

A46 Coventry junctions
(Walsgrave)

Preliminary Environmental
Information Report

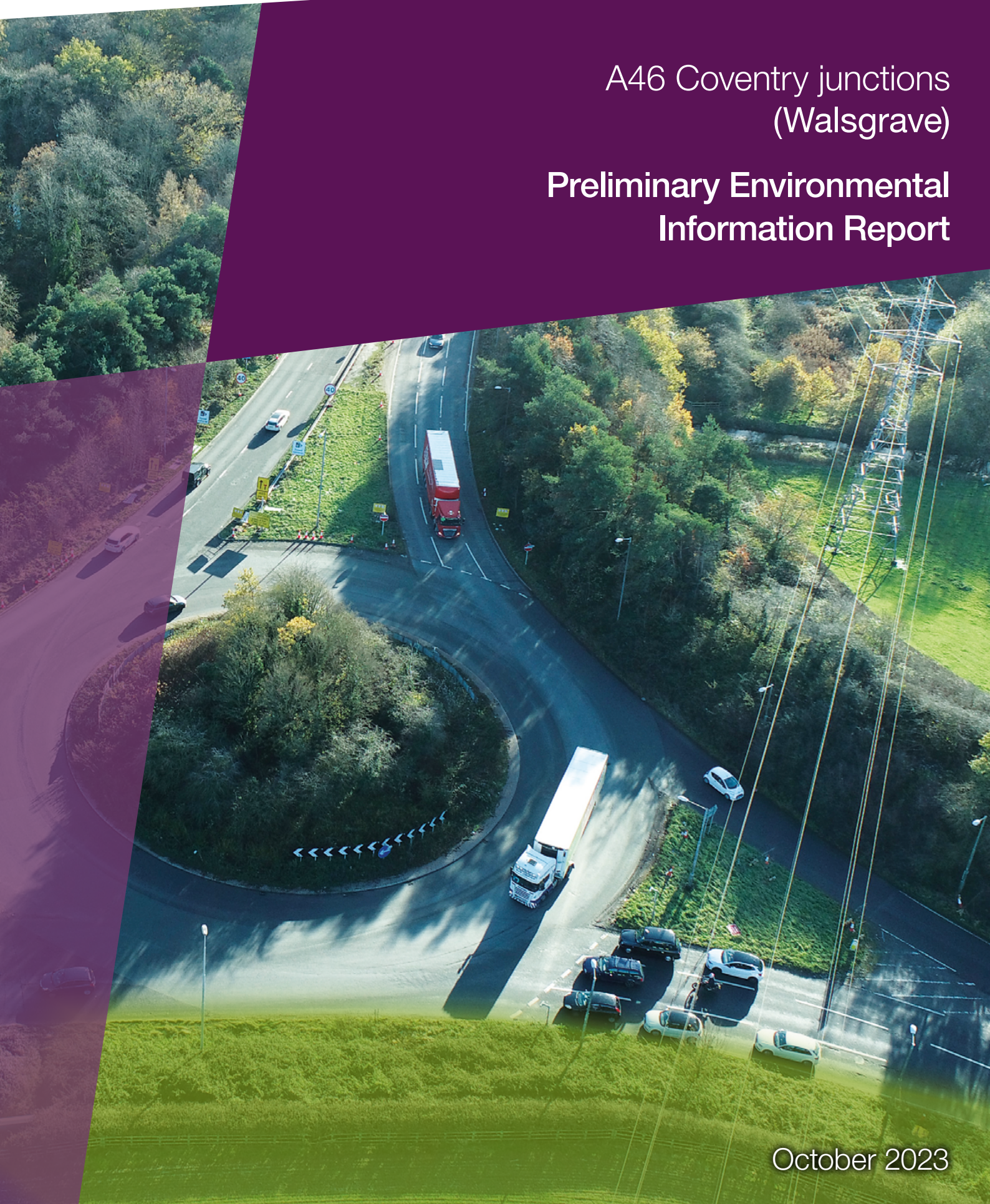


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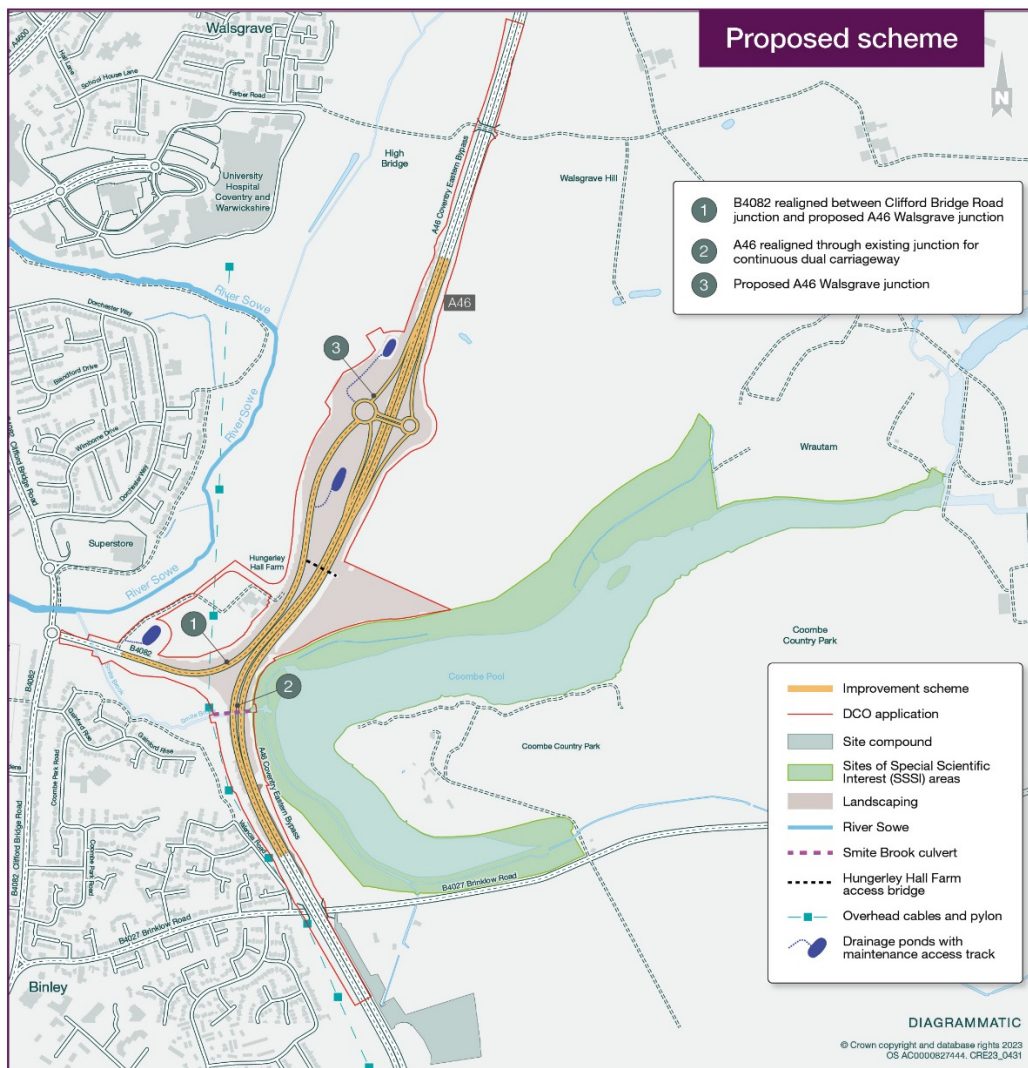
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1. Introduction

1.1. Overview of the Scheme

- 1.1.1. The A46 Coventry junctions (Walsgrave) ('the Scheme') comprises of an upgrade to the junction of the A46 Coventry Eastern bypass and the B4082, east of Walsgrave. The Scheme is being progressed by National Highways to ease congestion and reduce queuing along the A46 corridor, east of Coventry.
- 1.1.2. The Scheme forms part of a wider scheme of improvements to the A46 which are being delivered by National Highways to connect the M6 and the M69 to the M40. The A46 is a non-continuous route which begins east of Bath and ends in Cleethorpes. The A46 connects a number of major employment sites to the wider motorway network and forms a key element of the north to south travel movements in the area.

Figure 1.1 The Scheme.



1.2. Purpose of this report

- 1.2.1. The Scheme is a Nationally Significant Infrastructure Project (NSIP) being progressed by National Highways. This is the Preliminary Environmental Information Report (PEIR) for the Scheme, which has been produced to support the statutory consultation. The PEIR includes environmental information to enable consultees (both specialist and non-specialist) to understand the likely environmental effects of the Scheme, and measures proposed to mitigate such effects, to help inform their consultation responses during the pre-application stage. This PEIR is based on the environmental information available at the time.
- 1.2.2. The Scheme is now in the Preliminary Design stage, which includes:
- undertaking surveys (such as topographical, geotechnical and environmental)
 - consulting with the community and stakeholders including exhibitions, completing consultation reports and resolving outstanding issues where feasible
 - refining, completing and freezing the preliminary design
 - preparing the draft Development Consent Order (DCO) application
 - completing the Environmental Impact Assessment (EIA) and preparing the Environmental Statement (ES)
- 1.2.3. This PEIR forms part of the consultation material to support the statutory consultation process under the Planning Act 2008. This PEIR has been prepared in line with guidance provided in Advice Note Seven: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping (Planning Inspectorate, 2020).
- 1.2.4. A separate Non-Technical Summary (NTS) for the PEIR has been produced to support the statutory consultation. The NTS presents the information in the PEIR in non-technical language which can be understood by a wider audience.
- 1.2.5. Preliminary Environmental Information (PEI) is defined in the Infrastructure Planning (EIA) Regulations 2017 in Regulation 12(2) as

In this regulation, 'preliminary environmental information' means information referred to in regulation 14(2) which:

(a) has been compiled by the applicant; and

(b) is reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development (and of any associated developments)

- 1.2.6. Regulation 14 sets out the information which is to be included in an ES and this is detailed in Table 1-2.
- 1.2.7. Feedback received from this consultation will be taken into consideration within both the design of the Scheme and the preparation of the ES.

1.3. The applicant

- 1.3.1. National Highways is the developer of the Scheme ('the Applicant'). National Highways is a Government-owned company which plans, designs, builds, operates and maintains the Strategic Road Network (SRN) in England, which includes all motorways and major A-roads (also known as trunk roads).

1.4. Legislative overview

- 1.4.1. The Planning Act 2008 is the legislative instrument for determining NSIPs. The Scheme is an NSIP within Sections 14(1)(h) and 22 of the Planning Act 2008. Under Section 22, an NSIP must fall within one of the three categories specified, which are expressly stated to be alternatives. The Scheme is an 'alteration of a highway' under Sections 22(1)(b), 22(3) and 22(4)(b).
- 1.4.2. The Scheme is defined as an NSIP under the Planning Act 2008 by virtue of the fact that it meets the following conditions:
 - the highway is wholly in England
 - the Applicant as a strategic highways company, will be the highway authority for the highway
 - the area of land on which the highway is to be altered and any adjoining land expected to be used in connection with its alteration, is greater than the limit of 12.5 hectares; and the speed limit for any class of vehicle on the highway is to be 50 miles per hour or greater
- 1.4.3. In accordance with the legislation, a DCO is therefore required to allow the construction and operation of the Scheme. National Highways intends to submit a DCO application to the Planning Inspectorate on behalf of the Secretary of State in autumn 2024.
- 1.4.4. The Scheme is currently in the pre-application stage of the DCO process. This involves developing the design and undertaking all necessary assessment and consultation before submitting the DCO application. See Section 1.7 for more information on the next steps of the DCO process.
- 1.4.5. The Scheme falls within paragraph 10(f) of Schedule 2 to the Infrastructure Planning (EIA) Regulations 2017 (the 'EIA Regulations') ('construction of roads'). By virtue of the fact that the potential for significant environmental effects has

been identified, an ES will be prepared to accompany the DCO application. In accordance with Regulation 8 (1b) the Planning Inspectorate was informed of the intention to submit an ES on 30th June 2023.

- 1.4.6. The ES will be provided in accordance with the requirements of Regulation 14 of the Infrastructure Planning (EIA) Regulations 2017. These regulations are secondary legislation to complement the Planning Act 2008. These regulations provide the details and requirements as to when and how to carry out an EIA to support a DCO application.
- 1.4.7. An Environmental Scoping Report (ESR) was submitted to the Planning Inspectorate on 30 June 2023 to inform its Scoping Opinion. A Scoping Opinion was received on 10 August 2023 which included responses from the majority of the Statutory Environmental Bodies. The comments will be taken into account where appropriate and used to inform the EIA.
- 1.4.8. The results of the EIA will be documented in an ES which will be submitted as part of the DCO application.
- 1.4.9. This PEIR has been produced in advance of the ES, for statutory consultation. The information contained within this PEIR should be regarded as a preliminary account of the likely significant environmental effects identified and proposed mitigation up to the point of its publication in October 2023. Some aspects of the design of the Scheme are still being developed, environmental information collected, impacts assessed and proposed mitigation detailed – this will all feed into the EIA process that is currently being undertaken. The PEIR identifies any uncertainties and assumptions and the information included may be subject to change as the design evolution and environmental assessment work continues. This PEIR also sets out what information is still to be collected and how it will be used, as well as how the mitigation identified might evolve in response to further design development, including changes resulting from the consultation.
- 1.4.10. Each environmental aspect chapter of this PEIR describes the local environment and any identified sensitive receptors. Environmental surveys that have been carried out for each aspect are described, along with detail of any consultation undertaken. Any likely impacts of the Scheme on the local environment are then described. The significance of environmental effects has not been quantified within the PEIR however where possible a statement as to whether effects will be adverse, neutral or beneficial has been made. The full quantification of effects will be assessed and presented in the ES.
- 1.4.11. The aspect chapters also list the key retained European Union (EU) legislation by the United Kingdom (UK) government and national legislation relevant to the protection of the environment. The UK is no longer a member of the EU. EU

legislation as it applied to the UK on 31 December 2020 is now part of UK domestic legislation and is published on legislation.gov.uk.

- 1.4.12. Some legislation crosscuts over more than one aspect area. The Environment Act 2021 was granted Royal Assent on 9 November 2021. Key provisions include the requirement for new developments to deliver a biodiversity net gain, new air quality and water quality standards, powers to implement resource and waste efficiency measures, as well as a number of environmental governance provisions. Many of the provisions within the Environment Act 2021 will be enacted or enabled through future secondary legislation and are not yet in force, for example the obligation to deliver biodiversity net gain is expected to come into force for NSIPs in November 2025.

1.5. Planning policy and national plans overview and context

- 1.5.1. This section provides an introduction to the policy relevant to the Scheme along with selected national plans.

National policy

National Policy Statement for National Networks (2014)

- 1.5.2. Section 104 of the Planning Act 2008 requires applications to be decided in accordance with the relevant National Policy Statement. The National Policy Statement for National Networks (NPSNN) (Department for Transport (DfT), 2014) sets out principles by which applications for road and rail schemes should be assessed. Paragraph 4.3 of the NPSNN states: *'In considering any proposed development and in particular when weighing its adverse impacts against its benefits, the Examining Authority and the Secretary of State should take into account:*
- its potential benefits including the facilitation of economic development, including job creation, housing and environmental improvement, and any long-term or wider benefits
 - its potential adverse impacts, including any longer-term and cumulative adverse impacts, as well as any measures to avoid, reduce or compensate for any adverse impacts.'
- 1.5.3. Section 2 of the NPSNN sets out the Government's vision and strategic objectives for the national networks:
- 1.5.4. *'The Government will deliver national networks that meet the country's long-term needs; supporting a prosperous and competitive economy and improving overall quality of life, as part of a wider transport system. This means:*

- Networks with the capacity and connectivity and resilience to support national and local economic activity and facilitate growth and create jobs.
 - Networks which support and improve journey quality, reliability, and safety.
 - Networks which support the delivery of environmental goals and the move to a low carbon economy.
 - Networks which join up our communities and link effectively to each other.’
- 1.5.5. The need for transport infrastructure in general is acknowledged in paragraph 2.2 of the NPSNN, which states:
- 1.5.6. *‘There is a critical need to improve the national networks to address road congestion and crowding on the railways to provide safe, expeditious and resilient networks that better support social and economic activity; and to provide a transport network that is capable of stimulating and supporting economic growth. Improvements may also be required to address the impact of the national networks on quality of life and environmental factors.’*
- 1.5.7. The Scheme has been developed to support the socioeconomic development of the region, through the improved connectivity and reliability of the strategic network to connect different communities and business. The need for this approach is recognised under paragraph 2.6 of the NPSNN, which states:
- 1.5.8. *‘There is also a need for development on the national networks to support national and local economic growth and regeneration, particularly in the most disadvantaged areas. Improved and new transport links can facilitate economic growth by bringing businesses closer to their workers, their markets and each other. This can help rebalance the economy.’*
- 1.5.9. Paragraph 2.10 of the NPSNN states: *‘The Government has therefore concluded that at a strategic level there is a compelling need for development of the national networks – both as individual networks and as an integrated system. The Examining Authority and the Secretary of State should therefore start their assessment of applications for infrastructure covered by this NPS on that basis.’*
- 1.5.10. Section 3 of the NPSNN sets out the wider Government policy on national networks; this includes policies on minimising social and environmental impacts and improving quality of life. In delivering new schemes, the Government expects applicants to:
- 1.5.11. *‘avoid and mitigate environmental and social impacts in line with the principles set out in the NPPF and the Government’s planning guidance. Applicants should also provide evidence that they have considered reasonable opportunities to deliver environmental and social benefits as part of schemes.’*

- 1.5.12. The Government recognises in the Appraisal of Sustainability accompanying the NPSNN that some developments will have some adverse local impacts on noise, emissions, landscape/visual amenity, biodiversity, cultural heritage and water resources. The significance of these effects and the effectiveness of mitigation is uncertain at the strategic and non-locational specific level of the NPSNN. Therefore, whilst applicants should deliver developments in accordance with Government policy and in an environmentally sensitive way, including considering opportunities to deliver environmental benefits, it is acknowledged that some adverse local effects of development may remain.
- 1.5.13. Evidence demonstrating how the Scheme will comply with the NPSNN will be documented within the NPSNN Accordance Table that will be submitted as part of the DCO application. Any environmental assessment principles outlined in the NPSNN will be considered within the ES.
- 1.5.14. The Scheme will be assessed against the policies outlined in the NPSNN. Each environmental aspect chapter in the ES will set out the key NPSNN policies relevant to the aspect and highlight the extent to which the Scheme meets these requirements.
- 1.5.15. The NPSNN is undergoing a process of review following a period of consultation from March to June 2023. A revised NPSNN is due to be published by Spring 2024. Until a revised NPSNN comes into force, the existing NPSNN remains the basis for which applications for development consent are determined but the emerging changes to the NPSNN will be taken into account.

National planning policy framework

- 1.5.16. The National Planning Policy Framework (NPPF), originally published by the Ministry of Housing, Communities and Local Government (MHCLG) (now the Department for Levelling Up, Housing and Communities (DLUHC)) in 2012 and last revised in 2023 (DLUHC, 2023), sets out the Government's planning policies for England and how these should be applied. It provides a framework within which locally prepared plans for housing and other development can be produced.
- 1.5.17. The NPPF is also of relevance to the Scheme. Paragraph 1.18 of the NPSNN states,
- 'The NPPF is also likely to be an important and relevant consideration in decisions on nationally significant infrastructure projects, but only to the extent relevant to that project.'* However, paragraph 1.19 goes on to say, *'the NPPF makes clear that it is not intended to contain specific policies for NSIPs where quite particular considerations can apply. The National Networks NPS will*

assume that function and provide transport policy which will guide individual development brought under it.'

1.5.18. Paragraph 5 of the NPPF also states that the NPPF does not contain specific policies for nationally significant infrastructure projects. These are determined in accordance with the decision-making framework in the Planning Act 2008 (as amended) and relevant national policy statements for major infrastructure, as well as any other aspects that are relevant (which may include the NPPF).

1.5.19. The overarching policy contained in the NPPF is a presumption in favour of sustainable development. It states:

'Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives):

- *An economic objective – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure.*
- *A social objective – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being.*
- *An environmental objective – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.'*

NPPF includes national planning policy on sustainable transport and environmental protection, amongst other things. Specific NPPF policies relevant to the environmental aspects are presented in the environmental aspects chapters: Chapters 5 to 13.

National plans

National Infrastructure Delivery Plan 2016-2021

1.5.20. The National Infrastructure Delivery Plan 2016-2021 (Infrastructure and Projects Authority, 2016) showed that the Government is clear about the economic importance of investment in highways infrastructure, especially in areas where congestion is a problem. Section 3 of the Delivery Plan covering roads states:

‘A reliable and high-performing road network helps improve productivity, but over decades, the quality of the network has declined and congestion, noise and poor air quality have become problems at certain hotspots. Poor or missing links mean cities which are close together do less business with one another. The government is committed to addressing these challenges by building a better network with smarter roads that use technology and modern road building techniques. In this way it can ensure the country has a road network that drives, instead of constrains, growth.’

Other relevant national transport policy documents

The following national policy documents are of relevance to the Scheme:

- Department for Transport Outcome Delivery Plan (2021)
- HM Treasury Investing in Britain’s Future (2013)
- Department for Transport Action for Roads: A Network for the 21st Century (2013)

Local planning policy

- 1.5.21. Local planning authorities are key consultees throughout the DCO process. They will typically produce Local Impact Reports during the DCO examination giving details of the likely impact of the Scheme on the authority’s area (or any part of that area), which must be considered by the Examining Authority and Secretary of State.
- 1.5.22. The Scheme is situated within the Coventry City Council and Rugby Borough Council administrative areas as described further in paragraph 2.3.2 of this PEIR. Rugby Borough Council’s administrative area also lies within Warwickshire County Council’s administrative area.
- 1.5.23. Coventry City Council Local Plan (2011 – 2031) was adopted in December 2017. The local plan for the City of Coventry sets out its blueprint and vision to help re-establish itself as one of the country’s top 10 cities, enhance its position at the centre of the Coventry and Warwickshire sub-region and contribute towards the West Midlands engine for growth. This includes policies which seek to integrate any new development into existing walking and cycling routes whilst safeguarding the existing routes.
- 1.5.24. Rugby Borough Council Local Plan 2011 – 2031 was adopted in June 2019. The local plan for Rugby Borough Council sets policies and proposals to support the development of the Borough through to 2031. It sets out the long-term spatial vision for how the town and villages in the Borough are planned to develop and change and how this vision will be delivered through a strategy for promoting, distributing, and delivering sustainable development. The plan includes policies

which seek to ensure that any new developments are sustainable and integrate with existing networks and provides good connectivity within the development and to the surrounding areas including any existing walking and cycling routes. The local plan also sets out their policy to support healthy, safe and inclusive communities.

- 1.5.25. The local plans for Coventry and Rugby have been reviewed and where relevant, local planning policies have been included within the relevant aspect chapters of this PEIR.
- 1.5.26. In addition to the local plans for Coventry and Rugby, Warwickshire County Council has produced the Warwickshire County Council – Council Plan 2022 – 2027. This plan, which takes effect from April 2022, sets out the council’s strategic priorities and areas of focus for their work over the next five years. It is focused on moving forward to meet challenges to level up opportunities and tackle climate change.
- 1.5.27. The plan seeks to deliver major infrastructure, digital connectivity and improved transport options. It endeavours that the council will create a long-term infrastructure strategy across the county, delivering on the new Local Transport Plan, and enhancing the transport network to support health, well-being and sustainability. Warwickshire County Council state that they will promote road safety and reduce the level of fatalities and serious injuries.
- 1.5.28. Although local planning policy is considered, National Policy Statements (NPS) are the sole policy on which NSIPs are determined. If there is any conflict between a designated NPS and any local planning document, the policies in the NPS will prevail (Planning Inspectorate, 2015).

National Highways policy and plans

Road Investment Strategy 2

- 1.5.29. In April 2020, the Department of Transport (DfT) published the Road Investment Strategy 2 (RIS2) for 2020-25. The RIS2 sets out the list of schemes that are to be developed by Highways England (now National Highways) over the period covered by the RIS.

Delivery Plan 2020-2025

- 1.5.30. The Delivery Plan outlines how National Highways will invest their Government funding in the SRN between 2020 to 2025, over the second road investment period. The Delivery Plan 2020-2025 (Highways England, 2020) also sets out in detail how National Highways will deliver its strategic outcomes and measure success. The Delivery Plan gives details of specific funding, activities and projects it will deliver over the five years of the plan. It includes a reduction of

National Highways' carbon emissions, supporting the Government's ambition to achieve net zero carbon emissions by 2050, improving noise mitigation, and committing to no net loss of biodiversity across National Highways' activities by 2025 and a net gain in biodiversity by 2040.

National Highways Net Zero Plan

1.5.31. In addition to the UK Government's Net Zero Strategy, National Highways have outlined their net zero strategy which contains three core commitments:

- Corporate emissions – net zero by 2030
- Maintenance and construction emissions – net zero by 2040
- Road user emissions – net zero by 2050

Environment Strategy 2017

1.5.32. The Environment Strategy (Highways England, 2017) outlines National Highways' approach to improving the environment particularly with respect to noise, air quality, biodiversity, landscape, water quality, flooding and cultural heritage.

1.6. Structure of this report

1.6.1. The environmental aspects covered in this PEIR include those within the EIA Regulations and the Design Manual for Roads and Bridges (DMRB). The relationship between DMRB and EIA is provided in Table 4.1 of Chapter 4: Environmental assessment methodology.

1.6.2. The structure of this report is set out in Table 1-1. This document forms Volume 1 of the PEIR. Figures are presented in Volume 2 and the non-technical summary (NTS) forms Volume 3.

1.6.3. Regulations 12 and 14, and Schedule 4 of the EIA Regulations set out the information which is to be included in the PEIR. In accordance with Regulation 12(2)(b), this PEIR presents information which "is reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development (and of any associated development)". Table 1-2 identifies where the information defined by Regulation 14(2) can be found within this PEIR.

Table 1-1: Structure of the PEIR

Chapter	Contents
1. Introduction	Provides an overview of the Scheme and the purpose of this report.
2. The Scheme	Provides a statement on the need for the Scheme, sets out the objectives for the Scheme, and provides a description of the Scheme location and design.
3. Assessment of alternatives	Provides a summary of the development of the Scheme and the various options considered during the design process. Also includes consideration of how the environmental assessment has influenced the option selection process and design development.
4. Environmental assessment methodology	Provides an overview of the environmental assessment methodology, including significance criteria and surveys and predictive techniques.
5. Air Quality	There is a chapter for each environmental aspect. Each sets out the assessment methodology, study area used, and baseline environmental conditions. Each chapter also describes the potential impacts, likely significant effects, and proposed mitigation.
6. Cultural Heritage Assessment	
7. Landscape & Visual Effects	
8. Biodiversity	
9. Geology & Soils	
10. Noise & Vibration	
11. Population & Human Health	
12. Road Drainage & the Water Environment	
13. Climate	
14. Assessment of cumulative effects	Provides a summary of how the cumulative effects assessment will be undertaken and presents a preliminary long list and shortlist of other developments and combined effects matrix that will be included in the assessment.
15. Summary	Summarises the likely significant effects and proposed mitigation from the PEIR assessment.
Acronyms, glossary, references	Description of acronyms, definitions of technical terms, and a reference list of document sources.
Appendix A	Heritage Gazetteer.
Appendix B	Lighting Assessment.

Table 1-2: Location of information defined by Regulation 14(2) in the PEIR

Specified information	Location within the PEIR
(2) an environmental statement is a statement which includes at least– a) a description of the proposed development comprising information on the site, design, size and other relevant features of the development.	Chapter 2 – The Scheme
b) a description of the likely significant effects of the proposed development on the environment.	Chapters 5 – 14
c) a description of any features of the proposed development, or measures envisaged in order to avoid, prevent or reduce and, if practicable, offset likely significant adverse effects on the environment.	Chapters 5 – 14
d) a description of the reasonable alternatives studied by the applicant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment.	Chapter 3 – Assessment of alternatives
e) non-technical summary of the information referred to in sub-paragraphs (a) to (d).	Non-Technical Summary
f) any additional information specified in Schedule 4 relevant to the specific characteristics of the particular development or type of development and to the environmental features likely to be significantly affected.	Chapters 1 – 14

1.7. Availability of the PEIR

- 1.7.1. Copies of the PEIR will be available as part of the consultation material produced for the Scheme public consultations to be carried out in autumn 2023.
- 1.7.2. The Scheme summary information, the Statement of Community Consultation (SoCC), policy guidance documents and other relevant technical documents will be available online and at various information points stationed at local community venues. These documents will be added to, throughout the course of the DCO application processes. The online Scheme web site address is:

<https://nationalhighways.co.uk/our-roads/west-midlands/a46-coventry-junctions-upgrade/>

2. The Scheme

2.1. Need for the Scheme

- 2.1.1. The Road Investment Strategy 2 (RIS2) published in 2020 sets a long-term strategic vision for the network. With that vision in mind, it then specifies the performance standards National Highways must meet; lists planned enhancement schemes expected to be built; and states the funding that will be made available during the second Road Period (RP2), covering the financial years 2020/21 to 2024/25. The A46 Coventry junctions Scheme is listed as a committed scheme for RP2.
- 2.1.2. The A46 corridor forms part of the national Strategic Road Network (SRN) connecting the M1, M6 and the M69 with the M5 and provides links to the SRN and the rest of the country as presented in Figure 2.1 of Volume 2. The South Midlands Route Strategy Evidence Report (Highways Agency, 2014) indicated that sections of the A46 to the south and east of Coventry suffer from congestion and poor journey time reliability issues. These are likely to be exacerbated by future housing growth and economic aspirations. Many communities are located adjacent to the A46 and stakeholders have raised concerns regarding the pedestrian crossing points on and near the A46.
- 2.1.3. The A46 has historically experienced safety performance issues in comparison to the rest of the SRN. The A46 south of Coventry was in the top 45% for total casualties and in the top 250 collision locations in England (Staged Overview of Assessment Report, National Highways 2022). As part of the A46 Coventry junctions Scheme improvements at the A45/A46 Tollbar End junction, to the south of Coventry, to grade separate the A46 (N) to A45 (W) movements were completed in 2017 and work to upgrade the Binley junction started in March 2020, and was completed in February 2023. Conversion of a section of the M6 between junctions 2 and 4 into a smart motorway was completed in March 2020.

Plate 2.1 Aerial view of Walsgrave junction looking northwards



- 2.1.4. Following the completion of the Binley junction improvement scheme in 2023 the Walsgrave junction is the only remaining roundabout east of Coventry and north of Tollbar End junction that is at grade, and as such is a pinch point for traffic. The Tollbar End junction and M6 Smart Motorway improvements have increased the pressure on Binley and Walsgrave junctions. The Binley junction is approximately 1.7km to the south of Walsgrave junction.
- 2.1.5. There are concerns that without further investment to reduce congestion on the A46, the benefits derived from the improvement works at Tollbar End junction would be limited. In particular, the current delays at the Walsgrave junction could undermine the existing investment which has been made on A46 improvements.

2.2. Scheme objectives

- 2.2.1. The Secretary of State appointed Highways England Company Limited (the Licence holder) (now operating as National Highways) by way of an Order in accordance with Section 1 of the Infrastructure Act 2015. The licence under which National Highways operates sets out the Secretary of States statutory directions and guidance to National Highways. Under the licence, National Highways is the highway authority, traffic authority and street authority for the SRN. It makes clear, to both National Highways and the wider community of road users and stakeholders, what National Highways is expected to achieve

and how they must behave in discharging their duties and in delivering plans for the network, set out in the RIS2 (Department for Transport, 2020).

2.2.2. Under Part 4.2g of The Highways England Licence (Department for Transport, 2015) and in accordance with the Infrastructure Act 2015, the licence holder must “*minimise the environmental impacts of operating, maintaining and improving its network and seek to protect and enhance the quality of the surrounding environment.*” The licence holder should and will as part of implementing this Scheme follow the conditions set out in Part 5.23 of the act:

- *“Ensure that protecting and enhancing the environment is embedded into its business decision-making processes and is considered at all levels of operations.*
- *Ensure the best practicable environmental outcomes across its activities, while working in the context of sustainable development and delivering value for money.*
- *Consider the cumulative environmental impact of its activities across its network and identify holistic approaches to mitigate such impacts and improve environmental performance.*
- *Where appropriate, work with others to develop solutions that can provide increased environmental benefits over those that the Licence holder can achieve alone, where this delivers value for money.*
- *Calculate and consider the carbon impact of road projects and factor carbon into design decisions, and seek to minimise carbon emissions and other greenhouse gases from its operations.*
- *Adapt its network to operate in a changing climate, including assessing, managing and mitigating the potential risks posed by climate change to the operation, maintenance and improvement of the network.*
- *Develop approaches to the construction, maintenance and operation of the Licence holder's network that are consistent with the government's plans for a low carbon future.*
- *Take opportunities to influence road users to reduce the greenhouse gas emissions from their journey choices.”*

Specific scheme objectives

2.2.3. In order to resolve the issues identified above the following objectives have been identified:

- A SRN that supports and facilitates economic growth, supporting employment and residential development opportunities.
- A SRN that is maintained to safe and serviceable condition.
- Improve the operation and efficiency of the existing transport network, delivering capacity enhancements to the SRN.

- A SRN that minimises its negative impacts on users, local communities and the environment.
- A SRN that balances the need of individuals and businesses that use and rely upon it.
- Reducing/minimising the impact on the wider environment, whilst seeking to bring enhancement.
- Operational maintenance to be considered holistically during the design stage and at a balance of cost versus disruption.

2.2.4. The A46 corridor provides opportunities for economic growth and improved accessibility within Coventry and Warwickshire enabling the unlocking of sites for residential development, such as the allocated land to the west of the A46 described further in paragraph 2.3.8 of this PEIR and improving access to existing commercial areas.

