indicators within the current health baseline that are worse than England average/ local ward or LSOA levels? • What are the levels of inequality in the study area? • What are the potential inequalities in the distribution of impacts?	
		Mitigation If the assessment has identified that significant negative effects are likely to occur with respect to the wider determinants of health, the assessment should include a description of planned mitigation measures the applicant will implement to avoid or prevent effects on the population. Mitigation and/or monitoring proposals should be logical, feasible and have a clear governance and accountability framework indicating who will be responsible for implementation and how this will be secured during the construction and/or operation of the NSIP. Any proposed mitigation should have sufficient detail to allow for an assessment of the adequacy of the proposed mitigation measures.	Embedded mitigation measures are presented in Section 28.3.5. Any mitigation measures referenced in technical topics feeding into the health assessment (as listed in Section 28.1) are also of relevance to the health assessment. Where necessary, proposed mitigation measures specifically for potential health impacts are detailed in Section 28.6.
		Positive benefits from the scheme The scale of many NSIP developments will generate the potential for positive impacts on health and wellbeing; however, delivering such positive health outcomes often requires specific enabling or enhancement measures. For example, the construction of a new road network to access an NSIP site may provide an opportunity to improve the active transport infrastructure for the local community. PHE expects developments to consider and report on the opportunity and feasibility of positive impacts. These may be stand alone or be considered as part of the mitigation measures.	The wider societal benefits of the Project are detailed in Section 28.6.3.3.

Consultee	Date / Document	Comment	Response / where addressed in the ES
		Employment NSIP schemes have the potential to negatively impact through the relocation or loss of local businesses. Equally they can offer an opportunity for new business activity and employment both at the construction stage and operation of the development approved by the DCO. There is clear evidence that good work improves health and wellbeing across people's lives and protects against social exclusion. Conversely, unemployment is bad for health and wellbeing, as it is associated with an increased risk of mortality and morbidity. For many individuals, in particular those with long-term conditions such as mental health problems, musculoskeletal (MSK) conditions and disabilities, health issues can be a barrier to gaining and retaining employment. Employment rates are lowest among disabled people, with only 51.3% in work, meaning there is a substantial employment rate gap in the UK between disabled and non-disabled people (81.4% in employment). Among these working age disabled people in the UK, 54% have a mental health or MSK condition as their main health condition. Enabling people with health issues to obtain or retain work, and be productive within the workplace, is a crucial part of the economic success and wellbeing of every community and industry. It is important that people are supported to gain employment and maintain economic independence for themselves and their families, especially as they age. This is of particular importance for individuals with long-term conditions and disabilities, due to the barriers they face in gaining employment and retaining a job. Where relevant any assessments should include: • The impact of business relocation in order to identify the likely level of job losses within the study area • The proposed support mechanisms to be established for business owners and employees • A clear strategy and action plan that addresses barriers to employment within the local population and those that cease employment due to the DCO.	Chapter 31 Socio-economics (Document Reference:3.1.33) considers effects on employment. Potential health effects are presented in Section 28.6.2.1.

Consultee	Date / Document	Comment	Response / where addressed in the ES
		Compulsory purchase NSIP schemes can involve the compulsory acquisition of property from land take. Mitigation will involve supporting home-owners and tenants in understanding and utilising the compensation and support offered through the compensation policies. The impacts from compulsory acquisition of land and property can affect health and wellbeing, including mental health, for example from home, school and employment relocation and loss of employment. This will be particularly relevant to sensitive receptors within communities, many of which will form part of the private rented sector. Compensation and support can be an important element of mitigation, but developers should consider opportunities to work through partners and local Voluntary, Community and Social Enterprise (VCSE) organisations. These organisations offer the potential for engagement with vulnerable groups and may gain greater acceptance by the wider community. Any compulsory purchase support schemes should ensure sufficient competency in public health, including public mental health, in order to help support local communities. The aim would be to establish a workforce that is confident, competent and committed to: • promote good physical and mental health across the population prevent mental illness and suicide • improve the quality and length of life of people living within affected communities The public mental health leadership and workforce development framework published by PHE offers a skills framework for the wider public health workforce. As well as the competences in this framework. Health Education England (HEE) have published a course content guide entitled Public Mental Health Content Guide For introductory courses or professional development in mental health and wellbeing.	The location of the onshore project area has been identified to minimise the need for compulsory purchase of land as far as practicable, to minimise the risk of adverse effects upon landowners – including their mental health – arising from the construction of the Project. Details of the Project's site selection process are provided in Chapter 4 Site Selection and Assessment of Alternatives. The Applicant is endeavouring to acquire land and rights by voluntary agreement wherever possible and is continuing to engage with affected persons on that basis. Notwithstanding, compulsory acquisition powers are necessary to ensure the Project can be delivered. As compulsory acquisition powers are sought in the DCO application, the justification for these powers is set out in the Statement of Reasons (6.5).

Consultee	Date / Document	Comment	Response / where addressed in the ES
		Monitoring PHE expects an assessment to include consideration of the need for monitoring and the ES should clearly state the principles on which the monitoring strategy has been established, including monitoring in response to unforeseen impacts or effects. It may be appropriate to undertake monitoring where: • Critical assumptions have been made in the absence of supporting evidence or data • There is uncertainty about whether significant negative effects are likely to occur and it would be appropriate to include planned monitoring measures to track their presence, scale and nature. • There is uncertainty about the potential success of mitigation measures • It is necessary to track the nature of the impact or effect and provide useful and timely feedback that would allow action to be taken should negative effects occur The monitoring strategy should set out: • Monitoring methodologies • Data sources, particularly if being obtained from third parties or open access data • Assessment methods • Publication methodology • Reporting frequency • Temporal and geographic scope For very large controversial schemes it may be worth considering the need to have an independent organisation undertake / report on the monitoring and the need for academic robustness.	Proposed monitoring is detailed in the relevant ES chapters referenced in this chapter (as listed in Section 28.1).
UK Health Security Agency	14.07.2023 / Consultation Response Letter to the PEIR	The health of an individual or a population is the result of a complex interaction of a wide range of different determinants of health, from an individual's genetic make-up to lifestyles and behaviours, and the communities, local economy, built and natural environments to global ecosystem trends. All developments will have some effect on the determinants of health, which in turn will influence the health and wellbeing of the	Noted. All four themes have been addressed in this and the following chapters as relevant: ES Chapter 22 Land Use and Agriculture (Document Reference: 3.1.24), ES Chapter 27 Traffic and Transport (Document

Consultee	Date / Document	Comment	Response / where addressed in the ES
		general population, vulnerable groups and individual people. Although assessing impacts on health beyond direct effects from, for example emissions to air or road traffic incidents is complex, there is a need to ensure a proportionate assessment focused on an application's significant effects. We have assessed the submitted documentation and wish to make the following comments: **Human Health and Wellbeing** This section of OHIDs response, identifies the wider determinants of health and wellbeing we expect the Environmental Statement (ES) to address, to demonstrate whether they are likely to give rise to significant effects. OHID has focused its approach on scoping determinants of health and wellbeing under four themes, which have been derived from an analysis of the wider determinants of health mentioned in the National Policy Statements. The four themes are: • Access • Traffic and Transport • Socioeconomic • Land Use	Reference: 3.1.29) and ES Chapter 31 Socio-economics (Document Reference: 3.1.33).
Tendring District Council	14.07.2023 / Consultation Response Letter to the PEIR	The Council, as previously stated, is extremely concerned about the health risks posed to residents within proximity to electro-magnetic fields - as demonstrated through considerable research and peer-reviewed scientific data in relation to childhood cancer. There will be considerable noise emanating from substations - again raising concern about proximity to people's homes. The sterilisation of agricultural land along the route of the underground power connections seems to have been given little weight in consideration of the preferred options for both Norwich to Tilbury and, consequently, this project – which could be avoided through achieving an offshore solution.	Electric and magnetic fields (EMF) are considered in Section 28.6.3.2. The effects from noise are presented in ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28) and in Section 28.6.1.1 and Section 28.6.3.1 of this chapter.
Essex County Council	14.07.2023 / Consultation Response	It is noted that the assessment of effects on healthcare services is the subject of ongoing data collection and will be addressed in full in the ES submitted with the	Effects on local onshore infrastructure and services (housing and health) are considered in ES Chapter 31 Socio-economics

Consultee	Date / Document	Comment	Response / where addressed in the ES
	Letter to the PEIR	DCO. It is welcomed that the consultation documents include a specific chapter (Chapter 28) on Health Impacts of the development.	(Document Reference: 3.1.33) and ES Chapter 27 Traffic and Transport (Document Reference:3.1.29). Effects on health services are presented in Section 28.6.1.5.
Suffolk & North East Essex ICB	14.07.2023 / Consultation Response Letter to the PEIR	Thank you for identifying NHS Suffolk and North East Essex Integrated Care Board (SNEE ICB) as a prescribed consultee under section 42 of the Planning Act 2008 and/or Regulation 11 of the 2017 Infrastructure Planning (Environmental Impact Assessment) Regulations. SNEE ICB has reviewed the documentation provided for this consultation, along with the responses it previously submitted in one-one consultations carried out in March 2023, the Non-Statutory Public Consultation (December 2022) and Scoping Report (August 2021). It has also liaised with NHS partners in the local area and the following comments are a combined response on behalf of SNEE ICB and the following organisations: East Suffolk & North East Essex Foundation Trust (ESNEFT) East of England Ambulance Service NHS Trust (EEAST) North East Essex Health and Wellbeing Alliance Essex Partnership University Trust (EPUT) System partners are generally supportive of this proposal and can see the overall benefits of the scheme, as it is instrumental in introducing and harnessing renewable and affordable energy. The comments below, which we hope are helpful and supportive, build on the previous responses provided by SNEE ICB and its system partners to the earlier scoping exercise and consultations that have taken place and the subsequent review of the Preliminary Environmental Impact Report (PEIR).	Noted.
Suffolk & North East Essex ICB	14.07.2023 / Consultation	1.The ICB identified a need to ensure that the Environmental Statement (ES) provides details on how the potential increase in demand on all healthcare services in the	Traffic and transport effects of the Project (including driver delay to all vehicle users

Consultee	Date / Document	Comment	Response / where addressed in the ES
	Response Letter to the PEIR	areas surrounding the proposed development, as a result of an influx of additional temporary workers, will be mitigated against. 2. The ICB and its partners are pleased to see that a specific chapter (chapter 28) of the PEIR has been devoted to assessing the impact of the development on human health and in particular that a Health Impact Assessment (HIA) has been undertaken, which has looked at the health impact of various factors on the local population. 3.In addition the ICB and its partners acknowledge that chapter 31 of the PEIR assess the demand on local healthcare services caused by an influx of temporary workers required for the duration of the project. It is pleasing to see that the PEIR recognises the current significant capacity constraints within primary care services in the geographical area surrounding the project, the higher than average waits for ambulance services and for Accident and Emergency (A&E) services at the local acute hospitals. All of this contributes to the assessment that the sensitivity of the health care receptor as being high. 4. The PEIR also identifies that the pressure on local healthcare infrastructure, caused by the influx of construction workers, as minor adverse and not significant in terms of the Environmental Impact Assessment (EIA). 5.This is something that the ICB and its partners would challenge, as this assessment appears to have been made purely on the impact to primary care services and in particular the impact on the availability of the number of GPs per patient registrations. 6.The assessment in chapter 31 doesn't appear, at this stage, to have considered the impact on wider healthcare services outside of a GP service, for instance the availability of alternative non-GP services in a primary care setting, the impact on ambulance waiting times and A&E attendance for emergency and non-emergency situations. 7.This later point is especially relevant if the non-local temporary workforce are not expected to register with a local GP, as highlighted in chapter 31 of the PEIR. Instead they are more likely to attend one the local A&E or Urgent Treatment Centres (UTC) if they require access to local healthcare services.	(including emergency services)) have been considered in ES Chapter 27 Traffic and Transport (Document Reference: 3.1.29) and in Section 28.6.1.5. Effects on local onshore infrastructure and services (housing and health) are considered in ES Chapter 31 Socio-economics (Document Reference: 3.1.33) and ES Chapter 27 Traffic and Transport (Document Reference: 3.1.29). Effects on health services are presented in Section 28.6.1.5. Cumulative effects with other projects are presented in Section 28.8.3. A consultation meeting was held in September 2023 with the NHS Suffolk and North East Essex ICB jointly with the Five Estuaries. Meetings have been held with EEAST (26 March 2024 and 28 May 2024) and NHS Suffolk and North East Essex Integrated Care Board (ICB) (23 May 2024). Discussions are ongoing with the intention of reaching a jointly agreed Statement of Common Ground.

Consultee	Date / Document	Comment	Response / where addressed in the ES
		8.In addition this is increasingly relevant due to the cumulative effect of other NSIPs currently being planned for the locality, including but not limited to Sizewell C, widening of the A12 and the North Falls wind farm. 9.Hence the ICB and its partners would encourage the developer to continue to assess the impact of the project on the availability of healthcare services and develop solutions for how the points made above will be mitigated against in its final Environmental Statement (ES) that will accompany the Development Consent Order application (DCO). 10. In order to facilitate this the ICB and its partners are willing and available to undertake further engagements with the developer to fully assess the current capacity position in the overall local healthcare system, the impact of the influx of temporary workers on the system and the development of appropriate mitigating actions to address any acknowledged impacts. 11. Such an assessment will ensure that the likely demand on local healthcare services is fully understood and appropriate plans are agreed and put in place to address any identified shortfalls ahead of the DCO submission. These measures would also need to be captured as either requirements within the DCO approval process and/or via Section 106 planning obligations linked to attaining planning consent for the project.	
Suffolk & North East Essex ICB - ESNEFT Response	14.07.2023 / Consultation Response Letter to the PEIR	On behalf of our client, East Suffolk and North Essex NHS Foundation Trust (ESNEFT), we write to provide our response to the North Falls Offshore Wind farm Project's Stage 2 Consultation. This letter comprises a review of, and comments on, the Preliminary Environmental Impact Report (May 2023) in respect of potential impacts arising from the proposed development on ESNEFT'S acute healthcare facilities and services. Please note that the representations contained in this letter form part of an overall response from the Suffolk and North East Essex Integrated Care Board (ICB), which draws together comments from other healthcare providers on the likely impacts on their respective facilities and services arising from the proposed wind farm development. In response to the Stage 1 consultation, we note that Public Health England (PHE) identified a need to ensure that the Environmental Statement provides	Traffic and transport effects of the Project (including driver delay to all vehicle users (including emergency services)) have been considered in ES Chapter 27 Traffic and Transport (Document Reference: 3.1.29) and in Section 28.6.1.5. Effects on local onshore infrastructure and services (housing and health) are considered in ES Chapter 31 Socio-economics (Document Reference: 3.1.33) and ES Chapter 27 Traffic and Transport (Document

Consultee	Date / Document	Comment	Response / where addressed in the ES
		further detail to the acknowledgement of the potential demand on healthcare services including Primary and Secondary Care (including mental health). In addition, we note that the North East Essex Clinical Commissioning Group (CCG) requested that a review of ambulance emergency and non-emergency patient transport services is undertaken, with particular regard to the influx of additional temporary residents. ESNEFT has reviewed the Preliminary Environmental Impact Report (PEIR) published as part of the Stage 2 Consultation on the North Falls Offshore Wind farm Project and wishes to build on the previous consultation process and make the following comments. Chapter 28 of the PEIR (Human Health) acknowledges the impact of the proposed wind farm on the health of the existing population in relation to noise, amenity, air quality and contamination. The applicant's intention is to undertake further consultation with stakeholders to prevent or minimise the health impacts on local communities, which is welcomed. ESNEFT, together with other members of the ICB, would be pleased to liaise further with the applicant on these matters. Chapter 31 of the PEIR (Socio-Economics) refers to an increased demand for healthcare services that may arise as a result of workers involved in the project occupying temporary accommodation within the wider study area for a period of time during the construction and decommissioning phases. It is stated that there would be a requirement for up to 480 non-local workers during the construction of the development that could also potentially see additional family members relocate temporarily. Therefore, a large number of construction workers and additional family members may require basic health services or public ambulance and hospital services at some point whilst being temporarily relocated. It is noted that a review of health provision has been undertaken in relation to the Suffolk and North East Essex ICB area. This identifies that there are significant capacity constraint issues in North East Essex and Suffolk and on that basis, the sensitivity of the health care receptor is assessed as high. This recognition is welcomed, but we consider that it would be useful to specify whether this relates to acute and secondary healthcare facilities as well as primary care services.	Reference:3.1.29). Effects on health services are presented in Section 28.6.1.5. A consultation meeting was held in September 2023 with the NHS Suffolk and North East Essex ICB jointly with the Five Estuaries. Meetings have been held with EEAST (26 March 2024 and 28 May 2024) and NHS Suffolk and North East Essex Integrated Care Board (ICB) (23 May 2024). Discussions are ongoing with the intention of reaching a jointly agreed Statement of Common Ground.

Consultee	Date / Document	Comment	Response / where addressed in the ES
		It is acknowledged that the applicant's assessment of healthcare impacts arising from the proposals is the subject of ongoing work and will be fully addressed in the forthcoming Environmental Statement that will accompany the Development Consent Order application. The Trust welcomes this recognition that its services and facilities are likely to be affected by the project proposals and concurs that further work is required to ascertain the scope and scale of demand and the mitigation required to address the impacts. "Accordingly, it is requested that a Healthcare Impact Assessment (HIA) should be prepared by the applicant, in liaison with ESNEFT and the ICB. The HIA should be prepared in accordance with the advice and best practice published by Public Health England, the Essex Planning Officer's Association HIA Guidance Note, and the Suffolk County Council Guide to Infrastructure Contributions to establish the current capacity position of ESNEFT's facilities and services, the likely level of demand for those services and facilities arising from the development project, and the means by which that demand could be addressed. It is considered that the following information would be required to prepare the HIA: • The number of workers from outside the wider study area to be temporarily housed within ESNEFT's catchment area (temporary population); • The location of accommodation for the temporary population; • The ESNEFT healthcare facilities and services likely to be accessed by the temporary population and their current capacity position; and • The number of A&E attendances likely to arise over the construction and decommissioning phases. 18. Alternatively, ESNEFT and the other ICB members would look to commission their own HIA of the proposed project and would submit this for review as part of the consultation process."	
Suffolk & North East Essex ICB - East of England Ambulance Service	14.07.2023 / Consultation Response	Human Health The PEIR (Chapter 28 – Human Health) provides a summary of consultation responses received in relation to human health to date, and signposts to specific topic areas within the PEIR which are also relevant to the determinants of human health.	Traffic and transport effects of the Project (including driver delay to all vehicle users (including emergency services)) have been considered in ES Chapter 27 Traffic and

Consultee	Date / Document	Comment	Response / where addressed in the ES
	Letter to the PEIR	Table 28.26 within Chapter 28 summarises the potential likely significant effects on human health, and considers these by phase as follows; • Construction phase - 'minor adverse' in terms of noise, air quality, physical activity & journey times/ reduced access, 'negligible' for ground/ water contamination effects & 'moderate beneficial' for employment • Operational phase – 'minor adverse' in terms of noise, 'no effect' from Electric & Magnetic Field (EMF) sources, & 'moderate beneficial' for employment & wider societal benefits • Decommissioning phase – not yet finalised & expected to be no greater than the construction phase effects	Transport (Document Reference: 3.1.29) and in Section 28.6.1.5. Effects on local onshore infrastructure and services (housing and health) are considered in ES Chapter 31 Socio-economics (Document Reference: 3.1.33) and ES Chapter 27 Traffic and Transport (Document Reference: 3.1.29). Effects on health services are presented in Section 28.6.1.5.
		• No reference is made to EEAST's role as a health & blue light partner, or the baseline position and potential impacts arising on accident and emergency services and nonemergency patient transport services within the Project area.	EEAST's role as a health & blue light partner is acknowledged: baseline data on EEAST activity is in Section 28.5.6 and the effects of the construction workforce are assessed in Section 28.6.1.5. Meetings have been held with EEAST (26 March 2024 and 28 May 2024). Discussions are ongoing with the intention of reaching a jointly agreed Statement of Common Ground.
		The PEIR findings have been reviewed, however these documents would not (at this stage) provide for effective mitigation and management measures to address the impacts on EEAST summarised above, and below in the 'Principal Areas of Concern' section.	Noted, and this ES chapter has been updated since PEIR to include further detail regarding assessment and mitigation measures identified since PEIR.
		Project Environmental & Social Effects	-
		Review of the NFOWP Preliminary Environmental Information Report and related documentation, indicates that the Project's potential impacts (effects) on EEAST's	EEAST's role as a health & blue light partner is acknowledged: baseline data on EEAST activity is in Section 28.5.6 and the effects of

Consultee	Date / Document	Comment	Response / where addressed in the ES
		operational capacity, efficiency and resources (staff, vehicle fleet and estate assets) have not been baselined, sufficiently assessed or mitigated to date.	the construction workforce are assessed in Section 28.6.1.5.
		EEAST is therefore keen to work with SSERWE to ensure this omission is addressed by further information being prepared to inform - either a topic in the Environmental Statement or in accompanying technical documentation, to provide the basis for a robust DCO Application for Examination.	Meetings have been held with EEAST (26 March 2024 and 28 May 2024). Discussions are ongoing with the intention of reaching a jointly agreed Statement of Common Ground.
		In particular, EAST wishes to agree and secure suitable mitigation and management measures as part of the DCO Requirements and/ or via a Section 106 planning obligation (or Deed of Obligation) and have this position reflected within documentation to be submitted as part of the forthcoming DCO Application, and thereafter pursuant to a Statement of Common Ground in advance of the Examination.	Meetings have been held with EEAST (26 March 2024 and 28 May 2024). Discussions are ongoing with the intention of reaching a jointly agreed Statement of Common Ground.
		EEAST's principal areas of interest and concern are summarised below. EEAST Principal Areas of Interest & Concern Information for Inclusion Within Scope of the Environmental Statement or Accompanying Documentation & Related Mitigation & Management Measures The principal areas of Project interest and concern which are likely to significantly impact on EEAST's operational capacity, efficiency and resources - requiring necessary and appropriate mitigation and management measures are outlined below, in light of the information and assumptions presented in the PEIR at this Stage 2 Consultation.	
		Population Increase, Health & Wellbeing	-

Consultee	Date / Document	Comment	Response / where addressed in the ES
		It is evident that during the anticipated 4-5 year construction period, a significant number of construction workers are required to implement the onshore and offshore components of the Scheme. Information to determine the nature of the construction workforce, their home origin, health status, clinical dependencies, location of any temporary accommodation, which are factors likely to directly impact on both EEAST and its health partners (ICB) operational capacity, efficiency and resources, including its co-ordinated response with health and blue light partners, is currently insufficiently dealt with in the PEIR documentation. This information therefore needs to be presented and assessed as part of the Environmental Statement or accompanying documentation, with any necessary mitigation and management measures secured and implemented through DCO Requirements, and/ or via a Section 106 planning obligation or Deed of Obligation, as part of any Development Consent Order approval.	ES Chapter 31 Socio-economics (Document Reference: 3.1.33) states that the peak construction demand is for 471 workers, of whom 429 (91%) will be non-resident. Effects on local onshore infrastructure and services (housing and health) are considered in ES Chapter 31 Socio-economics (Document Reference: 3.1.33) and ES Chapter 27 Traffic and Transport (Document Reference: 3.1.39). Effects on health services are presented in Section 28.6.1.5.
		Transport, Community Safety, Health & Wellbeing Working Group	-
		In the light of the above, EEAST recommend that appropriate Terms of Reference, Membership and a Communications Strategy for a Transport, Community Safety, Health and Wellbeing Working Group is established, as soon as practicable, and in advance of the Examination. This would help to inform and assist the management of relevant aspects of the Project requiring a coordinated response from 'health and blue light partners', incorporating representatives from EEAST, NHS Suffolk & North East Essex ICB, East Suffolk North Essex Foundation Trust, Essex Partnership University Trust, Essex Police, Essex Fire & Rescue Service, Essex & Herts Air Ambulance and HM Coastguard.	Meetings have been held with EEAST (26 March 2024 and 28 May 2024). Discussions are ongoing with the intention of reaching a jointly agreed Statement of Common Ground.
		EEAST is an INTERESTED PARTY in this planning process, operating in close association with the Integrated Care Boards across the East of England, along with blue light partner organisations, such as Essex CC and Essex Police and Essex Fire & Rescue.	Noted.

Consultee	Date / Document	Comment	Response / where addressed in the ES
		EEAST welcomes the opportunity to respond to the Stage 2 (statutory) consultation for the North Falls Wind farm Project, and following review of the PEIR documentation raises Points of Concern, due to its omission to address EEAST's principal areas of interest and concern outlined above.	Noted
		EEAST considers that the Project is likely to have a significant impact on its operational capacity, efficiency and resources (incorporating its staff, vehicle fleet and estate assets) which have not been baselined or sufficiently assessed in the PEIR and associated documentation to date.	Meetings have been held with EEAST (26 March 2024 and 28 May 2024). Discussions are ongoing with the intention of reaching a jointly agreed Statement of Common Ground.
		The Project is therefore considered to adversely affect EEAST's ability to meet and deliver its targets and priorities (statutory duties) as a key healthcare and emergency services provider.	This has been raised at meetings with EEAST (26 March 2024 and 28 May 2024). Discussions are ongoing with the intention of reaching a jointly agreed Statement of Common Ground.
		Information including identified impacts arising from the development should therefore be presented and assessed, either as part of the Environmental Statement or in accompanying documentation, with necessary mitigation and management measures secured and implemented through DCO	Effects on local onshore infrastructure and services (housing and health) are considered in ES Chapter 31 Socio-economics (Document Reference: 3.1.33) and ES Chapter 28 Traffic and Transport (Document Reference: 3.1.29). Effects on health services are presented in Section 28.6.1.5.
		Requirements, and/ or via a Section 106 planning obligation or Deed of Obligation, as part of any Development Consent Order approval.	NFOW has indicated to EEAST that it does not intend to agree Section 106 planning obligation with EEAST. NFOW's approach is to reduce effects on the environment and on service providers, such as EEAST, through design and embedded mitigation and through

Consultee	Date / Document	Comment	Response / where addressed in the ES
			the Outline Code of Construction Practice (OCoCP) and communication protocols.
		It is recommended that an agreed approach is then reflected in a future Statement of Common Ground, to clarify the position reached and inform the Examination process.	Meetings have been held with EEAST (26 March 2024 and 28 May 2024). Discussions are ongoing with the intention of reaching a jointly agreed Statement of Common Ground.
		The measures ought to include a process to assist EEAST and its health and blue light partners to plan for and implement co-ordinated responses to construction phase (and any operational and decommissioning phase) Scheme impacts and incidents arising, to optimise patient outcomes.	It is agreed with EEAST that NFOW will take steps to minimise the number of incidents generated by the Project through commitments to safe working practices set out with the Code of Construction Practice (CoCP). Draft text outlining the measures set out within the OCoCP are appropriate for minimising incidents generated by the Project as far as possible.
		Early information exchange and liaison is therefore important to ensure an effective scheme design is developed, and robust EIA and related technical assessments are carried out, in order to inform the basis for mitigating and managing the impacts arising on EEAST and its health and blue light partners.	Noted.
		We trust this is of assistance and look forward to working with SSERWE in order to address the points raised.	Thank you for this response.
Little Bromley Parish Council	April 2024 / Targeted consultation	The cumulative effect of the currently planned North Falls onshore development together with those planned by Five Estuaries and National Grid is devastating for Little Bromley and is causing many residents anxiety and stress.	We note this response. The Applicant has taken account of the likely significant effects of the Project and of other developments. Care has been taken to reduce adverse impacts on the environment as well as on people who live and work close to the

Consultee	Date / Document	Comment	Response / where addressed in the ES
			activities of the Project. Cumulative effects with other projects are presented in Section 28.8.3. Likely significant effects on mental health have been considered throughout this chapter and attention is paid to likely significant effects on vulnerable populations. Vulnerable populations considered in the assessment are detailed in Section 28.3.2.1.2.
Canal and River Trust	April 2024 / Targeted consultation	We are the charity who look after and bring to life 2000 miles of canals & rivers. Our waterways contribute to the health and wellbeing of local communities and economies, creating attractive and connected places to live, work, volunteer and spend leisure time. These historic, natural, and cultural assets form part of the strategic and local green-blue infrastructure network, linking urban and rural communities as well as habitats. By caring for our waterways and promoting their use we believe we can improve the wellbeing of our nation. The Trust is a prescribed consultee in the Nationally Significant Infrastructure Projects (NSIPs) process. The Trust has reviewed your proposals and, considering the proposed works would not be within close proximity to our network, the Canal & River Trust have no comments to make on the proposals.	Noted.
East of England Ambulance Service	26.04.2024 / ETG meeting	Matters discussed included traffic and transport including severance and amenity, highway safety, driver delay, abnormal indivisible loads; assessment of human health impacts including construction safety (onshore and offshore); assessment of socio-economic impacts including the size of the non-resident construction workforce. It was agreed that a log of agreements and disagreements would be maintained and that this would be a precursor to a Statement of Common Ground.	Traffic and transport effects of the Project (including driver delay to all vehicle users (including emergency services)) have been considered in ES Chapter 27 Traffic and Transport (Document Reference: 3.1.29) and in Section 28.6.1.5. Effects on local onshore infrastructure and services (housing and health) are considered in ES Chapter 31 Socio-economics (Document Reference: 3.1.33) and ES Chapter 27 Traffic and Transport (Document

Consultee	Date / Document	Comment	Response / where addressed in the ES
			Reference: 3.1.29). Effects on health services are presented in Section 28.6.1.5.

28.3 Scope

10. A summary of the determinants of health that are scoped in, and therefore assessed in this chapter, are as follows:

    - The construction phase health assessment considers:
        - Noise;
        - Air quality;
        - Ground and/or water contamination;
        - Physical activity;
        - Journey times and access; and
        - Employment.
    - The operational phase health assessment considers:
        - Noise;
        - EMFs; and
        - Employment.

11. The wider societal benefits to health as a result of the Project are also discussed in Section 28.6.3.3.

28.3.1 Study area

12. North Falls is an extension project to the existing Greater Gabbard offshore wind farm. The North Falls array area is located in the southern North Sea, with the Project's transmission infrastructure connecting the array to landfall between Clacton-on-Sea and Frinton-on-Sea, Essex. The Project onshore export cables are then to be located within an onshore cable route connecting the landfall to the new proposed onshore substation west of Little Bromley, within the district of Tendring, Essex. Additional 400kV export cables will then connect the new onshore substation to the national grid connection point to be located adjacent to the onshore substation. The landfall, onshore cable route, onshore substation works area, 400kV onshore cable route and national grid connection point collectively comprise the onshore project area.

13. The onshore project area passes through the administrative areas of Tendring District Council and Essex County Council. A full description of the Project is provided in ES Chapter 5 Project Description (Document Reference: 3.1.7).

14. The study areas used in other chapters of the ES are also of relevance, but do not necessarily define the boundaries of potential health impacts, including physical and mental health. The health chapter uses study areas to broadly define representative population groups, relevant to determining sensitivity, rather than to set boundaries on the extent of likely significant effects.

15. The study areas have been divided into the following geographic area classifications:

    - Site-specific (the onshore project area (i.e. landfall, onshore cable route, onshore substation));

- Local (Tendring District);
- Regional (Essex County);
- National (England); and
- International.

16. The site-specific level considers localised effects through statistics collected for the ward level, as the Office for Health Improvement and Disparities (OHID) now reports 'Local Health' by ward level and not by Lower Layer Super Output Areas (LSOAs) (see ES Appendix 28.1, Document reference: 3.3.68).

17. The site-specific and local geographic study areas are shown in ES Figure 28.1 (Document Reference 3.2.24). The wards presented in Table 28.2 are the most representative of the population near landfall, in proximity to the onshore cable route and near the onshore substation. Other wards that the onshore cable route passes through are also presented, as well as the justification for choosing the representative wards, as it is not feasible and would be disproportionate to include all the wards crossed by the onshore cable route.

