Cottam Parkway Railway Station

Environmental Statement

Volume 2: Main Statement

Chapter 13: Human Health and Population

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13 Human Health and Population

ES Chapter Number	Environmental Topic	Relevant Appendices
13	Human Health and Population	Appendix 13.1 – Health Profiles Appendix 13.2 – Health Deprivation and Disability Rank Appendix 13.3 - Rapid Health Impact Assessment

13.1 Introduction

13.1.1 The Town and County Planning (Environmental Impact Assessment) Regulations 2017 ('EIA regulations' herin) states that:

'The EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors—

(a)population and human health;'

13.1.2 In this chapter, the topic of population and human health has been assessed as per the EIA regulations which will be considered in line with best practice guidance.

13.1.3 This chapter considers the predicted human health effects of the Scheme at a local and regional level. Both general population and vulnerable population groups will be considered in this approach.

13.1.4 Human health is defined by the World Health Organisation (WHO) as 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity' (WHO, 2006).

13.1.5 Public health is defined as the science and art of promoting and protecting health and wellbeing, preventing ill-health and prolonging life through the organised efforts of society. Public health has three domains of practice:

- Health protection;
- Health improvement; and,
- Improving services.

13.1.6 This assessment seeks to identify the impacts on human health and population resulting from the Scheme and where appropriate, seek to prevent, avoid, reduce and remediate any impacts. Opportunities to protect and improve health and service outcomes will be identified and discussed throughout this chapter. Any potential pressures on human health will also be identified.

13.1.7 This chapter will draw upon information from other chapters of this ES including:

- Chapter 5 - Landscape and Visual Impact
- Chapter 8 - Air Quality
- Chapter 9 - Noise and Vibration
- Chapter 12 - Climate Change
- Chapter 14 - Traffic and Transport

13.2 Study Area

13.2.1 The study area for the Scheme is based on the DMRB LA 112 Population and Human Health guidance, as it provides a suitable site boundary for this type of Scheme. As a result, the study area shall be defined based on the following:

- the construction footprint/project boundary (including compounds and temporary land take) plus a 500m area surrounding the project boundary.

13.2.2 Where likely effects are identified outside the 500m area surrounding the project boundary, the study area would be extended accordingly to include the communities/wards directly and indirectly affected by the project such as Ingol and Cottam and, Lea and Larches.

13.2.3 The baseline health profile is gathered from a 2km buffer zone and in some cases a larger, district (Preston and Fylde) area where higher resolution data was not available to capture the health profile of those likely to use the station.

13.3 Relevant Legislative, Plans and Policies

National Planning Policy and Guidance

13.3.1 The National Planning Policy Framework (the NPPF) (MHCLG, 2021) identifies the importance of promoting healthy, inclusive and safe communities in new developments. The NPPF states that this should be achieved through developing places that:

- Promote social interaction, including opportunities for meetings between people who might not otherwise come into contact with each other;
- Are safe and accessible, so that crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion; and,
- Enable and support healthy lifestyles, especially where this would address identified local health and well-being needs.

13.3.2 The National Planning Policy Guidance (NPPG) - Healthy and Safe Communities (Ministry of Housing, Communities & Local Government 2022), states that the use of built and natural environments, including green infrastructure, are major determinants of health and wellbeing. The document further encourages developers and planners to create environments that support and encourage healthy lifestyles, and identify and secure the facilities

needed for primary, secondary and tertiary care, and the wider health and care system.

13.3.3 Additional legislation that has been referred to in the writing of this chapter this includes:

- The Town and Country Planning (Environmental Impact Assessment) Regulations (2017);
- The Localism Act (2011); and,
- The Health and Social Care Act (2012).

13.3.4 The 25 Year Environment Plan (2018) states the aim of connecting people with the environment to improve health and wellbeing. The plan proposes to achieve this through four objectives:

- Help people improve health and wellbeing by using green spaces including through mental health services;
- Encourage children to be close to nature, in and out of school, with particular focus on disadvantaged areas;
- 'Green' towns and cities by creating green infrastructure and planting one million urban trees; and,
- Make 2019 a year of action for the environment, working with Step Up To Serve and other partners to help children and young people from all backgrounds to engage with nature and improve the environment.

13.3.5 The NPPF, NPPG and The 25 Year Environment Plan have been referred to where applicable throughout this chapter.

13.3.6 Public Health England (PHE) Strategy 2020-2025 (2019), provides a range of health priorities for England. The following policies have been taken from PHE as most relevant to the Scheme:

- Reduce air pollution levels and people's exposure to polluted air; and,
- Promote good mental health and contribute to the prevention of mental illness.

13.3.7 In 2018, the Government recognised loneliness and isolation as a public health issue. The Loneliness Annual Report (2020), identified the role of places in tackling loneliness. Strategies set out in the report include strengthening community infrastructure and assets, and growing people's sense of belonging.

