

# LIGHTHOUSE GREEN FUELS PROJECT

**Preliminary Environmental  
Information Report**

**Chapter 15: Population and  
Human Health**

The Inspectorate Reference: EN010150

**May 2024**

Volume 1

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## **15. POPULATION AND HUMAN HEALTH**

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### **15.1. INTRODUCTION**

15.1.1. This Chapter of this Preliminary Environmental Information Report (PEIR) provides the preliminary Population and Human Health Assessment of the Proposed Scheme. Details of the Proposed Scheme that form the basis of this assessment are outlined in **Chapter 2: Site and Proposed Scheme Description (Volume 1)**.

15.1.2. The Population and Human Health assessment will consider the potential impacts associated with:

- Construction phase disruption to walkers and cyclists;
- Construction and operational phase disruption to terrestrial recreation;
- Construction and operational phase disturbance to human health; and
- Operational phase disruption to businesses that rely on the River Tees.

15.1.3. This Chapter reports the preliminary assessment of the likely significant effects of the Proposed Scheme on Population and Human Health, and describes:

- Relevant legislation, policy and guidance;
- Consultation undertaken with stakeholders to date;
- The methodology for assessment; and
- Potential effects of the Construction and Operation Phase.

### **MATTERS SCOPED OUT**

15.1.4. The following effects are considered unlikely to be significant and have therefore not been considered further in this assessment:

- Construction phase:
  - Effects on private property and housing;
  - Effects on community land and assets;
  - Effects on terrestrial businesses;
  - Effects on businesses that rely upon access to the River Tees; and
  - Effects on recreational users of the River Tees;
- Operation phase:
  - Effects on private property and housing;
  - Effects on community land and assets;
  - Effects on walkers and cyclists;
  - Effects on terrestrial businesses; and
  - Effects on recreational users of the River Tees.
- Decommissioning phase:
  - Effects on private property and housing;
  - Effects on community land and assets;

- Effects on walkers and cyclists;
- Effects on terrestrial businesses;
- Effects on businesses that rely upon access to the River Tees; and
- Effects on recreational users of the River Tees.

15.1.5. As set out in **Table 15-2**, the Inspectorate agrees that these effects would not likely be significant and, therefore, do not need to be considered further (see **Section 15.3** for details).

## 15.2. POLICY, LEGISLATION, AND GUIDANCE

15.2.1. The policy, legislation, and guidance relevant to the assessment of the Proposed Scheme is detailed in **Appendix 4A: Policy, Legislation and Guidance (Volume 3)**. The key policy, legislation, and guidance most relevant to this Chapter are as follows:

- Policy:
  - Overarching National Policy Statement (NPS) for Energy EN-1 2023<sup>1</sup>;
  - National Planning Policy Framework (NPPF) 2023<sup>2</sup>;
  - North East Inshore and North East Offshore Marine Plan 2021<sup>3</sup>;
  - Stockton-on-Tees Borough Council Local Plan 2019<sup>4</sup>;
  - Redcar and Cleveland Local Plan 2018<sup>5</sup>;
  - Stockton-on-Tees Open Spaces Strategy 2017<sup>6</sup>;
  - Redcar and Cleveland Green Space Strategy 2006 – 2016<sup>7</sup>;
  - Stockton-on-Tees Communities Strategy 2020<sup>8</sup>;
  - Redcar and Cleveland Climate Change Strategy 2021 -2030<sup>9</sup>;
- Legislation:
  - Countryside and Rights of Way (CROW) Act 2000<sup>10</sup>;
  - Equality Act 2010<sup>11</sup>;
  - Localism Act 2011<sup>12</sup>;
- Guidance:
  - National Planning Practice Guidance 2021<sup>13</sup>;
  - Planning Practice Guidance - Open Space, Sports and Recreation Facilities, Public Rights of Way and Local Green Space 2014<sup>14</sup>;
  - Planning Practice Guidance - Healthy and Safe Communities 2014<sup>15</sup>;
  - Design Manual for Roads and Bridges (DMRB) LA112 Population and Human Health 2020<sup>16</sup>;
  - Office for Health Improvement and Disparities (formally Public Health England), Health and environmental impact assessment: guide for local teams 2017<sup>17</sup>; and
  - Institute Environmental Management and Assessment (IEMA) Guidance ‘Determining Significance for Human Health in Environmental Impact Assessment’ (2022)<sup>18</sup>.

### 15.3. SCOPING OPINION AND CONSULTATION

- 15.3.1. An EIA Scoping Opinion<sup>19</sup> was received by the Applicant from the Planning Inspectorate (hereafter referred to as the Inspectorate) on behalf of the Secretary of State (SoS) on 01 September 2023, including formal responses from Statutory Consultees. The responses from the Inspectorate in relation to Population and Human Health, and how these requirements should be addressed by the Applicant, are set out in **Table 15-1** below.
- 15.3.2. In addition, consultation will be undertaken with Stockton-on-Tees Borough Council and Redcar and Cleveland Borough Council officers in order to discuss usage levels of Public Rights of Way (PRoW) and recreational receptors used by walkers, cyclists and for terrestrial recreation. This has not been undertaken as part of this PEIR, but will be completed prior to the Environmental Statement (ES) (with responses considered as part of the Population and Human Health ES baseline).

**Table 15-1: Summary of the EIA Scoping Opinion in relation to Population and Human Health**

Section ID	Applicant's Proposed Matter	Scoping Opinion Comments	Response
3.12.1	Private property and housing – construction and operation	<i>“This matter is proposed to be scoped out on the basis that there are only a limited number of private properties in proximity to the Proposed Development, the construction site is contained with good road linkages, and operational activities are unlikely to result in significant effects on private property and housing. The Inspectorate agrees that this matter may be scoped out on that basis.”</i>	No response is required.
3.12.2	Community land and assets – construction and operation	<i>“The Applicant states that this matter is to be scoped out on the basis that there are limited community land uses within the Study Area and access to these facilities is “likely” to be maintained throughout construction and operation. The phrasing used here suggests that there is a possibility that access to community facilities would not be maintained throughout construction and operation. The ES should either provide evidence that access to community facilities would be maintained throughout construction and operation of the Proposed Development. If evidence cannot be provided, then the impact on community land and assets from construction and operation should be assessed in full within the ES.”</i>	The embedded mitigation implemented as part of the Proposed Scheme during the Construction Phase will be secured as part of an Outline Code of Construction Practice (OCoCP). This will include commitments relating to access for motorised and non-motorised users to ensure that access is maintained to local community facilities during the construction period. The OCoCP will also include provisions to ensure the safety of users is maintained whilst accessing community land and assets (for example ensuring appropriate signage, screening, and marked crossings in proximity to works sites and construction traffic routes). Therefore, there is a commitment by the Applicant to ensure that access is maintained to community land and assets. On this basis, the assessment of these receptors has remained scoped out of this PEIR. The baseline context for community land and assets has been included in <b>Section 15.3</b> below

Section ID	Applicant's Proposed Matter	Scoping Opinion Comments	Response
			in order to evidence the appropriateness of scoping this receptor out from further assessment.
3.12.3	Walkers and cyclists – operation	<i>“This matter is proposed to be scoped out on the basis that the area surrounding the Proposed Development is already heavily industrialised and so significant effects would be unlikely to occur on walkers and cyclists passing through the area. The Inspectorate agrees that given the industrial context of the area, the Proposed Development is unlikely to significantly detract from walking and cycling routes passing through it. This matter can be scoped out of the ES.”</i>	No response is required.
3.12.4	Terrestrial businesses – construction	<i>“The Scoping Report proposes to scope this matter out on the basis that access to businesses is “likely” to be maintained throughout construction. The ES should provide evidence that access to terrestrial businesses will be maintained throughout the construction of the Proposed Development. If evidence cannot be provided, then the impact on terrestrial businesses from construction should be assessed in full within the ES.”</i>	The embedded mitigation implemented as part of the Proposed Scheme during the Construction Phase will be secured as part of a OCoCP and will include commitments to ensure that access is maintained to terrestrial businesses during the construction period. The OCoCP will also include provisions to ensure the safety of business operators and users (for example ensuring appropriate signage, screening, and marked crossings in proximity to works sites and construction traffic routes). Therefore, there is a commitment by the Applicant to ensure that access is maintained to terrestrial businesses. On this basis, the assessment of these receptors has remained scoped out of this PEIR. The baseline context for terrestrial businesses has been included in <b>Section 15.3</b> below in order to evidence the appropriateness of scoping this receptor out from further assessment.

Section ID	Applicant's Proposed Matter	Scoping Opinion Comments	Response
3.12.5	Terrestrial businesses – operation	<i>“The Scoping Report proposes to scope this matter out on the basis that the Proposed Development is not anticipated to result in significant effects on any local businesses. The Inspectorate agrees that the operation of the Proposed Development is unlikely to result in any significant effects on terrestrial businesses in proximity. This matter can therefore be scoped out from further assessment.”</i>	No response is required.
3.12.6	Businesses that rely upon access to the River Tees – construction	<i>“The Applicant states that this matter is to be scoped out of this Chapter as it will be considered within Chapter 20: Marine Navigation. The Inspectorate agrees with this approach. This matter can be Scoped out of the Population and Human Health Chapter.”</i>	No response is required.
3.12.7	Businesses that rely upon access to the River Tees – operation	<i>“The Scoping Report proposes to scope this matter out on the basis that, whilst there will be some impact from an increase in marine vessels associated with the Proposed Development, it is not likely to be of a scale that would result in significant impacts. It is noted that information on marine vehicle movements during the Operation Phase has not been provided. In the absence of this information, the Inspectorate is not in a position to scope this matter out.”</i>	Following comments from the Inspectorate, the potential operational effects to businesses that rely upon access to the River Tees are considered within this PEIR and will be assessed as part of the ES. Information on marine vehicle movements during the Operation Phase will be outlined in the ES. This will be used to inform the Population and Human Chapter within the ES.
3.12.8	Terrestrial recreation – operation	<i>“It is not clear why this matter is proposed to be scoped out. The Scoping Report states that Chapter 7: Ecology outlines the potential impacts on bird species at two nearby nature reserves which could subsequently impact</i>	Following comments from the Inspectorate, the potential operational effects on terrestrial recreation (and users) are considered within this PEIR and will be assessed as part of the ES.