2.2.5. Economic growth aspirations in the surrounding environment as mentioned in the Coventry and Warwickshire updated strategic economic plan (Coventry and Warwickshire Local Enterprise Partnership, 2016) include:

- up to 75,000 new homes and 94,500 jobs in Coventry and Warwickshire by 2030
- Friargate, a 30-hectare mixed use regeneration project in Coventry city centre
- Ansty Park, high profile prestige business park site for Coventry and Warwickshire
- Whitley South, an extension of Jaguar Land Rover's existing site west of the A46 Tollbar junction

2.2.6. The A46 corridor also fulfils a key strategic role in linking the advanced manufacturing sector within the Warwickshire sub region.

2.2.7. The Scheme seeks to support the following performance outcomes as stated in the Highways England Strategic Business Plan: 2020-2025 (Highways England, 2020):

- Improved safety for all
- Providing fast and reliable journeys
- A well-maintained and resilient network
- Delivering better environmental outcomes
- Meeting the needs of all users
- Achieving efficient delivery

- 2.2.8. Under Section 5.24 of the Licence, National Highways must deliver these commitments and develop strategies and timescales as specified and published in Highway's England Delivery Plans.
- 2.2.9. The Scheme is set out in Highways England's Delivery Plan 2020-2025 (Highways England, 2020). The Delivery Plan 2020-2025 builds on Highways England's Strategic Business Plan 2020-2025 which was the response to the Government's Road Investment Strategy. The Strategic Business Case sets out the performance goals in six key areas, one of which is delivering better environmental outcomes. The Delivery Plan states *"We want our roads to work more harmoniously with the communities that live alongside them, and the built, natural and historic environments that surround them. Every aspect of our business has a part to play in improving environmental performance, alongside ensuring we meet our statutory obligations. We will build on the progress made during the first road period and embed environmental considerations into all our activities, ranging from infrastructure design to scheme delivery"*.

2.3. Scheme location

- 2.3.1. The Scheme, shown in Figure 2.1 of Volume 2, is located in the West Midlands, approximately 5km to the east of Coventry city centre. The Scheme involves improvements to the B4082 which runs eastwards from Clifford Bridge Road to the A46 Walsgrave roundabout and the A46 (Coventry Eastern Bypass) which runs north-south to the east of Coventry. Binley junction, located on the A46, is approximately 1.7km to the south of the existing Walsgrave junction and the M6 and M69 junctions are approximately 2.5km to the north of the existing Walsgrave junction.
- 2.3.2. The Scheme is situated within the Coventry City Council and Rugby Borough Council administrative areas (Figure 2.1 of Volume 2). The boundary between these two administrative areas is along the western side of the A46. Rugby Borough Council's administrative areas also lies within Warwickshire County Council's administrative area, which shares the same border with Coventry City Council.
- 2.3.3. The A46 and the B4082 to the Clifford Bridge Road roundabout are currently owned, maintained and operated by National Highways. The B4082 at Clifford Bridge Road roundabout is currently owned, maintained and operated by Coventry City Council.

Surrounding areas

- 2.3.4. Figure 2.2 of Volume 2 shows the local area. To the west of Walsgrave junction, the area is densely populated with seven schools within 2km of the junction. University Hospital Coventry is located approximately 1.2km to the north of the

existing A46 and Walsgrave junction which serves as a blue-light (i.e., emergency services) route to the hospital.

- 2.3.5. To the immediate north-west of Walsgrave junction and along the western side of the A46 north of the existing junction are areas of agricultural land associated with Hungerley Hall Farm and further north with Walsgrave Hill Farm. To the immediate south-west of the Walsgrave junction and north of Smite Brook the land is associated with Hungerley Hall Farm, south of Smite Brook are areas of public open space, beyond which are residential areas. A high voltage electricity line runs north-south on the western side of the A46, crossing the B4082 immediately west of Walsgrave junction, which is described further in paragraph 2.4.51 of this PEIR.
- 2.3.6. Immediately adjacent to the east side of Walsgrave junction is Coombe Country Park, part of which includes Coombe¹ Pool Site of Special Scientific Interest (SSSI) and Coombe Abbey Grade II* Park and Garden/Conservation Area. To the north-east of the existing junction and northwards along the eastern side of the A46 are areas of agricultural land associated with Walsgrave Hill Farm.

Sensitive environmental receptors

- 2.3.7. Environmental constraints and sensitive receptors within the study areas for each aspect are described in detail in the individual aspect chapters of this Preliminary Environmental Information Report (PEIR). Each aspect has its own specific study area and these are described further in section 4.4.6 and in each of the aspect chapters. Potentially sensitive receptors to the Scheme have been identified and are presented on the environmental constraints plan as shown in Figure 2.3 of Volume 2 and summarised as follows:

Residential, community, noise and air receptors:

- Nearby residential communities which are part of Walsgrave on Sowe and Binley are located to the north and south of the B4082, west of the A46. A residential property is also located at Hungerley Hall Farm approximately 140m north-west of the roundabout and approximately 70m away from the existing A46 carriageway, to its east.
- The nearest noise important areas (NIA)² in relation to road noise are over 1km from the existing junction.
- Clifford Bridge Academy and, Pearl Hyde Community Primary School are situated approximately 325m and 750m from the existing roundabout respectively. A further five schools are within 2km of the junction.

¹ Coombe is also spelt as Combe in some databases. For consistency, hereafter the spelling of Coombe will be used.

² Noise Action Planning Important Areas (IAs) for roads and railways are also shown. These areas provide a framework for the local management of the Important Areas.

- Wyken Community Centre is located approximately 770m north-west of the existing junction and University Hospital Coventry is approximately 1.2km to the north.
- Caludon Castle playing fields are situated 1km to the north-west.
- The junction is immediately adjacent to the Coventry City-Wide Air Quality Management Area (AQMA), which has been designated due to exceedances of the annual mean nitrogen dioxide (NO₂) objective.
- Coombe Country Park (immediately east), the Spring Estate Allotments adjacent to Clifford Bridge Road (approximately 480m west of the Walsgrave roundabout), recreational open space adjacent to Binley residential area (immediately west), and Caludon Castle playing field (1km north-west) may be sensitive to dust soiling during construction.

Ecological receptors:

- There are no European protected sites (Special Protection Areas (SPAs), Special Areas of Conservation (SAC) or Wetlands of International Importance (Ramsar sites)) within 2km of the existing junction. The nearest European protected site is Ensor's Pool SAC which is located over 11.5km to the north-west.
- There are two Sites of Special Scientific Interest (SSSI) within 2km of the site. Coombe Pool SSSI is located immediately adjacent to the east of Walsgrave junction. The SSSI lies within Coombe Country Park and contains a 36 hectare (ha) pool (fed by Smite Brook), reed beds and woodland. The site is known for its herons (it is the largest heronry in the county with 20 breeding pairs recorded in the past) and wintering waterfowl. The woodland within the SSSI supports a diverse breeding bird community. Herald Way Marsh SSSI, located 1.6km south, is designated for its assemblage of invertebrates, a number of which are nationally rare.
- Two locally designated Local Nature Reserves (LNRs) are located within 2km of the junction. Herald Way Marsh LNR, located approximately 1.45km to the south, comprises one of the most important areas for rare invertebrates in the county. The site overlaps with Herald Way Marsh SSSI. Stoke Floods LNR is located approximately 900m south-west of the junction. The reserve has a large lake, reedbeds and scrub next to the River Sowe. The site supports many wetland plants, flag and reed canary grass and bird life is varied from many species of duck, seven species of warbler in the summer and occasional black tern and yellow wagtails. The reserve is one of the most important wetland sites in Coventry and is a wildlife oasis in an area of high intensity housing.
- Seven local wildlife sites (LWS) are located within 2km of the junction, the closest of which is Gainford Rise LWS which is approximately 80m south of existing Walsgrave junction (west of the A46).

Plate 2.2. Coombe Pool and the A46 looking southwards



Hydrological, flood risk and geological receptors:

- Smite Brook, which is culverted beneath the A46 approximately 50m to the south of Walsgrave junction and under the B4082 approximately 300m west of the junction. Smite Brook is an ordinary watercourse and classified under the Water Framework Directive (WFD).
- River Sowe and Withy Brook are main rivers. The River Sowe, which passes around the edge of Walsgrave on Sowe, is approximately 280m to the north-west of the junction. Smite Brook flows into the River Sowe approximately 75m downstream of the B4082 culvert and 500m downstream of the A46 culvert. The River Sowe is classified under the WFD.
- There are a number of standing water bodies within 2km of the junction, including Coombe Pool SSSI and Herald Way Marsh SSSI/LNR. To the north of the A428 Binley Road, the floodplain north of the channel of the River Sowe is included within the Stoke Floods LNR. There are also a number of unnamed ponds and field drains.
- No SSSIs designated for geological or geomorphological interest have been identified within 2km of the Walsgrave junction.
- Agricultural land to the east and west of the A46 is classified as a mixture of Grade 2 and Grade 3.

Cultural heritage receptors:

- Coombe Abbey, Grade II* listed building and Coombe Abbey Registered Park and Garden/Conservation Area which is adjacent to Walsgrave junction

and is situated within the Coombe Country Park. The County Park is owned, managed and maintained by Coventry City Council. The park has been developed on the grounds of the old abbey which was enclosed in 1150 for sheep pasture. The abbey has now been converted into the privately owned Coombe Abbey Hotel.

- Three Grade II listed buildings including some associated curtilage features at the site of Hungerley Hall Farm, approximately 170m north of Walsgrave junction. These listed buildings are associated with the late 17th – early 18th century farmhouse.
- Other designated heritage assets located up to 1km from Walsgrave junction include:
 - two scheduled monuments at the site of Caludon Castle (approximately 880m north-west of the Scheme at the nearest point)
 - two Grade I listed buildings
 - one Grade II* listed building
 - 16 Grade II listed buildings

Key traffic and transport receptors:

- No public rights of way (PRoW) cross the A46 near the Walsgrave junction. Nearby PRoW include: R75x and R75b bridleways which are located approximately 1.5km to the north-east and footpaths R75y 2.4km to the north-east) and R145 (approximately 1.7km to the south).
- The Sowe Valley Walk, a locally promoted walk, is situated approximately 280m west of the junction and follows the River Sowe from Longford through to Willenhall.
- No footways or pavements are provided along the A46 or the B4082.
- Footways are provided along Clifford Bridge Road and there is a crossing point on Clifford Bridge Road near Bridgeacre Gardens. The Sowe Valley Walk also passes beneath Clifford Bridge Road north of the junction with B4082.
- A number of bus routes are serviced along Clifford Bridge Road, with the following route numbers calling at 'Clifford Bridge Rd Stop': 17, 17A, 85, 85B, 60 (travelling north-east) and 8, 85S, 8S, 9, X30, 74, 74A, 74S, X6, 85A (travelling south-west).

Future development

- 2.3.8. An area of land on the west side of the A46, from north of Walsgrave junction to where the A46 crosses the River Sowe, has been allocated for development (H2:3) in the Coventry City Council Local Plan 2011 to 2031 (Coventry City Council, 2017). This site is expected to deliver approximately 900 dwellings through future development proposals, which is approximately 3.7% of the homes the Local Plan sets out to provide before 2031.

Description of the existing A46 Walsgrave junction

- 2.3.9. The existing A46 is a dual carriageway within the draft Order Limits, owned and maintained by National Highways. South of Walsgrave junction the road is generally elevated, and north of the existing roundabout, it is generally in cutting.
- 2.3.10. The existing junction comprises of a three arm at grade roundabout connecting the A46 mainline to the B4082 local network. The central island of the roundabout has a diameter of approximately 40m, and with the 12.5m wide circulatory carriageway, the outside diameter of the roundabout is approximately 65m. On approach to the roundabout the A46 northbound and southbound entry arms flare from two to three lanes, to allow two lanes for traffic continuing on the A46 and one lane to the B4082. The B4082 entry arm flares from one lane to three lanes on approach to the roundabout.
- 2.3.11. The B4082 and Clifford Bridge Road are part of Coventry City Council's highway network. The B4082 link road is a two-lane single carriageway road that provides a link between the A46 and Clifford Bridge Road.
- 2.3.12. The B4027 Brinklow Road passes under the A46 mainline approximately 600m south of the existing Walsgrave junction.
- 2.3.13. Parking laybys are located on the northbound and southbound carriageways of the A46 mainline between the Walsgrave junction and the M6/M69 junction. Emergency telephones are located at these laybys. The usage levels of the laybys are currently unknown.
- 2.3.14. Two gantries are present within the draft Order Limits. A variable message sign (VMS) gantry is situated approximately 1.2km to the north of the existing Walsgrave junction. The second VMS gantry is situated approximately 1.5km to the north of the existing junction. Both gantries span over the verge of the northbound carriageway of the A46.

The Rochdale envelope

- 2.3.15. The Planning Inspectorate's Advice Note 9: 'Rochdale Envelope' (Planning Inspectorate, 2018) provides guidance regarding the degree of flexibility that may be considered appropriate within an application for development consent under the Planning Act 2008. The advice note acknowledges that there may be aspects of the Scheme design that are not yet fixed, and therefore, it may be necessary for the Environmental Impact Assessment (EIA) to assess likely worst-case variations to ensure that all foreseeable significant environmental effects of the Scheme have been assessed. In accordance with the guidance provided in Advice Note 9, the draft Order Limits (Figure 2.2 of Volume 2) have been drawn at this stage to allow some design flexibility. The Scheme design

process is ongoing, and as such it is not possible to define the exact footprint of the Scheme. The draft Order Limits as included herein will be subject to review and revision but will be finalised prior to the Development Consent Order (DCO) application.

2.3.16. This PEIR is based on the emerging preliminary design for the Scheme. The Scheme is to be developed further through a reference design fix which will form the basis for the DCO application.

2.3.17. Within the reference design there will need to be sufficient flexibility to provide scope for finalising the detailed design and construction methodology in due course. Therefore, when presenting the Scheme design in the Environmental Statement (ES) and the accompanying assessment, the requirements of Advice Note 9 will be complied with to ensure that the likely significant effects of the Scheme are assessed on a reasonable worst-case basis.

2.3.18. The draft Order Limits used in this PEIR has been amended from the “proposed Scheme extent” used in the Environmental Scoping Report (ESR) in the following ways:

- Changes around the Clifford Bridge Road roundabout/B4082 to accommodate a potential pedestrian crossing (described further in paragraph 2.4.29 of this PEIR).
- Changes north of Hungerley Hall Farm related to the location of the main construction compound (described further in paragraph 2.5.6 of this PEIR).
- Changes associated with the southern attenuation basin (described further in paragraph 2.4.40 of this PEIR).
- Changes to the western side of the western dumbbell roundabout related to changes in earthworks (described further in paragraph 2.4.38 of this PEIR).
- Changes in some areas that relate to construction working areas which have been increased to 20m.

2.3.19. The draft Order Limits presented in this PEIR have not yet been fixed for the preliminary design stage and are likely to be amended following the statutory consultation and prior to the DCO application. At the time of writing, the main locations where the Order Limits are likely to change between this PEIR and the DCO application due to us awaiting survey and assessment results to finalise the design are as follows:

- In the location of the northern attenuation basin and associated earthworks around the western dumbbell roundabout (described further in paragraph 2.4.38 of this PEIR).

- In the location of the Hungerley Hall Farm accommodation bridge and around the Hungerley Hall Farm area (described further in paragraph 2.4.6 of this PEIR).
- In the location of the southern attenuation basin (described further in paragraph 2.4.38 of this PEIR).
- In the location of the proposed environmental mitigation area (described further in paragraph 2.4.57 of this PEIR).
- In the location of the Smite Brook culverts (described further in paragraph 2.4.15 of this PEIR).

2.3.20. We are waiting to review feedback received on the Scheme, including the elements listed above, to determine if these and other changes are required to our design.

2.3.21. At present not all embedded mitigation that will be included in the DCO application has been identified and quantified. This process is dependent upon assessment and can be iterative as the preliminary design evolves. Some changes to the draft Order Limits will be to accommodate the embedded mitigation that is likely to be required and some will be due to design changes. Embedded mitigation can also include changes to the design for the benefit of the environment. By acknowledging these potential changes now it allows us to explore opportunities to reduce carbon and the impact upon the environment as the design evolves. It is considered that the changes are unlikely to give rise to substantial changes to the scope of the environmental assessment.

2.4. Scheme description

Introduction

2.4.1. The Scheme consists of the following principal elements, which are described in further detail in the below sections:

- Realignment of the existing A46 dual carriageway through the existing at grade roundabout (which will be removed), for approximately 880m to improve the road geometry and allow for a 50mph speed limit.
- A new grade separated junction over the A46 mainline, approximately 800m north of the existing Walsgrave junction to connect the B4082 with the A46.
- A new overbridge structure across the existing A46, between the dumbbell roundabouts forming the grade separated junction.
- New merge and diverge slip roads at the grade separated junction for both northbound and south bound movements.
- Realignment of the B4082 to form a single carriageway link road, for approximately 900m, to connect the local road network to the new A46 grade separated junction with a proposed 40mph speed limit.

- Proposed maintenance accesses to the proposed road assets such as drainage basins and relocated VMS.
- Proposed road assets and street furniture such as traffic signs and lines, relocated variable message sign, street lighting columns, vehicle restraint systems (VRS), fences, noise barriers, anti-glare screens, retaining walls and kerbs.
- Improvements to facilities for walkers, cyclists and horse-riders (WCH) through provision of a signalised pedestrian crossing on the link road and future-proofing the Scheme to facilitate a route for WCH along the link road to the Hungerley Hall Farm accommodation bridge.
- Retain the existing accommodation bridge for Hungerley Hall Farm. We're carrying out a structural survey in autumn 2023 and will keep the bridge if it is in a suitable condition. This may require a slight amendment to the design of the B4082 near Hungerley Hall Farm. If the structural survey shows the existing accommodation bridge for Hungerley Hall Farm is not suitable alternative solutions will be explored for potential ecological and walkers, cyclists and horse riding impacts.
- Replacement vegetation planting to compensate for the vegetation that needs to be removed to facilitate the Scheme.

2.4.2. The area within the draft Order Limits covers an area of approximately 33.4ha. Of this approximately 26.5ha will be permanently required for the operation of the Scheme, including the proposed environmental mitigation area which covers approximately 3.7ha. Approximately 6.9ha will be required temporarily during the construction phase.

Highways alignment

A46 mainline

2.4.3. At its southern limits, the Scheme ties into the existing A46 north of the B4027 Brinklow Road bridge. Travelling north-eastwards, the A46 is realigned to provide a continuous dual carriageway through the existing Walsgrave junction. The vertical profile matches the existing ground level through the first 300m section then varies up to 1.7m above existing road level for approximately 600m before returning to the existing road level. The realignment ties in with the existing road at the existing Hungerley Hall Farm accommodation bridge. The proposed alignment reduces the existing speed from 70mph to 50mph throughout the extents of the Scheme. In this location the road has been kept as far from Coombe Pool SSSI as possible whilst still being able to achieve a 50mph speed limit. The A46 mainline will continue to be owned, maintained and operated by National Highways.

Existing roundabout

- 2.4.4. The existing central island is covered with woody vegetation comprising of bushes, shrubs, small trees and brambles. The surrounding earthworks comprise of vegetated earth bunds with a maximum height of 5m towards the junction. Vegetation will be retained where practicable, however a 5m strip of grass will be required either side of the existing drainage pipe to allow for access and maintenance. Hard surfacing will be removed in the redundant areas and these will be incorporated into the landscape planting proposals.

Plate 2.3 View eastwards from Clifford Bridge Road towards Walsgrave junction and Coombe Pool



B4082 link road

- 2.4.5. The B4082 link road connects into the local road network at Clifford Bridge Road roundabout. The existing alignment towards the A46 Walsgrave junction is retained for 245m. As the existing junction is removed a new section of the B4082 is created from this point running between the proposed A46 alignment and Hungerley Hall Farm to the new grade separated junction described further below. The road is in cutting of a maximum 5.5m below existing ground level and rises on embankment to a maximum of 8.5m above existing ground level to meet the junction. The B4082 link road will be owned, maintained and operated by Coventry City Council. The speed limit is proposed to be reduced from 60mph to 40mph along its entire length.

- 2.4.6. Assuming Hungerley Hall Farm accommodation bridge can be retained and the WCH provision provided over it then the earthworks and the alignment of the B4082 in this area will change, with the link road moving slightly closer to the farm buildings to the north of them. No additional bridge structure would be required over the B4082 as future provision for a WCH route would include a pedestrian crossing across the B4082 as described further in paragraph 2.4.28 of this PEIR. The draft Order Limits used for this PEIR would be able to accommodate this change should it be required.

Grade separated junction

- 2.4.7. The proposed junction comprises of a grade separated dumbbell roundabout connecting the A46 mainline to the B4082 local network. The dumbbell junction is made up of a western and eastern roundabout connected by a new bridge that crosses over A46 mainline at 8m above existing road level. The roundabouts are connected to the A46 mainline with slip roads allowing movements northbound and southbound between the A46 and local road network.
- 2.4.8. The western roundabout comprises of four arms connecting the A46 north facing slip roads, the junction bridge, and the B4082 link road. The geometry of the roundabout has been designed to accommodate a future blue light route to University Hospital Coventry. The provision of the blue light route will be delivered by others in future and does not form part of this Scheme.
- 2.4.9. The eastern roundabout connects the slip roads to the junction bridge leading to the western roundabout. The eastern roundabout will also include an alternative access to the field for Hungerley Hall Farm and Walsgrave Hill Farm. The slip roads and roundabouts are above existing ground level with embankments on both sides with a maximum height of 9m. The grade separated junction will be owned, maintained and operated by National Highways.

Structures

New overbridge

- 2.4.10. The new overbridge at the dumbbell junction comprises of a single span structure that would provide access across the A46 between the two roundabouts and would carry a two-way single carriageway. A hatched area will be provided in the central reserve to accommodate broken down vehicles safely. No pavements will be provided for pedestrians over the bridge to prevent erroneous pedestrian access onto the A46 mainline.
- 2.4.11. For the proposed overbridge a steel-composite superstructure is proposed as the preferred option, subject to further buildability and design work. The slender profile of this option will allow lower earthworks height which has the potential to reduce noise and visual impacts on nearby receptors. The lower earthworks

height allows shallower gradients for slopes and this increases opportunities for planting. Less earthworks results in a shorter construction programme which can be reduced further if the bridge can be constructed offline. This option also has a lower weight that will likely lead to reduced quantities of material required in the substructure (i.e., the underground foundations that support the weight of the overbridge).

- 2.4.12. In the absence of ground investigation (GI) data an assessment of the substructure and foundation options has not yet been undertaken and it is not known whether piled foundations or ground improvement will be needed.

Other structures

- 2.4.13. There are also four existing structures:

- Hungerley Hall Farm accommodation bridge
- Walsgrave Hill Farm accommodation bridge
- Smite Brook culvert under the A46
- Smite Brook culvert under the B4082

- 2.4.14. Protected species surveys associated with the structures have been undertaken and are described further in Chapter 8 Biodiversity.

- 2.4.15. The Smite Brook carries water from Coombe Pool and crosses the A46 mainline in a culvert less than 100m to the south of the existing Walsgrave junction. The structure (Smite Main Culvert) comprises a single span in situ reinforced concrete box culvert. The overall length (based on as-built information) is approximately 80m. Splayed wingwalls are provided on each side of the headwalls.

- 2.4.16. Smite Brook also crosses the B4082 in a culvert approximately 300m to the west of the Walsgrave roundabout. The structure (Smite Link Culvert) comprises a single span in situ reinforced concrete box. The structure has a square length of approximately 20m and a skew length of 18m (from as-built information). Wingwalls are provided on each side of the headwalls.

- 2.4.17. At present it is assumed that works will not be required to the two Smite Brook culverts however this is subject to further hydraulic flood modelling and dependent upon structural surveys to be undertaken in autumn 2023.

- 2.4.18. Hungerley Hall Farm accommodation bridge, located approximately 400m north of the Walsgrave junction, is owned by National Highways. The bridge provides private access between Hungerley Hall Farm to the west of the A46 and the agricultural land to the east of the A46. The bridge is not currently accessible to

the public. The structure comprises of a continuous two span 63m long overbridge with a single concrete column at mid-span. The proposed mainline alignment has been designed to ensure the central column is not affected. The Coventry junction (Walsgrave) Environmental Assessment Report (National Highways 2021) and the ESR identified this bridge for removal. Subject to a structural survey in autumn 2023 it is proposed that the accommodation bridge will be retained to facilitate potential future WCH access across the A46 mainline as discussed further below. If the structural survey shows the existing access bridge for Hungerley Hall Farm is not suitable we are exploring alternative solutions for potential ecological and walkers, cyclists and horse riding impacts.

- 2.4.19. The Walsgrave Hill Farm accommodation bridge is located approximately 1.6km north of the Walsgrave junction, this also carries the R75 bridleway. The structure comprises a two-span deck supported on reinforced concrete abutments and a reinforced concrete pier as the intermediate support.
- 2.4.20. Any works required in relation to these three structures will be confirmed during the preliminary design stage and assessed in the EIA.

Geotechnical

- 2.4.21. Geology and soil conditions underlying the Scheme are described in PEIR Chapter 9 Geology and soils. Ground Investigation (GI) work was undertaken in summer 2023. Once the results become available, anticipated ground conditions will be reviewed and a ground model for the site will be developed.
- 2.4.22. The abutments of the proposed new overbridge for the grade separated junction are proposed to be integral and formed by conventional cantilever reinforced concrete supporting the deck structure loading and the horizontal earth pressures behind the abutments. Currently, the abutments are anticipated to be supported by conventional ground bearing foundation. This will be reviewed once further GI at the bridge location becomes available, however it is possible that the supports of the bridge abutments may change from ground bearing foundations to piled foundations.
- 2.4.23. It is anticipated that retaining walls will be needed to the slip roads in the vicinity of the dumbbell roundabouts to allow the provision of signage and technology assets. The design and form will be developed during preliminary design.
- 2.4.24. Depending on the results of GI at the proposed dumbbell roundabout locations, the formation supporting the earthworks forming the roundabouts may require ground improvement, for example replacing with suitable material or piling.

- 2.4.25. The Scheme would require a number of embankments and cuttings to accommodate the horizontal and vertical alignment of the Scheme. As a general principle, these slopes are proposed to be 1:2 and 1:3 or shallower.
- 2.4.26. It should be noted that the section of the northbound merge slip road running parallel to the Hungerley Farm Hall is currently proposed to be formed using cut slopes battered back with slope gradients of 1:2 due to space constraints in this location. This design will be reviewed once further GI relevant for this section of the Scheme becomes available.
- 2.4.27. The Scheme will impact the agricultural land, mainly to the west of the A46 (in the area allocated for future housing development as described in paragraph 2.3.8 of this PEIR). An agricultural survey is proposed in autumn 2023 to confirm the agricultural land classification and determine the soil chemistry to inform the design and any required mitigation.

Walkers, cyclists and horse riders

- 2.4.28. At present only the permissive footpath from Farber Road to Walsgrave Hill Farm (via the Walsgrave Hill Farm accommodation bridge) provides WCH facilities within the draft Order Limits. Operation of the Scheme will not result in any impacts on any WCH facilities and the Scheme will not lead to any changes to the local WCH network.
- 2.4.29. At the options selection stage WCH provision was not included in the Scheme options proposed. However, this issue was raised during the consultation period and acknowledged in the preferred route announcement (PRA) (National Highways, June 2022). At the start of the preliminary design stage the ESR was produced and this was based upon the proposed option from the option selection stage. Since the production of the ESR practicable and proportionate opportunities within the remit of the Scheme have been explored and it is proposed that the Scheme will now include the following components:
- A signalised pedestrian crossing on the B4082 link road to the immediate east of the Clifford Bridge Road/B4082 roundabout to improve the north-south movement of pedestrians along the eastern side of Clifford Bridge Road between Wyken and Binley.
 - Retention of Hungerley Hall Farm accommodation bridge to facilitate future WCH provision over the A46 mainline, subject to structural survey in autumn 2023.
 - Space within the proposed verge to safeguard for a future WCH route in accordance with LTN 1/20 on the north side of the link road between the proposed signalised pedestrian crossing and the Hungerley Hall Farm accommodation bridge. This will allow the delivery of a future WCH route in parallel with local developments.

- Ducting to be provided in the road and verge to allow for a future pedestrian crossing to be installed across the B4082 link road to access the Hungerley Hall Farm accommodation bridge.
- A surfaced WCH route and signalised crossing at the Hungerley Hall Farm accommodation bridge will not be provided as part of the Scheme to deter the public from erroneously entering the agricultural land to the east of the A46 mainline. A gate will be provided across the western entrance to Hungerley Hall Farm accommodation bridge to prevent trespass on agricultural/private land. Access will be maintained for agriculture.

2.4.30. Opportunities for WCH will continue to be explored during the preliminary design stage.

Watercourse crossings and flood risk

- 2.4.31. There are two known watercourse crossings relating to Smite Brook as described above. A potential third crossing of an agricultural drainage ditch may be present along the field boundary in the location of the proposed dumbbell junction. This ditch is not identifiable from OS mapping and will be confirmed during the proposed drainage survey in autumn 2023. A new culvert may be required to carry flow under the proposed connector road to maintain this existing drainage ditch.
- 2.4.32. On the eastern side of the A46 Smite Brook culvert lies a bund. The current purpose of this bund is unknown and consultation to date with the Environment Agency and Lead Local Flood Authorities (LLFA) of Coventry City Council and Warwickshire County Council has been unable to determine its purpose. This bund will be removed as part of the Scheme to facilitate an alignment and associated earthworks which allows a 50mph speed limit. Scheme Hydraulic flood modelling will be undertaken for the A46 Smite culvert but at the present time works to the A46 Smite Brook culvert are not anticipated subject to a structural survey in autumn 2023.
- 2.4.33. Works to the Smite Brook culvert under the B4082 are not anticipated, subject to a structural survey in autumn 2023 which will be undertaken to ensure the culvert is strong enough to facilitate the future WCH provision proposed across it. The culvert will not be affected by the new link road which joins the existing B4082 to the east of this culvert.
- 2.4.34. The Scheme does not encroach within the floodplain of the River Sowe nor does it have any direct impacts upon this river.

Drainage design

- 2.4.35. The Scheme introduces new road surface areas which require new and improved drainage, and in some locations where the existing drainage network

will be impacted it will be replaced. The drainage design will be based on the principles of the standard Design Manual for Roads and Bridges (DMRB) CG 501: Design of Highway Drainage Systems (National Highways, 2022) for the majority of the work. The approach will be discussed with the LLFAs before the drainage strategy is finalised.

- 2.4.36. Within the draft Order Limits eight existing outfalls have been identified from National Highways data, four of which discharge to Smite Brook in the location of the A46 culvert. Drainage assets will be confirmed through a drainage survey in autumn 2023.
- 2.4.37. The current drainage proposal replicates the existing drainage arrangement and includes six proposed drainage catchments. Surface water will be collected through a combination of gullies, surface water channel and filter drains. The run-off would then be conveyed through carrier drains and for three drainage catchments this would be held in attenuation basins before discharging to local watercourses. Outflows from the attenuation basins will be controlled through orifices or hydrobrakes.
- 2.4.38. Three attenuation basins are proposed, all three basins are located on the west side of the A46. The first basin is located north of the western dumbbell roundabout and will discharge via an existing outfall into a ditch which flows to the River Sowe. The second basin is located between the A46 mainline and the B4082 link road north of the Hungerley Hall Farm accommodation bridge and will discharge to an existing ditch, via a new outfall. The third basin is located to the north off the B4082 and south of Hungerley Hall Farm, this attenuation basin will discharge to Smite Brook near the B4082 culvert via an existing outfall. The basin volumes will take into account relevant climate change allowances, to be agreed with statutory bodies.
- 2.4.39. The attenuation basins would be designed to allow for a minimum 300mm freeboard in the event of rainfall of a 100-year return period with 25 percent climate change. A sensitivity test would be carried out for 40 percent climate change to ensure the proposed basins do not flood.
- 2.4.40. Each attenuation basin would have a minimum 3.5m wide circulation track around it with a 0.5m verge width on either side to allow for maintenance.
- 2.4.41. For the three other drainage catchments, flows would pass through filter drains and be discharged unattenuated into watercourses. In these instances, discharge rates would be the same or less than the existing. These discharges would be to the Smite Brook in the location of the A46 culvert.

Lighting

- 2.4.42. The Scheme will include new lighting. It is proposed to light the realigned B4082 along its entire length with lighting columns at 10m height in the eastern verge. The proposed junction is proposed to be lit with 10m high columns along all slip roads and throughout the roundabouts and bridge.
- 2.4.43. It is not proposed to light the A46 mainline within the draft Order Limits as the existing A46 mainline is currently unlit, except in the vicinity of Walsgrave roundabout which will be removed.
- 2.4.44. The lighting design is still to be developed; however, it is assumed that efficient full cut-off lighting technology and light emitting diodes (LEDs) would be used.

Technology

- 2.4.45. Within the Scheme limits there are several technology asset installations. These include: two existing VMS, two existing Emergency Roadside Telephones (ERTs), two existing communications network cabinets, one existing power supply cabinet, and two existing traffic flow loops. Due to Scheme proposals and the introduction of a new dumbbell junction some of these existing installations will be impacted.
- 2.4.46. A summary of the impacted existing assets is as follows:
- One of the two existing VMS will require relocating approximately 720m north of the existing roundabout.
 - Both ERTs will likely be removed as they are not required from a road operational perspective.
 - The existing communications cabinets will require relocation.
 - The existing power cabinet will remain in its current location but the power cable from one of the two existing VMS will need to be replaced.
 - The existing traffic flow loops may need to be replaced at the same location.
- 2.4.47. On the northern side of the Scheme, there are additional existing technology assets which currently fall outside the draft Order Limits and are therefore assumed to be unimpacted.

