Preliminary Environmental Information Report

Volume 2

Chapter 11: Health

11 Health

11.1 Introduction

11.1.1.1 This chapter of our Preliminary Environmental Information Report (PEIR) considers the effects from construction and operation of the River Thames Scheme (RTS) ('the project') in relation to health. Within this chapter we have included topic specific sections on:

- Legislation, policy and guidance (noting any changes since Environmental Impact Assessment (EIA) scoping);
- Engagement with consultees, including responses to comments received on the RTS EIA Scoping;
- The assessment methodology for this topic (again noting any changes or updates since EIA scoping);
- Key environmental considerations and opportunities;
- Primary and tertiary mitigation;
- Our preliminary assessment of effects;
- Secondary mitigation; and
- Future work for this topic of our EIA.

11.1.1.2 For a summary of the key baseline elements associated with health see Section 5.7. Appendix 11.1 provides the updated health baseline and Appendix 11.2 provides the sources used for the health evidence base.

11.1.1.3 In order to determine the potential for significant health and wellbeing effects from construction and operation of the RTS, this chapter will draw on the outputs of other topics within the PEIR, in particular: Chapter 6: Air Quality, Chapter 7: Biodiversity, Chapter 8: Climatic Factors, Chapter 10: Flood Risk, Chapter 12: Landscape and Visual Amenity, Chapter 13: Materials and Waste, Chapter 14: Noise and Vibration, Chapter 15: Socio-economics, Chapter 17: Traffic and Transport and Chapter 18: Water Environment.

11.1.1.4 The World Health Organisation (WHO) Europe defines health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 2020). Public health encompasses general wellbeing, not just the absence of illness. The assessment of likely health effects therefore takes a broad view of physical and mental

health and wellbeing. It will assess how a range of factors determine health outcomes (the determinants of health).

11.1.2 Study Area

11.1.2.1 The health study area for PEIR (the health study area) is the area within the project boundary for the EIA PEIR plus a 500 metre buffer or the area within the 1 in 100-year floodplain (i.e. the area with a one per cent chance of flooding in any given year) that is expected to experience a change in flood risk as a result of the project, whichever is the greater (see Figure 5.14). The buffer combined with the floodplain that could be changed as a result of the RTS means that the likely significant changes in relation to health can be fully captured.

11.1.2.2 The Planning Inspectorate (PINS) Environmental Impact Assessment (EIA) Scoping Opinion (dated 15 November 2022) (‘the PINS Scoping Opinion’) outlined several suggestions from local authorities, which included the use of Middle Layer Super Output Area (MSOA) level data within the baseline, as health data is aggregated at this level.

11.1.2.3 The health study area is a bespoke geography which does not align exactly with the datasets required to complete the health baseline. For this reason, the health baseline section will focus on MSOA-level datasets, based on recommendations from local authorities. The health study area for the PEIR is spread across parts of 23 MSOAs (over five relevant local authorities) which are listed below:

- Richmond upon Thames 017
- Richmond upon Thames 018
- Richmond upon Thames 022
- Richmond upon Thames 023
- Windsor and Maidenhead 011
- Windsor and Maidenhead 016
- Elmbridge 001
- Elmbridge 002
- Elmbridge 004
- Elmbridge 007
- Elmbridge 009
- Elmbridge 012
- Elmbridge 013

- Runnymede 003
- Runnymede 004
- Runnymede 005
- Runnymede 006
- Runnymede 007
- Spelthorne 004
- Spelthorne 009
- Spelthorne 011
- Spelthorne 012
- Spelthorne 013.

11.1.2.4 Taken together, the 23 MSOAs form a wider geographic area than the health study area. For that reason, the term 'approximately' is used to highlight health indicators that cover the 23 MSOAs rather than the health study area. See Figure 5.14 for a map of the health study area. The map shows the relationship between the health study area and the 23 MSOAs.

11.1.2.5 Some effects scoped into the health assessment relate to traffic, noise and air quality. It is important to note that the traffic, noise and air quality topics use study areas that cover different geographies from the health study area. Further details on the study areas for the traffic, noise and air quality topics are mentioned in specific technical chapters, as highlighted in paragraph 11.1.1.3.

11.2 Legislation, Policy and Guidance

11.2.1.1 A summary of the key legislation, policy and guidance relevant to health is provided in Appendix M of the RTS EIA Scoping Report (Environment Agency and Surrey County Council, October 2022) (the 'EIA Scoping Report').

11.2.1.2 The National Policy Statement for Water Resources Infrastructure (NPS) has been updated and finalised (Defra, 2023a). In relation to health, the NPS now states that where the proposed project has likely significant environmental impacts that would have an effect on human population or health, the applicant should identify and set out the assessment of any likely significant health impacts. It goes on to state that applicants should consider the cumulative impacts on health and measures to avoid, reduce or compensate for negative health impacts and seek enhancement opportunities as appropriate.

11.2.1.3 The NPS states that "*access to high quality open spaces and the countryside and opportunities for sport and recreation can be a means of providing necessary mitigation and/or compensation requirements. There is good and growing evidence that connecting people with green space can deliver positive health outcomes through the prevention of mental ill-health, as an alternative option for managing mild to moderate mental health conditions and in some cases supporting the management of more severe conditions. It can also deliver important benefits for recreation, physical health, social well-being and employment. Green and blue infrastructure can also enable developments to provide positive environmental, social, health and economic benefits*."

