

**Vattenfall Wind Power Ltd**  
**Thanet Extension Offshore Wind Farm**

**Environmental Statement Volume 3**  
**Chapter 12: Public Health**

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Vattenfall Wind Power Ltd  
Thanet Extension Offshore Wind Farm  
Volume 3  
Chapter 12: Public Health  
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## 12 Public Health

### 12.1 Introduction

- 12.1.1 This chapter of the Environmental Statement (ES) describes the approach taken in the assessment on potential impacts to public health. The approach to this chapter has been agreed with Public Health England and will draw on information that has been gathered and presented in other chapters of the ES for Thanet Extension Offshore Wind Farm (TEOWF). The purpose of this chapter is to consider the potential impacts of the project on the health of the local population.
- 12.1.2 Public health is an inherent part of a number of technical areas assessed within the ES, including flood risk, air quality, noise and vibration, traffic and transport, landscape and visual impact assessment, tourism and recreation, and socio-economics. This chapter provides a summary of the conclusions for each relevant ES chapter assessment, which are referenced below, and provides a further assessment of the potential effects arising from electromagnetic fields (EMF), as these effects are not considered in the wider ES in the context of Public Health.
- 12.1.3 Following a summary of the relevant policy and legislation, the chapter describes the assessment methodology, the potential impacts relating to public health, the embedded mitigation that has been incorporated into the design of the proposed development and the likely significant environmental effects.
- 12.1.4 This public health assessment should be read alongside the following chapters of the ES, which are referred to and drawn upon throughout this document:
- Volume 3, Chapter 1: Project Design – Onshore (Document Ref: 6.3.1)
  - Volume 3, Chapter 2: Onshore Landscape and Visual Impact Assessment (Document Ref: 6.3.2)
  - Volume 3, Chapter 3: Socio-Economics (Document Ref: 6.3.3);
  - Volume 3, Chapter 4: Tourism and Recreation (Document Ref: 6.3.4);
  - Volume 3, Chapter 6: Ground Conditions, Flood Risk and Land Use (Document Ref: 6.3.6);
  - Volume 3, Chapter 8: Traffic and Transport (Document Ref: 6.3.8);
  - Volume 3, Chapter 9: Air Quality (Document Ref: 6.3.9); and
  - Volume 3, Chapter 10: Noise and Vibration (Document Ref: 6.3.10).

### 12.2 Statutory and policy context

- 12.2.1 Detail regarding the relevant legislation and policy is outlined in Table 12.1. This section identifies legislation, guidance, national and local policy of particular relevance to the potential impact on public health associated with the construction, operation and decommissioning of Thanet Extension.
- 12.2.2 The Planning Act 2008, Infrastructure Planning EIA Regulations 2017 and Environment Act (1995) are considered along with the more specific legislation relevant to health. As noted previously the consideration of health and well-being matters are inherent within a number of the technical assessments presented within the ES and specific policies apply specific topic areas and impacts. Where impacts have already been assessed in another chapter further policy information should be sought in that relevant chapter.
- 12.2.3 Planning policy relating to health, which is of relevance to the proposed development, is provided by the National Policy Statements (NPSs). These provide the primary basis for the recommendations made by the Examining Authority (the Planning Inspectorate) to the Secretary of State for Business Energy and Industrial Strategy on applications for development consent for nationally significant renewable energy projects. Overarching guidance on nationally significant energy projects is provided in National Policy Statement for Energy (NPS EN-1) (DECC 2011a).
- 12.2.4 Guidance specifically relating to onshore grid connections is provided in EN-5 (DECC 2011c). This policy focuses on guidance primarily in relation to overhead lines which is not applicable to Thanet Extension as all export transmission cables from the offshore array, through to the landfall location at Pegwell Bay Country Park and onward to the substation at Richborough Port would be buried or encased in appropriate bunding.
- 12.2.5 Policy specifically relating to air emissions can be found in Volume 3, Chapter 9: Air Quality (Document Ref: 6.3.9) and Volume 3, Chapter 8: Traffic and Transport (Document Ref: 6.3.8)..
- 12.2.6 Policy specifically relating to water and soil emissions can be found in Volume 3, Chapter 6: Ground Conditions, Flood Risk and Land Use (Document Ref: 6.3.6).
- 12.2.7 Policy specifically relating to noise emissions can be found in Volume 3, Chapter 10: Noise and Vibration (Document Ref: 6.3.10) and Volume 3, Chapter 8: Traffic and Transport (Document Ref: 6.3.8).



12.2.8 Policy specifically relating to community wellbeing and stress, with regards visual amenity, open spaces, and the associated benefits to community wellbeing and mental health can be found in Volume 3, Chapter 2: Onshore Landscape and Visual Impact Assessment (Document Ref: 6.3.2), Volume 3, Chapter 3: Socio-Economics (Document Ref: 6.3.3), and Volume 3, Chapter 4: Tourism and Recreation (Document Ref: 6.3.4). It should be noted that the primary impact considered with this regard is, in line with the scoping report and opinion, limited to consideration of 'Temporary loss of access to green space'.

12.2.9 There are no statutory regulations in the UK with regard to exposure to EMF. However, in 2004 the Government adopted guidelines published in 1998 by the International Commission on Non-Ionizing Radiation Protection (ICNIRP, 1998) in accordance with the terms of the 1999 EU Council recommendation on limiting public exposure to EMF (EU, 1999). The criteria establish acceptable limits for exposure of the public to EMF that adopt a precautionary approach taking into account various scenarios and potentially more vulnerable groups (such as infants).

12.2.10 Whilst there are no statutory regulations in the UK that limit the exposure of people to power-frequency EMF, responsibility for implementing appropriate measures for the protection of the public lies with the UK Government, who have a clear policy, restated in October 2009 (Department of Health, 2009) and incorporated in NPS EN-5 (DECC, 2011), on the exposure limits and other policies they expect to see applied. It is important to note however that whilst reference is made to EN-5 insofar as it relates to electrical infrastructure the Thanet Extension project has been actively designed to avoid overhead lines and the associated effects by committing to underground all electrical cable infrastructure as detailed within Volume 3, Chapter 1 Project Description (Onshore) (Document Ref: 6.3.1) Practical details on EMF exposure limits, appropriate design of electrical infrastructure and how the policy is to be implemented are contained in Codes of Practice (see below) agreed between industry and Government:

- Power Lines: Demonstrating compliance with EMF public exposure guidelines – a Voluntary Code of Practice (DECC, March 2012a);
- Optimum Phasing of high voltage double-circuit Power Lines – a Voluntary Code of Practice (DECC, 2012b); and
- Power Lines: Control of microshocks and other indirect effects of public exposure to electric fields - a Voluntary Code of Practice (DECC, July 2013).