Maintenance accesses

- 2.4.48. Offline drainage features such as the attenuation basins will be accessed by separate access tracks. These will be owned and maintained by the respective highway authority.

2.4.49. An on-line maintenance hardstanding is proposed for the relocated VMS along the A46 northbound. A walking maintenance access strip will be proposed along the proposed boundary fenceline. Other road assets such as lighting columns, signs, noise barriers, VRS, retaining walls, bridges, underground utilities, pavement, landscaping, etc. will be maintained through temporary traffic management.

Utilities

2.4.50. Utilities searches have identified that there is statutory undertaker's equipment located in the vicinity of the Scheme belonging to various utility companies. Most notably, this includes 132kV overhead transmission lines operated by Western Power Distribution and a high-pressure sewer main operated by Severn Trent.

2.4.51. The overhead transmission line runs north-south on the western side of the A46, crossing the B4082 immediately west of Walsgrave junction. It is not proposed that this line will be impacted by the Scheme. Further surveys during the detailed design stage are required on site to verify these positions and to confirm if any diversion or protection works are required.

2.4.52. The proposed alignments have been designed to not affect the required clearances of the existing overhead lines. Working restrictions in the vicinity of the overhead lines and the pylons will be in place and agreed with the utility company.

Environmental design

2.4.53. The Scheme design is an iterative process which considers the key potential significant effects on environmental receptors. Environmental considerations that have influenced the option development and selection process are set out in PEIR Chapter 3 Assessment of alternatives. The ongoing design development will continue to be influenced by the EIA process.

2.4.54. Environmental mitigation can be incorporated within the highways design, where appropriate and practicable, to mitigate environmental effects from the Scheme. Examples of this include noise barriers and bunds to mitigate noise level changes from road traffic, drainage features, and landscape planting to screen visual effects. Mitigation measures will be developed throughout the preliminary design development. At present where mitigation is anticipated to be required this is described in the PEIR technical aspect chapters (Chapters 5 – 14). At this stage the type of mitigation and location cannot always be confirmed. For example, it is likely that noise fencing will be required in some locations, however the height, length and exact locations cannot be determined until forecast traffic flows are available in winter 2023-2024 and noise modelling has been undertaken in spring 2024. Therefore, mitigation such as this cannot be

presented yet. However, assessments will be undertaken and mitigation will be identified in accordance with the requirements of DMRB and the National Policy Statement for National Networks (NPSNN) and this will be presented in the ES.

- 2.4.55. Mitigation measures themselves also have the potential to impact upon the receptors. For example, a noise fence may require screening which could be achieved by the planting of trees and hedgerows, whilst this may have biodiversity benefits it may have an impact upon setting of some receptors. It may not always be possible to detail this mitigation until it was known if it would be required and the overall effects would need to be balanced against the need for the mitigation.
- 2.4.56. At present, based upon experience of schemes of a similar nature and type a summary of the typical mitigation measures that may be required to reduce the impact of the operation of the Scheme include:
- retention of as much vegetation as possible
 - replacement vegetation planting (woodland and grassland)
 - noise (acoustic) fencing
 - low-noise surfacing
 - installation of bat and bird boxes
 - photographic recording of any cultural heritage assets
 - provision of attenuation basins

Land for mitigation

- 2.4.57. A triangular area of land to the east of the A46 immediately north of Coombe Pool SSSI was identified at the options selection stage for compensatory planting, which is a type of mitigation involving the planting of new trees to directly replace those lost. Assessments will determine if this area included within the draft Order Limits is adequate to provide the mitigation required for the Scheme and accordingly the draft Order Limit in this location may increase or decrease for the ES and DCO application. It is likely that this mitigation area will be bounded by a post and rail fence with access for maintenance provided via the Hungerley Hall Farm accommodation bridge. The details will be developed as the preliminary design progresses.
- 2.4.58. Whilst land for mitigating the impacts of the Scheme can be included within the draft Order Limits and DCO application and will be, any land required for Biodiversity Net Gain (BNG) cannot. At the time of the DCO application (Autumn 2024) there will be no statutory requirement to provide for 10% BNG. However National Highways policy is currently for the Scheme to provide for 10% BNG. Whilst the mitigation planting to be provided on site can also be used to count

towards this 10% target, not all of the mitigation areas will provide the BNG required to achieve 10% and so off-site provision will be investigated. The provision of off-site BNG measures is not part of this Scheme and will be developed with local stakeholders and landowners outside of the DCO process.

2.5. Construction

Construction programme and phasing

2.5.1. The DCO is expected to be granted in spring 2026. The Start of Works (SoW) is anticipated to be September 2026, with the Scheme being open for traffic (OFT) in May 2028, lasting approximately 21 months.

Construction activities

2.5.2. As part of the Scheme, the following elements will be required during construction:

- haul roads
- a main site compound to be used for Scheme offices, welfare facilities and material and plant (equipment) storage
- additional secondary site compounds to be used for welfare facilities and material and plant storage, located nearer to where works are occurring
- utility diversion and/or protection works if required
- temporary traffic management arrangements on the A46 and the B4082 to create safe journeys and safe working areas

2.5.3. The types of construction elements that are likely to form part of the Scheme include the following:

- site mobilisation including establishing of site compounds, haul roads and security fencing
- site clearance including vegetation and street furniture
- earthworks including topsoil strip and construction of embankments and cuttings
- construction of structural concrete foundations including piling works
- construction of new bridge structure over the a46
- construction of retaining wall solutions for the retention of new embankments and cuttings.
- relocation of existing technology on the a46
- installation of new drainage assets including pipework, chambers, basins and headwalls
- construction of a new central reservation on the A46 including VRS

- Installation of new VRS on the verges of the A46 and B4082 link road
- installation of new street lighting and traffic signs
- installation of new fencing and visual screening
- laying of asphalt and road markings
- landscaping and planting works

- 2.5.4. Details of the construction methodology will be included as part of the ES. The ES will describe the construction phasing, the likely duration and location of construction activities, any requirements for night-time working, and the anticipated numbers and types of vehicle movements associated with the construction phase.
- 2.5.5. The development of the construction strategy will aim to ensure that adverse effects are reduced for sensitive receptors as far as practicable.

Compounds and haul roads

- 2.5.6. At the options selection stage a construction compound located to the north of Hungerley Hall Farm with access off the existing B4082 was proposed. This was presented in the ESR. Since then the location of the main compound has been reviewed and an existing construction compound used by National Highways for the Binley junction improvements will be used. This proposed main site compound is located on land to the south of the Brinklow Road (B4428) and the east of the A46. The site currently contains site offices, welfare and storage facilities for plant and materials. This construction compound is approximately 13,000m² and accessed via an existing haul road from Brinklow Road. It is proposed that this site compound will be secured under an extension to the existing planning permission relating to the Binley Scheme and thus has not been included within the draft Order Limits.
- 2.5.7. The compound and satellite compound will be lit 24 hours per day for security purposes. Wire mesh fencing and palisade gates will be used around the main site compound. Heras fencing/hoarding will be used around the satellite compounds.
- 2.5.8. A small satellite compound within the draft Order Limits will also be required to provide welfare facilities. The location will be determined following confirmation of the phasing of construction works and will be positioned to suit the areas of construction. Welfare facilities will also be provided within the draft Order Limits, positioned to suit the live areas of construction. The provision of welfare facilities nearer to working areas will help to decrease traffic movements of the construction operatives.

- 2.5.9. A haul route is likely to be required between the Hungerley Hall Farm access from the B4082 and the proposed new dumbbell junction on the west side of the A46. Where possible this haul road will follow the proposed alignment of the new link road to reduce the site clearance which will be required, however due to space constraint the draft Order Limits also includes provision for this haul road to be to the west and north side of Hungerley Hall Farm.
- 2.5.10. To minimise the impacts on the environment, compound locations will be selected where reduced earthworks will be required and where practicable nearby utilities can be utilised to prevent running elements 'off grid', significantly reducing potential carbon emissions. Where possible import of raw materials will be kept to a minimum with a low impact solution sought for the engineered pavement and foundations for these temporary areas.
- 2.5.11. On completion of the permanent works, these areas will be incorporated into the Scheme or removed and reinstated as part of the landscaping works.

Traffic management

- 2.5.12. There are currently two options for traffic management during the construction phasing of the Scheme which are being considered.
- 2.5.13. Option 1 is based on keeping all lanes running on the A46 northbound and southbound carriageway at peak times throughout the works.
- 2.5.14. Option 2 is based on reducing the capacity of the northbound and southbound carriageways of the A46 to single carriageway whilst constructing sections of the works to the south of the existing Walsgrave junction.
- 2.5.15. Construction programmes for each option are currently being drafted. These programmes will then be used to calculate costs and forecast delay to journey times. This information will be used to inform the decision on the preferred traffic management option.
- 2.5.16. Both options 1 and 2 require the following traffic management arrangements:
- narrow lane running and a reduced speed limit on the A46 northbound and southbound carriageways
 - night closures of the A46 northbound and southbound carriageways
 - narrow lane running and a reduced speed limit on the B4082.
 - night closures of the B4082
 - realignment of the existing Walsgrave roundabout
 - use of temporary crossovers between carriageways

2.5.17. Option 1 requires the following additional traffic management:

- construction of temporary lanes in the southbound verge south of the existing roundabout

2.5.18. Option 2 requires the following additional traffic management:

- reduction of the northbound carriageway to single lane traffic for sections of the programme
- reduction of the southbound carriageway to single lane traffic for sections of the programme
- running traffic in single lane contraflow
- removal of right hand turns to and from the B4082 for sections of the programme

2.5.19. Where practicable all lanes will be kept open during construction of the Scheme to minimise disruption to the road user. The following works will be completed offline:

- construction of the new link road (other than tie-ins to A46)
- construction of the new slip roads and roundabouts
- construction of the new overbridge
- removal of the existing Walsgrave roundabout

2.5.20. To increase the working area and safety zones during offline working, narrow lanes, temporary safety barriers and reduced speed limits will be implemented.

2.5.21. Works requiring carriageway closures are as follows:

- installation of new traffic management layouts
- final surfacing/road marking visits
- completion of tie in works for new slip roads and link road
- demolition of the existing access bridge (if required)

2.5.22. Where carriageway closures are noted above, these will be undertaken during nights or over weekends to minimise disruption. Closures will be communicated to stakeholders and suitable diversion routes will be in place.

Plant and equipment

2.5.23. Construction activities would involve the use of heavy plant items, for example excavators, dumper trucks, dozers, piling rigs, and demolition and compaction equipment. Exact plant numbers and type will be determined by the construction methodology and the volume of material to be handled on site.

Earthworks

2.5.24. Large amounts of fill material would be required, estimated at approximately 193,000m³. This may be reduced by recycling material generated at site, with cut material estimated to be approximately 126,500m³. Various options will be explored to obtain additional fill material from local sources, including other nearby construction projects which have a surplus of suitable fill, as well as local quarries.

Dewatering

2.5.25. GI will be undertaken to determine the ground and groundwater conditions within the draft Order Limits. The information obtained will be used to inform the risk assessment of any identified contaminated land impacting on the groundwater and will be used to determine the requirements for protective measures if deemed necessary. An assessment of the requirement for dewatering activities as part of the construction works will also be undertaken following the ground investigation.

2.5.26. If required, dewatering and disposal using standard techniques such as sumps and pumps may be used to manage the potential for groundwater seepages into excavations/earthworks.

Carbon management

2.5.27. In order to deliver National Highways' aspirations with respect to the minimisation of carbon emissions and the efficient use of resources, the carbon intensity of the Scheme will be established and monitored throughout the design and construction phases.

Sustainable procurement

2.5.28. In addition to ensuring a carbon efficient design, a sustainable procurement strategy will be implemented to ensure that low carbon materials are, where practicable, specified and that the carbon intensity of materials and sub-contract packages is measured and monitored throughout.

Materials and waste management

2.5.29. The recycling and re-use of site (including demolition) materials arising from the Scheme will be implemented and, where practicable, construction materials will be sourced from local sources of supply.

Excavation, re-use and disposal

- 2.5.30. At this stage, it is estimated that there will be approximately 41,125m³ of material removed from site.
- 2.5.31. Where excavation arisings cannot be re-used on the Scheme, opportunities will be sought to re-use them on other construction schemes. Where this is not possible, they will be diverted from landfill to another off-site development or sent to an appropriately licenced recovery, treatment and recycling facility.
- 2.5.32. Through implementation of 'good practice' during construction and the local and regional availability of waste processing, treatment and recovery facilities, it is predicted that the Government's 70% target for the recovery or recycling of construction waste (either on or off the Scheme or both) could be achieved where technically appropriate and economically feasible.

Import

- 2.5.33. At this stage, there is predicted to be approximately 128,225m³ of material imported to site, comprising approximately 92,625m³ secondary/recycled general fill materials and approximately 35,600m³ asphalt and sub-base materials constituting primary aggregates.
- 2.5.34. Prioritising the use of secondary, recycled or site-won resources and implementing the principles of local and responsible sourcing of key resources.
- 2.5.35. Through implementation of 'good practice' during construction and the local availability of secondary and recycled aggregates or earthworks materials from other development schemes within the locality, it is predicted that the regional (West Midlands) guideline target of 27% relating to the use of secondary and recycled aggregates could be achieved where technically appropriate and economically feasible.

Demolitions

- 2.5.36. Where the existing road is to be upgraded, there may also need to be demolition of road infrastructure, planing of surfaces and removal of existing drainage, signs etc. This will be managed as part of the wider construction programme and controls to manage environmental effects implemented through the Environmental Management Plan (EMP). Full details of the proposed demolitions will be provided in the ES.

Maintenance

- 2.5.37. Maintenance will be authorised under the DCO. As required by DMRB, industry standard control measures will be applied and encapsulated in the EMP at the

end of construction to inform the handover process, and ensure key requirements are met during operation so that the mitigation implemented continues to be effective. With the implementation of these measures no significant effects from maintenance are considered likely that will not already be considered for the construction phase. Consequently, maintenance activities are not considered separately, except for climate where the impact of the Scheme's emissions over the 60-year appraisal period will be considered as part of the whole life requirements in line with relevant guidance as described further in PEIR Chapter 13 Climate.

3. Assessment of alternatives

3.1. Introduction

3.1.1. This chapter outlines the alternative design options that have been considered during the development of the Scheme. All projects undertaken by National Highways go through the following initial project stages:

- Strategy stage: at this project stage, initial analysis and appraisal are conducted to assess the viability of transport scheme solutions to the problem, including road network and non-road network solutions.
- Options identification stage: at this stage, traffic modelling and economic and environmental assessment is undertaken on a number of options.
- Option selection stage: at this stage, the public are consulted on the recommended options from the options identification stage. Refinements are then made to the option designs, traffic modelling and economic and environmental assessments following feedback from the consultation. At the end of the option selection stage a Preferred Route Announcement (PRA) is made to announce the decision on which option will be progressed.
- Preliminary design stage: this is the stage the Scheme is currently in and involves developing a design for the preferred option. An environmental impact assessment is undertaken upon the Scheme at this stage which is reported in the Environmental Statement (ES) to support the Development Consent Order (DCO).

3.2. History of the Scheme Alternative options considered

3.2.1. In July 2014, Highways England published the Route Strategies: Options Assessment Report – A46 Coventry to M6 J2 Study (Highways England, 2014) following engagement with key stakeholders in 2013. This report identified four potential options associated with the Binley and Walsgrave Junctions that could address congestion and poor journey time reliability issues at Binley and Walsgrave Junctions along the A46. These included:

- Option 1: Improvements to the Binley junction by grade separation
- Option 2: Improvements to Walsgrave junction through relocation of the junction and grade separation
- Option 3: Improvements to or upgrade of M6 junction 2 and M6/M69, and consideration of whether the links can be improved, and if there is sufficient capacity to cope with the planned growth
- Option 4: Improvements to both Binley and Walsgrave junctions as stated in Options 1 and 2 above

3.2.2. Option 4 was progressed, and design development was undertaken between mid-March to October 2016 in several phases. First, several designs for each of the two junctions were developed and evaluated against a number of metrics (safety, traffic throughput, impact on local network, environment, geotechnical issues, economic growth, cost and stakeholder impact). The designs were then considered in a series of scenarios which comprised:

- grade separation of Binley junction only (at either 50mph or 70mph)
- two grade separation junctions at Binley and Walsgrave (at either 50mph or 70mph)

3.2.3. In October 2016, it was determined that a scheme that included Walsgrave Junction would not be achievable within the RIS1 funding allowance and that development of Binley Junction should continue with Walsgrave Junction placed on hold. There was significant potential identified to secure developer contributions from ‘sites’ that would be unlocked by the relocation of the Walsgrave junction.

Walsgrave option development

3.2.4. Following an internal review, funding was identified by National Highways in February 2018 to allow Walsgrave junction to progress. In April 2018, design work for Walsgrave re-commenced and a review of the work completed as part of the early option assessment was undertaken. To ensure that identification of specific options was not biased by earlier work or limited to a narrow interpretation of the layout, options were developed within six design families, as outlined in Table 3-1.

Table 3-1: Descriptions of the six design families considered as part of the assessment of alternatives

Design family	Description	Degree of change
1	Do nothing/Do minimum	None
Do something		
2	Southbound dedicated bypass lane	Minor
3	Signalised junction	Minor to moderate
4	Remodel for left-in and left-out to B4082	Moderate
5	Compact grade separated junction	Substantial
6	Full grade separation	Substantial

3.2.5. Using the six design families, 30 Walsgrave junction layout options were developed and/or considered for options identification, including the previous work undertaken prior to 2018. Through rationalisation and Option sifting activities the options were shortlisted down to 10 for further development and

assessment. The 10 options were selected for further assessment in the options identification stage and are detailed in Table 3-2.

Table 3-2: Descriptions of the 10 design options

Option	Brief Description
1	One-way traffic system on Clifford Bridge Road (70mph)
2	Dedicated bypass southbound (free-flow link) with fly-over northbound (50mph)
3	Signalised T-junction (50mph)
4	Left-in/Left-out (LILO) connection to B4082 (50mph)
5	Compact Grade-separated Junction (fully compact junction) (50mph)
6	Fully Grade-separated Junction (70mph)
7	Left-in/Left-out (LILO) connection to B4082 (tight radii) (50mph)
8	Realignment of A46 Mainline with Left-in/Left-out (LILO) connection to B4082 (70mph)
9	Removal of A46 connection to B4082 (50mph)
10	Removal of A46 connection to B4082, with realignment of A46 Mainline (70mph)

3.2.6. Following on from the options identification stage, three options were initially taken forward to the options selection stage, with seven options discounted for the following reasons:

- Option 1 is highly unlikely to be considered favourably by local road users and residents and provides no meaningful benefit to the A46.
- Option 2 has insufficient capacity on the southbound free flow link. The Option also does not fit within the budget.
- Option 3 is not considered practical given the need to have five lanes for A46 traffic at the stop line and the likely safety disbenefits of this traffic merging into two lanes exiting from the junction. It would also not meet the overall scheme objectives of having free flowing traffic on the A46, would severely penalise off-peak journey times and does not fit within the budget.
- Option 4 impacts the existing Western Power Distribution (WPD) electricity assets which would require relocation. This relocation cost is substantial and cannot be afforded within the available project budget.
- Option 5 technically complies with the RIS requirement for “grade-separation”; however, compact arrangement is not suitable for traffic flows on A46 and alignments would encircle Hungerley Hall Farm. It is not affordable within the project budget.
- Options 9 and 10 do not provide any connectivity with the B4082, plus would likely result in significant negative stakeholder reaction due the combination of the removal of the connection to the local network. National Highways

want to meet the RIS requirements as far as possible and Options 7 and 8 are superior in this respect.

- 3.2.7. Following initial environmental assessment and traffic modelling of the three selected options, a further fourth option was identified to be taken forward as part of the options selection stage. This option (Option 11) was considered as one of the 30 design layout options but was discounted because it was similar to Option 6, providing grade separation, but with the limited benefit of a 50mph bend past the SSSI.
- 3.2.8. To summarise at the end of the options appraisal stage four 'do something', options were progressed to the options selection stage. These four options are described further below along with the 'do minimum' option which is a standard option against which change is measured.
- 3.2.9. At the options selection stage, an Environmental Assessment Report (EAR) (National Highways, 2021) was produced to inform the comparison of environmental effects for the four options and to support the selection of the preferred option. The preferred option was selected after the EAR was completed and was informed by the conclusions of the EAR.

Options selection stage

Do minimum

- 3.2.10. This is the current baseline (that is, what would happen in future without the Scheme) and includes the completed improvements to Binley junction. With this option there would be no capacity improvements to Walsgrave junction and the Applicant would be required to put in place a long-term repair and maintenance strategy to maintain the serviceability of the existing structures.

Do something

- 3.2.11. Four options were considered at the options selection stage and these were assessed for the upgrade to the existing Walsgrave junction. The options were:
- Do something – option 6
 - Do something – option 7
 - Do something – option 8
 - Do something – option 11

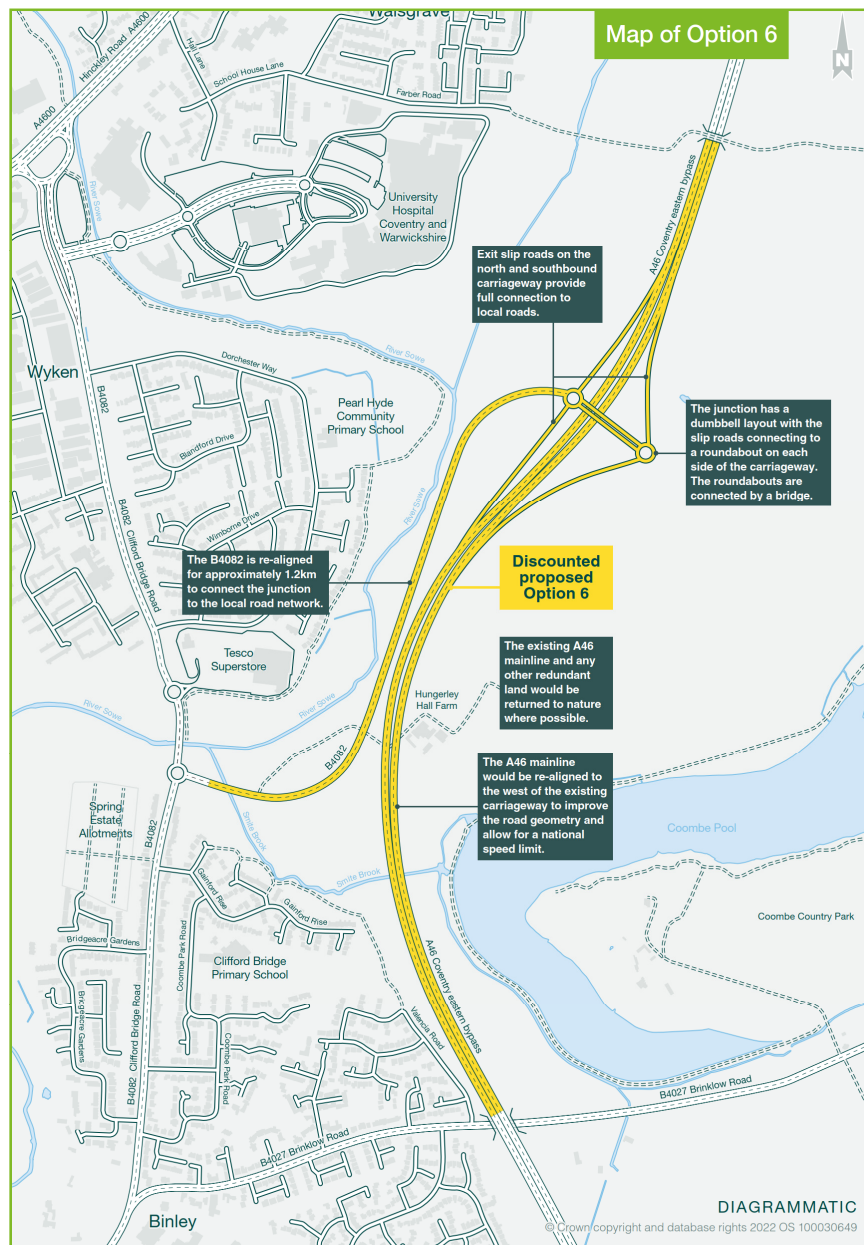
Do something – Option 6 – Full grade separated junction

- 3.2.12. Option 6 comprised of a grade separated junction approximately 1km to the north of the existing roundabout location as presented in Figure 3-1 of this

Preliminary Environmental Information Report (PEIR). The geometry of this option allowed for a 70mph speed limit on the mainline dual carriageway.

- 3.2.13. The A46 mainline would be realigned through the existing Walsgrave roundabout for approximately 1.8km in length, approximately 225m west of the existing route, and approximately 1m above the existing ground level before re-joining the existing A46 approximately 1.1km north of the existing roundabout.

Figure 3-1 . Option 6



- 3.2.14. The full grade separated dumbbell junction would be approximately 830m northwest of the existing Walsgrave junction and would consist of north and southbound diverge and merge slip roads connecting to an overbridge with

roundabouts at each end. The overbridge would be provided across the realigned A46 between the two roundabouts and would carry a two-lane single carriageway. The proposed height above the A46 mainline road level would be up to approximately 7m. A new link road, approximately 1km in length, would be provided between the western roundabout of the dumbbell junction and the existing roundabout on Clifford Bridge Road. This would be a two-lane single carriageway.

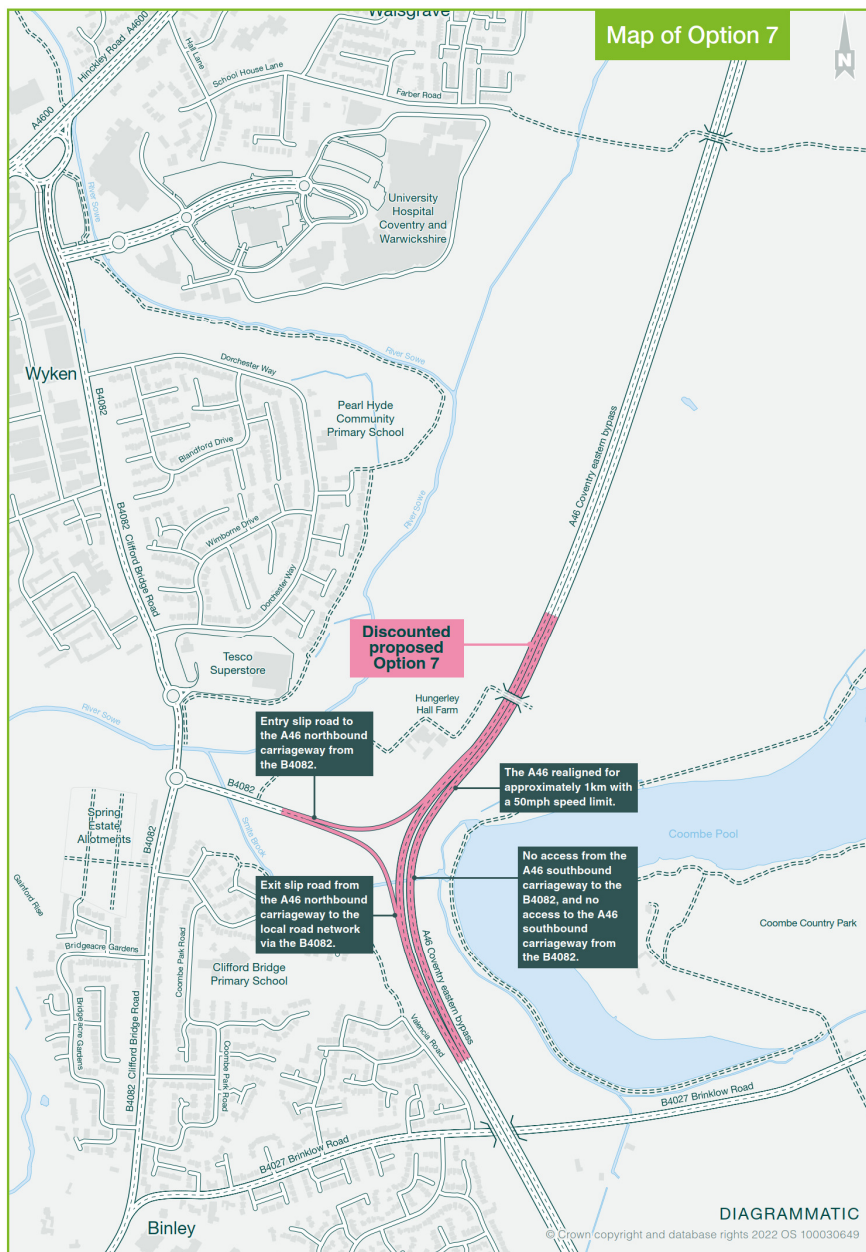
- 3.2.15. The existing sections of the B4082 and A46 that are no longer required would be grubbed up and landscaped; however, one carriageway from the eastern dumbbell could have been re-used to the south for accommodation works to re-provide access to Hungerley Hall Farm.
- 3.2.16. The proposed outline drainage strategy for Option 6 comprised of three attenuation basins to be constructed to attenuate the increase in impermeable area, before discharging to the River Sowe to the west via new outfalls. A new culvert may have been required for this option to carry flow under the proposed mainline and connector road. An extension to the culvert carrying Smite Brook under the B4082 would be required on both sides to support the proposed verge. This would involve an in-situ reinforced concrete extension of approximately 7m on the north side and approximately 3m on the south side of the culvert. The existing wingwalls and headwalls would also need to be removed and replaced with in-situ reinforced concrete wingwalls and headwalls.
- 3.2.17. The Scheme footprint for Option 6 was 333,138m². The permanent land take required for this option outside of the highway boundary would be 192,825m². The temporary land take required for this option would be 86,358m².
- 3.2.18. Option 6 was discounted within the option selection stage as the newly aligned B4082 would have led to a significant reduction in the River Sowe's floodplain storage and would have resulted in regular flooding of the road and local area.

Do something – Option 7 – Left-in/left-out junction

- 3.2.19. Option 7 is a left-in/left-out arrangement, allowing merging or diverging from the proposed A46 northbound carriageway. Access/egress to the local road network from the southbound carriageway would be removed. Option 7 is presented on Figure 3-2 of this PEIR.
- 3.2.20. In Option 7 the existing roundabout would be removed and the A46 mainline dual carriageway would be realigned to provide a continuous link for two lanes of traffic in both the north and southbound directions. The realignment would occur at approximately the same level as the existing A46 and would be approximately 1km in length and approximately 40m to the east of the existing roundabout. The proposed alignment would have a posted speed limit of 50mph.

3.2.21. Access to the northbound carriageway of the A46 would be maintained through the provision of a new northbound merge slip road from the B4082 to the A46 mainline. Similarly, egress would be maintained via a new northbound diverge slip road from the A46 mainline to the B4082. The northbound diverge and merge slip roads would be single lane and would require widening of the existing highway corridor north and south of the B4082 where it meets the existing Walsgrave roundabout. Access to and egress from the A46 southbound carriageway at this junction would no longer be possible.

Figure 3-2 . Option 7.



3.2.22. The diverge lane from the A46 would begin approximately 200m south of the existing junction and would join the B4082 approximately 230m to the west of

the existing junction. The northbound diverge would be introduced at approximately the same level as the existing A46.

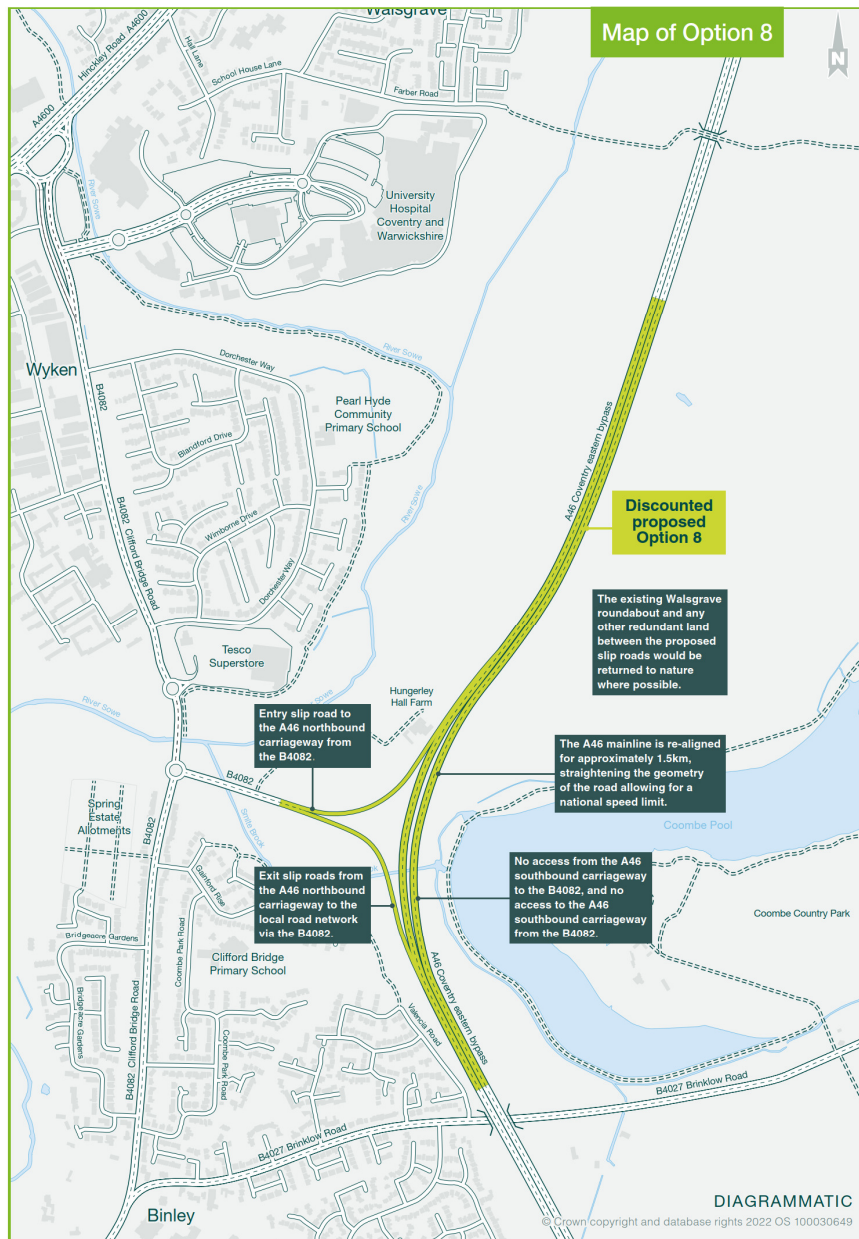
- 3.2.23. The merge lane would join the B4082 approximately 230m west of the existing junction and join the A46 approximately 260m to the north. The northbound merge would be introduced at approximately the same level as the existing A46.
- 3.2.24. The existing Walsgrave roundabout and any other redundant land between the proposed slip roads would be grubbed up and landscaped.
- 3.2.25. As part of the drainage strategy, a culvert extension on the west side of the A46 for the Smite Brook under the mainline A46 would be required. This would involve the introduction of a new precast concrete retaining wall approximately 1.2m high and 6.2m long, to be installed in front of the existing headwall to retain fill. No extension would be required for the existing link road culvert.
- 3.2.26. The Scheme footprint for Option 7 would have been 111,453m². The permanent land take required for this option outside of the highway boundary would be 7,177m². The temporary land take required for this option would be 28,006m².
- 3.2.27. Option 7 was discounted in the option selection stage as further traffic modelling showed that the left in left out junction design would have led to worsening congestion on the local road network. These traffic impacts would then tailback onto the A46 meaning there would still be queuing on the A46 between the Binley and Walsgrave junctions.