13.3.8 The Marmot Review (2010), is an independent report on health inequalities in England post-2010. The report found that there is a social gradient in health – the lower a person's social position, the worse their health. To combat the health inequalities that arise from this social disparity The Marmot Review developed the following four objectives which are relevant to this Scheme:

- Create fair employment and good work for all;
- Ensure healthy standard of living for all;
- Create and develop healthy and sustainable places and communities; and,
- Strengthen the role and impact of ill health prevention.

13.3.9 The Review advises that these policy objectives are implemented at central and local government level.

13.3.10 Communities are identified as being important for physical health and mental health and well-being as they can enable and promote healthy behaviours. However, communities can also contribute to social inequalities in health. Marmot recommends reducing health inequalities through the promotion of active travel (for example walking or cycling), public transport, availability of green space and reduced carbon-based pollution.

13.3.11 Health Equity in England: The Marmot Review 10 Years On (2020), sought to track the changes in health inequalities in England since the original review.

13.3.12 Policy improvements of particular interest to the Scheme include:

- Putting health equity and wellbeing at the heart of local, regional and national economic planning and strategy;
- Adopting inclusive growth and social value approaches nationally and locally;
- To value health and wellbeing as well as, or more than, economic efficiency;
- Aim for net zero carbon emissions by 2030; and,
- Invest in the development of economic, social and cultural resources in the most deprived communities.

Local Policy and Guidance

13.3.13 The Central Lancashire Core Strategy (Preston City Council et al.,2012), established where major development and other forms of investment should be located to be sustainable, meet local needs and take full advantage of opportunities.

13.3.14 One of the cross-cutting themes of the strategy is promoting health and wellbeing. The strategy advocates well planned transport infrastructure to provide better walking and cycling facilities and more efficient interchange between modes of transport benefiting health and wellbeing.

13.3.15 The Lancashire Joint Strategic Needs Assessment (2017) and the Working-Age Population Summary Report (2017) details the current health issues that are prevalent in the region. The reports identify that having a healthy working-age population gives rise to economic and social improvements. Consequently, this lessens poverty in the region and reduces social exclusion.

13.3.16 To achieve better long-term health for the working-age population in Lancashire, two key objectives have been identified:

- Reducing unemployment and worklessness; and,
- Improving physical and mental health.

13.3.17 Lancashire's Health and Wellbeing Strategy also provides a framework for improving health and wellbeing outcomes across the region. The strategy advocates the following key points for action that are relevant to this development:

- Activating Communities for Health and Wellbeing;
- Healthy lifestyle behaviours;
- Promoting self-care; and,
- Social isolation and loneliness.

13.3.18 The following policies from the Preston Local Plan have been considered in the preparation of this chapter:

- ST2 – General Transport Considerations;
- EN1 – Development in the Open Countryside;
- EN9 – Design of New Development;

13.3.19 The Committee on the Medical Effects of Air Pollutants identify nitrogen dioxide as detrimental to human health (Committee on the Medical Effects of Air Pollutants, 2015). Preston Local Plan 2012 – 2026 (Preston City Council, 2015) states that Preston City Council have developed an Air Quality Action Plan to help reduce the levels of nitrogen dioxide in the local area. The plan includes the aim to promote the use of public transport to tackle poor air quality.

13.3.20 Investing in Our Health and Wellbeing - Report of the Director of Public Health 2019/20, sets out the argument for a system wide response to addressing health inequalities and why this must be a collective priority in Lancashire. The

report recommends key evidence-based opportunities for action across four themes. These are:

- Giving our children the best start in their life;
- Investing in our communities;
- Focussing on health as an economic asset; and,
- Looking after our own health and wellbeing.

13.3.21 The report states that investing in communities is vital. Living and working conditions and employment are important determinants of health, but healthy, resilient communities are also a vital determinant of a thriving economy. This investment in communities should help tackle the climate emergency.

13.3.22 The report calls for the region to develop strong and resilient communities that take responsibility for creating and maintaining their own health and wellbeing. This should be supported by effective services that are co-created with the communities. These services should include carbon neutral modes of transport and work environments.

Other Relevant Documentation

13.3.23 The following best practice and industry guidance has been used throughout this report:

- Health in Environmental Impact Assessment - A Primer for a Proportionate Approach (IEMA, 2017);
- Design Manual for Roads and Bridges LA 112 - Population and human health (DMBR, 2019); and,
- International Association for Impact Assessment (IAIA) - Addressing Human Health in Environmental Impact Assessment – Consultation Draft (IAIA, 2020).

13.4 Methodology

Stages of Assessment

13.4.1 This assessment has been produced in line with The EIA Regulations to consider how population and human health may be impacted by the Scheme.

13.4.2 This assessment has been undertaken in four discrete stages formed from a combined approach using the guidance from DMRB LA112, IEMA Health Impact Assessment in Planning, IEMA Health Environmental Impact Assessment A Primer for Proportionate Approach and professional judgement.