12.2.11 Government, in turn, acts on the scientific advice from Public Health England, which has responsibility for advising on non-ionising radiation protection, including power frequency fields.

12.2.12 The ICNIRP guidance, to which the UK Government policy follows, outlines two categories of public exposure levels, 'reference levels' and 'basic restriction' levels.

12.2.13 The ICNIRP 'reference levels' for the public are:

- 100 microteslas ( $\mu\text{T}$ ) for magnetic fields; and
- 5 kilovolts (kV) per metre for electric fields.

12.2.14 While the ICNIRP 'basic restriction' for levels of public exposure are higher at:

- 360  $\mu\text{T}$  for magnetic fields; and
- 9 kV per metre for electric fields.

12.2.15 In the ICNIRP guidelines and the EU Recommendation, the actual limit is the basic restriction. The reference levels are not limits, but are guides to when detailed investigation of compliance with the actual limit, the basic restriction, is required. If the reference level is not exceeded, the basic restriction cannot be exceeded and no further investigation is needed. If the reference level is exceeded, the basic restriction may or may not be exceeded.

12.2.16 If the fields produced by an item of equipment are lower than 9 kV/m and 360  $\mu\text{T}$ , the fields corresponding to the ICNIRP basic restriction, it is compliant with the ICNIRP guidelines and hence with Public Health England (PHE) recommendations and Government policy. If the fields are greater than these values, it is still compliant with Government policy if the land use falls outside the residential and other uses specified in the Code of Practice (DECC, 2012a) and it may still be compliant if the fields are non-uniform.



**Table 12.1: Relevant policy and legislation with respect to assessing potential public health impacts for Thanet Extension**

Policy/legislation	Key provisions	Section where provision addressed
NPS EN-1 Para 4.13 (DECC 2011a)	<p>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.</p> <p>As described in the relevant sections of this NPS and in the technology specific NPSs, where the proposed project has an effect on human beings, the ES should assess these effects for each element of the project, identifying any adverse health impacts, and identifying measures to avoid, reduce or compensate for these impacts as appropriate. The impacts of more than one development may affect people simultaneously, so the applicant and the IPC should consider the cumulative impact on health.</p> <p>The direct impacts on health may include increased traffic, air or water pollution, dust, odour, hazardous waste and substances, noise, exposure to radiation, and increases in pests.</p> <p>New energy infrastructure may also affect the composition, size and proximity of the local population, and in doing so have indirect health impacts, for example if it in some way affects access to key public services, transport or the use of open space for recreation and physical activity.</p>	<p>Impacts to health are assessed in sections 12.10, 12.11, 12.12 and 12.13.</p> <p>Direct impacts to health are outlined in Table 12.3.</p>

Policy/legislation	Key provisions	Section where provision addressed
NPS EN-5 Para 2.10.2 (DECC 2011b)	All overhead power lines produce EMFs, and these tend to be highest directly under a line, and decrease to the sides at increasing distance. Although putting cables underground eliminates the electric field, they still produce magnetic fields, which are highest directly above the cable (see para 2.10.12). 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.	<p>The potential effects of EMF is described in section 12.7.</p> <p>Assessment of impacts can be found in section 12.10, 12.11, 12.12 and 12.13.</p>
NPPF Para 69	Planning policies and decisions, in turn, should aim to achieve places which promote: safe and accessible developments, containing clear and legible pedestrian routes, and high quality public space, which encourage the active and continual use of public areas.	Impacts to health, specifically with regards impacts to green space are assessed in sections 12.10,
EIA Regulations 2017 Part 1.4 (2)(a)	(2) 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— (a) population and human health;	Addressed in section 12.4.

**12.3 Consultation and scoping**

12.3.1 A formal scoping opinion was requested from PINS following the submission of the Scoping Report (VWPL, 2016). Ongoing consultation post-scoping has been important in the evolution of the project and the parameters for assessment. As part of the Environmental Impact Assessment (EIA) process, ongoing consultation has been undertaken with various statutory and non-statutory authorities.



12.3.2 In response to the Thanet Extension Scoping Report, PINS issued a Scoping Opinion (PINS, 2017). The consultation responses relating to the Health Assessment which are addressed in this report are presented in Table 12.2.

**Table 12.2: Summary of consultation relating to the Public Health Assessment**

Consultation phase/ type	Consultation and key issues raised	Section where comment addressed
Scoping Opinion	The SoS echoes the comments of Public Health England who welcome the Applicant’s proposed inclusion of a Health Impact Review (HIR) within the ES, which will review the health impact of onshore aspects of the Proposed Development.	This chapter represents an assessment of potential impacts to health, in a format agreed with Public Health England (Evidence Plan, Document Ref 8.5).
Section 42 Consultation: Public Health England	Public Health England acknowledge that a chapter relating to potential health impacts drawing on information from other chapters will be sufficient.	This chapter represents an assessment of potential impacts to health, in a format agreed with Public Health England (Evidence Plan, Document Ref 8.5).
Section 42 Consultation: Kent County Council	The applicant seeks access to the TJB and construction areas through the car park and coastal path. However, there is significant concern about the practicality and impact of this proposal on users and their safety. The path is not suitable for vehicles and there would have to be works to widen and surface it, impacting the habitat and the management of the site. Mitigation and safe working practices would need to be in place regarding the use of the path by Park users and the applicant. However, there is concern that the Electro-Magnetic Fields of AC current cables could be a safety concern to people and wildlife.	Volume 3, Chapter 8: Traffic and Access (Document Ref: 6.3.8) assesses the impact of vehicle movements on public safety. Section 12.11.5 addresses the impact of Electro-magnetic Fields on public health.

**12.4 Scope and methodology**

12.4.1 The potential impacts scoped into this assessment can be found in Table 12.3. The study area, methodology and baseline data for this assessment is dependent on each potential impact and are defined in detail within each relevant ES chapter (Table 12.3).