Do something – Option 8 – Left-in/left-out junction

- 3.2.28. Option 8 is also a left-in/left-out arrangement, allowing merging or diverging from the proposed A46 northbound carriageway as presented on Figure 3-3 of this PEIR. Access/egress to the local road network from the southbound carriageway would be removed. The mainline in this option has a larger radius compared to option 7 to allow for a posted speed limit of 70mph on the proposed A46 through the junction.
- 3.2.29. The existing roundabout would be removed and the A46 mainline dual carriageway would be realigned to provide a continuous link for two lanes of traffic in both the north and southbound directions. The realignment would occur at the approximately the same level as at the existing A46 and would be approximately 1.4km in length and approximately 30m to the east of the existing roundabout.
- 3.2.30. Access to the northbound carriageway of the A46 would be maintained through the provision of a new northbound merge slip road from the B4082 to the A46 mainline. Similarly, egress would be maintained via a northbound diverge slip

road from the A46 mainline to the B4082. The northbound diverge and merge slip roads would be single lane and would require widening of the existing highway corridor north and south of the B4082 where it meets the existing Walsgrave roundabout. Access to and egress from the A46 southbound carriageway would no longer be possible.

Figure 3-3 . Option 8.



3.2.31. The diverge lane from the A46 would begin approximately 260m south of the existing junction and would join the B4082 approximately 230m to the west of the existing junction. The northbound diverge would be at approximately the same level as the existing A46. The merge lane would diverge from the B4082 approximately 230m west of the existing junction and join the A46 approximately

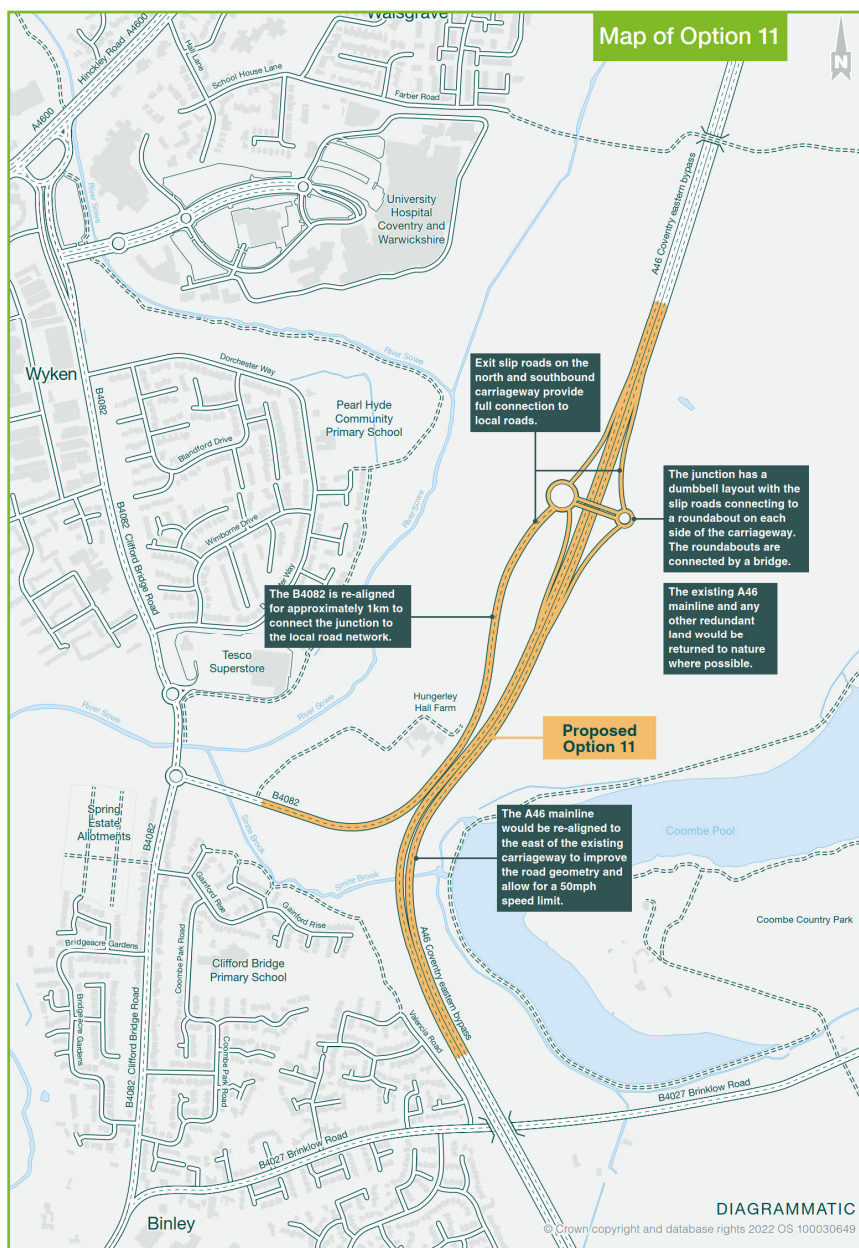
570m to the north. The northbound merge would be at approximately the same level as the existing A46.

- 3.2.32. The existing Walsgrave roundabout and any other redundant land between the proposed slip roads would be landscaped. The road realignment would impact the listed buildings at Hungerley Hall Farm and require the demolition of the farmhouse.
- 3.2.33. As part of the drainage strategy, an attenuation basin would be introduced just north-west of the existing junction to provide attenuation for the surface water runoff. This attenuation basin would be constructed to attenuate the increase in impermeable area and discharge to the River Sowe to the north-west of the pond via a new outfall. A culvert extension to the east and west of the A46 would be required for the Smite Brook. This would involve an in-situ reinforced concrete extension of approximately 3m on the west side and approximately 4.5m on the east side of the culvert. The existing wingwalls and headwalls would also need to be removed and replaced with in-situ reinforced concrete wingwalls and headwalls. No extension would be required for the existing link road culvert.
- 3.2.34. The Scheme footprint for Option 8 would be 223,636m². The permanent land take required for this option outside of the highway boundary would be 52,890m². The temporary land take required for this option would be 38,253m². Option 8 includes both temporary and permanent land take within the Coombe Pool SSSI, with approximately 1,850m² permanent land take and approximately 2,850m² temporary land take.
- 3.2.35. Option 8 was discounted in the option selection stage as further traffic modelling showed that the left in left out junction design would have led to worsening congestion on the local road network. These traffic impacts would then tailback onto the A46 meaning there would still be queuing on the A46 between the Binley and Walsgrave junctions.

Do something – Option 11 – Full grade separated junction

- 3.2.36. Option 11 is a grade separated junction approximately 800m to the north of the existing roundabout location. The geometry of this option allows a 50mph speed limit on the mainline dual carriageway. Option 11 is presented in Figure 3-4 of this PEIR.
- 3.2.37. The A46 mainline would be realigned through the existing Walsgrave roundabout for approximately 800m, before tying back into the current alignment at the existing Hungerley Hall Farm accommodation bridge. The mainline then continues on the current alignment for approximately 850m to allow for junction slip road tie ins.

Figure 3-4 . Option 11.



3.2.38. The full grade separated dumbbell junction would be approximately 800m north of the existing Walsgrave junction roundabout and would consist of north and southbound diverge and merge slip roads connecting to an overbridge with roundabouts to the east and west. The overbridge would be provided across the A46 between the two roundabouts and would carry a two-lane single carriageway. The proposed height above the A46 mainline road level would be up to approximately 8m. A new B4082 link road, approximately 1km in length, would be provided between the western roundabout of the dumbbell junction and an existing section of the B4082 that leads to the existing roundabout on Clifford Bridge Road. This would be a two-lane single carriageway. The new link road would pass close to the A46 mainline carriageway between the A46 and

Hungerley Hall Farm before being aligned further west away from the A46 to connect to the western dumbbell.

- 3.2.39. The existing sections of the B4082 and A46 roundabout that are no longer required would be grubbed up and landscaped. The existing overpass (farm access) over the A46 close to Hungerley Hall Farm would be demolished, with access re-provided via the B4082 and dumbbell junction overbridge, subject to consultation with the current landowner.
- 3.2.40. The proposed outline drainage strategy for Option 11 comprised of three attenuation basins to be constructed to attenuate the increase in impermeable area, before discharging to the River Sowe to the west via new outfalls. A new culvert may be required to carry flow under the proposed connector road to maintain an existing drainage ditch.
- 3.2.41. The Scheme footprint for Option 11 would be 306,752m². The permanent land take required for this option outside of the highway boundary would be 94,553m². In addition, an allowance has been made for an environmental compensation area to the north of Coombe Pool SSSI of 37,020m². The temporary land take required for this option would be 23,678m².

Consultation at options selection stage

- 3.2.42. Consultation is an important part of the options selection process. The Applicant held a non-statutory consultation between 11 January and the 14 February 2022 as part of the option selection stage for the proposed upgrade to Walsgrave junction. Consultation was undertaken with applicable statutory stakeholders including Historic England, Natural England, Environment Agency, Coventry City Council, Warwickshire County Council and Rugby Borough Council as well as the public.
- 3.2.43. All four of the 'do something' options were presented at non-statutory consultation with Option 11 being highlighted as the only viable option. Reasons for the discounting of Options 6, 7 and 8 were presented within the consultation documentation.
- 3.2.44. Due to Covid-19 restrictions that were in place at the time, this was carried out remotely which included three online public information events. Members of the community could also request a call back from a specialist within the project team as well as request hard copies of consultation documents to be posted to them free of charge. Detail was shared during the public consultation on the discounted options and why these options were not viable. The purpose of the consultation was to provide the local community and stakeholders with the opportunity to have their say on the proposals and share ideas, concerns, and local knowledge.

- 3.2.45. The feedback received during the consultation showed support for improvements at A46 Walsgrave junction and support for Option 11. Option 11 would provide a fully grade separated junction approximately 800m north of the existing A46 Walsgrave Junction. Exit and entry slip roads would be provided on both the north and southbound carriageway allowing full connection to the local road network. 80% of respondents agreed that improvements to the A46 Walsgrave junction are needed, and 66% supported Option 11.
- 3.2.46. The Applicant received 121 responses to the consultation. This feedback was important to understand how the local community currently uses the road and what people thought about the proposals for upgrading the A46 Walsgrave Junction. Respondents were asked to share thoughts on the need for improvements at Walsgrave junction and on Option 11, as presented in the consultation.
- 3.2.47. A number of comments were raised in response to the consultation, which will be looked at further during the preliminary design stage. These include:
- access to the hospital
 - walking and cycling provision
 - proposed 50mph speed limit
 - impact on the local road network

Selection of the preferred option

- 3.2.48. When selecting the preferred route several criteria, including the Scheme objectives, safety, benefits, costs, environmental effects, construction and feedback from the public consultation were considered.
- 3.2.49. Following public consultation in early 2022 Option 11 was chosen as the preferred option which was supported by the consultation responses received. The PRA for Option 11 was made in June 2022 and Option 11 has been progressed to the preliminary design stage which commenced in February 2023.
- 3.2.50. Early engagement with statutory environmental bodies has been undertaken after the PRA and prior to the start of the preliminary design stage to discuss the Scheme with:
- Natural England (September 2022)
 - Environment Agency (September 2022)
- 3.2.51. Historic England were contacted for early consultation in October 2022 however, no response was received.

3.3. Further Scheme development

Design development

- 3.3.1. During the preliminary design stage, the design process will consider alternative ways of delivering the Scheme. This will include consideration of:
- the design (including size and scale) of the Scheme and associated structures (e.g., bridges and culverts)
 - optimising the cut-fill balance to reduce material requirements and waste
 - the alignment of new offline elements
 - the type, location and extent of environmental mitigation
 - the construction methodology and programme (including the phasing of construction works and number and location of compounds and haul roads)
- 3.3.2. The assessment of alternatives presented within the ES will examine the complete suite of design variations of the preferred option, including ‘a description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the Scheme and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects’, in line with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. This will demonstrate the rationale and decisions made for the final preliminary design to be submitted as part of the DCO application.
- 3.3.3. The design will continue to be developed and the feedback received at statutory consultation will inform the design where appropriate. The continued development of the Scheme design will be an iterative process, based upon the principles of the design and mitigation hierarchy outlined in Design Manual for Roads and Bridges (DMRB) LA104 Environmental Assessment and Monitoring.

Statutory consultation

- 3.3.4. The Applicant will consult with prescribed consultees as per the requirements of Section 42 of the Planning Act 2008. The consultees will include statutory consultees (Natural England, the Environment Agency, Historic England, relevant planning authorities, UK Health Security Agency and the Office for Health Improvement and Disparities (OHID)), statutory undertakers and anyone who has an interest in the Scheme (for example landowners and tenants).
- 3.3.5. The local community and wider public will be consulted on the Scheme via a statutory consultation programme in line with Section 47 of the Planning Act 2008.

- 3.3.6. Consultation will be ongoing throughout the preliminary design stage, with the first consultation exercise being related to the environmental scoping report in summer 2023. A Statement of Community Consultation (SoCC) will be produced and published prior to the formal statutory consultation period. The SoCC will outline how the Applicant will formally consult with the local community about the Scheme. This PEIR will also be used to provide consultees with information on the potential environmental effects of the Scheme to help inform responses as described in Chapter 1.
- 3.3.7. The approach to statutory consultation includes (without being limited to):
- Meetings and workshops with local community groups and other local stakeholders.
 - Publication of brochures, reports and other information made available in local community facilities and online.
 - Public exhibitions where members of the community can meet with the project team.
- 3.3.8. In addition, consultation materials will be available online during the consultation period, as well as an online response form enabling people to share their views.
- 3.3.9. A consultation report will be produced and submitted as part of the DCO application. This will summarise the feedback received during the consultation as well as how the project team have considered this feedback in the Scheme design and EIA. The consultation report will demonstrate how the Applicant has complied with the consultation requirements of the Planning Act 2008.
- 3.3.10. Technical engagement will be ongoing throughout the preliminary design stage to discuss the scope, potential effects, and proposed mitigation with relevant stakeholders. This engagement will take the form of email exchanges, telephone calls, virtual meetings, and face to face meetings where required.

4. Environmental assessment methodology

4.1. Introduction

- 4.1.1. Environmental Impact assessment (EIA) is a process that identifies the likely significant environmental effects (both adverse and beneficial) of a proposed development and is a legislative requirement to support the Development Consent Order (DCO) application as described in Chapter 1. This chapter outlines the purpose and main stages of the EIA process and explains the methodology that will be followed for the EIA. The focus of the EIA methodology is to ensure a robust and proportionate approach, in line with Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 ("EIA Regulations"). The EIA will be reported in the Environmental Statement (ES) which will be submitted to the Planning Inspectorate to support the DCO application.
- 4.1.2. The aim of EIA is to protect the environment by ensuring that the decision maker, when deciding whether to grant permission for a project, which is likely to have significant effects on the environment, does so in the full knowledge of the likely significant effects, and takes this into account in the decision-making process. The Planning Inspectorate which is responsible for examining an application for development consent, will use this information in making a recommendation to the Secretary of State, about whether or not the Scheme should be consented. The Secretary of State will also rely upon the ES in coming to a decision on the Application.

4.2. Approach to assessment

- 4.2.1. The Design Manual for Roads and Bridges (DMRB) is the established standard for assessing the environmental impacts of highway schemes and has been developed by Highways England (now National Highways) in collaboration with relevant stakeholders.
- 4.2.2. The EIA will be undertaken in accordance with the DMRB standards including:
- LA 101 Introduction to environmental assessment (Highways England, 2019a) hereafter referred to as DMRB LA 101
 - LA 102 Screening projects for environmental impact assessment (Highways England, 2019b) hereafter referred to as DMRB LA 102
 - LA 103 Scoping projects for environmental assessment (Highways England, 2020a) hereafter referred to as DMRB LA 103
 - LA 104 Environmental assessment and monitoring (Highways England, 2020b) hereafter referred to as DMRB LA 104

- 4.2.3. As defined in DMRB LA 101 “*environmental assessment is the process by which information about environmental effects is collected, assessed, reported and used to inform decision-making. Environmental assessment includes screening, scoping, EIA, non-statutory environmental assessment and monitoring.*”
- 4.2.4. Each technical environmental aspect has their own DMRB standard which takes precedence over the standards listed above. The relevant DMRB standard for the environmental aspects and factors is listed in Table 4-1 below. Where relevant, the environmental assessment will draw on relevant technical aspect guidance and best practice.

Table 4-1: Environmental aspects and factors and respective DMRB environmental aspects

Environmental factors contained within Regulation 5(2) of the Infrastructure Planning (EIA) Regulations 2017	DMRB environmental standard
Population and human health	Chapter 5 Air Quality (LA 105) Chapter 10 Noise and Vibration (LA 111) Chapter 11 Population and Human Health (LA 112) Chapter 12 Road Drainage and the Water Environment (LA 113)
Biodiversity	Chapter 7 Landscape and Visual Effects (LA 107, LD 117 and LD 119) Chapter 8 Biodiversity (LA 108 and LD 118)
Land, soil, water, air and climate	Chapter 5 Air Quality (LA 105) Chapter 9 Geology and Soils (LA 109) Chapter 12 Road Drainage and the Water Environment (LA 113) Chapter 13 Climate (LA 114)
Material assets, cultural heritage, and the landscape	Chapter 6 Cultural Heritage (LA 106) Chapter 7 Landscape and Visual Effects (LA 107, LD 117 and LD 119) Material Assets and Waste (LA 110) – note this has been scoped out of further assessment.
The interaction between the factors referred to in sub-paragraphs a) to d)	Chapter 14 Assessment of Cumulative Effects

- 4.2.5. Each environmental aspect has considered the potential environmental effects associated with the construction and operational phases of the Scheme.

4.3. Environmental scoping

- 4.3.1. EIA begins with an environmental scoping process. The purpose of this scoping process is to determine which environmental aspects (and their environmental factors) are to be examined during the assessment stage and the level of detail to which they should be assessed. This assessment is then reported in the ES.
- 4.3.2. An Environmental Scoping Report (ESR) (National Highways, 2023) was produced in April 2023. It was prepared in accordance with Section 10 of the Infrastructure Planning (EIA) Regulations 2017, LA 103 (Scoping projects for environmental assessment) of the DMRB and the Planning Inspectorate's Advice Note Seven for all environmental aspects set out in the Infrastructure Planning (EIA) Regulations 2017.
- 4.3.3. The ESR was submitted to the Planning Inspectorate on the 30 June 2023 and can be viewed on the Planning Inspectorate's website under 'National Infrastructure Applications' (alternative contact is A46Walsgrave@planninginspectorate.gov.uk, telephone: 0303 444 5000), or at the following link:
- [TR010066-000010-TR010066 Environmental Scoping Report.pdf \(planninginspectorate.gov.uk\)](https://www.planninginspectorate.gov.uk/nia/tr010066-000010-tr010066-environmental-scoping-report.pdf)
- 4.3.4. The ESR has been submitted to the consultation bodies by the Planning Inspectorate and the responses from these bodies will be taken into account in adopting the Scoping Opinion. The Planning Inspectorate published a Scoping Opinion on 10 August 2023 (Planning Inspectorate, 2023). The Scoping Opinion can be viewed on the Planning Inspectorate's website under 'National Infrastructure Applications' or at the following link:
- 4.3.5. <https://nationalhighways.co.uk/our-roads/west-midlands/a46-coventry-junctions-upgrade/>
- 4.3.6. Table 4-2 below summarises the proposed scope of the ES. The scope of the assessment could be refined, with agreement from stakeholders, as additional data and survey information become available.
- 4.3.7. At present the Materials, Assets and Waste aspect has been scoped out. Part of this is based upon the available quantities and type of material for import and export at the time of writing. As the design progresses the quantities and types of materials for import and export will be refined and this information will be presented in the ES to confirm the scoping out of this aspect in consultation with relevant consultees.

Heat and radiation

4.3.8. Schedule 4, Part 1 of the EIA Regulations introduced a requirement to consider the likely significant effects of residues and emissions, such as from heat and radiation, from the Scheme. Due to the nature of the Scheme as a road improvement scheme, it is considered unlikely that heat and radiation effects associated with the proposals are likely to arise. The assessment of heat and radiation is therefore not considered relevant to the Scheme and has been scoped out of further assessment.

Major accidents and disasters

4.3.9. Schedule 4, Part 5 of the EIA Regulations require that risks due to accidents and disasters are considered within the EIA. As per DMRB LA 104, the scope of the assessment would cover:

- vulnerability of the project to risks of major accidents or disasters
- any consequential changes in the predicted effects of that project on environmental aspects as a result of major accidents and/or disasters

4.3.10. To address the requirements of DMRB LA 104 the aspect of major accidents and disasters will be assessed within each individual environmental aspect chapter. In considering the elements of vulnerability, professional judgement would be applied in consultation with National Highways, to develop project specific definitions of major events. Major events, both man-made and naturally occurring, will be identified and any potential effects and likely mitigation measures, will be included as part of the assessment presented in the ES. Where major events are identified, the potential for any changes in the assessed significance of the project on relevant environmental aspects will be described, with relevant mitigation clearly identified.

Decommissioning

4.3.11. The Scheme would be unlikely to be decommissioned as it would form an integral part of the Strategic Road Network (SRN). As such, decommissioning has not been considered within this PEIR, and it has been proposed that decommissioning is scoped out of the ES.

Transboundary effects

4.3.12. Regulation 32 of the EIA Regulations requires the consideration of any likely significant effects on the environment of another European Economic Area (EEA) State. Guidance on transboundary effects is provided in Planning Inspectorate Advice Note Twelve: development with significant transboundary

impacts consultation (Planning Inspectorate, 2018). The Planning Inspectorate will determine if the Scheme is likely to result in significant transboundary effects.

- 4.3.13. As the Scheme involves alteration works to a trunk road any significant environmental effects are most likely to be experienced at a local or regional level. It is considered unlikely that the Scheme would have a significant environmental effect, either on its own or cumulatively, in another European Economic Area state.

Table 4-2: Summary of scoping assessment for DMRB environmental aspects and requirement for further assessment

Environmental aspects	Stage	Scoped in	Scoped out	Justification for scoping out where applicable
Air quality	Construction	Dust	Construction activities/emissions	The Scheme construction period is expected to be 21 months. The impact of construction activities on vehicle emissions and local air quality can be scoped out of the assessment. This is in line with DMRB LA 105, which states “...if the construction activities are less than 2 years it is unlikely that the construction activities would constitute a significant air quality effect...”
	Operation	Traffic emissions		
Cultural heritage	Construction	Built heritage Upstanding designated and non-designated assets Buried archaeology Historic Landscape	-	-
	Operation	Built heritage Upstanding designated and non-designated assets Historic Landscape	Buried archaeology	Buried archaeology will be unaffected during operation.
Landscape and visual effects	Construction	Visual Effects Landscape Character	Visual receptors – hospital receptors	Hospital users have a low value/sensitivity as an indoor place of work and temporary or short-term nature of patient stays (day/night) i.e., not residential use. As such no significant effects on hospital receptors have been

Environmental aspects	Stage	Scoped in	Scoped out	Justification for scoping out where applicable
				identified and as such are scoped out from any further assessment.
	Operation	Visual Effects Landscape Character	Visual receptors – hospital receptors	Hospital users have a low value/sensitivity as an indoor place of work and temporary or short-term nature of patient stays (day/night) i.e., not residential use. As such no significant effects on hospital receptors have been identified and as such are scoped out from any further assessment.
Biodiversity	Construction	Designated sites Habitats Protected species	Herald Way Marsh Site of Scientific Special Interest (SSSI) Herald Way Marsh Local Nature Reserve (LNR) Piles Coppice Local Wildlife Site (LWS), Claybrookes Marsh LWS, Binley Little Wood, Old Pools Wood LWS, New Close Wood LWS, Binley Common Farm LWS, Big Rough (ungraded ecosite) Ecosite/ungraded Ancient woodland Great crested newts (GCN)	Herald Way Marsh SSSI, Herald Way LNR and Piles Coppice LWS, Claybrookes Marsh LWS, Binley Little Wood, Old Pools Wood LWS, New Close Wood LWS, Binley Common Farm LWS, Big Rough (ungraded ecosite) Ecosite/ungraded - A substantial distance from the draft Order Limits with no hydrological connection. Ancient woodland – There are no parcels of ancient woodland within 500m of the Scheme. GCN - Single waterbody with GCN presence confirmed is within 500m of in-carriageway works only. GCN confirmed likely absent from other waterbodies within study area. Should the design of the Scheme change, GCN may be scoped in.
	Operation			
Geology and soils	Construction	Agricultural Land Classification soils Land contamination (historical landfills)	Geology Land contamination (Introduction of significant sources of contamination)	No statutory or non-statutory geological sites recorded within the draft Order Limits. No significant sources of contamination are likely to be introduced as part of the Scheme's construction or operation.

Environmental aspects	Stage	Scoped in	Scoped out	Justification for scoping out where applicable
	Operation	Agricultural Land Classification soils Land contamination (historical landfills)	Geology Land contamination (Introduction of significant sources of contamination) Agricultural Land Classification soils	No statutory or non-statutory geological sites recorded within the draft Order Limits. No significant sources of contamination are likely to be introduced as part of the Scheme's construction or operation.
Material assets and waste	Construction	-	Use of materials Generation of waste	<p>It is concluded that all potential impacts associated with material assets and waste during construction and operational stages of the Scheme should be scoped out of further assessment.</p> <p>Construction</p> <p>Recover/re-use of materials:</p> <p>Throughout the design process, a number of embedded mitigation features would be included with the potential to reduce consumption of natural resources. Essential mitigation measures may include, amongst others:</p> <ul style="list-style-type: none"> • Scheme designed to optimise a cut/fill balance with minimal materials requiring import. • Application of the 'Principles of Designing Out Waste' to reduce the demand for resources. • Prioritising the use of site-won resources in accordance with the relevant legislation, standards and specification for the Scheme. • An Environmental Management Plan (EMP) and where applicable, Materials Logistics Plan MLP, Site Waste Management Plan (SWMP) and Materials Management Plan (MMP) would be prepared and implemented. <p>Through implementation of 'good practice' during construction and the local and regional availability of waste processing, treatment and recovery facilities, it is predicted that the Government's 70% target for the recovery or recycling of CDW (either on or off the Scheme</p>

Environmental aspects	Stage	Scoped in	Scoped out	Justification for scoping out where applicable
				<p>or both) would be adopted, where technically appropriate and economically feasible.</p> <p>Recycled or secondary materials: Throughout the design process, a number of embedded mitigation features would be included with the potential to reduce consumption of natural resources. Essential mitigation measures may include, amongst others:</p> <ul style="list-style-type: none"> • Scheme designed to optimise a cut/fill balance to minimise the quantity of materials requiring import to the Scheme. • Application of the 'Principles of Designing Out Waste' to reduce the demand for resources. • Prioritising the use of secondary, recycled or site-won resources in accordance with the relevant legislation, standards and specification for the Scheme. • Implementing the principles of local and responsible sourcing of key resources • An EMP and where applicable, an MLP, SWMP and MMP would be prepared and implemented. <p>Through achieving 'good practice' during construction and the local availability of secondary and recycled aggregates or earthworks materials from other development schemes within the locality, it is predicted that the regional guideline target of 27% relating to the use of secondary and recycled aggregates could be achieved where technically appropriate and economically feasible.</p> <p>Sterilise peat resources: Available mapping shows no peat is present within the area of the Scheme. The works would be undertaken in consideration of best practice mitigation. If encountered any peat excavated would be recovered as a commodity so there would be no needless sterilisation.</p>

Environmental aspects	Stage	Scoped in	Scoped out	Justification for scoping out where applicable
				<p>Sterilise mineral sites: Whilst the Scheme falls within a Mineral Safeguarding Area (MSA), there are no existing or allocated mineral sites within the draft Order Limits.</p> <p>The works would be undertaken in consideration of best practice mitigation and if encountered, any minerals excavated would be recovered as a commodity so there would be no needless sterilisation.</p> <p>Generate large quantities of waste or have an affect on the ability of waste infrastructure within the region to continue to accommodate waste from other sources: Throughout the design process, a number of embedded mitigation features would be included with the potential to reduce waste generation. Essential mitigation measures may include, amongst others:</p> <ul style="list-style-type: none"> • Scheme designed optimised to maximise a cut-fill balance with minimal materials requiring disposal. • Applying the principles of the waste hierarchy to the management of waste. • The 'Principles of Designing Out Waste' will be implemented. • Where Construction and Demolition Waste (CDW) and excavation arisings generated by the Scheme cannot be re-used on the Scheme opportunities will be sought to re-use them on other construction schemes. Where this is not possible they will be diverted from landfill to another off-site development or sent to an appropriately licenced recovery, treatment and recycling facility.

Environmental aspects	Stage	Scoped in	Scoped out	Justification for scoping out where applicable
				<ul style="list-style-type: none"> Compliance with all relevant waste legislation relating to waste handling, storage, transport and disposal. An EMP and where applicable MLP, SWMP and MMP will be prepared and implemented. <p>The Scheme is unlikely to generate large quantities of waste relative to regional landfill capacities or affect the ability of regional waste infrastructure to accommodate waste from other sources.</p>
	Operation			No further assessment is required as small-scale, routine or ad-hoc maintenance activities are expected. These activities have minimal materials requirements and generate insignificant volumes of waste.
Noise and vibration	Construction	Noise Vibration		
	Operation	Noise	Vibration	DMRB LA 111 section 1.4 notes that “operational vibration is scoped out of the assessment methodology as a maintained road surface will be free of irregularities as part of project design and under general maintenance, so operational vibration will not have the potential to lead to significant adverse effects”. Operational vibration is therefore scoped out from further assessment.
Population and human health	Construction	Land use and accessibility Human health	-	-
	Operation	Land use and accessibility Human health		
Road drainage and the water environment	Construction	Surface water Water quality Flood risk	River Avon Tidal flooding	River Avon – ClaycotonYelvertoft Bk to conf R Sowe (WBID: GB109054043920) is located at the southern extent of the study area but has been scoped out as this
	Operation	WFD waterbodies		

Environmental aspects	Stage	Scoped in	Scoped out	Justification for scoping out where applicable
		Groundwater		waterbody is hydraulically disconnected from the Scheme. The River Sowe is not tidal and therefore tidal flooding has been scoped out of this assessment.
Climate	Construction	Effects on climate change	Resilience of the scheme to climate change	Due to the short period anticipated for construction and considering the effects of risks from climate change are felt over a much greater period, it is unlikely that climate change will be experienced during construction of the Scheme.
	Operation	Resilience of the Scheme to climate change Effects on climate change		

- 4.3.14. Due to the limited time between the publication of this PEIR and the receipt of the Scoping Opinion from the Planning Inspectorate, the comments within the Scoping Opinion have not been incorporated into the environmental assessments contained within this PEIR. EIA is an iterative process and will therefore additionally take into account comments received as part of the statutory consultation. The ES will include a schedule of responses received from the Planning Inspectorate which will explain and identify how each of the comments have been addressed either within the ongoing environmental assessment work and ES, or as agreed through consultation with the relevant consultees.

4.4. Surveys and predictive techniques and methods

Introduction

- 4.4.1. Information gathered through desk top studies, environmental walkovers and any site surveys undertaken to date have been collated to inform this report. Specific details of the information sources used to inform this PEIR are included within each of the individual environmental chapters (Chapters 5 to 13).
- 4.4.2. In addition to surveys and desk top studies, other predictive techniques will be used to inform the EIA, such as air quality, noise, and flood risk modelling. This modelling will be undertaken during the winter of 2023-2024. Further information on the proposed modelling to be undertaken is provided in the individual environmental factor chapters.