11.2.1.4 The following new guidance documents have been published since the EIA Scoping Report and have informed the approach to the assessment:

- IEMA – Determining Significance for Human Health in Environmental Impact Assessment (IEMA, 2022b). This new guidance provides guidance on what should be included within the scope of human health. This includes explaining the range of issues that can be relevant within an EIA, including not only health protection, but also health promotion and healthcare service considerations.
- IEMA – Effective Scoping of Human Health in Environmental Impact Assessment (IEMA, 2022c). This guide explains how human health significance relates to the degree and context of changes in population health, including effects on vulnerable groups. This is explained with reference to public health evidence sources and consistent judgement criteria.

11.2.1.5 Based on recommendations from local authorities and Environment Agency within the EIA Scoping Opinion, these existing guidance documents have been included:

- Wales Health Impact Assessment Support Unit (WHIASU) – Health Impact Assessment Overview (WHIASU, 2020a). This provides an overview on a Health Impact Assessment (HIA).
- Wales Health Impact Assessment Support Unit (WHIASU) – Health Impact Assessment: A Practical Guide (WHIASU, 2020b). The guide is a toolkit for practitioners and those who may have an interest in using the process as part of their work.

11.2.1.6 Health assessment policy and guidance is now being adopted by greater numbers of local authorities, although this typically aligns with the UK Health Security Agency (UKHSA) and Town and Country Planning Association (TCPA) guidance. Since the EIA Scoping Report, London Borough of Richmond upon Thames (LBRUT) has updated its Health Impact Assessment (HIA) Guidance for developers, which was published in 2022. This HIA Guidance supports existing policies in the Council's adopted Richmond Local Plan and draft Local Plan. The new guidance has been reflected in our approach to the assessment in the PEIR.

11.3 Engagement

11.3.1 Responses to EIA Scoping

11.3.1.1 Table 11-1 below summarises the comments and responses received on the Scoping Report following formal submission to the Planning Inspectorate (PINS) including the PINS EIA Scoping Opinion (dated 15 November 2022) ('the PINS Scoping Opinion') and any key comments received from statutory consultees. Full responses to consultee comments on our EIA Scoping Report and our responses to these comments are provided in Appendix 4.1.

Table 11-1: Responses to comments received on the EIA Scoping Report

Consultee or Organisation	Summary of Comment	Project Response
PINS	The Environmental Statement (ES) should describe how the scheme alters drainage patterns, based on modelling, and how this alters flood risk from all sources across the study area. Likely significant effects on health from altered flood risk should be set out in the ES where they are likely to occur.	Changes in flood risk will be detailed in the Flood Risk Assessment (FRA) accompanying the Development Consent Order (DCO) application as well as in the ES. The likely significant effects considered in this chapter include changes to flood risk during construction and operation.
PINS	The Inspectorate agrees to scope out risk of the Proposed Development on public health and safety on the basis it will be assessed and mitigated in an	A PSRA will be prepared and included in the DCO application.

Consultee or Organisation	Summary of Comment	Project Response
	appropriate Public Safety Risk Assessment (PSRA) that will inform the design of the Proposed Development and will be submitted with the application.	It is not covered in the health assessment in the PEIR.
PINS	The Scoping Report suggests that loss of access to existing public open spaces should be scoped out on the basis that either no public open space is affected, or replacement public open space would be provided as part of the Proposed Development design. The ES should demonstrate how any loss of public open space has been adequately mitigated to avoid a significant effect. The value of any existing open space to be lost should be explained.	There may be some minor temporary losses of public open space during the construction period, for example for access or working areas. Details are to be confirmed and will be considered in the ES, including the value of open spaces. For the PEIR, a precautionary approach has been taken.
PINS/ Local Planning Authority (LPA) Project Group	The Inspectorate notes that the baseline year is 2021 during the pandemic. Covid-19 may have influenced human health indices, for example, reduced vehicle emissions may skew associated health indicators such as rates of asthma. Where it is possible and appropriate to do so, such datasets should be validated, and the ES should explain the limitations and assumptions made in relation to 2021 being used as a baseline.	The pandemic changed patterns of behaviour which could well have implications for health determinants such as air quality. However, there will be a considerable time lag before effects like this filter through into changes in health outcomes which are then reflected in health indicators, and it is unlikely that the Covid-19 pandemic will have affected health indicators published during 2021. It is considered that using 2021 as the baseline year for the assessment provides consistency with the recently published data from the 2021 Census which was not available for the preparation of the EIA Scoping Report.
LPA Project Group	Engagement list does not include Local Authority Environmental Health	Environmental Health Officers have been engaged in relation to

Consultee or Organisation	Summary of Comment	Project Response
	Departments but rather is through the County Public Health Team. In order to reach specialists in air quality and noise it would be prudent to also consult the Senior Environmental Health Managers for the Project Group.	air quality and noise effects. A separate workshop for the health assessment has not been undertaken to date but is planned.
LPA Project Group	In addition to understanding the baseline characteristics, engagement with local authority public health officers should include discussion of local health priorities and how the Scheme can support these. The Applicant should seek the public health officer's local knowledge of vulnerable groups, to be considered in the assessment.	LPA equalities officers were consulted via a workshop that took place on 20th July 2023 as part of the Equality Impact Assessment (EqIA) process for the DCO. This session provided valuable local intelligence on vulnerable groups in the study area. We are planning a similar workshop with LPA health officers.
LPA Project Group	The health baseline should include data that is relevant to the potential impacts of the RTS, where available. An example is air quality and related baseline on percentage of the community with respiratory diseases/ chronic obstructive pulmonary disease (and relevant source data). Another example is outdoor recreation in relation to current activity levels of the population in the Study Area (Sports England Active Lives data tables). The assessment should then identify how the RTS could influence this baseline.	A revised baseline to include wider health data and related assessment will be provided in the ES.
LPA Project Group	The Wales Health Impact Assessment Support Unit (WHIASU) provides a list of potential vulnerable groups that should be reviewed to ensure all potential groups are captured. Consideration should be given to relevant vulnerable groups in the assessment and during consultation,	Vulnerable groups (based on the WHIASU potential vulnerable group list) are listed in the assessment methodology at Section 11.4.3 of this Chapter.