**Table 12.3: Relevant chapters which assess the impact of Thanet Extension on public health**

Potential impact on health	Relevant ES Chapter
Air emissions (All phases)	Volume 3, Chapter 9: Air Quality (Document Ref: 6.3.9) and Volume 3, Chapter 8: Traffic and Transport (Document Ref: 6.3.8)
Water emissions (All phases)	Volume 3, Chapter 6: Ground Conditions, Flood Risk and Land Use (Document Ref: 6.3.6)
Soil emissions (All phases)	Volume 3, Chapter 6: Ground Conditions, Flood Risk and Land Use (Document Ref: 6.3.6)
Noise emissions (All phases)	Volume 3, Chapter 10: Noise and Vibration (Document Ref: 6.3.10) and Volume 3, Chapter 8: Traffic and Transport (Document Ref: 6.3.8)
Temporary loss of access to green space;	Volume 3, Chapter 4: Tourism and Recreation (Document Ref: 6.3.4)
	Volume 3, Chapter 2: Onshore Landscape and Visual Impact Assessment (Document Ref: 6.3.2)
	Volume 3, Chapter 3: Socio-Economics (Document Ref: 6.3.3)
Electromagnetic radiation (operational phase only)	This document - Volume 3, Chapter 12: Public Health (Document Ref: 6.3.12)

12.4.2 Only one potential impact on Public Health, electromagnetic radiation during operation, is not already assessed in a relevant ES chapter. This is assessed within this chapter with respect to the study area encompassing the onshore cable route which is described in section: 12.7 and in detail in Volume 3, Chapter 1: Project Description – Onshore (Document Ref: 6.3.1). In summary the potential impact is restricted to a very localised study area <5m of the export cable.



### 12.5 Assessment criteria and assignment of significance

- 12.5.1 This assessment considers the potential impacts associated with the construction, O&M and decommissioning of Thanet Extension and the subsequent effects upon public health.
- 12.5.2 Information about the project and the project activities for all stages of the project life cycle (construction, O&M and decommissioning) have been combined with information about the environmental baseline to identify the potential interactions between the project and the receptors. These potential interactions are known as potential impacts, the potential impacts are then assessed to give a level of significance of effect upon the receiving receptors.
- 12.5.3 The outcome of the assessment is to determine the significance of these effects against predetermined criteria.

#### Magnitude of impact

- 12.5.4 The magnitude of potential impacts is defined by a series of factors including the spatial extent of any interaction, the likelihood, duration and frequency of a potential impact. The definitions of the levels of magnitude used in the assessment as shown in Table 12.4.

Table 12.4: Magnitude of impact classification

Magnitude	Receptor description
High	Deaths, acute or chronic diseases or mental ill health would arise. Exposure to electromagnetic radiation, noise, odour, visual amenity of high intensity and/or long duration and/or over a wide geographical area and/or likely to affect a large number of people (e.g. over 500) and/or vulnerable groups e.g. children/older people. Long-term and/or permanent effects on physical and mental health.  Significant positive change to the baseline environment such as positive change in visual amenity attracting visitors at a national level, or significant increase in air quality at a national level.
Medium	Exacerbation of existing illness, or temporary symptoms. Exposure to electromagnetic radiation, noise, odour, visual amenity of medium term and/or moderate intensity and/or over a relatively localised area and/or of intermittent duration and/or likely to affect a moderate-large number of people e.g. between 100-500 or so and/or vulnerable groups. Medium-term and/or temporary effects which may affect physical and mental health.  Moderate positive change to the baseline environment such as positive change in visual amenity improving local amenity assets, or significant increase in air quality at a local level.
Low	Disruption to quality of life or wellbeing. Exposure to electromagnetic radiation, noise, odour, visual amenity of low intensity and/or short/intermittent duration and/or over a small area and/or affect a small number of people e.g. less than 100 or so. Short-term and/or temporary effects which are unlikely to affect physical and mental health.  Small change from baseline conditions resulting in a localised increase in health and wellbeing from small changes in visual amenity or small changes in air quality and/or reduction in noise
Negligible	Health effects are barely discernible or measurable though complete absence cannot be shown.

**Sensitivity of receptors**

12.5.5 The sensitivities of public health receptors are defined by both population groups i.e. vulnerable groups and exposure i.e. continuous. The definitions of terms relating to the sensitivity of public health receptors are detailed in Table 12.5.

**Table 12.5: Sensitivity of receptor**

Sensitivity of receptor	Receptor description
High	Such receptors include pupils in residential educational facilities and patients in healthcare facilities and are defined as a "vulnerable subgroup" with very high or continuous rates of occupancy. Receptors are categorised as high sensitivity where noise may be detrimental to vulnerable subgroups.
Medium	Residential receptors. Receptors are categorised as medium sensitivity where electromagnetic radiation may cause disturbance and a level of protection is required but a level of tolerance is expected.
Low	Area used primarily for leisure activities including PRoW, sports facilities and sites of historic or cultural importance. Receptors are categorised as low sensitivity where electromagnetic radiation may cause short duration effects in a recreational setting although particular high noise levels may cause a moderate effect.
Negligible	Not applicable to this assessment.

12.5.6 The matrix used for the assessment of significance is shown in Table 12.6. The magnitude of the impact is correlated against the sensitivity of the receptor to provide a level of significance.

12.5.7 For the purposes of this assessment, any effect that is Moderate or Major, and shaded in the matrix table, is considered to be significant in EIA terms. Any effect that is minor or below, is not significant in respect to the EIA.

**Table 12.6: Significance of potential effects**

		Sensitivity			
		High	Medium	Low	Negligible
Negative Magnitude	High	Major	Major	Moderate	Minor
	Medium	Major	Moderate	Minor	Negligible
	Low	Moderate	Minor	Minor	Negligible
	Negligible	Minor	Minor	Negligible	Negligible
Beneficial Magnitude	Negligible	Minor	Minor	Negligible	Negligible
	Low	Moderate	Minor	Minor	Negligible
	Medium	Major	Moderate	Minor	Negligible
	High	Major	Major	Moderate	Minor

Note: shaded cells are defined as significant effects in respect of the EIA.

**12.6 Uncertainty and technical difficulties encountered**

12.6.1 Any uncertainty and technical difficulties encountered with regard to impacts on health assessed in other chapters e.g. air emissions, can be found in the relevant chapter.

**12.7 Existing environment**

12.7.1 The existing environment for each potential health impact identified in Table 12.3. is described in the relevant ES chapter. This chapter has not sought to duplicate that information and instead focusses on providing a description of the existing environment with regards the specific potential impact considered in this chapter; namely electromagnetic fields.

