REPORT

Boston Alternative Energy Facility – Preliminary Environmental Information Report

Chapter 22 Health

Client: Alternative Use Boston Projects Ltd

Reference: PB6934-RHD-01-ZZ-RP-N-2022

Status: 0.1/Final

Date: 17 June 2019

baef
Boston Alternative Energy Facility

Royal HaskoningDHV
Enhancing Society Together

HASKONINGDHV UK LTD.

Rightwell House
Rightwell East
Bretton
Peterborough
PE3 8DW
Industry & Buildings
VAT registration number: 792428892

+44 1733 334455 **T**
+44 1733 262243 **F**
email **E**
royalhaskoningdhv.com **W**

Document title:	Boston Alternative Energy Facility – Preliminary Environmental Information Report
Document short title:	Health
Reference:	PB6934-RHD-01-ZZ-RP-N-2022
Status:	0.1/Final
Date:	17 June 2019
Project name:	Boston Alternative Energy Facility
Project number:	PB6934-RHD-01-ZZ-RP-N-2022
Author(s):	Ashleigh Holmes, Charlotte Goodman
Drafted by:	Isabel O'Mahoney
Checked by:	Gary Bower
Date / initials:	GB 14/06/2019
Approved by:	Gary Bower
Date / initials:	17/06/2019 GB

Classification
Project related

Table of Contents

Non-Technical Summary

The preliminary results of the Human Impact Assessment (HIA) for the proposed Boston Alternative Energy Facility (the Facility) are presented below. The full HIA will be completed in the Environmental Statement (ES).

In terms of Active and Sustainable Travel, Connectivity and Safety, the relationship between traffic and related emissions upon the health of local residents – traffic data is included in the assessment in **Sections 19.5** and **19.7** of **Chapter 19 Traffic and Transport** and has been used in **Chapter 10 Noise and Vibration** and **Chapter 14 Air Quality**. The Facility has the potential to disrupt existing walking routes during construction and some footpaths will be permanently closed. However, the diversion for these route closures would follow the route of an existing footpath.

Air pollution can have adverse effects on the health of humans. Poor air quality is the largest environmental risk to public health in the UK. During the construction phase, the Facility has the potential to pose a human health risk from inhalation or ingestion of pollutants in the emissions from vehicles (both light- and heavy-duty vehicles) travelling to and from the Facility on local road networks, vessels visiting the Facility and non-road mobile machinery (NRMM) working on the Application Site. A preliminary assessment was carried out to consider the potential impacts associated with the Facility on air quality, during its construction and operation. The indicative results of this assessment are described below.

The Facility was determined to have a medium risk of generation of dust during construction. With implementation of effective mitigation measures, generation of construction phase dust and particulate matter will be minimised such that the residual impacts can be considered to be **not significant**.

The impact significance of construction phase road traffic emissions was determined to be **minor adverse**.

In operation, there were predicted to be exceedances of the relevant Environmental Assessment Level for benzo [a] pyrene (BaP). However, the background concentrations used in the assessment were in exceedance of the Environmental Assessment Level without the effect of the Facility. The maximum predicted concentrations of all other pollutants at human receptors were below the relevant Objectives.

Further work will be carried out at the ES stage with regard to operational phase stack, road traffic and vessel emissions, following refinement of the Facility design. The significance of operational phase impacts will therefore be presented in the ES.

Operational phase noise emissions were considered to be **minor adverse**.

Vehicle movements generated by transportation of materials to and from the Facility during the operational phase were assessed in the context of the Application Site and surrounding road network and residual noise impacts were considered to be **negligible adverse**.

Chapter 11 Contaminated Land, Land Use and Hydrogeology identified that residual health impacts would be **minor adverse** for the following:

- Impact on human health, including construction workers and general public during any excavations and construction related activities.
- Impact on human health and controlled waters including workers and public during operation from residual contaminants present within the ground.
- Impact on human health and controlled waters during operation from new sources of contamination being introduced.

22 Health

22.1 Introduction

22.1.1 This chapter of the Preliminary Environmental Information Report describes the existing environment in relation to Health Impacts and provides a preliminary screen of the assessment process and the potential impacts during the construction, operational and decommissioning phases of the Boston Alternative Energy Facility (the Facility).

22.1.2 This Health Impact Assessment (HIA) outlines potential health impacts among relevant local groups. The full HIA will be completed in the Environmental Statement (ES).

22.1.3 This chapter considers the preliminary screen of health and well-being impacts. Additionally, health impacts are also covered in **Chapter 10 Noise and Vibration**, **Chapter 11 Contaminated Land, Land Use and Hydrogeology**, **Chapter 14 Air Quality**, **Chapter 19 Traffic and Transport** and **Chapter 20 Socio-Economics.**

22.2 Legislation, Policy and Guidance

Legislation

National Policy Statements

22.2.1 The policy framework for examining and determining applications for NSIPs is provided by National Policy Statements (NPSs). The NPSs that are considered relevant to the Project include:

- The overarching National Policy Statement for Energy (EN-1) (DECC, 2011a); and
- National Policy Statement for Renewable Energy Infrastructure (EN-3) (DECC, 2011b).

22.2.2 NPS EN-1 states:

"The energy NPSs are likely to contribute positively towards improving the vitality and competitiveness of the UK energy market by providing greater clarity for developers which should improve the UK's security of supply and, less directly, have positive effects for health and well-being in the medium to longer term through helping to secure affordable supplies of energy and minimising fuel poverty; positive medium and long term effects are also likely for equalities."

22.2.3 Health is specifically identified as an issue to be considered by DCO applications in NPS EN-1. It 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."

"[…] 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."