Consultee or Organisation	Summary of Comment	Project Response
	and any specific mitigation to reduce impacts on vulnerable groups should be identified.	
LPA Project Group	It is advised that the Applicant use the Middle Super Output Area (MSOA) level data, as health data is aggregated at this level. This would allow for more direct comparisons between datasets. Furthermore, MSOA level data are more stable over time compared to wards.	The PEIR addresses this query by revising the health study area, which now comprises of 23 MSOAs. The baseline at Appendix 11.1 has been updated with an average of the MSOA data for the study area.
LPA Project Group	Consideration should be given to the role that lighting may provide in reducing crime/ fear of crime, especially in areas of the RTS which may not benefit from natural surveillance.	The consideration of landscape design and personal security, specifically for people with protected characteristics, will be covered as part of the EqIA process and not considered further in the health chapter.
LPA Project Group	Consideration should be given to how vulnerable groups will be considered within the consequent stages of the RTS's design and consultation. For example, shading and suitable paving along active travel routes, and provision of benches and a range of seating areas will help to ensure the elderly, pregnant women and those with pre-existing health conditions can benefit from the RTS. The mitigation section of the ES should set out how these elements will be considered and secured during the detailed design phases.	This information will be included in the EqIA process for RTS, which helps ensure that the design, construction and operation of the scheme does not disadvantage these groups.
LPA Project Group	The Applicant has referenced the Healthy Urban Development Unit (HUDU) rapid HIA toolkit (2019) within Chapter 23 References, however it's not clear how the toolkit will be utilised in the health assessment.	The HUDU Healthy Urban Planning Checklist (2017) will not be used as the main basis for this assessment. Therefore, reference to the HUDU rapid HIA toolkit (2019) has been removed.

Consultee or Organisation	Summary of Comment	Project Response
		The guidance now used for this assessment is set out in Section 11.2 of this Chapter.
LPA Project Group	The magnitude of effect should also consider whether any vulnerable groups are likely to be affected by the impact, and whether the impact is linked to a local public health priority/ objective. The scientific literature/ strength of evidence base linking the aspect of the RTS to health outcomes should also be considered. The Human health: ensuring a high level of protection (International Association of Impact Assessment, 2020) paper sets out how contextual considerations should support a robust reasoned conclusion on significance.	These magnitude criteria are taken from UKHSA's "Advice on the content of Environmental Statements accompanying an application under the Nationally Significant Infrastructure Planning Regime". Therefore, further discussions are required to understand how effects on vulnerable groups can be included within the existing UKHSA guidance on the magnitude of change related to vulnerable groups. The guidance now used for this assessment is set out in Section 11.2 of this Chapter. Links to reference material can be found in Appendix 11.2.

11.3.2 Other Engagement since EIA Scoping

11.3.2.1 Section 11.2.2 of our EIA Scoping Report summarises the stakeholder engagement relevant to Health that was undertaken prior to submission of the EIA Scoping Report.

11.3.2.2 As set out in the table above, LPA equalities officers were consulted via a workshop that took place on 20th July 2023 as part of the Equality Impact Assessment (EqIA) process for RTS. This session provided valuable local intelligence on vulnerable groups in the study area (also refer to 11.4.3.5 below). We are planning a similar workshop with LPA health officers to help inform the ES.

11.4 Methodology

11.4.1 Introduction

11.4.1.1 This section should be read in conjunction with Chapter 4 'Approach to the Environmental Assessment' which sets out relevant information on the design parameters and information that have informed the PEIR assessment, and how we have approached various aspects of the assessment including:

- The scope of the assessment;
- The methodology (including the approach to defining the baseline environment, topic study areas, and assessment methodology and criteria);
- The approach to mitigation; and
- The approach to cumulative effects.

11.4.1.2 The assessment methodology used for the Health assessment in this PEIR and to be used in the ES is presented in Section 11.7 of the EIA Scoping Report and updated below in Section 11.4.3.

11.4.2 Baseline Methodology

11.4.2.1 We have used a desktop assessment to prepare the health baseline, using a range of data sources as set out in Section 11.2 of the EIA Scoping Report.

11.4.2.2 According to the Design Manual for Roads and Bridges (DMRB) LA 112 'Population and human health' (Highways England, 2020c), there is a requirement to establish baseline health profiles of the health study area which should consider the following datasets:

- Percentage of community with increased susceptibility to health issues (vulnerable members, e.g. <16 & >65);
- Percentage of community with pre-existing health issues, e.g. respiratory disease/chronic obstructive pulmonary disease (COPD);
- Deaths from respiratory diseases;
- Percentage of community with long term illness or disability;
- General health;
- Life expectancy; and

- Income deprivation.