18. Some statistics (i.e. from the 2021 Census, index of multiple deprivation (IMD) and other deprivation statistics) are only available for LSOAs (i.e. site-specific) level and those corresponding to the representative wards presented in Table 28.2 are also provided. The site-specific LSOA study area is shown in ES Figure 28.2 (Document Reference 3.2.24). It is identified throughout this chapter and in ES Appendix 28.1 (Document Reference: 3.3.68) whether sites-specific statistics provided are ward or LSOA level; both are considered to be representative of the site-specific level.

Table 28.2 Representative wards (i.e. site-specific geographic level) for the various onshore elements

Onshore infrastructure element	Wards crossed by onshore project area	Representative ward of population*	Justification
Landfall	Thorpe, Beaumont & Great Holland	Thorpe, Beaumont & Great Holland (LSOA: Tendring 008G)	The indicative landfall extent is located within the ward of Thorpe, Beaumont & Great Holland.
Onshore cable route	Thorpe, Beaumont & Great Holland Weeley & Tendring Lawford, Manningtree & Mistley The Oakleys & Wix Stour Valley Ardleigh & Bromley The Bentleys & Frating	Weeley & Tendring (LSOA: Tendring 003E)	The ward of Weeley & Tendring is typically more deprived (Index of Multiple Deprivation (IMD) Score: 30.4 (OHID, 2022)) than the other wards along the onshore cable route, and therefore its consideration is consistent with assessing the worst-case scenario.

Onshore infrastructure element	Wards crossed by onshore project area	Representative ward of population*	Justification
Onshore substation works area and national grid connection point	Ardleigh & Bromley Lawford, Manningtree & Mistley Alresford & Elmstead	Alresford & Elmstead (LSOA: Tendring 005C)	The ward of Alresford & Elmstead is typically more deprived (IMD Score: 16.3 (OHID, 2022)) than the other wards at the onshore substation. While this ward covers the smallest proportion of the onshore substation, its consideration is consistent with assessing the worst-case scenario.
*These wards also correspond with the most deprived LSOA for each element			

19. The wards selected are not intended to indicate the area of effect, but rather the profile of the population potentially affected. Using the wards of Thorpe, Beaumont & Great Holland, Weeley & Tendring and Alresford & Elmstead to characterise the population near landfall, along the onshore cable route and near the onshore substation works area, respectively, is consistent with proportionately assessing a representative worst-case. Thereby it may be assumed that likely significant effects in other wards will be no greater, and likely less, than in those assessed.

28.3.2 Population groups

20. Ten broadly defined population groups have been identified within the study area adopted for the assessment presented in this chapter. The population groups have been split into geographic and potentially vulnerable population groups. The intention of grouping populations is to allow for consistent discussion across health issues. People falling into more than one group may be especially sensitive.

28.3.2.1.1 Geographic population groups

21. A total of six geographic population groups have been identified along the entire length of the onshore project area. These range in scale from site-specific to national scale. The identified geographic locations are as follows:

- The population near landfall between Clacton-on-Sea and Frinton-on-Sea (site-specific);
- The population along the onshore cable route (site-specific);
- The population near the onshore substation works area (site-specific);
- The population of Tendring District (local);
- The population of Essex County (regional); and
- The population of England and neighbouring countries (national and international).

22. The most relevant geographic scale is used for each determinant of health. For localised effects this is the site-specific level, where data availability allows this. For wider more diffuse effects, such as employment opportunities a broader geographic scale is the most appropriate basis for assessment.

28.3.2.1.2 Vulnerable population groups

23. Potentially vulnerable population groups are defined as those who are sensitive to changes associated with North Falls[1]. The following five population groups were identified within the study area:

- Children and young people;
- Older people (particularly those suffering with dementia);
- People living in deprivation (including those experiencing income and/or access/geographic vulnerability);
- People with heightened sensitivity e.g. spending more time in affected dwellings (e.g. due to low economic activity, home working, shift work, retirement, or ill health) and/or neurological conditions; and
- People with existing poor health (physical and mental health).

28.3.3 Temporal scope

24. The temporal scope has been defined in Table 28.3.

Table 28.3 Definitions of timescales used within this chapter

Timescale	Definition	Example
Very short term	Effects measured in hours, days or weeks	Effects close to a particular dwelling, associated with duct installation or cable pulling activity.
Short term	Effects measured in months	The construction stage accommodation for construction workforce.
Medium term	Effects measured in years	Local employment during construction.
Long term	Effects measured in decades	The operational stage.

28.3.4 Realistic worst case scenario

25. The final design of North Falls will be confirmed through detailed engineering design studies that will be undertaken post-consent. In order to provide a precautionary but robust impact assessment at this stage of the development process, realistic worst case scenarios have been defined in terms of the likely significant effects that may arise. This approach to EIA, referred to as the Rochdale Envelope, is common practice for developments of this nature, as set out in Planning Inspectorate Advice Note Nine (2018). The Rochdale Envelope for a project outlines the realistic worst case scenario for each individual impact, so that it can be safely assumed that all other scenarios within the design envelope will have less impact. Further details are provided in ES Chapter 6 EIA Methodology (Document Reference:3.1.8).

[1] 'Social disadvantage (social isolation or discrimination)' as defined in the IEMA Guide to Effective Scoping of Human Health in EIA (2022) was also considered but is judged not applicable to the effects associated with North Falls.

26. The realistic worst case scenarios for the likely significant effects scoped into the EIA for the health assessment are summarised in Table 28.4. These are based on North Falls parameters described in ES Chapter 5 Project Description (Document Reference: 3.1.7), which provides further details regarding specific activities and their durations.

27. The main grid connection options considered in the ES are outlined below:

- Option 1: Onshore electrical connection at a national grid connection point within the Tendring peninsula of Essex, with a project alone onshore cable route and onshore substation infrastructure;
- Onshore electrical connection at a national grid connection point within the Tendring peninsula of Essex, sharing an onshore cable route and onshore cable duct installation (but with separate onshore export cables) and co-locating separate project onshore substation infrastructure with Five Estuaries; or
- Option 3: Offshore electrical connection, supplied by a third party.

28. Grid connection Option 2 is considered the realistic worst case scenario for the health assessment, and for all the assessments which feed into it, with the exception of the socio-economic assessment (for which the worst case is either Option 2 (adverse effects) or 3 (beneficial effects)). Option 2 is described in detail in Table 28.4. Option 3 is described in ES Chapter 31 Socio-economics (Document Reference: 3.1.33).

29. Under Option 2, the Project's onshore infrastructure comprises the following elements:

- Landfall, where the offshore export cables are brought ashore;
- Onshore cable route, which includes space for temporary works for the installation of cable ducts and buried onshore export cables, including areas for temporary construction compounds (TCCs), construction and operation and maintenance accesses (including Bentley Road improvement works);
- Onshore substation, proposed to be located west of Little Bromley;
- Onshore substation works area, which includes land required for temporary construction, export cables, means of access, drainage, landscaping and environmental mitigation for the onshore substation;
- The search area for the East Anglia Connection Node (EACN) (the Project's national grid connection point), within which will be located the Project's national grid substation connection works.

30. Collectively, the footprint of the Project's onshore infrastructure is referred to herein as the 'onshore project area' and is shown on ES Figure 5.2 (Document Reference 3.2.3). The Project's onshore infrastructure outlined above is proposed to be located entirely within the Tendring peninsula of Essex.

Table 28.4 Realistic worst case scenario: Grid Connection Option 2

Potential impact	Parameter	Notes
Construction		

Potential for likely significant effects on:
• Noise
• Air quality
• Ground and/or water contamination
• Physical activity
• Journey times and/or reduced access
• Employment
	Landfall
	• Temporary horizontal directional drilling (HDD) compound work
	  ○ HDD temporary works area: 150 x 75m
	  ○ HDD length: up to 1.1km
	  ○ Max HDD depth 20m
	• Transition joint bay size = 4 x 15m
	• Duration: Up to 13 months (of which HDD = 6 months)
	• HDD to include 24 hour / 7 days working where required
		Relevant information on health is brought together in this chapter including assessing the findings and conclusions of other chapters within the ES.
		The worst case parameters presented here represent the worst case parameters that informed the assessments in other ES chapters (as listed in Section 28.1) but are included here for completeness.
		This chapter explains the public health implications of these determinants of health, as well as considering other determinants which may affect health and wellbeing.

	Onshore cable route
	• Cable burial depth: 0.9 to 2.0m
	• No. of temporary construction compounds (est.): 11
	  ○ Temporary construction compound (TCC) footprint: 150 x 150m (main) and 100 x 100m (satellite).
	• Indicative cable route width: 72m (open cut trenching), 90m (trenchless crossings), 130m (complex trenchless crossings)
	• No. trenches (max.): 4
	• Haul road width:
	  ○ 6m (within cable swathe)
	  ○ 10m (passing places, within cable swathe)
	• Overall duration: 18 – 27 months	

	Onshore substation • Permanent substation footprint: 280 x 210m • Indicative construction compound dimensions: 150 x 250m • Construction duration: 21 – 27 months	
Operation		
Potential for likely significant effects on: • Employment • Noise	Onshore substation • Permanent substation footprint: 280 x 210m • Onshore export cables: HVAC • Operational lifetime: 30 years	Relevant information on health is brought together in this chapter including assessing the findings and

Potential impact	Parameter	Notes
• EMF • Wider societal benefits	• Unmanned, only visits for maintenance staff and visitors	conclusions of other chapters within the ES. The worst case parameters presented here represent the worst case parameters that informed the assessments in other ES chapters (as listed in Section 28.1) but are included here for completeness. This chapter explains the public health implications of these determinants of health, as well as considering other determinants which may affect health and wellbeing.
Decommissioning		
No final decision has yet been made regarding the final decommissioning policy for the onshore project infrastructure including landfall, onshore cable route, 400kV cable route and onshore substation. It is also recognised that legislation and industry good practice change over time. However, it is likely that the onshore project equipment, including the cable, will be removed, reused, or recycled where practicable and the transition bays and cable ducts being left in place. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and will be agreed with the regulator. It is anticipated that for the purposes of a worst-case scenario, the impacts will be no greater than those identified for the construction phase.		

28.3.5 Summary of mitigation embedded in the design

31. This section outlines the embedded mitigation relevant to the health assessment, which has been incorporated into the design of North Falls (Table 28.5). Where other mitigation measures are proposed, these are detailed in the impact assessment (Section 28.6), where applicable.

32. This health assessment takes as its starting point the residual effects as assessed and determined in other relevant ES topic chapters, in order to prevent duplication of information. This includes taking into account relevant embedded and standard good practice mitigation. The embedded mitigation measures which have been identified within the topic specific chapters and further details of additional mitigation measures (i.e. those not embedded) are described in the relevant topic chapters (as identified in paragraph 3).

33. The Applicant will seek to work with local authorities and stakeholders to (whenever possible) prevent or minimise the health impacts on local communities and specifically vulnerable groups.

Table 28.5 Embedded mitigation measures

Parameter	Mitigation measures embedded into North Falls design

Site selection	The Applicant has undertaken an extensive site selection process, which has involved the prevention or minimisation of potential disturbance effects, such as:
	• at landfall:
	  ○ avoiding areas with substantial infrastructure or urban land use, e.g. areas of housing, and other energy infrastructure (including nuclear energy land)
	  ○ options that could facilitate co-location of cable landfall infrastructure with other known developers who may be connecting to the national grid at a similar location and therefore using a similar landfall (subject to being able to make realistic assumptions about other developers' proposals)
	• along the onshore cable route:
	  ○ routing was kept as straight and short as practicable
	  ○ avoiding residential titles (including whole garden) where possible
	  ○ minimising the number of crossings of assets (e.g. utilities)
	  ○ minimising the number of road and rail crossings
	  ○ minimising the number of hedgerow crossings
	  ○ minimising the number of watercourse crossings and number of ponds affected
	  ○ options that could facilitate co-location of cable infrastructure with other known developers who may be connecting to the national grid at a similar location and therefore using a similar landfall (subject to being able to make realistic assumptions about other developers' proposals)
	• at the onshore substation:
	  ○ avoiding land within residential titles (including whole gardens), where possible
	  ○ avoiding siting infrastructure within inner Special Protection Zone (SPZ) 1 and outer (SPZ2) source protection zones (SPZs), where possible
	  ○ options should keep the visual, noise and other environmental effects to a reasonably practicable minimum.
	
	Full details on the site selection process are described in ES Chapter 4 Site Selection and Assessment of Alternatives (Document Reference: 3.1.6).

Trenchless crossing	• At landfall, horizontal directional drilling (HDD) will be used in order to avoid disturbances to the public and access to the beach. • To avoid disruption to transport users, trenchless crossing techniques will be used in certain locations (shown in ES Figure 27.4 (Document Reference 3.2.23). and identified in ES Chapter 27 Traffic and Transport (Document Reference:3.1.29)).

Parameter	Mitigation measures embedded into North Falls design

Roads	Likely significant effects on journeys times and access will be minimised through the following:
	• An outline Construction Traffic Management Plan (OCTMP) (Document Reference: 7.16) is submitted with the DCO application.
	  ○ The DCO contains measures to control, monitor and enforce heavy goods vehicle (HGV) movements and would provide details of the mechanisms for managing design of accesses and offsite highway works.
	  ○ It also includes a 'Travel Plan' to manage the number of single occupancy car trips.
	  ○ Any restrictions requested or agreed with Essex County Council (or other relevant stakeholders) is managed through the CTMP.
	  ○ Additional embedded mitigation measures, such as access strategy, crossings, etc., for Project-generated traffic, including AILs, are detailed in ES Chapter 27 Traffic and Transport (Document Reference: 3.1.29).

EMFs	The Project will adopt the ICNIRP guidelines (1999, 2009, 2010) and Government voluntary Code of Practice on EMF public exposure Department of Energy and Climate Change, 2012). Such considerations are inherent to the detailed engineering considerations of cable specification and routing. Embedded design for EMF comprises the shielding of part of the cable which is designed to the ICNIRP guidelines (1998) 'Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz)' and guidelines (2010) 'Guidelines for limiting exposure to time-varying electric and magnetic fields (1Hz – 100 kHz)'. Overhead cables will not be used for North Falls. Embedded mitigation includes burying cables. EMF decreases rapidly with distance. Burying cables creates distance between any receptor at the surface (even directly above the cables) and the cable, resulting in a lower field than the cable itself generates. Relevant public EMF exposure guideline limits are noted in NPS EN-5 and would be complied with by the Project. These guidelines are long standing and have a high safety margin. The levels of exposure that they require would not pose a risk to public health. The Project will provide clear and non-technical information about the electrical infrastructure and its compliance with UK guidance. This information will explain that potential EMF risks have been eliminated through careful design and do not pose a risk to public health.
Workforce	The workforce would be professional and hard-working and would be focused on delivering the work safely, to a high specification and on schedule. The Applicant is committed to providing appropriate Occupational Health and Hygiene services for the construction and operational workforce. The Applicant would promote health and well-being, including occupational health and hygiene and good worker conduct through the preparation and implementation of a Code of Conduct in accordance with the principles in the CoCP, an outline version of which is submitted with the DCO application (Document Reference: 7.13). The Applicant provides clear standards for the conduct of its workforce, these include a Code of behaviour/conduct; Employee Rules; Health and Safety; Drugs, Alcohol and Substance Misuse, etc. Drug and alcohol testing would be an integral part of the occupational health service. The Applicant would require Contractors to put in place similar arrangements and enforce a commensurate standard of conduct across the workforce. The Applicant would ultimately reserve the right to remove persons from the Project in the event of unacceptable conduct. Health promotion information would be available to the workforce, e.g. at facilities provided for the construction workforce (see the OCoCP (Document Reference: 7.13)).

28.4 Assessment methodology

28.4.1 Legislation, guidance and policy

34. The following sections detail information on the key pieces of UK legislation, policy and guidance relevant to the assessment within this ES chapter. Further detail where relevant is provided in ES Chapter 3 Policy and Legislative Context (Document Reference: 3.1.5).

28.4.1.1 National Policy Statements

35. The assessment of potential impacts upon ES Chapter 28 Human Health (Document Reference 3.1.30) has been made with specific reference to the relevant legislation and guidance, of which the principal policy documents with respect to the Nationally Significant Infrastructure Projects (NSIPS) are the National Policy Statements (NPS). Those relevant to the Projects are:

- Overarching NPS for Energy (EN-1) (Department for Energy Security and Net Zero (DESNZ) 2023a);
- NPS for Renewable Energy Infrastructure (EN-3) (DESNZ 2023b);
- NPS for Electricity Networks Infrastructure (EN-5) (DESNZ 2023c);

36. The specific assessment requirements for ES Chapter 28 Human Health (Document Reference: 3.1.30), as detailed in the NPS, are summarised in Table 28.6 together with an indication of the section of the ES chapter where each is addressed.'

Table 28.6 NPS assessment requirements

NPS Requirement	NPS Reference	ES Reference
Overarching NPS for Energy (EN-1)		
To consider the likely significant effects, including benefits, of a proposal for a project, the applicant must set out information on the likely significant social and economic effects of the development, and show how any likely significant negative effects would be avoided, reduced, mitigated or compensated for, following the mitigation hierarchy. This information could include matters such as employment, equality, biodiversity net gain, community cohesion, health and well-being.	EN-1 paragraph 4.2.4	Employment is considered within this chapter, as well as ES Chapter 31 Socio-economics (Document Reference:3.1.33). Health and well-being is considered throughout this chapter.
Energy infrastructure has the potential to impact on the health and well-being ("health") of the population. Access to energy is clearly beneficial to society and to our health as a whole. However, the construction of energy infrastructure and the production, distribution and use of energy may have negative impacts on some people's health. The direct impacts on health may include • increased traffic, • air or water pollution, • dust, odour, • hazardous waste and substances, • noise,	EN-1 paragraph 4.3.1 and 4.3.2	The effects to health are considered in Section 28.6. The wider societal benefits of the Project are discussed in Section 28.6.3.3. Direct impacts to health are considered in ES Chapter 19 Ground Conditions and Contamination (Document Reference: 3.1.21), ES Chapter 21 Water Resources and Flood Risk (Document Reference: 3.1.23), ES Chapter 20 Onshore Air

NPS Requirement	NPS Reference	ES Reference
• exposure to radiation, and • increases in pests.		Quality (Document Reference:3.1.22), ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28), ES Chapter 27 Traffic and Transport (Document Reference:3.1.29), and this chapter summarises the results from these assessments and explains the public health implications.
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.	EN-1 paragraph 4.3.3	These types of health effects are considered in Section 28.6, and ES Chapter 22 Land Use and Agriculture (Document Reference: 3.1.24) and ES Chapter 27 Traffic and Transport (Document Reference:3.1.29).
As described in the relevant sections of this NPS and in the technology specific NPSs, where the proposed project has an effect on humans, the ES should assess these effects for each element of the project, identifying any potential adverse health impacts, and identifying measures to avoid, reduce or compensate for these impacts as appropriate.	EN-1 paragraph 4.3.4	The effects to health are considered in Section 28.6.
The impacts of more than one development may affect people simultaneously, so the applicant should consider the cumulative impact on health in the ES where appropriate.	EN-1 paragraph 4.3.5	Cumulative impacts on health are considered in Section 28.8.3.
Opportunities should be taken to mitigate indirect impacts, by promoting local improvements to encourage health and wellbeing, this includes potential impacts on vulnerable groups within society, i.e. those groups which may be differentially impacted by a development compared to wider society as a whole.	EN-1 paragraph 4.3.6	The differential impacts upon vulnerable groups are considered during the assessment described in Section 28.6. the breakdown of vulnerable groups within the study area is described in Section 28.5.1.
Generally, those aspects of energy infrastructure which are most likely to have a significantly detrimental impact on health are subject to separate regulation (for example for air pollution) which will constitute effective mitigation of them, so that it is unlikely that health concerns will either by themselves constitute a reason to refuse consent or require specific mitigation under the Planning Act 2008. However, not all potential sources of health impacts will be mitigated in this way and the Secretary of State may want to take account of health concerns when setting	EN-1 paragraph 4.3.7 and 4.3.8	General health effects as well as potential discharges are considered in Section 28.6, as well as ES Chapter 19 Ground Conditions and Contamination (Document Reference:3.1.21), ES Chapter 21 Water Resources and Flood Risk (Document Reference: 3.1.23), ES Chapter 20 Onshore Air

NPS Requirement	NPS Reference	ES Reference
requirements relating to a range of impacts such as noise.		Quality (Document Reference:3.1.22), ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28).
The planning and pollution control systems are separate but complementary. The planning system controls the development and use of land in the public interest. It plays a key role in protecting and improving the natural environment, public health and safety, and amenity, for example by attaching conditions to allow developments which would otherwise not be environmentally acceptable to proceed and preventing harmful development which cannot be made acceptable even through conditions. Pollution control is concerned with preventing pollution through the use of measures to prohibit or limit the releases of substances to the environment from different sources to the lowest practicable level. It also ensures that ambient air, water, and land quality meet standards that guard against impacts to the environment or human health.	EN-1 paragraph 4.11.2	Health effects related to this paragraph are considered in Section 28.6, as well as ES Chapter 19 Ground Conditions and Contamination (Document Reference:3.1.21), ES Chapter 21 Water Resources and Flood Risk (Document Reference: 3.1.23), ES Chapter 20 Onshore Air Quality (Document Reference:3.1.22), ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28).
Energy infrastructure development can have adverse effects on air quality. The construction, operation and decommissioning phases can involve emissions to air which could lead to adverse impacts on health, on protected species and habitats, or on the wider countryside and species. Air emissions include particulate matter (for example dust) up to a diameter of ten microns (PM10) as well as gases such as sulphur dioxide, carbon monoxide and nitrogen oxides (NOx).	EN-1 paragraph 5.2.1	Health effects related to air quality are considered in Section 28.6, as well as ES Chapter 20 Onshore Air Quality (Document Reference:3.1.22)
The government's policy is to ensure there is adequate provision of high quality open space and sports and recreation facilities to meet the needs of local communities. Connecting people with open spaces, sports and recreational facilities all help to underpin people's quality of life and have a vital role to play in promoting healthy living. Applicants will need to consult the local community on their proposals to build on existing open space, sports or recreational buildings and land. Taking account of the consultations, applicants should consider providing new or additional open space including green and blue infrastructure, sport or recreation facilities, to substitute for any losses as a result of their proposal.	EN-1 paragraph 5.11.6 and paragraph 5.11.9	Within the current onshore project area, there is no plan to build permanent infrastructure on any open space, sports or recreational buildings and land. Effects on local communities are considered in this chapter in relation to physical activity and mental health, as well as in ES Chapter 22 Land Use, and Agriculture (Document Reference: 3.1.24) and Chapter 32 Tourism and Recreation (Document Reference: 3.1.34).
Applicants should also identify any effects and seek to minimise impacts on soil health and protect and improve soil quality taking into account any mitigation measures proposed.	EN-1 paragraph 5.11.13	Health effects are considered in Section 28.6.1.3 and in ES Chapter 19 Ground Conditions and Contamination (Document Reference: 3.1.21).

NPS Requirement	NPS Reference	ES Reference
Operational noise, with respect to human receptors, should be assessed using the principles of the relevant British Standards and other guidance. The Secretary of State should not grant development consent unless they are satisfied that the proposals will meet the following aims, through the effective management and control of noise: • Avoid significant adverse impacts on health and quality of life from noise; • Mitigate and minimise other adverse impacts on health and quality of life from noise; • Where possible, contribute to improvements to health and quality of life through the effective management and control of noise.	EN-1 paragraph 5.12.9 and paragraph 5.12.17	Operational health effects in respect of noise are considered in Section 28.6.1.4 and ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28).
Government policy on hazardous and non-hazardous waste is intended to protect human health and the environment by producing less waste and by using it as a resource wherever possible. Where this is not possible, waste management regulation ensures that waste is disposed of in a way that is least damaging to the environment and to human health.	EN-1 paragraph 5.15.1	ES Chapter 19 Ground Conditions and Contamination (Document Reference: 3.1.21) considers likely significant effects from hazardous and non-hazardous waste.
During the construction, operation and decommissioning phases, developments can lead to increased demand for water, involve discharges to water and cause adverse ecological effects resulting from physical modifications to the water environment. There may also be an increased risk of spills and leaks of pollutants to the water environment. These effects could lead to adverse impacts on health […].	EN-1 paragraph 5.16.2	Potential health effects from potential pollutants to water resources are considered in Sections 28.6.1 and ES Chapter 21 Water Resources and Flood Risk (Document Reference:3.1.23).
NPS for Renewable Energy Infrastructure (EN-3)		
EN-3 contains relevant policy in relation to the assessment of transmission infrastructure for renewable energy installations, however there is no information specific to this human health chapter.		
NPS for Electricity Networks Infrastructure (EN-5)		
All overhead power lines produce EMFs. 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. 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.	EN-5 paragraphs 2.9.46 to 2.9.50 and 2.9.53 to	Based on the guidance documents referenced in NPS EN-5 along with other relevant guidance documents, consideration of EMF-related health effects is presented in 28.5.8 and Section 28.6.3.2. This includes the following sources cited (Council of the European Union, 2013; Council of the European Union, 1999; Environment Agency, 2012 ; HM Government of Great Britain & Northern Ireland, 1993; HM Government of Great Britain

NPS Requirement	NPS Reference	ES Reference
To prevent these known effects, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) developed health protection guidelines in 1998 for both public and occupational exposure […]. The reference levels are such that compliance with them will ensure that the basic restrictions are not reached or exceeded. Exceeding the reference levels does not necessarily mean that the basic restrictions will not be met; this would be a trigger for further investigation into the specific circumstances. For protecting against indirect effects, the ICNIRP 1998 guidelines give an electric field reference of 5kV m-1 for the general public and keeping electric fields below this level would reduce the occurrence of adverse indirect effects for most individuals to acceptable levels. When this level is exceeded, there is a suite of measures that may be called upon in particular situations, including provision of information, earthing and screening, alongside limiting the field. In some situations, there may be no reasonable way of eliminating indirect effects. The National Institute for Health Protection's (NIHP) Centre for Radiation, Chemical and Environmental Hazards (CRCE) provides advice on standards of protection for exposure to non-ionizing radiation, including the ELF EMFs arising from the transmission and use of electricity. In March 2004, the National Radiological Protection Board (now part of NIHP CRCE), published advice on limiting public exposure to electromagnetic fields. The advice recommended the adoption in the UK of the EMF exposure guidelines published by ICNIRP in 1998. These guidelines also form the basis of the Control of Electromagnetic Fields at Work Regulations 2016.Resulting from these recommendations, Government policy is that exposure of the public should comply with the ICNIRP (1998) guidelines. The electricity industry has agreed to follow this policy. Applications should show evidence of this compliance as specified in 2.10.11. The balance of scientific evidence over several decades of research has not proven a causal link between EMFs and cancer or any other disease. The NIHP CRCE keeps under review emerging scientific research and/or studies that may link EMF exposure with various health problems and provides advice to the Department of Health and Social Care on the possible need for introducing further precautionary measures. The Department of Health and Social Care's Medicines and Healthcare Products Regulatory Agency does not consider that transmission line EMFs constitute a significant hazard to the operation of pacemakers.		& Northern Ireland, 1999; HM Government of Great Britain & Northern Ireland, 2016; ICNIRP, 2009; ICNIRP, 2010; ICNIRP,1998; McKinlay, A.F., et al. 2004a; McKinlay, A.F., et al. 2004b; Stakeholder Advisory Group on ELF EMFs, 2007; Stakeholder Advisory Group on ELF EMFs, 2010).

NPS Requirement	NPS Reference	ES Reference
There is little evidence that exposure of crops, farm animals or natural ecosystems to transmission line EMFs has any agriculturally significant consequences.		

28.4.1.2 Other legislation, policy and guidance

37. In addition to the NPS, there are a number of pieces of legislation, policy and guidance applicable to the assessment of health. A summary of the key National and local policy and guidance considerations outside of the NPS is provided in Table 28.7.

Table 28.7 Additional relevant national legislation and local policy and guidance

Policy, legislation or guidance consideration	Relevance to health assessment
National legislation, policy and guidance	
The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations 2017)	The 2017 update of the EIA Regulations clarified that 'population and human health' was to be included in the list of topics to be considered in an EIA: *"The EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors – population and human health"*.
Health and Safety at Work Act 1974	The Act sets a duty on employers to ensure, so far as is reasonably practicable, the health, safety and welfare at work of all their employees. Similarly, employers must also ensure, so far as is reasonably practicable, that persons not in their employment are not exposed to risks to their health or safety as a result of activities being undertaken.
The Health Protection (Notification) Regulations 2010	Under the Public Health (Control of Disease) Act 1984, as amended by the Health and Social Care Act 2008, a suite of new regulations, The Health Protection (Notification) Regulations came into effect in April 2010, covering notifications, local authority powers and Part 2A Orders.
Clean Air Act 1993	The Act establishes measures to reduce pollution from smoke, grit and dust and gives local authorities powers to designate smoke control areas (HM Government of Great Britain & Northern Ireland, 1993).
Environmental Protection Act 1990 (EPA 1990)	Established a system of industrial process regulation and control on emissions. Part III of the EPA 1990 sets out control of emissions (including dust, noise and light) that may be prejudicial to health or a nuisance (HM Government of Great Britain & Northern Ireland, 1990).
Environment Act 1995	Led to the UK's first Air Quality Strategy in 1997. Placed duties on Local Authorities to review air quality and to designate Air Quality Management Areas where health-based standards are not met. The Air Quality (England) Regulations 2000 laid down ambient air quality standards for a range of air pollutants.
International Convention for the Prevention of Pollution from Ships (MARPOL) 1973	Regulations aimed at preventing and minimising, both accidental and operational, pollution from ships are included in the MARPOL (International Maritime Organisation, 1973).
The Bathing Water Regulations 2013 (as amended)	Regulations which transposed the Bathing Water Directive 2006/7/EC, and which safeguards public health and clean bathing waters.

Policy, legislation or guidance consideration	Relevance to health assessment
The Water Environment (Water Framework Directive (WFD)) (England and Wales) Regulations 2017	Regulations which transpose the WFD 2000/60/EC, and which sets out a commitment to protecting water bodies, including bodies of water designated as recreational waters.
Planning Practice Guidance (PPG) on EIA	The guidance explains the requirements of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017.
PPG on Healthy and Safe Communities	The guidance encourages the promotion of healthy and safe communities.
Institute of Environmental Management and Assessment (IEMA) (2017): Health in Environmental Impact Assessment	The guidance raises awareness of the implications of the 2017 revisions to the Environmental Impact Assessment legislation, in relation to population and human health in EIA (Cave et al., 2017a).
IEMA, 2020: Health Impact Assessment in Planning	The guidance brings together a selection of articles on health impact assessment in planning. It explores mechanisms by which health may be better integrated into the planning system as an integral part of EIA (Bagley et al., 2020).
IEMA Guide to Effective Scoping of Human Health in EIA (2022)	These are the most recently released guidance on the assessment of human health in EIA, both released in November 2022. They cover the consideration of health as a topic in EIA and presents a framework that supports a proportionate approach that can apply to all scales of EIA. They are applicable to the various EIA legislative processes within England, Wales, Scotland, Northern Ireland and the Republic of Ireland. The effective scoping guidance confirms that a wider determinant of health approach should be taking by EIA scoping and that the scoping exercise should be proportionate, focusing on the assessment to likely and potentially significant population health effects of a project. The guidance on determining significance discusses what 'significance' means for 'human health' as an EIA topic and responds to gaps and inconsistencies across existing guidance documents as to how health is assessed in EIA, particularly with regard to significance. The guidance provides greater consistency in assessment approaches, and provides tables on methodology criteria for determining health sensitivity, health magnitude, and significance conclusion and reasoning related to public health.
IEMA Guide to Determining Significance for Human health in Environmental Impact Assessment (2022)	
Institute of Public Health – Health Impact Assessment Guidance (2021)	This is Northern Irish and Republic of Ireland guidance, but it has relevance as a UK HIA guidance document as it provides relevant reference assessment methods.
International Association for Impact Assessment (IAIA) and European Public Health Association (EUPHA) – Human health: Ensuring a high level of protection (2020)	A reference paper on addressing human health in EIA, as per EU Directive 2011/92/EU amended by 2014/52/EU. This is the international consensus position from public health and impact assessment on the coverage of human health in EIA.
PHE, Health and Environmental Impact Assessment (2017)	PHE issued a briefing note on health in EIA for public health teams (Cave et al., 2017b).