13.4.3 The four-stage approach has been developed to ensure that a comprehensive assessment of human health is undertaken to capture and assess all aspects of the Scheme that have the potential to impact human health and population:

- Stage 1: Establishes the baseline data regarding the site and a 2km buffer zone. This will entail the collection and analysis of data from a range of sources regarding the current health and wellbeing of the population likely to be affected by the development.
- Stage 2: Is a preliminary review of the design proposals in the form of a 'Tier 2: Rapid Assessment', undertaken in accordance with 2019 HUDU Planning for Health: Rapid Health Impact Assessment (RHIA) Tool guidance. This has been done to demonstrate how human health has been integrated into the design proposals and what likely impacts may arise from the Scheme.
- Stage 3: Stage 3 builds upon the findings from Stage 2 and other ES chapters. In-depth assessment of the likely significant effects upon human health as a result of the Scheme development will be assessed. This would include drawing on:
    - Scientific literature;

- Baseline conditions for the population;
- Consultation for the project;
- Health priorities in the region;
- Nature of the development;
- Regulatory standards in the jurisdiction; and,
- Policy context in the region.

- Stage 4: Consists of assessing the likely risks to human health identified from stages 2 and 3 through a source-pathway-receptor matrix. The remaining likely impacts of the Scheme would then feed into a significance matrix to assess the likely significant effects of the development and determine any required mitigation measures.

Impacts Considered Within This Chapter

13.4.4 In stage 2 of the assessment, the RHIA assesses the Scheme against eleven broad determinants of human health:

- Housing design and affordability
- Access to health and social care services and other social infrastructure
- Access to open space and nature
- Air quality, noise and neighbourhood amenity
- Accessibility and active travel
- Crime reduction and community safety
- Access to healthy food
- Access to work and training
- Social cohesion and inclusive design

- Minimising the use of resources
- Climate change

13.4.5 As the Scheme is a rail transport scheme, some of the determinants were scoped out of the assessment to leave the following seven relevant broad determinants for health that were directly relevant to the Scheme:

- Access to open space and nature;
- Air quality, noise and neighbourhood amenity;
- Accessibility and active travel;
- Crime reduction and community safety
- Social cohesion and inclusive design
- Minimising the use of resources
- Climate change

13.4.6 When considering human health and population, significant medium to long-term impacts may arise from the construction phase of the Scheme. Although, short-term impacts to human health and population during construction may arise, these should be managed through adherence to industry standard legislation, guidance and the production of a Construction and Environmental Management Plan (CEMP). These impacts may include:

- Noise and vibration from machinery and movements;
- Dust generated during construction;
- Exhaust emissions from machinery;
- Flood risk potential; and,
- Accidental spillage.

13.4.7 The likely short-term impacts from construction are discussed in Section 13.6 and any necessary mitigation proposed in Section 13.8 of this chapter.

13.4.8 Examples of the medium to long-term impacts on human health during the construction phase might include changes to Public Rights of Way (PRoW), traffic flows, air quality, biodiversity and landscape.

13.4.9 The potential for each relevant environmental topic covered in the chapters of this ES to impact human health during the operational phase of the Scheme is considered in this chapter.

Identification of Sensitive Receptors

13.4.10 The geographical scope of this assessment is such that receptor groups which are likely to be significantly affected by the Scheme are included within the assessment. The scope of the Health Impact Assessment (HIA) is therefore dependent upon the study areas identified by other disciplines (such as air quality, noise, transport and flood risk) and the receptor groups within these study areas whose health may be adversely affected or benefitted by the Scheme.

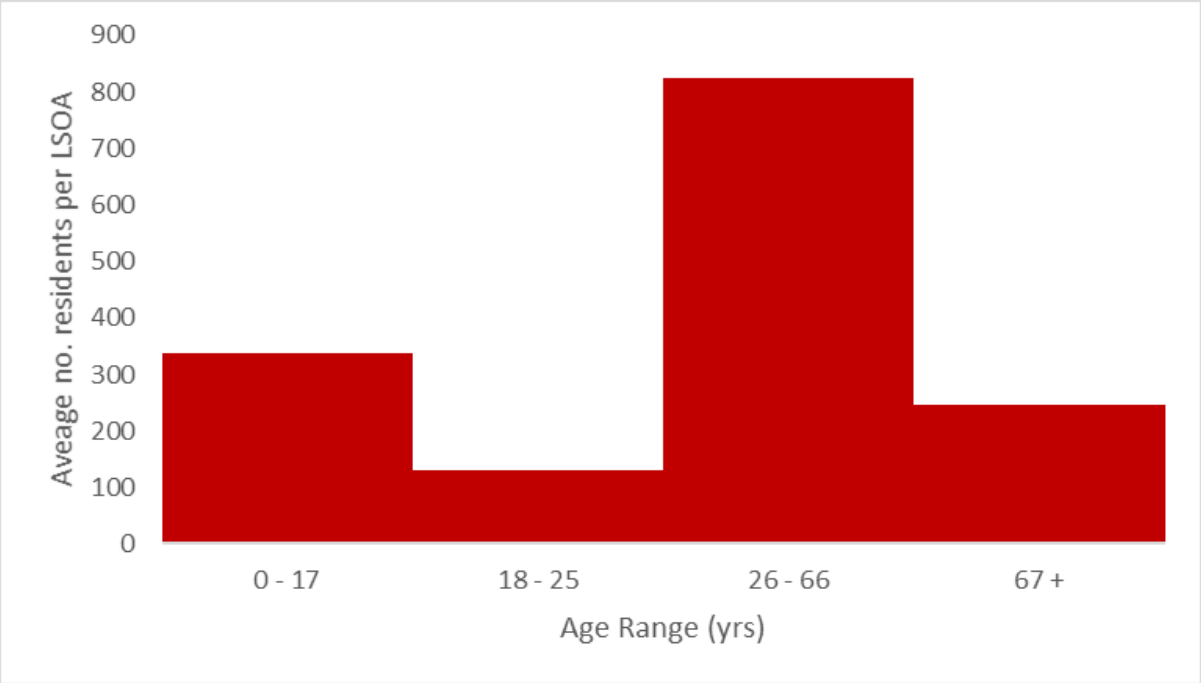
13.4.11 The following groups have been identified as receptors to human health and are considered in the remainder of this chapter:

- Existing local residents located adjacent to the site boundaries and those within the area immediately surrounding the application site;
- Existing community service users such as school children, hospital patients, users of parks, playing fields and open spaces and Public Rights of Way users; and,
- New community service users likely to work at or use the facilities provided by the Scheme such as commuters and construction workers.

Assessing the Sensitivity of Receptors

13.4.12 Figure 13.1 shows the average age of population within the LSOAs associated with the Scheme.

Figure 13.1: Average age of population per LSOA within the sphere of influence of the Scheme



13.4.13 The sensitivity of these receptors is likely to vary. For instance, local residents aged 18 – 65 with no pre-existing medical conditions will be of low concern compared with residents who are 65 and over with respiratory illnesses.

13.4.14 To account for this variance, local census data has been used to determine an overall sensitivity of the receptor based on the available population information and English Indices of Multiple Deprivation (IMD) data (Fig. 13.1).

13.4.15 Based on the 2018 population estimates data provided by the Office for National Statistics (ONS), the majority of existing local residents are adults of working age. Adults within this age range are generally considered to be a low sensitivity receptor. The ages of the local population have been grouped in

accordance with UK law and a sensitivity has been assigned to each group based on PHE analysis and professional judgement (PHE, 2017).

13.4.16 Those at risk are defined as those that are more susceptible to negative impacts on human health for instance these would include:

- Those with a high level of deprivation, low income or unemployment;
- Groups with pre-existing health conditions and compromised immune systems;
- New parents and pregnant women.

13.4.17 For this assessment, the vulnerable receptors have been determined from the baseline health data, local policies, professional judgement, and the characteristics of the Scheme.

Table 13.1: Sensitivity of receptors by age defined using professional judgement.

Age Range (yrs)	Sensitivity of receptor
Children 0-17	High
Young Adult 18 - 25	Medium
Adult 26 - 66	Low
Those of retirement age >67	High
Those at risk*	Very high

* The 'Those at risk' category captures individuals of all ages who may be considered at increased risk due to a pre-existing susceptibility.

Assessing the Magnitude of Change

13.4.18 Once the likelihood of a significant impact for human health has been identified through the RHIA, the in-depth assessment and the source pathway receptor matrix, the magnitude of change is then assessed.

13.4.19 The magnitude for each category will be assessed individually for likely significant impacts (No Change, Negligible, Minor, Moderate, Major).

13.4.20 The overall level of significance is derived from the magnitude of change against the sensitivity of the affected receptor (Table 13.1) rather than the 'value' stated in Chapter 4 – Assessment Methodology and Consultation Process of this ES.

Assessment Criteria for Significant Effects

13.4.21 Significance in terms of human health and population is not defined in The Town and Country Planning (Environmental Impact Assessment) Regulations 2017. Following best practice guidance, the term 'significance' for this chapter is defined as:

13.4.22 'A professional judgement supported by evidence, for example on an issue's 'importance' and 'acceptability'' (IEMA, 2017).

13.4.23 This chapter uses analysis of population and human health data to predict significant health and well-being outcomes for the Scheme. For example, a significant change in air quality or noise resulting from the operational phase of the development.

13.4.24 The effects on human health and population are either described as "beneficial" or "adverse" to human health. Primarily, this assessment focuses on the adverse effects on human health that may require mitigation.

13.4.25 For a likely significant effect to be likely, it must first be identified in the RHIA, in-depth assessment and for there to be a viable source-pathway-receptor relationship for the risk.

Limitations

13.4.26 Limitations of this assessment include the variety of sources the baseline data was gathered from. Gathering data from different sources may result in limited direct comparisons that are not appropriate due to varying scales of data e.g., local to regional datasets. For instance, Indices of multiple deprivation data is gathered in units of approximately 1500 people within a geographical area. However, data on Health profiles for Preston and Fylde are gathered from district level datasets which would make them less reliable for comparison.