11.4.2.3 Data for general health, disability and deprivation are summarised in Appendix 11.1; other health profiles will be collected for the ES. Furthermore, DMRB LA 112 Section 3.26 also notes the requirement to identify health determinants. Health determinants are a diverse range of social, economic and environmental factors which influence people's mental and physical health and social wellbeing and will be included in the ES.

11.4.3 Assessment Methodology

Vulnerable groups

11.4.3.1 This PEIR has identified key vulnerable groups who may be disproportionately affected by the RTS and these will used in the subsequent assessment. WHIASU provides a list of potential vulnerable groups (outlined below), which will be used to ensure that all potentially affected groups are captured. These vulnerable groups include:

Age related groups

- Children and young people; and
- Older people.

Income related groups

- People on low income;
- Economically inactive;
- Unemployed/workless; and
- People who are unable to work due to ill health.

Groups who suffer discrimination or other social disadvantage

- People with physical or learning disabilities/difficulties;
- Refugee groups;
- People seeking asylum;
- Travellers[1];

[1] Travellers is a broad term used in encompass all groups that fit under this term such as Gypsies and Romany peoples.

- Single parent families;
- Lesbian and gay and transgender people;
- Black and minority ethnic groups; and
- Religious groups.

Geographical groups

- People living in areas known to exhibit poor economic and/or health indicators;
- People living in isolated/over-populated areas; and
- People unable to access services and facilities.

11.4.3.2 We will consider relevant vulnerable groups in the consultation and assessment stages in the ES, with any specific mitigation recommended to reduce impacts on vulnerable groups, where identified.

Significance Criteria

11.4.3.3 There is no definitive single guidance or methodology for defining the significance criteria for health effects. However, the significance criteria set out below has been updated since the EIA Scoping Report and will (in this PEIR and the ES) use the Institute of Environmental Management and Assessments (IEMA) "*Determining Significance for Human Health in Environmental Impact Assessment*". This guidance discusses what 'significance' means for 'human health' as an EIA topic and will be applied to the assessment in the ES. This guidance has *"been produced, both to inform current practice and in anticipation of potential changes to the way that EIA is undertaken in the UK and Republic of Ireland, and addresses inequalities and population health as environmental outcomes of a project"* (IEMA, 2022b).

11.4.3.4 The assessment will continue to be informed by the following sources:

- Former Public Health England's (PHE) *"Advice on the content of Environmental Statements accompanying an application under the Nationally Significant Infrastructure Planning (NSIP) Regime"* (PHE, 2021) is guidance related to significance determination in EIAs.
- The DMRB LA 112 'Population and human health' is a guidance document that provides advice on assessing human health effects. The DMRB outlines guidance for scoping, baseline and assessment, mitigation and reporting stages (Highways England, 2020c).

Sensitivity

11.4.3.5 As explained in the IEMA guidance, sensitivity assessments should consider determinants linked to vulnerable groups. However, it is important to note that several groups with protected characteristics as defined by the Equality Act 2010 are not necessarily considered as vulnerable. Therefore, the effects on protected characteristic groups will be assessed separately within the EqIA to be undertaken as part of the DCO application.

11.4.3.6 The IEMA "*Determining Significance for Human Health in Environmental Impact Assessment*" guidance will be used to define receptor sensitivity to determine the significance of effects. The sensitivity of receptors pays particular attention to the ability of receptors to respond to change that may arise as a result of the project. The sensitivity of receptors will be categorised into high, moderate and low as outlined below. The categorisation of sensitivity is based on good practice, professional judgement and experience on other projects.

<u>High sensitivity</u>

- 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; and
- Dependants; people with very poor health status; and/or people with a very low capacity to adapt.

<u>Moderate sensitivity</u>

- 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; and

- People with poor health status; and/or people with a limited capacity to adapt.

Low sensitivity

- Low levels of deprivation; many alternatives to shared resources;
- Existing narrowing inequalities between the most and least healthy; a community whose outlook is predominantly ambivalence with some concern;
- People who are slightly limited from undertaking daily activities;
- People providing or requiring some care; people with fair health status; and/or
- People with a high capacity to adapt.

Negligible sensitivity

- 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.

Magnitude

11.4.3.7 We will use the IEMA "*Determining Significance for Human Health in Environmental Impact Assessment*" guidance to define impact magnitude to determine the significance of effects. The magnitude (scale) of effects will be defined using the following criteria:

High magnitude

- 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.

Medium magnitude

- 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 magnitude

- 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 magnitude

- 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.

11.4.3.8 For the ES, the assessment of environmental effects will use the criteria shown in Table 11-2 below. After establishing the sensitivity of the receptor and assessing the magnitude of change using the criteria above, the effect on the receptor can be determined as either significant (major or moderate effects) or not significant (minor or negligible effects).