Traffic modelling

- 4.4.3. Air quality, noise and water quality impact assessments are dependent upon traffic modelling outputs. A traffic model provides predictions of future traffic levels both with and without the Scheme.
- 4.4.4. A traffic model was built at options selection stage which was used to understand the likely impacts on the road network (including on air quality and noise) and to inform the options appraisal. A new traffic model is being built for the preliminary design stage during autumn 2023, the output of which will feed into the EIA. Updated traffic modelling outputs from the new model were not available at the time of writing this PEIR but are expected to be available in winter 2023-24.
- 4.4.5. A 2018 base year has been used in the traffic model as this represents the most up to date information available on travel patterns and traffic volumes pre-COVID. Travel behaviour post-COVID has not yet stabilised, making more recent data collection difficult, and as such would not provide a reliable base for traffic forecasts. The impacts of COVID on travel behaviour will be incorporated

into the forecasting process. The Scheme is anticipated to have an opening year of 2028 and a design year (15 years after opening) of 2043. Air quality, noise and climate will use traffic modelling data from the base year (2018) in their assessments.

Study areas

- 4.4.6. Study areas define the geographical area over which environmental receptors will be identified. Study areas have been identified for each of the environmental aspects following DMRB standards and environmental factor-specific guidance. Specific study areas are outlined in the individual environmental chapters (Chapters 5 to 13).

Order Limits

- 4.4.7. The draft Order Limits for the purposes of consultation includes the land anticipated at this stage that is likely to be required temporarily and/or permanently for the construction, operation and maintenance of the Scheme. The final Order Limits will be confirmed as the design and mitigation evolves and will be reflected in the DCO application.
- 4.4.8. There are a number of locations where there have been small changes to the draft Order Limits used for the assessments in this PEIR, as described in Chapter 2, compared to the 'proposed Scheme extent' used for the scoping exercise. None of these changes are expected to lead to new or different likely significant effects to those already identified in the ESR.
- 4.4.9. The design of the Scheme will continue to be developed, including in response to statutory consultation feedback; and the draft Order Limits will be finalised and reflected in the DCO application. The latest version of the draft Order Limits is presented in Figure 2.2 of Volume 2.
- 4.4.10. The EIA and ES will be based on the draft Order Limits presented on the plans which will form part of the DCO application.

Future baseline

- 4.4.11. The baseline conditions used for assessment purposes are the predicted future conditions that would exist in the absence of the Scheme either (a) at the time that construction is expected to start, for impacts arising from construction, (b) at the time that the Scheme is expected to be open to traffic, for impacts arising from its operation, or (c) the design year, which is taken to be 15 years after opening. Within the ES, an outline of the likely evolution of the baseline and future baseline scenarios, without implementation of the Scheme will be included.

4.5. General assessment assumptions and limitations

- 4.5.1. Assumptions and limitations have been outlined throughout this report. General assumptions relating to all aspects and factors include the following:
- This PEIR is based on the options selection stage option 11 design as presented in the PRA which has been refined as the design progresses through the preliminary design stage.
 - The Scheme is at an early stage in design development and the construction methodology is not fully defined at this stage. There could therefore be changes to the draft Order Limits to accommodate changes in temporary working areas, or changes in permanent footprint associated with the design and/or environmental mitigation areas. The draft Order Limits presented in Figures 2.1 to 2.3 of Volume 2 are based upon the Scheme at the time of writing.
 - The assessment of all environmental aspects and factors is based on existing baseline information and publicly available information. It is assumed this information is accurate at the time of which it was supplied.

4.6. Significance criteria

- 4.6.1. The output of the environmental assessment is to report the likely significance of effects using established significance criteria, as presented within DMRB LA 104. DMRB states that the approach to assigning significance of effect relies on reasoned argument, professional judgement and taking on board the advice and views of appropriate organisations.
- 4.6.2. Environmental assessment requires the identification of receptors. A receptor or resource's environmental value (or sensitivity) is then determined. The magnitude of a project's impacts (i.e., its change upon the receptor) is then established. The significance of an environmental effect is typically a function of the 'value' or 'sensitivity' of the receptor and the 'magnitude' of the impact.
- 4.6.3. For some environmental aspects and factors, predicted effects may be compared with quantitative thresholds and scales in determining significance. Each environmental assessment chapter within the ES will describe the specific thresholds/criteria used to determine value and magnitude and will align within the general methodology described within this chapter.
- 4.6.4. The value of receptors is determined based upon Table 3.2N in DMRB LA 104 which is reproduced below in Table 4-3.
- 4.6.5. Assigning values to the relevant receptors for each aspect enables different environmental receptors to be placed upon the same scale and can assist with the process of assigning significance.

Table 4-3: Descriptions of environmental value (sensitivity)

Value (sensitivity) of receptor/resource	Typical description
Very High	Very high importance and rarity, international scale and very limited potential for substitution.
High	High importance and rarity, national scale, and limited potential for substitution.
Medium	Medium or high importance and rarity, regional scale, limited potential for substitution.
Low	Low or medium importance and rarity, local scale
Negligible	Very low importance and rarity, local scale.

4.6.6. For the majority of environmental aspects assessed within this PEIR, where appropriate and evidence allows, the value or sensitivity of identified receptors has been provided. The value of receptors will be confirmed as the EIA progresses. The value of receptors along with the magnitude of impact will be reported in the ES.

4.6.7. The criteria for identifying the magnitude of an impact is based upon Table 3.4N in DMRB LA 104 which has been reproduced below as Table 4-4. Potential impacts are identified that might occur due to the construction and operation of the Scheme. Impacts may be adverse or beneficial, direct, indirect, secondary or cumulative, temporary or permanent, short, medium or long term.

Table 4-4: Magnitude of impact and typical descriptors

Magnitude of impact (change)		Typical description
Major	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
Moderate	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements. improvement of attribute quality.
Minor	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements.

Magnitude of impact (change)		Typical description
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.
No change		No loss or alteration of characteristics, features or elements; no observable impact in either direction.

4.6.8. The greater the magnitude of impact, the more significant the effect. For example, the consequences of a highly valued environmental resource experiencing a major adverse impact would be a significant adverse effect.

Table 4-5: Significance matrix

Environmental Value (Sensitivity)	Magnitude of Impact (Degree of Change)					
	No change	Negligible	Minor	Moderate	Major	
Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large	
High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large	
Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large	
Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate	
Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight	

4.6.9. For noise, air quality and flood risk, a matrix-based approach is not used as calculations are used to assess the effects in numerical terms.

4.6.10. The significance of an effect is reported after an assessment of the effectiveness of the design and mitigation measures (the residual effect). Where the significance matrix (Table 4-5) includes two significance categories, evidence should be provided to support the reporting of a single significance category. Any avoidance or mitigation measures proposed, how they may be secured and the anticipated residual effects are to be included as per Planning Advice Note Seven: Environmental Impact Assessment (Planning Inspectorate, 2020).

4.6.11. Assigning each effect to one of the five significance categories enables different environmental issues to be placed upon the same scale, to assist the decision-making process at whatever stage the project is at within that process. Typical descriptors for the five significance categories are set out in Table 4-6.

4.6.12. As stated in DMRB LA 104 and Table 4-6 effects with a very large or a large significance are considered as being ‘material’ and ‘likely to be material’ in the decision-making process respectively. Therefore, large and very large effects

are considered 'significant' for the purposes of the EIA Regulations. Moderate effects are described as potentially being material in the decision-making process. Moderate residual effects are therefore also typically considered as 'significant'.

Table 4-6: Descriptions of the significance of effect categories

Significance category	Typical descriptors of effects
Very Large	Effects at this level are material in the decision-making process
Large	These beneficial or adverse effects are very important considerations and are likely to be material in the decision-making process.
Moderate	Effects at this level can be considered to be material decision-making factors.
Slight	Effects at this level are not material in the decision-making process.
Neutral	No effects or those that are beneath levels of perception, within normal bounds or variation or within the margin of forecasting error.

Mitigation and enhancement measures

4.6.13. The mitigation hierarchy from DMRB LA 104 will be considered for all environmental features throughout the Scheme's lifecycle. The mitigation hierarchy is based on a series of sequential steps undertaken to limit any adverse impacts on the environment and has the following steps in order of priority:

1. Avoidance and prevention: design and mitigation measures to prevent the effect (e.g., alternative design options or avoidance of environmentally sensitive sites).
2. Reduction: where avoidance is not possible, then mitigation is used to lessen the magnitude or significance of effects.
3. Remediation: where it is not possible to avoid or reduce a significant adverse effect, these are measures to offset the effect.

4.6.14. The mitigation hierarchy will be used in the design of mitigation. Factor specific mitigation, where identified at this stage in the design process has been outlined in each of the individual environmental factor chapters. This PEIR reflects an ongoing EIA process and further mitigation will be identified and mitigation refined as the design and EIA progress and will be detailed in the ES.

4.6.15. The environmental assessment will report on the following categories of mitigation as per DMRB LA 104:

1. Embedded mitigation: project design principles adopted to avoid or prevent adverse environmental effects.

2. Essential mitigation: measures required to reduce and if possible offset likely significant adverse environmental effects, in support of the reported significance of effects in the environmental assessment.
- 4.6.16. It is important to note that proposed mitigation measures can only be taken into account when determining significance if the success of the measures delivering the desired outcome is supported by evidence and the project has an identified legal mechanism for implementing the measures.
 - 4.6.17. Mitigation measures can produce adverse as well as beneficial effects e.g., an environmental noise barrier can increase visual intrusion.
 - 4.6.18. An assumption regarding the incorporation of best practice measures and standard mitigation was used to inform the assessment for individual factors. One typical standard mitigation measure for ensuring effects are avoided and reduced is through an EMP. The first iteration of an EMP will be produced during the preliminary design stage in line with DMRB LA 120: environmental management plans (Highways England, 2020c). The first iteration of the EMP will contain measures, including the Register of Environmental Actions and Commitments (REAC), to manage environmental effects in construction and operation. This first iteration of the EMP will provide the framework for the future production of the more detailed second iteration of the EMP. The second iteration of the EMP will be produced during the detailed design stage in preparation for the construction stage. The EMP is seen as a “live” document which will evolve as the project progresses.
 - 4.6.19. During construction, the responsibility for further environmental mitigation and the adherence to environmentally responsible working practices will fall to the Principal Contractor. The first and second iterations of the EMP will detail the measures that the Principal Contractor is to apply on-site that will demonstrate commitments to environmental management. It will include both generic and specifically targeted measures to enable construction to be undertaken whilst minimising the impact on the environment and will also enable monitoring requirements to be set up.
 - 4.6.20. If effects cannot be mitigated, compensatory measures would be considered, for example, to provide replacement habitat.
 - 4.6.21. Mitigation measures will be developed further in the preliminary design stage and in consultation with statutory consultees, where appropriate. A design to show the proposed mitigation will be shown on the indicative Environmental Masterplans as part of the DCO application, however the exact detail of mitigation locations and designs will be determined through the detailed design

process and a final environmental mitigation design will be developed as part of the pre-commencement process and secured through the EMP.

Implementation and enforcement of mitigation

- 4.6.22. Mitigation will be secured through the DCO process, likely by being 'written in' to the DCO as a legal requirement. As such, the Scheme must comply with the measures provided for.
- 4.6.23. The EMP will be implemented at construction stage and compliance will be secured through a Requirement of the DCO. This will be in line with the EMP submitted with the DCO application as part of the ES. Contractors at detailed design and construction stage will be obliged to comply with the DCO.

Enhancements

- 4.6.24. Enhancement measures have also been considered. An enhancement is defined as a measure that is over and above what is required to mitigate the adverse effects of the Scheme. Unlike mitigation and compensation measures, enhancements are not factored into the determination of significance; however, the potential benefits of these measures are presented within the relevant aspect chapters, in accordance with the National Policy Statement for National Networks (NPSNN).

Monitoring

- 4.6.25. Where significant adverse environmental effects are reported, monitoring of those effects shall be undertaken in accordance with DMRB LA 104, as well as the specific DMRB standards (as contained within DMRB LA 105 to 115) and the EIA Regulations. The purpose of monitoring is to:
1. Ensure measures envisaged to avoid, prevent or reduce and, if possible, offset significant adverse effects on the environment are delivered.
 2. Build data on the effectiveness of design and mitigation measures thereby driving improvement in environmental performance for future projects.
 3. Satisfy licence/permit requirements (where applicable).
 4. Identify remedial action as a consequence of under-performance or failure of mitigation.
- 4.6.26. Plans for any monitoring of significant adverse effects will be developed as the scheme design and environmental assessments progress.

4.7. Duplication of assessment

- 4.7.1. The ES will be prepared taking into account other relevant environmental assessments with a view to avoiding duplication of assessment. The other assessments are described below.

Habitats Regulation Assessment

- 4.7.2. A Habitats Regulations Assessment (HRA) screening exercise was undertaken of the four options at the options selection stage (Highways England, 2020d) for the Scheme. The HRA concluded that no likely significant effects on any European sites are anticipated, when considered alone or in combination with other plans and projects.
- 4.7.3. Natural England will be consulted on the conclusions of the screening exercise to confirm that an Appropriate Assessment is not required. The HRA screening assessment will be submitted with the DCO application.

Water Environment Regulations

- 4.7.4. The impact of the Scheme on the Water Framework Directive (WFD) is now being assessed under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (WER). The impacts to the Water Environment Regulation objectives are being assessed in line with the Planning Inspectorate's Advice Note Eighteen: The WFD (2017). A standalone WFD compliance assessment will be prepared as an appendix to the ES with the conclusions summarised in the road drainage and the water environment chapter.

Flood Risk Assessment

- 4.7.5. A Flood Risk Assessment (FRA) will be undertaken and reported within a standalone report which will form an appendix to the ES. To avoid duplication, the road drainage and the water environment chapter will cross refer to this report and summarise where appropriate.

Health Impact Assessment

- 4.7.6. The impact of the Scheme on health will be assessed in the population and human health chapter of the ES in line with Institute of Environmental Management and Assessment (IEMA) guidance (IEMA 2022). This in turn will be supported by technical appendices as required. Following the IEMA guidance will satisfy the requirements for a Health Impact Assessment (HIA) and a separate HIA will not be necessary.

5. Air quality

5.1. Introduction

- 5.1.1. This chapter presents the preliminary findings of the air quality assessment. This comprises a review of the existing air quality conditions, and the identification of potential impacts of the Scheme relevant to air quality. Potential impacts are assessed within the context of relevant policy, legislation, and industry best practice.
- 5.1.2. The assessment has been undertaken with reference to the Design Manual for Roads and Bridges (DRMB) LA 105 Air Quality (Highways England 2019), hereafter referred to as DMRB LA 105.
- 5.1.3. This chapter is supported by the following figures of Volume 2:
- Figure 5.1 Location of nearby air quality management areas (AQMA)
 - Figure 5.2: Local authority air quality monitoring sites (passive and automatic) within relevant proximity to the Scheme
 - Figure 5.3: Preliminary Operational phase sensitive receptors within 200m of realigned existing roads and new roads and junctions
 - Figure 5.4: Construction phase sensitive receptors within 200m of the Scheme draft Order Limits

Stakeholder engagement

- 5.1.4. No formal consultation has been undertaken at this stage in relation to air quality. Following receipt of the scoping opinion from the Planning Inspectorate, key stakeholders will be contacted to discuss the agree the methodology, including but not limited to:
- Coventry City Council
 - Warwickshire County Council
 - Rugby Borough Council
 - Natural England
- 5.1.5. A summary of the key requirements from the Planning Inspectorate's Scoping Opinion (2023), as relevant to the scope of the air quality assessment, will be presented in the Environmental Statement (ES), as well as clear detail on how these comments have been addressed within the assessment.

Legislative and policy framework

Legislation

- 5.1.6. The European Directive on Ambient Air Quality (2008/50/EC) sets legally binding limits for ambient concentrations of air pollutants that impact public health such as particulate matter (PM)₁₀, PM_{2.5}, and nitrogen dioxide (NO₂). The Directive and associated pollutant limit values were transposed into the UK law under the Air Quality Standards Regulations 2010 and, following the UK's exit from the EU, the Environment (Legislative Functions from Directives) (EU Exit) Regulations 2019.
- 5.1.7. The UK's Air Quality Strategy (Department for Environment, Food and Rural Affairs (Defra), 2007) established the framework for air quality improvements across the UK. The Strategy sets out standards for key air pollutants that reflect levels of pollutants thought to avoid or minimise risks to health or ecosystems. The associated air quality objectives are policy targets, expressed as maximum permissible outdoor concentrations of pollutants that take account of economic efficiency, practicability, technical feasibility and timescales.
- 5.1.8. The national air quality objectives for the aforementioned key pollutants considered in this assessment are enacted by the Air Quality (England) Regulations 2000. The national objectives are numerically identical to the European limit values, with the exception of PM_{2.5}. With respect to PM_{2.5}, the limit value was amended (reduced from 25 to 20) in 2020 by The Environment (Miscellaneous Amendments and Revocations) (EU Exit) Regulations 2020.
- 5.1.9. Following the departure of the UK from the EU, the Environment Act 2021 makes provision for targets, plans, and policies to improve the natural environment, including air quality. Long-term targets have been set within the first Environmental Improvement Plan 2023 (EIP) (Defra, 2023) pursuant to Section 10(6) of the Act. These legal targets specifically relate to PM_{2.5} and have been transposed into law via The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023:
- Annual Mean Concentration Target – a maximum concentration of 10µg/m³ to be met across England by 2040
 - Population Exposure Reduction Target – a 35% reduction in population exposure by 2040 (compared to a base year of 2018)
- 5.1.10. The UK Government is yet to publish guidance on how these targets should be applied in decision making, and how best to ensure the targets are achieved. The Department for Levelling Up, Housing and Communities is leading extensive planning reforms and one of the aims of these reforms is the successful implementation of these targets. At present there is no detail or formal guidance.

Until formal guidance is published on how to apply these targets in air quality assessments, the assessment of PM_{2.5} concentrations will be undertaken within the context of the annual mean air quality limit value for PM_{2.5} (20 µg/m³) as stated above.

5.1.11. An overview of the relevant national air quality objectives for the aforementioned key pollutants (and PM_{2.5} targets) is presented in Table 5-1.

Table 5-1 Relevant objectives set out in the Air Quality Strategy and concentration targets as per Environment Act 2021 for the protection of human health

Pollutant	Averaging Period	Concentration (µg/m ³)	To be achieved by
For the protection of human health			
NO ₂	Annual mean	40	31 st December 2005
	1-hour mean	200 (not to be exceeded more than 19 times per year)	31 st December 2005
PM ₁₀	Annual mean	40	31 st December 2004
	24-hour mean	50 (not to be exceeded more than 35 times a year)	31 st December 2004
PM _{2.5}	Annual Average	20	1 st January 2020
	Annual Mean (Legal Target)	10	1 st January 2040
	Annual Mean (Interim Target)*	12	1 st January 2028
For the protection of vegetation and ecosystems			
Oxides of Nitrogen (NO _x)	Annual Mean	30	31 st December 2000
* The Interim Target for PM _{2.5} is not legally binding.			

Statutory nuisance

5.1.12. Section 79(1)(d) of the Environmental Protection Act 1990 defines one type of ‘statutory nuisance’ as “*any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance*”. Where a local authority is satisfied that a statutory nuisance exists, or is likely to occur or recur, it must serve an abatement notice. Failure to comply with an abatement notice is an offence. Best practicable means is a widely used defence by operators, if employed to prevent or to counteract the effects of the nuisance.

Planning policy

National Policy Statement for National Networks (NPSNN)

5.1.13. The National Policy Statement for National Networks (NPSNN) (Department for Transport (DfT), 2014) sets out the Government’s policies to deliver the

development of Nationally Significant Infrastructure Projects (NSIP) on the national road and rail networks in England. The Secretary of State (SoS) uses the NPSNN as the primary basis for making decisions on Development Consent Order applications.

5.1.14. Air quality is within the General Impacts section of the NPSNN, with paragraphs 5.3 – 5.15 setting out the expectations for an air quality assessment of National Highways schemes. The NPSNN notes that the assessment must consider:

- existing air quality levels
- forecasts of air quality at the time of opening, assuming that the Scheme is not built (the future baseline) and taking account the impact of the Scheme
- any significant air quality effects, their mitigation, and any residual effects, distinguish between the construction and operation stages and taking account of the impact of road traffic generated by the Scheme

5.1.15. Paragraph 5.11 of the NPSNN states that air quality considerations are likely to be relevant where schemes are proposed:

- within or adjacent to an AQMA, roads identified as being above limit values or nature conservation sites (including Natura 2000 sites and Sites of Special Scientific Interest (SSSI), including those outside England); and/or
- where changes are sufficient to bring about the need for a new AQMA or change the size of an existing AQMA; or bring about changes to exceedances of the limit values, or where they may have the potential to impact on nature conservation sites

5.1.16. The NPSNN directs that the SoS “...*must give air quality considerations substantial weight where, after taking into account mitigation, a project would lead to significant air quality impacts in relation to EIA and/or where they lead to a deterioration in air quality in a zone/agglomeration³...*”. Consent for the project should be refused by the SoS “...*where the residual air quality impacts of the scheme will:*

- *result in a zone/agglomeration which is currently reported as being compliant with the Air Quality Standards Regulations 2010 becoming non-compliant; or*
- *affect the ability of a non-compliant area to achieve compliance...*”

³ The United Kingdom is split into 43 zones and agglomerations for the purpose of reporting air quality within those zones

National Planning Policy Framework (NPPF) 2023

5.1.17. The revised National Planning Policy Framework (NPPF) was published in September 2023 and sets out the Government's planning policies for England. With regard to air quality, it states that:

- *“Planning policies and decisions should contribute to and enhance the natural and local environment by: ...e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality...”* (para 174).
- *“Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible, these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.”* (para 186).

Planning Practice Guidance (PPG)

5.1.18. On 6 March 2014, the Department for Communities and Local Government published a national planning practice guidance (PPG) web-based resource. Some of the guidance has been revised and updated in various years.

5.1.19. PPG includes a dedicated section on air quality (2019). It notes that, for new planning applications, the local planning authority may require information on:

- *“The ‘baseline’ local air quality, including what would happen to air quality in the absence of the development.”*
- *“whether the Scheme could significantly change air quality during the construction and operational phases (and the consequences of this for public health and biodiversity)”*.
- *“whether occupiers or users of the development could experience poor living conditions or health due to poor air quality.”*

5.1.20. It also states the following in relation to determining whether air quality is relevant to a planning decision:

- *“Whether air quality is relevant to a planning decision will depend on the Scheme and its location. Concerns could arise if the development is likely to*

have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the Scheme would be particularly sensitive to poor air quality in its vicinity”.

25 Year Environment Plan

5.1.21. The Department for Environment, Food & Rural Affairs (Defra) 25 Year Environment Plan (2018) is a policy paper setting out what Government will do to improve the environment, including restoring and safeguarding wildlife habitats. This plan is being treated as the first Environmental Improvement Plan required under the Environment Act 2021. The plan sets out aims to achieve clean air by:

- Meeting legally binding targets to reduce emissions of five damaging air pollutants; this should halve the effects of air pollution on health by 2030
- Ending the sale of new conventional petrol and diesel cars and vans by 2040
- Maintaining the continuous improvement in industrial emissions by building on existing good practice and the successful regulatory framework

National Highways policy

5.1.22. National Highways supports the delivery of the Government’s National Air Quality Plan, including the delivery of measures to achieve compliance in the shortest timescales possible alongside the strategic road network. In addition, air quality is one of the environmental topic areas where the six strategic levers of the National Highways’ Environment Strategy will be applied. The strategic levers will make a contribution towards the organisation’s environment vision.

5.1.23. National Highways’ air quality strategy sets out a strategy to improve air quality on and around the SRN, through to 2021. The strategy sets out the approach and activities to achieve this goal. National Highways has identified four areas of action to improve air quality:

1. Policy
2. Planning
3. Monitoring
4. Operational management

Local Policy

Coventry City Council Local Plan (2011 – 2031)

5.1.24. The relevant Local Plan policies are:

- Policy DS3: Sustainable Development Policy
- Policy AC1: Accessible Transport Network
- Policy AC2: Road Network
- Policy AC3: Demand Management
- Policy AC4: Walking and Cycling
- Policy AC5: Bus and Rapid Transit
- Policy AC7: Freight
- Policy EM7 Air Quality

Rugby Borough Council Local Plan 2011 – 2031

5.1.25. The relevant Local Plan policies are:

- Policy HS5: Traffic Generation and Air Quality, Noise and Vibration
- Policy D1: Transport

Other plans and policies

- Clean Air Strategy 2019 (Department for Environment, Food and Rural Affairs (Defra), 2019).

5.2. Assessment methodology

Baseline assessment

5.2.1. The baseline assessment has encompassed a review of freely available air quality data in proximity to the Scheme and review of nearby receptors. Air quality data has been gathered from Local Authority Annual Status Reports, national air quality monitoring networks and national air quality models.

5.2.2. Scheme specific baseline air quality monitoring has not been undertaken given the availability of existing local authority air quality monitoring sites within relevant proximity (see Figure 5.2 of Volume 2) that can be used for both the baseline assessment and for dispersion model verification, as applicable.

Assessment of construction impacts

5.2.3. The scope of the construction phase assessment will consider dust arising from construction activities within the Scheme draft Order Limits, as well as the impacts from trackout by construction vehicles. A qualitative assessment of the construction dust risk and associated air quality effects will be undertaken.

5.2.4. Once a detailed construction programme has been developed, the key stages of the construction phase and the locations and types of sensitive receptors will be identified in accordance with DMRB LA 105. Appropriate mitigation measures

will be identified, which will be incorporated into an Environmental Management Plan (EMP), to minimise significant residual effects.

- 5.2.5. With respect to the impact of construction activities on vehicle emissions and local air quality, DMRB LA 105 states that “...*If the construction activities are less than 2 years it is unlikely that the construction activities would constitute a significant air quality effect or impinge on the UK's reported ability to comply with the Air Quality Directive given the short term duration of the construction activities as opposed to the long term operation of the project.*”
- 5.2.6. The Scheme construction period is expected to be 21 months. Therefore, the impact of construction activities on vehicle emissions and local air quality are not considered in this assessment.

Assessment of operational impacts

- 5.2.7. At this stage of the Scheme, it is not possible to undertake an operational impact assessment due to the absence of operational traffic data for the Scheme opening year.
- 5.2.8. The assessment for the operational phase will be undertaken in accordance with DMRB LA 105 and will include:
- Identifying the level of assessment required and provide full justification in the preliminary design stage environmental assessment. This will be based on the risk level of the Scheme as well as the receiving environment (i.e., identified sensitive receptors within the study area).⁴
 - Establishing the affected road network (ARN) and associated study area, capturing sensitive human and ecological receptors within 200m of the ARN, based on the traffic scoping criteria.
 - Where a detailed assessment is required, atmospheric dispersion modelling of vehicle emissions associated with the ARN, specifically for the 'Base Year' and the opening year 'Do-Minimum' and 'Do-Something' scenarios to predict air pollutant concentrations (NO_x, NO₂, PM₁₀, PM_{2.5}, ammonia (NH₃) (if required) and associated nutrient nitrogen deposition) at identified human and ecological receptors within the study area.
 - Where a simple assessment is required, the National Highways DMRB air quality spreadsheet will be used and applied to the same scenarios as outlined above for a detailed assessment.
 - The air quality model will be verified against local monitoring data, obtained from Coventry City Council and Rugby Borough Council. Model verification will be completed with reference to Defra's local air quality management

⁴ Once traffic data for the Scheme are provided, the affected road network, study area, and associated sensitivity of the receiving environment will be defined to identify the level of assessment required (simple or detailed).

technical guidance (Defra LAQM.TG22, 2022) and will focus on road source contributions of NO_x (road-NO_x) given that there are more local authority NO₂ monitoring sites within proximity to the Scheme relative to PM₁₀ and PM_{2.5} (see Section 5.5). As guided by LAQM.TG22, any associated road-NO_x model adjustment factor(s) may also be applied to road source contributions of PM_{2.5} and/or PM₁₀, where applicable.

- A 'gap analysis' as per DMRB LA 105 to address the uncertainty in predicted future roadside NO₂ concentrations, ensuring that the modelled roadside NO₂ concentrations are not too optimistic in the future opening year (i.e., not underestimated).
- Calculating air quality impacts at the identified receptors based on the difference in pollutant concentrations (and nitrogen deposition, where applicable) between the opening year Do-Minimum and Do-Something scenarios.
- Completing a compliance risk assessment based on the outputs of the Scheme air quality modelling assessment and the latest Defra Pollution Climate Mapping (PCM) model data for the relevant road links. This analysis will determine whether the Scheme will affect the UK's reported ability to comply with the Air Quality Standards Regulations 2010, as transposed from European law into UK law, in the shortest timescales possible and inform whether the project triggers a significant air quality effect.

5.2.9. A suitable assessment approach will be adopted to account for PM_{2.5}, primarily due to the introduction of the new legally binding long term concentration target for PM_{2.5}, which will align with the latest version of DMRB LA 105 at the time of progressing the assessment⁵.

5.3. Assessment assumptions and limitations

5.3.1. Assessment work to date has been based on an understanding of the baseline conditions, location of sensitive receptors and potential changes in emissions due to the road layout and traffic flows. This exercise has comprised a desktop study, utilising available air quality information.

5.4. Study area Construction

5.4.1. The study area for the construction phase dust assessment will encompass human receptors and designated ecological habitats in relative proximity to the construction activities.

⁵ A revised version of DMRB LA 105 is currently being developed to account for the assessment of both NH₃ and PM_{2.5} emissions, which will be adhered to at the assessment stage. Furthermore, further guidance from Defra is required to understand how the PM_{2.5} targets should be applied within a planning context.

- 5.4.2. The first step of the construction assessment methodology outlined in DRMB LA 105 is to identify "...all sensitive receptors (human and designated habitats) within 0-50m, 50-100m and 100-200m of all construction activity". To provide a conservative assessment, the construction phase study area will assume that construction activities could occur anywhere within the draft Order Limits.
- 5.4.3. Therefore, the study area of the construction phase comprises of a 200m buffer based on the draft Order Limits.

Operational

- 5.4.4. The operational phase study area will be determined following DMRB LA 105 standard. A key stage of the methodology is to define the ARN for the air quality assessment. The ARN will consist of all roads that meet the traffic scoping criteria (see *para 5.4.5*) as well as any adjoining roads within 200m of a road that meets the criteria.
- 5.4.5. The scoping is completed based on an analysis of the difference between the without ('Do Minimum) and with ('Do Something') Scheme scenario traffic data for the Scheme opening year. A road link is included within the ARN if it meets any of the following criteria:
- Annual average daily traffic (AADT) is predicted to change by $\geq 1,000$.
 - Heavy duty vehicle (HDV) AADT is predicted to change by ≥ 200 .
 - A change in speed band.
 - A change in carriageway alignment by $\geq 5m$.
- 5.4.6. Human and ecological receptors included within the study area will be those located within 200m of a triggered road link only. The inclusion of adjoining road links within 200m of a triggered link is to ensure vehicle emissions contributions are adequately captured within the air quality assessment study area.
- 5.4.7. Forecasted traffic flows on the ARN will be used to determine the change in vehicle emissions associated with the operation of the Scheme and the resulting changes to pollutant concentrations at identified receptor locations within the study area.

5.5. Baseline conditions

Sensitive receptors

- 5.5.1. In accordance with DMRB LA 105, receptors that are potentially sensitive to changes in air quality include residential properties, schools, hospitals and designated species/habitats (ecological receptors) located within 200m of the

defined ARN for the operational phase and, for construction phase dust impacts, within 200m of the draft Order Limits.

5.5.2. Once the ARN and operational phase study area are determined, representative sensitive receptors shall be identified to ensure that those receptors exposed to the highest pollutant concentrations (closest to the road, junctions etc.) or those anticipated to experience the highest level of change (next to roads within the ARN with the largest change in the traffic screening criteria) are included in the air quality assessment.

5.5.3. With respect to ecological receptors, all international, national, and locally designated sites within 200m of the ARN will be included in the air quality assessment. The following site designations will be considered, where there are habitats and/or species that are sensitive to changes in concentrations of NO_x, NH₃, and/or changes in nutrient nitrogen deposition:

- Ramsar sites
- Special Protection Areas (SPA)
- Special Area of Conservation (SAC)
- SSSI
- Local Nature Reserves
- Local Wildlife Sites
- Nature Improvement Areas
- Ancient Woodland
- Veteran Trees

5.5.4. At this stage, detailed traffic data is not available, thus the ARN and study area cannot be determined. On receipt of the data, a detailed traffic scoping exercise will be completed to establish the ARN.

5.5.5. The Scheme will introduce two new slip roads to serve the A46, which will be adjoined by roundabout junctions, thus will result in triggered links due to changes in the carriageway alignment of over 5m. A preliminary review of potentially sensitive receptors within 200m of new/realigned road links has identified approximately 40 human receptors, including, but not limited to, residential properties at:

- Hungerley Hall Farm
- Gainford Rise
- Royston Close
- Valencia Road

- 5.5.6. In addition to the above, the Coombe Pool SSSI is also located within 200m of new/realigned road links and will be included within the operational phase study area.
- 5.5.7. The locations of the above sensitive receptors are depicted in Figure 5-3 of Volume 2. A comprehensive review of potentially sensitive receptors for inclusion in the operational phase local air quality assessment will be completed once the Scheme traffic data is available and the associated ARN is identified, as part of the air quality assessment within the ES.
- 5.5.8. Potentially sensitive receptors associated with construction phase dust impacts have been identified within 200m of the Scheme draft Order Limits and are presented in Figure 5.4 of Volume 2. An overview of the sensitive receptors that are at risk of impact during the construction period is provided in Table 5-2.