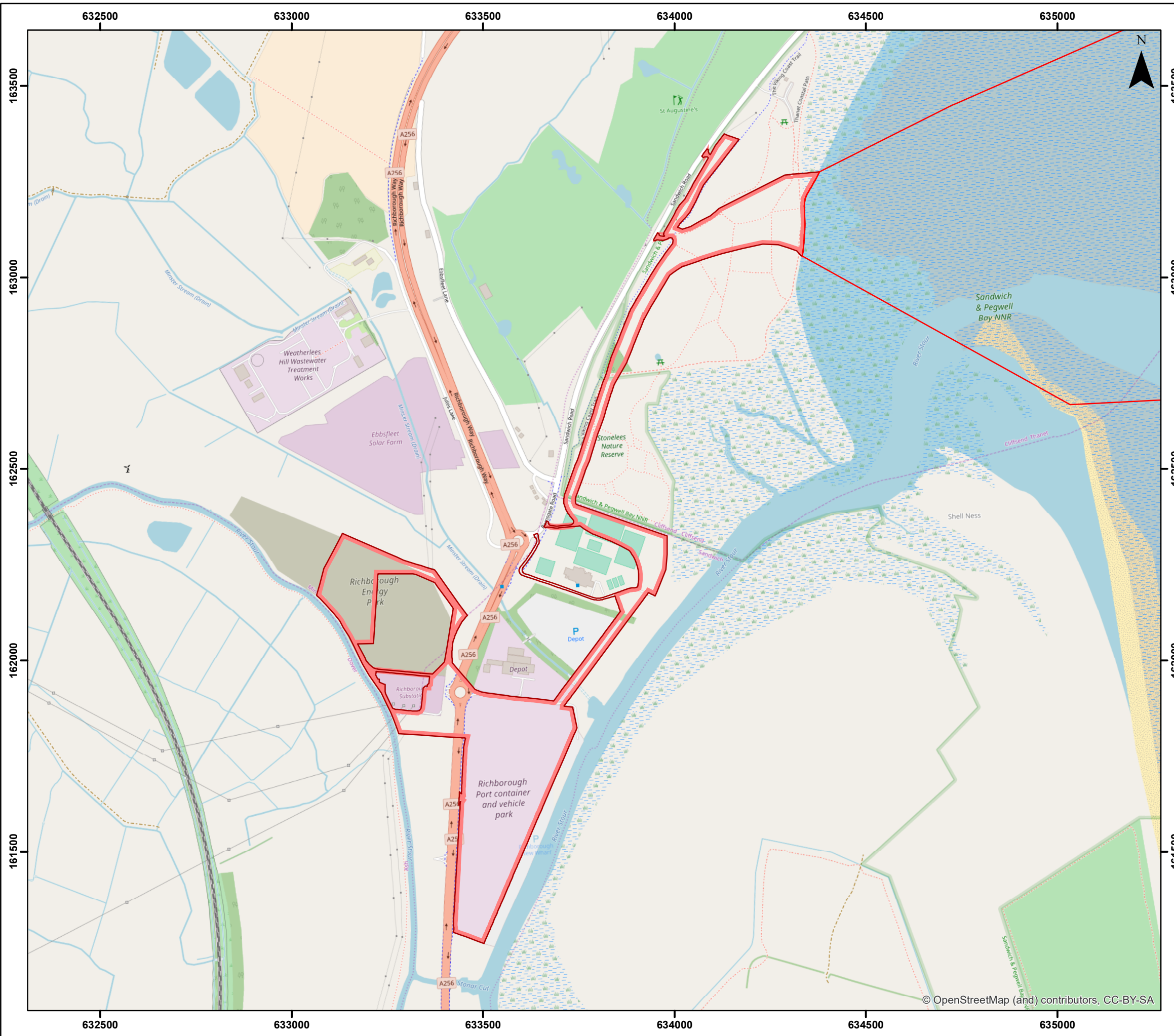


- 12.7.2 EMFs are produced both naturally and as a result of certain human activities. The earth has a magnetic field produced by currents deep inside the core of the planet; the earth is also subject to electric fields produced by electrical activity in the atmosphere such as thunderstorms. The direction of the Earth's magnetic field is normally constant, varying in size only slowly over time, and is referred to as a static or "DC" field. The Earth's magnetic field is approximately 50  $\mu\text{T}$  in the UK. Other fields that alternate in their intensity more frequently over time are referred to as alternating or "AC" fields. EMFs are inevitable wherever electricity is produced, distributed, and used, including electrical substations, power lines and from household electrical equipment.
- 12.7.3 Electric fields are produced by voltage. Voltage is the pressure behind the flow of electricity. Electricity inside UK homes is at 230 volts (V), whereas electrical distribution systems in the UK utilise much higher voltages generally from 11,000 to 400,000 volts (11kV to 400kV). The higher the voltage the greater the electric field, which is measured in volts per metre (V/m). Electric fields are eliminated when electrical cables are buried due to the effect of the ground and protective sheath surrounding the cable.
- 12.7.4 Magnetic fields are produced by current, which is a measure of the flow of electricity. Generally, the higher the current (measured in amperes or amps) the greater the magnetic field. Magnetic fields are measured in microteslas ( $\mu\text{T}$ ).
- 12.7.5 The onshore cable route can be seen in Figure 12.1. It connects to the offshore export cable within the country park, which is a public area used for recreational activities such as walking. The cable then enters Stonelees Nature Reserves before passing through the Baypoint Sports Club. The Baypoint Sports Club consists of several outdoor football pitches and a golf centre. The cable circuits then connect to the substation at Richborough Port where it will pass under the A256 and into the Richborough Energy Park to connect with the national grid. Further information on the design and cable laying method can be found in Volume 3, Chapter 1: Project Description – Onshore (Document Ref: 6.3.1).