22.2.4 NPS EN-1 outlines that the potential sources of health effects as the direct effects of:

- Increased traffic;
- Pollution – including air, water, noise, dust, and odour;
- Hazardous waste and substances
- Radiation; and
- Increases in pests.

22.2.5 NPS EN-1 also states that new energy infrastructure may *"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"*.

22.2.6 It is noted in NPS EN-1 that the *"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 constitute a reason to refuse consents or require specific mitigation under the Planning Act 2008. However, the IPC will want to take account of health concerns when setting requirements relating to a range of impacts such as noise."*

22.2.7 The aspects of NPS EN-1 that relate to the health and well-being effects from noise, contaminated land and water, air quality (and dust), traffic and transport, and socio-economics are discussed in more detail in **Chapter 10 Noise and Vibration**, **Chapter 11 Contaminated Land, Land Use and Hydrogeology**,

Chapter 14 Air Quality, **Chapter 19 Traffic and Transport** and **Chapter 20 Socio-Economics** respectively.

22.2.8 In **Section 2.5** of **NPS EN-3** biomass and waste combustion, it notes that the combustion of waste can have significant adverse impacts on carbon dioxide (CO_2) emissions, as well as the other air emission impacts outlined in **Section 5.2** of **EN-1**. The Industrial Emission Directive (IED) (Directive 2010/75/EU) (EC, 2010) is relevant to waste combustion plants, in addition to the air quality and emission legislation outlined in **EN-1**.

22.2.9 **NPS EN-3** says that where a *"proposed waste combustion generating station meets the requirements of the WID[1]"* (now contained in the IED), and *"will not exceed the local air quality standards"*, the Secretary of State *"should regard the proposed waste generating station as having no adverse impacts on health."*

National Planning Policy

National Planning Policy Framework

22.2.10 The National Planning Policy Framework (NPPF) was updated on 19 February 2019 (MHCLG, 2019). The NPPF acknowledges the importance of considering health impacts during the planning process.

22.2.11 Section 8 of the NPPF refers to 'Promoting healthy and safe communities.

22.2.12 The NPPF says that planning policies and decisions should support development that makes efficient use of land and take into account *"the importance of securing well-designed, attractive and healthy places".*

22.2.13 Paragraph 180 states that planning policies and decisions should ensure that new developments are be appropriately located, taking into account *"the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life[2];

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;

[1] *The Waste Incineration Directive (WID) (Directive 2000/76/EC) (EC, 2000), which has now been superseded by the Industrial Emission Directive (IED)*
[2] *See Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010).*

and

c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."

National Planning Policy for Waste (2014)

22.2.14 The National Planning Policy for Waste (NPPW) was published in October 2014 (DCLG, 2014). It sets out the detailed waste planning policies to achieve the government's plans to *"work towards a more sustainable and efficient approach to resource use and management"* as set out in the Waste Management Plan for England (Defra, 2013).

22.2.15 The NPPW acknowledges that planning can help deliver the national waste strategy through *"helping to secure the re-use, recovery or disposal of waste without endangering human health and without harming the environment".*

A Green Future: Our 25 Year Plan to Improve the Environment (Defra, 2018)

22.2.16 The 25 Year Environment Plan was published in January 2018 (Defra, 2018) and sets out what is to be done to improve the environment, within a generation.

22.2.17 The Plan includes ten goals for environmental improvement over the next 25 years. The goals to be achieved include:

1. Clean air
2. Clean and plentiful water
3. Thriving plants and wildlife
4. Reducing the risks of harm from environmental hazards
5. Using resources from nature more sustainably and efficiently
6. Enhancing beauty heritage and engagement with the natural environment
7. Mitigating and adapting to climate change
8. Minimising waste
9. Managing exposure to chemicals
10. Enhancing biosecurity

Local Planning Policy

South-East Lincolnshire Local Plan 2011-2036

22.2.18 The South East Lincolnshire Joint Strategic Planning Committee, consisting of Boston Borough, South Holland District and Lincolnshire County Councils,

adopted the South-East Lincolnshire Local Plan on 8 March 2019 (South East Lincolnshire Joint Strategic Planning Committee, 2019). The Local Plan will guide development and use of land in South-East Lincolnshire from 2011 to 2036.

22.2.19 Section 7 'A Distinctive, Greener, Cleaner, Healthier Environment' of the Local Plan outlines that a development *"should seek to protect and enhance the site's important features, and its relationship with other natural and built environment sites, in order to make the best use of the site." "Planning policies and decisions should address the connections between people and places and the community facilities they provide".*

22.2.20 The Local Plan was reviewed for policies relevant to health and the following policies were identified.

*"**Policy 30: Pollution***
Development proposals will not be permitted where, taking account of any proposed mitigation measures, they would lead to unacceptable adverse impacts upon:

1. *health and safety of the public;*
2. *the amenities of the area; or*
3. *the natural, historic and built environment;*
   by way of:
4. *air quality, including fumes and odour;*
5. *noise including vibration;*
6. *light levels;*
7. *land quality and condition; or*
8. *surface and groundwater quality."*

<u>Joint Health and Wellbeing Strategy for Lincolnshire 2018</u>

22.2.21 The Joint Health and Wellbeing Strategy for Lincolnshire was published in June 2018 by the Lincolnshire Health and Wellbeing Board (LCC, 2018). The production of the Strategy is a legal requirement under the Health and Social Care Act 2012 (HMSO, 2012). The Strategy aims to inform and influence decisions about health and social care services in Lincolnshire, in addition to addressing factors that affect everyone's health and wellbeing. The Strategy is based on the five priorities identified in the Joint Strategic Needs Assessment for Lincolnshire.