Policy, legislation or guidance consideration	Relevance to health assessment
Department of Health and Social Care, 2010 – Health Impact Assessment of Government Policy	The specialist guidance provides general principles and is used as contextual guidance in the production of this chapter.
Environmental, Health and Safety Guidelines for Wind Energy. World Bank Group, 2015	The guidance advises that community health and safety hazards specific to wind energy include blade or ice throw, aviation impacts, marine navigation, electromagnetic fields, public access, and abnormal load transportation. Blade or ice throw impacts are unlikely to impact on local populations along the onshore cable route due to the distance of the projects from the coast (see ES Chapter 5 Project Description, Document Reference: 3.1.7).
PHE (2013) Electric and magnetic fields: health effects of exposure	This guidance has been used to consider the effects of electromagnetic fields (EMFs).
PHE (2020) Health Impact Assessment in spatial planning	This guide is for local authority public health and planning teams, however, supports the use of health impact assessment in the spatial planning process.
Review of the scientific evidence for limiting exposure to electromagnetic fields (0-300 GHz). NRPB, 2004	The NRPB published advice on limiting public exposure to electromagnetic fields and recommended the adoption in the UK of the EMF exposure guidelines published by the ICNIRP.
UK Stakeholder Advisory Group on Extremely Low Frequency Electric and Magnetic Fields (SAGE), 2010	This guidance has been used to consider the effects of EMFs.
Guidance Demonstrating compliance with EMF public exposure guidelines: voluntary code of practice (DECC, 2012)	The voluntary code of practice concerns situation where it is necessary to demonstrate compliance with the exposure guidelines that apply to public exposure to power frequency EMFs in the UK.
Industrial Strategy White Paper - Building a Britain fit for the future (HMSO, 2017b). Updated 2021 – The Grand Challenges.	Sets out the government's vision for the UK economy, with the Strategy's underlying motivation 'to create an economy that boosts the productivity and earning power throughout the UK'. The Industrial Strategy identifies five foundations, including investment in digital, transport, housing, low carbon and other infrastructure. Identifies clean growth as one of the main opportunities for the UK economy to take advantage of, through the 'development, manufacture and use of low carbon technologies, systems and services'. Offshore wind is one of the areas where the UK has world-leading capabilities. The Industrial Strategy aims to maximise the share of global markets taken up by UK businesses in the sector.
The Clean Growth Strategy, Leading the way to a low carbon future (HMSO, 2017c)	Connected to the UK Industrial Strategy, the Clean Growth Strategy seeks to ensure that economic growth goes hand in hand with greater protection for the natural environment. Within this is a commitment to help businesses and entrepreneurs seize opportunities of a low carbon economy, and specifically offshore wind.

Policy, legislation or guidance consideration	Relevance to health assessment
	Under its ambition to deliver clean, smart and flexible power the Clean Growth Strategy seeks to deliver a diverse electricity system that supplies homes and businesses with secure, affordable and clean power. The Strategy seeks to deliver this through the development of low carbon sources of electricity (including renewables) and acknowledges that the UK is well-paced to benefit and become one of the most advanced economies for smart energy and technologies.
National Planning Policy Framework (NPPF)	Emphasises that one of the overarching objectives of the planning system is to contribute to the achievement of sustainable development. In paragraph 148, NPPF explains that the planning system should support the transition to a low carbon future, and states that the planning system should shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and provide resilience to the impacts of climate change, whilst also supporting the delivery of renewable and low carbon energy and associated infrastructure. Section 8 (Promoting healthy and safe communities) is the key policy text for EIA health assessments in the NPPF. Paragraph 92 states: "Planning policies and decisions should aim to achieve healthy, inclusive and safe places …." Paragraph 100 states that "Planning policies and decisions should protect and enhance public rights of way and access…."
Noise Policy Statement for England (NPSE, 2010)	Paragraph 1.6 sets out the long term vision of the noise policy: "Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development." The long term vision is supported by the aims in paragraph 1.7: "Noise Policy Aims Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development: avoid significant adverse impacts on health and quality of life; mitigate and minimise adverse impacts on health and quality of life; and where possible, contribute to the improvement of health and quality of life."
UK Marine Policy Statement (MPS) (HMSO, 2011)	The MPS states that properly planned developments in the marine area can provide both environmental and social benefits, whilst also driving economic development, providing opportunities for investment and generating export and tax revenues. This includes the 'obvious' social and economic benefits from such an increase in network capacity, most notably the facilitation of offshore renewable energy.
Local policy and guidance	
Essex Healthy Places Guidance: Advice Notes for Planners, Developed and Designers, and The Essex Design Guide: Health Impact Assessments (Essex Planning Officers Association, 2019)	This planning guidance provides information around what the planning system should address within the environment to support better health and wellbeing in the Essex population.

Policy, legislation or guidance consideration	Relevance to health assessment
Essex Joint Health and Wellbeing Strategy (JHWS) 2022 - 2026 (Essex County Council, 2022)	The overall ambition of the Health and Wellbeing Board is to reduce the gap in life expectancy and reduce the differences between health outcomes in the population. To reach these long-term ambitions, the JHWS identifies five key overarching priority areas of focus in Essex: • Improving mental health and wellbeing • Physical activity and healthy weight • Supporting long term independence • Alcohol and substance misuse • Health inequalities and the wider determinants of health
Essex Joint Strategic Needs Assessment (JSNA): Tendring District Profile (Essex County Council, 2019)	This document presents data from a range of key topics which contribute to the overall health and wellbeing of residents of Tendring District.
Tendring District Local Plan 2013-2033 and Beyond: Section 1	Policy SP6 'Infrastructure & Connectivity' states that: "C. Social Infrastructure The local planning authorities will work with relevant providers and developers to facilitate the delivery of a wide range of social infrastructure required for healthy, active and inclusive communities, minimising negative health and social impacts, both in avoidance and mitigation, as far as is practicable." […] Health and Wellbeing […] Require new development to maximise its positive contribution in creating healthy communities and minimise its negative health impacts, both in avoidance and mitigation, as far as is practicable."

38. Further detail is provided in ES Chapter 3 Policy and Legislative Context (Document Reference: 3.1.5).

28.4.2 Data and information sources

39. This chapter has drawn information from the following chapters and the data sources presented within them:

- Chapter 19 Ground Conditions and Contamination;
- Chapter 20 Onshore Air Quality;
- Chapter 21 Water Resources and Flood Risk;
- Chapter 26 Noise and Vibration;
- Chapter 27 Traffic and Transport;
- Chapter 31 Socio-economics;
- Chapter 32 Tourism and Recreation; and
- Chapter 33 Climate Change.

40. Other sources that have been used to inform the assessment are listed in Table 28.8.

Table 28.8 Other available data and information sources

Source	Data Set	Spatial coverage	Year
MHCLG	Indices of Deprivation (MHCLG, 2019a to 2019e)	Neighbourhoods (i.e. LSOAs), aggregated to the UK, local authority and district level	2019
OHID	Local Health (OHID, 2022)	Site-specific (i.e. ward), local, regional and national	Variable
	Wider Determinants of Health (OHID, 2024a)	Local, regional and national	Variable
	Public Health Outcomes Framework (OHID, 2024b)	Local, regional and national	Variable
ONS	Census data	UK	2021
	Population projections for local authorities (ONS, 2020)	Local, regional and national	2018
	Mid-2020 population estimates (ONS, 2021a)	Site-specific, local, regional and national	2020
	LSOA population estimates (supporting information) (ONS, 2021b)	Neighbourhood (i.e. LSOA) aggregated to the UK, local authority and district level	2020

28.4.3 Impact assessment methodology

28.4.3.1 General approach

41. This section outlines the methodology used for the identification and assessment of any likely significant effects caused by the Project on human health, as is required by the EIA Regulations 2017.

42. The methods identify effects that either provide, or fail to provide, a high level of protection to health. This includes reasoned conclusions in relation to health protection, health improvement and/or improving services.

43. A framework is presented to determine the 'likelihood' of a project having an effect on health, and the 'significance' of an effect in terms of the EIA Regulations.

44. Effects are considered with regard to the general population and vulnerable groups.

28.4.3.1.1 Population conclusions

45. In line with relevant guidance set out in Section 28.3.2, with particular regard to the '*IEMA Guide to: Determining Significance for Human Health in Environmental Impact Assessment*' (IEMA, 2022a), a population health approach has been used, as it would be disproportionate to reach conclusions on the potential health outcomes of individuals. To take account of potential inequalities, where appropriate, conclusions on a particular health issue have been reached for more than one population. For example:

- One conclusion for the general population (or for a defined area); and

- A second separate sub-population conclusion for relevant vulnerable group (as a single defined class of sensitivities for that issue).

28.4.3.2 Health determinants

46. Health determinants are considered in order to understand the effects on human health and wellbeing. The methodology adopted in this chapter uses guidance in the 'IEMA Guide to Determining Significance for Human Health in Environmental Impact Assessment' (IEMA, 2022a) in addition to other industry good practice guidance by IEMA (Cave et al., 2017a), IAIA & EUPHA (2020), PHE (2020) and IPH (2021).

47. A wide variety of direct and indirect factors can influence health, from controllable factors such as lifestyle to uncontrollable factors such as genetics. The effects are often wide-ranging and are likely to vary between individuals.

48. In determining 'physical, mental and social wellbeing', external contributory factors, known as 'determinants', are considered. Determinants are made up of a combination of influences from an individual's society and environment.

49. This chapter adopts the 'wider determinants of health' model, illustrated in Plate 28.1 which is used to conceptualise how health spans across environmental, social, behavioural, economic and institutional components.

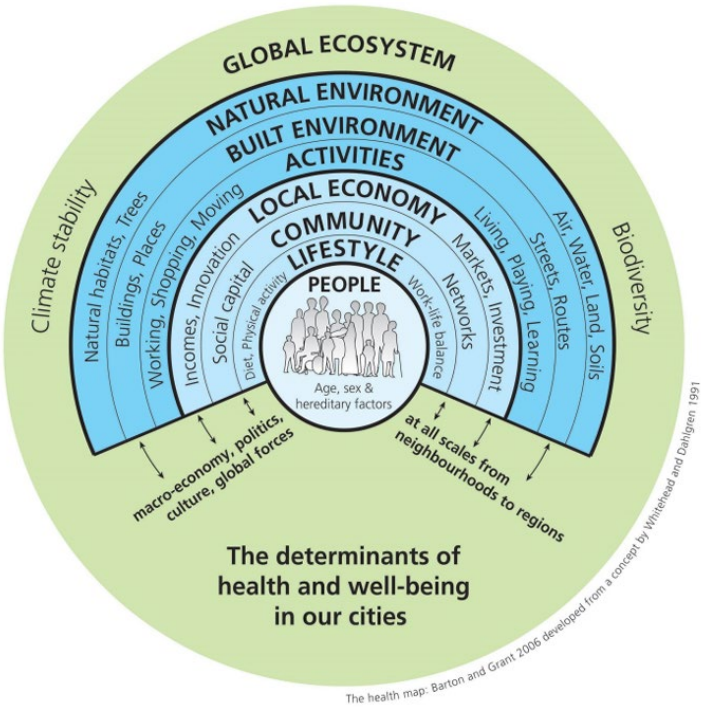

Plate 28.1 Wider determinants of public health (Source: based on the Dahlgren and Whitehead (1991) diagram as amended by Barton and Grant (2006)). Referenced in Cave et al. (2017a)

50. Changes in determinants have the potential to cause beneficial or adverse effects on health, either directly or indirectly. The degree to which these determinants influence health varies, and are dependent upon the degree of personal choice, location, mobility, and exposure.

51. An increase in air pollution is an example of a change in determinants leading to an adverse effect on health. Evidence suggests that exposure to fine

particulate matter ($PM_{2.5}$) increases mortality risk, particularly from heart and lung conditions (Air Quality Expert Group, 2012). On the other hand, reductions in noise from traffic may lead to decreased stress and have a beneficial effect on health.

52. It is important to note the relationship between determinants of health, risk factors and health outcomes, i.e. a change in a determinant of health may affect a risk factor for a particular health condition. However, a change in a determinant of health does not necessarily mean that all people will experience a change in their health outcomes.

28.4.3.3 Likelihood

53. The likelihood of a project having an effect is the first issue to consider as part of an assessment. A likely effect should be both probable and plausible:

- Plausible means there is a relevant source, pathway and receptor. Plausible effects relate to whether a causal relationship is adequately supported by the scientific literature.
- Probable relates to a qualitative judgement to exclude those effects that could only occur under certain very rare conditions, except where these relate to the Project's vulnerability to major accidents or disasters (as required by regulation 5(4) of the EIA Regulations 2017).

54. Likelihood considers the strength of evidence for there to be a source-pathway-receptor linkage in the particular circumstance of the Project.

55. The definitions of a source, pathway and receptor are as follows:

- A 'source' represents the features of the Project from which change originates (i.e. facility, structure, process, activity, vehicle fleet or workforce) and could lead to health outcomes of a receptor population.
- A 'pathway' describes the method or route by which the 'source' could affect the 'receptor' (either causation or association).
- A 'receptor' is the recipient of an effect from the 'source', via the 'pathway'.

56. Table 28.9 presents the 'Source-Pathway-Receptor' criteria, based on the definitions above, adapted from IEMA (2017) Box 5, which is used to identify plausible health effects.

Table 28.9 'Source-pathway-receptor' model used to identify plausible health effects

Source	Pathway	Receptor	Is there a plausible effect?	Justification
✓	✓	×	No	No receptors which would be sensitive and vulnerable are present.
✓	×	✓	No	There is no means of transmission from the source to a population.
×	✓	✓	No	There is no source from which a potential effect could instigate.
✓	✓	✓	Yes	Identifying a source, pathway and receptor does not mean a health impact is a likely significant effect. The particular circumstance of the Project should also be

Source	Pathway	Receptor	Is there a plausible effect?	Justification
				considered, as should the potential significance of the effect.

28.4.3.4 Significance – sensitivity and magnitude

57. Where a potential effect is considered to be likely, the determination of the significance of the effect is required.

58. The determination of significance has two stages:

- Firstly, the sensitivity of the receptor affected and the magnitude of the impact upon it are characterised. This establishes whether there is a relevant population and a relevant change to consider; and
- Secondly, a professional judgement is made (considering the sensitivity and magnitude conclusions together) as to whether the expected change in a population's health outcomes would be significant in public health terms. This judgement is explained using an evidence-based narrative setting out reasoned conclusions.

59. Table 28.10 and Table 28.11 summarise the EIA health assessment methodology scoring of sensitivity and magnitude from IEMA (2022a) guidance and can be applied consistently to all determinants of health. The tables support narrative conclusions. This approach shows how the general EIA methods of using sensitivity and magnitude to inform a judgement of significance are applied for health.

60. The approach uses professional judgement, drawing on consistent and transparent criteria for sensitivity and magnitude. It also references relevant contextual evidence to explain what significance means for health in terms of the importance, desirability or acceptability of a change in population health outcomes. This follows the European Commission (EC) definition of EIA significance that *"the assessment of significance relies on informed experts' judgements about what is important, desirable or acceptable with regards to changes triggered by the Project in question. These judgements are relative and must always be understood in their context…"* (EC, 2017).

61. The following general characteristics of how the 'general population' may differ from 'vulnerable group population' was considered when scoring sensitivity. These statements were not duplicated in each assessment and apply (as relevant) to the issues discussed for both construction and operation.

- In terms of life stage, the general population can be characterised as including a high proportion of people who are independent, as well as those who are providing some care. By contrast, the vulnerable group population can be characterised as including a high proportion of people who are providing a lot of care, as well as those who are dependant.
- The general population can be characterised as experiencing low deprivation. However, the professional judgment is that the vulnerable group population experiences high deprivation (including where this is due to pockets of higher deprivation within low deprivation areas).

- The general population can be characterised as broadly comprised of people with good health status. Vulnerable groups, however, tend to include those parts of the population reporting bad or very bad health status.
- The general population tends to include a large majority of people who characterise their day-to-day activities as not limited. The vulnerable group population tends to represent those who rate their day-to-day activities as limited a little or limited a lot.
- Based on a professional judgement the general population's resilience (capacity to adapt to change) can be characterised as high, whilst the vulnerable group population can be characterised as having limited resilience.
- Regarding the usage of affected infrastructure or facilities, the professional judgement is that the general population are more likely to have many alternatives to resources shared with the Project. For the vulnerable group population, the professional judgement is that they are more likely to have a reliance on shared resources.

Table 28.10 Health sensitivity methodology criteria (IEMA, 2022a)

Category/ level	Indicative criteria (judgment based on most relevant criteria, it is likely in any given analysis that some criteria will span score categories)*
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 and; • 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.
Negligible	• Very low levels of deprivation;

Category/ level	Indicative criteria (judgment based on most relevant criteria, it is likely in any given analysis that some criteria will span score categories)*
	• 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) and; • People with good health status; and/or people with a very high capacity to adapt.
*The narrative explains that the population or sub-population's sensitivity is driven by (select as appropriate, i.e. not all criteria will be of relevance in the determination of a sensitivity level)	

Table 28.11 Health impact magnitude methodology criteria (IEMA, 2022a)

Category/ Level	Indicative criteria (judgment based on most relevant criteria, it is likely in any given analysis that some criteria will span score categories)*
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 and; • 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 and; • 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 and; • 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 and;

Category/ Level	Indicative criteria (judgment based on most relevant criteria, it is likely in any given analysis that some criteria will span score categories)*
	• No service quality implication.
*The narrative explains that the population or sub-population's magnitude narrative explains that the magnitude of change due to the Project is driven by (select as appropriate, i.e. not all criteria will be of relevance in the determination of a magnitude level)	

62. The EIA health assessment is a qualitative analysis, following the IEMA (2022a) and IPH (2021) guidance approach, which draws on qualitative and quantitative inputs from other EIA topic chapters. This is considered the most appropriate methodology for assessing wider determinants of health proportionately, consistently and transparently.

28.4.3.5 Judgement framework for significance

63. Having established that a source, pathway and receptor for a plausible health effect exists (as set out in Section 28.4.3.3), the magnitude/sensitivity criteria are used to consider whether there is a relevant population to consider and a relevant change in health outcomes, a decision is made as to whether or not the change in a population's health is significant or not, as set out in Section 28.4.3.4.

64. The consideration of the sensitivity of the receptor and magnitude of the impact provides consistency between EIA topics. However, other relevant information sources (in addition to sensitivity and magnitude) also need to be evidenced for the professional judgement on significance to be a reasoned and robust conclusion on population health outcomes.

65. The EIA health chapter provides conclusions both as an assessment of effect significance, such as major, moderate, minor or negligible (adverse or beneficial), and a narrative explaining this score with reference to evidence, local context and any inequalities.

66. The approach uses a framework for reporting on a range of data sources to ensure reasoned and robust professional judgements are reached. Key sources of data include:

- scientific literature;
- baseline conditions;
- health priorities;
- consultation responses;
- regulatory standards; and
- policy context.

67. Table 28.12 and Table 28.13 summarise the EIA health assessment methodology scoring of significance. This can be applied to adverse and to beneficial effects.

Table 28.12 Generic indicative EIA health significance matrix (IEMA, 2022a)

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

68. Where the matrix offers more than one significance option, professional judgement is used to decide which option is most appropriate, as *"the matrix is only a tool to assist with judgement, there are not clear cut-off points between categories and terminologies, for example the point at which an impact changes magnitude category is a professional judgement and should be supported by evidence and justification"* (IEMA, 2022a).

Table 28.13 Health significance methodology criteria

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

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

69. The assessment provides reasoned conclusions for the professional judgement as to whether in EIA terms an effect is significant, or not. Where appropriate, variation expressed in each evidence source has been reported. This approach is considered proportionate and in line with industry good practice for the consideration of human health in EIA.

70. For the purposes of the ES, major and moderate effects are considered to be significant. In addition, whilst minor and negligible effects are not significant in their own right, it is important to distinguish these from other non-significant effects as they may contribute to significant cumulative effects.

71. Mitigation has been considered to reduce the significance where significant adverse effects are identified. Additionally, enhancements have been considered where significant and proportionate opportunities to benefit population health have been identified.

72. The residual effects represent the output of iterative assessment, taking into consideration the mitigation measures.

73. The health assessment takes as its starting point the residual effects as assessed and determined in other relevant ES topic chapters. This includes taking into account relevant embedded and standard good practice mitigation.

28.4.4 Cumulative effects assessment methodology

74. The health impact assessment methodology used for the CEA described in ES Chapter 6 EIA Methodology (Document Reference: 3.1.8).

75. The CEA considers the inter-relationships between health effects from the Project and relevant external projects. These are considered for the following project geographies:

- Landfall;
- Onshore cable route;
- Onshore substation;
- Locally, regionally, and nationally.

76. The likely significant effects are also considered for the vulnerable populations as in Section 28.4.3, as detailed in Section 28.3.2.1.2.

77. As with other chapters, in the consideration of inter-project cumulative effects, projects are screened for assessment based on a list agreed with local authorities. Then projects are considered for cumulative effect at different locations and for different vulnerable populations listed in Section 28.3.2.1.2.

28.4.5 Transboundary effects assessment methodology

78. The transboundary assessment considers the potential for transboundary effects to occur on health receptors as a result of North Falls. ES Chapter 6 EIA Methodology (Document Reference: 3.1.8) provides further details of the general framework and approach to the assessment of transboundary effects.

79. There are no transboundary health effects, as the onshore project area would not be sited in proximity to any international boundaries. Transboundary impacts are therefore scoped out of the assessment and not considered further.

28.4.6 Assumptions and limitations

80. The key limitations of data used within the baseline are:

- lags in the release of publicly available statistics;
- the effects of the Covid-19 pandemic on longer-term trends;
- applying scientific evidence from peer-reviewed literature to this specific Project.

81. The Covid-19 pandemic required social distancing and other non-pharmaceutical interventions (NPIS) to prevent and control Sars-Cov-2 transmission in the community. This affected, and continues to affect, longer-term trends in health and health inequalities. The assessment specifies the source and timeframe for the data, and it provides the context for the local data by including a regional and national comparator.

82. Scientific evidence on health determinants was reviewed to inform the assessment. The review is not exhaustive and provides a summary of the key issues relevant to this project and to the scope of this chapter.

83. None of the assumptions and limitations listed above are likely to affect the overall assessment of effects from the construction, operation and maintenance and decommissioning phases of the onshore project.

28.5 Existing environment

84. The existing environment has been categorised into the following general themes that are likely to have an effect on health:

- General population characteristics;
- Noise;
- Air quality;
- Ground and/or water contamination;
- Physical activity;
- Journey times and/or reduced access;
- Employment; and
- EMFs.

85. Details of the statistics used in this assessment are provided in ES Appendix 28.1 (Document Reference: 3.3.68). The data sources outlined in Table 28.8 have been used to inform the baseline for this health assessment.

86. The IMD (2019) has been consulted and referenced as appropriate, including sub-domains and underlying indicators (MHCLG, 2019a); the 2019 Index is the most recent information available. While more recent statistics have been collected for some health-related variables, the 2021 census is considered an appropriate baseline for use for some statistics in this health assessment (see Table 28.1.1 in ES Appendix 28.1, Document reference:3.3.68) as it provides consistent comparative data across the population groups used in the assessment.

28.5.1 General population characteristics

87. Details of the statistics used in this assessment are provided in ES Appendix 28.1 (Document reference: 3.3.68).

88. Landfall for the Project will occur between the seaside towns of Clacton-on-Sea and Frinton-on-Sea, Essex. The land within the onshore project area is predominantly rural and the local area is typified by small villages and individual residential properties. The onshore substation is located in the vicinity of the existing Lawford Substation, Essex, between the villages of Little Bromley and Ardleigh. The area is generally rural in nature, with solar farms located 1.1km west and 1.5km south-west of the onshore substation works area and a plant nursery approximately 1km to the north-west of the onshore substation works area.

89. The local population of Tendring has demonstrated low population growth between mid-2019 and mid-2020 (ONS, 2021). The projected population increase for the local Tendring area (9.1%) between 2018 and 2028 is higher

than both the regional (6.0%) and national (5.0%) averages over the same time period (ONS, 2020).

90. The wards (i.e. site-specific data) that are most representative near landfall, along the onshore cable route and near the onshore substation (see Table 28.2) are used where practicable in the section. All representative site-specific and local geographical areas considered have a higher percentage of retirement-aged people (i.e. population aged 65 years and over) when compared with the regional and national averages (see Plate 28.2).

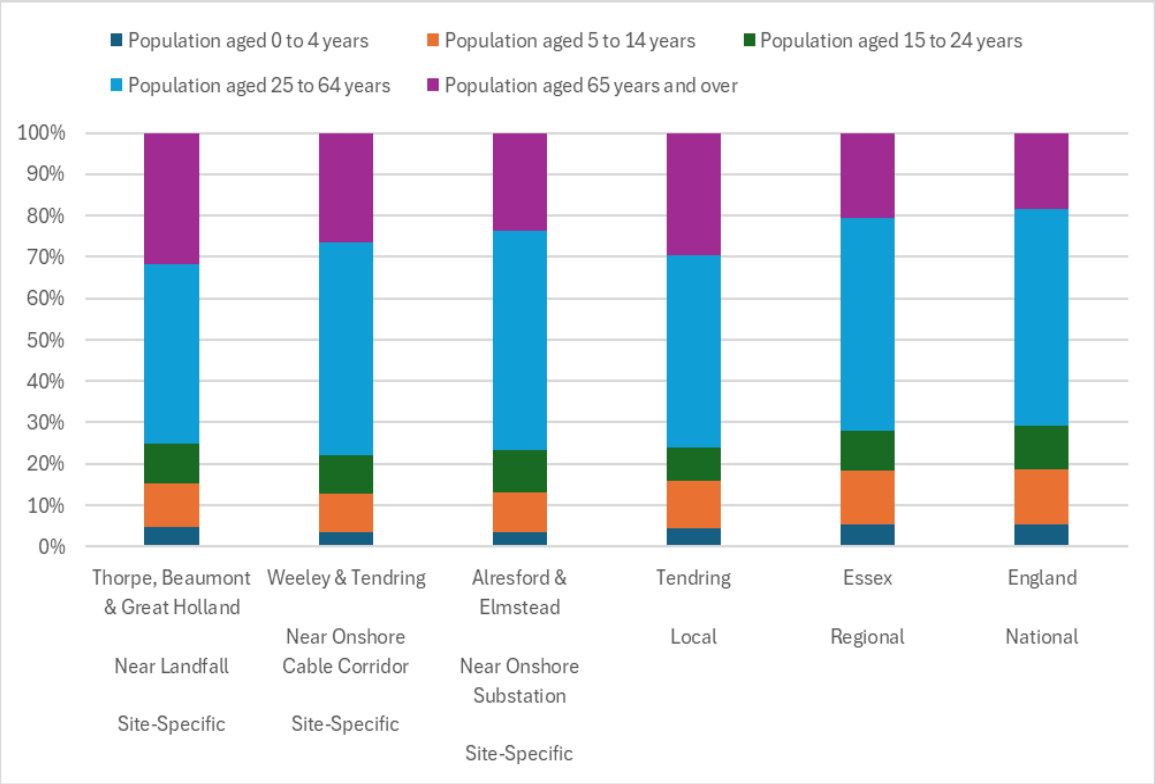

Plate 28.2 Resident Population Age Breakdown (Nomis, 2021)

91. Baseline statistics (which are provided in ES Appendix 28.1 (Document reference:3.3.68) and discussed further in Sections 28.5.2 to 28.5.8) show how near landfall, the general population are providing unpaid care and a higher proportion of people report their health as fair (14.1%) or bad/very bad (5.8%) than the regional (12.4% and 4.7% respectively) and national (12.7% and 5.2% respectively) averages. It should be noted that all site-specific averages are lower than the local Tendring averages (17.2% and 7.8% respectively). Life expectancy for women (83.6) is similar to the regional (83.5) average and higher than local (81.9) and national (82.9) averages, while life expectancy for men (76.4) is lower than the local (77.6), regional (79.8) and national (78.9) averages. The representative populations at landfall considered in this assessment are slightly below the median for overall deprivation (see Table 28.14) and a higher proportion of people report their day-to-day activities as limited a little (11.3%) or a lot (8.1%) compared to the regional (9.9% and 6.8% respectively) and national (10.0% and 7.3% respectively) average.

92. The general population along the onshore cable route are providing unpaid care, and a lower proportion of people report their health as 'good or very good' (79.9%) compared to regionally and nationally (82.9% and 82.2% respectively). Life expectancy for women is lower along the onshore cable route (81.2) compared to the local (81.9), regional (83.5) and national (82.8) averages. Life expectancy for men is lower along the onshore cable route (77.8) compared to the regional (79.8) and national (78.9) averages, but higher than the local (77.6) average. The representative worst case population along the onshore cable route considered in this assessment are among the 20% most deprived for overall deprivation (see Table 28.14) and a high proportion of people report their day-to-day activities as limited 'a lot' (8.6%) compared to regionally (6.8%) or nationally (7.3%).

93. The general population near the onshore substation are providing some unpaid care and a slightly higher proportion of people report their health as fair (13.4%) or bad/very bad (5.4%) as regionally (12.4% and 4.7% respectively) and nationally (12.7% and 5.2% respectively). Life expectancy for men (79.7) is higher than the local (77.6) and national (78.9) averages, but higher than the regional (79.8) average. Life expectancy for women (82.0) is higher than the local (81.9) average, but lower than the regional (83.5) and national (82.8) averages. The representative populations near the onshore substation considered in this assessment are slightly below the median (see Table 28.14) for overall deprivation and a high proportion of people report their day-to-day activities as limited a little (10.7%) or a lot (8.4%) compared to the regional (9.9% and 6.8% respectively) and national (10.0% and 7.3% respectively) average.

94. The majority of the onshore project area is largely located within agricultural land. The onshore cable route passes close to the small villages of Great Holland, Thorpe-le-Soken, Tendring Green and Tendring Heath, and passes close to some individual properties elsewhere along the approximate 24km onshore cable route.

95. Individual community infrastructure receptors that are sensitive and could potentially influence population health from the construction phase have been discussed in the other chapters (e.g. ES Chapter 20 Onshore Air Quality, Document Reference: 3.1.22). Such receptors include residential properties, schools, hospitals, footpaths, cycleways, etc. This chapter considers populations rather than community infrastructure receptors.

96. Five key overarching health priorities are identified in the Essex JHWS (Essex County Council, 2022) to reach the long-term ambitions of reducing the gap in life expectancy and the difference between health outcomes in the population. The overarching health priorities are:

- Improving mental health and wellbeing;
- Physical activity and healthy weight;
- Supporting long term independence;
- Alcohol and substance misuse; and
- Health inequalities and the wider determinants of health.

97. The overall health of people at the site-specific level is generally better than the local Tendring averages (see ES Appendix 28.1, Document Reference: 3.3.68 for further details).

98. Health deprivation can increase sensitivity to change and can affect all the topics detailed in Sections 28.5.2 to 28.5.8. Deprivation statistics for site-specific, local, regional and national level are provided in Table 28.14.