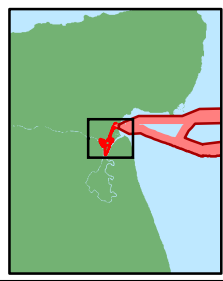
# THANET EXTENSION OFFSHORE WIND FARM

**Figure 1.1**  
Location of the Onshore  
Thanet Extension  
Boundary

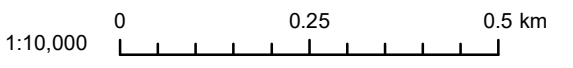
- Legend**
- Offshore Red Line Boundary
  - Onshore Red Line Boundary



Datum: OSGB 1936  
Projection: BNG



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Drg No	Fig1.1_OnRLBLoc			<b>Figure 1.1</b>
Rev	0.1	Date	25/05/2018	
By	RM	Layout	N/A	

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## 12.8 Key parameters for assessment

- 12.8.1 The offshore project description for Thanet Extension is described in Volume 3, Chapter 1: Project Description (onshore) (Document Ref: 6.3.1) of this ES. A maximum development envelope based on the Rochdale envelope principle has been developed for the project EIA.
- 12.8.2 The maximum design scenarios identified in Table 12.7 have been selected as those having the potential to result in the greatest effect on the identified receptor or receptor group. These scenarios have been selected from the details provided in the onshore project description (Volume 3, Chapter 1: Project Description (onshore) (Document Ref: 6.3.1)). Effects of greater adverse significance are not predicted to arise should any other development scenario (based on the details within the project description) to that assessed here be taken forward in the final design scheme.
- 12.8.3 It is noted that only variations in those design parameters detailed under each specific impact in Table 12.7 have the potential to influence the significance of the effect described. Therefore, if a particular design parameter is not discussed, then any change to that parameter is not considered to have a material bearing on the outcome of the assessment.
- 12.8.4 For the purpose of the assessment, only the impact of magnetic fields caused by electricity transmission will be taken forward. This is due to the elimination in electric fields when cables are buried.

Table 12.7: Maximum design scenario assessed

Potential effect	Maximum design scenario assessed	Justification
Construction		
Impact on Health due to air emissions	<ul style="list-style-type: none"> <li>See Table 9.15 in Volume 3, Chapter 9: Air Quality (Document Ref: 6.3.9); and</li> <li>Table 8.11 in Volume 3, Chapter 8: Traffic and Transport (Document Ref: 6.3.8);</li> </ul>	The parameters represent the worst-case for impacts to health with respect to air quality.
Impacts on health due to water emissions	See Table 6.11 in Volume 3, Chapter 6: Ground Conditions, Flood Risk and Land Use (Document Ref: 6.3.6)	The parameters represent the worst-case for impacts to health with respect to water emissions.
Impacts on health due to soil emissions	See Table 6.11 in Volume 3, Chapter 6: Ground Conditions, Flood Risk and Land Use (Document Ref: 6.3.6)	The parameters represent the worst-case for impacts to health with respect to soil emissions.
Impacts on health due to noise emissions	See Table 10.17 in Volume 3, Chapter 10: Noise and Vibration (Document Ref: 6.3.10); and Table 8.11 in Volume 3, Chapter 8: Traffic and Transport (Document Ref: 6.3.8);	The parameters represent the worst-case for impacts to health with respect to noise and vibration.
Temporary loss of access to green space;	See: <ul style="list-style-type: none"> <li>Table 4.12 in Volume 3, Chapter 4: Tourism and Recreation (Document Ref: 6.3.4);</li> <li>Table 2.13 in Volume 3, Chapter 2: Onshore Landscape and Visual Impact Assessment (Document Ref: 6.3.2); and</li> <li>Table 3.25 in Volume 3, Chapter 3: Socio-Economics (Document Ref: 6.3.3).</li> </ul>	The parameters represent the worst-case for impacts to health with respect to community stress and wellbeing insofar as they relate to the temporary loss of green space.
O&M		
Impact on Health due to air emissions	See Table 9.15 in Volume 3, Chapter 9: Air Quality (Document Ref: 6.3.9); and <ul style="list-style-type: none"> <li>Table 8.11 in Volume 3, Chapter 8: Traffic and Transport (Document Ref: 6.3.8);</li> </ul>	The parameters represent the worst-case for impacts to health with respect to air quality.
Impacts on health due to water emissions	See Table 6.11 in Volume 3, Chapter 6: Ground Conditions, Flood Risk and Land Use (Document Ref: 6.3.6)	The parameters represent the worst-case for impacts to health with respect to water emissions.
Impacts on health due to soil emissions	See Table 6.11 in Volume 3, Chapter 6: Ground Conditions, Flood Risk and Land Use (Document Ref: 6.3.6)	The parameters represent the worst-case for impacts to health with respect to soil emissions.
Impacts on health due to noise emissions	See Table 10.17 in Volume 3, Chapter 10: Noise and Vibration (Document Ref: 6.3.10); and <ul style="list-style-type: none"> <li>Table 8.11 in Volume 3, Chapter 8: Traffic and Transport (Document Ref: 6.3.8)</li> </ul>	The parameters represent the worst-case for impacts to health with respect to noise and vibration.



Potential effect	Maximum design scenario assessed	Justification
Change in green space	See: <ul style="list-style-type: none"> <li>• Table 4.12 in Volume 3, Chapter 4: Tourism and Recreation (Document Ref: 6.3.4);</li> <li>• Table 8.11 in Volume 3, Chapter 8: Traffic and Transport (Document Ref: 6.3.8);</li> <li>• Table 2.13 in Volume 3, Chapter 2: Onshore Landscape and Visual Impact Assessment (Document Ref: 6.3.2); and</li> <li>• Table 3.25 in Volume 3, Chapter 3: Socio-Economics (Document Ref: 6.3.3).</li> </ul>	The parameters represent the worst-case for impacts to health with respect to community stress and wellbeing insofar as they relate to the change in green space.
Impacts on health due to electromagnetic radiation	<b>Onshore cable length (per cable):</b> 2.6 km <b>Maximum transmission voltage to substation:</b> 220 kV <b>Maximum transmission voltage between onshore substation and National Grid connection:</b> 400 kV <b>Maximum number of onshore export cable circuits:</b> two <b>Onshore Substation:</b> one	The maximum design scenario consists of the longest cable length combined with the highest voltages and number of cable circuits.
Decommissioning		
Impacts from decommissioning are expected to be similar to those listed above for construction, if project infrastructure is removed at the end of the development’s operational life. If it is deemed closer to the time of decommissioning that removal of certain parts of the development (e.g. cables) would have a greater environmental impact than leaving <i>in situ</i> , it may be preferable to leave those parts <i>in situ</i> . In this case, the impacts would be similar to those described for the operational phase.		
Cumulative effects		
Cumulative effects are assessed in section 12.13.		

## 12.9 Embedded mitigation

12.9.1 In line with NPS EN-5 (DECC, 2011), the electrical infrastructure will be designed to comply with current guidelines on levels of public exposure and design of electrical infrastructure. It is also important to note that the project have made an active design decision to bury all electrical cable infrastructure.