22.2.22 The Strategy focuses on the following areas:

- Mental Health and Emotional Wellbeing (Children and Young People);

- Mental Health (Adults);
- Carers;
- Physical Activity;
- Housing and Health;
- Healthy Weight (previously known as Obesity); and
- Dementia.

Lincolnshire Minerals and Waste Local Plan

22.2.23 The Lincolnshire Mineral and Waste Local Plan (LMWLP) is made up of two documents: the Adopted Core Strategy (Lincolnshire County Council (LCC), 2016); and the Adopted Site Locations (LCC, 2017).

22.2.24 The LMWLP provides a *"strategic planning framework to facilitate the sustainable supply and use of minerals and to manage waste sustainably in accordance with the waste hierarchy"*. It ensures that *"the economic, environmental and social benefits of mineral and waste development are considered whilst" "the health and amenity of local communities is protected"*.

22.2.25 The LMWLP states that *"proposals, which may give rise to pollution and health issues, should be submitted with details of these issues, and where applicable the relevant health and pollution control authorities will be consulted."*

Guidance

Planning Practice Guidance

22.2.26 The Planning Practice Guidance (PPG) includes guidance on the importance of the role of health and wellbeing in planning as the built and natural environments are major determinants of health and wellbeing (MHCLG, 2017). A range of issues that could be considered throughout the decision-making process in respect to health are identified in the PPG.

22.2.27 The relevant issue in relation to the Facility are:

- *"potential pollution and other environmental hazards, which might lead to an adverse impact on human health, are accounted for in the consideration of new development proposals".*

22.2.28 This issue is discussed in further detail in relation to human health in **Chapter 10 Noise and Vibration**, **Chapter 11 Contaminated Land, Land Use and Hydrogeology**, **Chapter 14 Air Quality**, **Chapter 19 Traffic and Transport** and **Chapter 20 Socio-Economics**.

22.2.29 A healthy community is defined in the PPG as one that "*is a good place to grow up and grow old in. It is one which supports healthy behaviours and supports reductions in health inequalities.*"

22.3 Consultation

22.3.1 Consultation undertaken throughout the pre-application phase informed the approach and the information provided in this Chapter. A summary of the consultation of particular relevance to health is detailed in **Table 22.1.**

Table 22.1 Consultation and Responses

Consultee and Date	Response	Chapter Section Where Consultation Comment is Addressed
Planning Inspectorate Scoping Opinion, 2018	The Inspectorate considers that in addition to the aspect assessments listed in this paragraph of the Scoping Report, human health aspects may also be relevant to soil handling and contaminated land. It is noted that in Section 6.5 the matter of human health is included. The ES should assess this matter and ensure consistency and cross reference between the health assessment and the contaminated land assessment chapter.	**Chapter 11 Contaminated Land, Land Use and Hydrogeology, Section 11.7**
Planning Inspectorate Scoping Opinion, 2018	The ES should assess cumulative effects on human health, from both multiple effects on individual receptors and from the combined effects of other developments with the Proposed Development.	**Section 22.8**

22.4 Assessment Methodology

Impact Assessment Methodology

22.4.1 This HIA was guided by the Rapid Health Impact Assessment Tool (London HUDU, 2017a), Healthy Urban Planning Checklist (London HUDU, 2017b) and the Central Lincolnshire Health Impact Assessment for Planning Applications Guidance Note (Central Lincolnshire, 2017), because there is no guidance specific to HIA in South-East Lincolnshire and / or Boston. The Rapid Health Impact Assessment Tool is partly based on the World Health Organisation (WHO) Healthy Urban Planning publication (Barton & Tsourou, 2000).

22.4.2 In general, there are five core steps of the HIA process (WHO, 2019). These include:

1. Screening
2. Scoping

3. Assessment
4. Reporting and recommendations (decision making)
5. Monitoring and evaluation

Screening

22.4.3 Screening is the first stage of the HIA process and establishes the need for a HIA.

22.4.4 Amendments that were made to the 2017 EIA Regulations (HMSO, 2017) specify that *"population and human health"* must be considered as part of the one of the five main "*factors"* to be assessed in the EIA process.

22.4.5 This HIA outlines the preliminary findings as part of the PEIR. A HIA will be submitted as part of the Environmental Statement (ES) with the Development Consent Order (DCO) application.

Scoping

22.4.6 A Scoping Report was submitted to the Planning Inspectorate on 30 May 2018 and a Scoping Opinion was received back from the Planning Inspectorates in July 2018.

22.4.7 It was put forward in the Scoping Report (Royal HaskoningDHV, 2018) that the HIA would be appended to the Air Quality Chapter and this method was generally accepted by the Planning Inspectorate in the Scoping Opinion (The Planning Inspectorate, 2018), with the addition that *"human health aspects may also be relevant to soil handling and contaminated land"* (see **Table 22.1**). The Planning Inspectorate also identified that *"cumulative effects on human health, from both multiple effects on individual receptors and from the combined affects of other development with the Proposed Development"* should be addressed.

22.4.8 However, it was decided that the HIA would have its own chapter in this PEIR as well as in the ES and as part of the DCO application. This chapter in the PEIR will consider the approach to assessment and a summary of health impacts that are covered in detail in other chapters (as detailed below) within the PEIR.

22.4.9 The following topics associated with the HIA are addressed elsewhere in this PEIR:

- Noise (**Chapter 10 Noise and Vibration**);
- Dust and other emissions (including air) (**Chapter 14 Air Quality**);

- Hazardous waste and substances (**Chapter 11 Contaminated Land, Land Use and Hydrogeology**);
- Disruption to local road network (reduced access to services and amenities) (**Chapter 19 Traffic and Transport**); and
- Increase local employment and community assessment (**Chapter 20 Socio-Economics**).