Section ID	Applicant's Proposed Matter	Scoping Opinion Comments	Response
		<p><i>the amenity value for these sites. No further rationale has been provided for scoping this matter out. In the absence of such rationale and evidence, the Inspectorate is unable to scope this matter out of further assessment. The ES should assess the potential impacts to terrestrial recreation as a result of the operation of the Proposed Development.”</i></p>	
<p><b>3.12.9</b></p>	<p>Recreational users of the River Tees – construction and operation</p>	<p><i>“The Scoping Report proposes to scope this matter out on the basis that the area surrounding the Proposed Development is already heavily industrialised, and so the construction and operation of the Proposed Development would not significantly detract from recreational users of the River Tees. The Inspectorate agrees that in the context of the surrounding area, the Proposed Development would not significantly detract from recreational users of the River Tees. This matter can be scoped out of further assessment.”</i></p>	<p>No response is required.</p>
<p><b>3.12.10</b></p>	<p>Human health – construction and operation</p>	<p><i>“The Applicant intends to scope this matter out on the basis that potential adverse health effects are likely to be temporary and minor given the location of the Site in an existing industrial area with limited health receptors and health effects are also considered in other relevant aspect Chapters (Chapter 5: Air Quality, Chapter 6: Noise and Vibration, Chapter 15: Socioeconomics, and Chapter 18: Traffic and Transport). Little information has been provided on the potential impacts</i></p>	<p>The potential construction and operational phase effects to human health are considered within this PEIR and will be assessed as part of the ES following the IEMA Guidance ‘Determining Significance for Human Health in Environmental Impact Assessment’ (2022)<sup>18</sup>.</p>

Section ID	Applicant's Proposed Matter	Scoping Opinion Comments	Response
		<p><i>on human health as a result of the Proposed Development. Whilst the Inspectorate acknowledges that impacts relevant to other aspects will be discussed within the relevant aspect Chapters, it is not clear which impacts are being scoped out here. As such, the Inspectorate is unable to scope this matter out of the ES. Any likely significant effects on human health as a result of the Proposed Development should be fully assessed within the ES."</i></p>	
3.12.11	Frequency of use	<p><i>"The Scoping Report identifies that a number of PRow could potentially be affected by the Proposed Development. However, limited information on the frequency of use of these PRow has been provided. The ES should provide this data for each PRow affected and reference it in the determination of significance."</i></p>	<p>Due to design freeze changes, there are now seven footpaths that fall within the Study Area. The England Coast Path (North Tees Trail section) and Teesdale Way are also located within 500m of the Proposed Scheme. Consultation with Stockton-on-Tees Borough Council and Redcar and Cleveland Borough Council will be sought to ascertain further information on the current conditions and user counts for the long-distance walking routes and PRow. This will be assessed within the ES.</p>
3.12.12	Methodology	<p><i>"The Scoping Report states that significance criteria for this assessment was established using guidance such as DMRB LA 112 and 104. It is the Inspectorate's opinion that this does not represent the most appropriate guidance considering the nature of the Proposed Development and the assessment. The Applicant should consider using guidance such as 'Determining Significance For Human Health In Environmental Impact</i></p>	<p>This PEIR Chapter will use the IEMA Guidance 'Determining Significance For Human Health In Environmental Impact Assessment'<sup>18</sup> to undertake the assessment of health impacts related to the Proposed Scheme. DMRB LA 112<sup>16</sup> is used as supplementary guidance, for the assessment of land use and accessibility.</p>

Section ID	Applicant's Proposed Matter	Scoping Opinion Comments	Response
		<i>Assessment' issued by the Institute of Environmental Management and Assessment (IEMA) as the basis for this assessment. The Applicant's attention is drawn to the comments from the UK Health Security Agency in Appendix 2 of this Opinion."</i>	
3.12.14	Figure(s)	<i>"The ES should contain a figure, or figures, which displays the location of sensitive receptors such as Walking, Cycling, Horse-riding (WCH) routes, residential properties, community facilities, PRow etc. in relation to the Proposed Development."</i>	A figure containing relevant Population and Human Health receptors has been produced and referenced within this PEIR ( <b>Figure 15-1 (Volume 2)</b> ).
3.12.15	Emissions to water	<i>"It is noted that the Scoping Report does not consider the health implications of emissions to water. The ES should contain an assessment of any health impacts that may arise as a result of emissions to water."</i>	As outlined in <b>Chapter 9: Water Environment and Flood Risk (Volume 1)</b> , a standalone Water Framework Directive assessment (WFD) is being produced in parallel to the ES. Stage 1 (WFD Screening) and Stage 2 (WFD Scoping) have been completed alongside this PEIR. These will examine the potential impact of emissions on water quality and outline the WFD classification of the Tees transitional waterbody, Tees Estuary (South Bank) waterbody and Tees coastal waterbody, and Tees Sherwood Sandstone groundwater body. This will also help to identify potential pollutants that may pose a risk to human health. If this risk is identified, the potential effects on human health will be considered as part of the ES.
<b>Appendix 2: UK Health Security</b>	Electromotive Force (EMF)	<i>"We request that the ES clarifies this and if necessary, the proposer should confirm either that the proposed development does not impact any receptors from potential</i>	All Major Accidents and Disasters categories and types in relation to electromotive force have been scoped out of this PEIR and ES, see <b>Appendix 17-A: Major Accidents and Disasters Long List</b>

Section ID	Applicant's Proposed Matter	Scoping Opinion Comments	Response
Agency Page 3		<i>sources of electromotive force (EMF); or ensure that an adequate assessment of the possible impacts is undertaken and included in the ES."</i>	<b>(Volume 3)</b> of this PEIR where this is detailed. It confirms that the Proposed Development will not impact any receptors from potential sources of EMF.

## BASELINE CONTEXT TO SUPPORT THE SCOPING OUT OF EFFECTS

15.3.3. When determining the baseline for the Community Land and Assets and Terrestrial Businesses the Applicant has taken into account relevant comments received as part of the EIA Scoping Opinion<sup>19</sup>, as set out in **Table 15-1**. Whether it would be practical to maintain access to the business, or to community land during construction and operation phases of the Proposed Development was also a key consideration when determining whether to Scope a receptor in or out of its assessment.

### Community Land and Assets

15.3.4. There are no community assets identified either within the Application Site or any that rely on access through the Site. The following community assets are located within the Study Area (defined in **Section 15.5**):

- West Lothian Street allotments 120m north of the Site;
- Port Clarence Playing Fields 300m northwest of the Site;
- Port Clarence Play Area 330m northwest of the Site;
- Billingham Community Fire Station 410m west of the Site;
- Middlesbrough Football Club and Riverside Stadium 430m south of the Site;
- Middlesbrough Docks 500m south of the Site; and
- Middlesbrough College 500m south of the Site.

### Terrestrial Businesses

15.3.5. The Site is located within Tees Valley. This is a connected economic area covering Darlington, Hartlepool, Middlesbrough Redcar and Cleveland and Stockton-on-Tees. The Study Area (defined in **Section 15.5**) is dominated by industrial uses. The north bank of the River Tees is occupied by a variety of operations including petro-chemical process facilities and storage and heavy engineering. Businesses within the Application Site include:

- Majority of The North Tees Works Oil Refinery (and associated infrastructure including pipelines and storage tanks);
- Material Resource Facility (operated by N+P Group);
- Navigator North Tees Rail Terminal;
- Wilton Engineering Wharf; and
- Clarence Wharf.

15.3.6. Beyond the Site, other land uses within the Study Area include Port Clarence landfill site, Teesside Gas Processing Plant and chemical works.

### Access to Community Land and Assets and Terrestrial Businesses

15.3.7. **Chapter 16: Traffic and Transport (Volume 1)** provides further detail on the management of access. In the case of Abnormal Indivisible Loads (AIL) which cannot be broken down:

- Option 1 of the marine infrastructure options would require access initially onto a short section of public highway (Port Clarence Road north of the Middlesbrough Transporter Bridge) before transitioning onto the Heavy Haul Road; and
- Option 2 would only require the AIL to be driven to the SAF Plant Site utilising the Heavy Haul Road.

- 15.3.8. In both instances, traffic management measures would require short, temporary closures of public highways, however these are not anticipated to be frequent or prolonged. Further details on the movements of the AILs are outlined in **Chapter 2: Site and Proposed Scheme Description (Volume 1)**.
- 15.3.9. As such, it is considered that community land and assets and terrestrial businesses can be scoped out of this Population and Human Health PEIR Chapter, on the basis that access will be maintained to receptors throughout construction and operation. This is a commitment that will be outlined and secured in the OCoCP and Construction Traffic Management Plan (CTMP), with an Outline CTMP to be prepared and submitted as part of the ES.
- 15.3.10. The ES will confirm the worst case number of AILs and the types of vehicles required. Any mitigation measures required to facilitate the delivery of abnormal loads will be detailed in the ES and any resultant likely significant effects assessed within **Chapter 16: Traffic and Transport (Volume 1)**. The Population and Human Health Chapter of the ES will review this assessment, and should any residual significant effects be identified, the relevant receptor will be scoped in. This will ensure that any significant effects identified as a result of closures to the public highway will be considered in the context of community land and assets and terrestrial businesses.

## **15.4. ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA**

- 15.4.1. The assessment of the likely significant effects on Population and Human Health as a result of the Proposed Scheme has been undertaken in line with the legislation, policy and guidance described in **Section 15.2**.

### **POTENTIAL SIGNIFICANT EFFECTS**

- 15.4.2. The following potential significant effects during the Construction and Operational Phases of the Proposed Scheme have been scoped into this assessment:
- Construction phase:
    - Effects on walkers and cyclists;
    - Effects on terrestrial recreation; and
    - Effects on human health.
  - Operation phase:
    - Effects on businesses reliant upon access to the River Tees;
    - Effects on terrestrial recreation; and
    - Effects on human health.

## SENSITIVE RECEPTORS

- 15.4.3. The sensitive receptors for each of the topics scoped into the Population and Human Health assessment are detailed in **Section 15.5** and are outlined on the next page:
- Routes used by walkers and cyclists including publicly accessible routes and PRow;
  - Terrestrial recreational receptors and their users, e.g. RSPB Saltholme Nature Reserve; and
  - Businesses which require access to the River Tees in order to operate.
- 15.4.4. Human health focuses on the potential effects on vulnerable groups who are most likely to experience health impacts due to the nature of the Proposed Scheme, including:
- Children and young people;
  - Older people;
  - People with existing health conditions;
  - Unemployed and low-income groups; and
  - Socially excluded or isolated groups.

## METHOD OF BASELINE DATA COLLECTION

- 15.4.5. The assessment is qualitative and informed by desk-based study. This involves collating data from various online sources including:
- Google Maps<sup>20</sup>;
  - Stockton-on-Tees Borough Council Local Plan Map Inserts and Policies<sup>21</sup>;
  - Stockton-on-Tees Active Travel Hub<sup>22</sup>;
  - Official Census and Labour Market Statistics (NOMIS)<sup>23</sup>;
  - Fingertips Public Health Data<sup>24</sup>;
  - English Indices of Multiple Deprivation (IMD)<sup>25</sup>; and
  - Tees Joint Strategic Needs Assessment<sup>26</sup>.

## ASSESSMENT METHODOLOGY

- 15.4.6. The methodology for this Population and Human Health assessment has been defined using DMRB LA112 Population and Human Health 2020<sup>16</sup> and IEMA guidance on 'Determining Significance for Human Health in Environmental Impact Assessment'<sup>18</sup>. In addition, the assessment is guided by national planning policy and guidance, and adopted local plans (particularly the NPPF<sup>2</sup>, the Stockton-on-Tees Borough Council Local Plan<sup>4</sup> and the Redcar and Cleveland Borough Council Local Plan<sup>5</sup>), as well as past experience and professional judgement.
- 15.4.7. Assessments undertaken within the other Technical Chapters have informed the Population and Human Health assessment. These include **Chapter 5: Air Quality (Volume 1)**, **Chapter 6: Noise and Vibration (Volume 1)**, **Chapter 7: Terrestrial Ecology (Volume 1)**, **Chapter 9: Water Environment and Flood Risk (Volume 1)**, **Chapter 10: Landscape and Visual (Volume 1)**, **Chapter 14: Socio-economics**

(Volume 1), Chapter 16: Traffic and Transport (Volume 1), Chapter 17: Major Accidents and Disasters (Volume 1) and Chapter 18: Marine Navigation (Volume 1).

- 15.4.8. The preliminary assessment presented in this PEIR is based on the information available at the time of writing. The assessment covers construction and operational effects categorised as either: 'Land Use and Accessibility' or 'Human Health'. Further details on the methodologies of each aspect of the Population and Human Health assessment have been detailed below.

### **Land Use and Accessibility**

#### **Effects on Walkers and Cyclists (Construction Phase)**

- 15.4.9. Relevant receptors include PRoW and non-designated routes for walkers and cyclists, and the users of those routes that:
- are located within the DCO Application Boundary (the Site);
  - which have a direct means of access within the Site; and / or
  - which lie within the 500m Study Area of the Site (see **Section 15.5** for details on the relevant Study Area for each receptor).

- 15.4.10. The assessment has identified the impact on PRoW and non-designated routes according to accessibility restrictions/severance resulting in changes to journey length and changes to amenity and overall experience for users of those routes. For the purposes of this assessment, amenity is considered to be a combination of air quality and noise levels as well as visual amenity experienced by users. Therefore, the assessment has been informed by **Chapter 5: Air Quality (Volume 1)**, **Chapter 6: Noise and Vibration (Volume 1)**, and **Chapter 10: Landscape and Visual (Volume 1)**.