Table 11-2: Determination of significance of environmental effects (Sensitivity of Receptor & Magnitude of Change)

	High Sensitivity	**Moderate** Sensitivity	**Low** Sensitivity	**Negligible** Sensitivity
High Magnitude	Major (Significant)	Major / moderate (Significant)	Moderate / minor (Significant)	Minor / negligible
Medium Magnitude	Major / moderate (Significant)	Moderate (Significant)	Minor	Minor / negligible
Low Magnitude	Moderate / minor (Significant)	Minor	Minor	Negligible
Negligible Magnitude	Minor / negligible	Minor / negligible	Negligible	Negligible

11.4.3.9 The significant effects detailed in Table 11-2 are defined as follows:

Major (significant)

- Changes, due to the project, have a substantial effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size (magnitude and sensitivity levels), and as informed by consultation themes among stakeholders, particularly public health stakeholders, that show consensus on the importance of the effect.
- Change, due to the project, could result in a regulatory threshold or statutory standard being crossed (if applicable).
- There is likely to be a substantial change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is a causal relationship between changes that would result from the project and changes to health outcomes.
- In addition, health priorities for the relevant study area are of specific relevance to the determinant of health or population group affected by the project.

Moderate (significant)

- Changes due to the project, have an influential effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size, and as informed by consultation themes among stakeholders, which may show mixed views.
- Change, due to the project, could result in a regulatory threshold or statutory standard being approached (if applicable).
- There is likely to be a small change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is a clear relationship between changes that would result from the project and changes to health outcomes.
- In addition, health priorities for the relevant study area are of general relevance to the determinant of health or population group affected by the project.

Minor (not significant)

- Changes, due to the project, have a marginal effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size of limited policy influence and/or that no relevant consultation themes emerge among stakeholders.
- Change, due to the project, would be well within a regulatory threshold or statutory standard (if applicable); but could result in a guideline being crossed (if applicable).
- There is likely to be a slight change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is only a suggestive relationship between changes that would result from the project and changes to health outcomes.
- In addition, health priorities for the relevant study area are of low relevance to the determinant of health or population group affected by the project.

Negligible (not significant)

- Changes, due to the project, are not related to the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size or lack of relevant policy, and

as informed by the project having no responses on this issue among stakeholders.

- Change, due to the project, would not affect a regulatory threshold, statutory standard or guideline (if applicable).
- There is likely to be a very limited change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is an unsupported relationship between changes that would result from the project and changes to health outcomes.
- In addition, health priorities for the relevant study area are not relevant to the determinant of health or population group affected by the project.

11.5 Key Environmental Considerations and Opportunities

11.5.1.1 The key considerations with respect to health are:

- Recreational or open space assets are sensitive to land use changes and development that may reduce the availability of land for these uses;
- Lakes within the study area which are used for recreation are sensitive to changes in lake water quality. Deterioration of lake quality can affect the use of these lakes for recreation;
- Communities vulnerable to changes to air quality, noise, traffic, access and other factors; and
- Recreational activities within the lakes, gravel pits and River Thames are sensitive to changes (for example changes in water quality) which may restrict access to these resources.

11.5.1.2 The key opportunities with respect to health are:

- Overall improvement of health and wellbeing and the reduction of health inequalities due to improved green space;
- Improved connectivity between communities due to increased access;
- Creating more sustainable and greener travel options, by introducing active travel routes;
- Creating new green open spaces and multi-functional landscaped spaces that are inclusive to the needs and abilities of different

people, as well as providing people with opportunities for connection with nature;
- Providing new accessible areas of waterway and opportunities for localised navigation and recreation;
- Providing new outdoor spaces for social interaction and good health; and
- Reduced flood risk to vulnerable groups, residential dwellings, businesses and community facilities could increase health and wellbeing through a reduction in stress/anxiety.

11.6 Primary and Tertiary Mitigation

11.6.1 Primary Mitigation

11.6.1.1 The following primary mitigation is proposed in relation to health effects. For further detail of these measures see Chapter 2 Project Description.

- The sequential approach – the proposed project components will be appropriately located in the areas of lowest flood risk where feasible and adhere to what is appropriate based on their vulnerability. This reduces health risks from flooding such as anxiety and physical injury.
- Integrated landscape design process - aims to sensitively integrate all project components within the existing landscape. This should include sensitively locating material stockpiles, screening of construction components and consideration of public space to be inclusive and meet the needs of vulnerable groups. This minimises health effects related to amenity and limiting access to green space for exercise during construction and maximises benefits during operation.
- Management of augmented flow - a small, continuous flow into the flood channels to maintain water quality by preventing stagnation of water in the flood channel and lakes, reducing the risk of algal blooms and eutrophication. This reduces related health risks during activities such as exercise due to algal blooms or waterborne illness for users of waterbodies.

11.6.2 Tertiary Mitigation

11.6.2.1 The following tertiary mitigation is proposed in relation to the health effects assessed within our PEIR. Many of these measures will also serve as mitigation for other environmental effects including air quality; noise; water and flooding; soils and land-use; materials and waste; landscape and socio-economic; and traffic:

- **Standard construction practices – Air quality:** for example, mitigation measures in accordance with the following Institute of Air Quality Management (IAQM) guidance documents: 'Guidance on the assessment of dust from demolition and construction' (2014) and 'Guidance on the Assessment of Minerals Dust Impacts' (2016). These measures reduce health risks from dust such as asthma and respiratory disease.
- **Air Quality Management Plan:** to include measures associated with managing dust and air quality during earthworks, demolition, construction activities, vehicle movements, odour and monitoring. These measures reduce health risks from dust and vehicle emissions such as asthma and respiratory disease.
- **Best Practicable Means noise and vibration mitigation:** for example, selection of quieter equipment or working methods, temporary screening, majority of construction work to take place during normal working hours. These measures reduce health risks such as stress and quality of sleep from noise disturbance.
- **Construction Surface Water Management Plan:** this could include measures such as design of stockpiles, sized and orientated to not obstruct storm surface water flow paths; and design of the sequencing and timing of works to optimise storm water storage. These measures reduce health risks from flooding such as anxiety and physical injury.
- **Construction flood protocol / Construction Emergency Planning**: to include sequencing of construction to enable safe flood response management and associated procedures of working in a floodplain (in accordance with PPG 2022). These measures reduce health risks from flooding such as anxiety and physical injury.
- **Standard construction practices – Handling of soils**: mitigation measures in accordance with documents such as Good Practice Guide for Handling Soils (The Institute of Quarrying (IQ), 2021).