Table 5-2 Sensitive receptors relevant to the construction phase of the Scheme

Receptors	Distance from construction activities (m)		
	0 – 50	50 – 100	100 – 200
Human Sensitive Receptors	<i>Estimated no. 35</i> Includes residential properties on: Tylney Close, Valencia Road, Clifford Bridge Road and Hungerley Hall Farm.	<i>Estimated no. 87</i> Includes residential properties on: Hepworth Road, Tylney Close, Skipworth Road, Brinklow Road, Coombe Court, Sevilla Close, Florence Road, Valencia Road, Gainford Rise and Clifford Bridge Road.	<i>Estimated no. 200</i> Includes residential properties on: Sturminster Close, Clifford Bridge Road, Gainford Rise, Faygate Close, Royston Close, Bracadale Close, Valencia Road, Florence Road, Calgary Close, Coombe Court, Brinklow Road, Skipworth Road, Camville, The Greensward, Tylney Close, Lyttleton Close, Brunton Close and Hepworth Road.
Designated Sensitive Ecological Receptors	Coombe Pool SSSI is located within each of the three distance bands. Veteran tree located 200m to the east of the Draft Order Limits.		

Local air quality management

- 5.5.9. All land within Coventry City Council’s administrative boundary is within the Coventry AQMA. The administrative boundary between Rugby Borough Council and Coventry City Council lies to the immediate west of the existing A46. Therefore, the elements of the Scheme that lie within Coventry’s administrative areas also lie within the Coventry AQMA. This AQMA was declared due to historic exceedances of the annual mean NO₂ health-based objective in the centre of Coventry. The proposed link road serving the new junction is also located within this AQMA, as depicted on Figure 5.1 of Volume 2.

- 5.5.10. Rugby Borough Council have declared a single AQMA in the borough, covering the urban area of Rugby, located 8km to the east of the Scheme.
- 5.5.11. Both Rugby Borough Council and Coventry City Council have air quality monitoring networks established that use passive diffusion tubes to monitor NO₂ concentrations. The passive monitoring results for annual mean NO₂ concentrations from relevant local authority sites are presented in Table 5-3 for the period 2018 to 2022 inclusive. Data were obtained from the most recently published local authority Annual Status Reports (Coventry City Council, 2021; Rugby Borough Council, 2022), unless stated otherwise. The locations of these monitoring sites are shown on Figure 5.2 of Volume 2.

Table 5-3 Annual mean NO₂ concentrations from nearby passive air quality monitoring locations

Site ID	Site Location	Site Type	Council	Distance from Walsgrave junction (km)	NO ₂ Annual Mean Concentration (µg/m ³)				
					2018	2019	2020*	2021*	2022
STL1	Stonehouse Lane	Roadside	Coventry	3.5	31.3	33.6	21.6	23.5 [^]	22.4 [^]
LON8	703 London Road	Roadside	Coventry	3.4	25.3	25.3	18.0	19.6 [^]	18.8 [^]
S16	Citrus Hotel, London Road	Roadside	Rugby	3.4	19.6	18.8	13.5	14.6	-
S14	Binley Woods, Village Hall, Rugby Road	Urban Background	Rugby	1.9	15.1	16.8	10.9	10.7	-
S4	Wolston School	Urban Background	Rugby	4.2	12.1	10.4	8.2	8.9	-
S5	High Street Ryton	Kerbside	Rugby	4.9	24.0	23.5	16.4	17.7	-
NO₂ Air Quality Objective					40				
<p>* Concentrations monitored in 2020 and 2021 were notably lower than previous years due to travel restrictions associated with the COVID-19 pandemic. Data for 2022 is similarly low, suggesting traffic flows/transport behaviours had not returned to pre-pandemic levels.</p> <p>[^] Data obtained from Coventry City Council interactive air pollution data map based on diffusion tube locations (https://www.coventry.gov.uk/pollution-1/air-quality/3; website accessed on 8th August 2023).</p> <p>⁻ 2022 data has not currently been published by Rugby Borough Council</p>									

- 5.5.12. The results presented in Table 5-3 demonstrate that NO₂ concentrations have remained consistently below the national annual mean objective (40µg/m³) over the period 2018 – 2022. Monitoring sites STL1 and LON8 are both located in proximity to the A46 Tollbar End junction, concentrations from which are likely to be representative of conditions near to the A46 Walsgrave junction due to their

situation. Monitoring site STL1 recorded a concentration of 33.6µg/m³ in 2019, which is well below the annual mean objective.

5.5.13. In addition, there is an automatic monitoring site within Coventry City Council, which forms part of Defra’s Automatic Urban and Rural National (AURN) monitoring network, located east of Coventry urban centre on Binley Road (Site ID: COBR). The site is located approximately 3.5km to the west of the draft Order Limits (see Figure 5.2 of Volume 2) which monitors both NO₂ and PM₁₀. The monitored annual mean concentrations for both pollutants are presented in Table 5-4 for the period 2018-2022 inclusive.

Table 5-4 Annual mean NO₂ concentrations from nearby automatic air quality monitoring location

Site ID	Site Location	Site Type	Pollutant	Annual Mean Concentration (ug/m ³) (Number of exceedances to the 1-hour mean objective of 200 ug/m ³ for NO ₂)				
				2018	2019	2020*	2021*	2022
COBR	Coventry Binley Road	Urban Traffic	NO ₂	29.4 (0)	30.9 (0)	23.0 (0)	24.3 (0)	23.5
			PM ₁₀	19.4	19.5	16.7	16.5	16.7

* Concentrations monitored in 2020 and 2021 were notably lower than previous years due to travel restrictions associated with the COVID-19 pandemic. Data for 2022 is similarly low, suggesting traffic flows/transport behaviours had not returned to pre-pandemic levels.

5.5.14. The data from the AURN monitoring site demonstrates that NO₂ annual mean concentrations have remained well below the air quality objective over the period reviewed. Similarly, PM₁₀ concentrations monitored at this site have been well below the relevant annual mean objective (40µg/m³).

5.5.15. There are no relevant monitoring sites that monitor PM_{2.5} in proximity to A46 Walsgrave junction. However, the latest monitored PM₁₀ annual mean concentration (16.7 µg/m³ in 2022) recorded at the COBR ‘urban traffic’ automatic station are below the PM_{2.5} limit value (20 ug/m³) and, by conservatively assuming that all PM₁₀ is equivalent to PM_{2.5}, baseline levels of PM_{2.5} are below the limit value. Furthermore, as per Table 5 5 below, the Defra mapped annual mean background PM_{2.5} concentrations for the area encompassing the Scheme are also notably below the limit value.

Defra pollution climate mapping

5.5.16. Defra uses the PCM model to report compliance with the EU Air Quality Directive (Directive 2008/50/EC) air quality limit values, as transposed into UK Law under the Air Quality Standards (England) Regulations 2010 and, following the UK’s exit from the EU, The Environment (Legislative Functions from Directives) (EU Exit) Regulations 2019.

- 5.5.17. Approximately 9,000 roadside PCM projection values are provided across the UK for NO₂, PM₁₀, and PM_{2.5}, covering all years from 2018 to 2030 from a reference base year of 2018. The most recent PCM model data were published in 2020. The focus of the DMRB LA 105 compliance risk assessment is on annual mean NO₂ roadside concentrations and the respective limit value (40µg/m³).
- 5.5.18. The Scheme is not included within the PCM model. However, once the ARN and associated study area is established, there is potential for a number of PCM links to be captured for inclusion in the compliance risk assessment as per DMRB LA 105.

Defra background pollutant concentrations

- 5.5.19. Defra provides mapped future year projections of background pollution concentrations for NO_x, NO₂, PM₁₀ and PM_{2.5} for each one-kilometre grid square across the UK for all years between 2018 to 2030 (Defra, 2022a). The maps include a breakdown of background concentrations by emission source, including road and industrial sources, which have been calibrated against UK monitoring data from 2018.
- 5.5.20. The maximum reported background concentrations based on a review of the 1km grid squares containing the Scheme are presented in Table 5-5 for the baseline year of 2018 (baseline traffic data year), the current year of 2023, and future year of 2028.
- 5.5.21. The maximum background concentrations within and near to the draft Order Limits are all within the relevant objectives for NO₂, PM₁₀ and PM_{2.5}. Background concentrations are predicted to decline annually based on the available mapped background concentrations up to 2030 and will remain below the current air quality objectives.
- 5.5.22. The background annual mean PM_{2.5} concentrations are forecasted to be marginally below the recently legislated 2040 long-term concentration target (10µg/m³) in the Scheme opening year (2028) and also below the 2028 interim target (12µg/m³) (see paragraphs 5.1.8 - 5.1.10 of this chapter for details of the new PM_{2.5} targets).

Table 5-5: Projected background concentrations (µg/m³) of NO_x, NO₂, PM₁₀ and PM_{2.5} relevant to the Scheme

National grid reference	Year	Annual man background concentration (µg/m ³)			
		NO ₂	NO _x	PM ₁₀	PM _{2.5}
438500, 278500	2018 (baseline)	16.6	23.0	15.8	10.3

National grid reference	Year	Annual man background concentration ($\mu\text{g}/\text{m}^3$)			
		NO ₂	NO _x	PM ₁₀	PM _{2.5}
	2023 (present year)	13.3	17.9	14.7	9.5
	2028 (opening year)	11.1	14.8	14.4	9.2

Source: Defra 2023. <https://uk-air.defra.gov.uk/data/laqm-background-maps>

* The reported grid reference represents the maximum pollutant concentrations predicted for all grid squares within which the draft Order Limits are located.

5.6. Potential impacts

Construction

- 5.6.1. A preliminary construction dust assessment has been undertaken following the risk-based approach set out in DMRB LA 105, accounting for the dust generating potential of the likely construction activities, and the location of potentially sensitive receptors.
- 5.6.2. The Scheme is a major bypass junction improvement and therefore is classified as '*large risk*' for its construction dust risk potential. The receiving environment sensitivity to construction dust is *high risk* for receptors within 100m of the draft Order Limits and *low risk* for receptors between 100 and 200m. Hungerley Hall Farm is within 20m of the draft Order Limits and is most at risk of experiencing construction dust impacts.
- 5.6.3. The construction dust assessment is used to inform the best practice mitigation measures in the EMP, which will need to account for the *high dust risk* potential and be implemented prior to commencing work on site. These measures are likely to include, but not be limited to, wheel washing, dust suppression (water spraying), and regular visual site inspections, with particular attention afforded to construction activities adjacent to Hungerley Hall Farm.
- 5.6.4. The effectiveness of the mitigation measures included in the EMP will be monitored with reference to DMRB LA105, through the following means:
- Development of a dust management plan with measures to monitor effectiveness of mitigation as part of the EMP.
 - Completion of daily on site and off site inspections to be included in EMP.
 - Maintaining a record of complaints/exceptional dust events to be included in EMP.
- 5.6.5. With the application of appropriate mitigation measures and associated monitoring of their effectiveness, any residual construction dust impacts should be negligible resulting in no significant air quality effect.

Operation

- 5.6.6. The redistribution of traffic as a result of the Scheme is likely to have an impact on local air quality. The nature and extent of this impact will depend on the magnitude of change in vehicle flows and the locations of this redistribution. The air quality assessment within the ES will include detailed assessment of the impacts associated with redistribution at identified sensitive receptors.
- 5.6.7. The Scheme includes realignment of the A46, the introduction of new grade separated junction, a new link road and the removal of an existing roundabout. The proposed link road to the east of the A46 is in close proximity to the Hungerley Hall Farm, an existing residential property to the west of the A46. At present Hungerley Hall Farm is located 70m from the kerb of the A46 at a lower elevation and separated by dense vegetation. The kerb of the proposed slip road is 46m from the residential property, which significantly reduces the separation between the receptor and source of emissions which may cause air quality effects. The air quality assessment within the ES will quantitatively assess the impact the Scheme has on pollutant concentrations at this receptor.
- 5.6.8. The Scheme is not included within the PCM model. However, once the ARN and associated study area is established, there is potential for a number of PCM links to be captured for inclusion in the compliance risk assessment as per DMRB LA 105 (section 6.7 Assessment methodology, paragraph 6.7.4).

5.7. Design, mitigation and enhancement measures

Embedded (design) mitigation

Construction

- 5.7.1. No additional mitigation measures during the construction phase are likely to be required beyond those stipulated within the EMP for the Scheme.

Operation

- 5.7.2. At the time of writing this report, no design interventions have been included for air quality. The efficacy of any mitigation measures proposed within other technical assessments will be considered in the air quality assessment in the ES.

5.8. Assessment of likely significant effects

Construction

- 5.8.1. With the implementation of best practice mitigation measures to control the release of construction dust from construction activities, there will be **no significant** air quality effect associated with the construction phase of the Scheme.

Operation

- 5.8.2. At this stage the likely significant effects upon human health due to changes in air quality is not yet established. This will be presented in the air quality assessment chapter of the ES.

5.9. Conclusions

- 5.9.1. This chapter provides a summary of the assessments that have been undertaken so far of the potential air quality effects of the scheme in accordance with DMRB LA 105.
- 5.9.2. Some construction activities would be likely to generate dust, which has the potential to cause annoyance at nearby properties if uncontrolled. These effects would be mitigated through the implementation of best practicable means included within the Second Iteration EMP.
- 5.9.3. In the absence of scheme traffic data, operational phase air quality effects have not been assessed at this stage. These will be assessed once traffic data for the scheme, which accounts for the final design, is available and will be reported within the ES that will be submitted to support the DCO application.
- 5.9.4. No significant air quality effects at human health or ecological receptors were identified at construction phase. However, at this stage, it is not possible to assess the likely significant effects during the operation phase. This will be presented in the air quality assessment chapter of the ES.

6. Cultural heritage

6.1. Introduction

- 6.1.1. This chapter addresses the likely significant effects of the Scheme on cultural heritage. The chapter considers the currently known heritage of the area (the “baseline”), which is divided into three general sub-aspects:
- Archaeological remains – the material remains of human activity which may exist in the form of buried traces of human activities, sites which are visible above ground, or artefacts.
 - Historic buildings – structures which are architectural or designed and hold significant historic value, this may include structures not usually thought of as ‘buildings’, such as milestones.
 - Historic landscapes – the character of the current landscape which is a result of the action and interaction of natural and human factors, and includes evidence of past human activities.
- 6.1.2. This chapter has been prepared in accordance with the Design Manual for Roads and Bridge (DMRB) LA 106 Cultural heritage assessment (Highways England 2020c), hereafter referred to as DMRB LA 106.
- 6.1.3. Archaeological geophysical survey is currently planned in autumn 2023. The results of this and any further Scheme specific site inspection and archaeological investigations as may be appropriate, will be reported in the Environmental Statement (ES) for the Scheme.
- 6.1.4. This chapter is supported by the following figures of Volume 2 and appendices of this Preliminary Environmental Information Report (PEIR):
- Figure 6.1: Designated Heritage Assets
 - Figure 6.2: Non-designated Heritage Assets
 - Figure 6.3: Heritage Events
 - Appendix A: Gazetteer

Stakeholder engagement

- 6.1.5. Engagement with Historic England, Coventry City Council and Warwickshire County Council was sought on 31/05/2023 requesting their views on the Scheme and specifically the cluster of listed buildings centred on the Grade II listed Hungerley Hall Farmhouse. A response was received from Historic England on 06/06/2023 stating that their ‘*main concern is the potential impact of the scheme on the setting of the Grade II* Registered Park and Garden associated with Coombe Abbey and the listed buildings there which are relatively close to the scheme*’. Advice was also provided by Historic England regarding the Grade II

listed building of Hungerley Hall Farmhouse and its environs. Historic England deferred responsibility for this matter to Coventry City Council with the following statement:

- 6.1.6. *“The decision on what is or is not listed beyond the principal listed buildings will depend on what is within the curtilage of each of the listed buildings. The decisions on these matters lies with the local planning authority, not Historic England (although there is a useful guidance note on our website). We do not need or wish to be involved in those discussions. When it comes to demolitions we only need to be involved with some categories of demolition of Grade II principal listed buildings: there is no requirement to consult Historic England on listed building consent for the demolition of structures within the curtilage of a Grade II listed building.”*
- 6.1.7. A formal response from the local authority has not yet been received at the time of writing. The following comments are the professional opinion of the applicant’s heritage expert taken at a moment in time and should not be read as authoritative or final.
- 6.1.8. The record for Hungerley Hall Farmhouse is a “legacy” record as identified in the National Heritage List for England (Historic England, 2023). These are records that have not yet been updated to fully describe the designated structures and their significance. This type of record represents most of the listed buildings in England, as the updating process is labour intensive and a long-term project for Historic England’s listing team. In the absence of this more detailed description, the assessment has relied on the wording of the legislation as well as the Secretary of State’s non statutory criteria for listing (Department for Culture, Media and Sport, 2018), Historic England guidance and professional judgement. The Listed Buildings (etc) Act (HM Government, 1990) includes in the designation by default:
- 5(a) any object or structure fixed to the building is part of the building.
 - 5(b) any object or structure within the curtilage of the building which, although not fixed to the building, forms part of the land and has done so since before 1st July 1948 is part of the building.
 - 5A(a) [a specific] object or structure may be treated as not part of the building.
 - 5A(b) any part or feature of the building may be noted as not of special architectural or historic interest.
- 6.1.9. Curtilage in this context can be summarised as the land joined to and in the same ownership as the land that the main building stands on.

6.1.10. A site visit of the Scheme was undertaken with the Conservation Officer for Coventry City Council on 07/07/2023. This site visit was undertaken in order to ascertain the curtilage listed status of the buildings surrounding the Grade II Listed Hungerley Hall Farmhouse. A formal response on the outcome of the site visit has not yet been received. During the site visit the structures surrounding Hungerley Hall Farmhouse were assessed including the yard wall (in pink in Plate 6.1 below), the barn to the east of the farmhouse (in orange in Plate 6.1 below), and the garden wall to the farmhouse (in blue in Plate 6.1 below). It is considered that these structures have the potential to be part of the curtilage of the Grade II listed farmhouse.

Plate 6.1. Image of Hungerley Hall Farm showing curtilage features of relevance to the Scheme that are considered to form part of the listings associated with the property



6.1.11. Due to the limited time between the publication of this PEIR and the receipt of the Scoping Opinion from the Planning Inspectorate, the comments within the Scoping Opinion have not been incorporated into the environmental assessments contained within this PEIR. However, all relevant consultees will be contacted to further discuss the assessment scope as per the Scoping Opinion. A summary of the key requirements from the Planning Inspectorate's Scoping Opinion (2023), as relevant to the scope of the cultural heritage assessment, will be presented in the ES, as well as clear detail on how these comments have been addressed within the assessment.

Legislative and policy framework

6.1.12. The following legislation and policy are relevant to the Scheme.

Legislation

Planning (Listed Buildings and Conservation Areas) Act 1990 (amended by the Enterprise and Regulatory Reform Act 2013)

6.1.13. This act sets out the protection given to buildings of special architectural or historic interest through listing. It also sets out the process for designation of conservation areas. The scheme could have potential effects on Listed Buildings and Conservation Areas.

Ancient Monuments and Archaeological Areas Act, 1979 (amended by the National Heritage Act 1983 and 2002)

6.1.14. This act relates to the investigation, preservation and recording of matters of archaeological and historic interest. The scheme could have potential effects on scheduled monuments and important archaeological deposits.

National policy

National Policy Statement for National Networks (NPSNN) 2014

6.1.15. The National Policy Statement for National Networks (NPSNN) (Department for Transport (DfT), 2014) sets out the Government's policies to deliver the development of Nationally Significant Infrastructure Projects (NSIP) on the national road and rail networks in England. The Secretary of State (SoS) uses the NPSNN as the primary basis for making decisions on Development Consent Order (DCO) applications.

6.1.16. Key policy from the NPSNN relevant to this aspect is set out below:

- *“Those elements of the historic environment that hold value to this and future generations because of their historic, archaeological, architectural or artistic interest are called ‘heritage assets’. Heritage assets may be buildings, monuments, sites, places, areas or landscapes. The sum of the heritage interests that a heritage asset holds is referred to as its significance. Significance derives not only from a heritage asset’s physical presence, but also from its setting.” (NPSNN Paragraph 5.122).*
- *“Non-designed heritage assets of archaeological interest that are demonstrable of equivalent significance to Scheduled Monuments, should be considered subject to the policies for designed heritage assets. The absence of designation for such heritage assets does not indicate lower significance.” (NPSNN Paragraph 5.124).*
- *“The Secretary of State should also consider the impacts on other non-designated heritage assets (as identified either through the development plan process by local authorities, including ‘local listing’, or through the nationally significant infrastructure project examination and decision making process) on the basis of clear evidence that the assets have a significance that merit*

consideration in that process, even though those assets are of lesser value than designated heritage assets.” (NPSNN Paragraph 5.125).

- *“Where the development is subject to EIA the applicant should undertake an assessment of any likely significant heritage impacts of the proposed project as part of the Environmental Impact Assessment and describe these in the environmental statement.” (NPSNN Paragraph 5.126).*
- *“The applicant should describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the asset’s importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant Historic Environment Record should have been consulted and the heritage assets assessed using appropriate expertise. Where a site on which development is proposed includes or has the potential to include heritage assets with archaeological interest, the applicant should include an appropriate desk-based assessment and, where necessary, a field evaluation.” (NPSNN Paragraph 5.127).*
- *“In considering the impact of a proposed development on any heritage assets, the Secretary of State should take into account the particular nature of the significance of the heritage asset and the value that they hold for this and future generations. This understanding should be used to avoid or minimise conflict between their conservation and any aspect of the proposal.” (NPSNN Paragraph 5.129).*
- *“When considering the impact of a proposed development on the significance of a designated heritage asset, the Secretary of State should give great weight to the asset’s conservation. The more important the asset, the greater the weight should be. Once lost, heritage assets cannot be replaced and their loss has a cultural, environmental, economic and social impact. Significance can be harmed or lost through alteration or destruction of the heritage asset or development within its setting. Given that heritage assets are irreplaceable, harm or loss affecting any designated heritage asset should require clear and convincing justification.” (NPSNN Paragraph 5.131).*
- *“Where there is a high probability that a development site may include as yet undiscovered heritage assets with archaeological interest, the Secretary of State should consider requirements to ensure that appropriate procedures are in place for the identification and treatment of such assets discovered during construction.” (NPSNN Paragraph 5.142).*

National Planning Policy Framework (NPPF) 2023

- 6.1.17. Section 16 (paragraphs 189-208) of the NPPF sets out a framework for the management of the historic environment and provides guidance for proposals affecting heritage assets.

Planning Practice Guidance (PPG)

- 6.1.18. PPG includes a dedicated section on historic environment (2019). It notes that, for new planning applications:

- 6.1.19. *“Heritage assets may be affected by direct physical change or by change in their setting. Being able to properly assess the nature, extent and importance of the significance of a heritage asset, and the contribution of its setting, is very important to understanding the potential impact and acceptability of development proposals.”*
- 6.1.20. *“Understanding the significance of a heritage asset and its setting from an early stage in the design process can help to inform the development of proposals which avoid or minimise harm. Analysis of relevant information can generate a clear understanding of the affected asset, the heritage interests represented in it, and their relative importance.”*

25 Year Environment Plan

- 6.1.21. The Department for Environment, Food & Rural Affairs (Defra) 25 Year Environment Plan (2018) is a policy paper setting out what Government will do to improve the environment, including restoring and safeguarding wildlife habitats. This plan is being treated as the first Environmental Improvement Plan required under the Environment Act 2021. The plan sets out aims to conserve and enhance the beauty of our natural environment, and make sure it can be enjoyed, used by and cared for by everyone by:
- Safeguarding and enhancing the beauty of our natural scenery and improving its environmental value while being sensitive to considerations of its heritage.

National Highways policy

- 6.1.22. Cultural heritage is one of the environmental topic areas where the six strategic levers of the National Highways’ Environment Strategy will be applied. The strategic levers will make a contribution towards the organisation’s environment vision.

Local policy

Coventry City Council Local Plan (2011 – 2031)

- 6.1.23. Environmental policies relating to cultural heritage elements and policies relevant to the Scheme from the Local Plan include:
- Policy GE3: Biodiversity, Geological, Landscape and Archaeological Conservation. Sites of Special Scientific Interest (SSSIs), Local Nature Reserves (LNRs), Ancient Woodlands, Local Wildlife and Geological Sites will be protected and enhanced. Proposals for development on other sites, having biodiversity or geological conservation value, will be permitted provided that they protect enhance and/or restore habitat biodiversity. Identified important landscape features, including Historic Environment assets, trees protected by preservation orders, individual and groups of ancient trees, ancient and newly-planted woodlands, ancient hedgerows and

heritage assets of value to the locality, will be protected against loss or damage. In the case of archaeological remains, all practical measures must be taken for their assessment and recording in accordance with Policy HE2.

- Policy HE1 lists conservation area within Coventry. Conservation Area Appraisals and Management Plans will be produced for all of the Conservation Areas to guide their preservation and enhancement. All development proposals within Conservation Areas will be determined in accordance with this Plan and the appropriate Appraisal and Management Plan.
- Policy HE2: Conservation and Heritage Assets. In order to help sustain the historic character, sense of place, environmental quality and local distinctiveness of Coventry, development proposals will be supported where they conserve and, where appropriate, enhance those aspects of the historic environment which are recognised as being of special historic, archaeological, architectural, artistic, landscape or townscape significance. Development proposals involving heritage assets in general and listed buildings in particular, should acknowledge the significance of the existing building and the area by means of their siting, massing, form, scale, materials and detail.

Rugby Borough Council Local Plan 2011 – 2031

- 6.1.24. Policy SDC3: Protecting and Enhancing the Historic Environment discusses how 'Development will be supported that sustains and enhances the significance of the Borough's heritage assets including listed buildings, conservation areas, historic parks and gardens, archaeology, historic landscapes and townscapes. Development affecting the significance of a designated or non-designated heritage asset and its setting will be expected to preserve or enhance its significance.'

6.2. Assessment methodology

- 6.2.1. The approach to assessment was set out in the scoping report (June 2023) and follows that described in DMRB LA 106. There is also consideration of the National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing and Communities (DLUHC), 2021) and The Setting of Heritage Assets (Historic England, 2017). Where appropriate, the value of heritage assets has also been determined with Historic England's Conservation Principles guidance (Historic England, 2008). Other guidance and policy documents have been used in general to make sure the information and assessment is informed. A full list is available in the gazetteer in Appendix A of this PIER.
- 6.2.2. The assessment of value (sensitivity) of assets in this report is an initial rating only and will be finalised in the ES. The rating is based on the assessment criteria described in Chapter 4. These criteria are set out as per DMRB LA 104 Environmental assessment and monitoring (Highways England, 2020a; referred

to from now on as “DMRB LA 104”). The ratings may change in the future as more information is gathered to better understand the heritage resource and the impacts associated with the Scheme.

6.3. Assessment assumptions and limitations

- 6.3.1. This report is based on the information gathered to up to and including July 2023 and is based on the preliminary design of the Scheme at the time of writing. The current preliminary design includes the maximum likely extents of land required for construction and operation of the Scheme. More information and design refinement will come to light during the iterative design process. In turn, there may be changes to design led by cultural heritage constraints as the baseline data develops and the evolving designs emerge.
- 6.3.2. The Historic Environment Records (HERs) consulted as part of this report only list the known archaeological sites, built heritage or historic landscape features at any given time. HERs are being constantly updated by local planning authorities and sometimes it can take time for new information to be entered onto the database. The information coming in can be limited as a result of a lack of targeted research or investigation rather than the genuine absence of heritage assets.
- 6.3.3. There might be previously unrecorded archaeological remains within the Order Limits. The possibility will be appraised more fully in the ES and potential mitigation measures considered (discussed further in section 6.7 of this chapter). As with assessment of importance (significance), the assessment of archaeological potential in this PEIR may change as more information is examined and the design of the Scheme is developed and refined. Scheme-specific site investigations may be proposed as part of that work.
- 6.3.4. Documentary sources are rare before the medieval period. Older primary sources often fail to accurately locate sites and interpretation can be subjective. These sources are considered in the assessment with a degree of caution to try to ascertain the facts but, sometimes the information will be vague or unreliable.
- 6.3.5. Some assets might be known, but only from sources like aerial imagery, historic mapping and professional judgement may have to be made as to what they actually comprise. Without more evidence from other sources such as archaeological excavation, it is hard to know for sure. Where such judgements are made, any relevant assumptions and levels of confidence will be clearly set out in its rationale, concluding as to the nature and value of the asset. The assessment and evolving design will remain flexible enough to adapt to new information as it may emerge in connection with currently unknown assets.

6.3.6. The impact assessment presented in this chapter is based on the current preliminary design at the time of writing. Future changes to the Scheme might alter the predicted impacts on heritage assets. Any changes to the design will be outlined in the ES and might require further engagement with relevant stakeholders.

6.4. Study area

6.4.1. There is no specific methodology to determine the study area at this stage according to DMRB. The study areas for this chapter have been determined by professional judgement. The following study areas have been used for this assessment to gather information on the heritage assets which have the potential to be affected by the Scheme:

- Designated heritage assets, such as scheduled monuments, listed buildings, conservation areas, registered battlefields, and registered parks and gardens will be assessed within a 1km radius of the Scheme.
- Non-designated heritage assets such as archaeological remains and locally listed buildings will be assessed within a 300m radius of the Scheme, however data was gathered within a 1km radius to inform the historic background and archaeological context.

6.4.2. These study areas allow for consideration of potential impacts. Records of designated and non-designated assets were examined from a wider area beyond the study area to sufficient detail to confirm that the study area is appropriate at this stage. Detailed data was gathered from the HERs for a 3km area to inform assessment of archaeological potential and to inform the setting of the study area. In addition, the potential for impacts on designated heritage assets outside the study area which have a relationship with the Scheme will be considered during preparation of the ES.

6.4.3. Information on both designated and non-designated heritage assets was gathered for a 1km study area around the draft Order Limits from the following sources:

- Historic England's National Heritage List for England:
- Assets from this source have reference numbers starting with "NHLE".
- Local Authority conservation area appraisals
- Coventry Historic Environment Record:
- Assets from this source have reference numbers starting with "MCT".
- Events (fieldwork or research reports) have reference numbers starting with "ECT".
- Warwickshire Historic Environment Record:

- Assets from this source have reference numbers starting with “MWA”.
- Events have reference numbers starting with “EWA”.

6.5. Baseline conditions

6.5.1. There are 28 designated heritage assets recorded within the 1km study area. These comprise:

- Two scheduled monuments
- One asset that is both a grade II* registered park and garden and a conservation area. This is Coombe Abbey Estate (NHLE100408). The boundaries of these designations are identical. A distinction between the two different types of designated will be made if it is relevant.
- 25 listed buildings:
 - Two Grade I
 - Two Grade II*
 - 18 Grade II

6.5.2. There are 31 known non-designated heritage assets recorded within the 300m study area. These include two findspots and 26 archaeological sites and three historic buildings. Some of these records are the same asset duplicated between the two HERs where they are located across or near the LPA border, or the same asset recorded in several different places from different primary sources. A process of consolidation will be undertaken in the ES. These assets are summarised within the gazetteer in the Appendix A.

Designated heritage assets

6.5.3. There are four designated heritage assets within or adjacent to the Scheme boundary. These include the grade II* registered park and garden and conservation area of Coombe Abbey Estate (NHLE1000408), the boundary of which sits just within the south-eastern edge of the Scheme, as well as a group of grade II listed buildings centred on Hungerley Hall Farmhouse (NHLE1265694) including its associated granary, cowshed, stable range (NHLE1265638) and barn (NHLE1226789), these sit to the north-west of the existing A46 and have a number of structures within the same curtilage.

6.5.4. The designated heritage assets within the Scheme all date to the post-medieval period and demonstrate the presence of both a rural agricultural landscape, as well as an ornamental one. Coombe Abbey Estate has origins in the late 16th century but was landscaped by Lancelot Brown in the 18th century at the peak of its prominence.

- 6.5.5. The boundary where the park meets the Scheme is a dense planted woodland that is part of the 18th century landscaping and therefore of potentially high cultural heritage value. There is a modern post and wire fence marking the edge of the woodland. At the western edge of the park, the boundary planting is thick and impassable up to the existing A46 barrier. It seems this part of the boundary has been replanted or possibly added to screen the road. The north-western part of the boundary, currently adjacent to open farmland, has a footpath route that can occasionally be seen through the outer perimeter of trees and hedges. The wooded border is an effective screen and no element of the grounds of the park can be seen from within the draft Order Limits.
- 6.5.6. The park is approached via a tree-lined avenue from the south and has extensive medium-distance views within its grounds from the former trackway between the house and the former menagerie. The designation description for the park notes there are significant views across surrounding agricultural land to the north and north-east from the house. There is a woodland belt further to the south of the registered park that runs east to west and is clearly visible from most of the open ground within the park. The dense woodland planting to the north and west and the more sparse planting near the house and avenue, provides a “frame” for the agricultural landscape. The slight rise in the landform in the centre of this open ground is an ideal viewing point to view this framed landscape, a key characteristic of Brown’s designs and the “picture” that gives the Picturesque movement its name.
- 6.5.7. During the site visit it was noted that there is no clear visibility from the registered park and garden towards the Scheme. However, the agricultural land to the east of the Scheme forms part of the setting of the registered park and garden, this can be seen on Figure 6.1 of Volume 2. Here the relationship within the setting is not visual. It is linked through historical association, as the agricultural land in this area was likely formerly owned and farmed for the benefit of the abbey. While further research would be needed to establish this as fact, the tithe records for the area show that the land within the Scheme was not titheable land, a clear indicator that the land was owned by the church in the 18th and 19th centuries. The link to the setting is also contextual, as the presence of agricultural land in general leads a visitor to understand the park as countryside estate as they travel to or around it.
- 6.5.8. The group of three grade II listed agricultural buildings to the north-west of the A46 also date to the 18th century, although the farmhouse could have earlier origins. The historic mapping shows the area as agricultural land up to the registered park boundary. The buildings form a group and an impact on one may impact on the others by association.