#### **Effects on Terrestrial Recreation (Construction and Operation Phases)**

- 15.4.11. Relevant receptors include community and recreational assets (e.g. parks and open spaces, nature reserves) and the users of those facilities that: are located within the Site; which have a direct means of access within the Site; or which lie within the 500m Study Area of the Site (see **Section 15.5** for details on the relevant Study Area for each receptor).
- 15.4.12. The assessment will identify accessibility restrictions/severance, changes to amenity for users, and the extent to which any terrestrial recreation facilities will be temporarily or permanently lost as a result of the Proposed Scheme. For the purposes of this assessment, amenity is considered to be a combination of air quality and noise levels as well as visual amenity experienced by users of these assets. Therefore, the assessment has been informed by **Chapter 5: Air Quality (Volume 1)**, **Chapter 6: Noise and Vibration (Volume 1)**, and **Chapter 10: Landscape and Visual (Volume 1)**.

### **Effects on businesses that rely on upon access to the River Tees (Operational Phase)**

- 15.4.13. Relevant receptors include any businesses that: are located within the Site; those which have a direct means of access within the Site; or which lie within the 500m Study Area of the Site (see **Section 15.5** for details on the relevant Study Area for each receptor).
- 15.4.14. The assessment has identified the access requirements for each business, potential for disruption to access/severance as a result of the Proposed Scheme, and any effects on the viability of these businesses and their operations as a result of the Proposed Scheme.

### **Human Health**

#### **Effects on Human Health (Construction and Operation Phases)**

- 15.4.15. There is potential for the Proposed Scheme to affect human health, with health determinants likely to include: air quality; noise; loss of visual amenity; changes to the opportunities for physical activity and recreation; flood risk; hazards and disasters; and changes to the availability of employment opportunities.
- 15.4.16. Specific human health effects have been assessed and detailed within **Chapter 5: Air Quality (Volume 1)**, **Chapter 6: Noise and Vibration (Volume 1)**, **Chapter 9: Water Environment and Flood Risk (Volume 1)**, **Chapter 10: Landscape and Visual**, **Chapter 14: Socioeconomics (Volume 1)**, and **Chapter 17: Major Accidents and Disasters (Volume 1)**. The outcomes of these individual assessments have been considered within this Population and Human Health assessment in order to inform the overall assessment of human health, in line with IEMA Guidance<sup>18</sup>.

### **SIGNIFICANCE OF EFFECT CRITERIA**

#### **Land Use and Accessibility Receptors**

- 15.4.17. The sensitivity criteria and magnitude of impact has been assigned according to **Table 15-2** and **Table 15-3** for land use and accessibility receptors: walkers and cyclists (construction); terrestrial recreation (construction and operation); and businesses reliant upon access to the River Tees (operation). The sensitivity criteria and magnitude of impact for human health is detailed separately in **Table 15-5** and **Table 15-6**.
- 15.4.18. The significance level attributed to each likely effect will be assessed based on the sensitivity of the affected receptor(s) and the magnitude of impact arising from the Proposed Scheme, in accordance with the criteria outlined in the DMRB LA 112 guidance.
- 15.4.19. In addition to the DMRB LA 112 criteria outlined in **Table 15-2** below, professional judgement and past experience of similar projects has also been considered, and effects will be assessed on the basis of:
- Consideration of sensitivity of receptors and their ability to respond to change;
  - Scope for adjustment or mitigation;
  - Magnitude of impact: This entails consideration of the size of the impact on receptors in the context of the area in which the effects will be experienced;

- Duration: This entails consideration of the duration of impact as either short, medium or long term. Impacts lasting less than a year are considered short term, impacts lasting between one and five years are considered medium term and impacts lasting five or more years are considered long term.
- Permanence: This involves identifying whether the impact will be permanent or temporary. Generally, impacts during the Construction Phase of the Proposed Scheme are considered temporary, and impacts during the Operation Phase of the Proposed Scheme are considered permanent.

15.4.20. For Land Use and Accessibility, the sensitivity criteria will be assigned based on Table 3-11 in the DMRB LA 112 guidance<sup>16</sup>. This categorises a receptor’s sensitivity as: very high; high; medium; low; and negligible and has been used to define sensitivity for Land Use and Accessibility receptors as outlined in **Table 15-2** below.

**Table 15-2: Sensitivity of Receptors (adapted from Table 3-11 in LA 112<sup>16</sup>)**

Sensitivity	Description
Very high	<p><b>Walkers, Cyclists, and Horse-riders (WCH):</b></p> <ul style="list-style-type: none"> <li>■ National trails and routes likely to be used for both commuting and recreation that record frequent (daily) use. Such routes connect communities with employment land uses and other services with a direct and convenient WCH route. Little/no potential for substitution.</li> <li>■ Routes regularly used by vulnerable travellers such as the elderly, school children and people with disabilities, who could be disproportionately affected by small changes in the baseline due to potentially different needs.</li> <li>■ Rights of way for WCH crossing roads at grade with &gt;16,000 vehicles per day.</li> </ul> <p><b>Terrestrial Recreation (where there is a combination of the following):</b></p> <ul style="list-style-type: none"> <li>■ Complete severance between communities and the land/assets, with little/no accessibility provision;</li> <li>■ Alternatives are only available outside the local planning authority area;</li> <li>■ The level of use is very frequent (daily); and</li> <li>■ The land/assets are used by the majority (&gt;=50%) of the community.</li> </ul> <p><b>Businesses reliant on the River Tees:</b></p> <ul style="list-style-type: none"> <li>■ Existing employment sites (excluding agriculture) and land allocated for employment (e.g. strategic employment sites) covering &gt;5ha</li> </ul>
High	<p><b>Walkers, Cyclists, and Horse-riders (WCH):</b></p> <ul style="list-style-type: none"> <li>■ Regional trails and routes (e.g. promoted circular walks) likely to be used for recreation and to a lesser extent commuting, that record frequent (daily) use. Limited potential for substitution; and/or</li> <li>■ Rights of way for WCH crossing roads at grade with &gt;8,000 - 16,000 vehicles per day.</li> </ul> <p><b>Terrestrial Recreation (where there is a combination of the following):</b></p> <ul style="list-style-type: none"> <li>■ There is substantial severance between community and assets, with limited accessibility provision;</li> </ul>

Sensitivity	Description
	<ul style="list-style-type: none"> <li>■ Alternative facilities are only available in the wider local planning authority area;</li> <li>■ The level of use is frequent (weekly); and</li> <li>■ The land and assets are used by the majority (<math>\geq 50\%</math>) of the community.</li> </ul> <p><b>Businesses reliant on the River Tees:</b></p> <ul style="list-style-type: none"> <li>■ Existing employment sites (excluding agriculture) and land allocated for employment (e.g. strategic employment sites) covering <math>&gt;1 - 5</math>ha</li> </ul>
Medium	<p><b>Walkers, Cyclists, and Horse-riders (WCH):</b></p> <ul style="list-style-type: none"> <li>■ Public rights of way for and other routes close to communities which are used for recreational purposes (e.g. dog walking), but for which alternative routes can be taken. These routes are likely to link to a wider network of routes to provide options for longer, recreational journeys, and / or 2); and</li> <li>■ Rights of way for WCH crossing roads at grade with <math>&gt;4000 - 8000</math> vehicles per day.</li> </ul> <p><b>Terrestrial Recreation (where there is a combination of the following):</b></p> <ul style="list-style-type: none"> <li>■ There is severance between communities and their land/assets but with existing accessibility provision;</li> <li>■ Limited alternative facilities are available at a local level within adjacent communities;</li> <li>■ The level of use is reasonably frequent (monthly); and</li> <li>■ The land and assets are used by the majority (<math>\geq 50\%</math>) of the community.</li> </ul> <p><b>Businesses reliant on the River Tees:</b></p> <ul style="list-style-type: none"> <li>■ Existing employment sites (excluding agriculture) and land allocated for employment (e.g. strategic employment sites) covering <math>&lt;1</math>ha</li> </ul>
Low	<p><b>Walkers, Cyclists, and Horse-riders (WCH):</b></p> <ul style="list-style-type: none"> <li>■ Routes which have fallen into disuse through past severance or which are scarcely used because they do not currently offer a meaningful route for either utility or recreational purposes, and/or; and</li> <li>■ Rights of way for WCH crossing roads at grade with <math>&lt;4,000</math> vehicles per day.</li> </ul> <p><b>Terrestrial Recreation (where there is a combination of the following):</b></p> <ul style="list-style-type: none"> <li>■ Limited existing severance between community and assets, with existing full Disability Discrimination Act 1995 compliant accessibility provision;</li> <li>■ Alternative facilities are available at a local level within the wider community;</li> <li>■ The level of use is infrequent (monthly or less frequent); and</li> <li>■ The land and assets are used by the minority (<math>\geq 50\%</math>) of the community</li> </ul> <p><b>Businesses reliant on the River Tees:</b></p> <ul style="list-style-type: none"> <li>■ N/A</li> </ul>
Negligible	<p><b>Walkers, Cyclists, and Horse-riders (WCH):</b></p>

Sensitivity	Description
	<ul style="list-style-type: none"> <li>■ N/A</li> </ul> <p><b>Terrestrial Recreation (where there is a combination of the following):</b></p> <ul style="list-style-type: none"> <li>■ No or limited severance or accessibility issues;</li> <li>■ Alternative facilities are available within the same community;</li> <li>■ The level of use is very infrequent (a few occasions yearly); and</li> <li>■ The land and assets are used by the minority (&gt;=50%) of the community.</li> </ul> <p><b>Businesses reliant on the River Tees:</b></p> <ul style="list-style-type: none"> <li>■ N/A</li> </ul>

15.4.21. For Land Use and Accessibility, magnitude of impact will be assigned according to Table 3.12 in the DMRB LA 112<sup>16</sup>. This categorises magnitude of impact as: Major; Moderate; Minor; Negligible; and No Change. The magnitude of change shall be reported in line with the criteria outlined in **Table 15-3** below.

**Table 15-3: Magnitude of Impact (adapted from Table 3-11 in LA 112<sup>16</sup>)**

Magnitude of Impact	Criteria
<b>Major</b>	<p><b>Walkers and Cyclists, and Horse-riders (WCH):</b></p> <ul style="list-style-type: none"> <li>■ Permanent loss/severance of an existing recreational or commuting route used by walkers and cyclists.</li> <li>■ Large scale reduction (adverse) or improvement (beneficial) to amenity value for users of the walking and cycling routes.</li> <li>■ &gt;500m increase (adverse) / decrease (beneficial) in WCH journey length.</li> </ul> <p><b>Terrestrial Recreation and Businesses Reliant on the River Tees:</b></p> <ul style="list-style-type: none"> <li>■ Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements, e.g. direct acquisition and demolition of buildings and direct development of land to accommodate the Proposed Scheme; and/or</li> <li>■ Introduction (adverse) or removal (beneficial) of complete severance with no/full accessibility provision.</li> </ul>
<b>Moderate</b>	<p><b>Walkers and Cyclists, and Horse-riders (WCH):</b></p> <ul style="list-style-type: none"> <li>■ Partial loss or noticeable reduction (adverse) or partial or noticeable improvement (beneficial) in amenity value for users of the walking and cycling routes.</li> <li>■ Disruption of a recreational or commuting route/resource</li> <li>■ &gt;250m - 500m increase (adverse) or decrease (beneficial) in WCH journey length.</li> </ul> <p><b>Terrestrial Recreation and Businesses reliant on the River Tees:</b></p> <ul style="list-style-type: none"> <li>■ Partial loss of/damage to key characteristics, features or elements, e.g. partial removal or substantial amendment to access or acquisition of land compromising viability of recreation asset; and/or</li> </ul>