These measures reduce health risks associated with poor air quality and odours, such as asthma and respiratory disease.

- **Site Waste Management Plan**: this sets out the amount and type of waste and how it will be reused, recycled or disposed of in accordance with legislation. These measures can reduce vehicle movements associated with waste and thereby health risks associated with vehicle emissions such as asthma and respiratory disease.
- **Materials Management Strategy:** this details efficient management proposals for processing, recovery, or re-use of materials and waste generated by the project, mitigating the need to import materials from off-site, and minimise the volume of unsuitable materials requiring off-site disposal. These measures reduce health risks associated with vehicle emissions such as asthma and respiratory disease by reducing the number of vehicle movements.
- **Standard construction practices – Waste & Materials Management:** this would include mitigation measures in accordance with legislation and guidance, for further details see the tertiary mitigation section of Chapter 13: Materials and Waste. In particular, for the purposes of this PEIR assessment, environmental permits for waste have been relied upon as mitigation in relation to potential spread of contaminants, with the assumption that these are in place. These measures reduce health risks associated with contamination such as stomach disorders and physical effects.
- **Application of the waste hierarchy**: for example, minimise generation of waste, reuse of arisings, treatment of waste to make it suitable for reuse etc. These measures reduce health risks associated with dust and vehicle emissions (from transportation of waste) such as asthma and respiratory disease by reducing the number of vehicle movements.
- **Standard construction practices – Amenity:** for example, mitigation measures such as appropriate designs of construction fencing and hoarding surrounding construction areas; location of construction-related visually obtrusive activities away from sensitive receptors such as existing residential properties. These measures improve amenity value and reduces health risks such as anxiety.
- **Artificial lighting to be restricted** to control light spill. This reduces health risks such as sleep-deprivation and stress.

- **Stakeholder Engagement** Plan to include engagement with residents, businesses and other members of the public to keep them informed about the proposed construction works (e.g. locations, timing, duration, any impacts on access and alternative routes available etc) to minimise disturbance. This helps reduce health effects related to anxiety and inadequate physical activity.
- **Construction Travel Plan:** aims to proactively manage and influence workforce (and visitor) travel to and from worksites to limit traffic movement and reduce disruption in the vicinity of the site. This reduces health risks associated with vehicle emissions such as asthma and respiratory disease.
- **Construction Public Right of Way (PRoW) Management Plan**: including details of temporary stopping up and diversions**.** This reduces health effects associated with limiting access to greenspace such as anxiety, low mood, and limiting exercise.
- **Operational Travel Plan:** aims to proactively manage and influence employee (and visitor) travel to and from facilities being provided at the New Green and Blue Open Spaces, to encourage the use of sustainable travel methods and reduce network disruption locally to these facilities. This reduces health risks associated with vehicle emissions such as asthma and respiratory disease.
- **Construction Traffic Management Plan:** aims to ensure all highways works are safe, planned and co-ordinated in order to secure the expeditious movement of traffic on the road network; and to minimise inconvenience to the public. This reduces health risks associated with vehicle emissions such as asthma and respiratory disease.
- **Construction Logistics Plan**: aims to detail the logistics management arrangements for worksites to minimise effects on communities and the environment from transportation of construction materials/waste. This reduces health risks associated with vehicle emissions such as asthma and respiratory disease.
- **Risk assessment / modelling of landfill gas migration and leachate migration**: desk-based assessments using ground investigation data to understand and mitigate the potential effects of landfill gas and leachate migrating out of landfills under compression from project components. This reduces health risks associated with contamination such as stomach disorders and physical effects.

11.7 Preliminary Assessment of Likely Significant Effects

11.7.1 Introduction

11.7.1.1 Our PEIR adopts a precautionary approach. Assessments reported within this chapter are a preliminary assessment of potential likely significant environmental effects based on the design parameters set out in Chapter 2. This precautionary approach has been taken for the PEIR as there is some information on the project that is currently incomplete and the parameters within Chapter 2 are high level and account for a range of uses and allowance for design development within a boundary that could possibly be refined once this work has been completed. For example, some designs, construction and mitigation details (and therefore also land requirements) or baseline information is still required from further surveys, assessments and/or consultation feedback. In making a determination of likely significant effects, we have considered the sensitivity of receptors (a receptor being a feature of the environment that responds to change) and the potential magnitude (i.e. size) of change caused by the RTS. The methodology for defining sensitivity and magnitude is defined in Section 11.4.3.

11.7.1.2 We are committed to including mitigation measures as necessary to address likely significant negative environmental effects as far as reasonably practicable. Both primary and tertiary mitigation are considered to form part of the RTS; those applicable to this topic are set out in Section 11.6. Several of these mitigation measures are still being developed, and therefore as a precaution, the preliminary assessment of effects for our PEIR does not assume full achievement of these in considering if a project effect is likely to be significant (Appendix 4.2 identifies the implementation status of primary and tertiary mitigation for the PEIR assessment). Furthermore, the potential likely significant effects reported within our PEIR have been assessed prior to the implementation of secondary mitigation measures, those applicable to this topic are set out in Section 11.7.5. These secondary mitigation measures are the subject of further development; and given they are still being developed, are not able to be applied to develop a ‘residual’ effects assessment.