13.5 Baseline Description and Evaluation

Environmental Profile The study area is not in an Air Quality Management Area (AQMA). The nearest AQMA is greater than 2km to the south east of the site boundary. As such, the baseline air quality on the site is not considered to be of concern.

13.5.2 As the Scheme is focused on the provision of transport, healthcare and local health services are unlikely to be impacted. Consequently, the provision of healthcare is not considered to be of concern to the Scheme.As the study area is situated along a railway line. The study area and the surrounding areas are already subject to noise and vibrations from passing trains. At the time of writing, there are no plans to increase the provision of trains along the line due to the additional station. As such, noise and vibrations from railway sources are not considered to be of concern with the exception of start-up and stopping from trains arriving at the station.

13.5.4 In the areas surrounding the study area there are a number of schools, sports facilities and areas of recreational green space including PRoWs that

contribute towards the environmental profile of the Scheme from a human health perspective. These include:

- Community sports facilities approximately 1km to the east of the Scheme;
- Cottam community centre approximately 1km to the north east of the Scheme;
- Lea Endowed School is 600m to the north of the Scheme;
- Ashton Primary School lies 760m to the south east of the Scheme;
- Cottam Primary School lies 880m to the north east of the Scheme;
- Ingol Community Primary School 1.5km east of the Scheme;
- Holy Family Catholic Primary School is also 1.5km east of the Scheme;
- Pool House Community Primary School 2km North east;
- Ashton Community College lies 1.3km to the south east of the Scheme;
- UCLan Sports Arena and facilities approximately 150m east of the Scheme boundary;
- Ashton and Lea Golf Club approximately 100m south of the Scheme boundary;
- Preston North End training ground and facilities approximately 1km south west of the Scheme boundary;
- Ashton Park 1.5km south of the Scheme boundary;
- Haslam Park 2km east of the Scheme boundary;
- Jubilee Park 800m south of the Scheme boundary; and,
- A PRoW running along the south of the Scheme.

13.5.5 In the immediate surrounding of the Scheme there are numerous permitted and constructed housing estates. The planning application for a housing estate to the immediate north of the site and the south over the railway along Lea Road is currently being developed. These housing estates would contribute additional sensitive receptors to the Scheme. However, the planning application for these developments are yet to be submitted to the planning authority.

Baseline Health Profile

13.5.6 Lancashire has a population of approximately 1.2 million people. This is expected to rise by 4.5% over the next 25 years. Between 2020 and 2030 it is predicted that the working-age will begin to decline, and the older population will continue to increase.

13.5.7 The two wards directly affected by the development of the Scheme; Ingol and Cottam and Lea and Larches, had populations of approximately 8,395 and 9,097 respectively in 2011 (Office for National Statistics, 2012).

13.5.8 On average, life expectancy in Lancashire is below the national average. Healthy life expectancy for Lancashire is consistently below the retirement age. This indicates ill health among the working-age population and suggests many residents are not able to enjoy their retirement in good health.

13.5.9 The Scheme and its associated 2km buffer falls within the districts of Preston and Fylde. The health profiles for Preston and Fylde are varied (details provided in Appendix 13.1 in volume 3 of this ES). Overall, Preston performs better than or equal to the national average in four out of the 32 indicators of population health whilst Fylde performs better than or equal to the national average in 21 out of the 32 indicators of population health.

13.5.10 A Lower Super Output Areas (LSOA) is a geographic area inhabited by approximately 1500 people. Four out of the 19 LSOAs that make up the site

area and surrounding 2km buffer zone are in the top 10% of the most deprived LSOAs in the Health Deprivation and Disability domain (Appendix 13.1).

13.5.11 The English IMD Health Deprivation and Disability (HDD) domain measures the risk of premature death and the impairment of quality of life through poor physical or mental health. The domain measures morbidity, disability and premature mortality. However, the domain does not measure aspects of behaviour or environment that may be predictive of future health deprivation. The more deprived an area is, the lower the IMD rank. For example, where 1 is the most deprived area and 32,844 is the least deprived area.

13.5.12 The IMD data displayed in Appendix 13.2 shows the Health and Disability Deprivation Domain ranking is worse towards the south eastern area of the site, towards Preston. This finding is congruent with data on high levels of health inequality being present in cities (Grant et al., 2017; Lim et al. 2016; Oni, Smit et al. 2016; WHO and UN Habitat 2010).

13.6 Impacts

Stage 2: Rapid Health Impact Assessment (RHIA)

Rapid Health Impact Assessment ScopeThe following seven broad human health determinants were assessed in the RHIA:

- Access to open space and nature;
- Air quality, noise and neighbourhood amenity;
- Accessibility and active travel;
- Crime reduction and community safety
- Social cohesion and inclusive design
- Minimising the use of resources
- Climate change

Rapid Health Impact Assessment

13.6.2 The RHIA evaluated the Scheme against 27 relevant assessment criteria. 25 out of the 27 assessment criteria yielded positive health impacts for the local receptors, see Appendix 13.3. One of the assessment criteria had a neutral impact on receptors.