Magnitude of Impact	Criteria
	<ul style="list-style-type: none"> <li>Introduction (adverse) or removal (beneficial) of severe severance with limited/moderate accessibility provision.</li> </ul>
Minor	<p><b>Walkers and Cyclists, and Horse-riders (WCH):</b></p> <ul style="list-style-type: none"> <li>Alteration of a recreational or commuting route/resource used by walkers and cyclists but with no significant increase in journey length/time. &gt;50m - 250m increase (adverse) or decrease (beneficial) in WCH journey length.</li> <li>Slight loss or reduction (adverse) or slight improvement (beneficial) in amenity value for users of the walker and cyclist route.</li> </ul> <p><b>Terrestrial Recreation and Businesses reliant on the River Tees:</b></p> <ul style="list-style-type: none"> <li>A discernible change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements, e.g. amendment to access or acquisition of land/waterway resulting in changes to operating conditions that do not compromise overall viability of recreation asset; and/or</li> <li>Introduction (adverse) or removal (beneficial) of severance with adequate accessibility provision.</li> </ul>
Negligible	<p><b>Walkers and Cyclists, and Horse-riders (WCH):</b></p> <ul style="list-style-type: none"> <li>Very minor change to recreational or commuting route/resource used by walkers and cyclists. &lt;50m increase (adverse) or decrease (beneficial) in WCH journey length.</li> <li>Very minor change in amenity value for users of the walker and cyclist route.</li> </ul> <p><b>Terrestrial Recreation and Businesses reliant on the River Tees:</b></p> <ul style="list-style-type: none"> <li>Very minor loss or detrimental alteration to one or more characteristics, features or elements, e.g. acquisition of non-operational land or waterways/buildings not directly affecting the viability of recreation asset; and/or very minor introduction (adverse) or removal (beneficial) of severance with ample accessibility provision.</li> </ul>
No Change	<ul style="list-style-type: none"> <li>No loss or alteration of characteristics, features, elements or accessibility; no observable impact in either direction.</li> </ul>

**Effect Significance for Land Use and Accessibility Receptors**

15.4.22. The significance of effect is derived by combining the assigned value (sensitivity) of receptors with the magnitude of change arising from the Proposed Scheme. DMRB LA 112<sup>16</sup> refers to DMRB LA 104<sup>27</sup> Table 3.8.1. for determining significance of effect. This categorises significance as the following:

- **Very Large:** Effects at this level are material in the decision-making process.
- **Large:** Effects at this level are likely to be material in the decision-making process.
- **Moderate:** Effects at this level can be considered to be material decision-making factors.

- **Slight:** Effects at this level are not material in the decision-making process.
- **Neutral:** No effects or those that are beneath levels of perception, within normal bounds of variation

15.4.23. The significance of effect will be determined using **Table 15-4** below.

**Table 15-4: Significance of Effect – Land Use and Accessibility**

		Magnitude				
		No Change	Negligible	Minor	Moderate	Major
Sensitivity	Very High	Neutral	Slight	Moderate or large	Large or very large	Very Large
	High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or large
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or moderate
	Negligible	Neutral	Neutral or Slight	Neutral or Slight	Neutral or Slight	Slight

15.4.24. As set out in **Chapter 3: Approach to EIA (Volume 1)**, effects that are classified as moderate or above are considered to be significant. Effects classified below moderate are considered to be not significant.

### Human Health

15.4.25. A health receptor’s sensitivity is based on its ability to experience a potential impact without incurring a substantial change to its health status. The IEMA Guidance<sup>18</sup> outlines health sensitivity methodology criteria which can be applied, based on the key considerations of what a population’s sensitivity is affected by, as outlined in **Table 15-5**.

15.4.26. The reporting of significance for human health, mental health and wellbeing differs from that outlined above in **Table 15-2**. This approach follows criteria set out in the IEMA 2022 Guidance on ‘Determining Significance for Human Health in Environmental Impact Assessment’<sup>18</sup>.

**Table 15-5: Human Health Sensitivity**

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

15.4.27. Magnitude describes the ‘severity’ of the experience of impact for a health receptor. The IEMA Guidance ‘Determining Significance In Health Impact Assessment’<sup>18</sup> outlines criteria on determining magnitude, noting that *“information on exposure, scale, frequency, duration and population extent are likely to come from other EIA topic Chapters or the project descriptions”*. Criteria for determining health magnitude are outlined in **Table 15-6**.

**Table 15-6: Human Health Magnitude of Impact**

Magnitude	Criteria
<b>High</b>	High exposure or scale; long term duration; continuous frequency; severity predominantly related to mortality or changes in morbidity (physical or mental health) for very severe illness/ injury outcomes; majority of population affected; permanent change; substantial service quality implications.

Magnitude	Criteria
Medium	Low exposure or medium scale; medium term duration; frequent events; severity predominantly related to moderate changes in morbidity or major change in quality-of-life; large minority of population affected; gradual reversal; small service quality implications.
Low	Very low exposure or small scale; short term duration; occasional events; severity predominantly related to minor change in morbidity or moderate change in quality-of-life; small minority of population affected; rapid reversal; slight service quality implications.
Negligible	Negligible exposure or scale; very short term duration; one-off frequency; severity predominantly relates to a minor change in quality-of-life; very few people affected; immediate reversal once activity complete; no service quality implication.

15.4.28. The IEMA Guidance<sup>18</sup> notes that human health significance should apply professional judgement supported by evidence to determine what a project means for public health, and “*what it means for a change triggered by the project to be ‘important’, ‘desirable’ or ‘acceptable’ for public health*”.

15.4.29. For human health, applying a matrix of sensitivity and magnitude helps to identify if there is “*a relevant population (the sensitive receptor) and if there is a relevant project change to a health determinant (magnitude of impact)*”. Applying this approach, the IEMA matrix for the significance of a human health effect is outlined in **Table 15-7**.

**Table 15-7: Human Health Significance Matrix**

Magnitude	Sensitivity			
	High	Medium	Low	Very Low
High	Major	Major/ Moderate	Moderate/ Minor	Minor/ Negligible
Medium	Major/ Moderate	Moderate	Minor	Minor/ Negligible
Low	Moderate/ Minor	Minor	Minor	Negligible
Negligible	Minor/ Negligible	Minor/ Negligible	Negligible	Negligible

15.4.30. The IEMA Guidance<sup>18</sup> outlines reasoning for significance conclusions which will be considered as part of the Human Health assessment. It notes that “*major or moderate effects are considered to be significant and minor or negligible are considered to be not significant*”; this aligns with the approach used for Land Use and Accessibility receptors outlined above, and the methodology in **Chapter 3: Approach to EIA (Volume 1)**.

## 15.5. STUDY AREA

15.5.1. The Study Area for land use and accessibility, and human health is detailed below for each element of the assessment.

- 15.5.2. The Study Areas for land use and accessibility have been defined using the DMRB guidance Volume 11, Section 3, Part 6, LA 112 Population and Human Health<sup>16</sup>, where appropriate. The Study Area for human health has been informed by the IEMA guidance on 'Effective Scoping of Human Health in Environmental Impact Assessment'<sup>28</sup>.
- 15.5.3. The relevant Study Areas outlined below are shown on **Figure 15-1 (Volume 2)**.

## **LAND USE AND ACCESSIBILITY**

### **Businesses which rely upon access to the River Tees**

- 15.5.4. The Study Area encompasses the stretch of River Tees within the Site as well as any area that extends beyond the Site where changes to navigation could affect business operations (see **Chapter 18: Marine Navigation (Volume 1)** for further details).

### **Walkers and Cyclists**

- 15.5.5. The Study Area includes those PRow located within the Site as well as those located within a 500m Study Area around the Site Boundary, as well as any PRow or routes beyond this catchment where a change to accessibility or amenity may be experienced by walkers and cyclists.

### **Terrestrial Recreation**

- 15.5.6. The Study Area includes recreational facilities located within 500m of the Site Boundary, those which have a direct means of access within the Site, and any areas used for terrestrial recreation beyond the Study Area which may be affected by a change in accessibility or amenity which could be experienced by users.

## **HUMAN HEALTH**

- 15.5.7. Whilst there is no specifically defined Study Area for human health, the IEMA guidance on 'Effective Scoping of Human Health in Environmental Impact Assessment'<sup>28</sup> notes that health effects vary between geographical areas and that the geographical scope for health assessment should consider "*where there are likely and potentially significant site and local area effects...and focus on areas where the project would exert most influence*"<sup>18</sup>, this is known as the Zone of Influence. In line with this, the Study Area for the human health assessment has been determined by the extent and characteristics of the Proposed Scheme, and the communities directly and indirectly affected by the Proposed Scheme. The smallest jurisdiction boundaries for the Proposed Scheme are Lower Layer Super Output Areas (LSOA) which lie within or adjacent to the Site Boundary.
- 15.5.8. Where possible, LSOAs form the basis of the Study Area for health because they are the communities that are most likely to experience direct and/or the greatest impacts. Where data is unavailable at an LSOA level, ward level data has been used.
- 15.5.9. The various geographical area profiles used to determine a baseline for human health and provide a comparison are as follows:
- **National:** England;

- **Regional:** Northeast of England;
- **County:** Durham;
- **Boroughs:** Stockton-on-Tees and Redcar and Cleveland;
- **Wards:** Billingham South ward, South Bank ward, and Dormanstown ward; and
- **LSOA:** Stockton-on-Tees 003B, Redcar and Cleveland 003D, and Redcar and Cleveland 003E.

## **15.6. BASELINE CONDITIONS AND FUTURE BASELINE**

15.6.1. The key sources of information uses for the baseline review of land use and accessibility, and human health are:

- Google Maps<sup>20</sup>;
- Stockton-on-Tees Borough Council Local Plan Map Inserts and Policies<sup>21</sup>;
- Redcar and Cleveland Borough Council Local Plan Map<sup>29</sup>;
- Redcar and Cleveland Borough Council Open Space Assessment<sup>30</sup>;
- Stockton-on-Tees Active Travel Hub<sup>22</sup>;
- Official Census and Labour Market Statistics (NOMIS)<sup>23</sup>;
- Fingertips Public Health Data<sup>24</sup>;
- English Indices of Multiple Deprivation (IMD)<sup>25</sup>; and
- Tees Joint Strategic Needs Assessment<sup>26</sup>.

### **LAND USE AND ACCESSIBILITY**

#### **Businesses which require access to the River Tees**

15.6.2. At the time of writing this PEIR Chapter, there are 21 businesses located within the Study Area (500m) of the Proposed Scheme that rely on access to the River Tees in order to operate. These are:

- Wilton Group – within the Site (occupying a site of approximately 0.4ha);
- N+P Subcoal Production Teeside – within the Site (occupying a site of approximately 20.3ha);
- North Tees Limited - within the Site (occupying a site of less than 0.1ha);
- BOC Teeside Hydrogen - within the Site (occupying a site of approximately 1ha);
- Sabic – North Tees Work – with the Site (occupying a site of approximately 20ha);
- Navigator Terminals Seal Sands Limited – adjacent to the Site to the east (occupying a site of approximately 18.2ha);
- Greenergy Biofuels Teeside – adjacent to the Site to the west (occupying a site of approximately 4.8ha);
- P&O Ferry Terminal adjacent to the southwest of the Site (occupying a site of approximately 35ha);
- Exololum, Seal Sands – approximately 50m to the north (occupying a site of approximately 30ha);

- KD Pharma UK Ltd. – approximately 60m to the north (occupying a site of approximately 7ha);
- Lianhetech Seal Sands (chemical manufacture) - approximately 60m to the north (occupying a site of approximately 16ha);
- Teeside Gas Processing Plant – approximately 75m to the north (occupying a site of approximately 11ha);
- Port of Middlesbrough – approximately 200m south (occupying a site of approximately 10.2ha);
- ABLE Ports - approximately 220m south (occupying a site of approximately 8.1ha);
- Svitzer Marine - approximately 220m south (occupying a site of approximately 1.8ha);
- Teesport Docks - approximately 260m to the southwest (occupying a site of approximately 17ha)
- Conoco Phillips (oil and gas) – approximately 280m to the northwest (occupying a site of approximately 60ha);
- Tarmac Cochranes Wharf Marine Aggregates and Breedon Aggregates – approximately 350m southeast (occupying a site of approximately 4.8ha);
- Heidelberg Materials Ready-mixed Concrete - approximately 350m east (occupying a site of approximately 40ha);
- MP Storage and Blending - approximately 430m southeast (occupying a site of approximately 2.3ha);
- A&P Tees - approximately 470m southeast (occupying a site of approximately 7.1ha); and
- Teeside Docks - approximately 500m east (occupying a site of approximately 27.1ha).