11.7.1.3 Our PEIR is based on the latest design and construction parameters and baseline information. As such the findings of the preliminary environmental appraisal presented within our PEIR may be subject to

change as the design progresses, as mitigation is further developed or information from further studies becomes available, such as our work to develop an adaptive augmented flow and further development of standard construction practices for air quality, amenity, waste and materials. The final assessment of effects undertaken as part of the EIA and reported within the ES will be based on the latest information available at that time.

11.7.2 Potential Likely Significant Effects

11.7.2.1 Our preliminary assessment of likely significant environmental effects has identified the potential for the following negative significant effects from construction in relation to health:

- Temporary risks to residents, including vulnerable groups from temporary increased emissions and dust due to the transportation of construction materials and waste that may exacerbate health risks including, but not limited to, asthma and respiratory disease.
- Temporary risks to residents from increased dust and particulate matter generated by construction activities that may exacerbate health risks including, but not limited to, asthma and respiratory disease.
- Temporary risks to residents, businesses and visitors, including vulnerable groups, from increased flood risk due to changes in the floodplain, which may cause or exacerbate health risks including, but not limited to, anxiety, physical injury and drowning.
- Temporary risks to residents and businesses operating on lakes, including vulnerable groups from changes at lakes in water quality and levels, hydromorphology, flow regime or sediment processes from construction of channels that may cause or exacerbate health risks including, but not limited to, water-borne illness and other physical effects.
- Temporary risks to residents, including vulnerable groups, visiting waterbodies and businesses on waterbodies, from worsened amenity values at bodies of water due to construction activities that may cause or exacerbate health risks including, but not limited to, anxiety due to limited access to open / blue space.
- Temporary risks to residents and workers, including vulnerable groups from increased traffic congestion from construction plant and

vehicles on local roads that may cause or exacerbate health risks including, but not limited to, stress and anxiety.

- Temporary risks to residents, including vulnerable groups from night-time light pollution from construction works that may cause or exacerbate health risks including, but not limited to, sleep deprivation, fatigue, stress and blood pressure.
- Temporary risks to residents and businesses, including vulnerable groups, from closures or reduced access at open / green spaces due to presence of construction works that may cause or exacerbate health risks including, but not limited to, anxiety due to limited access to open / green space and obesity due to limiting access to exercise.
- Temporary risks to residents, including vulnerable groups, and businesses from airborne noise from construction plant and methods causing a disturbance to residential receptors near construction areas that may cause or exacerbate health risks including, but not limited to, stress and quality of sleep.

11.7.2.2 Our preliminary assessment of likely significant environmental effects has identified the potential for the following significant negative effects from operation in relation to health:

- Permanent risks to residents, including vulnerable groups, and businesses operating on lakes from fluctuations at lakes in water quality (from connectivity with other water bodies including the River Thames and from channel maintenance) and levels, hydromorphology, flow regime or sediment processes that may cause or exacerbate health risks including, but not limited to, water-borne illness and other physical effects.
- Permanent inability for residents and businesses to use lakes and flood channels from the introduction of River Thames water and potential pollution from maintenance; could potentially cause or exacerbate health risks including, but not limited to, anxiety, inadequate physical activity and obesity.
- Permanent risks to residents and businesses, including vulnerable groups, from increased traffic congestion from traffic on local roads that may cause or exacerbate health risks including, but not limited to, stress and anxiety.

11.7.2.3 Our preliminary assessment of likely significant environmental effects has identified the potential for the following significant positive effects from operation in relation to health:

- Permanent benefits from decreased risk to residents and businesses, including vulnerable groups, from flooding that may remove or reduce health risks including, but not limited to, anxiety, physical injury and drowning.
- Permanent improved access for residents and businesses, including vulnerable groups, to open and green space which may remove or reduce health risks including, but not limited to, anxiety, inadequate physical activity and obesity.
- Permanent improved public access (e.g. footpaths and cycle ways) and provision of recreational facilities (e.g. moorings and visitor facilities) for residents and businesses, including vulnerable groups may remove or reduce health risks including, but not limited to, anxiety, inadequate physical activity and obesity.
- Permanent benefits during flood events due to greater protection of some amenities.

11.7.2.4 Further details of the potential likely significant effects from construction and operation with respect to receptors, project components and project activities, in relation to health can be found in Table 1 and 2 in Appendix 11.3.

11.7.3 Potential Likely Non-Significant Effects

11.7.3.1 Further details of the non-significant effects from construction and operation with respect to receptors, project components and project activities, in relation to health can be found in Table 3 and 4 in Appendix 11.3.

11.7.3.2 Some examples of non-significant effects include (this is not an exhaustive list):

- Temporary closures of PRoW, cycling and equestrian routes during construction which may cause or exacerbate health risks such as anxiety and obesity due to limiting access to exercise.
- Permanent positive effects on health on visitors using new green and blue open spaces from physical activity.

11.7.4 In-Combination Climate Impact

11.7.4.1 Consideration of 'In-Combination Climate Impact' (ICCI) has been undertaken. The preliminary environmental assessment has considered a future climate scenario and has identified certain potential likely significant environmental effects for this topic which may be exacerbated further by predicted climate change. Further consideration of ICCI will be included in the ES.