## 12.10 Environmental assessment: construction phase

### Impacts from air emissions

12.10.1 For detailed consideration of the potential construction impacts on health due to air emissions refer to Volume 3, Chapter 9: Air Quality (Document Ref: 6.3.9) which concludes that impacts from air emissions, with the standard best practice embedded mitigation measures applied, will be of **Negligible** significance. Volume 3, Chapter 8: Traffic and Transport (Document Ref: 6.3.8) which concluded **Minor** adverse significance (not significant in EIA terms)

### Impacts from water and soil emissions

12.10.2 For the detailed consideration of the potential construction impacts on health caused by water and soil emissions refer to Volume 3, Chapter 6: Ground Conditions, Flood Risk and Land Use (Document Ref: 6.3.6) which concludes that impacts from water and soil emissions will be of **Minor** adverse significance, which is not significant in EIA terms.

### Impacts from noise emissions

12.10.3 For the detailed consideration of the potential construction impacts on health caused by noise emissions refer to Volume 3, Chapter 10: Noise and Vibration (Document Ref: 6.3.10) which concludes that impacts from noise emissions, with the standard best practice embedded mitigation measures applied; will be of **Minor** adverse significance, which is not significant in EIA terms. Volume 3, Chapter 8: Traffic and Transport (Document Ref: 6.3.8) which concluded **Minor** adverse significance (not significant in EIA terms).

12.10.4 Temporary loss of access to green space For the detailed consideration of the potential construction impacts on health and wellbeing as a result of the proposed temporary loss of access to green space refer to Volume 3, Chapter 4: Tourism and Recreation (Document Ref: 6.3.4) which concluded **Minor** adverse significance (not significant in EIA terms), , Volume 3, Chapter 2: Onshore Landscape and Visual Impact Assessment (Document Ref: 6.3.2) which concluded **no significant** impact and Volume 3, Chapter 3: Socio-Economics (Document Ref: 6.3.3) which concluded both **Minor** adverse and **Minor** beneficial significance (both not significant in EIA terms).

### Impacts from electromagnetic radiation

12.10.5 Electromagnetic radiation is emitted from cables which are operational. Therefore, no assessment can be conducted on the impacts of construction on public health.

## 12.11 Environmental assessment: O&M phase

### Impacts from air emissions

12.11.1 For the detailed consideration of the potential O&M impacts on health due to air emissions refer to Volume 3, Chapter 9: Air Quality (Document Ref: 6.3.9) which concludes that impacts from noise emissions; with the standard best practice embedded mitigation measures applied; will be of **Negligible** significance. Volume 3, Chapter 8: Traffic and Transport (Document Ref: 6.3.8) was scoped out due to low vehicle numbers.

### Impacts from water and soil emissions

12.11.2 For the detailed consideration of the potential O&M impacts on health caused by water and soil emissions refer to Volume 3, Chapter 6: Ground Conditions, Flood Risk and Land Use (Document Ref: 6.3.6) which concludes that impacts from water and soil emissions will be of **Minor** adverse significance, which is not significant in EIA terms.

### Impacts from noise emissions

12.11.3 For the detailed consideration of the potential O&M impacts on health caused by noise emissions refer to Volume 3, Chapter 10: Noise and Vibration (Document Ref: 6.3.10) which concludes that impacts from noise emissions, with the standard best practice embedded mitigation measures applied; will be of **Minor** adverse significance, which is not significant in EIA terms. Volume 3, Chapter 8: Traffic and Transport (Document Ref: 6.3.8) was scoped out due to low vehicle numbers.

### Change in access green space

12.11.4 For the detailed considerations of the potential O&M impacts on health caused by community stress and wellbeing refer to Volume 3, Chapter 4: Tourism and Recreation (Document Ref: 6.3.4) which concluded **Minor** adverse significance (not significant in EIA terms), Volume 3, Chapter 2: Onshore Landscape and Visual Impact Assessment (Document Ref: 6.3.2) which concluded **no significant** impact and Volume 3, Chapter 3: Socio-Economics (Document Ref: 6.3.3) which concluded both **Minor** adverse and **Minor** beneficial significance (both not significant in EIA terms).



### Impacts from electromagnetic radiation

- 12.11.5 Electromagnetic radiation will result from the operation of up to four onshore export cable circuits extending over a maximum distance of 2.6 km and one onshore substation located at Richborough Port with access by authorised personnel only. The transport of electricity through the cables have the potential to emit a localised electromagnetic radiation which could potentially affect public health depending on vulnerability, levels of EMF and exposure time.
- 12.11.6 Studies on human health impacts caused by exposure to electromagnetic radiation suggest there may be an increased risk of Alzheimer’s disease and childhood leukaemia due to higher than usual magnetic field exposures in homes, some of which are near to large above ground powerlines. However, the balance of evidence is towards no effects and there is no known mechanism or clear experimental evidence to explain how these effects might happen (Public Health England, 2013).
- 12.11.7 The strength of the magnetic field decreases rapidly horizontally and vertically with distance from source. Objects such as trees, buildings and earth will reduce the strength further still. It is estimated that a high voltage overhead powerline of 400 kV will be reduced to background/ household levels within 50-100 m with no object in between the source and receptor (National Radiation Laboratory, 2008). Data indicates that magnetic field strength from a typical 400 kV cable buried at 1 m below ground would be over 30  $\mu$ T at ground level directly over the cable, falling to 10  $\mu$ T at 2 m above the ground (lower for lower voltages) (ICF, 2003). These values are below the ‘reference levels’ of the ICNIRP guidance exposure levels. Overall ground level EMF from underground cables fall much more rapidly with distance than those from a corresponding overhead line, but are higher at small distances from the cable (ENA, 2017).
- 12.11.8 The cables will be buried to at least 0.5 m within areas used by the public (e.g. The Baypoint Club and Pegwell Bay Country Park) which will significantly reduce the exposure to electromagnetic radiation. The onshore substation will be adequately secured and accessed only by authorised personnel with appropriate training and safety equipment. As well as this, all infrastructure built will comply with the government guidelines on electromagnetic radiation emission (ICNIRP, 1998; DECC, 2012a; DECC, 2012b; ENA, 2017). The embedded mitigation in place as well as no conclusive scientific evidence relating EMF and certain health effects leads to the magnitude of impact to be deemed as Negligible.
- 12.11.9 The area which the proposed cables will pass through contains no residential living and is comprised of open land used for leisure activities and industry. Therefore, the sensitivity of the receptor to electromagnetic radiation is considered to be Low.
- 12.11.10 With a magnitude of impact assessed as Negligible and the sensitivity of the receptor to electromagnetic radiation being assessed as Low, the effect is therefore assessed as **Negligible** adverse significance, which is not significant in EIA terms.