Table 28.14 2019 Health Deprivation Statistics (MHCLG, 2019a to 2019e)

Deprivation Statistic	Site-Specific (LSOA)			Local	Regional
	Near Landfall (Tendring 008G)	Near Onshore Cable Route (Tendring 003E)	Near Onshore Substation (Tendring 005C)	Tendring	Essex
				Rank of average rank*	
National (England) Total Rank	LSOA: 1 to 32,844*			Local Districts: 1 to 317*	Regions: 1 to 151*
For overall deprivation*	10,792	5,337	11,698	32	114
IMD decile**	4	2	4	-	-
Income rank*	9,839	14,110	21,361	36	109
Income decile**	3	5	7	-	-
Income deprivation in children (IDACI)*	4,660	21,182	29,656	30	101
Relative IDACI by neighbourhoods in England**	2	7	10	-	-
Income deprivation in older people (IDAOPI)*	19,186	16,358	21,014	75	107
Relative IDAOPI by neighbourhoods in England**	6	5	7	-	-
Employment rank*	9,759	6,370	13,365	22	111
Employment decile**	3	2	5	-	-
Education, Skills and Training rank*	9,477	14,798	13,865	12	64
Education, Skills and Training decile**	3	5	5	-	-
Health Deprivation and Disability rank*	10,956	5,157	11,185	34	112
Health Deprivation and Disability decile**	4	2	4	-	-
Crime rank*	19,199	4,009	18,523	96	94

Deprivation Statistic	Site-Specific (LSOA)			Local	Regional
	Near Landfall (Tendring 008G)	Near Onshore Cable Route (Tendring 003E)	Near Onshore Substation (Tendring 005C)	Tendring	Essex
				Rank of average rank*	
National (England) Total Rank	LSOA: 1 to 32,844*			Local Districts: 1 to 317*	Regions: 1 to 151*
Crime decile**	6	2	6	-	-
Barriers to Housing and Services rank*	5,684	743	1,869	211	54
Barriers to Housing and Services decile**	2	1	1	-	-
Living Environment rank*	21,336	3,294	4,856	153	132
Living Environment decile**	7	2	2	-	-
*Where 1 is the most deprived **Where 1 is most deprived 10% of LSOAs and 10 is least deprived 10% of LSOAs					

99. For overall deprivation, site-specific LSOAs are among the 20% most deprived (onshore cable route) and 40% most deprived (landfall and onshore substation). At a site-specific level, IDACI is among the 20% most deprived LSOAs (near landfall) to 40% (near the onshore cable route) and 10% (near the onshore substation) least deprived LSOAs, and IDAOPI is among the 40-60% least deprived LSOAs.

100. At a local level, Tendring is one of the 20% most deprived local district authorities in England, while at a regional level, Essex is one of the 30% least deprived regions in England.

101. The sensitivity of the affected population to potential health effects has given regard to site-specific (i.e. ward or LSOA depending on health statistic) data where possible. In some cases, health effects are presented at a local and regional level only as they are not reported on the site-specific level.

28.5.2 Noise

102. The environmental baseline for noise has been provided in ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28). The baseline and assessment for noise takes account of the existing quiet, rural nature of much of the surrounding environment.

103. The sensitivity of the affected population to noise effects has had regard to site specific (i.e. ward or LSOA) data (representative of the population near landfall, the onshore cable route and onshore substation, see Section 28.3.1) where possible. Baseline data is discussed accordingly, including reference to local or

regional indicators as appropriate, and the health baseline relevant to this topic is provided in ES Appendix 28.1 (Document Reference:3.3.68).

104. People who live near to the study area and spend extended periods at home may experience greater exposure duration (to project-related noise) than those who are absent during normal working hours. Baseline environmental data (see Table 28.1.1 of ES Appendix 28.1, Document Reference:3.3.68). show that near landfall, a slightly higher proportion of people in general spend extended periods at home, than at the regional or national level. This refers to long term unemployment, deprivation measures, and people aged over 65. Near the onshore cable route and the onshore substation, people generally spend less (or approximately the same amount of) time at home than at the local, regional or national level. This refers to the same parameters as previously mentioned.

105. Table 28.1.3 in ES Appendix 28. (Document Reference: 3.3.68) provides the measure indicators that are available for noise effects. These are not available at the site-specific level; therefore, local level statistics were considered to be representative. The rate of complaint about noise (crude rate, per 1,000 people) locally in Tendring (3.7) are less than regionally (6.7) and approximately half of the national complaint rate (12.0) The data on noise complaints were gathered in 2020/2021, during the Covid-19 pandemic, and are higher compared to data from 2019/2020, when people presumably spent less time at home.

28.5.3 Air quality

106. The environmental baseline for air quality is provided in ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22). Air quality effects are expected at the site-specific level. Baseline data are discussed accordingly, including reference to local or regional indicators as appropriate and the health baseline relevant to this topic is provided in ES Appendix 28.1 (Document Reference: 3.3.68).

107. As for noise, people who live adjacent to the onshore project area and spend extended periods at home may experience greater exposure durations (to project-related air pollution) than those who are absent during normal working hours, therefore some of the information provided in Section 28.5.2 is also of relevance to air quality.

108. Background air pollutant concentrations of $PM_{2.5}$ in Tendring are 'well below' (i.e. less than 75% of) the UK air quality $PM_{2.5}$ target of 25 µg/m^3, at 6.9 µg/m^3, which is less than the regional and national average which are both 7.4 µg/m^3 (see Table 28.1.3 in ES Appendix 28.1 (Document Reference: 3.3.68). As detailed in Chapter 20, background pollutant concentrations of NO_2, PM_{10} and $PM_{2.5}$ are well below and no greater than 50% of the health-based air quality Objectives and are anticipated to decrease further into the future. As detailed in Table 28.1.2 in ES Appendix 28.1 (Document Reference: 3.3.68), locally the fraction of mortality attributed to particulate air pollution (5.5%) is lower than the regional average (6.3%) and the national average (5.8%).

28.5.4 Ground and/or water contamination

109. The environmental baseline for ground conditions and water contamination is provided in ES Chapter 19 Ground Conditions and Contamination (Document

Reference: 3.1.21) and ES Chapter 21 Water Resources and Flood Risk (Document Reference: 3.1.23).

110. The potential for ground disturbance of historic contamination or new spills of pollutants (such as fuel or oil) to affect communities is dependent on proximity and behavioural exposure influences. This may include use of bathing waters or encountering in-situ or mobilised contamination (dust or aerosols) whilst in the outdoor environment.

111. Children are more vulnerable to water contamination compared to adults as, in proportion to their body weight, they would ingest comparatively more contaminant than adults. Thus, the proportion of the population who are children and the overall population density was considered.

112. The proportion of the population who are under the age of 15 and the population density estimate (2021 population estimates) are detailed in Table 28.1.1 of ES Appendix 28.1 (Document Reference: 3.3.68), and is provided below for the different geographic levels is:

- Site-specific:
  - Near landfall: 15.4%, 85 people/km^2
  - Along the onshore cable route: 12.7%, 152 people/km^2
  - Near the onshore substation: 13.2%, 167 people/km^2
- Local (Tendring): 15.8%, 441 people/km^2
- Regional (Essex): 18.5%, 435 people/km^2
- National (England): 18,5%, 435 people/km^2

113. The proportion of young people near the onshore project area is lower than locally, regionally or nationally, but currently higher than along the onshore cable route and the onshore substation. Site-specific population density estimates also show a much lower population density than locally, regionally or nationally, which is representative of the rural nature of the onshore project area.

28.5.5 Physical activity

114. Physical activity effects are expected at the site-specific level. Baseline data is discussed accordingly, including reference to local or regional indicators as appropriate. The health baseline relevant to this topic is provided in ES Appendix 28.1 (Document Reference: 3.3.68).

115. On a site-specific level, the health statistics reflect the older age profile (i.e. those over the age of 65) near landfall (31.8%), along the onshore cable route (26.5%) and near the onshore substation (23.7%) compared to the average for Essex (20.7%) or England (18.3%).

116. The proportion of people reporting their health as good or very good near landfall (80.0%), along the onshore cable route (79.9%) and near the onshore substation (81.3%) varies with location, when compared with the Tendring (75.0%), Essex (82.9%) and England (82.2%) averages. A similar variability is shown for people reporting their day-to-day activities as not being limited, where the site-specific areas are all higher than the local average, but lower than the

regional and national averages (see Table 28.1.1 in ES Appendix 28.1, Document Reference: 3.3.68).

117. At a local level, the percentage of physically active adults (63.5%) is lower than regional (67.7%) and national (67.3%) averages, whereas the percentage of physically active children/young people (49.7%) is the same as the regional (49.7%) average and higher than the national (47.0% respectively) average.

118. The representative populations around the onshore project area are lower than the median for relative health deprivation and disability (approximately 5,157 to 11,185 out of 32,844) (see Table 28.14). A higher proportion of households have access to a vehicle (89.8% to 91.3%) compared to the Tendring (79.9%), Essex (84.1%) and England (76.5%) averages, which would allow them to access wider physical activity opportunities (see Table 28.1.1 in ES Appendix 28.1, Document Reference: 3.3.68). However, the higher vehicle numbers may be associated with the rural nature of Tendring, and may influence people away from exercise.

28.5.6 Journey times and/or reduced access

119. The environmental baseline for traffic and transport has been provided in ES Chapter 27 Traffic and Transport (Document Reference: 3.1.29). Likely significant effects are considered at a site-specific and local level. Baseline data are discussed accordingly, including reference to local or regional indicators as appropriate, and the health baseline relevant to this topic is provided in ES Appendix 28.1 (Document Reference: 3.3.68).

120. The journey times and/or access effects are limited when reporting on smaller area statistics, such as to Access to Health Assets & Hazards (AHAH) presented in Table 28.15, which is a multi-dimensional index for Great Britain measuring how "healthy" neighbourhoods are and produced for the LSOA level (i.e. site-specific. Therefore, effects are also discussed at a local level.

Table 28.15 AHAH baseline site-specific statistics (source: Consumer Data Research Centre, 2022). The domains and deciles presented are out of a maximum of 100 and 10 respectively

Factor Representative LSOA	Landfall Tendring 008G	Onshore cable route Tendring 003E	Onshore substation Tendring 005C
AHAH Index (1-10 decile)[2]	23 (3rd best decile)	48 (5th best decile)	54 (6th best decile)
Health domain	86 (2nd worst decile)	95 (Worst decile)	95 (Worst decile)

[2] This factor is driven by the health domain, and specifically by access to healthcare services. This demonstrates the sensitivity of the local area to healthcare access disruption. 1st decile has the best access to health care, down to 10th decile which has the worst access to healthcare services.

Factor Representative LSOA	Landfall Tendring 008G	Onshore cable route Tendring 003E	Onshore substation Tendring 005C
Blue/green space domain	25 (3rd best decile)	7 (Best decile)	12 (2nd best decile)
Air quality domain	29 (3rd best decile)	44 (5th best decile)	49 (5th best decile)

121. Representative populations at the site-specific level travel further to work on average (21.6 to 28.3 km), than the local (19.5 km), regional (18.7 km) or national (14.9 km) average, especially near the onshore cable route (28.3 km) with average distance travelled nearly double the national average. This may be reflective of the rural nature of the location. The proportion of people walking and cycling for travel at least three days per week is lower at the local level (8.7% and 0.5%, respectively) when compared to the regional (13.8% and 2.4%) and national (15.1% and 2.3%) averages, which may suggest that people use other forms of transport for travel (i.e. private vehicle or public transport) and may also reflect both access availability and the age profile of the local population.

122. At the site-specific level, the travel time by walking, cycling, car or public transport to the nearest GP or hospital for representative populations near landfall and the onshore cable route is longer than the local, regional or national averages. Near the onshore substation, travel times are similar to the local, regional and national averages. The minimum journey time people at the local level have to travel to eight key services[3] by car, public transport, walking or by bicycle is longer than the regional and national minimum journey times. This again may be as a result of the rural nature of the study area.

123. Regarding ambulance service EEAST responded to 6.6 million category 1-4 calls between April 2022 and March 2023. In this time period, EEAST also handled 55,083 non-emergency conveyances (NHS England, 2024). EEAST states that an incident can range from emergency treatment and transport to hospital to a call to 999. In meetings with EEAST and NHS Suffolk and North East Essex Integrated Care Board (ICB) health stakeholders (see Table 28.1) stated that the number of NSIPs across the regional health care economy is a source of concern.

[3] The eight key services are medium sized centres of employment (500 to 4,999 jobs), primary schools, secondary schools, further education, GPs, hospitals, food stores and town centres.

28.5.7 Employment

124. The environmental baseline for employment is provided in Chapter 31 Socio-economics (Document Reference: 3.1.33). Potential employment effects were considered at a site-specific and regional level. Baseline data are discussed accordingly, including reference to local or regional indicators as appropriate, and the health baseline relevant to this topic is provided in ES Appendix 28.1 (Document Reference: 3.3.68).

125. The proportion of people in employment is lower at a local level (68.0%) when compared to the Essex (77.6%) and England (75.7%) averages (see Table 28.1.3 in ES Appendix 28.1 Document Reference: 3.3.68). The representative populations considered in this assessment are below the median of relative employment deprivation at a site-specific level, but are higher than the local ranking (see Table 28.14). Site-specific income deprivation ranges between 30% most deprived (near landfall) and 40% least deprived (near the onshore substation), and these are better than the local ranking.

126. Unemployment at the site-specific level is varied (2.5% near the onshore substation, 3.7% near landfall and 4.0% along the onshore cable route), and are lower than the local (6.0%), regional (4.1%) and national (5.0%) averages. As shown in Table 28.14, income deprivation in children (IDACI) and income deprivation in older people (IDAOPI) at the site-specific level is varied. The representative population near landfall are among the 20% most deprived LSOAs for IDACI, although representative populations along the onshore cable route and near the onshore substation are among the 40% and 10% least deprived LSOA respectively. These are better than the IDACI rank for the local level. IDAOPI ranges from the 50% most deprived to 40% least deprived at the site-specific level, and the IDAOPI at the site-specific level is better than at the local Tendring level.

127. The proportion of children living in absolute low income families at the local level (13.1%) is higher than the regional level (9.6%), but lower than the national level (15.3%). Fuel poverty at the local level (17.1%) is higher than the regional or national averages (11.4% and 13.1% respectively). At the local level, average weekly earnings (£451.40) and the gender pay gap (by workplace location) (18.6%) are worse than the regional (£505.00, 14.1%) and national (£496.00, 16.6%) averages. These statistics (see Table 28.1.3 of ES Appendix 28.1, Document Reference: 3.3.68) are not available for the site-specific level.

128. At the local level, long term claimants of Jobseeker's Allowance, the economic inactivity rate, employment and support allowance claimants are higher than the regional and national averages. The job density ratio is also lower than the regional and national averages. Again, these statistics (see Table 28.1.3 of ES Appendix 28.1, Document Reference: 3.3.68) are not available for the site-specific level.

28.5.8 EMF

129. A HVAC transmission system will be used for the transmission of the power from the array area to the onshore substation as part of the Project. Due to the fact that EMF from AC induces a current in a conducting medium and EMF from

Direct Current (DC) does not, two different exposure limits are considered under UK regulations.

130. In 2004, the National Radiological Protection Board (NRPB, 2004a) recommended the adoption of the International Commission on Non-ionising Radiation Protection (ICNIRP) 'Guidelines for Limits of Exposure to Static Magnetic Fields' guidance (1998).[4] The recommended values are summarised in Table 28.16.

Table 28.16 Recommended values for power frequencies

Public exposure level	Electric fields	Magnetic fields
Power frequency		
Basic restriction (induced current density in central nervous system)	2 mA/m^2	
Reference level (external unperturbed field)	5,000 V/m	100 µT
Field corresponding to the basic restriction	9,000 V/m	360 µT
Static		
Basic restriction	None	40,000 µT

131. The ICNIRP guidelines (ICNIRP, 1998) are designed to prevent external exposure to EMFs, with a large safety margin, that could cause currents to be induced in the body that are large enough to cause effects on nerves. The guidelines are based on current density. The ICNIRP guidelines recommend that the general public is not exposed to levels of EMFs able to cause a current density of more than 2 mA/m^2 within the human central nervous system (Table 28.16). This recommendation is described as the "basic restriction".

132. The ICNIRP guidelines also contain "reference levels". For the public, the reference level for electric fields is 5,000 V/m, and the reference level for magnetic fields is 100 µT. The EU Recommendation (Council of the European Union, 1999) uses the same values as ICNIRP (ICNIRP, 1998).

133. Under the ICNIRP guidelines, the limits adopted are the basic restrictions. The reference levels are used as guides to when detailed investigation of compliance with the basic restrictions is required. If the reference level is not exceeded, the basic restriction cannot be exceeded, and no further investigation is required. If the reference level is exceeded, the basic restriction may or may not be exceeded.

134. The Code of Practice on compliance (DECC, 2012) endorses this approach and gives the values of field corresponding to the basic restriction.

135. The Energy Networks Association (2017) explains that electric fields are produced by voltage and measured in volts per metre (V/m). Atmospheric static electric field at ground level is typically around 100 V/m in fine weather and during thunderstorms can rise to many thousands of volts per metre. The

[4] The NRPB joined the Health Protection Agency in April 2005, becoming the Radiation Protection Division, which then later became Public Health England in 2013 and UKHSA in 2021.

voltage system within homes is approximately 230 V. However, outside of houses, electricity is distributed at much higher voltages ranging from 11,000 V (11 kV) up to 400,000 V (400 kV). Generally, the higher the voltage the higher the electric field. Most buildings materials and trees are effective at screening electric fields.

136. Magnetic fields are produced by current and measured in microteslas (μT). The earth's static magnetic field varies over the surface of the globe and is about 50 μT in the UK. Anything which uses or carries mains electricity is a potential source of power-frequency magnetic fields, which modulate the Earth's steady natural fields. The strength of the magnetic-field modulation depends on the current carried by the equipment. In the case of a power line, this varies according to the demand for power at any given time. Unlike electric fields, magnetic fields are little affected by trees and ordinary building materials.

137. Both AC and DC fields exist in addition to the earth's steady natural fields. In AC, the voltage, current and corresponding EMF switches direction. Most transmission infrastructure in the UK uses AC. Within the UK, the frequency of AC mains electricity is 50 hertz (Hz, or 50 cycles per second). Any alternating magnetic field will induce an electric field, which in turn produces a current in a conducting medium. The human body is conducting and will therefore have a current induced in it – albeit, usually, a very small one.

138. Mains-powered AC appliances produce elevated magnetic fields whenever they draw current. Such fields generally fall as the inverse cube of distance, and thus are significant only within a metre or two of the appliances, as shown in Table 28.17. The cables will be buried to a depth of 0.9m to 2.0 metres (see Table 28.4).

Table 28.17 Typical magnetic field levels from common household mains appliances (source: National Grid, EMFs.info, Energy Networks Association (2017))

Factor	Magnetic field (μT)	
	Close to appliance	1 m distance
Vacuum cleaner	800	2
TV, Washing machine, Microwave	50	0.2
Electric oven	10	0.02
Fridge	2	0.01

139. The high-voltage underground cables to be installed for North Falls will be surrounded by a metal sheath/screen to provide mechanical protection. This eliminates the electric field outside the cable. The magnetic field is not affected by the metal sheath/screen.

140. Large electrical substations do not produce significant electric fields outside their boundary because the perimeter fence screens the electric field generated by any sources within the substation. There is equipment inside substations which produces magnetic fields. But the field falls rapidly with distance, and at the perimeter fence the magnetic field from inside the substation is usually approaching background levels.

141. The magnetic field immediately above a buried AC system has a strength of 20 – 24 μT (National Grid, EMFs.info, 2020). For comparison, this is approximately half of the magnetic field from a household electrical appliance at the same distance (Table 28.17).

28.5.9 Future trends in baseline conditions

142. In the event that North Falls is not developed, an assessment of the future conditions for health has been carried out and is described within this section.

143. The health assessment draws from several ES chapters (as listed in Section 28.1) and a detailed discussion of the predicted future baseline of each topic can be found in their respective chapters. A brief summary (of each topic) has been included in Table 28.18 for completeness; these statements refer to the lifetime of the Project.

Table 28.18 Future trends in topics the health assessments draws from

Topic	Summary of future trend over lifetime of Project
Noise and vibration	It is anticipated that there would be no change in overall baseline noise conditions in the study area.
Air quality	Future pollutant concentrations are anticipated to reduce from baseline levels.
Geology and ground conditions	The onshore project area is located within an area identified as containing sand and gravel resources. The potential extraction of sand and gravel resources within the onshore project area could alter baseline conditions. Climate change may mobilise pre-existing contamination, through more extreme weather (i.e. wetter winters and drier summers). Natural degradation of contaminants over time may result in a general improvement in ground conditions. Increases in urbanisation may increase agricultural pressures and expansion in the brownfield land, which could increase the potential for exposure to pre-existing sources of contamination.
Water resources and flood risk	A steady improvement in baseline geomorphology and water quality is expected. The surface drainage network is likely to change, with higher winter flows and lower summer flows with a greater number of storm-related flood flows. The drainage network is unlikely to remain stable over time and may revert to more natural river types in future. Groundwater quality and quantity is likely to improve in the future, although this would occur over long timescales.
Traffic and transport	Given the rate of technological advancement in decarbonisation of transport, and legal commitments to net-zero, it is anticipated that greenhouse gas (GHG) emissions will be reduced from current baseline levels. The contribution of decarbonisation from modal shift is harder to forecast, especially given the significant ongoing travel choice changes related to the Covid-19 pandemic. However, as noted in the *Decarbonising Transport (cited in ES* Chapter 27 Traffic and Transport (Document Reference: 3.1.29)): “It now seems likely some of the necessary short-term changes brought about by the pandemic, including the rise of home working, could remain for the longer-term and could become permanent shift in travel habits. This has created additional uncertainty for projecting forward transport usage and potential carbon emissions. It seems highly unlikely that the demand, patterns, timings, and modal choices of transport users across all forms of transport will simply return to those of 2019”.
Socio-economics	Total populations in Essex and Suffolk are anticipated to increase, with the largest increase in those aged 65 years and over. Employment in Greater Essex is anticipated to continue growing at a consistent rate of 0.6% per annum. Under a moderate climate change scenario, the health of the local, UK and global population may be adversely affected by reduced food production, warmer temperatures and increased natural disasters.

Topic	Summary of future trend over lifetime of Project
Climate change	The UK electricity grid mix currently includes a number of different energy sources, including gas, nuclear, onshore and offshore wind, coal, bioenergy, solar and hydroelectric. The growth of renewable energy is key to the UK's Energy Strategy and Net Zero targets, and a transition away from electricity generated by fossil fuels.

144. North Falls will contribute to a reduction in climate change, as it will lead to a reduction in greenhouse gas (GHG) emissions compared to equivalent power generation from fossil fuel combustion (especially without carbon capture), and will contribute significantly to the decarbonisation of the UK energy supply. This is discussed and detailed further in ES Chapter 33 Climate Change (Document Reference: 3.1.35). The GHG assessment concluded that the Project would have a beneficial impact in reducing GHG emissions, when compared to the relevant baseline scenario and will provide a renewable source of electricity which contributes beneficially to the UK's goal of achieving net zero emissions by 2050 – the role of the offshore wind sector is a focus of action to contribute to meeting this target.

145. The earliest possible date for the start of construction for the onshore elements of North Falls is 2027, with an anticipated operational life of 30 years, and therefore there exists the potential for the baseline to evolve between the time of assessment and point of impact. Outside of short-term or seasonal fluctuations, changes to the baseline in relation to health usually occur over an extended period of time.

146. Based on current information regarding reasonably foreseeable events over the next three to four years, the baseline environment is not anticipated to have fundamentally changed from its current state at the point in time when impacts occur.

147. The current baseline description in the section above provides a reflection of the current state of the existing environment. It is acknowledged that the health statistics referenced in this chapter (and in ES Appendix 28.1, Document Reference: 3.3.68) either predate the Covid-19 pandemic or have been recorded during the pandemic. Longer term trends and interventions in population health may influence the future baseline. NHS and social care, public health initiatives and government policies aim to reduce inequalities and improve the quality of life. The historic success of such interventions is increasingly challenged by national trends such as an aging population, rising levels of obesity, the Covid-19 pandemic and recruitment and retention of NHS staff.

148. It would not be proportionate (or consistent with the qualitative assessment approach taken) to quantitatively model the population's future health. This reflects the complexities of interactions between the wider determinants of health, as well as the potential for macro-economic changes in the next decade that are hard to predict, any predication would have such wide error margins that it would greatly limit the value of the exercise. Annual national population health trend forecasting is undertaken by the 'Health profile for England' publication series and was taken into account in qualitatively describing future trends relevant to the Project.

149. The baseline environment for operational/decommissioning impacts is expected to evolve as described in this Section, with the additional consideration that any changes during the construction phase will have altered the baseline environment to a degree (as set out in this chapter).

28.6 Assessment of significance

28.6.1 Likely significant effects during construction

150. This section details the likely significant impacts resulting from the construction phase of the Project. This is based upon the realistic worst case scenario, Grid Connection Option 2, as identified in Table 28.4. The sensitivity of the general population and vulnerable groups detailed in the following sections is regarded as the most conservative sensitivity unless otherwise stated.

151. Further detail on the temporal scope (i.e. construction timeframes) is provided in ES Chapter 5 Project Description (Document Reference: 3.1.7). The sensitivity, magnitude and significance have been determined based on the methodology presented in Section 28.4.3.

28.6.1.1 Impact 1: Noise effects

152. During the construction phase of the Project, there is a potential for noise to temporarily arise from construction activities and movement of Heavy Goods Vehicles (HGVs) across the onshore project area and associated highway links as well as increased traffic from construction workers.

153. The population groups relevant to this assessment, due to either proximity or vulnerability, are (as defined in Section 28.3.2):

- The population near landfall, the onshore cable route and onshore substation (site-specific) and along associated highway links (local);
- People with existing poor health (physical and mental);
- Children and young people; and
- Older people (particularly those suffering with dementia).

154. The key health outcomes relevant to noise as a determinant of health are:

- Cardiovascular health (associated with chronic noise effects);
- Mental health (including stress, anxiety or depression associated with chronic noise effects); and
- Cognitive performance of school children (Basner et al., 2014; Münzel et al., 2018; Dzhambov & Dimitrova, 2018).

155. The temporal scope for this potential effect (as described in Section 28.3.3) varies depending on the construction area of the Project, this is explained below in the discussion of magnitude.

156. The conclusions of ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28) are summarised below. The mitigation measures taken into consideration during the assessment are described in Chapter 26.

28.6.1.1.1 Source-pathway-receptor

157. A potential health effect is considered *likely* because, based on the methods described in Section 28.4.3, there is a *plausible* source-pathway-receptor relationship where:

- Source – the construction areas and transport operations;
- Pathway – noise transmission via pressure waves through the air; and
- Receptors – communities of people.

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

28.6.1.1.2 Sensitivity of receptor

159. The sensitivity of the general population and vulnerable groups (collectively grouped) is determined separately and characterised below (based on the methods described in Section 28.4.3.4.

160. The onshore project area has an ageing population, especially near landfall and along the onshore cable route, who may spend longer periods at home in affected dwellings. However, there is also a lower number of children as a proportion of the population. Income deprivation in children and older people at a site-specific level is similar or better than the median for England, with the exception of IDACI at landfall, and in general deprivation at site-specific level is better than for the wider local level.

161. Based on the baseline statistics provided in Section 28.5.1 and 28.5.2, the general population near landfall, along the cable route and near the onshore substation may be sensitive to change with a *low* sensitivity ranking. Any more sensitive individuals are covered within the vulnerable group population below.

162. Some people are more sensitive to changes in noise and in consideration of this, and the site-specific baseline population profile in Section 28.5.2, sensitivity is considered to be *medium to high*. Vulnerability in this case is particularly linked to:

- Age (both young people and older people);
- Existing poor health (e.g. long-term illness);
- People with heightened sensitivity e.g. spending more time in affected dwellings (e.g. due to low economic activity, home working, shift work, retirement, or ill health) and/or neurological conditions;
- Vulnerability due to deprivation or health inequalities; or
- Having strong views or high degrees of uncertainty about the Project (which may be associated with health effects, in some cases below thresholds that are generally considered to be acceptable).

28.6.1.1.3 Magnitude of impact

163. The conclusions of ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28) can be summarised as follows:

- Residual construction noise effects during the day, evening and weekends of negligible significance (i.e. not significant in EIA terms) at all noise sensitive receptors near landfall and the onshore substation after the

implementation of noise control measures which will be specified in the final CoCP;

- Residual construction noise effects at night of minor adverse significance (i.e. not significant in EIA terms) near landfall and the onshore substation (at night) after the implementation of noise control measures which will be specified in the final CoCP;
- Residual construction noise effects of negligible to minor adverse significance (i.e. not significant in EIA terms) at receptors near the onshore cable route, after implementation of mitigation measures which will be specified in the final CoCP;
- Residual road improvements to Bentley Road and the A120 noise effects of negligible to minor adverse significance (i.e. not significant in EIA terms) after the implementation of noise control measures which will be specified in the final CoCP.
- Residual construction road traffic noise effects of negligible to minor adverse significance (i.e. not significant in EIA terms), after the implementation of mitigation measures which will be specified in the final CTMP and CoCP, preparation of which will be secured by DCO Requirement.

164. The temporal scope for potential noise effects varies depending on the location along the onshore project area:

- At landfall – there is a short-term temporal scope at landfall of approximately 13 months (of which six months are for HDD works).
- Along the onshore cable route – for peak noise, there is a very short-term temporal scope, as the onshore cable route would be worked on in sections, and therefore works would be undertaken in the vicinity of a receptor for a maximum of weeks, i.e. less than a month, and not for the full duration of construction. For potential noise effects associated with the haul road and temporary construction compounds (TCCs), there may be a short- to medium-term temporal scope as the haul road will be operational in some cases for longer than the passing trenching works and the TCCs will operate in some cases for up to the full 27 months.
- At the onshore substation – there is a medium-term temporal scope of up to approximately 27 months.
- There is a medium-term temporal scope for noise related to project-generated traffic, as traffic will be generated throughout the whole construction phase of the Project. However, locally, the impacts will be short-term as the works move along the onshore cable route.

165. The level of noise experienced would be within working noise limits for temporary disruption, undertaken in accordance with the relevant British Standards identified in ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28) and as detailed above, residual impacts were either negligible or minor adverse, i.e. not significant in EIA terms. The extent of effects would be highly localised, and therefore only experienced by a very small number of people in local populations. The severity of noise effects would result in a minor change to quality of life and very few receptors would be affected at the same time as the cable route construction sections are progressed. Once

construction is complete, noise impacts would immediately cease. Therefore, the magnitude of change due to the Project can be characterised as negligible to low. At these levels, it is unlikely that there would be changes in the risk of developing a new health condition (morbidity) or of exacerbating an existing condition. Reductions in wellbeing associated with very short- to short-term, noise levels would be unlikely to persist beyond the period of elevated exposure.

28.6.1.1.4 Significance of effect

166. The conclusion of the assessment for population health on the general population is that any change due to the Project would be a negligible to low magnitude of impact on a receptor of low sensitivity. This represents an effect of minor adverse significance, i.e. not significant for the general population in EIA terms.

167. The conclusion of the assessment for population health is that any change due to the Project would be a negligible to low magnitude of change over the very-short, short or medium term on a receptor of medium to high sensitivity. This represents an effect of minor adverse significance, i.e. not significant for the vulnerable groups in EIA terms. Vulnerability in this case relates to carers, young children, retirement aged population, those with long term illness, and those who are unemployed or shift workers who are most likely to spend more of their time at home and who are living adjacent to the Project.

168. In line with the NPS EN-1 (DESNZ, 2023a) and the Noise Policy Statement for England (2010), it is considered that (based on the assessment in ES Chapter 26 Noise and Vibration, Document Reference: 3.1.28), the Project has avoided significant impacts for noise and vibration, has proposed additional mitigation in places where impacts are predicted, and will put in place measures to effectively manage and control noise. Therefore, there would be no residual long-term change in population health outcomes related to noise.