11.7.5 Secondary Mitigation

11.7.5.1 As noted in Section 11.7.1.2, primary and tertiary mitigation are still being developed, and therefore as a precaution, the preliminary assessment of effects for our PEIR does not assume full achievement of these in considering if a project effect is likely to be significant. Furthermore, the potential likely significant effects reported within our PEIR have been assessed prior to the implementation of secondary mitigation measures. For the majority of the identified likely significant environmental effects it is considered likely that the primary and tertiary mitigation will be sufficient at ES stage such that no secondary mitigation will be required. Where secondary mitigation is already under consideration for potential significant environmental effects, this is detailed below.

11.7.5.2 In order to reduce the magnitude of significant effects, the following secondary mitigation is under consideration:

- Water quality monitoring (during construction) and subsequent remedial actions, where required, to ensure that effective water and waste management plans (tertiary mitigation) are mitigating the risk to human health from waterborne illness or other physical effects.
- Additional location best practicable means and/or receptor specific noise mitigation may be specified during construction, for example, physical mitigation such as barriers or noise insulation improvements; or monitoring. These measures reduce health risks such as stress and quality of sleep from noise disturbance.
- Water quality monitoring (during operation) and subsequent remedial actions, where required, to enable management of augmented flow to reduce the risk to human health from waterborne illness or other physical effects.

- Junction / Highway Improvements may be required to improve traffic flow and reduce effects relating to congestion such as stress and anxiety.

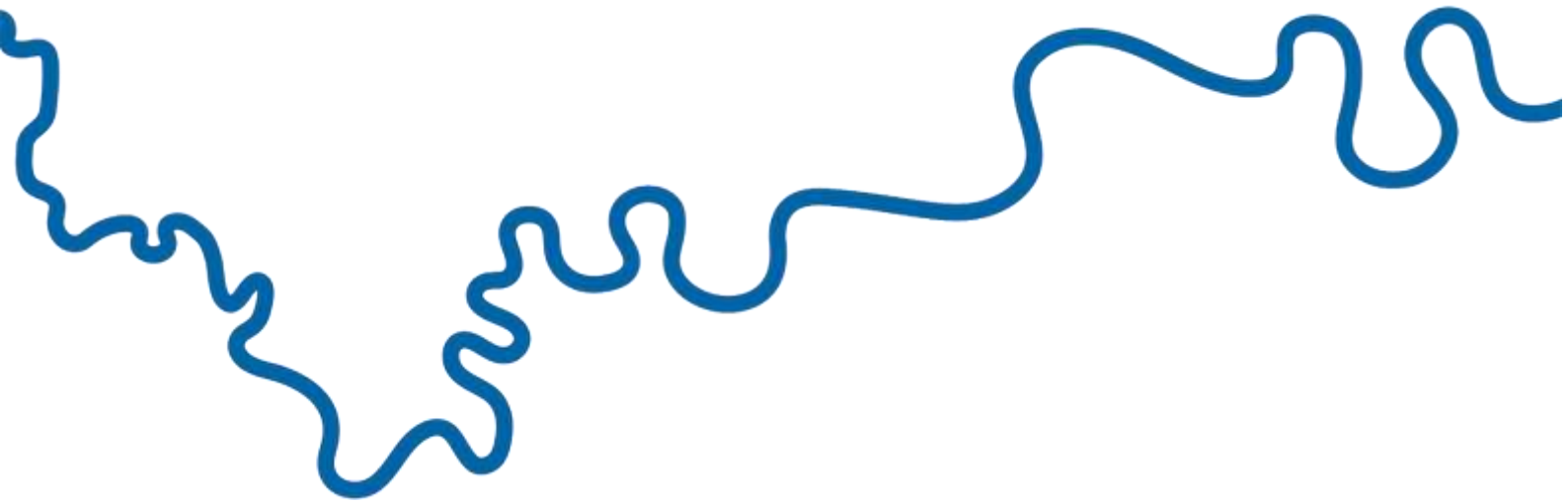
11.8 Further Work for the EIA

11.8.1.1 The assessment for this chapter has drawn on effects from related topics. The development of mitigation and further assessment as part of the ES for many of these topics, in particular, air quality, flood risk, landscape, materials and waste, noise and vibration, traffic and transport and water environment, will better inform the assessment of health-related effects.

11.8.1.2 A detailed assessment of the effects from construction and operation on human health from the project will be undertaken and documented in the ES in accordance with the methodology set out in Section 11.4 above.

11.8.1.3 The assessment will be based on the effects scoped in the assessment and documented within this PEIR. It will continue to be informed by relevant aspects of PINS EIA Scoping Opinion and be informed by any additional baseline information that may become available, particularly on the distribution of vulnerable groups in the health study area. The assessment will also take account of further information received during the statutory consultation process.

The assessment will state the predicted significance of effects, provide further detail of relevant mitigation and document the subsequent residual effects. We consider that the further development of the project design and mitigation measures which will be reflected in the ES and DCO application, will enable a reduction in the scale of identified negative likely significant effects set out in this chapter.



SURREY COUNTY COUNCIL

Environment Agency

The River Thames Scheme represents a new landscape-based approach to creating healthier, more resilient and more sustainable communities by mitigating the risk of flooding and creating high quality natural environments.

River Thames
Scheme