- 6.5.9. There are two scheduled monuments recorded within the 1km study area. The closest is Caludon Castle, a moated site and part of an associated water management system dating to the 12th century. The castle is c.855m north-west of the Scheme (NHLE1014044). The other is a moated site 190m south of and relating to Caludon Castle, likely dating to the 12th century c.714mm north-west of the Scheme (NHLE1014045). These scheduled monuments are of national importance and both demonstrate that the presence of an elite defensive landscape during the medieval period across the region. However, both of these assets are screened from the Scheme by a ridge of high ground.
- 6.5.10. The NHLE also records 22 listed buildings within the 1km study area. The listed buildings comprise:
- two grade I listed buildings; the Church of St Bartholomew (NHLE1076629) c.840m south-west of the Scheme and the remains of Caludon Castle (NHLE1076645) c.855m north-west of the Scheme
 - two grade II* listed buildings; West Lodge (NHLE1233532) c.880m south-east of the Scheme, and The Woodlands (NHLE1233533) c.390m east of the Scheme
 - 18 post-medieval grade II listed buildings
- 6.5.11. The listed buildings within the 1km study area are of high value. Further information can be found in Appendix A. There are numerous listed buildings outside the 1km study area that are of a similar nature to those within the study area. Of these, the grade I listed Coombe Abbey (NHLE1233485) c.1.6km to the east of the Scheme has been selected for further assessment. The building sits within the grade II* registered park and garden discussed above and draws significance from this setting. While there are other grade II* and II listed buildings within the park, these are considered as adjunct to the Abbey and assessment of any impacts on this asset will be sufficient to describe the effects of the Scheme on the group at this stage.
- 6.5.12. Other designated assets outside of the 1km study area are considered to either not share intervisibility within the Scheme or do not draw significance from the Scheme area in their long-distance views.

Non-designated heritage assets

- 6.5.13. There are four non-designated heritage assets within the Scheme footprint that are recorded on the Warwickshire and Coventry HERs. There are a further two non-designated areas of ridge and furrow recorded within the Scheme footprint on the Warwickshire HER, these ridge and furrow assets are non-designated heritage assets have not been attributed a HER number but are shown in light green on Figure 6.2 of Volume 2.

- 6.5.14. The four heritage assets recorded within the Scheme include two records of a post-medieval turnpike road, running east to west from Market Harborough to Coventry following the same trajectory as the B4428 in the southern part of the Scheme (MCT15261; MWA4788). The remaining two non-designated heritage assets within the draft Order Limits are two areas of ridge and furrow which have been partially excavated. One (MCT891) dates to the post-medieval period (1500-1900 CE) with post-1800 CE coins and a belt buckle found in the same area, along the B4082 to the west of the A46 roundabout. The other sits just within the northern area of the Scheme (MCT16481) and is of potential early medieval date (410-1066 CE). Field boundaries of unknown date were also recorded during the excavation. The two unnumbered records of ridge and furrow recorded by Warwickshire HER also sit in the northern area of the Scheme.
- 6.5.15. The Warwickshire and Coventry HERs record a further 28 non-designated heritage assets within the 300m study area. Warwickshire also record areas of ridge and furrow across the Scheme and the study area, these are not attributed numbers but are shown in light green on Figure 6.2 of Volume 2.
- 6.5.16. The earliest evidence of activity recorded within the study area is ridge and furrow of early medieval date (MCT16482), made up of multiple areas, all of which sit within the northern part of the study area. These cropmarks and archaeological evidence suggest that there may have been early medieval agricultural activity throughout the study area. However, there is evidence of earlier activity close to but outside the study area including a Roman double-ditched enclosure c.350m east of the Scheme (MWA19114). The next nearest early remains are an undated but possibly prehistoric enclosure c. 950m to the east (MWA13379) and the findspot of a neolithic axe c1000m to the west (MCT157). There are four non-designated heritage assets recorded within the 300m study area of medieval date, all of which are areas of ridge and furrow (MCT65; MCT304; MCT581; MWA8277). While the evidence for medieval activity within the 1km study area is limited, Coombe Abbey (outside the 1km study area) was established during the 12th century and enclosed the surrounding area (NHLE1000408). Villages in the area surrounding the draft Order Limits and the study area are also recorded within the Domesday Book (Powell-Smith, A. 2023). The Scheme would certainly have been part of the rural hinterland between Coombe Abbey and other surrounding settlements, but the extent of agricultural development is unknown.
- 6.5.17. There are 18 non-designated heritage assets recorded within the 300m study area of post-medieval date. The heritage assets of this date within the 300m study area consist of numerous quarries, gravel pits and a brickworks, as well as a number of assets identified from 1st edition OS mapping. There is also potential that the ridge and furrow recorded by Warwickshire HER (Figure 6.2 of

Volume 2) also dates to or continued in use through this period. This ridge and furrow could mask earlier features.

Historic Landscapes

- 6.5.18. The Coventry Historic Landscape Characterisation (HLC) available online shows the southern area of the Scheme as part of the East Binley Character Area which predominantly consists of residential settlement located on the eastern fringe of Coventry. The earliest evidence of the development of this historic landscape area shows it as almost entirely enclosed fields which remained largely unchanged until the early 20th century when housing was built here.
- 6.5.19. The Coventry HLC also records the northern area of the Scheme as part of the South Stowe Character Area which has always been largely open in character. The open fields were enclosed in the mid-18th century and there were little changes following this aside from the construction of the A46 in the late 20th century.

Previous Archaeological Investigations

- 6.5.20. Studies and investigations are recorded in the HER data and are shown on Figure 6.3 of Volume 2. The majority of these investigations record assets that are now destroyed, having been conducted for construction projects including the existing A46 (ECT36,37,63,76 and 77), University Hospital Coventry (ECT117) and a pipeline (ECT64 and 93). Where remains have been identified in the investigations, these will usually have been added to the HER asset datasets. However, there is often a delay between reporting and updating of the data. Two interventions (ECT144 and EWA9683) are records of non-investigative reports.
- 6.5.21. Results of a geophysical survey (ECT492), previously undertaken in parts of the draft Order Limits, has shown potential evidence for sporadic activity of unknown date suggestive of some use, although relatively small scale.
- 6.5.22. Another previous archaeological investigation, carried out in 2020/21 for National Highways (Network Archaeology, 2021, not yet included in the HER), immediately to the south-west of the draft Order Limits identified a post-medieval ditch running north-east to south-west which aligns with a field boundary identified on historic mapping, as well as unstratified post-medieval remains. The intervention records suggest that potential remains are most likely be medieval to post-medieval in date and agricultural in nature. If any such remains were to survive, they would derive their significance from their archaeological interest as well as their potential relationship with the Coombe Abbey estate or other known assets.

6.6. Potential impacts

Construction

- 6.6.1. Potential adverse impacts to cultural heritage assets during the construction phase include the following:
- Temporary impact on the setting of designated and non-designated heritage assets, resulting from noise, vibration and visual presence of construction plant and works.
 - Permanent impact through the disturbance or removal of designated and non-designated assets, within land required for the construction of the Scheme.
 - Permanent impact through vehicle movements within the land required for the construction of the Scheme, which may cause damage to sub-surface archaeological deposits through compaction.
 - Permanent impact through changes to groundwater levels or ground movement adjacent to the land required for construction.
- 6.6.2. Potential beneficial impacts to the heritage value of cultural heritage assets during the construction phase would result from landscaping and planting that would enhance the setting of assets.
- 6.6.3. There is potential for the construction of the Scheme to physically affect the buildings surrounding the Grade II listed building of Hungerley Hall Farmhouse (NHLE1265694). The proposed B4082 link road and associated landscaping may involve the alteration or demolition of the yard wall. The proximity of the structures to the draft Order Limits means that there is a potential for ground movement or vibration during construction or ground movement after construction from settling to adversely affect the barn. If removal of the modern steel pole barn becomes necessary, this may affect the fabric of the brick barn, as the two are physically connected at various points with metal bracing and guttering, however this is not anticipated to be required at present.

Operation

- 6.6.4. Potential adverse impacts to the heritage value of cultural heritage assets during the operational phase would be due to changes in their setting as a result of changes to lighting, noise, vibration, air quality or ecological conditions (particularly in the case of the registered park and garden and Hungerley Hall Farmhouse).
- 6.6.5. A potential reduction in noise, vibration or traffic would have a positive impact on the heritage value of an asset due to an improvement in its setting.
- 6.6.6. Potential operational impacts include:

- Long term impact on the historic setting/character of designated and non-designated heritage assets, through increased visual intrusion from lighting and landscaping, or from changes in noise, air quality or ecological conditions.
- Long term impact on the integrity of designated and non-designated heritage assets through, vibration or air quality associated with changes in traffic movements, or from seasonal or episodic changes in ground-water levels.

6.7. Design, mitigation and enhancement measures

Embedded (design) mitigation

6.7.1. Embedded (design) mitigation is defined by DMRB LA104 as “*project design principles adopted to avoid or prevent adverse environmental effects*”. Full details of the embedded mitigation of the Scheme can be found in Chapter 2.

Essential mitigation

6.7.2. Essential mitigation is defined by DMRB LA104 as “*measures required to reduce and if possible offset likely significant adverse environmental effects, in support of the reported significance of effects in the environmental assessment*”.

6.7.3. Essential mitigation measures to reduce impacts from the construction and operation phases of the Scheme upon specific heritage assets could include:

- management of noise and vibration in the vicinity of heritage assets
- design of development proposal and/or construction methods to avoid or reduce impacts on specific heritage assets or areas of potential
- working with other aspects to make sure that landscaping proposals are in keeping with the historic character of the area
- installation of physical protection measures for heritage assets, both temporary, such as barriers during construction or permanent, such as consolidation of structures or buried assets
- recording heritage assets that cannot be avoided by design and publishing results to the public. This may include:
 - excavations
 - non-destructive surveys (such as geophysics or building recording)

Enhancement

6.7.4. Enhancement will be considered as the design progresses and will be detailed in the ES in consultation with local stakeholders.

6.8. Assessment of likely significant effects

Construction

- 6.8.1. The Scheme has potential to cause temporary and permanent adverse effects during construction. Some have the potential to be significant without adequate mitigation. However, none of the effects are likely to be of a level and character that cannot be reduced, avoided or mitigated through preservation by record or preservation in-situ, in consultation with the relevant local authority archaeological advisor. The Scheme will include good practice measures in an Environmental Management Plan (EMP) to guard against accidental damage and react to unexpected archaeological discoveries.
- 6.8.2. The current Scheme would require substantive groundworks associated with the construction of a full grade separated dumbbell junction, overbridge, and new B4082 link road, which would pass between the existing A46 and Hungerley Hall Farmhouse. The Scheme as proposed also requires the realignment of the A46 mainline through the existing roundabout, which will be removed as part of the works.
- 6.8.3. It is likely that construction of the existing highway will have disturbed or truncated archaeological remains within its footprint. However, the land either side of the current A46 road and cutting has no record of previous development and is currently open agricultural land. It is most likely that these areas have been agricultural land since at least the post-medieval period and, while ploughing may have damaged any below ground archaeological remains, some deeper remnants may survive.
- 6.8.4. The full extent of disturbance from construction of the existing A46 carriageway across the Scheme is unknown. There is, therefore, potential for further archaeological remains relating to the known heritage assets within the Scheme or other, previously unknown, assets to be disturbed or truncated during groundworks within the Scheme. As such, the Scheme could have an adverse effect upon the recorded archaeological sites and/or previously unknown archaeological remains. There is a medium to low likelihood of archaeological remains overall and it is considered that any remains would most likely be of low value. However, there is a small chance for remains of up to high value to survive here. Total removal of any such remains would be a major magnitude of impact and therefore up to a large adverse (significant) effect without adequate mitigation. Potential mitigation measures such as minimal intrusion into areas outside the existing A46 footprint and archaeological monitoring in areas of higher potential would reduce impacts on archaeological remains to result in a **neutral (not significant) effect**. However, it is almost never possible to exclude any chance of finding remains of a nature that may result in a higher significance

of effect. This risk is managed through close consultation with the local authority archaeological advisors.

- 6.8.5. The Scheme could physically affect the group of three grade II listed buildings of Hungerley Hall Farm (NHLE1265694; NHLE1226789; NHLE1265638). The proposed B4082 link road and associated landscaping may involve the alteration or demolition of the yard wall and potentially the alteration or demolition of the garden wall to the farmhouse and a barn. The yard wall and barn are within the curtilage, of and therefore possibly included in the listing, of the Grade II listed farmhouse. As assets of potentially high value, alteration or demolition could be up to major magnitude of impact and therefore up to a large adverse (significant) effect, prior to mitigation. As mitigation is yet to be determined and agreed the effect with mitigation is likely to be reduced but is currently **not yet established**.
- 6.8.6. The Scheme as currently proposed could also physically affect the designated historic landscape of Coombe Abbey Estate (NHLE1000408). As an asset of high value, alteration could be up to a moderate magnitude of impact and therefore up to a large adverse (significant) effect, prior to mitigation. Furthermore, if after additional site visits and further consultation it is determined that there is a built structure delineating the boundary of the registered park within the draft Order Limits, this may be curtilage of the grade I Coombe Abbey itself (NHLE1233485) and therefore an asset of high value. Potential alteration or demolition of part of the boundary could be up to a moderate magnitude of impact and therefore up to a large adverse (significant) effect, prior to mitigation. As mitigation is yet to be determined if it is required and what this would entail the effect with mitigation is likely to be reduced but is currently **not yet established**.
- 6.8.7. The Scheme will not physically impact any other designated or non designated heritage assets. All designated or non-designated historic buildings, other than those discussed above, sit far enough outside the study areas for assessing the impact of the Scheme upon cultural heritage, and will therefore not be subject to physical change.
- 6.8.8. The Scheme has the potential to impact the setting of numerous designated historic buildings as well as the designated historic landscape of Coombe Abbey Estate (NHLE1000408). The Grade II listed buildings centred on Hungerley Hall Farmhouse (NHLE1265694; NHLE1226789; NHLE1265638) would be subject to setting impacts during the construction phase.
- 6.8.9. While the majority of the significance of these buildings lies within their fabric, they draw significance from their rural setting. While this has already been altered during the construction of the existing A46 the construction of the new B4082 link road would further erode the rural agricultural setting in which these listed buildings can be understood. As assets of high value any alteration to their

setting would be a minor to moderate magnitude of impact and therefore have a slight to moderate adverse effect, prior to mitigation. As mitigation is yet to be determined and agreed, but is likely to include vegetation planting to provide screening, the effect with mitigation is likely to be reduced but is currently **not yet established**.

- 6.8.10. During construction it is considered that there may be some temporary alteration to the setting of the Grade II* registered park and garden (NHLE1000408) and the listed buildings recorded within this area (NHLE1233663; NHLE1276493; NHLE1233533; NHLE1233703; NHLE1276492; NHLE1233532), as well to the grade II listed building of Walsgrave Hill Farmhouse (NHLE1233531) c.300m east of the Scheme. Since these effects are temporary and fully reversible at the end of construction, the changes cannot be said to result in losses and therefore cannot lead to significant effects. Standard considerate construction measures, such as the management of noise and vibration during construction would be sufficient to safeguard against accidental effects.
- 6.8.11. The Scheme does not have the potential for significant physical or setting effects on non-designated historic landscapes. The landscape types within the study area are typical for the region and proposed changes to the existing overall historic landscape layouts and land use are minimal relative to the resource.

Operation

- 6.8.12. The significance of effects have not yet been established, further assessment required as part of the ES to determine significance of effect. The Scheme has potential to cause long term adverse effects during operation. However, none of the impacts are likely to be of a level and character that cannot be reduced, avoided or mitigated using standard mitigation measures.
- 6.8.13. As the Scheme is largely within the existing road corridor, it is not considered likely that there will be significant additional impacts to the settings of archaeological remains. This is due to the retention of enough of the existing landscape context to inform interpretation and experience of buried remains to an informed observer.
- 6.8.14. The Scheme has the potential to impact the setting of numerous designated historic buildings as well as the designated historic landscape of Coombe Abbey Estate (NHLE1000408). The Grade II listed buildings centred on Hungerley Hall Farmhouse (NHLE1265694; NHLE1226789; NHLE1265638) would be subject to setting impacts during the operation phase. The effect upon setting is **not yet established**.

6.9. Conclusions

- 6.9.1. This chapter provides a summary assessment, based on the information currently available, of the potential cultural heritage effects of the scheme in accordance with DMRB.
- 6.9.2. In depth desk-based analysis, archaeological fieldwork and setting assessment will be undertaken in line with the development of the scheme design. The initial fieldwork will include geophysical survey in autumn 2023 alongside an archaeological watching brief on geotechnical investigations. This will be supplemented with archaeological trenching to provide a comprehensive archaeological baseline.
- 6.9.3. The assessment has recognised the likely effect of direct physical impacts on the heritage assets including Grade II listed buildings centred on Hungerley Hall Farmhouse (NHLE1265694; NHLE1226789; NHLE1265638) and potential unknown archaeological remains.
- 6.9.4. The settings of heritage assets will be assessed to determine the effects, if any, from the scheme and enable appropriate mitigation to be designed. This assessment will be documented fully in the ES.
- 6.9.5. Should substantial harm or loss of significance to heritage assets remain after further design development and assessment work is completed, it will be necessary for the DCO application to demonstrate that all reasonable alternatives have been considered and that their loss or harm is necessary in order to deliver substantial public benefits that outweigh that loss or harm. This information will be submitted with the DCO application.

7. Landscape and visual effects

7.1. Introduction

7.1.1. This chapter presents the preliminary findings of the Landscape and Visual Impact Assessment (LVIA) of the Scheme. It provides a preliminary review of the existing baseline landscape and visual environment and identifies potential impacts that the Scheme could have upon the surrounding landscape and upon visual receptors. The chapter also outlines incorporated mitigation proposed measures into the design of the Scheme to help mitigate likely landscape and visual effects as indicated on the current Indicative Environmental Masterplan for Consultation, which will evolve through the project stages, part of an ongoing iterative design process. This landscape and visual mitigation which has been identified as likely to be required at this stage in the assessment process is shown on the Indicative Environmental Masterplan for Consultation.

7.1.2. This chapter is supported by the following figures of Volume 2:

- Figure 7.1: Landscape Character Context (HE604820-OIL-ELS-00-DR-LX-30001)
- Figure 7.2: Visual Context (HE604820-OIL-ELS-00-DR-LX-30002)
- Figure 7.3: Indicative Environmental Masterplan For Consultation Overview (HE604820-OIL-ELS-00-DR-LE-31000)
- Figure 7.4: Indicative Environmental Masterplan For Consultation Sheet 1 of 4 (HE604820-OIL-ELS-00-DR-LE-31001)
- Figure 7.5: Indicative Environmental Masterplan For Consultation Sheet 1 of 4 (HE604820-OIL-ELS-00-DR-LE-31002)
- Figure 7.6: Indicative Environmental Masterplan For Consultation Sheet 1 of 4 (HE604820-OIL-ELS-00-DR-LE-31003)
- Figure 7.7: Indicative Environmental Masterplan For Consultation Sheet 1 of 4 (HE604820-OIL-ELS-00-DR-LE-31004)

7.1.3. A lighting impact assessment will be included as part of the EIA process to determine the likely effects of the lighting design of the Scheme on the surrounding environment. The lighting assessment will inform the landscape assessment and will be included as a technical appendix to the LVIA within the Environmental Statement (ES). Appendix B presents the scope of the lighting assessment proposed and initial effects that have been identified.

Stakeholder engagement

7.1.4. The visual assessment of the Scheme will be informed by detailed assessment of the effects upon a set of representative viewpoints. Eleven proposed

representative viewpoints have been identified (see Figure 7.2 of Volume 2). Their selection has been informed by desktop study and a preliminary site visit undertaken in March 2023.

- 7.1.5. Coventry City Council, Rugby Borough Council and Warwickshire County Council were contacted in May 2023 regarding the proposed representative viewpoints for their consideration. Rugby Borough Council responded on 3rd July 2023 stating that comments on representative viewpoint selection would be provided in due course as part of their formal scoping response to the Planning Inspectorate. Responses to this consultation from Coventry City Council and Warwickshire County Council have yet to be received.
- 7.1.6. As discussed in paragraph 7.5.6 of this Preliminary Environmental Information Report (PEIR), Project Landscape Character Areas (PLCAs) have been defined to highlight distinctive local landscape character areas within the study area. These will be consulted upon with the Local Planning Authorities in due course.
- 7.1.7. This chapter of the PEIR does not therefore include baseline photography from the proposed positions given that they are yet to be agreed.

Legislative and policy framework

- 7.1.8. The following legislation and policy are relevant to the landscape and visual aspects of the Scheme.

Legislation

- 7.1.9. The European Landscape Convention (ELC) promotes the protection, management and planning of European landscapes and organises European co-operation on landscape issues. The UK Government became a signatory to the ELC in 2006, introducing it in March 2007. The ELC is a convention of the Council of Europe and is therefore not affected by Brexit. The ELC contains 18 articles which, collectively, promote landscape protection, management and planning and organising European cooperation on landscape issues. Articles 5 and 6 commit signatory states to a number of actions which are designed to help compliance with the overarching aims of the ELC. These include the need to recognise landscapes in law, to establish policies aimed at landscape planning, protection and management, and the integration of landscape into other policy areas. The ELC does not advocate the same measures and policies for all landscapes. Instead, it encourages approaches that are adaptable to particular landscape types and which respond to their unique characteristics.
- 7.1.10. The Environment Act 2021 sets out measures to protect and improve the UK's environments, including biodiversity, water, and habitats. The Act introduces a requirement for developments to deliver a 10% increase in biodiversity. The Act

also introduces local nature recovery strategies (LNRS), a system of spatial strategies in England. Appointed authorities will be tasked with creating opportunities to improve local habitats and aid their recovery.

National policy

National Policy Statement for National Networks (NPSNN)

- 7.1.11. The National Policy Statement for National Networks (NPSNN) (Department for Transport (DfT), 2014) sets out the Government's policies to deliver development of Nationally Significant Infrastructure Projects (NSIP) on the national road and rail networks in England. The Secretary of State (SoS) uses the NPSNN as the primary basis for making decisions on Development Consent Order (DCO) applications for highway schemes.
- 7.1.12. Key policy from the NPSNN relevant to the landscape and visual aspect is set out below:
- Paragraph 5.144: [...] The landscape and visual assessment should include reference to any landscape character assessment and associated studies, as a means of assessing landscape impacts relevant to the proposed project.
 - Paragraph 5.145: The applicant's assessment should include any significant effects during construction of the project and/or the significant effects of the completed development and its operation on landscape components and landscape character.
 - Paragraph 5.146: The assessment should include the visibility and conspicuousness of the project during construction and of the presence and operation of the project and potential impacts on views and visual amenity. This should include any noise and light pollution effects, including on local amenity, tranquillity, and nature conservation.
 - Paragraph 5.157: [...] the Secretary of State should consider whether the project has been designed carefully, taking account of environmental effects on the landscape and siting, operational and other relevant constraints, to avoid adverse effects on landscape or to minimise harm to the landscape, including by reasonable mitigation.
 - Paragraph 5.158: The Secretary of State will have to judge whether the visual effects on sensitive receptors, such as local residents, and other receptors, such as visitors to the local area, outweigh the benefits of the development. [...]

National Planning Policy Framework (NPPF) 2023

- 7.1.13. The NPPF sets out the Government's planning policies for England, with Section 15, Paragraphs 174-188 setting out the framework with respect to conserving and enhancing the natural environment. Section 16, Paragraphs 189-208, sets out a framework for the management of the historic environment.

- 7.1.14. Section 13, paragraphs 137-151 of the NPPF relate to Protecting Green Belt land, with paragraph 138 outlining the five purposes of Green Belt. Paragraphs 147 to 151 address proposals affecting the Green Belt and set out the parameters for appropriate and inappropriate development. Paragraph 150 states that “*Certain other forms of development are also not inappropriate in the Green Belt provided they preserve its openness and do not conflict with the purposes of including land within it.*” The list of these developments include “*local transport infrastructure which can demonstrate a requirement for Green Belt location*”.

Planning practice guidance (PPG)

The PPG includes a dedicated section on the natural environment (2019). It explains key issues in implementing policy to protect and enhance the natural environment, including local requirements. It notes that “*information on biodiversity and geodiversity impacts and opportunities needs to inform all stages of development.*”

- 7.1.15. It also states that “*a local planning authority must consult Natural England before granting planning permission for large-scale non-agricultural development on best and most versatile land that is not in accord with the development plan.*”

25 Year Environment Plan

- 7.1.16. The Department for Environment, Food & Rural Affairs (Defra) 25 Year Environment Plan (2018) is a policy paper setting out what Government will do to improve the environment, including restoring and safeguarding wildlife habitats. This plan is being treated as the first Environmental Improvement Plan required under the Environment Act 2021. Chapter 2: Recovering nature and enhancing the beauty of landscapes relates to the development of a Nature Recovery Network to protect and restore wildlife, as well as a review of nationally designated landscape areas. The plan also introduces a new environmental land management system (ELMS) to incentivise land managers to restore and improve natural capital and rural heritage. The three ELMS schemes include a Local Nature Recovery scheme and a Landscape Recovery scheme, both piloting in 2022 and launching in 2024.

National Highways’ policy and guidance

- 7.1.17. Landscape is one of the environmental topic areas where the six strategic levers of National Highways’ Environment Strategy will be applied. The strategic levers will make a contribution towards the organisation’s environment vision.
- 7.1.18. National Highways’ ‘People, places and processes: A guide to good design at National Highways’ (2022) sets out a vision, which aims to put people at the

heart of National Highways' work, by designing an inclusive, resilient and sustainable road network. This road network should be appreciated for its usefulness but also its elegance, reflecting in its design the beauty of the natural, built and historic environment through which it passes, and enhancing it where possible. The accompanying set of principles for good road design follow the themes of people, places and processes. The focus on good design seeks to make a difference to both road users and the communities through which the roads pass, while being sensitive to the context of a road's surroundings. The road should contribute to higher quality of life, greater economic vitality and a more efficient use of resources.

Local policy

Coventry City Council Local Plan (2011 – 2031)

7.1.19. The Coventry Local Plan (2011-2031), (Coventry City Council, December 2017) includes environmental policies relating to the "Green Belt and Green Environment' elements and policies relevant to the Scheme include:

- Policy GB1: Green Belt and Local Green Space — "Part 3c: 'Land south at Walsgrave Hill Farm (residential)'" to be removed from the Green Belt to accommodate future development needs.
- Policy GE3: Biodiversity, Geological, Landscape and Archaeological Conservation. Sites of Special Scientific Interest (SSSIs), Local Nature Reserves (LNRs), Ancient Woodlands, Local Wildlife and Geological Sites will be protected and enhanced. Proposals for development on other sites, having biodiversity or geological conservation value, will be permitted provided that they protect enhance and/or restore habitat biodiversity. Development proposals will be expected to ensure that they:
 - lead to a net gain of biodiversity, where appropriate, by means of an approved ecological assessment of existing site features and development impacts;
 - protect or enhance biodiversity assets and secure their long term management and maintenance;
 - avoid negative impacts on existing biodiversity;
 - preserve species which are legally protected, in decline, are rare within Coventry or which are covered by national, regional or local Biodiversity Action Plans.
- Policy GE4: Tree Protection – Part 1 and 2:
 - '1. Development proposals will be positively considered provided:
 - a. there is no unacceptable loss of, or damage to, existing trees or woodlands during or as result of development, any loss should be supported by a tree survey

- b. trees not to be retained as a result of the development are replaced with new trees as part of a well designed landscape scheme; and
- c. existing trees worthy of retention are sympathetically incorporated into the overall design of the scheme including all necessary measures taken to ensure their continued protection and survival during construction.
- 2. Development proposals that seek to remove trees that are subject to 'Protection', without justification, will not be permitted.'
- Policy DE1 'Ensuring High Quality Design' relates to Councils requirements to *"raise the standard of design in the built and green environments"*; and should be considered within the development of design proposals for the Scheme.

7.1.20. Coventry City's The New Coventry Local Development Plan (2011-2031), (Coventry City Council, September 2014) pages 37-38, reinforce Policy DE1 by providing key design criteria and considerations for use within new developments but also the need for high quality transport links, which benefit the local community and economy (pages 39-41).

Rugby Borough Council Local Plan 2011 – 2031

- 7.1.21. Rugby Borough Council's Local Plan 2011-2031 Draft publication (Rugby Borough Council, 2019), Policy NE2: Strategic Green and Blue Infrastructure, discusses how new developments 'must provide suitable Green and Blue Infrastructure corridors throughout the development and link into adjacent strategic and local Green and Blue Infrastructure networks or assets where present.'
- 7.1.22. Policy NE3: Landscape Protection and Enhancement, discusses how all new developments must 'positively contributes to landscape character.' Development proposals will be required to demonstrate that they:
- integrate landscape planning into the design of development at an early stage; Consider its landscape context, including the local distinctiveness of the different natural and historic landscapes and character, including tranquillity
 - relate well to local topography and built form and enhance key landscape features, ensuring their long-term management and maintenance
 - identify likely visual impacts on the local landscape and townscape and its immediate setting and undertakes appropriate landscaping to reduce these impacts
 - aim to either conserve, enhance or restore important landscape features in accordance with the latest local and national guidance
 - address the importance of habitat biodiversity features, including aged and veteran trees, woodland and hedges and their contribution to landscape

character, where possible enhancing and expanding these features through means such as buffering and reconnecting fragmented areas

- are sensitive to an area's capacity to change, acknowledge cumulative effects and guard against the potential for coalescence between existing settlements

7.1.23. Policy SDC1: Sustainable Design discusses how developments must 'demonstrate high quality, inclusive and sustainable design and new development will only be supported where the proposals are of a scale, density and design that responds to the character of the areas in which they are situated. All developments should aim to add to the overall quality of the areas in which they are situated.'

7.1.24. Policy SDC2: Landscaping determines that all proposals should ensure that:

- important site features have been identified for retention through a detailed site survey
- features of ecological, geological and archaeological significance are retained and protected and opportunities for enhancing these features are utilised (consideration will also be given to the requirements of policies NE1 and SDC3 where relevant)
- opportunities for utilising sustainable drainage methods are incorporated
- new planting comprises native species which are of ecological value appropriate to the area
- in appropriate cases, there is sufficient provision for planting within and around the perimeter of the site to minimise visual intrusion on neighbouring uses or the countryside
- detailed arrangements are incorporated for the long-term management and maintenance of landscape features

Other plans and policies

- Warwickshire, Coventry and Solihull Green Infrastructure Strategy 2013.

7.2. Assessment methodology

7.2.1. The approach to the ongoing landscape and visual impact assessment follows best practice for the assessment of highway schemes and is therefore being undertaken principally in line with Design Manual for Roads and Bridges (DMRB) LA 107 Landscape and visual effects, Revision 2, (Highways England, 2020d) (hereafter referred to as DMRB LA 107) with reference also to the Guidelines for LVIA 3rd Edition (GLVIA3), (Landscape Institute and Institute of Environmental Management and Assessment, 2013). Visualisations within the final ES will also in due course be produced in accordance with the Landscape Institute's

Technical Guidance Note 06/19 - Visual Representation of Development Proposals (September 2019).

- 7.2.2. The purpose of the landscape assessment is to report on the likely effects of the Scheme on the distinctive character of the landscape and the characteristics that contribute to this, including physical features and aesthetic/perceptual aspects. The purpose of the visual assessment is to report on the likely effects of the Scheme on views and how this affects the visual amenity of people. The standard approach and assessment criteria for highway schemes for the assessment of both landscape and visual effects is determined by DMRB LA107.
- 7.2.3. The sensitivity of the receptors is derived from the detailed assessment of their susceptibility and value. The magnitude of change considers the size/scale of change, the geographical extent over which the change will likely be experienced, and the duration of the effect.
- 7.2.4. The overall assessment of the significance of landscape and visual effects is the result of professional judgement drawing on the criteria provided in DMRB LA 107. A numerical or formal weighing system is not applied. Instead, consideration of the relative importance of each aspect feeds into the overall assessment.

7.3. Assessment assumptions and limitations

- 7.3.1. The landscape and visual chapter of the PEIR draws on desk-based studies, a computer-generated Zone of Theoretical Visibility (ZTV) (as shown on Figure 7.2 of Volume 2), and a preliminary site visit undertaken in March 2023. Representative viewpoint photography and the detailed assessment of visual effects at each location has yet to be undertaken.
- 7.3.2. The potentially significant landscape and visual effects identified within this PEIR are based on the preliminary Scheme design available at the time of writing. The assessments are subject to revision as the design of the Scheme evolves. The preliminary design, including mitigation design and the extent of likely required vegetation clearance has been used to inform the PEIR. Preliminary landscape and visual mitigation is shown by the Indicative Environmental Masterplan for Consultation (see Figures 7.3 to 7.7 of Volume 2).

7.4. Study area

- 7.4.1. In accordance with DMRB LA 107 a study area for the landscape and visual assessment has been established. This was determined following a review of the preliminary Scheme ZTV (see Figure 7.2 of Volume 2), desk-based studies, and a preliminary site visit undertaken in March 2023.

- 7.4.2. The preliminary site visit was conducted to inform the landscape and visual baseline of the study area and surrounding context and determined that 1km was adequate, as highlighted on the preliminary ZTV (see Figure 7.2 of Volume 2). The extent of the study area has been selected as being appropriate to ensure that all potentially significant landscape and visual effects are identified. Beyond 1km, it is considered unlikely that the Scheme will give rise to any significant effects on landscape and visual receptors due to the distance and presence of intervening topography, vegetation and built form (as highlighted on the preliminary ZTV), particularly the context of the existing A46 (Coventry Eastern Bypass) and Walsgrave junction.
- 7.4.3. The study area is divided between the urban edge of Coventry to the west and rural countryside of Rugby to the east. The north-eastern area of the study area contains arable farmland around Walsgrave Hill, and the south-eastern section is dominated by Coombe Country Park and farmland north of Binley Woods. In contrast the north-western section of the study area consists of urban areas of Walsgrave around University Hospital Coventry and south-western section consists of Binley residential area.

7.5. Baseline conditions

- 7.5.1. Landscape and visual baseline conditions have been established through desktop study and a preliminary site visit.