15.6.3. Further research on the usage of the river by these companies, including the frequency and type of access, will be incorporated into the ES. This will include information from the Navigational Risk Assessment which will incorporate data on river usage and vessel movements from the Port Authority.

#### **Walkers, Cyclists and Horse-riders**

- 15.6.4. There are eight PRoWs within the Study Area, including five footpaths and one bridleway (116/9/2). These can be seen in **Figure 15-1 (Volume 2)**. The footpaths are located parallel to the Northern Rail line on the eastern side of the River Tees. Footpaths 116/31/1, 116/31/2, and 116/31/3 are located within the Site Boundary adjacent to the Northumbrian Water's Bran Sands Wastewater Treatment Works (WWTW). Footpaths 116/31/2, and 116/31/3 are also intersected by Tees Dock Road, within the Site Boundary.
- 15.6.5. Outside of the Site Boundary, footpaths 102/2A/2 and 102/2A/1 run parallel to the Teesport Docks and Tees Dock Road.
- 15.6.6. Within the Study Area, the England Coast Path runs to the east, south and west, which can be seen in **Figure 15-1 (Volume 2)**. This section of the England Coast Path is part

of a ten-mile route from Newport Bridge to North Gare which opened in 2019 to provide increased access to the Tees Valley coastline<sup>31</sup> and is of national significance. This route is also part of the 9.3km long North Tees Trail walking route from Port Clarence to Seal Sands<sup>32</sup>.

- 15.6.7. To the east of the Study Area, the England Coast Path runs in parallel to the Northern Railway line following Trunk Road and Tees Dock Road, adjacent to the Site Boundary. Due to the higher elevation of the England Coast Path, compared to the access road (Tees Dock Road) within the Site Boundary, the Site Boundary does not intersect the England Coast Path.
- 15.6.8. To the west of the Study Area, the England Coast Path runs adjacent to the western edge of the Site Boundary on the A178 Seaton Carew Road, passing the RSPB Saltholme Nature Reserve.
- 15.6.9. The Teesdale Way, a 92-mile walk from Cumbria to North Yorkshire<sup>33</sup>, is also located to the east and south of the Study Area. This can be seen in **Figure 15-1 (Volume 2)**. To the east, the Teesdale Way runs almost parallel to the England Coast Path and Trunk Road. The Teesdale Way is intersected by the access road (Tees Dock Road) within the Site Boundary. To the south of the Study Area, the Teesdale Way runs along Dockside Road and Vulcan Street following the River Tees.
- 15.6.10. There are two National Cycle Network (NCN) Routes (NCN Route 1 and NCN Route 65) within the Study Area. These can be seen in **Figure 15-1 (Volume 2)**. NCN Route 1 runs to the south of the Study Area and the River Tees, along Vulcan Street and Riverside Park Road, and NCN Route 65 runs to the south via Cleveland Street. There are no further PROWs or walking and cycling routes identified within the 500m Study Area.
- 15.6.11. Information on the usage levels of these routes will be obtained through consultation with Stockton-on-Tees Borough Council and incorporated as part of the ES baseline. Notably, it was reported by Natural England that only 6% of the annual users of the English Coastal Paths network visited those located in the North East in 2017<sup>34</sup>.

### **Terrestrial Recreation**

- 15.6.12. Within the Study Area, the RSPB Saltholme Nature Reserve is located adjacent to the Site to the west, see **Chapter 7: Terrestrial Ecology (Volume 1)** for more information. The associated Dorman's Pool Nature Reserve is surrounded by the Site on all sides, situated off Huntsman's Drive. The RSPB Saltholme Nature Reserve is classified by the RSPB as being a popular family friendly wetland, which includes a visitor centre, hides, family discovery zone, café, play area, and accessible trails<sup>35</sup>. The Reserve and bird hides have direct views looking eastwards onto the Site.
- 15.6.13. The Dorman's Pool Nature Reserve is for the exclusive use of RSPB members and Teesmouth Bird Club members. Further information on the usage levels of these nature reserves and their importance as terrestrial recreational facilities will be obtained through consultation with Stockton-on-Tees Borough Council and incorporated as part of the ES baseline.

## HUMAN HEALTH

### Population

15.6.14. As of 2021<sup>a</sup>, Billingham South ward had a population of 7,900, South Bank ward had a population of 5,400, and Dormanstown ward had a population of 4,643. This compares with populations in the Stockton-on-Tees and Redcar and Cleveland boroughs of 196,600 and 136,536 people respectively<sup>36</sup>. By 2024, it is expected that the population of Stockton-on-Tees will have risen by 2% to 201,186 people and in Redcar and Cleveland by 2.2% to 139,565 people<sup>37</sup>.

### **Age Breakdown**

15.6.15. The population distribution by age group for Billingham South ward, South Bank ward, and Dormanstown ward is outlined in **Table 15-8**. The population distribution for the boroughs of Stockton-on-Tees and Redcar and Cleveland (in which the Proposed Scheme is located), and County Durham, the North East, and England is also presented for comparison. Overall, Billingham South, South Bank and Dormanstown has a population age profile that is similar to both regional and national averages. However, the Billingham South ward has the lowest working age population (16-64 years) compared to the other jurisdictions at 59.7%, and Dormanstown has a higher proportion of elderly people (65+) at 20.8% compared to the regional (20.4%) and national (18.4%) averages. South Bank ward has the lowest elderly population of 13.6%.

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<sup>a</sup> The most recently available data at the time of writing.

**Table 15-8: Population distribution (%) by age group at ward, borough, county, regional, and national level in 2021**

<b>Age group (years)</b>	<b>Billingham South ward</b>	<b>South Bank ward</b>	<b>Dormanstown ward</b>	<b>Stockton-on-Tees</b>	<b>Redcar and Cleveland</b>	<b>County Durham</b>	<b>North East</b>	<b>England</b>
	<b>Proportion (%)</b>	<b>Proportion (%)</b>	<b>Proportion (%)</b>	<b>Proportion (%)</b>	<b>Proportion (%)</b>	<b>Proportion (%)</b>	<b>Proportion (%)</b>	<b>Proportion (%)</b>
<b>0-15</b>	19.4	23.1	20.1	19.6	16.6	16.9	17.7	18.5
<b>16-24</b>	8.8	10.0	10.2	9.1	10.0	11.3	10.7	10.6
<b>25-64</b>	50.9	53.4	50.5	52.4	50.1	50.5	51.2	52.4
<b>65-84</b>	18.5	12.3	17.1	16.2	20.5	18.9	17.9	16.0
<b>85+</b>	2.3	1.3	2.0	2.2	2.8	2.5	2.5	2.4

**Health and Wellbeing**

15.6.16. Overall, the health of the Billingham South, South Bank and Dormanstown wards are similar to the health indicators at a borough, regional and national level. However, the wards of Billingham South, South Bank, and Dormanstown has a higher percentage of obese children in both Reception Year and Year 6 compared to national averages. Data also shows that compared to the national averages residents of these three wards account for significantly higher emergency hospital admissions for coronary heart disease, emergency admissions for chronic obstructive pulmonary disease (COPD), deaths from respiratory disease, limiting long term illness and disability.

**Table 15-9: Indicators of population health for Billingham South, Dormanstown, the North East, and England<sup>38</sup>**

Indicator	Indicator value	Period	Billingham South	South Bank	Dormanstown	Stockton-on-Tees	Redcar and Cleveland	North East	England
<b>Life expectancy at birth for males</b>	Years	2016 – 2020	77.7	73.0	74.4	78.2	77.6	77.1	79.5
<b>Life expectancy at birth for females</b>	Years	2016 – 2020	79.5	75.2	80.9	81.3	81.5	82.8	83.2
<b>Obese children (Reception Year)</b>	%	2019/20 – 2021/22	14.3	14.0	16.1	9.8	12.0	11.4	9.9
<b>Obese children (Year 6)</b>	%	2019/20 – 2021/22	25.0	30.4	30.3	22.4	24.1	26.6	21.6
<b>Emergency hospital admissions for coronary heart disease</b>	Standardised admission ratio	2016/17 – 2020/21	160.6	115.4	134.9	153.7	94.0	153.7	100
<b>Deaths from coronary heart disease</b>	Standardised mortality ratio	2016 – 2020	119.7	166.3	154.4	111.1	116.4	111.1	100
<b>Emergency admissions for COPD</b>	Standardised admission ratio	2016/17 – 2020/21	176.4	336.0	233.1	158.1	150.3	159.1	100

Indicator	Indicator value	Period	Billingham South	South Bank	Dormanstown	Stockton-on-Tees	Redcar and Cleveland	North East	England
<b>Deaths from respiratory disease</b>	Standardised mortality ratio	2016 – 2020	142	177.7	169.7	112.9	119.3	112.9	100
<b>Deaths from all cancer (all ages)</b>	Standardised mortality ratio	2016 – 2020	113.4	168.2	165.4	113.0	112.0	110.9	100

### **Disability**

- 15.6.17. In Billingham South, 21.7% of people reported having a limiting long-term illness or disability. This is higher than the Stockton-on-Tees and England average of 19% and 17.6%, respectively. In Dormanstown, 25.1% of people have reported having a limiting long-term illness or disability. In South Bank, there is a lower percentage of people reported as having a limiting long-term illness or disability at 22.7%, which is in line with the Redcar and Cleveland average of 22.7%<sup>39</sup>.
- 15.6.18. Of the proportion of the population in Stockton-on-Tees, 9.1% of people feel limited a lot by their long-term condition or disability, and 11.0% feel limited a little<sup>40</sup>. In Redcar and Cleveland 10.1% of the population feel limited a lot by their long-term condition or disability, and 11.3% of people feel limited a little.

### **Physical Activity**

- 15.6.19. In Stockton-on-Tees, only 67% of adults are classified as physically active compared to 25% of adults who are physically inactive. In Redcar and Cleveland, 65.4% are classified as physically active compared to 25.2% who are physically inactive<sup>41</sup>. This is in line with the physical activity levels in the northeast region. Levels of walking and cycling in the local authority areas are lower than the national average. In Stockton-on-Tees and Redcar and Cleveland only 9.7% and 10.7% of adults walk for travel, respectively, whereas only 1% and 1.6% cycle for travel, respectively. This is compared to the national average of 15.1% and 2.3% respectively<sup>41</sup>.
- 15.6.20. In children, this figure lessens. Only 56.7% of children and young people are classified as physically active in Stockton-on-Tees. At the time of writing, there was not enough data for Redcar and Cleveland, for any figure to be representative. While this figure is low, it remains significantly higher than both the regional and national averages, both at 47.2%<sup>41</sup>.

### **Mental Health**

- 15.6.21. The Small Area Mental Health Index (SAMHI) is a composite annual measure of population mental health for each LSOA in England. The SAMHI combines data on mental health from multiple sources (NHS-Mental health-related hospital attendances, Prescribing data – Antidepressants, Quality and Outcomes Framework (QOF) - depression, and Department for Work and Pensions (DWP) - Incapacity Benefit and Employment and Support Allowance for mental illness) into a single index<sup>42</sup>. Stockton-on-Tees, Billingham South, South Bank and Dormanstown are all classified as 10; the lowest possible score. The North East region also receives low scores overall ranging from a score 6 to 10<sup>42</sup>.
- 15.6.22. In the population aged over 16 in Stockton-on-Tees and Redcar and Cleveland, mental health disorder prevalence is 17% and 18.1%, respectively. The suicide rate in Stockton-on-Tees is 12.5 per 100,000 people, compared to 18.3 per 100,000 people in Redcar and Cleveland. The rate is significantly higher for men (40 per 100,000 people, and 29.5 per 100,000 people, respectively) than women (12 per 100,000 people, and 8 per 100,000 people, respectively). This is in line with national averages and marginally higher than the regional figure<sup>43</sup>.