### 12.12 Environmental assessment: decommissioning phase

- 12.12.1 Impacts from decommissioning are expected to be similar to those listed for construction, if the project infrastructure is removed at the end of the developments operational life. The nature and scale of impacts arising from decommissioning are expected to be of similar, or reduced magnitude to those generated during construction, certain activities such as HDD would not be required.
- 12.12.2 It may be deemed, closer to the time of decommissioning, that removal of certain parts of the development (e.g. cables) would have a greater environmental impact than leaving *in situ*. In this case, the impacts would be similar to those described for the operational phase.

### 12.13 Environmental assessment: cumulative effects

- 12.13.1 Cumulative effects refer to effects upon receptors arising from Thanet Extension when considered alongside other proposed developments and activities and any other *reasonably foreseeable project(s)* proposals. In this context the term *projects* is considered to refer to any project with comparable effects and is not limited to offshore wind projects.
- 12.13.2 The approach to cumulative assessment for Thanet Extension takes into account the Cumulative Impact Assessment Guidelines issued by RenewableUK in June 2013, together with comments made in response to other renewable energy developments within the Southern North Sea, and PINS ‘Advice Note 9: Rochdale Approach’. The renewable energy developments that have informed this approach have been agreed within the Scoping Opinion (PINS, 2017), the suggested tiers, and the Cumulative Impact Assessment conducted for Thanet Extension.
- 12.13.3 In assessing the potential cumulative impact(s) for Thanet Extension, it is important to bear in mind that for some projects, predominantly those ‘proposed’ or identified in development plans etc. may or may not actually be taken forward. There is thus a need to build in some consideration of certainty (or uncertainty) with respect to the potential impacts which might arise from such proposals. For example, relevant projects/ plans that are already under construction are likely to contribute to cumulative impact with Thanet Extension (providing effect or spatial pathways exist), whereas projects/ plans not yet approved or not yet submitted are less certain to contribute to such an impact, as some may not achieve approval or may not ultimately be built due to other factors.

12.13.4 For this reason, all relevant projects/ plans considered cumulatively alongside Thanet Extension have been allocated into ‘Tiers’, reflecting their current stage within the planning and development process. This allows the cumulative impact assessment to present several future development scenarios, each with a differing potential for being ultimately built out. Appropriate weight may therefore be given to each scenario (Tier) in the decision-making process when considering the potential cumulative impact associated with Thanet Extension (e.g., it may be considered that greater weight can be placed on the Tier 1 assessment relative to Tier 2).

12.13.5 The projects and plans selected as relevant to the assessment of impacts to health receptors are based upon an initial screening exercise undertaken on a long list. Each project, plan or activity has been considered and scoped in or out on the basis of effect–receptor pathway, data confidence and the temporal and spatial scales involved.

12.13.6 The proposed tier structure that is intended to ensure that there is a clear understanding of the level of confidence in the cumulative assessments provided in Thanet Extension onshore infrastructure ES is as follows:

#### **Tier 1**

12.13.7 Thanet Extension onshore infrastructure considered alongside other projects/ plans currently under construction and/ or those consented but not yet implemented, and/ or those submitted but not yet determined where data confidence for the projects falling within this category is high.

12.13.8 Built and operational projects will be included within the cumulative assessment where they have not been included within the environmental characterisation survey, i.e. they were not operational when baseline surveys were undertaken, and/ or any residual impact may not have yet fed through to and been captured in estimates of ‘baseline’ conditions or there is an ongoing effect.

#### **Tier 2**

12.13.9 All projects included in Tier 1 plus other projects/ plans consented but not yet implemented and/ or submitted applications not yet determined where data confidence for the projects falling into this category is medium.

#### **Tier 3**

12.13.10 The above plus projects on relevant plans and programmes (the PINS Programme of Projects or other appropriate planning portal sources. Specifically, all projects where the developer has advised PINS in writing that they intend to submit an application in the future were considered.

12.13.11 The health impacts assessed in standalone chapters, such as noise emissions and air emissions, will outline the projects scoped in for cumulative assessment. The relevant chapters will also proceed to assess any cumulative impacts on those potential health impacts.

12.13.12 The specific projects scoped into the cumulative impact assessment for potential electromagnetic radiation impacts with respect to health are identified in Table 12.8.



**Table 12.8: Projects for cumulative assessment**

Development type	Project	Status	Data confidence assessment/ phase	Tier
Sub-sea interconnector cable	Nemo Link	Construction Phase Complete	High – Consented by Applicant.	Tier 1
Solar Farm	Richborough Solar Farm	Consented	High – Consented by Applicant.	Tier 1
Biomass Combined Heat and Power (CHP) Plant	Biomass CHP Plant	Consented/ Under Construction	High – Consented by Applicant.	Tier 1
Grid connection Project	Richborough Energy Park	Consented	High – Consented by Applicant.	Tier 1

12.13.13 The cumulative Rochdale Envelope is described in Table 12.9 with a column for impact, scenario and justification/ notes/ assumptions.

**Table 12.9: Cumulative Rochdale Envelope**

Impact	Scenario	Justification
Impact to health by cumulative exposure to electromagnetic radiation	Public living, working and passing through the area will be exposed to increased electromagnetic radiation when all energy production/ transmission projects are in operation.	All completed projects will emit electromagnetic radiation when in operation. Projects will transmit electricity to the Richborough Energy Park increasing the exposure of the public to EM radiation in the surrounding area.

**Cumulative O&M Electromagnetic Radiation exposure**

**Tier 1**

12.13.14 There is potential for cumulative exposure to electromagnetic radiation as a result of operational power production facilities and transmission infrastructure around the Thanet Extension onshore cable route.

12.13.15 All electrical infrastructure will have to comply with ICNIRP guidelines by being designed to comply with current guidelines on levels of public exposure and design of electrical infrastructure. As such the impact will be of Negligible magnitude.

12.13.16 The cumulative impact of exposure to electromagnetic radiation will be of local spatial extent with emitting infrastructure connecting to the Richborough Energy Park at different locations. The area to most likely emit the highest EM radiation is the Richborough Energy Park as all other infrastructure, such as the Nemo Link and the existing Thanet OWF cables are buried and will not result in a cumulative increase in EMF. This area does not pose any potential impact on high or medium sensitivity receptors. Therefore, the sensitivity of the receptors is considered to be Low.