22.4.10 The health determinants that are considered in the HIA are detailed in **Table 22.3**.

Assessment

22.4.11 There are three types of HIAs:

- The **desktop HIA** includes a broad overview of potential impacts of a development.
- The **rapid HIA** involves a more detailed assessment of potential health impacts and mitigation measures than the desktop HIA and may involve stakeholder consultation.
- The **full HIA** is the most detailed assessment of potential health impacts and normally involves both quantitative and qualitative information as well as data from healthy needs assessments and community engagement.

22.4.12 For this PEIR, a preliminary desktop HIA was undertaken. It will be determined at the ES stage whether a full HIA will be needed for the ES and DCO application.

22.4.13 At this stage, it is anticipated that the requirements of **NPS EN-3** will be met. This states that where a *"proposed waste combustion generating station meets the requirements of the WID[3]"* (now contained in the Industrial Emission Directive (IED)), and *"will not exceed the local air quality standards"*, the Secretary of State *"should regard the proposed waste generating station as having no adverse impacts on health."* This will be confirmed following the completion of a full impact assessment of Air Quality impacts at the ES stage.

22.4.14 This HIA utilised information gathered during the baseline studies of relevant topics (see above) in the PEIR to produce a list of potential health impacts associated with the Facility. The planning checklist provided in the London HUDU (2017b) was used to structure the HIA.

[3] *The Waste Incineration Directive (WID) (Directive 2000/76/EC) (EC, 2000), which has now been superseded by the Industrial Emission Directive (IED)*

22.5 Scope

Study Area

22.5.1 As part of the assessment stage of the HIA, the baseline and community profiles were assessed to establish details on the current health issues within the Study Area population. The wider study area for the HIA is the same as that detailed in **Chapter 20 Socio-Economics** (i.e. Boston borough).

Study Population

22.5.2 The Application Site falls within the administrative areas of Boston Borough Council (BBC) and Lincolnshire County Council (LCC). The HIA Study Area will allow for the assessment of receptors which are likely to be significantly affected or benefitted by the Facility. The HIA Study Area is therefore dependent on the study areas of other topics in this PEIR, for example air quality, noise, contaminated land, transport and socio-economics, because receptors within these Study Areas may have their health adversely affected or benefitted by the Facility.

Data Sources

22.5.3 The assessment was undertaken with reference to several sources, as detailed in **Table 22.2.**

Table 22.2 Key Information Sources

Data Source	Reference
Boston's Health and Wellbeing Strategy 2017-2020	BBC (2017). Boston's Health and Wellbeing Strategy 2017-2020.
Boston District Health Profile 2018	Public Health England (2018). Boston District: Local Authority Health Profile 2018.
Health and Wellbeing in Lincolnshire 2017/18	Lincolnshire Research Observatory (2018). Health and Wellbeing in Lincolnshire 2017/18.
Labour Market Profile – Boston	NOMIS (2019). Labour Market Profile – Boston.
Lincolnshire County Health Profile 2018	Public Health England (2018). Lincolnshire County: Local Authority Health Profile 2018.
Lincolnshire Joint Strategic Needs Assessment (JSNA)	Lincolnshire Research Observatory (2019). Lincolnshire Joint Strategic Needs Assessment.

Determinants of Health

22.5.4 The determinants of health of relevance to the Facility are detailed in **Table 22.3**. The Healthy Urban Planning Checklist (London HUDU, 2017b) provided the basis of which determinants were assessed in relation to the Facility.

Table 22.3 Scope of Determinants to be Considered in the HIA

HUDU Checklist Theme	Planning Issue	Pathways to Health Outcome
Healthy Housing	Housing Design	n/a because the Facility is not a housing development and impacts to residents are identified in 'Healthy Environment' below.
	Accessible Housing	
	Healthy Living	
	Housing Mix and Affordability	
Active Travel	Promoting Walking and Cycling	The Facility has the potential to disrupt public rights of ways that cross the Application Site The Facility will promote car-sharing and mini-buses will be used to transport workers to the Facility. The potential health and well-being impacts are detailed further in **Chapter 19 Traffic and Transport**.
	Safety	
	Connectivity	
	Minimising Car Use	
Healthy Environment	Construction	The construction phase of the Facility has the potential to cause stress and disturbance.
	Air Quality	The Facility has the potential to impact air quality during the construction (i.e. from construction dust and traffic emissions) and operational (i.e. from stack, traffic and vessel emissions) phases. The potential health and well-being impact from air quality are detailed further in **Chapter 14 Air Quality**.
	Noise	The Facility has the potential to impact noise levels in the area surrounding the Application Site in both the construction and operational phases, predominantly through the operation of the Facility and Facility-generated traffic. The potential health and well-being impact of noise from the Facility are detailed further in **Chapter 10 Noise and Vibration**.
	Contaminated Land (and Water)	The Facility has the potential to disturb any existing contamination within the Application Site, which could result in further contamination of land and waterways and lead to human exposure to contamination via inhalation and ingestion. The potential health and well-being impact of contaminated land and water are detailed further in **Chapter 11 Contaminated Land, Land Use and Hydrogeology**.