### **Deprivation**

- 15.6.23. The Index of Multiple Deprivation (IMD) is the official measure of relative deprivation for small neighbourhoods in England. The IMD is used by local governments to focus programmes in the most deprived areas and develop strategies.
- 15.6.24. The overall IMD ranking for Stockton-on-Tees Borough Council is 113 out of 317 local authorities in England. Redcar and Cleveland Borough Council has a IMD ranking of 62, where 1 is the most deprived. Within Stockton-on-Tees Borough Council, there are 120 Lower Super Output Areas (LSOAs) compared to 88 LSOAs in Redcar and Cleveland
- 15.6.25. All LSOAs within the Study Area fall within the top 10% most deprived LSOAs in the country.

## **FUTURE BASELINE**

### **Land Use and Accessibility**

- 15.6.26. Existing terrestrial businesses are anticipated to remain operational in the future baseline, however it is acknowledged that market fluctuations and economic factors cannot be predicated which may lead to some businesses relocating or closing. The baseline will be updated and presented in the ES stage. However, the terrestrial recreational uses and WCH routes within the Study Area are likely to remain in line with their current baseline states.

### **Human Health**

- 15.6.27. Between 2018 and 2043, the population of Stockton-on-Tees and Redcar and Cleveland is anticipated to increase by 2% and 4.3%, respectively, whereas the population for England is anticipated to increase by 10% in the same period<sup>44</sup>. Notably, the over 65 years population is projected to increase 46% between 2018 and 2043 within Stockton-on-Tees, and 35% for Redcar and Cleveland<sup>45</sup>. This growth is likely to place additional pressure on existing services, particularly healthcare, and require additional housing, facilities, services and infrastructure.
- 15.6.28. Despite the projected population growth and demographic changes, these factors are not considered likely to change the overall assessment outcome, however, the baseline will be updated and presented at the ES stage.

## **15.7. EMBEDDED DESIGN, MITIGATION AND ENHANCEMENT MEASURES**

- 15.7.1. This section sets out the embedded design, mitigation and enhancement measures which are relevant to the Population and Human Health assessment.

### **CONSTRUCTION**

- Commitment to maintain access as far as reasonably practical for PRoWs/National Trails during construction;
- A CTMP (and an Outline CTMP will be prepared and submitted as part of the ES) will be implemented to minimise effects on vehicular travellers and their access

between community facilities (**Chapter 16: Traffic and Transport (Volume 1)**); and

- Good practice measures will be outlined within the OCoCP submitted alongside the ES in order to avoid conflict with WCHs, local residents and recreation facilities and ensure impacts from construction dust, noise and traffic are managed appropriately.

## OPERATION

- The Proposed Scheme will embed best practice for the minimisation and control of emissions throughout the SAF production and energy generation process through the incorporation of emission control techniques as detailed in **Chapter 5: Air Quality (Volume 1)**;
- Up to 100% of imports of feedstock, and export of SAF and naphtha will be transferred by rail or marine infrastructure. This reduces the volume of import and export using road transport, thereby reducing the noise impact of development generated road traffic. This is detailed in **Chapter 6: Noise and Vibration (Volume 1)**;
- Tree and shrub planting will be provided to aid visual assimilation and screen lower level ancillary elements of the Proposed Scheme. More details can be found in **Chapter 10: Landscape and Visual (Volume 1)**;
- Navigation management measures, detailed in **Chapter 18: Marine Navigation (Volume 1)**, will be implemented during operation of the Proposed Scheme to minimise navigation disruption to users of the River Tees;
- The Outline Environmental Management Plan (OEMP) (prepared prior to the Proposed Scheme becoming operational) will ensure that adverse effects are avoided/reduced where practicable. This will be secured via a requirement in the DCO;
- An Outline Emergency Preparedness and Response Plan (OEPRP) for Operational Phase emergency preparedness and response planning will be submitted as part of the application for development consent. More details can be found in **Chapter 17: Major Accidents and Disasters (Volume 1)**; and
- Embedded mitigation measures from; **Chapter 9: Water Environment and Flood Risk (Volume 1)**; **Chapter 14: Socioeconomics (Volume 1)**; and **Chapter 16: Traffic and Transport (Volume 1)**; are also relevant to Population and Human Health.

## 15.8. SENSITIVE RECEPTORS

- 15.8.1. The sensitivity of a population encompasses their ability to withstand exposures and the range of associated impacts or effects, and the physiological and socio-economic factors that increase their susceptibility to the exposure. The key sensitive receptors are outlined in **Table 15-10**, with those related to Land Use and Accessibility reported from **negligible to very high**. The sensitivity of health receptors is reported differently to Land use and Accessibility. As outlined in IEMA Health Impact Assessment Guidance<sup>28</sup>, populations may have varying levels of sensitivity that result in greater beneficial or

adverse health effects compared with the baseline. The key sensitive receptors for human health are reported as either **very low**, **low**, **medium** or **high** as outlined in **Table 15-10**.

15.8.2. Using the baseline information set out in **Section 15.5**, the sensitivity of the receptors for each topic within the 500m Study Area is detailed below:

**Table 15-10: Summary of Sensitive Receptors**

<b>Topic</b>	<b>Sensitive Receptors</b>	<b>Sensitivity</b>	<b>Justification</b>
<b>Businesses reliant upon access to the River Tees</b>	N+P Subcoal Production Teeside Industrial Chemicals Limited Navigator Terminals Seal Sands Limited Port of Middlesbrough ABLE Ports Heidelberg Materials Ready-mixed Concrete A&P Tees	Very high	Existing employment site covers >5ha
	BOC Teeside Hydrogen Greenergy Biofuels Teeside Svitzer Marine Tarmac Cochranes Wharf Marine Aggregates and Breedon Aggregates MP Storage and Blending	High	Existing employment site covers >1-5ha
<b><u>Walkers, Cyclists and Horse-riders</u></b>	England Coast Path (incorporating North Tees Trail) Teesdale Way NCN Route 1 NCN Route 65	High	These NCN routes have regional and national significance and are likely to be used on a regular (daily) basis.
	Footpaths 116/31/1, 16/31/2, 116/31/3, 102/2A/2, 102/2A/1, 102/2/3 and 102/2/2	Medium	These PRow are footpaths are designated and likely to be used regularly (daily) by local residents and commuters, however do not have regional or national significance.
<b>Terrestrial recreation</b>	RSPB Saltholme Nature Reserve	High	Frequent (daily) level of use by RSPB members and the general public, no similar alternative facilities in the

Topic	Sensitive Receptors	Sensitivity	Justification
			vicinity, likely to be accessed by visitors within and beyond the local area.
	Dorman's Pool Nature Reserve	High	Frequent (daily) level of use, restricted for exclusive use of RSPB members and Teesmouth Bird Club members
	Wilton Group North Tees Limited	Medium	Existing employment site covers <1ha.
<b>Human health</b>	The local population within the Billingham South, South Bank, and Dormanstown wards <sup>b</sup> .	High	The overall health of the local population at ward level is deemed to be poor, with many health indicators in the locality ranking worse than the national average.

## 15.9. PRELIMINARY ASSESSMENT OF LIKELY IMPACTS AND EFFECTS

15.9.1. This Section details the preliminary assessment of predicted impacts and effects for the DCO Proposed Scheme during both the Construction and Operation Phases.

### CONSTRUCTION PHASE

#### Walkers, Cyclists and Horse-riders

15.9.2. The England Coast Path (incorporating the North Tees Trail) and the Teesdale Way, and footpaths 116/31/1, 116/31/2, and 116/31/3 are located within the Site Boundary.

15.9.3. There are also two other PRowWs, footpaths 102/2A/2 and 102/2A/1, within the eastern side of the 500m Study Area.

15.9.4. Footpaths 116/31/1, 116/31/2, and 116/31/3 are located adjacent to the Northumbrian Water Bran Sands WWTW and are intersected by Tees Dock Road, which will be used as an access road during construction. Construction works in this area of the Site will involve the connection of the Proposed Scheme to an existing pipeline tunnel that passes beneath the River Tees to the Northumbrian Water Bran Sands WWTW. Due to these minor works, it is anticipated that footpaths 116/31/1, 116/31/2, and 116/31/3 will remain open during the construction phase and will not be diverted as a result of construction works.

<sup>b</sup> For human health the local population is deemed to be the sensitive receptor, rather than individuals. This is in line with IEMA's Guidance on 'Determining Significance for Human Health in Environmental Impact Assessment'<sup>18</sup>

- 15.9.5. **Chapter 16: Traffic and Transport (Volume 1)** has omitted these footpaths from their Study Area due to the limited number of vehicle movements forecast during the wastewater pipeline connection works. Therefore, construction works here are unlikely to give rise to a change in the amenity value of these PRoW for users, taking in consideration of the embedded mitigation measures of the OCoCP. Therefore, these footpaths will not be affected by the Proposed Scheme. As such, the magnitude of change for footpaths 116/31/1, 116/31/2, and 116/31/3 is negligible. The sensitivity of these routes is considered to be medium. Therefore, there is anticipated to be a Slight Adverse (not significant) temporary, medium term effect on the users of these PRoW.
- 15.9.6. There are two NCN routes located approximately 235m southwest across the River Tees along Vulcan Street (NCN1) and Durham Street (NCN65). Due to the location of these NCN routes, they will not be disrupted or diverted as a result of construction works, and the amenity value for cyclists will not be affected by the Proposed Scheme. As such, the magnitude of change for the two NCNs is negligible. The sensitivity of these routes is considered to be high. Therefore, there is anticipated to be a Slight Adverse (not significant) temporary, medium term effect on the users of the NCN routes.
- 15.9.7. The England Coast Path (and North Tees Trail) runs in parallel to the Northern Railway line following Trunk Road and Tees Dock Road, adjacent to the east of the Site Boundary, adjacent to the Site Boundary to the south along Port Clarence Road, and to the west of the Site Boundary along the A178 Seaton Carew Road. The Teesdale Way follows a similar route for the sections which fall within the Study Area. On the basis of the current design of the Proposed Scheme, it is not envisaged that construction phase works will require any stopping up or diversion of this section of the England Coast Path or Teesdale Way. However, there is likely to be some disturbance to amenity along this section of the England Coast Path and Teesdale Way due to the increase in construction traffic and construction related noise, in particular if the Option 1 (utilising Wilton Engineering Wharf) is required, where a short section of the public highway will be used for marine transport.
- 15.9.8. This assessment has considered **Chapter 5: Air Quality (Volume 1)**, **Chapter 6: Noise and Vibration (Volume 1)**, and **Chapter 10: Landscape and Visual (Volume 1)** in order to understand how these topic effects may affect users of the England Coast Path (North Tees Trail) and Teesdale Way due to a loss of amenity. The findings from these Chapters are as follows:

**Table 15-11: Walkers, Cyclists and Horse-riders consideration of Air Quality, Noise and Vibration and Landscape and Visual effects.**

Technical Topic / Chapter	Details
<p><b>Chapter 5: Air Quality (Volume 1)</b></p>	<p>This Chapter outlines that a detailed assessment of air quality and dust emissions associated with construction road traffic, marine vessel, and non-road mobile machinery (NRMM) movements will be provided in the ES when baseline data collection has been completed. Emissions associated with Dust, PM10 and PM2.5 are not anticipated to be significant with embedded mitigation measures in place as part of the OCoCP.</p>
<p><b>Chapter 6: Noise and Vibration (Volume 1)</b></p>	<p>This Chapter outlines that the assessment of construction traffic noise will be undertaken and reported in the ES. The Chapter identifies that with embedded mitigation measures in place as part of the OCoCP, preliminary assessment of the construction of the Proposed Scheme has the potential to result in significant noise and vibration impacts from Heavy Haul Road construction and associated activities.</p>
<p><b>Chapter 10: Landscape and Visual (Volume 1)</b></p>	<p>This Chapter identifies that with embedded mitigation measures in place as part of the OCoCP, the likely visual effects for users of the England Coast Path (North Tees Trail) could be significant, however for Teesdale Way users is likely to be not significant.</p>

15.9.9. Whilst it is envisaged that the England Coast Path (and North Tees Trail) and Teesdale Way will remain open during construction, due to their proximate location there is the potential for construction works to give rise to a change in the amenity value for users, who may therefore be affected by the Proposed Scheme. As such, the magnitude of change for the users of the England Coast Path (North Tees Trail) and Teesdale Way is considered to be moderate. The sensitivity of England Coast Path (North Tees Trail) and Teesdale Way is considered to be high. Therefore, there is anticipated to be a Moderate Adverse (significant) temporary, medium term effect on the users of these routes.