169. As such, change due to the Project would be well within the statutory guidelines for construction noise impacts. In addition, health priorities for the relevant study area are of low relevance to the determinant of health or population group affected by the Project.

170. Although the scientific evidence indicates a relationship between changes to noise and health outcomes, any changes that would result from the Project would likely contribute to only a slight and temporary change in the health baseline of the population. Whilst an adverse effect, it would have only a marginal effect on delivering health policy linked to noise and on contributing to narrowing health inequalities.

28.6.1.2 Impact 2: Air quality effects

171. During the construction phase of the Project, there is a potential for air quality to be temporarily affected by dust and fine particulates from construction activities and emissions from construction vehicles and non-road mobile machinery (NRMM).

172. The population groups relevant to this assessment, due to either proximity or vulnerability are (as defined in Section 28.3.2):

- The population near landfall, the onshore cable route and onshore substation (site-specific) and along associated highway links;

- People with existing poor health (physical and mental);
- Children and young people; and
- Older people (particularly those suffering with dementia).

173. The key health outcomes relevant to this determinant of health, i.e. an elevated concentration of air pollutants, are cardiovascular diseases, respiratory diseases and unfavourable pregnancy/birth-related outcomes (Markozannes et al., 2022). Markozannes et al. found strong evidence for short-term exposure to traffic related pollution being associated with an increased risk of stroke-related mortality for an increase of PM_{10} and $PM_{2.5}$ levels; an increase in $PM_{2.5}$ levels with hypertension and asthma-related admissions; and an increase of NO_2 with chronic obstructive pulmonary disease (COPD) and asthma-related admissions of elderly. Pregnancy/birth-related outcomes are associated with long-term elevated exposure to traffic related pollution, for example a 10 µg/m3 increase of $PM_{2.5}$ levels, over one or more trimesters. The research is based on emissions from traffic and not on emissions due to construction dust.

174. The temporal scope for this effect (as described in Section 28.3.3) varies depending on the area of the Project. These are explained below in the discussion of magnitude.

175. The conclusions of ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22) are outlined in the section below. The mitigation measures taken into consideration during the assessment are as described in ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22).

28.6.1.2.1 Source-pathway-receptor

176. The potential health effect is considered *likely* because (based on the methods described in Section 28.4.3) there is a *plausible* source-pathway-receptor relationship:

- Sources – excavated materials (dust) and particulate or emissions (construction traffic or NRMM);
- Pathway – dispersion through the air and inhalation; and
- Receptors – communities of people.

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

28.6.1.2.2 Sensitivity of receptor

178. The sensitivity of the general population and vulnerable groups (collectively grouped) is determined separately and characterised (based on the methods described in Section 28.4.3, and information in Section 28.5.3) as the same as for noise, as detailed in Section 28.6.1.1.2.

179. The sensitivity of the general population is considered to be *low*. The sensitivity of vulnerable groups is considered to be *medium to high*.

28.6.1.2.3 Magnitude of impact

180. The conclusions of Chapter 20 Onshore Air Quality (Document Reference: 3.1.22) can be summarised as follows:

- Residual construction dust and particulate matter effects are considered to be not significant with appropriate mitigation, which will be applied across construction of the full onshore project area;
- Emissions from NRMM after implementation of good practice mitigation measures are considered not significant; and
- Emissions from road vehicle exhausts at human receptors were predicted to be negligible at all receptors considered (i.e. not significant in EIA terms):
    - Predicted pollutant concentrations were well below (i.e. less than 75% of) the relevant air quality Objectives at all considered human receptor locations; and
    - Project-generated construction traffic was not predicted to cause a breach of any of the air quality Objectives at any identified sensitive human receptor location.

181. The temporal scope for potential air quality effects varies depending on the location across the onshore project area:

- At landfall – there is a short-term temporal scope at landfall of approximately 13 months (with six months for HDD works).
- Along the onshore cable route – for peak effects, there is a very short term temporal scope as works will be undertaken in sections and therefore works would be undertaken in the vicinity of a receptor for a maximum of weeks, i.e. less than a month, and not for the full duration of construction. Any dust or emissions generated as a result of the haul road and/or TCCs would be of a short- to medium-term temporal scope as the haul road will be operational for longer than passing trenching and some of the TCCs may be in use for up to the full 27 month duration
- At the onshore substation – there is a medium-term temporal scope of up to approximately 27 months.
- There is a medium term temporal scope for air quality-related to project-generated traffic, as traffic will be generated throughout the whole construction phase of the Project. However, locally, the impacts will be short term as the works move along the onshore cable route (these will affect road links outside of the onshore project area, as discussed in ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22) and ES Chapter 27 Traffic and Transport (Document Reference: 3.1.29).

182. For particles of non-respirable size, coarser (larger and heavier) fractions of dust are expected to rapidly reduce in airborne concentration with distance from source due to deposition, and site-selection of the onshore works has ensured construction related works are at a suitable separation distance from nearby human (i.e. residential) receptors. The potential for nuisance-type dust effects is therefore expected to be occasional and limited and will be mitigated through the control and management measures recommended in ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22). As detailed above and in ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22), the changes would be well below all recognised statutory thresholds for health protection and residual impacts would be negligible, and therefore not significant.

183. Finer fractions of generated particles would remain airborne for longer, and deposition rates would be slower, affecting a wider area and thus more people. However, exposure is expected to be low due to the finer dust particles dispersing with increased distance, and as stated above, construction works within the onshore project area have been sited at a suitable separation distance from sensitive receptors. In addition, background pollutant concentrations across the study area are well below the relevant air quality Objectives (as detailed in ES Chapter 20 Onshore Air Quality, Document Reference: 3.1.22). At these levels, although the effect on any single individual cannot be quantified, it is unlikely that there would be changes in the risk of developing a new health condition (morbidity) or of exacerbating an existing condition on a receptor group basis. Given the baseline air quality is good (see ES Chapter 20 Onshore Air Quality, Document Reference: 3.1.22), it is unlikely that there would be a significant change in population health outcomes for the neighbouring community during these periods.

184. The severity of any population health effects associated with air quality would result in a negligible change to quality of life for a small minority of the population at the same time as the cable route construction sections are progressed. Once construction is complete, any population health effects associated with a slight reduction in quality of life would be expected to reverse. Therefore, the magnitude of change due to the Project can be characterised as low.

28.6.1.2.4 Significance of effect

185. The conclusion of the assessment for population health on the general population is that any change due to the Project would be a low magnitude of impact on a receptor of low sensitivity. This represents an effect of minor adverse significance, i.e. not significant for the general population in EIA terms.

186. The conclusion of the assessment for population health is that any change due to the Project would be a low magnitude of impact on a receptor of medium to high sensitivity (in the worst case). This represents an effect of minor adverse significance, i.e. not significant for the vulnerable groups in EIA terms. Vulnerability in this case relates to, carers, young children, retirement aged population, those with long term illness, and those who are unemployed or shift workers who are most likely to spend more of their time at home and who are living adjacent to the Project. Any effects would be below all recognised statutory thresholds for health protection, and would be short-term, temporary and would immediately cease on completion of the works.

187. Whilst the literature supports there being thresholds set for health protection purposes, it also acknowledges that for some air pollutants there are non-threshold health effects (i.e. when there is no known exposure threshold level below which adverse health effects will not occur). The potential for non-threshold effects of pollutants to population health is noted and has been taken into account in determining the significance of potential air quality effects.

188. In line with the NPS EN-1 (DESNZ, 2023a), it is considered that (based on the assessment in ES Chapter 20 Onshore Air Quality, Document Reference: 3.1.22) the Project has avoided significant impacts for dust, NRMM and vehicle emissions, has proposed mitigation in place where impacts are predicted, and will put in place measures to effectively manage and control dust and vehicle

emissions. Therefore, there would be no residual long-term change in population health outcomes related to air quality.

189. Although the scientific evidence indicates a relationship between changes to air quality and health outcomes, any changes that would result from the Project would likely contribute to only a slight change in the health baseline of the population. Whilst an adverse effect, it would have only a marginal effect on delivering health policy linked to air quality and on contributing to narrowing health inequalities.

28.6.1.3 Impact 3: Ground and/or water contamination effects

190. During the construction phase of the Project, there is a potential for water quality to be temporarily affected by the accidental release of potentially polluting substances or mobilisation of existing contamination as a result of intrusive works such as excavation of soils, piling at the onshore substation or trenchless techniques (e.g. HDD). There is also potential for accidental leakages of foul water from welfare facilities, and construction materials including concrete and inert drilling fluids. These can enter surface waters and connected groundwaters through run-off, especially following rainfall.

191. The population groups relevant to this assessment, due to either proximity or vulnerability are (as defined in Section 28.3.2):

- The population near landfall, along the onshore cable route and near the onshore substation (site-specific);
- People with existing poor health (physical and mental health);
- Children and young people; and
- Older people.

192. The key health outcomes relevant to this determinant of health relate to potential toxicological exposure associated with release of substances and contaminated bathing water. Effects may relate to either biological or chemical contaminants. Potential examples of contaminant pathways include accidental spillage from site amenities (i.e. biological contaminants); accidental spillage from machinery or construction processes (i.e. chemical contaminants, hazardous materials); or exposure of buried contaminants (e.g. from contaminated soil).

193. The temporal scope for this effect (as described in Section 28.3.3) varies depending on the area of the Project. These are explained below in the discussion of magnitude.

194. The conclusions of ES Chapter 19 Ground Conditions and Contamination (Document Reference: 3.1.21) and ES Chapter 21 Water Resources and Flood Risk (3.1.23) are summarised below.

28.6.1.3.1 Source-pathway-receptor

195. The potential health effect is considered *plausible but unlikely* (based on the methods described in Section 28.4.3):

- Sources – increased water turbidity, accidental fuel spill, or mobilisation of historic contamination;

- Pathway – mobilisation or remobilisation of contaminants into bathing waters or ground/surface water sources used as drinking water supplies; and
- Receptors – users of the beach near landfall and watercourses, and people within the Drinking Water Protected Area (DWPA) (Surface Water).

196. The plausibility of the potential effect occurring largely depends on unusual conditions (i.e. combination of undetected human error and certain weather conditions) to make the source-pathway-receptor linkage, as the source of contamination is unlikely to be present for the duration of construction. Other than increased water turbidity (which has limited potential to affect health), the sources related to accidental releases of pollutants, or the unexpected encountering of historic contamination, are unlikely. Mitigation measures are described in ES Chapter 19 Ground Conditions and Contamination (Document Reference: 3.1.21) and Chapter 21 Water Resources and Flood Risk (Document Reference: 3.1.23) to reduce the probability of a risk occurring in the first place. Should an incident occur, further mitigation to reduce the risk of widespread contamination that could affect the public is also outlined.

28.6.1.3.2 Sensitivity of receptor

197. The sensitivity of the general population and vulnerable groups (collectively grouped) is determined separately and characterised (based on the methods described in Section 28.4.3).

198. As detailed in Section 28.5.4, younger people are considered to be more vulnerable to ground or water contamination due to having a lower body mass and a higher likelihood of exposure to water bodies during recreational activities. There are fewer people under 16 compared to the regional and national averages, especially near landfall and population density estimates show a much lower population density at the site-specific level, in comparison to the local, regional and national average. Relative IDACI by neighbourhood shows near landfall neighbourhoods are among the 20% most deprived but along the cable route and near the onshore substation, neighbourhoods are within the 40% and 10% least deprived respectively.

199. Sensitivity is considered to be low for the general population and medium for vulnerable groups. This reflects population sensitivity due to the limited likelihood that people would interact with bodies of inland surface water for recreational purposes.

28.6.1.3.3 Magnitude of impact

200. The realistic worst-case scenario would involve up to three HDDs at landfall, an approximately 24km onshore cable route with a construction width of 72m (open trench), 90m (shallow HDD crossing) or 130m (deeper HDD crossings) and has an onshore substation works area with construction compound of 150m x 250m and permanent substation footprint of 280 x 210m. The expected construction period of the Project's onshore infrastructure (excluding commissioning) would be three years. The onshore cable route will be constructed in sections at a time, with haul roads being in place for longer durations than trenching works and some TCCs will be in place for up to the full 27-month period.

201. The conclusions of ES Chapter 19 Ground Conditions and Contamination (Document Reference: 3.1.21) can be summarised as follows:

- Residual effects of minor adverse significance (i.e. not significant in EIA terms) to work force, land owners, land users and neighbouring land users exposure to contaminated soils and groundwater and associated to health impacts;
- Residual effects of minor adverse significance (i.e. not significant in EIA terms) on groundwater quality and resources; and
- Residual effects of minor adverse significance (i.e. not significant in EIA terms) on surface water quality.

202. The conclusions of ES Chapter 21 Water Resources and Flood Risk (Document Reference: 3.1.23) can be summarised as follows:

- Residual effects of negligible to minor adverse significance (i.e. not significant in EIA terms) for supply of contaminants to surface and groundwater.

203. At points such as crossings of small scale watercourses, the public would not have access to any impounded water. Use of trenchless techniques at Main Rivers is proposed to avoid impacts to the watercourses. The conclusions of ES Chapter 19 Ground Conditions and Contamination (Document Reference: 3.1.21) and ES Chapter 21 Water Resources and Flood Risk (Document Reference: 3.1.23) indicate that following the implementation of mitigation (including embedded mitigation) measures to prevent pollution of groundwater and surface water, the Project is predicted to have negligible to minor adverse impacts in relation to water quality.

204. The impacts are predicted to be of local spatial extent associated with accidental spillage, of short-term duration and of highly infrequent occurrence The general water related pollutant exposure (if any) implication for public health would be a minor change in morbidity or quality of life for a small minority of the population. The magnitude is therefore, considered to be low for the Project (based on the methods described in Section 28.4.3).

28.6.1.3.4 Significance of effect

205. The conclusion of the assessment for population health on the general population is that any change due to the Project would be a low magnitude of impact on a receptor of low sensitivity. This represents an effect of minor adverse significance, i.e. not significant for the general population in EIA terms.

206. The conclusion of the assessment for population health is that any change on ground or surface water quality due to contamination associated with the Project would be a low magnitude of impact on a receptor of medium sensitivity. This represents an effect of minor adverse significance, i.e., not significant for vulnerable groups in EIA terms. Vulnerability in this case may particularly relate to disruption in the unlikely event of a serious contamination event that may require bathing waters to be temporarily closed or temporary use of alternative emergency water sources.

207. The temporal scope for any effects would be short-term due to the duration of the different elements of construction, and most likely pathways are at points where the offshore export cable makes landfall, or where the onshore cable route crosses small watercourses using temporary dam and diversion.

208. In accordance with NPS EN-1 (DESNZ, 2023a), it is considered that (based on the assessments presented in ES Chapter 19 Ground Conditions and Contamination (Document Reference: 3.1.21) and ES Chapter 21 Water Resources and Flood Risk, Document Reference:3.1.23), the Project has avoided significant effects for contamination, has proposed mitigation in place where impacts are predicted and will put in place measures to effectively manage and control contamination. All effects (should they occur at all) would be short-term, temporary and would cease on completion of the works. Therefore, there would be no residual long-term change in population health outcomes.

209. A review of the regional public health strategy indicates that water quality, as a determinant of health, is not a key public health priority issue. Any change due to the Project would be well within a regulatory threshold or statutory standard.

210. Although the scientific evidence indicates a relationship between changes to water quality and health outcomes, any changes that would result from the Project would likely contribute to only a slight change in the health baseline of the population. Whilst an adverse effect, it would have only a marginal effect on delivering health policy linked to water quality and on contributing to narrowing health inequalities.

28.6.1.4 Impact 4: Physical activity effects

211. During the construction phase of North Falls, there is a potential for physical activity to be temporarily affected by the temporary diversion of PRoWs (majority of which are footpaths), national cycle network (NCN) routes, bridleways, byways and long distance walking routes (i.e. Tendring Hundred Hinterland) (herein referred to as 'routes'). All other direct interaction with public spaces, such as playing fields and common land, has been avoided through careful site selection as part of the embedded mitigation for the Project and through the use of trenchless techniques (i.e. HDD) under features such as local nature reserves.

212. The population groups relevant to this assessment, due to either proximity or vulnerability are (as defined in Section 28.3.2):

- The population near landfall, along the onshore cable route and near the onshore substation (site-specific);
- People with existing poor health (physical and mental health);
- Children and young people; and
- Older people (particularly those suffering with dementia).

213. The key health outcomes relevant to this determinant of health, associated with levels of physical activity and obesity levels are:

- physical health conditions (e.g. cardiovascular diseases, cancer and diabetes) (World Health Organization, 2022); and
- mental health conditions (e.g. stress, anxiety or depression) (World Health Organization, 2022; Lubens et al., 2016; Mochcovitch et al., 2016).

214. The temporal scope for this effect (as described in Section 28.3.3) varies depending on the area of the Project. These are discussed below. The potential

effect is considered for outdoor activities (based on the methods described in Section 28.4.3).

215. The mitigation measures taken into consideration during the assessment are as described in ES Chapter 32 Tourism and Recreation (Document Reference: 3.1.34). Any alternative routes and management practices of route impacts would be agreed with Essex County Council (and any other relevant stakeholders) prior to construction in accordance with the OPRoWMP and which accompanies the DCO application.

28.6.1.4.1 Source-pathway-receptor

216. The potential health effect is considered *likely* because (based on the methods described in Section 28.4.3) there is a *plausible* source-pathway-receptor:

- Sources – construction works in the onshore project area and vehicles/plant operations increasing disturbance on routes;
- Pathway – people's understanding of change in the usability of the routes; and
- Receptors – users of the routes, resulting in a lower level of active travel or outdoor recreation.

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

28.6.1.4.2 Sensitivity of receptor

218. The sensitivity of the general population and vulnerable groups (collectively grouped) is determined separately and characterised (based on the methods described in Section 28.4.3 and specifically the paragraph describing the general characteristics of how the 'general population' may differ from 'vulnerable group population' when scoring sensitivity)).

219. The general population is considered to be of low sensitivity. This reflects the site-specific baseline population profile presented in Section 28.5.5. The representative baseline of neighbourhoods near landfall reports a marginally higher level of poor or very poor health than the average for England. This may be reflective of the higher proportion of people aged over 65 at landfall. The representative baseline of the neighbourhood around near the onshore cable route and landfall also report marginally higher levels of poor or very poor health compared to the average for England. The baseline indicates that the number of physically active children and young people in Tendring is the same as the regional averages and higher than national averages, whereas the number of physically active adults in Tendring is lower than both the regional and national averages.

220. Some people would be more sensitive to changes in physical activity. For this population, the sensitivity is considered medium to high. Vulnerability in this case is particularly linked to people who are less able to adapt to changes and who have limited access to alternatives (e.g. walking routes with a tranquil setting). These people may undertake less exercise during the period that they are affected by active project works and therefore forgo the benefits to physical and mental health.

221. Young or older people may have higher levels of dependence on carers or public transport to access alternative physical activity opportunities. People

(adults and children) who are already overweight or obese would be particularly sensitive to fewer opportunities to be physically active. The proportion of adults (aged over 18) classified as overweight or obese is slightly higher in Tendring (64.5%) when compared to the national (63.8%) averages.

222. However, child obesity in Year 6 of school is lower near landfall (18.8%) and near the onshore substation (17.9%) but slightly higher near the onshore cable route (23.1%), when compared to the regional (20.2% and national (22.5%) averages. One of Essex County Council's key overarching health priorities relates to physical activity and healthy weight (see Section 28.5.1). However, there are no regulatory standards regarding physical activity.

223. Vulnerability in this case relates to people who currently make frequent use of the routes primarily due to their current tranquillity and for whom there are access barriers to alternate routes in the area. People over the age of 60 and those with existing health conditions may particularly benefit from physical activity, so would also be particularly sensitive to any change.

28.6.1.4.3 Magnitude of impact

224. The conclusions of ES Chapter 32 Tourism and Recreation (Document Reference:3.1.34) to physical activity assets can be summarised as follows:

- Residual effects of negligible to minor adverse significance (i.e. not significant in EIA terms) as a result to disruption to key onshore recreational assets (i.e. PRoWs and other non-motorised routes, clubs, parks and hotels); and
- Residual effects of negligible significance (i.e. not significant in EIA terms) as a result of disruption to marine and coastal recreational assets.

225. The use of HDD methodology at landfall should not require closure of the beach/foreshore.

226. There is a potential for physical activity to be temporarily affected by the temporary management or diversion of routes during landfall works, duct installation and cable pulling activities along the onshore cable route or construction activities near the onshore substation. The temporal scope for these effects along the onshore cable route is very short-term, and short-term at landfall and near the onshore substation. This is because the onshore cable route will have a minimal level of disruption on community infrastructure. However, temporary and reversible impacts to routes and marine/coastal waters are discussed in ES Chapter 32 Tourism and Recreation (Document Reference:3.1.34). This could lead to a change in the tranquillity and perceived quality of physical activity opportunities.

227. During construction in the onshore project area, any route affected by the works would be temporarily managed and/or diverted. Alternative methods include appropriately fenced (unmanned) crossing points or manned crossing points. After this, the site would be reinstated except for the temporary haul road which would have a controlled crossing until the haul road is no longer in use. The area would then be reinstated but some time would be required before the same level of natural coverage (such as grass, shrubs, and hedgerows) returns.

228. These measures are included within the OPRoWMP (7.17) submitted along with the DCO application.

229. As stated above, ES Chapter 32 Tourism and Recreation (Document Reference: 3.1.34) concludes that residual impacts on routes are expected to be negligible to minor adverse, with the implementation of mitigation measures detailed in the chapter.

230. There is no residual impact on community infrastructure (such as sports facilities) predicted due to site selection avoiding interaction with these sites (e.g. through the use of trenchless techniques (i.e. HDD) to cross Frinton golf course). The potential effect is considered likely for outdoor activities but not for sports activities using community infrastructure.

231. The installation of the cable within the ducts will require cable pulling works at jointing bays located along the onshore cable route. The locations of the jointing bays are yet to be determined but will be chosen to avoid sensitive features, including the presence of routes, wherever possible and where engineering considerations allow. Parts or all of the haul road will also be retained to facilitate access to the jointing bay locations and therefore could potentially interact with routes. Therefore, as a worst-case it is assumed there will be a requirement for temporary diversions and / or controlled crossings to be in place during cable pulling works as outlined above at a limited number of locations.

232. The impacts are predicted to be of a site-specific spatial extent, of short-term (due to the sequential linear nature of construction) to medium-term duration (in haul road locations, i.e. for up to 27 months) and immediately reversible once construction works are completed. Temporary diversions may marginally increase the length of routes, which may disincentivise use by some people. However, the temporary diversions would be unlikely to affect population physical activity levels to the extent of changes in the risk of developing new health conditions or of exacerbating existing conditions. Any short-term changes in physical activity levels would be unlikely to have a lasting influence on population health and would lead to a minor change in quality of life to a very small population. Therefore, the magnitude is considered to be low for the Project (based on the methods described in Section 28.4.3.4).

28.6.1.4.4 Significance of effect

233. The conclusion of the assessment for population health on the general population is that any change due to the Project would be a low magnitude of impact on a receptor of low sensitivity. This represents an effect of minor adverse significance, i.e. not significant for the general population in EIA terms.

234. The conclusion of the assessment for population health is that any changes in health outcomes associated with a reduction of physical activity stemming from access disruption of, or reduced environmental quality (noise, dust, air quality and views) along routes would be a low magnitude of effect on a receptor of medium to high sensitivity (at worst case). This represents an impact of minor adverse significance, i.e. not significant for vulnerable groups in EIA terms. This is because the only direct impact on access to physical activity would be in relation to diversion of routes which will be temporary, localised and reversible. In line with the NPS EN-1 (DESNZ, 2023a), it is considered that the Project (based on the assessment in ES Chapter 32 Tourism and Recreation, (Document Reference: 3.1.34) has avoided significant impacts for obstruction to recreational activities, has proposed mitigation in places where impacts are

predicted, and will put in place measures to effectively manage and control temporary obstructions.

235. Additional recommended mitigation measures to ensure minimising of the risk of any behavioural change are detailed in Section 28.6.1.4.5. All effects would be short-term, temporary, fully reversible and would cease on completion of the works. Therefore, there would be no residual long-term change in population health outcomes.

Although the scientific evidence indicates a relationship between changes to environmental quality and health outcomes, any changes that would result from the Project would likely contribute to only a slight change in the health baseline of the population. Whilst an adverse effect, it would have only a marginal effect on delivering health policy linked to environmental quality and on contributing to narrowing health inequalities.

28.6.1.4.5 Additional mitigation measures

236. Although a non-significant effect (in EIA terms) has been identified above, industry best practice mitigation measures have been recommended as part of the diversion to help minimise the risk of any behavioural change as a result of unexpected or unknown duration changes. These include:

- Providing reopening signs and notices that advertise the reopening of the route and promote active travel connectivity to destinations; and
- Liaison with Essex County Council about proposed construction works on Public Rights of Way.

28.6.1.4.6 Residual significance of effect

237. Following the implementation of the additional mitigation measures as detailed above, the residual significance of effect on physical activity effects on human health represents a negligible effect, i.e. not significant in EIA terms for the general population or vulnerable groups.

238. These measures are included within the OPRoWMP (7.17) submitted along with the DCO application.

28.6.1.5 Impact 5: Journey times and/or reduced access effects

239. There are two main pathways by which the Project could affect access to services.

- During the construction phase of the Project, there is a potential for the availability of services to change due to the presence of the construction workforce placing greater demand on services.
- During the construction phase of the Project, there is a potential for journey times and access to be temporarily affected by an increase in the number of HGVs or employee vehicles on the road and temporary traffic management at certain locations. This increase in volume has the potential to lead to temporary delays and to temporarily reduce access to local services.

240. The population groups relevant to this assessment, due to either proximity or vulnerability are (as defined in Section 28.3.2):

- The local populations of Tendring District;

- People living in deprivation (including those experiencing income and/or access/geographic vulnerability); and
- People with existing poor health (physical and mental health).

241. Vulnerability in this case relates to people living in deprived areas in the vicinity of the landfall, onshore cable route and onshore substation, particularly people with long-term illnesses (and their carers) and users of primary healthcare and ambulance services.

242. Travelling to, or accessing health care, underpins management of illness or injury. The key health outcomes relevant to this determinant of health are emergency response times or non-emergency treatment outcomes associated with delays or non-attendance caused by increased traffic and journey times arising from additional project-related traffic.

243. The temporal scope for this effect varies depending on the element of the onshore project area (landfall, onshore cable route, onshore substation). The conclusions of ES Chapter 27 Traffic and Transport (Document Reference: 3.1.29) are summarised below.

244. As part of the Project site selection process, built up areas and locations where health care facilities are located have been avoided. General mitigation measures taken into consideration for traffic and transport impacts are detailed in ES Chapter 27 Traffic and Transport (Document Reference: 3.1.29). Traffic impacts during construction will be managed through an CTMP, including Travel Plan measures, which will be developed further in consultation with Essex County Council and National Highways prior to the commencement of the construction. An OCTMP (7.16) is provided with the DCO application.

28.6.1.5.1 Source-pathway-receptor

245. **Presence of the construction workforce**: The potential effect is considered *not likely* because (based on the methods described in Section 28.4.3) while there is a potential source-pathway-receptor relationship as shown below, this relationship will be interrupted by the embedded mitigation (summarised in Table 28.5):

- Source - changes in demand for medical and healthcare facilities (e.g. primary care, ambulance or A&E services) as a result of the presence of the construction workers.
- Pathway - a change in capacity, staffing and resources of services.
- Receptor - local primary care, ambulance or A&E services.

246. The potential effect is *plausible* but *not probable* as unusual conditions (e.g. the absence of embedded mitigation (summarised in Table 28.5) is required for the source-pathway-receptor relationship to be established.

247. **Volume of traffic:** The potential effect is considered *likely* because (based on the methods described in Section 28.4.3) there is a potential source-pathway-receptor relationship as follows:

- Source – increased number of vehicles on the road network or temporary traffic management measures due to the Project;

- Pathway – journey times or accessibility to amenities/services being affected, particularly healthcare (emergency and non-emergency); and
- Receptors – local road users.

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

28.6.1.5.2 Sensitivity of receptor

249. **Presence of the construction workforce**: The baseline for health facilities in Essex and Suffolk is set out in Socio-economics (Section 31.5.4). This indicates that a high proportion of Accident and Emergency (A&E) patients are having to wait longer than the minimum target times and the local area is exceeding national average ambulance wait times. This is in line with national trends. Tendring has the highest patients per GP of 2,206 patients per GP with Colchester and Ipswich also exceeding 2,000 patients per FTE GP. This suggests there are significant capacity constraint issues in North East Essex and Ipswich. On this basis, the sensitivity of the health care receptor is assessed as high.

250. **Volume of traffic:** The sensitivity of the general population and vulnerable groups (collectively grouped) is determined separately and characterised below (based on the methods described in Section 28.4.3 and specifically the paragraph describing the general characteristics of how the 'general population' may differ from 'vulnerable group population' when scoring sensitivity)).

251. Baseline statistics (provided in ES Appendix 28.1 (Document Reference: 3.3.68) and discussed in Section 28.5.6) show that journey times to eight key services by car and public transport in Tendring are similar to the regional and national averages, but are longer via walking or bicycle. Average distances travelled to work in representative populations near landfall (22.0km), along the onshore cable route (28.3km) and near the onshore substation (21.6km) are longer than the local (19.5km), regional (18.7km) and national (14.9km) averages; this is representative of the rural nature of the study area. The AHAH index ranges from 3rd to 6th decile. The sensitivity of the general population is therefore considered to be low. Any more sensitive individuals are covered within the vulnerable group population below.

252. It is relevant to note for this determinant of health resource sharing with the Project (i.e. shared use of the road network by communities and the Project) and the capacity to adapt (e.g. whether the road network inherently provides alternative routes that most people, and emergency services, would be able to use to achieve similar journey times) has been assessed in the driver delay assessment of ES Chapter 27 Traffic and Transport (Document Reference: 3.1.29). A small number of vulnerable communities may be affected more than the general population. The sensitivity of vulnerable groups is considered high because deprivation indices show some neighbourhoods around the landfall and onshore cable route are amongst the 20% (near the onshore cable route) and 40% (near landfall and the onshore substation) most deprived in England. Deprived populations may already face more access barriers than the general population (refer to Sections 28.5.1 and 28.5.6) and therefore be more sensitive to access changes. The more sensitive population particularly includes those accessing health services (emergency or non-emergency) at times and locations where there may be some increase in congestion. Similarly,

ambulance services, and the recipients of their care, are particularly sensitive to delays.

28.6.1.5.3 Magnitude of impact

253. **Presence of the construction workforce**: Primary care:

254. ES Chapter 31 Socio-economics (Document Reference: 3.1.33) states that the peak construction demand is for 471 workers, of whom 429 (91%) will be non-resident. The non-resident construction workforce will temporarily relocate to the area and workers are not expected to transfer their GP registration to the Project area. London's Healthy Urban Development Unit recommends a ratio of 1,800 patients per FTE GP.[5] It has been noted that while this ratio has long been considered appropriate the actual ratio has increased (2,282 per FTE GP in 2021)[6]. It is estimated that the additional non-local construction workers (if all were to register) would generate demand for less than 0.3 FTE GPs. Given this limited scale of increase in demand the magnitude of impact is assessed as negligible.

255. Emergency care: As noted in Section 28.5.6, EEAST responded to 6.6 million category 1-4 calls between April 2022 and March 2023. In this time period, EEAST also handled 55,083 non-emergency conveyances (NHS England, 2024). EEAST noted that a simple incident rate of all calls upon the ambulance service is achieved by dividing the annual number of incidents in their region by the number of people resident in their region. EEAST states that an incident can range from emergency treatment and transport to hospital to a call to 999. EEAST notes this provides a simple rate of 0.08 incidents per person per year. This suggests that in the worst case, the peak 429 non-resident construction workforce would generate 34 additional calls to the ambulance service across a 24-hour period. During worktime the construction workforce will work according to high standards of safety. In the event of injury, first aid will be given on site and, where necessary and possible, arrangements will be made to convey the injured party to hospital. The volume of calls to the ambulance service during work hours is expected to be low. Table 28.19 and Table 28.20 below show data from projects run by the Applicant.