HUDU Checklist Theme	Planning Issue	Pathways to Health Outcome
	Open Space	n/a
	Play Space	n/a
	Biodiversity	The Facility has the potential to disturb terrestrial and marine species. Impacts on terrestrial and marine ecology are reported in **Chapter 12 Terrestrial Ecology** and **Chapter 17 Marine and Coastal Ecology**
	Local Food Growing	n/a
	Flood Risk	Flooding is an issue that affects the wellbeing of local residents and businesses. Impacts are assessed in **Chapter 13 Surface Water, Flood Risk and Drainage Strategy**
	Overheating	n/a
Vibrant Neighbourhoods	Healthcare Services	n/a
	Education	The Facility has potential to offer a pathway to employment in engineering roles. Boston College offers apprenticeship schemes that are directly relevant to the construction and operation of the Facility.
	Access to Social Infrastructure	n/a
	Local Employment and Healthy Workplaces	The Facility has the potential to impact on local employment during both the construction and operational phases. This is likely to be a beneficial impact by creation of jobs. The potential health and well-being impact of local employment are detailed further in **Chapter 20 Socio-Economics**.
	Access to Local Food Shops	n/a
	Public Buildings and Spaces	n/a

Assumptions and Limitations

22.5.5 The latest available baseline data were used for the HIA; however, it should be noted that data sources may have been updated and could be subject to change during the Development Consent Order (DCO) application process. Furthermore, the most recent census data is from 2011 and while it is probable that this baseline

information may have undergone some change, the broad characteristics have likely remained the same.

22.5.6 The assumptions and limitations stated in the relevant topic chapters referenced in this chapter also apply.

22.6 Existing Environment

22.6.1 This section sets out the existing community profile and health characteristics of the Study Area population.

22.6.2 The baseline assessment and community profile were determined using sources outlined in **Table 22.2**.

22.6.3 The majority of the Application Site is situated within the ward of St Thomas'; however, a small portion of the south Application Site is located within the Wyberton ward. The wards including the Application Site, as well as the wider Study Area of Boston borough are discussed. In relation to employment and economy, the data is presented to identify vulnerable groups in relation to deprivation and the 60-minute drive time area, given that effects may be significant at this geographical scale for this particular topic. Where baseline data is available at a different geographical level (e.g. transport) this is noted in these topic areas.

22.6.4 The approximate population sizes of the wards surrounding the Application Site and Boston town centre in 2017 were taken from the City Population website[4] are detailed in **Table 22.4**.

Table 22.4 Population Statistics of the Study Area.

Ward	Population (people)
St Thomas'	2,833
Wyberton	4,267
Coastal	3,841
Fenside	4,992
Fishtoft	6,901
Five Village	3,856
Kirton and Frampton	7,021
Old Leake and Wrangle	3,463
Skirbeck	8,272

[4] https://www.citypopulation.de/

Ward	Population (people)
Staniland	4,109
Station	3,100
Swineshead and Holland Fen	3,800
Trinity	5,160
West	1,990
Witham	4,883
Boston Borough Total	**68,488**
Lincolnshire Total	**751,171**
East Midlands Total	**4,771,666**

Local Authority Health Profiles

22.6.5 This section outlines the current health profile for both local authorities that cover the Application Site. The health profile includes an overview of the general health, inequalities and priorities for both Boston Borough and Lincolnshire County.

Boston

22.6.6 The 2018 public health profile for Boston District (Public Health England, 2018a) states that:

- The health of people in Boston is varied in comparison with the England average. About 15% (1,900) of children live in low income families. Life expectancy for men is lower than the England average.
- Life expectancy is 7.8 years lower for men and 3.2 years lower for women in the most deprived areas of Boston than in the least deprived areas.

Lincolnshire

22.6.7 The 2018 public health profile for Lincolnshire County (Public Health England, 2018b) states that:

- The health of people in Lincolnshire is varied in comparison with the England average. About 16% (19,500) of children live in low income families. Life expectancy for both men and women is similar to the England average.
- Life expectancy is 7.2 years lower for men and 5.5 years lower for women in the most deprived areas of Lincolnshire than in the least deprived areas.

Health Overview

Wards Covering the Application Site

22.6.8 The Application Site is predominantly located within the ward of St Thomas', with a small portion of the southern part of the Application Site located within the ward of Wyberton.

22.6.9 St Thomas' and Wyberton wards have a lower proportion of people of working age (16-64 years old), 60.5% and 58.1% respectively, than the England average, which is 63.3%. Both wards have a higher proportion of people under 16, 20% and 21.2% respectively, than the England average, which is 19% (Public Health England, 2016).

22.6.10 St Thomas' ward has a similar proportion of people (15.7%) aged between 65-84 as the England average which is 15.7%. The ward of Wyberton has a higher proportion of people aged 65-84 at 18%. In relation to people aged 85 and over, St Thomas' ward has a higher proportion (3.9%) than the England average which is 2.4%, while Wyberton has a similar proportion (2.7%) as the England average (Public Health England, 2016).

22.6.11 The life expectancy of both females and males in St Thomas' is significantly lower than the England averages of 83.1 and 79.1 years respectively, by 5.3 and 3.7 years respectively. In Wyberton, life expectancy for females is similar to the England average, while the life expectancy for males is 3.4 years longer than the England average (Public Health England, 2017a).

22.6.12 In Wyberton, the proportion of people considering their health as "bad" or "very bad" is the same as the England average which is 5.5%, while in St Thomas' the proportion is higher at 6.2%. Both wards have a higher proportion of people living with a long-term illness or disability than the England average of 17.6%, with 19.2% in St Thomas' and 19% in Wyberton (Public Health England, 2011).

22.6.13 Both wards had a higher proportion of obese adults than the England average, however, neither differed significantly from this average. In St Thomas' and Wyberton, there are 1.9% and 2.7% more obese adults than the England average of 24.1% (Public Health England, 2010).