**Terrestrial recreation**

15.9.10. The Proposed Scheme is adjacent to the RSPB Saltholme Nature Reserve. The associated Dorman’s Pool Nature Reserve is surrounded by (but excluded from) the Site Boundary, situated off Huntsman’s Drive. The sensitivity of RSPB Saltholme Nature Reserve is considered to be high as the reserve provides a regionally important area for recreation and tourism. The sensitivity of Dorman’s Pool Nature Reserve is also considered to be high, as whilst it is only accessible to RSPB members, frequency of

use is also anticipated to be regular given the significant number of RSPB members in the UK.

- 15.9.11. During construction, there is likely to be a loss of amenity for users of both nature reserves due to an increase in construction traffic and construction related activities. It is currently envisaged that both nature reserves will remain open and accessible during construction, however construction activity may give rise to a loss of amenity for users and therefore reduce the enjoyment of people using the nature reserves.
- 15.9.12. This assessment has considered **Chapter 5: Air Quality (Volume 1)**, **Chapter 6: Noise and Vibration (Volume 1)**, and **Chapter 10: Landscape and Visual (Volume 1)** in order to understand how these topic effects may inhibit users of the nature reserves due to a loss of amenity. The findings from these Chapters are as follows:

**Table 15-12: Terrestrial Recreation consideration of Air Quality, Noise and Vibration and Landscape and Visual effects.**

Technical Topic / Chapter	Details
<b>Chapter 5: Air Quality (Volume 1)</b>	A detailed assessment of air quality and dust emissions associated with construction road traffic, marine vessel, and non-road mobile machinery (NRMM) movements will be provided in the ES when baseline data collection has been completed. Emissions associated with Dust, PM10 and PM2.5 are anticipated to be Minor Adverse (not significant) with embedded mitigation measures in place.
<b>Chapter 6: Noise and Vibration (Volume 1)</b>	The assessment of construction traffic noise will be undertaken and reported in the ES. The Chapter identifies that with embedded mitigation measures in place, preliminary assessment of the construction of the Proposed Scheme has the potential to result in Moderate/ Major (significant) noise and vibration impacts from Heavy Haul Road construction and associated activities.
<b>Chapter 10: Landscape and Visual (Volume 1)</b>	Identifies that with embedded mitigation measures in place, the likely visual effects at RSPB Saltholme could be moderate adverse (significant).

- 15.9.13. Whilst it is envisaged that both nature reserves will remain open during construction, due to their proximate location, there is the potential for construction works to give rise to a change in the amenity value for users, who may therefore be affected by the Proposed Scheme. As such, the magnitude of change for the users of RSPB Saltholme Nature Reserve and RSPB Dorman’s Pool Nature Reserve is considered to be moderate. The sensitivity of RSPB Saltholme Nature Reserve and Dorman’s Pool Nature Reserve is considered to be high. Therefore, there is anticipated to be a Moderate Adverse (significant) temporary, medium term effect on the users of these nature reserves.

**Human health**

15.9.14. The likely effects for human health associated with the Construction Phase are set out in **Table 15-11** below. Other Chapters of this PEIR have informed the summary of the effects on human health reported below. These include **Chapter 5: Air Quality (Volume 1)**, **Chapter 6: Noise and Vibration (Volume 1)**, **Chapter 9: Water Environment and Flood Risk (Volume 1)**, **Chapter 10: Landscape and Visual (Volume 1)**, **Chapter 14: Socioeconomics (Volume 1)**, and **Chapter 17: Major Accidents and Disasters (Volume 1)**. It should be noted that **Table 15-12** has taken the effects assuming embedded mitigation measures are in place, but prior to the implementation of any additional mitigation required from each of Technical Chapters, and these would be mitigated as set out in each of the relevant Chapters.

**Table 15-13: Human Health Considerations – Construction**

Technical Topic / Chapter	Details
<p><b>Chapter 5: Air Quality (Volume 1)</b></p>	<p>During construction, there is the potential to generate dust close to the RSPB Saltholme Nature Reserve and some residential properties located on Port Clarence Road at the southern perimeter of the Site Boundary. Temporary worsening of air quality as a result of increased particulate matter in the immediate vicinity of the Proposed Scheme may adversely affect the health of the population, particularly those more vulnerable sub-groups (such as the elderly, very young and those with underlying health conditions such as asthma). This may also cause indirect impacts from loss of amenity, which may deter some users of the RSPB Saltholme Nature Reserve.</p> <p>Assuming embedded mitigation measures are in place, the effect of temporary dust generation is determined to be not significant.</p>
<p><b>Chapter 6: Noise and Vibration (Volume 1)</b></p>	<p>Noise generated during the Construction Phase (including through construction traffic) has the potential to cause nuisance and disruption above normal levels to human receptors including residential properties and businesses (specifically employees), in particular those located on the A178 Seaton Carew Road and Port Clarence Road.</p> <p>Assuming embedded mitigation measures are in place, the effect of construction noise and vibration has the potential to cause significant temporary effects.</p>
<p><b>Chapter 9: Water Environment and Flood Risk (Volume 1)</b></p>	<p>Construction of the Proposed Scheme has the potential to increase the rate and volume of surface water runoff as a result of works in the floodplain, and therefore consequently increasing the risk of flooding of residential properties. Experiencing disruption resulting from flooding can have physical and mental health impacts. Loss of utilities (gas, water and electricity), loss of personal possessions and potential financial losses as a consequence can be significant stressors which can adversely affect both physical and mental health.</p> <p>An increased flood risk can also act as a deterrent to the use of RSPB Saltholme Nature Reserve and the English Coastal Path by residents. This will indirectly impact on residents' ability to undertake physical activity.</p>

Technical Topic / Chapter	Details
	<p>There is also potential for contamination of the water bodies within the RSPB Saltholme Nature Reserve or smaller watercourses that outfall into the River Tees during the construction phase. This may lower the amenity value of recreational activities making use of the River Tees, as well as use of the English Coastal Path, and therefore may impact the local population's ability to undertake physical activity within these areas.</p> <p>Assuming embedded mitigation measures are in place, the impact of flood risk has the potential to cause no significant temporary effects, however, potential significant effects were identified for surface water contamination.</p>
<p><b>Chapter 10: Landscape and Visual (Volume 1)</b></p>	<p>There is the potential for temporary changes to visual amenity during construction of the Proposed Scheme for walkers using the England Coast Path and Teesdale Way, and users of the RSPB Saltholme Nature Reserve. This may deter some users of RSPB Saltholme Nature Reserve and the England Coast Path, inhibiting their ability to undertake physical activity. As physical activity in Stockton-on-Tees and Redcar and Cleveland (in the form of walking and cycling) is already lower than regional and national figures, the potential deterrence of use of the Nature Reserve will cause adverse impacts to the health of the population.</p> <p>Assuming embedded mitigation measures are in place, the impact of changes to visual amenity has the potential to cause significant effects to users of the England Coast Path and Teesdale Way, and users of the RSPB Saltholme Nature Reserve.</p>
<p><b>Chapter 15: Socio-economics (Volume 1)</b></p>	<p>The construction of the Proposed Scheme is likely to result in increased employment opportunities in the local area and wider northeast region, during the construction phase. It is anticipated that up to 2,600 temporary construction staff will be required at peak during the construction phase. Employment improves health and wellbeing not only from an economic standpoint but also in terms of quality of life.</p>
<p><b>Chapter 17: Major Accidents and Disasters (Volume 1)</b></p>	<p>During construction there is a risk of hazard pipelines being struck by third parties leading to a large-scale loss of containment event. This could result in a fire and/or explosion affecting neighbouring property and/or members of the public such as users of RSPB Saltholme Nature Reserve or the England Coast Path, as well as contamination of soils and surface water features.</p>

15.9.15. The overall sensitivity of the local population is considered to be high as there are a number of adverse health indicators, with overall health considered to be poor within the wards and local authorities within the Study Area. Due to the in-combination impacts detailed in **Table 15-12**, the magnitude of change is identified as is low, as there is anticipated to be limited changes overall to quality-of-life for residents in the locality, users of the WCH routes, and the nature reserves. A small proportion of the total local population is anticipated to be affected. Therefore, there is likely to be an indirect, temporary, Minor Adverse (not significant) medium term effect on human health.

## OPERATION PHASE

### Businesses that rely on the River Tees

- 15.9.16. Once the Proposed Scheme is operational, it is anticipated that the SAF/naphtha will be exported via the Navigator wharfs off Riverside Road located within the DCO Application Boundary. However, at this time details on the types, number and routes of the vessels used to transport the operational product are not known. There may also be requirement for export via the rail terminal or by road. Further detail on these operations will be determined as the Proposed Scheme design and associated output is refined. Therefore, for the purposes of this PEIR, an assessment of the effects on those businesses that rely upon access to the River Tees has not been undertaken and this will be considered in full within the ES. For more details see **Chapter 18: Marine Navigation (Volume 1)**.
- 15.9.17. The sensitivity of the businesses that rely on the River Tees has been determined as very high, high, or medium (dependent on plot size, in line with DMRB LA 112 guidance). The magnitude of change is unknown for the purposes of this PEIR assessment. Therefore, there is the potential for direct, permanent, long term effects on businesses that rely on the River Tees, however this will be fully assessed within the Population and Human Health Chapter of the ES.

### Terrestrial Recreation

- 15.9.18. During operation, direct impacts on access to the RSPB Saltholme Nature Reserve and Dorman's Pool Nature Reserve are expected to be avoided, however, the Proposed Scheme has the potential to give rise to a range of indirect impacts such as noise, vibration, lighting and visual disturbance which is likely to impact amenity for users of both nature reserves. The assessment has therefore considered the assessment findings of **Chapter 5: Air Quality (Volume 1)**, **Chapter 6: Noise and Vibration (Volume 1)** and **Chapter 10: Landscape and Visual (Volume 1)**. As such the magnitude of change is considered minor due to the proposed embedded mitigation. However, due to limited baseline information at the time of writing, a detailed assessment within these technical assessments impacts during operation will be provided in the ES. The sensitivity of the RSPB Saltholme Nature Reserve and Dorman's Pool Nature reserve is high as both provide regionally important areas for recreation. It is envisaged that both nature reserves will remain open and accessible during operation, with potential indirect amenity effects arising in the context of the wider industrial nature of the area. Therefore, there is likely to be direct, permanent, long term, Slight Adverse (not significant) effect on RSPB Saltholme and Dorman's Pool Nature Reserves.