Table 28.19 Project incident reported dates – Aug 2021 to Dec 2023

Incident		Site treatment	Travel to A&E / hospital?		Treatment
			Self	Ambulance / Paramedic	
1	Cut finger	1st Aid	Self		Check up
2	Tripped – bruised elbow	LTI	Self		Check up
3	Diabetic – low	NWR		To site	
4	Compression to finger	1st Aid	No		

[5] NHS Healthy Urban Development Unit. 2009.
[6] Gooderham, 2022

	Incident	Site treatment	Travel to A&E / hospital? Self	Ambulance / Paramedic	Treatment
5	Crush foot – dislocated / broken toes	LTI/RIDDOR		Ambulance	
6	Compression to fingers	1st Aid	No		
7	Cut finger	1st Aid	No		
8	Impact to hand (hammer)	1st Aid	Self		X-ray / check up

Table 28.20 Project incident reported dates – Aug 2022 to Mar 2024

	Incident	Site treatment	Travel to A&E / hospital? Self	Ambulance / Paramedic	Treatment
1	Cut finger	1st Aid	Self		Check up / stitched
2	Slipped – grazed hip	1st Aid	No		
3	Trapped finger in door	1st Aid	Self – walk-in centre		Check up
4	Manual handling / lower back	1st Aid (paracetamol)	No		
5	Slipped – twisted knee	Minor	Self		Check up
6	RTC – broken collar bone	Major	Self		X-ray, etc
7	Cut finger	1st Aid	Self		Check up
8	Impact – bruised finger	Minor	Self		Check up
9	Thumb trapped in door	Minor	Self		Check up

256. The workforce would be professional and hard-working and would be focused on delivering the work safely, to a high specification and on schedule. The Applicant provides clear standards for the conduct of its workforce. Embedded mitigation includes a Code of behaviour/conduct; Employee Rules; Health and Safety; Drugs, Alcohol and Substance Misuse, etc. Drug and alcohol testing would be an integral part of the occupational health service. The Applicant would require Contractors to put in place similar arrangements and enforce a commensurate standard of conduct across the workforce. The Applicant would ultimately reserve the right to remove persons from the Project in the event of

unacceptable conduct. Health promotion information would be available to the workforce, e.g. at facilities provided for the construction workforce (see the OCoCP (7.13)). As such it is expected that, out of work hours, they will make fewer demands upon emergency services than the general population.

257. Given this limited scale of increase in demand the magnitude of impact is assessed as negligible.

258. **Volume of traffic:** The temporal scope for these effects are as follows:

- With regard to delays due to traffic management along routes:
  - At landfall, there is a short-term temporal scope for the installation of cable ducts using HDD, cable pulling works and associated temporary works. Works at the landfall would be over a period of approximately 13 months with six months for Trenchless techniques (i.e. HDD). Trenchless techniques (i.e. HDD) at landfall has been selected to minimise impacts and avoid restrictions or closures to the beach.
  - Along the onshore cable route, the temporal scope is of short- to medium-term as the haul road will be in place for a longer duration than the individual sections of export cable installation and some TCCs will be operational for up to 27 months (as described in ES Chapter 5 Project Description, Document Reference: 3.1.7).
  - At the onshore substation, there is a medium-term temporal scope because the works are planned for up to 27 months.
- With regard to traffic movement, there would be between a short-term (driver delay due to road closures for cable installation works would be up to six weeks) to medium-term (up to 27 months) temporal scope, for areas where impacts are predicted in ES Chapter 27 Traffic and Transport (Document Reference: 3.1.29). The duration of impacts is measured in the short- to medium-term, intermittent, and fully reversible on completion of the Project.

259. The magnitude of the change due to North Falls can be characterised as low based on the following:

- Only small changes in journey times would be expected. The driver delay for road users (due to road closures for project crossing locations) to use a suitable alternative route ranges from one to three minutes in travel time for the four anticipated road closures. The roads subject to closure during construction are Damant's Farm Lane, Payne Lane, Spratts Lane, and Barlon Road, which all have low daily traffic flows. Access through the closures would be maintained for pedestrians and cyclists at all times;
- The frequency of any delays is likely to be low because works are linear, and delays would be temporary, intermittent and fully reversible. Any change is considered unlikely to be of a scale that would affect quality of life or morbidity or receipt of time-critical healthcare;
- Commitment to trenchless crossing techniques is proposed for a number of major roads (e.g. A120), allowing the roads to remain open at all times, in order to minimise impacts;
- Residual effects of negligible to minor adverse (at worst) significance (i.e. not significant in EIA terms) for the impacts (i.e. severance, amenity,

pedestrian delay, road safety and driver delay) considered in ES Chapter 27 Traffic and Transport (Document Reference: 3.1.29) with the implementation of mitigation measures recommended in the chapter and the OCTMP; and

- Any change in journey times would be reversible as the Project does not make any permanent change to the road network.

28.6.1.5.4 Significance of effect

260. Presence of the construction workforce: The conclusion of the assessment for population health is that any change due to the Project would be a negligible magnitude of impact on a receptor of high sensitivity. This represents an effect that is minor/negligible in terms of EIA significance. A Workforce Management Strategy will put in place measures to effectively reduce and address any likely significant effects. This is detailed in the CoCP, an outline version of which is submitted with the DCO application (Document Reference: 7.13).

261. Volume of traffic

262. The conclusion of the assessment for population health on the general population is that any change due to the Project would be a low magnitude of impact on a receptor of low sensitivity. This represents an effect of minor adverse significance, i.e. not significant for the general population in EIA terms.

263. The conclusion of the assessment for population health is that any change due to the Project would be a low magnitude of impact on a receptor of high sensitivity (at a worst case). This represents an effect of minor adverse significance, i.e. not significant for vulnerable groups in EIA terms. Vulnerability in this case relates to people who are more likely to require urgent medical care and/or are required to make frequent use of the road networks primarily due to medical access needs and those who require at home medical assistance. People over the age of 60 and those with existing health conditions would be particularly sensitive to any change. All effects would be short- to medium-term, temporary and would cease on completion of the works.

264. ES Chapter 27 Traffic and Transport (Document Reference: 3.1.29) has proposed mitigation in place where impacts are predicted and will put in place measures to effectively manage and control temporary obstructions.

265. In line with NPS EN-1 (DESNZ, 2023a), it is considered that the Project has avoided significant impacts for obstruction to health services. Therefore, there would be no residual long-term change in population health outcomes.

28.6.2 Likely significant effects during construction and operation

266. During operation, it is expected that there will be no further requirement for land to be disturbed or excavated, except in the event that onshore cables require repair or maintenance or the onshore substation access works needing to be reinstated. However, these activities would not extend beyond the construction footprint assessed above, and for the former would be relatively rare and localised in occurrence. For the latter, the haul road required to access the onshore substation, required in the unlikely event of transformer failure, would potentially be in place for up to 7 months, and its location would be over land

already disturbed during construction. As such, effects arising from these activities are likely to be no worse than that assessed during construction.

28.6.2.1 Impact 6: Employment effects

267. Employment has been considered across both construction and operation. As discussed in ES Chapter 31 Socio-economics (Document Reference: 3.1.33), the development of the Project is part of a wider process of developing an offshore wind supply chain at the Essex, Suffolk and national level. Therefore, from a health perspective, creating a demand for transferable skills (both between construction projects and on to operation of projects) has a multiplying effect on employment. Direct employment by North Falls also creates indirect employment in the supply chain and induced employment due to expenditure. For employment, Option 1 is considered to be the worst case scenario as it will create a lower number of jobs.

268. The population groups relevant to this assessment, due to either proximity or vulnerability are (as defined in Section 28.3.2):

- The local population of Tendring District;
- The population of Essex County (regional);
- People living in deprivation (including those experiencing income and/or access/geographic vulnerability); and
- Children and young people, older people and people in poor health for indirect effects as dependants.

269. The key health outcomes relevant to this determinant of health are:

- Mental health conditions (e.g. stress, anxiety or depression) (van der Noordt et al., 2014); and
- Indirect influences on physical health (e.g. cardiovascular conditions) Sommer et al., 2015).

270. These are due to potential improvements in social determinants, such as improved socio-economic position, greater job security and facilitating beneficial lifestyle choices (e.g. healthier eating and recreational physical activity, including for dependants).

271. The temporal scope for these effects (see Section 28.3.3) is variable:

- During construction, the temporal effect is measured in years, but individuals may only be directly employed for months at a time. However, the overall effect on direct and indirect employment would be considered across the duration of the construction phase, and is therefore medium-term; and
- During operation, it is expected that people would be permanently employed, and that this employment could last for decades. Therefore, the temporal scope is long-term.

272. The Applicant has also committed to taking a proactive, collaborative, and open approach to identifying opportunities to maximise local skills development, training and jobs, this will be detailed in an Outline Skills and Employment Plan (7.18) which is submitted with the DCO application. The conclusions of Chapter 31 Socio-economics show that the South East and the UK have the potential to

benefit through increased employment opportunities and direct economic benefit.

28.6.2.1.1 Source-pathway-receptor

273. The potential effect is considered *likely* because (based on the methods described in Section 28.4.3) this is a potential source-pathway-impact relationship as follows:

- Source – direct and indirect job creation due to the development of the Project;
- Pathway – employment, with increased probability of effect due to supply chain and skills development; and
- Receptors – people of working age in the regional labour market (and their dependants).

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

28.6.2.1.2 Sensitivity of receptor

275. The sensitivity of the general population and vulnerable groups (collectively grouped) is determined separately and characterised below (based on the methods described in Section 28.4.3). Sensitivity in this case is related to how likely it is a population could benefit from being employed.

276. The baseline labour market data show that both the economic and employment rates in Essex and Suffolk are above the UK average and the unemployment rate is below the UK average (see ES Chapter 31 Socio-economics, Document Reference: 3.1.33). The employment deprivation score for Tendring is among the 10th most deprived. However, employment deprivation among representative populations at the site-specific level is slightly better (20% to 50% most deprived LSOAs), with high proportions of retirement aged (65+ years) people, especially close to the landfall and onshore cable route that may struggle to benefit from employment opportunities.

277. The number of people in Tendring District at working age (25-64 years) is lower (46.5%) than in Essex County (51.5%) or regionally (52.4%) and the proportion of the population in employment is lower (68.0%) than the Essex (77.6%) and England (75.7%) averages. The regional population also has an employment deprivation score that is slightly better than the average for England. As a result, many people in the region are already in stable employment that would not be affected by the Project (or are a dependant of such a person). Locally, the average attainment 8 scores (42.4%) and pupil absence percentage (9.6%) show education deprivation is slightly higher compared to the rest of Essex (48.2% and 7.7% respectively) and England (48.7% and 7.6% respectively). People with a lower educational attainment may find it harder to gain employment in technical areas required by the offshore wind industry. The sensitivity of the general population is therefore considered to be *low to medium*.

278. For some groups, there is a potential for *high* levels of sensitivity. Vulnerable populations include young people choosing their careers, people on low incomes or those who are unemployed and future young or older people who may rely on those employed by North Falls.

28.6.2.1.3 Magnitude of impact

279. ES Chapter 31 Socio-economics (Document Reference: 3.1.33) finds that peak construction demand for onshore workers would number 471. The worst-case assumption is that 91%, or 429, will be non-local workers.

280. ES Chapter 31 Socio-economics (Document Reference: 3.1.33) concluded that residual effects on direct economic benefit (to both onshore and offshore supply chain) arising from increased employment would be of negligible to minor beneficial (i.e. not significant in EIA terms) (both for the UK and Essex and Suffolk) in the construction and operational phases.

281. The magnitude of the change due to North Falls can be characterised as follows:

- There would be direct and indirect employment opportunities both during construction and operation;
- Construction jobs would be short- to medium-term, and benefits would be maintained, through knowledge and transferable skills gained during construction, which in turn would have longer term benefits;
- Operational jobs could provide several decades (around 30 years) of benefit to those employed and their dependants;
- The operational/maintenance workforce will be much smaller than construction, and the potential for local people to access employment opportunities created as a result the operation and maintenance (O&M) of the Project is dependent on the location of the O&M bases and the match between the type of employment created and the skills and occupational profile of local residents; and
- Compared to national comparators, the higher proportion of retired people (and lower proportion of young people) close to the actual onshore project suggests that fewer direct economic benefits would be experienced in these areas.

282. The Project's contribution to direct economic benefit and employment both onshore and offshore will be relatively small, as detailed ES Chapter 31 Socio-economics (Document Reference: 3.1.33). The potential change, whilst positive, is unlikely to be associated with a widespread reduction in inequalities or a widespread increase in prosperity or quality of life. However, those employed directly and indirectly through either the construction or operation of the Project would experience overall improvements in socio-economic status and this is likely to lead to improvements in general well-being. The beneficial magnitude (from the health perspective) is considered negligible to low, driven by the longer-term regional benefits to upskilling and employment. A negligible to low beneficial effect on physical and mental health morbidity and quality of life outcomes for a small minority of the local and regional population would also be expected.

28.6.2.1.4 Significance of effect

283. The conclusion of the assessment for population health on the general population is that any change due to the Project would be a low beneficial magnitude of impact on a receptor of low to medium sensitivity. This represents an effect of minor beneficial significance, i.e. not significant for the general population in EIA terms.

284. The conclusion of the assessment for population health tied to employment is that any change associated with North Falls would be a low beneficial magnitude of effect on a receptor of high sensitivity. This represents an impact of minor beneficial significance, i.e. not significant for vulnerable groups in EIA terms. The score is driven by effects to vulnerable groups, including as employees and dependants. Vulnerability in this case relates to direct and indirect employment opportunities for people living who are of working age and on low incomes or unemployed. The Applicant specifically sets out an approach to identifying opportunities to maximise local skills development, training and jobs, which is outlined in the Outline Skills and Employment Strategy submitted as part of the DCO application.

285. Scientific literature shows that good quality employment is generally associated with better health. Employment can have a protective effect on depression and general mental health (van der Noordt et al., 2014). Unemployment may occur due to poor health, it may also cause poor health (Herbig et al., 2013).

286. There are no regulatory standards with regard to employment as a determinant of health. The NPS for Overarching Energy (EN-1) (DESNZ, 2023a) recommends: *"considering the potential effects, including benefits, of a proposal for a project, the applicant must set out information on the likely significant social and economic effects of the development, and show how any likely significant negative effects would be avoided, reduced*, *mitigated or compensated for, following the mitigation hierarchy. This information could include matters such as employment, equality, biodiversity net gain*, *community cohesion, health and well-being."* These effects have been considered in ES Chapter 31 Socio-economics (Document Reference: 3.1.33).

Although the scientific evidence indicates a clear relationship between changes to employment and changes to health outcomes, the level of employment from the Project would likely contribute to only a slight change in the health baseline of the population. Whilst a positive effect, it would have only a marginal effect on delivering health policy linked to good quality employment and on contributing to narrowing health inequalities.

28.6.3 Likely significant effects during operation

28.6.3.1 Impact 7: Noise effects

287. The potential for noise impacts during operation of the onshore substation has been considered in ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28).

288. The population groups relevant to this assessment, due to either proximity or vulnerability are (as defined in Section 28.3.2):

- The population near the onshore substation (site-specific);
- People with existing poor health (physical and mental health);
- Children and young people; and
- Older people (particularly those suffering with dementia).

289. The key health outcomes are the same as those discussed in Section 28.6.1.1, in relation to potential noise effects during construction.

28.6.3.1.1 Source-pathway-receptor

290. A potential health effect is considered *likely* because, based on the methods described in Section 28.4.3, there is a *plausible* source-pathway-receptor relationship where:

- Source – the operation of the onshore substation;
- Pathway – noise transmission through the air; and
- Receptors – communities of people local to the onshore substation.

291. The potential effect is *probable* (however this is *low*) as no unusual conditions are required for the source-pathway-receptor linkage.

28.6.3.1.2 Sensitivity of receptor

292. The sensitivity of the general population and vulnerable groups are the same as those discussed in Section 28.6.1.1.2, in relation to potential noise effects during construction at the onshore substation.

28.6.3.1.3 Magnitude of the effects

293. The conclusions of ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28) summarised that with mitigation there would be:

- No significant residual operational noise effects at all noise sensitive receptor locations near the onshore substation, with the implementation of mitigation measures and set noise limits of 35dB, which are secured through a DCO Requirement. The noise assessment presented in ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28) considered ten 'substation noise receptors' in the operational phase assessment, the closest approximately 225m to the onshore substation and furthest greater than 1km away.

294. The mitigation measures taken into consideration during the assessment are described in ES Chapter 26 Noise and Vibration (Document Reference:3.1.28).

295. The temporal scope for this effect is long-term as it relates to the operational phase of the Project. Noise effects would be highly localised to the onshore substation and therefore experienced by very few people, and therefore exposure would be one of low exposure by a small population.

296. The magnitude of change due to the Project can be characterised as *low*. At these levels, it is unlikely that there would be changes in the risk of developing a new health condition (morbidity) or of exacerbating an existing condition.

28.6.3.1.4 Significance of effect

297. The conclusion of the assessment for population health on the general population is that any change due to the Project would be a low magnitude of impact on a receptor of low sensitivity. This represents an effect of minor adverse significance, i.e. not significant for the general population in EIA terms.

298. Any change due to the Project would be a low magnitude of change on a receptor of medium to high sensitivity (in a worst case scenario). This represents an impact of minor adverse significance, i.e. not significant for vulnerable groups in EIA terms. Vulnerability in this case relates to carers, young children, retirement aged population, those with long term illness, and those who are unemployed or shift workers who are most likely to spend more of their time at home and who are living near to the onshore substation. In line with the NPS

EN-1 (DESNZ, 2023a), it is considered that (based on the assessment in ES Chapter 26 Noise and Vibration, Document Reference: 3.1.28) the Project has avoided significant impacts for noise and vibration, has proposed additional mitigation in place where impacts are predicted, and will put in place measures to effectively manage and control noise.

299. Although the scientific evidence indicates a relationship between changes to noise and health outcomes, any changes that would result from North Falls would likely contribute to only a slight change in the health baseline of the population. Whilst an adverse effect, it would have only a marginal effect on delivering health policy linked to noise and on contributing to narrowing health inequalities.

28.6.3.2 Impact 8: EMF effects

300. The onshore buried cable systems will generate EMFs when the Project is in operation. The 50 Hz EMFs generated by this type of electricity transmission are often referred to as power frequency or extremely low frequency (ELF) EMFs. ELF EMFs are produced wherever electricity is generated, transmitted or used.

301. The population groups relevant to this assessment, due to either proximity or other sensitivity are:

- The population along the onshore cable route (site-specific); and
- The following vulnerable groups:
  - Children and young people;
  - Older people;
  - People with existing poor health (physical and mental health); and
  - People living in deprivation (including those experiencing income and/or access/geographic vulnerability).

302. The temporal scope for likely significant effects would likely to be long term due to the operation of the infrastructure being at least 30 years.

303. The Project will only design and install equipment that is compliant with the relevant exposure limits. To ensure this, all of the equipment for North Falls capable of producing EMFs will be assessed in accordance with the provisions of the UK Government's Code of Practice on Compliance, which is compliant with ICNIRP guidance (ICNIRP, 1998). The government, acting on the advice of the authoritative scientific bodies, has put in place appropriate measures to protect the public from EMFs. All the fields produced would be below the relevant exposure limits, and therefore, there would be no significant EMF effect resulting from the Project.

28.6.3.2.1 Source-pathway-receptor

304. Based on the methods described in Section 28.4.3, there is *no plausible* source-pathway-receptor relationship as:

- The sources of EMF are the onshore cable route, cable crossing points, and onshore substation. These sources will all be below regulatory exposure limits;

- The pathway is electric and magnetic fields. However, such fields will be designed within regulatory standards, avoiding a plausible pathway of effect; and
- Receptors would be people living close to the onshore substation and onshore cable route.

305. As there is *no plausible source-pathway-receptor relationship*, there would be *no likely significant population health effects*, for the general population or for vulnerable groups, from EMF from the onshore cable route or onshore substation.

306. While there may be some concern about EMF risk (i.e. a person's understanding or views of the risk to their health, or in other words their outlook), and that such concerns may influence their mental health and quality of life even where the exposure levels are well within health protection good practice standards, the information set out in this chapter should also provide reassurance for those who may be concerned.

307. In order to avoid adverse health outcomes from the public's understanding of EMF risk, which may negatively impact mental health, embedded mitigation is recommended (see Table 28.5) which includes providing clear and non-technical information about the electrical infrastructure and its compliance with UK guidance. This information will explain that potential EMF risks have been eliminated through careful design and do not pose a risk to public health

28.6.3.3 Impact 9: Wider societal benefits

308. There are potential wider societal gains as a result of the operation the Project. The population groups relevant to this assessment, due to either proximity or vulnerability, are (as defined in Section 28.3.2):

- The site-specific, local, regional, national and international populations;
- People with existing poor health (physical and mental health);
- Children and young people;
- Older people; and
- People living in deprivation (including those experiencing income and/or access/geographic vulnerability).

309. North Falls would increase energy independence of the UK and reduce air pollutants and GHG emissions that are produced from the generation of electricity from other non-renewable sources of energy (i.e. coal, oil, gas, etc.), see ES Chapter 33 Climate Change (Document Reference: 3.1.35). The associated key health outcomes are reducing premature deaths, heart attacks, asthma exacerbations, and hospitalisations for cardiovascular or respiratory issues (Harvard Chan School, 2022). Reduction in GHG emissions is essential for the UK to transition to a low carbon economy and to manage the long-term effects of climate change, which will have wide-ranging impacts on the UK's communities. The temporal scope is long term as it relates to the operational phase of the Project, i.e. 30 years.

28.6.3.3.1 Source-pathway-receptor

310. The potential effect is considered *likely*, because (based on methods described in Section 28.4.3) there is a potential source-pathway-receptor relationship as follows:

- Source – renewable energy created during the operation of the Project;
- Pathway – (national) energy security, potential to contribute to affordable energy and reduction in air pollutant and GHG emissions; and
- Receptor – all population groups listed in the section above.

28.6.3.3.2 Sensitivity of receptor

311. The sensitivity of the general population and vulnerable groups (collectively grouped) is determined separately and characterised below (based on the methods described in Section 28.4.3. Sensitivity in this case is related to how likely it is a population could benefit from energy security and from the generation of renewable energy as part of the Project.

312. The baseline shows that at a site-specific and local level, households in fuel poverty are higher than the regional and national averages. During 2021, approximately 43% of the energy generation share in 2021 was from fossil fuels, which primarily comprised gas. While energy demand fell in 2020 to levels not seen since the 1950s due to the Covid-19 pandemic, they increased slightly in 2021, but were still down 9% on 2019. Renewable generation (as a percentage of generation) continued to grow and reached a record proportion of 43% in 2020, but dropped again slightly in 2021 to 40% (second only to 2020), and both recent years were an increase on 2019 (37%). 2020 was also the first time where renewable generation outpaced annual fossil fuel generation. UK's electricity generation landscape continues to evolve towards more renewable alternatives (BEIS, 2022).

313. Therefore, in the consideration of climate change effects and the ongoing need for UK's energy transition, the sensitivity of the general population can be characterised as medium, and the sensitivity of vulnerable population groups can be characterised as high.

28.6.3.3.3 Magnitude of the effects

314. As stated in the NPS for Overarching Energy (EN-1), energy production has the potential to impact on the health of the population as access to energy is clearly beneficial to society and to health as a whole. Provision of renewable energy infrastructure through the Project would provide benefits to public health, including inherent improvements in energy provision, energy security and potentially to energy prices. The renewable energy produced as part of the Project would reduce air pollutant and GHG emissions associated with the production of fossil fuel based energy (see ES Chapter 33 Climate Change, Document Reference: 3.1.35).

315. The current installed generating capacity of onshore and offshore wind farms in the UK is 27.9 gigawatts (GW) – 14.2GW and 13.7GW of onshore and offshore capacity respectively (RenewableUK, 2022). North Falls would contribute to the decarbonisation of the UK energy supply once operational.

316. ES Chapter 33 Climate Change (Document Reference: 3.1.35) concluded that the Project was predicted to lead to a reduction in atmospheric GHG

concentrations compared to the without-project baseline (i.e. electricity produced by gas, as it is the most common form of fossil fuel combustion). It was considered that the Project will provide a renewable source of electricity and therefore will have a beneficial effect by reducing GHG emissions and assist in the UK's trajectory towards Net Zero emissions by 2050, and therefore effects of the Project would be of beneficial significance (i.e. significant in EIA terms) in relation to reducing GHG emissions.

317. The magnitude from a health perspective is considered low to medium (beneficial), driven by the longer term regional, national and international wider benefits to society, which could contribute to minor to moderate beneficial changes in quality of life for a large proportion of the population. The benefits of providing renewable infrastructure through the Project would add to national energy security, which is relevant to wider public health supporting technologies, services and living standards as well as the potential contribution to affordable energy which is relevant to those on low incomes. In addition, renewable sources of energy reduce the adverse health effects of climate change experienced internationally, particularly in low and middle income countries.

28.6.3.3.4 Significance of effect

318. The conclusion of the assessment for population health on the general population is that any change due to the Project would be a low to medium beneficial magnitude of impact on a receptor of medium sensitivity. This represents an effect of moderate to minor beneficial significance, i.e. significant for the general population in EIA terms.

319. The conclusion of the assessment for population health is that any change due to the Project would be a low to medium beneficial magnitude of change on a receptor of high sensitivity. This represents an impact of moderate/minor to major/moderate beneficial significance, i.e. significant for vulnerable groups in EIA terms. Vulnerability in this case may particularly relate to people on low incomes or who are experiencing fuel poverty.

320. Scientific literature shows that decarbonising the energy sector and switching to renewable energy helps to reduce air pollution and GHG emissions, which are associated with premature deaths, heart attacks, asthma exacerbation and hospitalisation for cardiovascular or respiratory issues.

321. There are no regulatory standards with regard to wider societal benefits as a determinant of health. The current NPS for Overarching Energy (EN-1) (DESNZ, 2023a) states that *"energy production has the potential to impact on the health and well-being ("health") of the population. Access to energy is clearly beneficial to society and to our health as a whole. However, the production, distribution and use of energy may have negative impacts on some people's health"*.

322. The Project is likely to have a positive, albeit marginal, effect on delivering health policy on standards of living and fuel poverty, as well as supporting a marginal reduction in inequalities. Overall, a slight beneficial effect on the population health baseline would be expected.

28.6.4 Likely significant effects during decommissioning

323. No decision has been made regarding the final decommissioning policy for the onshore substation, as it is recognised that industry good practice, rules and legislation change over time. However, the onshore substation equipment will likely be removed and reused or recycled.

324. It is expected the onshore cables will be removed from ducts and recycled, with the transition pits and ducts left in-situ.

325. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning plan would be provided.

326. It is anticipated that the effects of decommissioning will be no greater in nature than those identified during construction (Section 28.6).

28.7 Potential monitoring requirements

327. No future monitoring is proposed as part of this health assessment. All potential adverse impacts on health were determined to be not significant in EIA terms, provided that the mitigation measures (both embedded and additional) detailed in the relevant technical chapters referenced in this chapter are in place or are implemented.

28.8 Cumulative effects

328. The health assessment methodology used for the CEA is described in ES Chapter 6 EIA Methodology (Document Reference: 3.1.8) as well as in Section 28.4.4.

329. There are many inter-relationships between determinants of health and health outcomes. This section considers inter-project cumulative effects, and intra-project cumulative effects are considered in Sections 28.10.

28.8.1 Identification of potential cumulative effects

330. The first step in the CEA process is the identification of which residual effects assessed for North Falls on their own have the potential for a cumulative effect with other plans, projects and activities. All impacts considered in this chapter have the potential for cumulative impacts on health in combination with other projects (i.e. inter-project effects) occurring at a similar time with effects to the same populations, this information is set out in Table 28.21.

331. Only likely significant effects assessed in Section 28.6 as negligible (adverse) or above are included in the CEA (i.e. those assessed as ‘no impact’ are not taken forward as there is no potential for them to contribute to a cumulative effect).

Table 28.21 Potential cumulative effects

Impact	Potential for cumulative effect	Rationale
Construction		
Impact 1: Noise effects	Yes	There is the potential for construction works associated with other projects in similar locations to the North Falls construction activities to result in cumulative effects, where there is a temporal overlap.
Impact 2: Air quality effects	Yes	
Impact 3: Ground and/or water contamination effects	Yes	
Impact 4: Physical activity effects	Yes	
Impact 5: Journey times and/or reduced access effects	Yes	
Construction and Operation		
Impact 6: Employment effects	Yes	There is the potential for cumulative construction and operational employment effects with projects that are also developing within the socio-economic study area.
Operation		
Impact 7: Noise effects	Yes	There is the potential for cumulative operational noise effects with projects that are introducing industrial / commercial noise sources nearby to the onshore substation.
Impact 9: Wider societal benefits	Yes	There is the potential for cumulative wider societal benefits with projects that are delivering renewable sources of energy.

28.8.2 Other plans, projects and activities

332. The second step in the cumulative assessment is the identification of the other plans, projects and activities that may result in cumulative effects for inclusion in the CEA (described as 'project screening'). This information is set out in Table 28.22 below, together with a consideration of the relevant details of each, including current status (e.g. under construction), planned construction period, closest distance to North Falls, status of available data and rationale for including or excluding from the assessment. Commentary specific to each of the EIA receptor topics is detailed in the technical chapter referenced in this chapter.

333. Sub-regional growth in housing and employment, as adopted by the region's Local Plans, has been captured within future year growth factors applied to the forecast traffic flows (further detail is provided in ES Chapter 27 Traffic and Transport, Document Reference: 3.1.29). The cumulative effect of housing and employment projects is therefore inherent in the traffic and transport impact assessment, and consequently also within the traffic-related aspects of the air quality and noise impact assessments (as traffic flows from the traffic and transport impact assessment were used in the impact assessments for air

quality and noise (see ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22) and ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28) for further details)). Therefore, the cumulative effects on journey times, reduced access, air quality or noise for any housing and employment projects listed in Table 28.21 are integral to the assessments of significance provided in ES Chapter 27 Traffic and Transport (Document Reference: 3.1.29), ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22) and ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28).

334. Any cumulative project identified and included in the CEA of the technical chapters (as listed in Section 28.1) has been considered in the CEA for this chapter, with the exception of potential cumulative effects that have been determined to be insignificant when compared to the same health criterion as in this chapter. For example, the cumulative effects of projects on air quality screened into the air quality CEA (see ES Chapter 20 Onshore Air Quality, Document Reference: 3.1.22) have been compared against health based Objectives (i.e. the same as in this chapter), and if the cumulative effect has been determined to be not significant as a result, the potential cumulative effect has not been included in Table 28.22 as it has been considered already. Other potential cumulative effects on air quality (i.e. construction dust) were included in the health assessment CEA, where applicable. Small scale developments (i.e. few dwellings, etc.) have also not been included in Table 28.22 due to the localised, small and temporary nature of construction works associated with these developments and therefore would be unlikely to cumulatively affect any of the receptors identified for North Falls.

335. The CEA is based on information available on each potential project and it is noted that the project details available may either change in the period up to construction or may not be available in detail at all. The assessment presented here is therefore considered to be precautionary, with the level of impacts expected to be conservative.

336. The project screening has been informed by the development of a CEA project list which forms an exhaustive list of plans, projects and activities within the study area (Section 28.3.1) relevant to North Falls. The list has been appraised, based on the confidence in being able to undertake an assessment from the information and data available, enabling individual plans, projects and activities to be screened in or out. Only cumulative effects from projects screened into relevant technical chapter CEA's (as listed in Section 28.1) were included in the CEA for health.