22.6.14 Emergency hospital admissions are significantly lower than the England average Standardised Admission Ratio (SAR) of 100, in both wards. St Thomas' had a SAR of 94.5, while Wyberton had a SAR of 92.4. Both wards had significantly lower hospital admissions for chronic obstructive pulmonary disease with SARs of 60.4 and 61.8 for St Thomas' and Wyberton respectively, while emergency

hospital admissions for coronary heart disease (CHD), stroke and myocardial infarction (MI) did not differ significantly from the England average (Public Health England, 2017b).

22.6.15 In St Thomas' the Standardised Mortality Ratio (SMR) for all causes of death of people under 75 is significantly worse than the England average SMR of 100, with a SMR of 151.5. Wyberton has a SMR of 94.5, which does not differ significantly from the England average (Public Health England, 2017c).

Wider Study Area (i.e. Boston Borough)

22.6.16 The wider Study Area is defined as Boston borough and comprises the wards of Coastal, Fenside, Fishtoft, Five Village, Kirton and Frampton, Old Leake and Wrangle, Skirbeck, Staniland, Station, Swineshead and Holland Fen, Trinity, West and Witham. These areas were considered in the HIA to include any potential adverse impacts resulting from the Facility on air quality, socio-economics and transport.

22.6.17 These 13 wards have similar proportions of people aged between 16-24 and 25-64 as the England averages (11.3% and 52.0% respectively). The coastal ward has the biggest deviation from the England average, with 3.9% fewer people aged 16-24. The biggest deviation from the England average of people aged 25-64 was the Station ward, with 8.1% greater people within this age bracket (Public Health England, 2016).

22.6.18 11 of the 13 wards have lower proportion of people under 16 years old than the England average (19%), with the Coastal ward having the fewest percentage of people under 16 years old (12.4%). Fenside and Skirbeck wards have a greater proportion of people under 16 years old than the England average, with 23.8% and 20.6% respectively (Public Health England, 2016).

22.6.19 The majority of the wards, with the exception of Fenside, Skirbeck, Station and Witham, have a greater proportion of people aged 65-84 than the England average (15.4%). Station ward has the fewest percentage of people aged 65-84 (8.0%) and the Old Leake and Wrangle ward has the greatest percentage of people aged 65-84 (23.4%) (Public Health England, 2016).

22.6.20 Four wards (Fenside, Skirbeck, Station and Witham) have a lower proportion of people aged 85 and over than the England average (2.4%), with Station ward having the lowest proportion (0.9%). Staniland ward has the highest proportion of people aged within this age bracket (4.3%) (Public Health England, 2016).

22.6.21 Only four wards (Station, Trinity, West and Witham) have a fewer proportion of

people who describe their general health as “bad” or “very bad” than the England average (5.5%), with Station and West wards having the lowest proportion (4.3%). Staniland ward has the highest proportion of people that describe their health as “bad” or “very bad” (7.8%). Staniland ward also has the highest proportion of people living with limiting long term illness or disability (25.9%). The majority of wards in the Boston borough have a higher proportion of people living with limiting long term illness or disability compared to the England average (17.6%), only Station and West wards have a lower proportion (15.7% and 17% respectively) (Public Health England, 2011).

22.6.22 Life expectancy for women is higher in seven wards than the England average (83.1 years). The largest deviation in the life expectancy for women was in Swineshead and Holland Fen ward, 3 years longer than the England average. The Skirbeck ward had the greatest negative deviation, with the average being 2.3 years fewer than the England average. Life expectancy for men is higher in 5 wards than the England average (79.4 years). The highest average was in the Five Village ward, which was 1.6 years greater than the England average, and the lowest average was in the Station ward, which was 6.9 years lower than the England average. No life expectancy data was available for the West ward (Public Health England, 2017a).

22.6.23 All the wards have a higher proportion of obese adults than the England average (24.1%). The highest being Coastal, Kirton and Frampton, and Old Leake and Wrangle wards (all 27.8%) (Public Health England, 2010).

22.6.24 There is an approximate even spread of wards with SMRs greater and lower than the England average (100) for premature mortality of people aged 75 and under for all causes. West ward had the lowest SMR (66.8) and Station ward had the highest SMR (167.6), which is considered significantly worse than the England average (Public Health England, 2017b).

22.6.25 Again, there is an approximate even spread of wards with SARs greater and lower than the England average (100) for all emergency hospital admissions. Fenside ward had the highest SAR (120.3), which is significantly worse than the England average, and West ward had the lowest (92.9), which is significantly better than the England average (Public Health England, 2017c).

Employment and Economy

Wards Covering the Application Site and Wider Study Area

22.6.26 Information on employment and the economy of the Application Site and wider Study Area is detailed in **Chapter 20 Socio-Economics**.

Education and Learning

Wards Covering the Application Site and Wider Study Area

22.6.27 Both St Thomas' and Wyberton have a higher proportion of the population with 'no qualifications' than the England and Wales average (15%), with 16.3% and 20.4% respectively. Both wards also have a lower proportion of the population with 'level 4 qualification and above' than the England and Wales average (29.7%), with 19.1% in St Thomas' and 16% in Wyberton (Public Health England, 2011).

Baseline Evolution

22.6.28 The Lincolnshire JSNA (Lincolnshire Health and Wellbeing Board, 2017) notes the following trends with regard to health outcomes:

- The proportion of people aged 65 and over in Boston is projected to increase from 21% in 2014 to 25% in 2039. All districts in Lincolnshire are predicted to experience a decrease in the percentage of people of working age.