13.6.3 The positive health benefits of the Scheme included:

- Better air quality in Preston city centre due to a reduction of cars;
- The provision of car parking spaces at the station reducing car use into Preston;
- Reduction in traffic noise in Preston city centre;
- Provision of cycle tracks and pedestrian footway;
- Provision of safe crossing points for pedestrians;
- Increased interconnectivity of public transport systems;
- Increased accessibility to public transport for those with mobility issues;
- Construction of a multiuse community waiting rooms ;
- Connect existing communities with sustainable transport;
- Incorporation sustainable design elements;
- Inclusion of solar energy generating capacity;
- The construction of a green roof and green infrastructure to encourage biodiversity;
- Inclusion of sustainable urban drainage systems (SuDS); and,
- The retention and enhancement of existing open and natural spaces.

13.6.4 The railway station would provide 248 car parking spaces for the park and rail functionality of the station. Other modes of sustainable transport would be encouraged such as expanding existing cycle tracks and footways. Overall, the railway station would have a beneficial effect elsewhere in the region as people would opt to travel into Preston, Blackpool or further via rail. Reducing vehicles in urban centres where AQMAs are more common is essential from a Human Health perspective. For this reason, this section of the RHIA was marked as neutral.

13.6.5 The railway station would divert an existing PRoW that travels alongside the railway line between Sidgreaves Lane and Lea Lane. This PRoW is lined with trees and provides countryside views to the north across agricultural land. The access road would require the removal of a limited number of hedgerows along Sidgreaves Lane, reducing the established natural features in the area. However, the trees would be retained closest to Lea Road. With mitigation and the need to achieve biodiversity net gain, the Scheme would create and enhance existing areas of high biodiversity value and monitor and maintain them for the required 30-year period resulting in an improved natural environment once established. For these reasons, the retention and enhancement of existing open and natural spaces as a result of the Scheme was considered to be neutral.

Stage 3: In-depth Assessment

13.6.6 Stage 3 builds upon the findings from Stage 2 and other ES chapters. In-depth assessment of the likely significant effects upon human health as a result of the Scheme development is assessed in section 13.7 and 13.8.

13.7 Construction Impacts

13.7.1 The primary human health issues that would be anticipated as a result of the construction of the Scheme are shown in Table 13.2.

Table 13.2: Potential impacts from Scheme construction

Health Determinant	Potential Impacts	Receptor Group and Vulnerable Group	Likely Significant Effects	Additional Mitigation
Air quality (dust)	Chapter 8 of this ES states that impacts from dust during the construction of the scheme are likely to be negligible to medium for the scheme. These impacts may be mitigated following construction management measures	Existing local residents Existing community service users	Negligible	None required
Noise	Transient short-term impacts on residential receptors with best practicable means in place.	Existing local residents Existing community service users	Negligible	Construction activities to be undertaken to best practicable means to prevent or counteract the effects of noise or vibration nuisance

	No potential significant vibration effects have been identified.			
Flood risk	Loss of floodplain storage Temporary flow constrictions during culvert construction Increase in surface water runoff rate Changes in groundwater levels Potential damage to canal structures	Existing local residents Existing community service users	Negligible with mitigation	Drainage design including SuDS Routine maintenance of the Scheme Construction of outfall structures Riparian vegetation Culvert replacement/ extensions Monitoring and maintenance of new and extended culverts Implementation of CEMP to include embedded mitigations detailed in section 11.7 Piling risk assessment Dewatering risk assessment

				Site walkover to determine nature of any groundwater features and undertaking a hydrogeological risk assessment
Walking and Cycling	Temporary diversion of the walking and cycling routes along Darkinson Lane and Lea Lane due to vehicle tracking	Existing local residents Existing community service users New community service users	Negligible with mitigation	Diversion of routes and signage would be implemented for pedestrians and cyclists
Minimising car use	Potential to cause increase in traffic in the area due to vehicle movements during station construction	Existing local residents Existing community service users	Unknown	Details regarding construction traffic will be confirmed in the Detailed Design

Not Considered in Construction

13.7.2 Health and Safety during the construction phase of the Scheme would be managed through the CEMP and the Construction Phase Health and Safety Plan and is therefore, not considered in Table 13.2.

13.7.3 Chapter 12 'Climate Change' assessed the Scheme to be resilient to climate change after mitigation. As such, no further consideration of climate effects on the Scheme were considered.

13.7.4 Details regarding construction traffic would be confirmed in the detailed design and are therefore not considered in Table 13.2.