12.13.17 The magnitude has been assessed as Negligible and the maximum sensitivity of the receptor in the area is Low. Therefore, the significance of effect from the electromagnetic radiation exposure from the operational Thanet Extension and the electrical production/ transmission infrastructure projects outlined in Table 12.8 is **Negligible** adverse, which is not significant in EIA terms.

**12.14 Inter-relationships**

12.14.1 Inter-relationships have been assessed within the relevant chapters. It is the nature of the Thanet Extension EIA that impacts on health are considered in all relevant chapters, the effects associated with changes in traffic and transport feed through to the air quality chapter and noise chapters, and the interactions between visual amenity and recreation or green space are considered with regard the loss of that visual amenity and open space. Consideration of interrelated effects is therefore inherent within the EIA and presented as such within this ES. It is therefore not expected that there will be any significant inter-related effects associated with health impacts that are not already discussed in the context of the individual chapters. A summary of the inter-relationships assessments undertaken to date is contained within Volume 2, Chapter 14: Inter-relationships (Document Ref: 6.2.14).

**12.15 Mitigation**

12.15.1 Additional mitigation relating to community wellbeing via effects on onshore recreation and utility users will be set out within the Public Rights of Way (PRoW) Strategy. No further mitigation measures are proposed beyond the embedded measures detailed within section 12.1 and within the relevant chapters.

## 12.16 Transboundary statement

12.16.1 No transboundary effects of relevance to public health are predicted to result from the construction, O&M and decommissioning of Thanet Extension.

## 12.17 Summary of effects

12.17.1 This chapter has investigated the potential effects on public health receptors arising from Thanet Extension. The range of potential impacts and associated effects considered has been informed by Scoping responses, as well as reference to existing policy and guidance. The impact considered exposure to electromagnetic radiation. The outcome of the assessment deems this impact to be of **Negligible** significance, which is not significance in EIA terms.

12.17.2 Cumulative impacts were also considered and an assessment was carried out looking at the potential for interaction of direct and indirect impacts as a result of the combined activities of the construction of Thanet Extension and other industrial activities in the study area. These included other projects which will increase exposure to electromagnetic radiation and overall were assessed as having no significance in EIA terms.



Description of impact	Impact	Additional mitigation measures	Residual impact
<b>Construction</b>			
For impacts on health due to air emissions see Table 9.35 in Volume 3, Chapter 9: Air Quality (Document Ref: 6.3.9)	<b>Negligible</b> adverse (not significant)	None required	<b>Negligible</b> adverse (not significant)
For impacts on health due to water emissions see Table 6.16 in Volume 3, Chapter 6: Ground Conditions, Flood Risk and Land Use (Document Ref: 6.3.6)	<b>Minor / Minor to Negligible</b> Adverse (not significant)	None required	<b>Minor / Minor to Negligible</b> Adverse (not significant)
For impacts on health due to soil emissions see Table 6.16 in Volume 3, Chapter 6: Ground Conditions, Flood Risk and Land Use (Document Ref: 6.3.6)	<b>Minor / Minor to Negligible</b> Adverse (not significant)	None required	<b>Minor / Minor to Negligible</b> Adverse (not significant)
For impacts on health due to noise emissions see Table 10.28 in Volume 3, Chapter 10: Noise and Vibration (Document Ref: 6.3.10)	<b>Minor</b> adverse (not significant)	None required	<b>Minor</b> adverse (not significant)
For impacts on health due to temporary loss of access to green space: <ul style="list-style-type: none"> <li>Table 4.22 in Volume 3, Chapter 4: Tourism and Recreation (Document Ref: 6.3.4);</li> <li>Table 8.11 in Volume 3, Chapter 8: Traffic and Transport (Document Ref: 6.3.8);</li> <li>Table 2.32 in Volume 3, Chapter 2: Onshore Landscape and Visual Impact Assessment (Document Ref: 6.3.2); and</li> <li>Table 3.42 in Volume 3, Chapter 3: Socio-Economics (Document Ref: 6.3.3)</li> </ul>	<b>Minor</b> adverse (not significant)	N/A	N/A
	<b>Minor</b> adverse (not significant)	Set out in PRoW Strategy	<b>Minor</b> adverse (not significant)
	<b>Minor</b> adverse (not significant)	None required	<b>Minor</b> adverse (not significant)
	<b>Not Significant</b>	None required	<b>Not Significant</b>
	<b>Minor</b> adverse and <b>Minor</b> beneficial (not significant)	None required	<b>Minor</b> adverse and <b>Minor</b> beneficial (not significant)
Impacts on health due to electromagnetic radiation exposure	N/A. Only occurs during operational phase.	N/A	N/A
<b>O&amp;M</b>			
For impacts on health due to air emissions see Table 9.35 in Volume 3, Chapter 9: Air Quality (Document Ref: 6.3.9)	<b>Negligible</b> adverse (not significant)	None required	<b>Negligible</b> adverse (not significant)
For impacts on health due to water emissions see Table 6.16 in Volume 3, Chapter 6: Ground Conditions, Flood Risk and Land Use (Document Ref: 6.3.6)	<b>Minor / Minor to Negligible</b> adverse (not significant)	None required	<b>Minor / Minor to Negligible</b> adverse (not significant)
For impacts on health due to soil emissions see Table 6.16 in Volume 3, Chapter 6: Ground Conditions, Flood Risk and Land Use (Document Ref: 6.3.6)	<b>Minor / Minor to Negligible</b> adverse (not significant)	None required	<b>Minor / Minor to Negligible</b> adverse (not significant)

Description of impact	Impact	Additional mitigation measures	Residual impact
For impacts on health due to noise emissions see Table 10.28 in Volume 3, Chapter 10: Noise and Vibration (Document Ref: 6.3.10)	<b>Minor</b> adverse (not significant)	None required	<b>Minor</b> adverse (not significant)
Impacts on health due to electromagnetic radiation exposure	<b>Minor</b> adverse (not significant)	None required	<b>Minor</b> adverse (not significant)
Cumulative effects			
Cumulative O&M Electromagnetic Radiation exposure	<b>Minor</b> adverse (not significant)	None required	<b>Minor</b> adverse (not significant)

## 12.18 References

- DECC 2011a - Department of Energy and Climate Change (DECC) (2011), Overarching National Policy Statement for Energy (EN-1), [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/47854/1938-overarching-nps-for-energy-en1.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf) [Accessed: March 2018].
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