22.7 Potential Impacts

Assessment Framework

Health and Wellbeing Issues

22.7.1 The determinants of health that have been considered in this HIA have been determined from the Healthy Urban Planning Checklist (London HUDU, 2017b) and are presented in **Table 22.5**

Table 22.5 Structure of Health Impact Assessment

HUDU Checklist Theme	Health Issue	Relevant Policy	Chapter
Active Travel	Promoting walking and cycling	NPPF (MHCLG, 2019) South-East Lincolnshire Local Plan (South East Lincolnshire Joint Strategic Planning Committee, 2019)	**Chapter 19 Traffic and Transport**
	Safety		
	Connectivity		
	Minimising car use		
Healthy Environment	Construction	NPS EN-1 (DECC, 2011a) NPS EN-3 (DECC, 2011b) NPPF (MHCLG, 2019)	**Chapter 10 Noise and Vibration** **Chapter 11 Contaminated Land, Land Use and Hydrogeology**

HUDU Checklist Theme	Health Issue	Relevant Policy	Chapter
		South-East Lincolnshire Local Plan (South East Lincolnshire Joint Strategic Planning Committee, 2019) Lincolnshire Mineral and Waste Local Plan: Core Strategy and Development Management Policies (LCC, 2016)	**Chapter 13 Surface Water, Flood Risk and Drainage Strategy** **Chapter 14 Air Quality** **Chapter 19 Transport** **Chapter 20 Socio-Economics**
	Air quality		**Chapter 14 Air Quality**
	Noise		**Chapter 10 Noise and Vibration**
	Contaminated land (and water)		**Chapter 11 Contaminated Land, Land Use and Hydrogeology**
	Biodiversity		**Chapter 12 Terrestrial Ecology and Chapter 17 Marine and Coastal Ecology**
	Flood risk		**Chapter 13 Surface Water, Flood Risk and Drainage Strategy**
Vibrant Neighbourhoods	Education	NPPF (MHCLG, 2019) South-East Lincolnshire Local Plan (South East Lincolnshire Joint Strategic Planning Committee, 2019)	**Chapter 20 Socio-Economics**
	Local employment and healthy workplaces		

Embedded Mitigation

22.7.2 No embedded mitigation measures were considered in this preliminary HIA assessment.

Potential Impacts during Construction and Operation

Active and Sustainable Travel, Connectivity and Safety

22.7.3 The Facility has the potential to disrupt existing walking routes during construction.

22.7.4 The Boston Public Footpath No.14 starts in Boston and follows the A16 (London Road) south over The Haven and merges with the existing footpaths along The Haven: BOST/14/1, BOST/14/2, BOST/14/4, BOST/14/5 and BOST/14/7). Footpaths BOST14/4 and BOST14/5 follow the crest of the primary flood bank that routes in parallel to The Haven. Footpath BOST/14/11 and BOST14/9, follow the route of Roman Bank (also known as 'Sea Bank'), which continues along the banks heading south from the Application Site.

22.7.5 The following footpath sections will be permanently closed: Bost/14/4, Bost/14/10 and Bost/14/5. The closure would also affect the England Coast Path route which follows these footpaths, as does Macmillan Way. The diversion for these route closures would follow the route of an existing footpath, which follows the route of Roman Bank (also known as 'Sea Bank') along footpath sections Bost/14/11 and Bost/14/9.

22.7.6 The relationship between traffic and related emissions upon the health of local residents – traffic data is included in the assessment in **Sections** Error! Reference s ource not found. and Error! Reference source not found. of **Chapter 19 Traffic and Transport** and has been used in **Chapter 10 Noise and Vibration** and **Chapter 14 Air Quality.**

Air Quality

22.7.7 Air pollution can have adverse effects on the health of humans. Poor air quality is the largest environmental risk to public health in the UK. Long-term exposure to poor air quality can result in reduction in life expectancies, predominantly due to cardiovascular and respiratory disease and lung cancer. Short-term exposure can result in effects on lung function, exacerbation of asthma, increases in respiratory and cardiovascular hospital admissions and mortality (Public Health England, 2018).

22.7.8 During the construction phase, the Facility has the potential to pose a human health risk from inhalation or ingestion of pollutants in the emissions from vehicles (both light- and heavy-duty vehicles) travelling to and from the Facility on local road networks, vessels visiting the Facility and non-road mobile machinery (NRMM) working on the Application Site. The main traffic-related pollutants of concern for human health are nitrogen dioxide and particulate matter (NO_2 and PM_{10} and $PM_{2.5}$).

22.7.9 A preliminary assessment was carried out to consider the potential impacts associated with the Facility on air quality, during its construction and operation. The following results are therefore considered to be preliminary and subject to

revision following further detailed design of the Facility.

22.7.10 For construction phase road traffic emissions, a moderate adverse impact was predicted in **Chapter 14 Air Quality** for annual mean NO_2 concentrations at one receptor location, which is within an Air Quality Management Area (AQMA) where existing background concentrations are already close to or above the relevant Objective. At all other receptor locations for NO_2, and at all receptor locations from PM_{10} and $PM_{2.5}$, the impact was predicted to be **negligible**. Therefore overall, the impact significance of construction phase road traffic emission assessment was determined to be **minor adverse**.

22.7.11 In operation, there were predicted to be exceedances of the relevant Environmental Assessment Levels for benzo [a] pyrene (BaP). However, background concentrations used in the assessment were in exceedance of the Environmental Assessment Level without the Facility in place. The maximum predicted concentrations at human receptors were below the relevant Objectives for all other pollutants considered in the assessment.

22.7.12 The **Chapter 14 Air Quality** identified that with implementation of effective mitigation measures, generation of dust and fine particulate matter will be minimised such that the residual impacts can be considered to be **not significant**.

22.7.13 Following detailed design of the Facility, the magnitude and significance of air quality impacts during the operational phase, as a result of stack, vessel and road traffic emissions, will be determined at the ES stage and the requirement for mitigation measures will be considered as required.