Table 28.22 Summary of projects considered for the CEA in relation to human health (project screening)

Project	Status	Construction period	Closest distance from the onshore project areas (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
National Infrastructure Planning						
Five Estuaries Offshore Wind Farm EN010115	Pre-application	2028-2030	0	High	Y	There may be spatial and temporal overlaps during construction, therefore some cumulative effects on determinants of health (i.e. noise, air quality, ground/water contamination, physical activity, journey times/reduced access and employment) may occur.
Norwich to Tilbury EN020027	Pre-application	2027 - 2031	Scoping area directly overlaps with North Falls onshore project area.	Low	Y	The proposed substation area for Norwich to Tilbury is in close proximity to North Falls proposed onshore substation works area; and the proposed new substation operational access road overlaps with the Bentley Road improvement works. Therefore, cumulative impacts could occur.
Longfield Solar Farm EN010118	Approved (DCO issued in 2023)	2024-2026	35.3	High	Y (for regional populations; operational phase only)	These projects could have temporal overlap during operation and could potentially affect the same regional population, therefore some cumulative effects on determinants of health (i.e. employment) may occur at the regional population level.
Thurrock Flexible Generation Plant EN010092	Approved (DCO issued in 2022)	2 year period – assumed to be 2021 -2023 in the planning submission but this has been delayed.	65.2	High	Y (for regional populations; operational phase only)	
Tendring District Council						
Battery energy storage scheme (BESS) on land	Approved (full)	Information unavailable	0.3	N/A	Y	The proposed BESS would be located in close proximity to the proposed onshore substation for

Project	Status	Construction period	Closest distance from the onshore project areas (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
adjacent to Lawford Grid Substation, Ardleigh Road, Little Bromley, Essex, CO11 2QB 21/02070/FUL						North Falls, therefore some cumulative effects on determinants of health (i.e. operational noise) may occur.
Land to The South of Thorpe Road Weeley Essex CO16 9AJ 19/00524/OUT	Approved	Information unavailable	N/A	High	Y	A Transport Assessment is provided in support of this scheme. A review of these documents identifies a potential temporal overlap and spatial and overlap between the schemes and North Falls traffic and transport study areas. Therefore, it is assessed that there is the potential for cumulative effects to occur.
Bathside Bay Stour Road Harwich Essex CO12 3HF 23/01594/FUL	Awaiting decision	2026-2028 (For Green Energy Hub)	N/A	High	Y	A Transport Assessment and ES traffic and transport chapter is provided in support of this scheme. A review of these documents identifies a potential temporal overlap and spatial and overlap between the schemes and North Falls traffic and transport study areas. Therefore, it is assessed that there is the potential for cumulative effects to occur.
Land South West of Horsley Cross Roundabout Clacton Road Horsley Cross Essex CO11 2NZ 13/00745/OUT	Approved – Outline (Aug 2014)	Information unavailable	N/A	High	Y	A Transport Assessment is included in the application and presents operational traffic impacts of the project. Thus, the project is included in cumulative assessment.
Other locations						

Project	Status	Construction period	Closest distance from the onshore project areas (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
Bramford to Twinstead Overhead Line	Pre application	2024-2028	14 km	High	Y	The Bramford to Twinstead Overhead Line may overlap with the study area used in the assessment of human health as set out in Section 28.3.1.
Sizewell C Project	Approved (DCO issued in 2022)	2022 – 2034	49 km	High	Y	The Sizewell C Nuclear Power Station will be located in East Suffolk, and some cumulative effects on determinants of health (i.e. construction and development employment effects) may occur.

28.8.3 Assessment of cumulative effects

337. The Five Estuaries Offshore Wind Farm (herein referred to as 'Five Estuaries') is also in its application phase, having submitted a DCO to the Planning Inspectorate for the project, which was accepted on 22 April 2024. Although subject to a separate DCO, the Five Estuaries shares the same landfall location and onshore cable route (including Bentley Road improvement works) as North Falls, with the two projects also having co-located onshore substations within the same onshore substation works area. The two projects also have the same national grid connection point.

338. Five Estuaries Offshore Wind Farm Limited and NFOW have sought to collaborate and coordinate where possible, which has led to collaborative design of the projects' onshore infrastructure, and also to sharing of detailed project design information onshore. As a result, a detailed CEA for effects arising from the development of the Five Estuaries can be undertaken. The CEA section of this chapter is therefore split into two sections:

- the first describing a detailed CEA covering effects predicted to arise from development of Five Estuaries and North Falls;
- the second, detailing effects predicted to arise from the development of Five Estuaries, North Falls and other projects.

339. The latter section will be based on the project information available for each scheme in the public domain, and by definition is therefore less detailed than the Five Estuaries and North Falls CEA section.

340. Full details on the approach to CEA used within this chapter are set out in ES Chapter 6 EIA Methodology (Document Reference: 3.1.8).

28.8.3.1 Five Estuaries Offshore Wind Farm

28.8.3.1.1 Realistic worst case scenario

341. Using the design information provided by Five Estuaries Offshore Wind Limited [and checked/updated against the submission of the Five Estuaries ES] a realistic worst case cumulative scenario has been developed for the purpose of this chapter.

342. This considers three potential cumulative build-out scenarios, as outlined in ES Chapter 5 Project Description (Document Reference 3.1.7):

- **Scenario 1:** North Falls 'Option 2' build out is progressed, and Five Estuaries Offshore Wind Limited undertakes landfall, onshore substation construction and cable pull which overlaps with North Falls equivalent works. In this scenario, onshore cable route associated works, including temporary construction compounds, accesses and haul road, all remain in place and are used by the second project during its construction.
- **Scenario 2:** North Falls 'Option 1' build out is progressed, and Five Estuaries Offshore Wind Limited undertakes landfall, onshore substation and onshore cable route construction and cable pull, all of which does not overlap with North Falls' equivalent works. There would be a gap of between 1 and 3 years between each Projects' construction. In this scenario, onshore cable route associated works, including temporary construction compounds,

accesses and haul road, all remain in place and are used by the second project during its construction.

- **Scenario 3:** North Falls 'Option 1' build out is progressed, and Five Estuaries Offshore Wind Limited undertakes a separate landfall, onshore substation and onshore cable route construction and cable pull with a multi-year (i.e. >3 year) gap between the two construction activities. In this scenario, there is no reuse in onshore temporary works between the two projects, and all onshore cable route associated works are rebuilt and reinstated in full by the second project.

343. Full details on the build out scenarios considered within this assessment are detailed in ES Chapter 5 Project Description (Document Reference: 3.1.7) ES Chapter 6 EIA Methodology (Document Reference: 3.1.8).

344. The realistic worst case scenarios for likely cumulative effects scoped into the EIA for the human health assessment are summarised in Table 28.23. These are based on project parameters for Five Estuaries described in ES Chapter 5 Project Description (Document Reference: 3.1.7), which provides further details regarding specific activities and their durations. The human health worst case scenario is informed by the determinant of human health which is being assessed, and this is therefore informed by the respective ES chapters. These are set out below.

345. Scenario 1 is assumed to be the realistic worst case scenario in the following chapters:

- Chapter 20 Air Quality;
- Chapter 26 Noise and Vibration;
- Chapter 27 Traffic and Transport; and
- Chapter 31 Socio-Economic.

346. Scenario 3 is assumed to be the realistic worst case scenario in the following chapters:

- Chapter 19 Ground Conditions and Contamination;
- Chapter 21 Water Resources and Flood Risks; and
- Chapter 32 Tourism and Recreation.

Table 28.23: Realistic worst-case scenario of cumulative effects arising from development of North Falls and Five Estuaries Offshore Wind Farm – (Scenario 1 (simultaneous build) and scenario 3 (independent builds))

Element of the project infrastructure	Parameter (scenario 1)	Parameter (scenario 3)	Notes
Construction			
Potential for likely significant effects on: Noise Air quality Ground and/or water contamination Physical activity Journey times and/or reduced access Employment	Landfall Temporary horizontal directional drilling (HDD) compound work HDD temporary works area (4 circuits): 300 x 150m HDD length: up to 1.1km TJB dimensions = 4 x 15 for the project, 5 x 20m for Five Estuaries Duration: Up to 13 months (of which HDD = 6 months) HDD to include 24 hour / 7 days working where required	Landfall Temporary horizontal directional drilling (HDD) compound work HDD temporary works area (4 circuits): 300 x 150m HDD length: up to 1.1km TJB dimensions = 4 x 15 for the project, 5 x 20m for Five Estuaries Duration: Up to 13 months (of which HDD = 6 months) + Up to 13 months (of which HDD = 6 months) HDD to include 24 hour / 7 days working where required	Relevant information on health is brought together in this chapter including assessing the findings and conclusions of other chapters within the ES. The worst case parameters presented here represent the worst case parameters that informed the assessments in other ES chapters (as listed in Section 28.1) but are included here for completeness. This chapter explains the public health implications of these determinants of health, as well as considering other determinants which may affect health and wellbeing.
	Onshore cable route Cable burial depth: 0.9 to 2.0m No. of temporary construction compounds (est.): 11 TCC footprint: 150 x 150m (main) and 100 x 100m (satellite). Indicative cable route width: 72m (open cut trenching), 90m (trenchless crossings), 130m (complex trenchless crossings) No. trenches for all cables (max.): 4 Haul road width: 6m (within cable swathe) 10m (passing places, within cable swathe) Overall duration: 18 – 27 months, with a 57 month gap in between i.e. 111 months start to finish [same for onshore substation]	Onshore cable route Cable burial depth: 0.9 to 2.0m No. of temporary construction compounds (est.): 11 TCC footprint: 150 x 150m (main) and 100 x 100m (satellite). Indicative cable route width: 72m (open cut trenching), 90m (trenchless crossings), 130m (complex trenchless crossings) No. trenches for all cables (max.): 4 Haul road width: 6m (within cable swathe) 10m (passing places, within cable swathe)	

Element of the project infrastructure	Parameter (scenario 1)	Parameter (scenario 3)	Notes
		Overall duration: 18 – 27 months, with a 57 month gap in between i.e. 111 months start to finish [same for onshore substation]	
	Onshore substation Permanent substation footprints: 280 x 210m + 280 x 210m Indicative construction compound dimensions: 150 x 250m + 150 x 250m Construction duration: 21 – 27 months	Onshore substation Permanent substation footprints: 280 x 210m + 280 x 210m Indicative construction compound dimensions: 150 x 250m + 150 x 250m Construction duration: 21 – 27 months + 21 – 27 months	
Operation			
Potential for likely significant effects on: Employment Noise EMF Wider societal benefits	Onshore substation 2x Permanent substation footprints: 280 x 210m Onshore export cables: HVAC Operational lifetime: 40 years Unmanned, only visits for maintenance staff and visitors	Onshore substation 2x Permanent substation footprints: 280 x 210m Onshore export cables: HVAC Operational lifetime: 40 years Unmanned, only visits for maintenance staff and visitors	Relevant information on health is brought together in this chapter including assessing the findings and conclusions of other chapters within the ES. The worst case parameters presented here represent the worst case parameters that informed the assessments in other ES chapters (as listed in Section 28.1) but are included here for completeness. This chapter explains the public health implications of these determinants of health, as well as considering other determinants which may affect health and wellbeing.
Decommissioning			
No final decision has yet been made regarding the final decommissioning policy for the onshore project infrastructure including landfall, onshore cable route, 400kV cable route and onshore substation. It is also recognised that legislation and industry good practice change over time. However, it is likely that the onshore project equipment, including the cable, will be removed, reused, or recycled where practicable and the transition bays and cable ducts being left in place. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and will be agreed with the regulator. It is anticipated that for the purposes of a worst case scenario, the impacts will be no greater than those identified for the construction phase.			

28.8.3.1.2 During construction

Impact 1: Noise effects

347. During the construction phase of the Project, there is a potential for noise to temporarily arise from construction activities and movement of Heavy Goods Vehicles (HGVs) across the onshore project area and associated highway links as well as increased traffic from construction workers.

348. In scenario 1, which is assumed to be the realistic worst case for noise effects, ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28) finds a significant cumulative effect in relation to off-site construction traffic, which it concludes can result in a moderate to major adverse temporary effect. Mitigation measures are proposed by the Project and Five Estuaries for inclusion in the respective CTMPs and CoCPs, and noise level monitoring is proposed at the worst-affected property. With this mitigation and monitoring in place, ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28) finds that the available range of potential traffic and mitigation measures are considered sufficient to ensure that cumulative residual effects from noise and vibration will be not significant.

349. In line with a proportionate assessment this human health chapter follows this reasoning. The level of noise experienced would be within working noise limits for temporary disruption, undertaken in accordance with the relevant British Standards identified in ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28) and as detailed above, residual effects resulting from the concurrent build-out of the Project and Five Estuaries were in the worst case negligible adverse, i.e. not significant in EIA terms.

350. The extent of effects would be highly localised, and therefore only experienced by a very small number of people in local populations. The severity of noise effects would result in a minor change to quality of life and very few receptors would be affected at the same time as the cable route construction sections are progressed. Once construction is complete, noise impacts would immediately cease. Therefore, the magnitude of change due to the Project and the Five Estuaries can be characterised as negligible to low. At these levels, it is unlikely that there would be changes in the risk of developing a new health condition (morbidity) or of exacerbating an existing condition. Reductions in wellbeing associated with very short- to short-term, noise levels would be unlikely to persist beyond the period of elevated exposure.

351. The Five Estuaries ES Health Chapter finds no significant cumulative effects on human health regarding noise.

352. No significant cumulative effects on human health for the general population are expected to arise. No significant cumulative effects on human health for vulnerable population groups are expected to arise.

353. No further mitigation is proposed from a human health perspective regarding noise effects.

Impact 2: Air Quality effects

354. During the construction phase of the Project, there is a potential for air quality to be temporarily affected by dust and fine particulates from construction

activities and emissions from construction vehicles and non-road mobile machinery (NRMM).

355. In scenario 1, which is assumed to be the realistic worst case for air quality effects, ES Chapter 20 Air Quality (Document Reference: 3.1.22) finds a potential cumulative effect in relation to construction dust, which it concludes can result in a negligible adverse temporary effect. Mitigation measures are proposed by the Project and Five Estuaries for inclusion in the respective CoCPs. With this mitigation and monitoring in place, ES Chapter 20 Air Quality (Document Reference: 3.1.22) finds that the available range of potential dust and mitigation measures is considered sufficient to ensure that cumulative residual effects from dust will be not significant. ES Chapter 20 Air Quality (Document Reference: 3.1.22) further finds no significant cumulative effect in relation to NRMM emissions. Mitigation measures are proposed by the Project as presented in the chapter. With this mitigation and monitoring in place, ES Chapter 20 Air Quality (Document Reference: 3.1.22) finds that the available range of potential NRMM emissions and mitigation measures is considered sufficient to ensure that cumulative residual effects from NRMM emissions will be not significant.

356. In line with a proportionate assessment this human health chapter follows this reasoning. The level of dust and NRMM emissions experienced would be within the IAQM guidance and Defra technical guidance, undertaken in accordance with the relevant British Standards identified in ES Chapter 20 Air Quality (Document Reference: 3.1.22) and as detailed above, residual effects resulting from the concurrent build-out of the Project and Five Estuaries were in the worst case negligible adverse, i.e. not significant in EIA terms.

357. The severity of any population health effects associated with air quality would result in a negligible change to quality of life for a small minority of the population at the same time as the cable route construction sections are progressed. Once construction is complete, any population health effects associated with a slight reduction in quality of life would be expected to reverse. Therefore, the magnitude of change due to the Project the Five Estuaries can be characterised as low.

358. The Five Estuaries ES Health Chapter finds no significant cumulative effects on human health regarding air quality.

359. No significant cumulative effects on human health for the general population are expected to arise. No significant cumulative effects on human health for vulnerable population groups are expected to arise. No further mitigation is proposed from a human health perspective.

Impact 3: Ground and/or water contamination effects

360. During the construction phase of the Project, there is a potential for water quality to be temporarily affected by the accidental release of potentially polluting substances or mobilisation of existing contamination as a result of intrusive works such as excavation of soils, piling at the onshore substation or trenchless techniques (e.g. HDD). There is also potential for accidental leakages of foul water from welfare facilities, and construction materials including concrete and inert drilling fluids. These can enter surface waters and connected groundwaters through run-off, especially following rainfall.

361. In scenario 3, which is assumed to be the realistic worst case for ground and water contamination effects, ES Chapter 19 Ground Conditions and Contamination (Document Reference: 3.1.21) and ES Chapter 21 Water Resources and Flood Risks (Document Reference: 3.1.23) finds a potential cumulative effect in relation to contaminated soils and groundwater, which the ES chapters conclude can result in a negligible to minor adverse temporary effect. Embedded mitigation measures are proposed by the Project and Five Estuaries for inclusion. With this mitigation in place, ES Chapter 19 Ground Conditions and Contamination (Document Reference: 3.1.21) and ES Chapter 21 Water Resources and Flood Risks (Document Reference: 3.1.23) find that the available range of potential water quality and mitigation measures is considered sufficient to ensure that cumulative residual effects from contaminated soils and groundwater will be not significant.

362. In line with a proportionate assessment this human health chapter follows this reasoning. The level of water quality experienced would be within the relevant British Standards identified in ES Chapter 19 Ground Conditions and Contamination (Document Reference: 3.1.21) and ES Chapter 21 Water Resources and Flood Risks (Document Reference: 3.1.23) as detailed above, and residual effects resulting from the concurrent build-out of the Project and Five Estuaries were in the worst case negligible to minor adverse, i.e. not significant in EIA terms.

363. The impacts are predicted to be of local spatial extent associated with accidental spillage, of short-term duration and of highly infrequent occurrence. Furthermore, the likelihood of the effect would reduce outside of the main recreational seasons due to a reduction in potential receptors. The general water related pollutant exposure (if any) implication for public health would be a minor change in morbidity or quality of life for a small minority of the population. The magnitude is therefore, considered to be low for the Project and the Five Estuaries.

364. The Five Estuaries ES Health Chapter finds no significant cumulative effects on human health regarding ground and water quality.

365. No significant cumulative effects on human health for the general population are expected to arise. No significant cumulative effects on human health for vulnerable population groups are expected to arise.

366. No further mitigation is proposed from a human health perspective regarding water and ground contamination effects.

Impact 4: Physical activity effects

367. During the construction phase of North Falls, there is a potential for physical activity to be temporarily affected by the temporary diversion of PRoWs (majority of which are footpaths), NCN routes, bridleways, byways and long distance walking routes (i.e. Tendring Hundred Hinterland) (herein referred to as ‘routes’). All other direct interaction with public spaces, such as playing fields and common land, has been avoided through careful site selection as part of the embedded mitigation for the Project and through the use of trenchless techniques (i.e. HDD) under features such as local nature reserves.

368. The present ES Chapter 28 Human Health (Document Reference: 3.1.30) found that following embedded mitigation measures as included within the

OPRoWMP, detailed in ES Chapter 32 Tourism and Recreation (Document Reference: 3.1.34), the residual significance of effect on physical activity effects on human health represents a negligible effect, i.e. not significant in EIA terms for the general population or vulnerable groups for the Project alone.

369. In scenario 3, which is assumed to be the realistic worst case for physical activity effects, ES Chapter 28 Human Health (Document Reference: 3.1.30) finds no potential significant cumulative effect in relation to physical activity, since any impacts would remain temporary and reversible in nature. The impacts are predicted to be of a site-specific spatial extent, of short-term (due to the sequential linear nature of construction) to medium-term duration (in haul road locations, i.e. for up to 27 months) and immediately reversible once construction works are completed. Temporary diversions may marginally increase the length of routes, which may disincentivise use by some people. However, the temporary diversions would be unlikely to affect population physical activity levels to the extent of changes in the risk of developing new health conditions or of exacerbating existing conditions. Any short-term changes in physical activity levels would be unlikely to have a lasting influence on population health and would lead to a minor change in quality of life to a very small population. Therefore, the magnitude is considered to be low for the Project and the Five Estuaries.

370. The Five Estuaries ES Health Chapter finds no significant cumulative effects on human health regarding physical health effects.

371. No significant cumulative effects on human health for the general population are expected to arise. No significant cumulative effects on human health for vulnerable population groups are expected to arise.

372. No further mitigation is proposed from a human health perspective regarding physical activity effects.

Impact 5: Journey times and/or reduced access effects

373. During the construction phase of the project, here are two main pathways by which the Project could affect access to services:

- there is a potential for the availability of services to change due to the presence of the construction workforce placing greater demand on services, and
- there is a potential for journey times and access to be temporarily affected by an increase in the number of HGVs or employee vehicles on the road and temporary traffic management at certain locations. This increase in volume has the potential to lead to temporary delays and to temporarily reduce access to local services.

374. The present ES Chapter 28 Human Health (Document Reference: 3.1.30) found that following embedded mitigation measures the significance of effect on service demand represents a minor/negligible effect, i.e. not significant in EIA terms on a receptor of high sensitivity and the significance of effect on traffic volume effects on human health represents a minor adverse effect, i.e. not significant in EIA terms for the general population or vulnerable groups for the Project alone for the Project alone. The assessment likewise found that in line with NPS EN-1 (DESNZ, 2023a), the Project has avoided significant impacts for

obstruction to health services. Therefore, there would be no residual long-term change in population health outcomes for the Project alone.

375. In scenario 1, which is assumed to be the realistic worst case for journey times and/or reduced access effects, ES Chapter 27 Traffic and Transport (Document Reference: 3.1.29) finds a minor adverse cumulative significance of effect, which is not significant in EIA terms, in relation to severance. ES Chapter 28 Human Health (Document Reference: 3.1.30) finds no potential significant cumulative effect in relation to Journey times and/or reduced access effects since any change in journey times would be reversible as the Project and the Five Estuaries does not make any permanent change to the road network.

376. The Five Estuaries ES Health Chapter finds no significant cumulative effects on human health regarding physical health effects.

377. No significant cumulative effects on human health for the general population are expected to arise. No significant cumulative effects on human health for vulnerable population groups are expected to arise.

378. No further mitigation is proposed from a human health perspective regarding journey times and/or reduced access effects.

28.8.3.1.3 During construction and operation

Impact 6: Employment effects

379. During the construction and operation phases of the Project, there is a potential for creating a demand for transferable skills (both between construction projects and on to operation of projects) has a multiplying effect on employment. Direct employment by the Project also creates indirect employment in the supply chain and induced employment due to expenditure.

380. In scenario 1, which is assumed to be the realistic worst case for employment effects, ES Chapter 31 Socio-economics (Document Reference: 3.1.33) finds no significant cumulative effect in relation to employment, which it concludes can result in a minor beneficial effect.

381. In line with a proportionate assessment this human health chapter follows this reasoning. Based on the anticipated scale of the work the magnitude of impact on employment and economic value is anticipated to remain negligible in the context of the level of employment and GVA supported across the study area and as detailed above, effects resulting from the concurrent build-out of the Project and Five Estuaries were in the worst case minor beneficial, i.e. not significant in EIA terms.

382. The Project's contribution to direct economic benefit and employment both onshore and offshore will be relatively small, as detailed ES Chapter 31 Socio-economics (Document Reference: 3.1.33). The potential change, whilst positive, is unlikely to be associated with a widespread reduction in inequalities or a widespread increase in prosperity or quality of life. However, those employed directly and indirectly through either the construction or operation of the Project and the Five Estuaries would experience overall improvements in socio-economic status and this is likely to lead to improvements in general well-being. The beneficial magnitude (from the health perspective) is considered negligible to low, driven by the longer-term regional benefits to upskilling and employment. A negligible to low beneficial effect on physical and mental health

morbidity and quality of life outcomes for a small minority of the local and regional population would also be expected.

383. The Five Estuaries ES Health Chapter finds no significant cumulative effects on human health regarding employment.

384. No significant cumulative effects on human health for the general population are expected to arise. No significant cumulative effects on human health for vulnerable population groups are expected to arise.

385. No further mitigation is proposed from a human health perspective regarding noise effects.

28.8.3.1.4 During operation

Impact 7: Noise effects

386. During operation the Five Estuaries and the Norwich to Tilbury[7] substations are in the same onshore substation works area as the North Falls onshore substation. The cumulative noise levels from all three substations have the potential to affect nearby noise and vibration sensitive receptors; hence, the Norwich to Tilbury substation has been included in the assessment of cumulative effects with Five Estuaries.

387. ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28) finds no significant cumulative effect in relation to the combined sound from all three substations, which would not exceed the agreed Lowest Observed Adverse Effect Level (LOAEL) of 35 dB $L_{Ar,Tr}$. Mitigation measures are proposed by the Project, Five Estuaries and the Norwich to Tilbury substations for inclusion in the respective CTMPs and CoCPs. With this mitigation and monitoring in place, ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28) finds that the available range of potential noise from the operation of all three substations and mitigation measures are considered sufficient to ensure that cumulative residual effects from noise and vibration will be not significant.

388. In line with a proportionate assessment this human health chapter follows this reasoning. The level of noise experienced would be within and below working noise limits, undertaken in accordance with the relevant British Standards identified in ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28) and as detailed above, residual effects resulting from the operation of the three were in the worst case negligible, i.e. not significant in EIA terms.

389. Although the scientific evidence indicates a relationship between changes to noise and health outcomes, any changes that would result from the three substations would likely contribute to only a slight change in the health baseline of the population. Whilst an (negligible) adverse effect, it would have only a marginal effect on delivering health policy linked to noise and on contributing to narrowing health inequalities.

[7] Note Norwich to Tilbury has been included in the assessment here rather than in section 28.8.3.2, as the cumulative assessment detailed in ES Chapter 26 Noise and vibration (Document Reference:3.1.28), upon which the assessment reported in this chapter draws, has detailed cumulative operational effects for these three projects, not for only North Falls and Five Estuaries.

390. The Five Estuaries ES Health Chapter finds no significant cumulative effects on human health regarding noise.

391. No significant cumulative effects on human health for the general population are expected to arise. No significant cumulative effects on human health for vulnerable population groups are expected to arise.

392. No further mitigation is proposed from a human health perspective regarding noise effects.

Impact 8: EMF effects

393. As discussed in Section 28.6.3.2, there is *no plausible source-pathway-receptor relationship*, there would be *no likely significant population health effects*, for the general population or for vulnerable groups, from EMF from the onshore cable route or onshore substation for the North Falls Project alone. While no explicit assessment is presented in their ES Health chapter the same is assumed for the Five Estuaries, hence no significant effect would arise cumulatively from the two projects.

394. While there may be some concern about EMF risk (i.e. a person's understanding or views of the risk to their health, or in other words their outlook), and that such concerns may influence their mental health and quality of life even where the exposure levels are well within health protection good practice standards, the information set out in this chapter should also provide reassurance for those who may be concerned.

395. To avoid adverse health outcomes from the public's understanding of EMF risk, and thereby the perceived cumulative or additive risk from multiple sources of EMF, which may negatively impact mental health, additional mitigation is recommended in addition to that suggested for the North Falls Project alone. This includes providing clear and non-technical information about the interplay of multiple sources of EMF, mainly North Falls and Five Estuaries. This information will explain that any potential EMF risks have been assessed and do not pose a risk to public health.

Impact 9: Wider societal benefits

396. During the operation phase of the Project there are potential wider societal gains including increased energy independence of the UK, reduced air pollutants and greenhouse gas emissions that are produced from the generation of electricity from other non-renewable sources of energy (i.e. coal, oil, gas, etc.) with associated key health outcomes such as reduced premature deaths, heart attacks, asthma exacerbations, and hospitalisations for cardiovascular or respiratory issues.

397. As detailed in ES Chapter 33 Climate Change (Document Reference: 3.1.35), greenhouse gas emissions have the potential to contribute to climate change, and therefore the effects are global and cumulative by nature. This is taken into account in defining the receptor (i.e., the global atmosphere) as high sensitivity. ES Chapter 33 Climate Change (Document Reference: 3.1.35) follows relevant IEMA guidance which states that the effects of GHG emissions from specific cumulative projects should therefore not be individually assessed, as there is no basis for selecting which projects to assess cumulatively over any other. The

GHG assessment is considered to be inherently cumulative, and no additional consideration of cumulative effects is required.

398. In line with a proportionate assessment this human health chapter follows this reasoning. There are potential wider societal gains as a result of the operation the Project in terms of climate change effects and any operation and maintenance emissions released by the Project over its lifetime would be negligible and offset by the avoided emissions it enables.

28.8.3.1.5 During decommissioning

399. As discussed in Section 28.6.4 no decision has been made regarding the final decommissioning policy for the onshore substation or the onshore cables.

400. It is anticipated that the cumulative effects of decommissioning, in case North Falls and Five Estuaries is decommissioned simultaneously, will be no greater in nature than those identified during construction.

28.8.3.1.6 Summary

401. Table 28.24 below provides a summary of the potential significant cumulative effects identified during the human health CEA in relation to Five Estuaries.

Table 28.24: Summary of cumulative effects with Five Estuaries Offshore Wind Farm

Potential impact	Cumulative effect (scenario 1)	Cumulative effect (scenario 3)	Additional mitigation
Construction			
Cumulative impact 1: Noise	Not significant	-	No additional mitigation proposed
Cumulative impact 2: Air Quality	Not significant	-	No additional mitigation proposed
Cumulative impact 3: Ground and/or water contamination effects	Not significant	Not significant	No additional mitigation proposed
Cumulative impact 4: Physical activity effects	-	Not significant	No additional mitigation proposed
Cumulative impact 5: Journey times and/or reduced access effects	Not significant	-	No additional mitigation proposed
Construction and operation			
Cumulative impact 6: Employment effects	Not significant	-	No additional mitigation proposed
Operation			
Cumulative impact 7: Noise effects	Not significant	-	No additional mitigation proposed
Cumulative impact 8: EMF effects	No impact	No impact	To avoid negative mental health effects of perceived risks: Include information about no cumulative effects from EMF in informational material.

Potential impact	Cumulative effect (scenario 1)	Cumulative effect (scenario 3)	Additional mitigation
Cumulative impact 9: Wider societal benefits	-	-	-
Decommission			
Decommissioning strategies have not yet been finalised; however, the cumulative effects are expected to be no greater than those of construction.			

28.8.3.2 Other projects

402. This section provides an assessment of cumulative effects of North Falls, Five Estuaries and the following projects which have been assessed for potential direct cumulative effects.

403. **Norwich to Tilbury Substation:** A new onshore substation is proposed as part of the Norwich to Tilbury proposals by National Grid Electricity Transmission (NGET), close to the preferred location for the North Falls onshore substation. North Falls is planned for construction from 2027 at the earliest, compared to 2027 to 2031 for Norwich to Tilbury. National grid prepared a human health chapter as part of the PEIR (National Grid, 2024), which finds no significant residual effects during the construction and operation (and maintenance) phases of the project at this stage. As presented in Section 28.8.3.1 of ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28) finds no significant residual cumulative effect in relation to the combined operational sound from the Project, Five Estuaries and the Norwich to Tilbury substations. Due to the absence of residual effects from the Norwich to Tilbury substation alone or the combination of the three mentioned substations, no further cumulative effects are expected.

404. **BESS on land adjacent to Lawford Grid Substation:** The BESS project involves the construction and operation of a 50 MW BESS, and related infrastructure with associated access, landscaping and drainage. The Longfield Solar Farm and Thurrock Flexible Generation Plant projects will be located in Chelmsford, Essex and Thurrock, Essex, respectively, and while there will be no spatial or temporal (during construction) overlap with North Falls, there may be cumulative operational effects on regional populations (i.e. employment). Due to the absence of temporal and spatial overlap no cumulative effects are expected.

405. **Longfield Solar Farm:** An application for a DCO for Longfield Solar Farm was awarded planning consent by the Government on 26 June 2023. Longfield Solar Farm prepared a human health chapter as part of the Environmental Statement within a successful DCO application (Longfield Solar Farm, 2022). The health assessment finds some noise effects during the construction and operation phases of the Scheme. These are close to the Longfield Solar Farm site and there is no spatial overlap with the Project. Due to the absence of spatial overlap no cumulative effects are expected.