13.8 Operation Impacts

13.8.1 The potential impacts of the Scheme during operation are shown in Table 13.3.

Table 13.3: Potential impacts from Scheme operation

Health Determinant	Potential Impacts	Receptor Group and Vulnerable Group	Likely Significant Effects	Additional Mitigation
Safety	Potential collisions as a result of increased vehicle traffic to and from the railway station Potential slips trips and falls in the railway	Existing local residents Existing community service users New community service users	Negligible with mitigation	Speed limits, segregated footway and cycle tracks, safe crossing points fitted with tactile paving for visually impaired and comfortable gradients Public footways would have sufficient drainage and would be gritted during cold weather to limit the potential for slips trips and falls Both platforms will include dry risers for fire fighting support. The station building would be fitted with smoke detectors. Internal doors would be fire resistant. The station would contain firefighting equipment. Firefighting access would be included in the design of the station. 2m

	station and car park Railway station and train fires Railway station crime			fire barrier would be installed to the rear of the platforms to protect fleeing passengers Closed Circuit Television shall be installed at the railway station to increase safety for station users. Lighting shall be installed outdoors
Air quality (pollution)	Modelled PM_{10} concentrations are negligible at all receptors Modelled NO_2 concentrations at all receptors are negligible Modelled $PM_{2.5}$ concentrations at all receptors was negligible	Existing local residents Existing community service users New community service users.	Negligible	None required

Noise	Operational road traffic noise Operational railway station noise	Existing local residents	Negligible	Application of Best Practicable Means including limiting duration of exposure to noise levels Contractor to conduct updated noise and vibration assessment and create noise and vibration mitigation strategy as part of Construction Environmental Management Plan
Flood risk	Reduced floodplain storage	Existing local residents Existing community service users New community service users	Negligible adverse with mitigation	Routine maintenance of the Scheme Riparian vegetation Monitoring and maintenance of new and extended culverts
Walking and Cycling	More pedestrians, cyclists, mobility scooters and wheelchair users and vehicles using	Existing local residents Existing community service users	Major beneficial with mitigation	Railway Station access would be improved with the provision of a new access road and suitable paving and cycle track It is likely that a range of road safety improvements would also take place during the construction of the Scheme. The improvements under consideration include:

	the roads and pavements require safe access to the station. The current road and pavement provision are inadequate for future levels of use.	New community service users		▪ Splitter Islands on Cottam Way roundabout junction with Lea Road would be widened to increase safety ▪ Widening of pavements with tactile paving and dropped kerbs and priority given to pedestrians and cyclists across side roads. ▪ The installation of controlled crossing points
Minimising car use	The Scheme would have a negligible impact upon the operation and capacity of the highway network in the surrounding area.	Existing local residents Existing community service users New community service users	Negligible	None required

Employment	The railway station would improve employment opportunities indirectly. The improved connectivity would allow local residents without vehicles to commute to work.	Existing local residents Existing community service users New community service users	Medium beneficial	None required

Not Considered in Operation

13.8.2 Chapter 12 'Climate Change' assessed the Scheme to be resilient to climate change after mitigation. As such, no further consideration of climate effects on the Scheme were considered.

Flood Risk

13.8.3 Following the in-depth assessment, flood risk has been identified as the only minor adverse negative risk associated with the Scheme. Floods are a risk to human health for a number of reasons:

- Stress;
- Waterborne disease;
- Loss or damage to property; and,
- Injury or in extreme circumstances, death.

Stage 4: Source-Pathway-Receptor Matrix

13.8.4 The potentially negative impacts of the Scheme that were identified by the RHIA and in-depth assessment have been further assessed to determine if there would be a viable source-pathway-receptor that would lead to an impact on human health (Table 13.4).

Table 11.4: Source-Pathway-Receptor table to identify plausible human health impacts. Table adopted from IEMA,2017.

Human Health	Source	Pathway	Receptor	Plausible health impact? (Yes/No)	Additional mitigation required? (Yes/No)
In-depth Assessment Construction					
Flood risk	☒	☒	☒	Yes	No
In-depth Assessment Operation					
Flood risk	☒	☒	☒	Yes	No

Justification

13.8.5 Mitigation measures would be taken to ensure that the impact of the Scheme on flood risk would be minimised throughout construction and operation. The impact of flooding on the scheme during construction and operation are covered in Chapter 11 – Water Environment where the impacts on groundwater flooding are considered. The assessment identified that all predicted impacts during the operational phase would be either neutral or slight. These negligible or slight impacts are not considered to be significant and therefore no additional mitigation is considered necessary and no residual impacts are predicted. As all implementable measures for minimising flood risk to an acceptable level have been taken, further measures to mitigate the risk have not been deemed necessary.

13.8.6 It is anticipated that the overall magnitude of impact on Flood Risk from the effects associated with the operational phase works would be negligible resulting in a significance of neutral.

Significance Matrix

Table 13.5: Matrix of significance for the risk of flooding in the study area as a result of the Scheme.

	Magnitude of change	Sensitivity of receptor	Significance of effect
Flood Risk construction	Slight	Medium/Low	Neutral
Flood Risk operation	Negligible	Medium/Low	Neutral

13.8.7 Based on the evidence provided throughout this chapter the average receptor was taken to be of Low to Medium sensitivity and the likely magnitude of change associated with flood risk was taken to be negligible to slight. Therefore, the overall significance of effect from the development of the

Scheme was determined to be **Neutral** which is not a significant level of risk associated.