### Human health

- 15.9.19. The likely significant effects for human health associated with the Operation Phase are set out in **Table 15-12** below. Other Chapters of this PEIR have informed the summary of the effects on human health reported below. These include **Chapter 5: Air Quality (Volume 1)**, **Chapter 6: Noise and Vibration (Volume 1)**, **Chapter 9: Water Environment and Flood Risk (Volume 1)**, **Chapter 10: Landscape and Visual**

(Volume 1), and **Chapter 14: Socioeconomics (Volume 1)**. It should be noted that **Table 15-15** has taken the effects before the implementation of any additional mitigation required from each of Technical Chapters, and these would be mitigated as set out in each of the relevant Chapters.

**Table 15-14: Human Health Considerations – Operation**

Technical Topic / Chapter	Details
<p><b>Chapter 5: Air Quality (Volume 1)</b></p>	<p>Upon completion of the construction works, dust generation will likely subside and any adverse effects to the health of the population as a result of air pollution are likely to be negligible. However, the operation of the Proposed Scheme may introduce emissions of new pollutants upon completion of construction, that have the potential to adversely affect human health. Worsening of air quality could be damaging to the health of the local population, particularly those more vulnerable groups (such as the elderly, very young and those with underlying health conditions such as asthma).</p>
<p><b>Chapter 6: Noise and Vibration (Volume 1)</b></p>	<p>Operational activity will also likely generate additional noise pollution in the immediate vicinity of the Proposed Scheme, due to an increase in rail and road traffic movements. This is likely to be particularly felt by residential receptors on Port Clarence Road and the A178 Seaton Carew Road, and users of the RSPB Saltholme Nature Reserve.</p> <p>Assuming embedded mitigation measures are in place, the effect of noise and vibration has the potential to cause significant permanent effects due to an increase in rail movements. Assessment on noise and vibration impacts from fixed plant and equipment and road noise during operation will be undertaken at the ES stage.</p>
<p><b>Chapter 9: Water Environment and Flood Risk (Volume 1)</b></p>	<p>Operation of the Proposed Scheme has the potential to increase the rate and volume of surface water runoff due to potential changes in ground levels, which may increase the risk of flooding of residential properties. Experiencing disruption resulting from flooding can have physical and mental health impacts. Loss of utilities (gas, water and electricity), loss of personal possessions and potential financial losses as a consequence can be significant stressors which can adversely affect both physical and mental health.</p> <p>An increased flood risk can also act as a deterrent to the use of RSPB Saltholme Nature Reserve by residents. This will indirectly impact on residents' ability to undertake physical activity.</p> <p>There is also a possibility for contamination of the water bodies within the RSPB Saltholme Nature Reserve or smaller watercourses that outfall into the River Tees. This may lower the amenity of recreational activities making use of the River Tees, as well as use of the English Coastal Path.</p>

Technical Topic / Chapter	Details
	Assuming embedded mitigation measures are in place, the impact of flood risk and surface water contamination has the potential to cause significant effects.
<p><b>Chapter 10: Landscape and Visual (Volume 1)</b></p>	<p>There is the potential for permanent changes to visual amenity. This may deter some users of RSPB Saltholme Nature Reserve and inhibit their ability to undertake physical activity. As physical activity in Stockton-on-Tees (in the form of walking and cycling) is already lower than regional and national figures, the potential deterrence of use of the Nature Reserve will cause adverse effects to the health of the population.</p> <p>Assuming embedded mitigation measures are in place, the impact of changes to visual amenity has the potential to cause significant effects to users of the England Coast Path and Teesdale Way, and users of the RSPB Saltholme Nature Reserve.</p>
<p><b>Chapter 17: Major Accidents and Disasters (Volume 1)</b></p>	<p>Once operational there is a risk of large-scale release of toxic gases (carbon monoxide) and CO<sub>2</sub> resulting from a loss of containment event involving a pipeline. This has potential to result in carbon monoxide toxicity hazard, CO<sub>2</sub> toxicity and fogging hazard, which could affect neighbouring properties and/or those people in the immediate area such as users of RSPB Saltholme Nature Reserve or the England Coast Path.</p> <p>There is a risk of combustion of syngas/naphtha/SAF following large scale loss of containment due to damage to storage vessel. This has the potential to cause a fire and/or explosion affecting neighbouring properties and/or members of the public.</p> <p>Further risks include the large-scale release of caustic soda/WWTP chemicals resulting from a loss of containment, which has the potential to result in localised contamination of the soil and surface water features.</p>

15.9.20. When considering the outcomes of the assessments in relation to human health, the overall sensitivity of the population is considered to be high. The magnitude of change is low, as there would be a minor change in quality-of-life of residents and users of the nature reserves and WCH routes, and a small proportion of the total local population is likely to be affected. Therefore, there is likely to be an indirect, permanent, long term, **Minor Adverse (not significant)** effect on human health.

## **15.10. ADDITIONAL DESIGN, MITIGATION AND ENHANCEMENT MEASURES**

15.10.1. This section sets out the additional mitigation and compensation measures which are relevant for Population and Human Health.

### **CONSTRUCTION PHASE**

- The public will be informed of the nature, timing and duration of particular construction activities and the duration of the construction works by newsletters/other publications or advertisements as part of the OCoCP;

- Ongoing engagement with the local community via Stockton-on Tees Borough Council and Redcar and Cleveland Borough Council, including users of PRow, pedestrian routes, and terrestrial recreational areas (e.g. the England Coast Path, and RSPB Saltholme Nature Reserves) would provide information which may help to reduce uncertainty and stress relating to the potential effects of the Proposed Scheme; and
- Ongoing engagement with businesses that rely on access to the River Tees.

## OPERATIONAL PHASE

- Ongoing engagement with local communities and other stakeholders would provide information which may help to reduce uncertainty and stress relating to the potential effects of the Proposed Scheme;
- Careful selecting of low noise plant and equipment, and location of this equipment to minimise noise impacts;
- The use of noise-attenuating barriers in the form of either acoustic screens and/or earth bunds;
- The Applicant would work proactively to provide local employment opportunities and to enable access to training where possible; and
- The processes used to recruit and manage staff working at the Proposed Scheme would be demonstrably fair and offer equal opportunities to all.
- Appropriate design of the Proposed Scheme to minimise water quality impacts on surrounding habitats, including waterbodies within nature reserves and the River Tees; and
- The provision of tree planting to provide visual assimilation and screen low level clutter.

15.10.2. For more detail, see additional topic specific mitigation measures outlined within **Chapter 5: Air Quality (Volume 1)**, **Chapter 6: Noise and Vibration (Volume 1)**, **Chapter 10: Landscape and Visual Impact (Volume 1)**, as well as **Chapter 15: Socioeconomics (Volume 1)**.

## 15.11. MONITORING

15.11.1. At this stage of assessment there are no proposed monitoring arrangements for Population and Human Health, due to the significance of anticipated effects. Where appropriate, monitoring associated with other assessments are described within the relevant Technical Chapters.

## 15.12. RESIDUAL EFFECTS

15.12.1. **Table 15-13** below summarises the residual effects associated with the Proposed Scheme.

**Table 15-15: Population and Human Health Summary of Residual Effects**

Description of the Effect	Sensitive Receptor	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation, Enhancement Measure	Residual effect
<b>Construction Phase</b>				
<b>Effects on Walkers, Cyclists and Horse-riders</b>	England Coast Path (and North Tees Trail) Teesdale Way NCN Route 1 NCN Route 65	Moderate Adverse (Not Significant)	Engagement with users (via contacts at Stockton-on Tees Borough Council and Redcar and Cleveland Borough Council) in order to understand levels and patterns of usage. Implementing clear signage informing users of the timing and duration of the planned works. Topic specific mitigation related to amenity effects on users of PRow and NCN routes.	Slight Adverse (Not Significant)
<b>Effects on Terrestrial Recreation</b>	RSPB Saltholme Nature Reserve and Dorman's Pool Nature Reserve	Moderate Adverse (Significant)	Engagement with users and the RSPB and Teesmouth Bird Club (via contacts at Stockton-on Tees Borough Council) in order to understand levels and patterns of usage. Implementing clear signage informing users of the timing and duration of the planned works. Topic specific mitigation measures related to amenity effects on users of terrestrial recreation facilities as set out in relevant Chapters of this PEIR.	Slight Adverse (Not Significant)
<b>Effects on Human Health</b>	Local Population	Minor Adverse (Not Significant)	Ongoing engagement with the local community should be sought via an Engagement Plan.	Negligible (Not Significant)
<b>Operation Phase</b>				
<b>Effects on businesses that rely on</b>	N+P Subcoal Production Teeside	TBC – to be assessed as part of the ES. There	None identified	TBC – to be assessed as part of the ES. There is the potential for significant

Description of the Effect	Sensitive Receptor	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation, Enhancement Measure	Residual effect
<b>the River Tees</b>	Industrial Chemicals Limited Navigator Terminals Seal Sands Limited Port of Middlesbrough ABLE Ports Heidelberg Materials Ready-mixed Concrete A&P Tees BOC Teeside Hydrogen Greenergy Biofuels Teeside Svitzer Marine Tarmac Cochranes Wharf Marine Aggregates and Breedon Aggregates MP Storage and Blending Wilton GroupNorth Tees Limited	is the potential for significant adverse effects to arise on some of the business receptors		residual adverse effects on some of the business receptors
<b>Effects on Terrestrial Recreation</b>	RSPB Saltholme Nature Reserve and Dorman's Pool Nature Reserve	Slight Adverse (Not Significant)	Engagement with users and the RSPB (via contacts at Stockton-on Tees Borough Council) in order to understand levels and patterns of usage. Implementing clear signage informing	Slight Adverse (Not Significant)

Description of the Effect	Sensitive Receptor	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation, Enhancement Measure	Residual effect
			<p>users of the timing and duration of the planned works as part of the OCoCP.</p> <p>Topic specific additional mitigation measures related to amenity effects on users of terrestrial recreation facilities as set out in <b>Chapter 5: Air Quality (Volume 1); Chapter 6: Noise and Vibration (Volume 1); and Chapter 10: Landscape and Visual (Volume 1);</b> of this PEIR.</p>	
<b>Effects on Human Health</b>	Local Population	Minor Adverse (Not Significant)	Ongoing engagement with the local community should be sought via an Engagement Plan.	Negligible (Not Significant)

## 15.13. NEXT STEPS

15.13.1. Further work to be completed and included in the ES comprises:

- The Population and Human Health assessment will be further developed and refined having regard to any relevant responses to the Statutory Consultation.
- Consultation will be undertaken with Stockton-on Tees Borough Council and Redcar and Cleveland Borough Council in order to understand usage levels and patterns of the walking and cycling routes and terrestrial recreational receptors identified.
- The detailed assessment within the ES will involve a review of the assessment presented in this Chapter, based on further information as part of ongoing design development in accordance with the methodologies outlined in **Section 15.4**.

## 15.14. LIMITATIONS AND ASSUMPTIONS

15.14.1. To ensure transparency within the EIA process, the following limitations and assumptions have been identified:

- This Chapter relies on, in part, data provided by third parties (e.g. OS Mapping, Local Authorities, NOMIS) which provide the most up-to-date data available at the time of writing.
- Population impacts would be identified in the ES down to the lowest defined population group available according to Office for National Statistics (ONS) survey outputs (LSOAs). Further granularity of data is not available. No significant changes or limitations in these datasets have been identified that would affect the outcome of the assessment.
- The assessment for Land Use and Accessibility within this Chapter has been based on limited design information on the Proposed Scheme. Assessments will be refined in the ES when full information on Construction and Operation phases is available.
- The assessment of businesses reliant upon the River Tees during operation, relies on marine vehicle movements which will be outlined within the ES. This will then be used to inform the Population and Human Health Chapter of the ES.
- The assessment of effects on human health relies on the use of reasonable assumptions, professional judgement, and above guidance (**Section 15.2**) to determine the significance of effects.

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The logo for Lighthouse Green Fuels, featuring the company name in a bold, green, sans-serif font. The text is contained within a white rectangular box with a thin green border. The background of the top half of the page is a solid green color, with a blue diagonal stripe running from the bottom left towards the top right.

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