406. **Thurrock Flexible Generation Plant:** A flexible generation project utilising gas generation and battery storage technologies, strategically positioned close to London in Thurrock, Essex. Thurrock Flexible Generation Plant prepared a human health chapter as part of the Environmental Statement (Thurrock

Flexible Generation Plant, 2020), which finds no significant effects to human health during the construction, operation and decommissioning phases of the Scheme. Due to the absence special overlap and residual effects from Thurrock Flexible Generation Plant alone, no further cumulative effects are expected.

407. **Land to The South of Thorpe Road Weeley:** The developers of the land to the south of Thorpe Road, Weeley submitted a successful planning application in 2023 (Weeley Parish Council, 2023). This did not include an assessment of likely significant effects on human health. The land development is set to commence within three years and will take five years to complete. The development is located along the onshore cable route and as the onshore cable route would be worked on in sections, and therefore works would be undertaken in the vicinity of the development for a maximum of weeks, i.e. less than a month, the temporal overlap is insignificant. Hence, no further cumulative effects are expected.

408. **Bathside Bay Container Terminal (BBCT) Stour Road Harwich:** The developers of the proposed BBCT submitted a successful planning application in 2022 (Tending District Council, 2022). Construction of BBCT is anticipated in 2024 with Green Energy Hub operation commencing in 2026 (at the earliest). While there will be no spatial overlap with North Falls, there may be cumulative beneficial operational effects on regional populations (i.e. employment). Due to the absence of spatial overlap, no further adverse cumulative effects are expected.

409. **Land South West of Horsley Cross Roundabout Clacton Road Horsley Cross:** The developers of the land South West of Horsley Cross Roundabout Clacton Road Horsley Cross submitted a successful planning application in 2023 (Tendring District Council, 2023). This did not include an assessment of likely significant effects on human health. The timeline of the development is yet to be determined, however there is no spatial overlap of the projects. Due to the absence of spatial overlap, no further cumulative effects are expected.

410. **Bramford to Twinstead Overhead Line:** The Bramford to Twinstead Overhead Line is the construction of a new double circuit electricity transmission network reinforcement of 29km, consisting of overhead lines, underground cables, a grid supply point substation and associated development. The UK Health Security Agency (UKHSA) reviewed submitted documentation and concluded that the Project should not result in any significant adverse impact on public health (UK HSA, 2023). Due to the absence of expected residual effects from the Bramford to Twinstead Overhead Line alone, no further cumulative effects are expected.

411. **Sizewell C Project:** Sizewell C Nuclear Power Station will be located in Suffolk and will be a 3.2-gigawatt power station generating low-carbon electricity. Sizewell C Nuclear Power Station prepared a human health chapter as part of the Environmental Statement within a successful DCO application (EDF, SZC, 2020). This finds one adverse residual significant effect on human health from construction of rail infrastructure and two significant effects, scored as both moderate beneficial/adverse, from construction of road infrastructure. Furthermore, the assessment finds one beneficial residual significant effect on human health and this arises from employment proposals. Overall the permanent beneficial effects of the Sizewell C Project on human health

outweigh the adverse temporary effects. Due to the absence of expected lasting significant residual adverse effects from the Sizewell C Project alone, no further cumulative effects are expected.

412. Summaries of the effects relevant to each population group and a conclusion with a professional judgement of the inter-project cumulative effect are presented in Table 28.25 and Table 28.26.

413. Similarly, Table 28.30 summarises the effects relevant to each vulnerable group and concludes with a professional judgement of the inter-project cumulative effects of all cumulative projects identified above.

28.8.3.2.1 Site specific geographic population groups

414. Cumulative effects for site-specific geographic population groups are shown in Table 28.25.

Table 28.25 Inter-project cumulative effects for site-specific geographic population groups

	Description of cumulative effects		
	Population near landfall	**Population along the onshore cable route**	**Population near the onshore substation**
Cumulative projects(s) and impacts considered	Cumulative effects relate to the combined population health influences from: Five Estuaries Norwich to Tilbury Sizewell C Bramford to Twinstead Overhead Line At landfall, there could be temporal and spatial overlap between North Falls, Five Estuaries, Norwich to Tilbury, Sizewell C and Bramford to Twinstead Overhead Line. Therefore, potential impacts would affect the same population groups. The CEAs presented in ES Chapter 19 Ground Conditions and Contamination (Document Reference:3.1.21), ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22), ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28), ES Chapter 27 Traffic and Transport (Document Reference:3.1.29), ES Chapter 31 Socio-economics (Document Reference: 3.1.33) and ES Chapter 32 Tourism and Recreation (Document Reference: 3.1.34) concluded that after the implementation of mitigation measures (as detailed where relevant in each technical ES chapter) no significant cumulative effects at the landfall location are anticipated in respect of ground contamination, construction and operation noise, air quality and journey times and/or reduced access, effects on health . The CEA for other projects presented in ES Chapter 31 Socio-economics (Document Reference: 3.1.33)	Cumulative effects relate to the combined population health influences from: Five Estuaries Norwich to Tilbury Bathside Bay Container Terminal (BBCT) Land to the South of Thorpe Road, Weeley Land to the south west of Horsley Cross Roundabout Sizewell C Bramford to Twinstead Overhead Line There could be temporal and spatial overlap between North Falls, Five Estuaries, Norwich to Tilbury, BBCT, land to the South of Thorpe Road, Weeley, the land to the south west of Horsley Cross Roundabout, Sizewell C and Bramford to Twinstead Overhead Line. The CEAs presented in ES Chapter 19 Ground Conditions and Contamination (Document Reference:3.1.21), ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22), ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28), ES Chapter 27 Traffic and Transport (Document Reference:3.1.29), ES Chapter 31 Socio-economics (Document Reference: 3.1.33) and ES Chapter 32 Tourism and Recreation (Document Reference: 3.1.34) concluded that after the implementation of mitigation measures (as detailed where relevant in each technical ES chapter) no significant cumulative effects at the onshore cable route are anticipated in respect of ground contamination, construction noise, air quality and	Cumulative effects relate to the combined population health influences from: Five Estuaries Norwich to Tilbury BESS at land adjacent to Lawford Grid Substation Sizewell C Bramford to Twinstead Overhead Line There could be a degree of temporal and spatial overlap of Five Estuaries, Norwich to Tilbury, the BESS and North Falls, Sizewell C and Bramford to Twinstead Overhead Line near the proposed onshore substation during construction and/or operation. The CEAs presented in ES Chapter 19 Ground Conditions and Contamination (Document Reference:3.1.21), ES Chapter 20 Onshore Air Quality (Document Reference: 3.1.22), ES Chapter 26 Noise and Vibration (Document Reference: 3.1.28), ES Chapter 27 Traffic and Transport (Document Reference:3.1.29), ES Chapter 31 Socio-economics (Document Reference: 3.1.33) and ES Chapter 32 Tourism and Recreation (Document Reference: 3.1.34) concluded that after the implementation of mitigation measures (as detailed where relevant in each technical ES chapter) no significant cumulative effects at the onshore substation are anticipated in respect of ground contamination, construction noise, air quality and

	Description of cumulative effects		
	Population near landfall	**Population along the onshore cable route**	**Population near the onshore substation**
	concluded that the cumulative effect might be major beneficial (i.e. significant in EIA terms) for employment effects at all locations. The CEA for human health finds no adverse significant effects on human health for the effects of other projects and NF with regard to the following determinants of health: Noise; Air quality; Ground and/or water contamination effects; Physical activity; Journey times and/or reduced access; Employment; and Wider societal benefits. Operational impacts at landfall have been scoped out (i.e. no impact) of the assessments in the chapters referenced in the paragraph above, therefore there is no potential for cumulative impact.	journey times and/or reduced access effects on health. The CEA for other projects presented in ES Chapter 31 Socio-economics (Document Reference: 3.1.33) concluded that the cumulative effect might be major beneficial (significant in EIA terms) for employment effects on health along the onshore cable route. The CEA for human health finds no adverse significant effects on human health for the effects of other projects and NF with regard to the following determinants of health: Noise; Air quality; Ground and/or water contamination effects; Physical activity; Journey times and/or reduced access; Employment; and Wider societal benefits. Operational impacts along the onshore cable route have been scoped out (i.e. no impact) of the assessments in the chapters referenced in the paragraph above, therefore there is no potential for cumulative impact.	journey times and/or reduced access effects on health. The CEA for other projects presented in ES Chapter 31 Socio-economics (Document Reference: 3.1.33) concluded that the cumulative effect might be major beneficial (significant in EIA terms) for employment effects on health at the onshore substation. The CEA for human health finds no adverse significant effects on human health for the effects of other projects and NF with regard to the following determinants of health: Noise; Air quality; Ground and/or water contamination effects; Physical activity; Journey times and/or reduced access; Employment; and Wider societal benefits.
Site specific geographic population groups: general population and vulnerable groups	The inter-project cumulative effect of the general population and vulnerable groups is considered to be no greater (i.e. not significant) than those presented for North Falls alone (see Section 28.6). The effects associated with the assessed projects in combination with the Project, are localised, temporary and there is a spatial and temporary separation, with all projects distributed across different areas.		

28.8.3.2.2 Local, regional and national geographic population groups

415. Cumulative effects for site-specific geographic population groups are shown in Table 28.26.

Table 28.26: Inter-project cumulative effects for local, regional and national geographic population groups

Description of cumulative effects		
Local population of Tendring District	**Regional population of Essex County**	**National and international population of England and beyond borders**
Cumulative effects relate to the combined population health influences from: Five Estuaries Norwich to Tilbury BESS at land adjacent to Lawford Grid Substation Land to The South of Thorpe Road Weeley Bathside Bay Stour Road Harwich Essex Land South West of Horsley Cross Roundabout Clacton Road Horsley Cross Bramford to Twinstead Overhead Line General population and vulnerable groups: Due to these projects being distributed across the area, likely cumulative effects are not anticipated to be significant. There is the potential for a beneficial effect at a local level from employment, particularly where there is specific mitigation to help target training and jobs to young people not in employment, education or training (NEET). The CEA for human health finds no significant adverse effects on human health for the effects of other projects and North Falls with regard to the following determinants of health: Noise; Air quality; Ground and/or water contamination effects; Physical activity; Journey times and/or reduced access; Employment; and Wider societal benefits.	Cumulative effects relate to the combined population health influences from: Five Estuaries Norwich to Tilbury BESS at land adjacent to Lawford Grid Substation Longfield Solar Farm Thurrock Flexible Generation Plant Bramford to Twinstead Overhead Line Sizewell C Project General population and vulnerable groups: Due to these projects being distributed across the area, likely cumulative effects are not anticipated to be significant. There is the potential for a beneficial effect at the regional level from employment, particularly where there is specific mitigation to help target training and jobs to young people NEET. Similarly, mitigation of climate change may be beneficial but also the development of offshore wind increases the employment potential in deprived areas and offsets the downturn in employment in the offshore oil industry. The CEA for human health finds no significant adverse effects on human health for the effects of other projects and North Falls with regard to the following determinants of health: Noise; Air quality; Ground and/or water contamination effects; Physical activity; Journey times	Cumulative effects relate to the combined population health influences from: Five Estuaries Norwich to Tilbury BESS at land adjacent to Lawford Grid Substation Bramford to Twinstead Overhead Line Sizewell C Project General population and vulnerable groups: the general population inter-project cumulative effect is considered to be minor beneficial (respectively) due to the reduction in CO_2 emissions, as a result of constructing utility scale renewable energy generation (as detailed in ES Chapter 33 Climate Change, Document Reference: 3.1.35). This leads to a myriad of environmental and health benefits to support a more sustainable society. The benefits of providing renewable infrastructure through this project (cumulatively with those listed above) would add to national energy security, which is relevant to wider public energy supporting technologies, services and living standards as well as the potential contribution to affordable energy which is relevant to those on low incomes. In addition, renewable sources reduce the adverse health effects of climate change experienced international, particularly deprived populations in low and middle income counties. For relevant vulnerable

Description of cumulative effects		
Local population of Tendring District	**Regional population of Essex County**	**National and international population of England and beyond borders**
Health stakeholders have stated that the number of NSIPs across the regional health care economy is a source of concern. After the implementation of mitigation measures (as detailed where relevant in each technical ES chapter) it is concluded that the Project will have no significant cumulative effects upon access to healthcare. Operational effects at landfall have been scoped out (i.e. no impact) of the assessments in the chapters referenced in the paragraph above, therefore there is no potential for cumulative effects.	and/or reduced access; Employment; and Wider societal benefits. Health stakeholders have stated that the number of NSIPs across the regional health care economy is a source of concern. After the implementation of mitigation measures (as detailed where relevant in each technical ES chapter) it is concluded that the Project will have no significant cumulative effects upon access to healthcare. Operational effects at landfall have been scoped out (i.e. no impact) of the assessments in the chapters referenced in the paragraph above, therefore there is no potential for cumulative effects.	groups, increased sensitivity may result in a moderate beneficial inter-project cumulative effect. The CEA for human health finds no significant adverse effects on human health for the effects of other projects and North Falls with regard to the following determinants of health: Noise; Air quality; Ground and/or water contamination effects; Physical activity; Journey times and/or reduced access; Employment; and Wider societal benefits. Operational effects at landfall have been scoped out (i.e. no impact) of the assessments in the chapters referenced in the paragraph above, therefore there is no potential for cumulative effects.

416. Cumulative effects for potentially vulnerable groups within geographic populations are shown in Table 28.27.

Table 28.27: Intra-project cumulative effects for potentially vulnerable groups within geographic populations

Description of cumulative effects			
Potentially vulnerable groups Children and young people	**Older people**	**People with existing poor health (physical and mental health)**	**People living in deprivation (including those experiencing income and/or access/geographic vulnerability**
Cumulative effects relate to the combined population health influences across the projects (assuming similar effects from each project):			
Construction noise; Construction air quality; Construction water contamination; Construction physical activities disruption; Operational noise at substation site; Construction and operational employment; Operational EMF; and Operational wider societal benefits. For children and young people there are unlikely to be combined biophysical determinant of health (air quality, water, noise or EMFs) effects between the projects due to the localised nature of such exposures and the expectation of sufficient geographical and/or temporal separation of projects. This is also the case due to the temporary nature of construction effects and the design and mitigating measures discussed in this chapter (e.g. operational EMF guideline compliance). Such cumulative adverse effects are therefore expected to be remain minor adverse (i.e. not significant), reflecting individual determinant effects discussed in this chapter. The most	Construction noise; Construction air quality; Construction physical activities disruption; Operational noise at substation site; Construction and operational employment; Operational EMF; and Operational wider societal benefits. For older people the same assessment rationale as for children and young people applies, with limited potential for biophysical determinants to cumulatively result in additive effects between projects. Such effects are also considered minor adverse (i.e. not significant). Whilst there would also be cumulative benefits to older people from indirect employment benefits and wider societal	Construction noise; Construction air quality; Construction physical activities disruption; Construction journey times or reduced access; Operational noise at substation site; Construction and operational employment; Operational EMF; and Operational wider societal benefits. For people with existing poor health the same assessment rationale as for children and young people applies, with limited potential for biophysical determinants to cumulatively result in additive effects between projects. Such effects are also considered minor adverse (i.e. not significant). Similar to children and young people, this group may particularly benefit as dependants, with potential for cumulative long-term benefits. The particular sensitivity of such groups to climate change health effects and their reliance on social infrastructures that are underpinned by stable and affordable energy	Construction journey times or reduced access; Construction and operational employment; Operational EMF; and Operational wider societal benefits. For people living in deprivation, particularly due to limited access, the combined projects may contribute to increased access challenges. However, the expectation is that the projects would not exceed local route capacities and would provide appropriate diversions and other mitigations. On this basis additive or synergistic effects are not expected, effects remain minor adverse (i.e. not significant). For people living in deprivation, particularly due to low incomes, the employment opportunities cumulatively across the projects are likely to be beneficial. Equitable access to good quality employment can act to reduce poverty and inequalities. Local employment opportunities across the projects, particularly targeting low income groups including NEETs, would contribute to a moderate beneficial (i.e. significant) effect.

Description of cumulative effects			
Potentially vulnerable groups Children and young people	**Older people**	**People with existing poor health (physical and mental health)**	**People living in deprivation (including those experiencing income and/or access/geographic vulnerability**
Cumulative effects relate to the combined population health influences across the projects (assuming similar effects from each project):			
influential driver of cumulative effects to children and young people are the indirect employment benefits to this group as dependents, as well as the wider societal benefits from the operation of the renewable energy generation. Such effects support good health through the life course and are therefore cumulatively moderate beneficial (i.e. significant).	benefits, due to only influencing part of the life course such effects are considered minor beneficial (i.e. not significant).	supplies increases this groups benefits from large-scale renewable energy projects. Such beneficial effects are therefore cumulatively moderate beneficial (i.e. significant).	

417. None of the CEAs included in the respective technical chapters (as listed in Section 28.1) and referenced in this chapter identified any reasonably foreseeable projects or developments where significant cumulative effects on individual environmental aspects would arise. In respect of potential cumulative effects on local population health, this CEA (presented in Table 28.22) has not identified impacts that are considered to be of any greater significance than those identified for North Falls, and no significant cumulative health effects are predicted.

28.9 Transboundary effects

418. There are no transboundary effects with regard to human health as the onshore project area is within the UK and is not located near to any international boundaries. While wider societal benefits (i.e. reduction in GHGs as a result of the Project) have an indirect transboundary impact, as stated in ES Chapter 33 Climate Change (Document Reference: 3.1.35), the cumulative transboundary impacts of GHGs emitted by the Project are not considered to require specific consideration.

419. Transboundary effects have therefore been scoped out of the assessment and are not considered further.

28.10 Interactions

420. The effects identified and assessed for each ES chapter have the potential to interact with each other, which could give rise to synergistic effects as a result of that interaction. The areas of interaction between effects are presented in each relevant ES chapter, along with an indication as to whether the interaction may give rise to synergistic effects. This chapter has interactions with:

- Chapter 19 Ground Conditions and Contamination (Document Reference 3.1.21);
- Chapter 20 Onshore Air Quality (Document Reference: 3.1.22);
- Chapter 21 Water Resources and Flood Risk (Document Reference: 3.1.23);
- Chapter 26 Noise and Vibration (Document Reference: 3.1.28);
- Chapter 27 Traffic and Transport (Document Reference: 3.1.29);
- Chapter 31 Socio-economics (Document Reference: 3.1.33);
- Chapter 32 Tourism and Recreation (Document Reference: 3.1.34); and
- Chapter 33 Climate Change (Document Reference: 3.1.35).

28.11 Intra-relationships

421. The population health effects of individual determinants of health identified and assessed in this chapter have the potential to be experienced by the same populations, potentially giving rise to additive or synergistic effects.

422. This assessment includes populations geographically defined within the onshore project area (see Section 28.3.2.1.1), as well as those defined for other sensitivities (see Section 28.3.2.1.2).

423. Cumulative intra-project effects are found to be no greater than minor adverse for the general population and vulnerable groups due to the commitments made as part of the embedded mitigation as a result of consultation and design decisions that have avoided impacts on health determinants.

424. Where a few individuals have greater sensitivity due to multiple vulnerabilities, such as age, poor health and low income (known as intersectionality), these individuals may be particularly sensitive and experience greater changes in health outcomes, beneficial and adverse compared to the general population. Such intersectionality effects are noted but are not expected to be sufficiently widespread in terms of their overlap with the Project activities to result in likely significant impacts at the population level.

425. Table 28.28 summarises effects for each geographic population and concludes with a professional judgement on the likely intra-project cumulative effect. Similarly, Table 28.29 summarises the effects relevant to each vulnerable group and concludes with a professional judgement of the intra-project cumulative effect.

Table 28.28 Intra-project cumulative effects for site-specific population groups

Impact	Population near landfall	Population along the onshore cable route	Population near the onshore substation
Effects related to location	Cumulative effects relate to the combined population health influences from the following: Noise (during construction and operation at onshore substation); Air quality (during construction); Physical activity (during construction); Journey times or reduced access (during construction); and Employment (during construction and operation).	Cumulative effects relate to the combined population health influences from the following: Noise (during construction and operation at onshore substation); Air quality (during construction); Physical activity (during construction); Journey times or reduced access (during construction); and Employment (during construction and operation).	Cumulative effects relate to the combined population health influences from the following: Noise (during construction and operation at onshore substation); Air quality (during construction); Physical activity (during construction); Journey times or reduced access (during construction); and Employment (during construction and operation).
Outcome for general population at location	Upon implementing the mitigation set out in the topic specific assessment of the ES, the general population intra-project cumulative effect is considered to be no greater than minor adverse, i.e. not significant, due to the very short temporal scope of negligible effects and the avoidance of significant impacts through design decisions taken during the site selection process.	Upon implementing the mitigation set out in the topic specific assessment of the ES, the general population intra-project cumulative effect is considered to be no greater than minor adverse, i.e. not significant, due to the very short temporal scope of negligible effects and the avoidance of significant impacts through design decisions taken during the site selection process.	Upon implementing the mitigation set out in the topic specific assessment of the ES, the general population intra-project cumulative effect is considered to be no greater than minor adverse, i.e. not significant, due to the very short temporal scope of negligible effects and the avoidance of significant impacts through design decisions taken during the site selection process.
Outcome for vulnerable population at location	For relevant vulnerable groups, combined proximity and increased sensitivity may result in a cumulative effect. This is because of the likelihood that vulnerable groups will be at home during the day and are more likely to experience the effects in combination. This reflects that most individual effects are negligible or minor adverse, i.e. not significant, and although potentially additive, the combined effects would still be unlikely to have significant adverse effect on population health, due to the low magnitude and localised, short-term, reversible and transient nature of effects. These conclusions remain the case where some population	For relevant vulnerable groups, combined proximity and increased sensitivity may result in a cumulative effect. This is because of the likelihood that vulnerable groups will be at home during the day and are more likely to experience the effects in combination. This reflects that most individual effects are negligible or minor adverse, i.e. not significant, and although potentially additive, the combined effects would still be unlikely to have significant adverse effect on population health, due to the low magnitude and localised, short-term, reversible and transient nature of effects. These conclusions remain the case where some population	For relevant vulnerable groups, combined proximity and increased sensitivity may result in a cumulative effect. This is because of the likelihood that vulnerable groups will be at home during the day and are more likely to experience the effects in combination. This reflects that most individual effects are negligible or minor adverse, i.e. not significant, and although potentially additive, the combined effects would still be unlikely to have significant adverse effect on population health, due to the low magnitude and localised, short-term, reversible and transient nature of effects. These conclusions remain the case where some population

Impact	Population near landfall	Population along the onshore cable route	Population near the onshore substation
	groups are considered sensitive across multiple determinants of health.	groups are considered sensitive across multiple determinants of health.	groups are considered sensitive across multiple determinants of health.

Table 28.29 Intra-project cumulative effects for vulnerable groups within site-specific populations

Impact	Children and young people	Older people	People with existing poor health (physical and mental health)	People living in deprivation (including those experiencing income and/or access/geographic vulnerability)
Effects related to vulnerable group	Cumulative effects relate to the combined population health influences from: Noise (during construction and operation of the onshore substation); Air quality (during construction); Water contamination (during construction); Employment; Physical activity (during construction); and Journey times or reduced access (during construction – children and older people only).			Cumulative effects relate to the combined population health influences from: Air quality; Physical activities; Journey times or reduced access; and Employment.
Outcomes for vulnerable population at location	For children and young people there are unlikely to be intra-project biophysical determinant of health (air quality, noise or EMF) additive effects of North Falls due to the localised nature of such exposures. This is also the case due to the temporary nature of construction effects and the design and mitigating measures discussed in this chapter (e.g. operational EMF guideline compliance). Such adverse effects are therefore expected to no greater than minor adverse (i.e. not significant), reflecting individual determinant effects discussed in this	For older people the same assessment rationale as for children and young people applies, with limited potential for intra-project biophysical determinants to result in additive effects. Such effects are also considered minor adverse (i.e. not significant). Whilst there would also be benefits to older people from indirect employment benefits and wider societal benefits, due to only influencing part of the life course such effects are considered minor beneficial (i.e. not significant).	For people with existing poor health the same assessment rationale as for children and young people applies, with limited potential for intra-project biophysical determinants to result in additive effects. Such effects are also considered minor adverse (i.e. not significant). Similar to children and young people, this group may particularly benefit as dependants, with potential for long-term benefits. The particular sensitivity of such groups to climate change health effects and their reliance on social infrastructures that are underpinned by stable and	For people living in deprivation, particularly due to limited access, the intra-project effects are not expected to contribute to increased access challenges. The expectation is that North Falls would not exceed local route capacities and would provide appropriate diversions and other mitigations. On this basis additive or synergistic effects are not expected, impacts remain minor adverse (not significant). For people living in deprivation, particularly due to low incomes, the employment opportunities are likely to be beneficial. Equitable access to good quality employment can act to reduce poverty and inequalities.

Impact	Children and young people	Older people	People with existing poor health (physical and mental health)	People living in deprivation (including those experiencing income and/or access/geographic vulnerability)
	ES chapter. The most influential driver of effects to children and young people are the indirect employment benefits to this group as dependants, as well as the wider societal benefits from the operation of the renewable energy generation. Such effects support good health through the life course and are therefore minor beneficial (i.e. not significant).		affordable energy supplies increases this groups benefits from large-scale renewable energy projects. However, at an intra-project level such beneficial effects are no greater than minor beneficial (i.e. not significant).	Impacts would be no greater than to a minor beneficial (i.e. not significant).

28.12 Summary

426. This chapter has assessed the potential human health effects predicted to arise during the construction, operation and decommissioning phases of the Project.

427. The baseline human health environment has been characterised using on existing data on sensitive population groups from the Ministry of House, Communities and Local Government, Office of Health Improvement and Disparities and Office of National Statistics, and on the determinants of health drawing on assessments provided in other chapters of the North Falls ES.

428. The desk-based review of available health and population data has established that human health receptors, comprised of eleven different population groups, such as older people and people living in deprivation, could be affected as a result of direct and indirect effects during the construction, operation and decommissioning phases of the Project. These can include noise, air quality and employment effects.

429. The residual effects on the majority of the population groups would be no greater than minor adverse (not significant in EIA terms) effects on human health during all its phases. Moderate beneficial (significant in EIA terms) effects were identified for employment during the construction and operation and maintenance phase, and moderate wider societal benefits during operation.

430. There is potential for cumulative effects to occur with a number of other or projects. The cumulative effects assessment concluded that there are no likely significant adverse health effects (in EIA terms) and some likely significant beneficial effects when North Falls is considered cumulatively with these projects.

431. Table 28.30 below presents a summary of the health effects assessed within this ES chapter, any mitigation and the residual effects. A summary of the conclusion of the CEA is also provided in Table 28.31.

Table 28.30 Summary of potential likely significant effects on human health

Potential impact	Temporal scope	Likelihood of effect	Sensitivity of:		Magnitude of impact	Significance of effect	Additional mitigation measures	Residual significance of effect
			General population	Vulnerable population		General / vulnerable population		General / vulnerable population
Construction								
Impact 1: Noise effects	Short / medium term	Plausible	Low	Medium to high	Negligible to low (adverse)	Minor adverse (i.e. not significant in EIA terms)	No additional mitigation measures proposed	Minor adverse (i.e. not significant in EIA terms)
Impact 2: Air Quality effects	Short / medium term	Plausible	Low	Medium to high	Low (adverse)	Minor adverse (i.e. not significant in EIA terms)	No additional mitigation measures proposed	Minor adverse (i.e. not significant in EIA terms)
Impact 3: Ground and / or water contamination effects	Short term	Plausible but not probable	Low	Medium	Low (adverse)	Minor adverse (i.e. not significant in EIA terms)	No additional mitigation measures proposed	Negligible (i.e. not significant in EIA terms)
Impact 4: Physical Activity effects	Very Short / short term	Plausible	Low	Medium to high	Low (adverse)	Minor adverse (i.e. not significant in EIA terms)	• Providing reopening signs and notices that advertise the reopening of the route and promote active travel connectivity to	Negligible (i.e. not significant in EIA terms)

Potential impact	Temporal scope	Likelihood of effect	Sensitivity of:		Magnitude of impact	Significance of effect	Additional mitigation measures	Residual significance of effect
			General population	Vulnerable population		General / vulnerable population		General / vulnerable population
							destinations; and • Liaison with Essex County Council about proposed construction works on Public Rights of Way.	
Impact 5: Journey times and / or reduced access effects	Short / medium term	Construction workforce: Plausible but not probable Traffic: Plausible	Health care receptor: High Traffic: Low	Health care receptor: High Traffic: High	Construction workforce: Negligible Traffic: Low (adverse)	Construction workforce: minor/negligible adverse (i.e. not significant in EIA terms) Traffic: Minor adverse (i.e. not significant in EIA terms)	No additional mitigation measures proposed	Construction workforce: minor adverse/ negligible (i.e. not significant in EIA terms) Traffic: Minor adverse (i.e. not significant in EIA terms)
Construction and Operation								
Impact 6: Employment	Medium/ long term	Plausible	Low to medium	High	Low (beneficial)	Minor beneficial (i.e. not significant in EIA terms)	No additional mitigation measures proposed	Minor beneficial (i.e. significant in EIA terms)
Operation								

Potential impact	Temporal scope	Likelihood of effect	Sensitivity of:		Magnitude of impact	Significance of effect	Additional mitigation measures	Residual significance of effect
			General population	Vulnerable population		General / vulnerable population		General / vulnerable population
Impact 7: Noise	Long term	Low probability	Low	Medium to high	Low (adverse)	Minor adverse (i.e. not significant in EIA terms)	No additional mitigation measures proposed	Minor adverse (i.e. not significant in EIA terms)
Impact 8: EMFs	Medium term	Not plausible	-	-	-	No effect	No additional mitigation measures proposed	No effect
Impact 9: Wider societal benefits	Long term	Likely	Low to medium	High	Low to medium (beneficial)	General population: Moderate to minor beneficial (i.e. significant in EIA terms) Vulnerable groups: Moderate/minor to Major/moderate beneficial (i.e. significant in EIA terms)	No additional mitigation measures proposed	General population: Moderate/minor beneficial (i.e. significant in EIA terms) Vulnerable groups: Moderate/minor to Major/moderate beneficial (i.e. significant in EIA terms)
Decommissioning								
Decommissioning strategies have not yet been finalised; however, the effects are expected to be no greater than those of construction.								

Table 28.31 Summary of potential inter-project cumulative effects on human health for site-specific geographic population groups

	Cumulative effect Population near landfall		Cumulative effect Population along the onshore cable route		Cumulative effect Population near the onshore substation	
Potential impact	***Construction***	***Operation***	***Construction***	***Operation***	***Construction***	***Operation***
Cumulative effect 1: Noise	No adverse significant effect	Scoped out	No adverse significant effect	Scoped out	No adverse significant effect	No adverse significant effect
Cumulative effect 2: Air Quality	No adverse significant effect		No adverse significant effect		No adverse significant effect	No adverse significant effect
Cumulative effect 3: Ground contamination	No adverse significant effect		No adverse significant effect		No adverse significant effect	No adverse significant effect
Cumulative effect 4: Physical activity	No adverse significant effect		No adverse significant effect		No adverse significant effect	No adverse significant effect
Cumulative effect 5: Journey times and/or reduced access	No adverse significant effect		No adverse significant effect		No adverse significant effect	No adverse significant effect
Cumulative effect 6: Employment	No adverse significant effect Possibility for major beneficial significant effects on employment		No adverse significant effect Possibility for major beneficial significant effects on employment		No adverse significant effect Possibility for major beneficial significant effects on employment	No adverse significant effect Possibility for major beneficial significant effects on employment
Cumulative effect 7: Wider societal benefits	No adverse significant effect		No adverse significant effect		No adverse significant effect	No adverse significant effect
Decommissioning						
Decommissioning strategies have not yet been finalised for North Falls, Five Estuaries or Norwich to Tilbury; however, the cumulative effects are expected to be the same as those of the initial construction phase.						

28.13 References

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