13.9 Likely Significant Effects

13.9.1 Using the information in the chapters 5 to 16 in this ES, Table 13.5 provides a summary of the anticipated significant negative impacts from the development.

13.9.2 Due to the comprehensive mitigation measures and designing out of foreseeable issues regarding the Scheme, no significant adverse impacts on human health are predicted as a result of the Schemes construction or operation.

13.9.3 Minor to Major beneficial effects are predicted as a result of the development of the Scheme. These include:

- Employment Opportunity;
- Walking and Cycling.

13.10 Mitigation

Required mitigation

13.10.1 Table 13.2 and 13.3 identified that the likely significant effects to human health and the mitigation that would be required to reduce the risk to human health. A Construction Environmental Management Plan would be developed along with a Health and Safety Plan to minimise the risk to human health from the construction process. During the construction process there would also be an Environmental Clerk of Works (EnvCoW) to provide advice about ecological and environmental issues during the construction of the Scheme.

13.10.2 The full range and details of the mitigation required for the Scheme is available in Tables 13.2 and 13.3 and the following chapter and appendices of this ES:

- Chapter 14 - Traffic and Transport;
- Chapter 5 – Landscape and Visual Impact;
- Chapter 6 – Ecology;
- Chapter 11 - Water Environment; and,
- Appendix 18.1 Environmental Masterplan.

Additional mitigation measures

13.10.3 No additional mitigation measures are required for the protection of population and human health.

13.11 Residual Impacts

13.11.1 The predicted significance of impact from the Scheme to human health and population is Neutral at its highest. Any risks during construction would be managed through the Construction Environmental Management Plan. Consequently, it is not predicted that any residual impacts would arise as a consequence of the development of the Scheme.

13.12 Monitoring and Management

13.12.1 Continued monitoring and management of the mitigation measures within the study area would take place beyond the opening years to establish their success and effectiveness and inform the county council of any further measures necessary.

13.13 Accidents and Disasters

13.13.1 The requirement for the assessment of potential accidents and disasters has been scoped out of this EIA process. Primarily, this aspect has been scoped out as all reasonable measures to prevent serious injury or loss of life would

be covered in the on-site Health and Safety Management Plan, Environmental Management Plan and the CEMP.

13.14 Cumulative Impacts

13.14.1 Human Health and Population assessment was brought in with the 2017 EIA regulations. Planning applications that were submitted prior to the 2017 EIA regulations would lack detail on this aspect of environmental assessment. Planning applications within 2km of the Scheme that give consideration to the socioeconomic effects of the developments are listed in Table 13.6.

Table 13.6: Socio-economic effects of planning applications nearby

Application Number	Socio-economic effects
06/2011/0473 06/2016/1035 06/2017/1384 06/2019/0585	The socio-economic effects of the completed development will be **beneficial.**
06/2017/0324	The socio-economic assessment has **not identified any negative impacts** associated with the proposals.
06/2011/0473 06/2013/0865 06/2019/0585	The socio-economic effects of the completed development will be **beneficial** after contributions to the enhancement of GP offices in the area and it is predicted that an increase in local spending and economic activity. It is estimated that approximately £5.7m of household expenditure would be generated in the local economy. This could be expected to support approximately 70 new jobs in Preston. In addition, uplift in the council tax revenue base would be expected to generate approximately £4.2m revenue per annum.
06/2011/0473 06/2016/1035	The development is predicted to positively contribute towards local economic development and regeneration by attracting more highly skilled people to live and work in the area. Resulting in economic growth. The occupation of the development would place additional demand on the social and community infrastructure. A contribution towards enhancing GP facilities in the area is recommended. Overall, the socio-economic effects of the completed development will be **beneficial.**

13.14.2 The socioeconomic effects assessed for each of the schemes were deemed to either be beneficial or neutral. Consequently, it is not anticipated that there would be any cumulative adverse impacts on human health and population from the development of the Scheme.

13.15 Summary

13.15.1 This chapter presents the findings of a desk-based assessment of the population and human health impacts of the Scheme.

13.15.2 The chapter describes the methods used to assess the impacts, the relevant baseline health characteristics and the potential direct and indirect impacts on human health and population of receptors that may be affected during the operation and construction of the Scheme. It also considers the mitigation measures embedded in the Scheme and those that are additionally required to avoid, reduce or offset human health inequalities.

13.15.3 This assessment considers the wider determinants of human health by drawing on the findings of other relevant chapters of this ES and other planning application documentation.

13.15.4 Negligible adverse impacts are predicted as a result of the construction and operation of the Scheme once mitigation measures have been implemented. Some minor to major beneficial impacts are predicted once mitigation has been implemented. Resultingly, the Scheme is predicted to provide the population of Ingol and Cottam with beneficial outcomes from a human health perspective.

13.15.5 No significant adverse impacts are anticipated from the development of the Scheme once mitigation measures have been fully implemented.

13.15.6 A monitoring and management plan in the form of a CEMP would be followed to ensure that no negative impacts on human health are encountered from the operation of the Scheme.

13.16 References

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