Noise

22.7.14 In **Chapter 10 Noise and Vibration**, operational phase noise emissions were considered. Noise levels at nearby residential receptors due to operation of the Facility were predicted to be above background noise levels at some receptors and the impacts were therefore considered to be moderate adverse. Mitigation was proposed and with the incorporation of these measures, noise levels at nearby receptors due to operation of the Facility were predicted to be **negligible** above background noise levels at some receptors and the residual impacts were therefore considered to be **minor adverse**.

22.7.15 Vehicle movements generated by transportation of materials to and from the Facility during the operational phase were assessed in the context of the Application Site and surrounding road network and residual impacts were considered to be **negligible adverse**.

Water and Ground Contamination

22.7.16 **Chapter 11 Contaminated Land, Land Use and Hydrogeology** identified the following residual health impacts:

- Impact on Human Health, Including Construction Workers and General Public During Any Excavations and Construction Related Activities – **minor adverse**.
- Impact on Human Health and Controlled waters Including Workers and Public During Operation as a result of residual contaminants present within the ground – **minor adverse**.
- Impact on human health and controlled waters during Operation from as a result of new sources of contamination being introduced – **minor adverse**.

22.8 Cumulative Impacts

22.8.1 The Cumulative Impact Assessment with the relevant cumulative schemes that have been determined in discussion with Boston Borough Council (BBC) will be provided in the ES.

22.9 Transboundary Impacts

22.9.1 As there is no international border near to the Facility, there are no transboundary impacts related to Health for this project.

22.10 Inter-Relationships with Other Topics

22.10.1 There is an inter-relationship between Health and the following topics as described above:

- **Chapter 10 Noise and Vibration**;
- **Chapter 11 Contaminated Land**, **Land Use and Hydrogeology**;
- **Chapter 14 Air Quality**;
- **Chapter 19 Traffic and Transport**; and
- **Chapter 20 Socio-Economics**.

References

Barton, H., Tsourou, C. (2000). Healthy Urban Planning.

Central Lincolnshire (2017). Health Impact Assessment for Planning Applications: Guidance Note. April 2017.

Department for Communities and Local Government (DCLG) (2014). National Planning Policy for Waste.

DCLG (2015). The English Index of Multiple Deprivation (IMD) 2015.

Department for Environment, Food and Rural Affairs (Defra) (2010). Noise policy statement for England.

Defra (2013). Waste Management Plan for England, December 2013.

Defra (2018). A Green Future: Our 25 Year Plan to Improve the Environment.

Department of Energy and Climate Change (DECC) (2011a). Overarching National Policy Statement for Energy (EN-1).

DECC (2011b). National Policy Statement for Renewable Energy Infrastructure (EN-3).

European Commission (EC) (2000). Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the incineration of waste.

EC (2010). Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control).

Her Majesty's Stationary Office (HMSO) (2012). Health and Social Care Act 2012.

HMSO (2017). Statutory Instrument 2017 No. 572 Infrastructure Planning. The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

Lincolnshire County Council (LCC) (2016). Lincolnshire Minerals and Waste Local Plan: Core Strategy and Development Management Policies. Adopted June 2016.

LCC (2017). Lincolnshire Minerals and Waste Local Plan: Site Locations. Adopted December 2017.

LCC (2018). Joint Health and Wellbeing Strategy for Lincolnshire. June 2018.

Lincolnshire Health and Wellbeing Board (2017). Joint Strategic Needs Assessment Summary Report 2017.

London Healthy Urban Development Unit (HUDU) (2017a). Rapid Health Impact Assessment Tool. Third Edition, April 2017.

London HUDU (2017b). Healthy Urban Planning Checklist. Third Edition, April 2017.

Ministry of Housing, Communities and Local Government (MHCLG) (2017). Guidance: Health and wellbeing.

MHCLG (2019). National Planning Policy Framework.
Public Health England (2010). *Local Health*. Available at: http://www.localhealth.org.uk [Accessed: 31/05/2019].

Public Health England (2011). *Local Health*. Available at: http://www.localhealth.org.uk [Accessed: 31/05/2019].

Public Health England (2016). *Local Health*. Available at: http://www.localhealth.org.uk [Accessed: 31/05/2019].

Public Health England (2017a). *Local Health*. Available at: http://www.localhealth.org.uk [Accessed: 31/05/2019].

Public Health England (2017b). *Local Health*. Available at: http://www.localhealth.org.uk [Accessed: 31/05/2019].

Public Health England (2017c). *Local Health*. Available at: http://www.localhealth.org.uk [Accessed: 31/05/2019].

Public Health England (2018a). Local Authority Health Profile 2018 – Boston District.

Public Health England (2018b). Local Authority Health Profile 2018 – Lincolnshire County.

Public Health England (2018c). Guidance – Health Matters: Air Pollution.

Royal HaskoningDHV (2018). Scoping Report: Boston Alternative Energy Facility. Reference I&BPB6934-RH002R001F01.

South East Lincolnshire Joint Strategic Planning Committee (2019). South East Lincolnshire Local Plan 2011 – 2036 Adopted March 2019. Available at: http://www.southeastlincslocalplan.org/wp-content/uploads/2019/02/Local-Plan-text-March-2019.pdf [Accessed: 30/04/2019].

The Planning Inspectorate (2018). Scoping Opinion: Proposed Boston Alternative Energy Facility. Case Reference: EN010095.

World Health Organisation (WHO) (2019). *Health impact assessment*. Available at: https://www.who.int/heli/impacts/hiabrief/en/ [Accessed: 03/05/2019].