Landscape

Landscape character

- 7.5.2. Natural England's National Character Areas (NCA) describe the general character of the English countryside. The Scheme is situated on the boundary of two NCAs; NCA 96: Dunsmore and Feldon (Natural England, 2013) and NCA 97: Arden (Natural England, 2012) (see Figure 7.1 of Volume 2).
- 7.5.3. The Scheme also sits on the boundary between two local authorities - Coventry City Council and Rugby Borough Council - the latter part of Warwickshire County Council. No published landscape character assessment relating to the study area has been undertaken by either Coventry City Council or Rugby Borough Council.
- 7.5.4. Warwickshire County Council has produced a suite of landscape character assessment reports for the whole of Warwickshire: Warwickshire Landscapes Guidelines (November 1993). The part of the study area located within Rugby Borough Council's jurisdiction falls within the identified Dunsmore Parklands Landscape Character Type (LCT). This is described by Warwickshire County

Council as *'an enclosed, gently rolling estate landscape with a strongly wooded character defined by woodland edges, parkland and belts of trees.'*

- 7.5.5. The character of the Dunsmore Parklands LCT gives a strong sense of scale, enclosure, and the feeling of a linked landscape; through large woodland blocks, wooded streams, mature hedgerows, and hedgerow trees (predominantly oak). This is emphasised by gently rolling landform and large-scale field pattern, poorly defined in some places, allowing for middle distance views to wooded skylines. The landscape around Coombe fields is open, allowing for wide views northwards, but fragmented by intrusive landscape features of busy roads and industrial built form.
- 7.5.6. Following a review of the published landscape character information and a preliminary site visit, it has been determined that the study area consists of four distinctive local landscape character areas, herein referred to as PLCAs (see Figure 7.1 of Volume 2). The following provides a brief introductory description of each:
- PLCA 1 - Walsgrave Hill and Valley including Hungerley Hall Farm:
 - This project landscape character area runs north to south from just off the A46 along Central Boulevard to the northern edge of Coombe Country Park. The character area bisects the A46, towards the west, following the route of the River Sowe, spreading south across the agricultural fields to B4082. The topography in the character area, east of the A46 rises towards Walsgrave Hill (92m Above Ordnance Datum (AOD)) before falling northwards across the valley to Walsgrave Hill Farm and Hill Park Woods or southwards across agricultural fields to the northern edge of Coombe Country Park. The key characteristic of the area is large irregular agricultural fields bound by gappy hedgerows. The A46 has a strong influence on the area in landscape character terms physically and perceptually by cutting through the agricultural fields on the eastern edge of Coventry near Hungerley Hall Farm.
 - PLCA 2 - Coombe Country Park and Old Lodge Farm:
 - This project landscape character encompasses Coombe Country Park and agricultural fields, south of the B4027 associated with Old Lodge Farm, just north of Binley Woods. These two areas were part of the former Coombe Abbey estate. Coombe Country Park has a strong sense of landscape character, consisting of lime tree lined avenue drive, scattered parkland trees, roundels, and vistas; surrounded by a thick woodland belt, consisting of walks and Coombe Pool Fishery (open selected times of the year, June to March). The 'Twelve O'clock Ride' and Coombe Park entrance drive are part of the Centenary Way Long Distance Footpath, which link the two areas together. Agricultural fields surrounding Old Lodge Farm are large and irregular, bound by gappy hedgerows and isolated field trees.

- PLCA 3 – Gainford Rise open space (Smite Brook) and Binley:
 - This project landscape character area runs from the Walsgrave roundabout at A46 Coventry Eastern Bypass and B4082 southwards to the A428 near Binley. The area is predominantly a mix of residential developments circa 1960s – 1970s spreading north from Clifford Bridge Road, across Brinklow Road (B4027) and latterly 1990s south along Skipworth Road. The southern edge of the character consists of out-of-town business and retail parks along Kynner Way and Harry Weston Road. The character is very urbanised with little green space generally. There is a ‘green wedge’ running along the character areas eastern boundary parallel with the A46, consisting of Smite Brook, part of the Gainford Rise open space, and public green open spaces, including children’s play parks associated with the residential developments along Valencia Road and Hepworth Road.
- PLCA 4 - Sowe Valley/Dorchester Way:
 - This project landscape character area is located along the western edge of Coventry, from the intersection of M69 junction 2 and A46 Coventry Eastern Bypass, following the River Sowe and its tributaries southwards towards the Walsgrave roundabout and the B4082. The most northern section comprises of distribution and retail units just off Parkway. Directly south is the Walsgrave residential area located between Hinckley Road in the west and Brade Drive in the east; predominately a 1970s/1980s development with some late 1990s/early 2000s infill. South of the residential Walsgrave area is the University Hospital Coventry which dominates the skyline of the surrounding area. South of University Hospital Coventry, the Sowe Valley follows the River Sowe route, in a south-eastern direction before heading due south and returning westwards, south of Tesco, near Dorchester Way. Dorchester Way follows the rivers arched route characteristic; the development vernacular consists of predominately 1970s/1980s properties. The area has direct access via a series of public paths off Abbotsbury Close, Bridport Close, Sturminster Close and Fontmell Close to the Sowe Valley/Dorchester Way open space.

Landscape designations

- 7.5.7. There are no national or local landscape designations within the study area.
- 7.5.8. Coombe Abbey Grade II* Registered Park and Garden is located within the Coombe Country Park and borders the eastern boundary of the Scheme (see Figure 7.1 of Volume 2). There is very limited potential intervisibility due to screening by a thick woodland belt along Coombe Country Park boundary (see ZTV included on Figure 7.2 of Volume 2).
- 7.5.9. The Scheme and study area is located within the Green Belt. The Warwickshire County Council Green Belt Study (January 2009) considered parts of the landscape surrounding Coventry. Green Belt parcels C4d, C5c, C6c and C23b

are located within the Scheme study area. This report was superseded by the 2015, Joint Green Belt Study by LUC on behalf of six West Midlands Councils (Coventry City Council, North Warwickshire Borough Council, Nuneaton and Bedworth Borough Council, Rugby Borough Council, Stratford-on-Avon District Council and Warwick District Council). The aim of the study was to assess the Green Belt against the five purposes of Green Belts, as set out in the NPPF. Green Belt parcels C6 and BW1 are located within the Scheme study area. The landscape and visual impact assessment will in due course consider effects on visual amenity within the Green Belt and effects on its open character.

- 7.5.10. Listed Buildings, Schedule Monuments and Conservation Areas are heritage assets; effects on their environment and or setting is discussed within Chapter 6, Cultural heritage.

National trails/Public Rights of Way/Long distance walking routes

- 7.5.11. There is a limited network of public paths within and beyond the 1km study area (as shown on Figure 7.2 of Volume 2). These include:

- Centenary Way Long Distance Path
- Public Right of Way (PRoW) no.R75X at Walsgrave Hill
- Local footpaths within: Sowe Valley Footpath, Dorchester Way open space and Gainford Rise open space, near Smite Brook

Visual context

- 7.5.12. The existing A46 (Coventry Eastern Bypass) is located within a landform cutting, resulting in limited visibility due to landform and virtually continuous woodland belt along both sides of the road with occasional gaps allowing for glimpsed views. A high voltage overhead power line crosses the study area in a north-south alignment, the main detracting visual feature of the study area.
- 7.5.13. Except for Walsgrave Hill, which is slightly elevated (92 AOD), north-east of the A46 Walsgrave junction; landform generally is largely flat with views comprising of arable fields with limited boundaries. Views north-west of the Scheme, towards the residential edge of Walsgrave and Hungerley Hall Farm, are blocked or partially screened due to woodland belt along River Sowe. University Hospital Coventry is four/five storeys tall with views potentially available from the upper storeys of the hospital towards the existing A46 corridor as part of the wider landscape. Due to continuous woodland belt on both sides of the road and topography, views south of A46 Walsgrave junction are restricted or limited in the direction of surrounding residential area of Binley, south-west of the Scheme or Coombe Country Park south-east.

7.6. Potential impacts

7.6.1. The landscape and visual assessment of the final Scheme design will describe the likely alterations in landscape character and visual amenity in comparison to the baseline conditions. The following provides a preliminary summary of the key issues and effects that are anticipated at this stage in the ongoing iterative design and assessment process.

ZTV

7.6.2. Figure 7.2 of Volume 2 provides a ZTV based on the preliminary Scheme design. This identifies the areas from which the Scheme is likely to be visible. The ZTV has been generated using 1m resolution Digital Surface Model (DSM) data which is made freely available by the Environment Agency (<https://www.data.gov.uk/dataset/f0db0249-f17b-4036-9e65-309148c97ce4/national-lidar-programme>). Use of this DSM data means that the ZTV reflects the screening effects of vegetation, buildings and other structures. The viewer height for each ZTV has been taken as 1.6m in accordance with GLVIA 3 best practice guidance.

7.6.3. The ZTV comprises two layers of information. The ZTV for the proposed road (represented in blue) is based on points at 4m above the proposed carriageway level at 20m intervals along the road. The ZTV for the proposed lighting columns (represented in pink) is based on points positioned 10m (current understanding) above the proposed carriageway level around the proposed roundabouts. This picks up potential areas of additional visibility associated with lighting around the proposed elevated junction.

Landscape receptors

7.6.4. The landscape receptors are the project landscape character areas which may potentially be affected by the introduction of the Scheme. Both the character and quality of the area within the draft Order Limits and wider study area is considered.

7.6.5. Table 7-1 considers the sensitivity of both the published and the local project landscape character areas within the study area to a Scheme of the type proposed. The extent of each PLCA is identified by Figure 7.1 of Volume 2.

Table 7-1 Landscape receptors and sensitivity to the Scheme

Name	Sensitivity to Scheme
PLCA 1 - Walsgrave Hill and Valley including Hungerley Hall Farm	<p>Medium</p> <p>The landscape is of medium value due to the local recreational and agricultural resources present. Despite highway infrastructure being an existing feature in landscape, the susceptibility of the PLCA would be</p>

Name	Sensitivity to Scheme
	high due to the potential changes in PLCA baseline character as a result of road Scheme design alterations in alignment including a grade separated junction and associated infrastructure.
PLCA 2 - Coombe Country Park and Old Lodge Farm	<p>High</p> <p>This PLCA is of high value as it contains a registered historic landscape, and the immediate surrounding landscape is important to how the location is perceived. As the Scheme and study area sits within the locality of Coombe Country Park any changes the local landscape would potentially have impacts upon the character of the area. As such, susceptibility of the PLCA would be high.</p>
PLCA 3 – Gainford Rise open space (Smite Brook) and Binley (Coventry East)	<p>Low</p> <p>The landscape is of low value as an urban fringe area of predominantly residential/out of town retail character. As highway infrastructure is a common feature in the urban landscape, the susceptibility of the PLCA would also be low due to the limited potential changes in PLCA character.</p>
PLCA 4 – Sowe Valley/Dorchester Way (Coventry East)	<p>Low</p> <p>The landscape is of low value as an urban fringe area of predominantly residential/out of town retail character. As highway infrastructure is a common feature in the urban landscape, the susceptibility of the PLCA would also be low due to the limited potential changes in PLCA character.</p>

Visual receptors

7.6.6. Visual receptors are people who would be affected by changes in views or visual amenity at different places, and they are usually grouped by what they are doing at that place (residents, footpath users, recreational users, and motorists). The key visual receptors within the study area that could be subject to significant visual effects include:

- residential receptors at Walsgrave and Binley including Hungerley Hall Farm
- recreational receptors at Coombe Country Park including Coombe Pool
- recreational receptors using the footpaths along:
 - Sowe Valley
 - Dorchester Way open space
 - PRoW no.R75X at Walsgrave Hill
 - Gainford Rise open space (near Smite Brook)
 - Centenary Way Long Distance Path, close to Coombe Country Park
 - Clifford Bridge Road at the roundabout with the B4082
- motorists at the roundabout junction between B4082 and Clifford Bridge Road

- 7.6.7. It is considered that there are no 'key' places of work or businesses in the study area which merit highlighting at this PEIR stage. Road and business users are generally not regarded as 'key' visual receptors as they are generally categorised as low sensitivity and it is unlikely that they would be subject to significant visual effects. For completeness, it is likely that the final ES will contain some brief information on low sensitivity receptors.
- 7.6.8. Due to the building height of the hospital (four to five storeys) and its proximity to the Scheme, views are potentially available from the upper storeys of the existing A46 and subsequently the Scheme. Any changes in views would be seen as part of the wider landscape and in the context of the A46 already present. Hospital users are considered to be low sensitivity as an indoor place of work and due to the temporary or short-term nature of patient stays. As such, significant visual effects on hospital users (whether employees or patients) are not anticipated.

Representative viewpoints

- 7.6.9. The visual assessment of the final Scheme design will in due course be informed by the detailed assessment of a set of representative viewpoints following further consultation. Eleven representative viewpoints (refer to Figure 7.2 of Volume 2) have been proposed to consultees but have yet to be agreed; therefore, not yet been photographed. Both summer and winter photography will be undertaken. This chapter of the PEIR nevertheless provides general preliminary consideration of the likely visual effects upon the proposed locations.
- 7.6.10. The majority of the views from the proposed represented viewpoints are screened in some way by intervening vegetation and differences in landform. The proposed representative viewpoints are presented below in Table 7-2 along with their sensitivity to the Scheme.

Table 7-2 Proposed representative viewpoints (VP) and their sensitivity to the Scheme.

VP No.	Name	Sensitivity to Scheme
1	Recreational users of public path to Coombe Country Park/PRoW R75x and residential receptors at Farber Road/Barrow Close, Walsgrave.	High Footpath and residential receptors will take an active interest in views of the surrounding landscape.
2	Recreational users along the PRoW R75x at Walsgrave Hill.	High Users of footpath linking to Centenary Way will take an active interest in views of the surrounding landscape.
3	Recreational users along the section of Centenary Way close to Coombe Country Park.	High As a named/promoted route, footpath users will take an active interest in views of the surrounding landscape.
4	Recreational users of Sowe Valley and Dorchester Way open space.	Medium Recreational users of this incidental landscape buffer public space will take some interest in views of the surrounding landscape.
5	Recreational users of Sowe Valley and residential receptors off northern end of Dorchester Way, Walsgrave - Abbotsbury Close/Bridport Close.	High Residential and recreational receptors will take an active interest in views of the surrounding landscape.
6	Recreational users of Sowe Valley and residential receptors off southern end of Dorchester Way, Walsgrave - Sturminster Close and Fontmell Close.	High Recreational and residential receptors will take an active interest in views of the surrounding landscape.
7	Recreational users of Gainford Rise open space by Smite Brook and residential receptors off northern end of Royston Close, Faygate Close and Gainford Rise.	High Residential and recreational receptors will take an active interest in views of the surrounding landscape.
8	Recreational users of Gainford Rise open space by Smite Brook off Royston Close and Gainford Rise.	Medium Recreational users of this incidental landscape buffer public space will take some interest in views of the surrounding landscape.
9	Recreational users of Gainford Rise open space and residential receptors off Valencia Road, Binley.	High Residential and recreational receptors will take an active interest in views of the surrounding landscape.
10	Recreational receptors at Coombe Country Park	High Recreational users will take an active interest in views of immediate surrounding landscape and further afield as part of the wider Coombe Country Park locale.
11	Principally motorist receptors at roundabout junction between Clifford Bridge Road and B4082	Low Limited interest in visual surroundings.

7.7. Design, mitigation and enhancement measures

- 7.7.1. Mitigation measures will be integrated into the design of the Scheme to reduce identified landscape and visual effects. Mitigation design proposals will utilise Highways England (2020) DMRB LD 117 Landscape Design standard. Any effects which remain after implementation of mitigation design proposals are referred to as residual effects.
- 7.7.2. An environmental masterplan and planting design will be produced as part of the DCO application in due course in order to develop a robust landscape mitigation strategy. Mitigation measures will seek to reduce impacts during both construction and operation phases and residual effects will be presented in the ES.
- 7.7.3. Based on the preliminary assessments undertaken to date, an Indicative Environmental Masterplan for Consultation has been developed (Figures 7.3 to 7.7 in Volume 2 of the PEIR). This indicative masterplan identifies the main areas where planting is likely to be required to mitigate potential landscape and visual effects and to address ecological objectives.

Embedded (design) mitigation

- 7.7.4. The embedded landscape and visual mitigation that is likely to be required is shown by the Indicative Environmental Masterplan for Consultation (Figures 7.3 to 7.7 in Volume 2 of the PEIR). The masterplan addresses the following potential issues.
- 7.7.5. General landscape mitigation principles:
- Protection of existing retained vegetation during construction.
 - Restoration of existing landscape pattern including hedgerows along field boundaries, use of trees and shrub planting to create screening to the Scheme in line with local landscape character.
 - Reinstatement planting, using local native species to aid landscape integration and provide biodiversity benefits, as well as visual screening where required.
- 7.7.6. Integration with each project landscape character area:
- PLCA 1 - Walsgrave Hill and Valley including Hungerley Hall Farm:
 - Along the Scheme's eastern boundary, mitigation proposed includes woodland belts up the roadside embankments near the grade separated dumbbell junction. Along the Scheme boundary, hedge planting to reinstate field pattern lost along with isolated trees along the road verge which tie into the wider former parkland estate character near to Coombe

Country Park. Woodland belts along the slip lane along the western boundary of the Scheme near Hungerley Hall Farm will reflect existing baseline landscape character.

- PLCA 2 - Coombe Country Park and Old Lodge Farm:
 - Planting of woodland belts and field hedgerows along the eastern embankments and verges to reinstate the temporary landscape character lost during construction.
- PLCA 3 - Gainford Rise open space (Smite Brook) and Binley (Coventry East):
 - There are limited interventions in this area afforded by the Scheme, mitigation measures will reinstate landscape character lost along the roadside during construction, predominantly woodland belt planting.
- PLCA 4 - Sowe Valley/Dorchester Way (Coventry East):
 - Along the Scheme western boundary, mitigation planting in keeping with the existing baseline landscape character will aid assimilation. This includes woodland belts along the slip lane and grade separated dumbbell junction embankments; plus, hedge planting to reinstate field pattern along the embankments base.

7.7.7. General visual mitigation principles during construction:

- Adverse visual effects would be associated with the presence of construction activity, machinery and associated infrastructure and the loss of vegetation.
- Vegetation clearance has the potential to open views to visual receptors described under potential construction impacts, resulting in adverse impacts.
- There is also potential for additional impacts associated with construction compounds, security and task lighting, and haul routes. The locations of such elements are yet to be determined.

7.7.8. Locations requiring specific visual mitigation/screening:

- Residential receptors and recreational users along the eastern urban edge of Coventry encompassed by representative viewpoints:
- Northern end of Dorchester Way, Walsgrave - Abbotsbury Close/Bridport Close.
- Southern end of Dorchester Way, Walsgrave - Sturminster Close and Fontmell Close.
- Sowe Valley and Dorchester Way open space.
- Mitigation planting would strengthen the glimpsed views through gaps in the intervening vegetation along the River Sowe and existing woodland belt along the A46. Woodland belt along the slip lane up to the grade separated dumbbell junction embankments will reinstate screening lost through the Scheme.

- Hungerley Hall Farm, as the closest residential residence, specific mitigation planting consisting of woodland planting along the slip lane embankments adjacent and northwards aid screening views north towards the grade separated dumbbell junction. If an acoustic barrier is provided at Hungerley Hall Farm mitigation planting would be provided to aid visual screening of the structure.
- Recreational receptors on the footpath PRow R75x at Walsgrave Hill and Centenary Way Long Distance Path:
- Mitigation proposed includes woodland belts up the roadside embankments including the grade separated dumbbell junction. Western edge mitigation will include infill woodland planting and groups of trees and isolated trees along the embankments this will help screen views of the A46.
- Recreational visual receptors at Coombe Country Park:
- Reinstatement infill woodland planting cover lost due to construction, in order to maintain a landscape buffer between the Scheme and the parkland. The woodland block north of Coombe Country Park, as shown on the Indicative Environmental Masterplan for Consultation will increase visual screening and integration.

Essential mitigation

- 7.7.9. There is no essential landscape and visual mitigation identified at the time of writing. Essential mitigation will be identified and detailed in the ES.

Enhancement

- 7.7.10. Through further consultation and design iteration, enhancement measures will be sought, those of relevance will be described and assessed in the ES.

7.8. Assessment of likely significant effects

- 7.8.1. Based on the preliminary assessments undertaken thus far, it is anticipated that overall, in landscape and visual terms, there would be no major adverse significant effects caused by the Scheme with the proposed mitigation measures in place, as depicted on the Indicative Environmental Masterplan for Consultation.
- 7.8.2. Visitors to Coombe Abbey Registered Park and Garden and Coombe Country Park are predicated not to be impacted significantly by the Scheme in terms of both landscape and visual effects due to intervening landform and vegetation. The eastern edge of Coventry would in the long-term experience limited changes in both landscape and visual baseline, therefore no significant adverse effects are anticipated.

Landscape

7.8.3. Overall, it is currently predicted that there would be no significant effects on landscape character. It is anticipated that in the long-term the most substantial adverse landscape effects would likely be on:

- PLCA 1 - Walsgrave Hill and Valley including Hungerley Hall Farm, due to the proximity of the A46, especially the grade separated junction and associated infrastructure and potential changes in the landscape surrounding buildings at Hungerley Hall Farm in close proximity to the slip road.
- PLCA 4 - Sowe Valley/Dorchester Way, due to the proximity of the A46, especially the grade separated junction and associated infrastructure.

7.8.4. However, these landscape effects would be reduced with the mitigation measures as outlined above in section 7.7.4 and 7.7.5 of this chapter.

Visual

7.8.5. Overall, it is predicted that there would be no significant visual effects. It is anticipated that in the long-term the most substantial adverse visual effects would likely be on:

- residential receptors along the edge of Coventry, Walsgrave near Farber Road/Barrow Close and Dorchester Way
- recreational receptors along the PRow R75x at Walsgrave Hill, a section of Centenary Way close to Coombe Country Park, Sowe Valley, and Dorchester Way open space

7.8.6. However, these visual effects would be reduced with specific mitigation measures as outlined above in section 7.7.6 and 7.7.7 of this chapter.

7.9. Conclusions

7.9.1. This chapter presents a preliminary review of the existing baseline landscape and visual environment and identifies potential impacts that the Scheme could have upon the surrounding landscape and upon visual receptors. Assessment of the significance of landscape and visual effects follows best practice for the assessment of highway schemes determined by DMRB LA107.

7.9.2. Majority of the scheme would be online or in close proximity to the existing A46 alignment, therefore lessening the potential impacts upon the wider landscape and surrounding visual receptors.

Based on the preliminary assessments undertaken thus far, it is anticipated that overall, in landscape and visual terms, there would be no major adverse significant effects caused by the Scheme with the proposed mitigation measures in place, as depicted on the Indicative Environmental Masterplan for Consultation.

8. Biodiversity

8.1. Introduction

8.1.1. This chapter presents the preliminary findings of the ecological impact assessment (EclA) for the Scheme. This comprises a review of the ecological baseline (including habitats, species and designated sites) within the draft Order Limits and identification of the potential impacts of the Scheme upon ecological features. The chapter also outlines proposed design mitigation measures to help mitigate potential impacts on ecological features.

Stakeholder engagement

8.1.2. During the options selection stage consultation was undertaken with Natural England in September 2022 to present the Scheme. At the time of writing, there is an application in progress for Natural England's Discretionary Advice Service to discuss the potential impacts of the Scheme on ecological features.

8.1.3. In addition to Natural England, detailed consultations will be required with various statutory bodies including Environment Agency, Coventry City Council, Rugby Borough Council, Warwickshire County Council, Warwickshire Wildlife Trust and the RSPB with their responses included in the Environmental Statement (ES).

8.1.4. Consultation with the following groups may also be required to fully develop robust mitigation measures:

- The Barn Owl Trust
- Warwickshire Biological Records Centre (WBRC)
- Warwickshire Bat Group
- Warwickshire Badger Group

Legislative and policy framework

8.1.5. The construction and operational activities must comply with UK nature conservation legislation, and with national and local biodiversity policies. The key national legislation and policies which influence the ecology and nature conservation assessments can be found within this section.

Legislation

Conservation of Habitats and Species Regulations 2017 (as amended) 'the Habitats Regulations'

8.1.6. The Habitats Regulations provide protection for European Protected Species (EPS) and deliver measures to establish and maintain a network of sites protecting habitats which are valuable in themselves and for the species they

support. These sites form a network across Europe known as Natura 2000 that is domestically now known as the National Site Network (NSN). Within the UK, this network consists of Special Protection Areas (SPAs) and Special Areas of Conservation (SACs), 'candidate' SACs (cSACs), 'possible' SACs (pSACs), and 'potential' SPAs (pSPAs). Ramsar sites (wetlands of international importance) are also treated equally within this Habitat Regulations framework.

Wildlife and Countryside Act 1981 (as amended) 'the 1981 Act'

8.1.7. The 1981 Act is the principal means of legislative protection for wildlife and the countryside in England, Wales and Scotland. It is divided into 17 Schedules which detail the protection of birds, some animals and plants, Public Rights of Way (PROWs), National Parks, and the designation of protected areas including, but not limited to, Sites of Special Scientific Interest (SSSI).

Hedgerow Regulations 1997

8.1.8. This legislation sets the criteria for determining the importance of hedgerows and provides controls for the protection of "important" hedgerows.

Protection of Badgers Act 1992

8.1.9. This legislation sets out the criteria for activities and behaviours that constitute an offence in relation to badgers to support their conservation.

Countryside and Rights of Way Act 2000 ('the CROW Act')

8.1.10. The CROW Act, amongst other elements, details further measures for the management and protection of Sites of Special Scientific Interest (SSSI) and strengthens wildlife enforcement legislation.

The Environment Act 2021

8.1.11. The Environment Act provides a legal framework for environmental governance and makes provision for targets, plans and policies for improving the natural environment. Section 99 and Schedule 15 of the Environment Act relate to the provision of a biodiversity net gain (BNG) assessment for nationally significant infrastructure projects (NSIPs). However, these sections of the Environment Act have not yet come into force, and there is currently no relevant secondary legislation in force. Similarly, the National Networks National Policy Statements (NNNPS) has not yet been updated to include a requirement to provide BNG or to include a "biodiversity gain statement". As such, it is not yet a legislative or policy requirement to provide BNG in new nationally significant developments.

8.1.12. Although legislation in respect of the BNG requirement for NSIPs is not yet in force, National Highways is already incorporating the concept of BNG into its design for the Scheme.

The Natural Environmental and Rural Communities (NERC) Act 2006

- 8.1.13. The NERC Act, 2006 requires public bodies, including local authorities, 'to have regard to the conservation of biodiversity in England' when carrying out their normal functions. Under Section 41 of this Act a list of species and habitats of 'principal importance to biodiversity within England' was drawn up which acts as an aid to guide public bodies in implementing their duty. These are referred to as 'priority habitats' and 'priority species' within this assessment.
- 8.1.14. Other legislation relevant to the biodiversity aspect includes the following:
- Wild Mammals (Protection) Act 1996
 - Animal Welfare Act 2006
 - The Eels (England and Wales) Regulations 2009
 - Salmon and Freshwater Fisheries Act 1975 (as amended)
 - The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017

National policy

National Policy Statement for National Networks (NPSNN)

- 8.1.15. The *National Policy Statement for National Networks* (NPSNN) (Department for Transport (DfT), 2014) sets out the Government's policies to deliver the development of Nationally Significant Infrastructure Projects (NSIPs) on the national road and rail networks in England. The Secretary of State (SoS) uses the NPSNN as the primary basis for making decisions on Development Consent Order (DCO) applications.
- 8.1.16. Key policy from the NPSNN relevant to biodiversity is set out below:
- Paragraph 5.25 – *"As a general principle, and subject to the specific policies below, development should avoid significant harm to biodiversity and geological conservation interests, including through mitigation and consideration of reasonable alternatives. The applicant may also wish to make use of biodiversity offsetting in devising compensation proposals to counteract any impacts on biodiversity which cannot be avoided or mitigated. Where significant harm cannot be avoided or mitigated, as a last resort, appropriate compensation measures should be sought."*
 - Paragraph 5.26 – *"In taking decisions, the Secretary of State should ensure that appropriate weight is attached to designated sites of international, national and local importance, protected species, habitats and other species of principal importance for the conservation of biodiversity, and to biodiversity and geological interests within the wider environment."*
- 8.1.17. As a general principle, and subject to specific policies outlined in 5.27 – 5.35 of the NPSNN, development should avoid significant harm to biodiversity and

geological conservation interests, including through mitigation and consideration of reasonable alternatives. In taking decisions, the Secretary of State should ensure that appropriate weight is attached to designated sites of international, national and local importance, protected species, habitats (including irreplaceable habitats such as ancient woodland and ancient and veteran trees) and priority species for the conservation of biodiversity, and to biodiversity and geological interests within the wider environment. Consent should not be granted where it cannot be shown that the harm to such sites, species, habitats and interests is clearly outweighed by the national need for and benefits of the development and, in the case of irreplaceable habitats, that their loss is unavoidable.

National Planning Policy Framework (NPPF) 2023

8.1.18. The NPPF requires local authorities in England to take measures to:

- Conserve and enhance biodiversity
- Protect habitats and species from further decline
- Protect the natural environment from the adverse effect of development
- Refuse planning permission for development if significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated or compensated for.

8.1.19. In addition, NPPF paragraph 174 states that “Planning policies and decisions should contribute to and enhance the natural and local environment by: [...]

- Minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures

8.1.20. NPPF paragraph 180 states that “*When determining planning applications, local planning authorities should apply the following principles: [...]*

- *Development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate.”*

Planning practice guidance (PPG)

8.1.21. PPG includes a dedicated section on the natural environment (2019). It explains key issues in implementing policy to protect and enhance the natural environment, including local requirements. It notes that:

8.1.22. *“Information on biodiversity and geodiversity impacts and opportunities needs to inform all stages of development.” “Development plans and planning decisions have the potential to affect biodiversity or geodiversity outside as well as inside relevant designated areas.”*

UK Post-2010 Biodiversity Framework

8.1.23. The country strategies for biodiversity and the environment in each of the four countries of the United Kingdom underpin the UK Post-2010 Biodiversity Framework. The UK Biodiversity Framework sets out the overarching vision, strategic goals and priority activities for the UK’s work towards international biodiversity targets. The Framework’s overall vision is that *“by 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people”*.

8.1.24. Objectives include, but are not limited to:

- Halt the loss of biodiversity and continue to reverse previous losses through targeted actions for species and habitats.
- Restore and enhance biodiversity in urban, rural and marine environments through better planning, design and practice.
- Develop an effective management framework that ensures biodiversity is considered in wider decision making.

25 Year Environment Plan

8.1.25. The Department for Environment, Food & Rural Affairs (Defra) 25 Year Environment Plan (2018) is a policy paper setting out what Government intends to do to improve the environment, including restoring and safeguarding wildlife habitats. This plan is being treated as the first Environmental Improvement Plan required under the Environment Act 2021. The plan aims to achieve a growing and resilient network of land, water and sea that is richer in plants and wildlife than at present. Of relevance to this Scheme are those elements of the plan relating to land and freshwater networks which the scheme will address by contributing towards:

- Restoring 75% of the UK's one million hectares of terrestrial and freshwater protected sites to favourable condition, securing their wildlife value for the long term
- Creation or restoration of 500,000 hectares of wildlife-rich habitat outside the protected site network, focusing on priority habitats as part of a wider set of land management changes
- Action to recover threatened, iconic or economically important species of animals, plants and fungi, and where possible prevention of human induced extinction or loss of known threatened species in England

- An increase in the extent of woodland in England in line with our aspiration of 12% cover by 2060: this would involve planting 180,000 hectares by end of 2042

Local policy

Coventry City Council Local Plan (2011 – 2031)

8.1.26. Environmental policies relating to biodiversity and policies from the Local Plan relevant to the Scheme include:

- Policy GE1 related to green infrastructure. New development proposals should make provision for green infrastructure to ensure that such development is integrated into the landscape and contributes to improvements in connectivity and public access, biodiversity, landscape conservation, design, archaeology and recreation. Development must respect the importance of conservation, improvement and management of green infrastructure in order to complement and balance the built environment. A strategic network of green infrastructure already exists in the city, connecting natural heritage, green space, biodiversity, historic landscapes or other environmental assets, together with links to adjacent districts in Warwickshire and Solihull. This strategic network will be safeguarded and enhanced by:
 - Investing in enhancement and restoration where opportunities exist, and the creation of new resources where possible, such as linking green infrastructure to other forms of infrastructure
 - Ensuring that a key aim of green infrastructure is the maintenance and improvement and expansion of biodiversity.
- Policy GE3: Biodiversity, Geological, Landscape and Archaeological Conservation. Sites of Special Scientific Interest (SSSIs), Local Nature Reserves (LNRs), Ancient Woodlands, Local Wildlife and Geological Sites will be protected and enhanced. Proposals for development on other sites, having biodiversity or geological conservation value, will be permitted provided that they protect enhance and/or restore habitat biodiversity. Development proposals will be expected to ensure that they:
 - lead to a net gain of biodiversity, where appropriate, by means of an approved ecological assessment of existing site features and development impacts
 - protect or enhance biodiversity assets and secure their long term management and maintenance
 - avoid negative impacts on existing biodiversity
 - preserve species which are legally protected, in decline, are rare within Coventry or which are covered by national, regional or local Biodiversity Action Plans.
 - 2. Where this is not possible, adequate mitigation measures must be identified. If mitigation measures are not possible on site, then compensatory measures involving biodiversity offsetting will be considered, but only in exceptional circumstances.

- 3. Biodiversity will be encouraged particularly in areas of deficiency, in areas of development and sustainable urban extensions, and along wildlife corridors. Opportunities will be sought to restore or recreate habitats, or enhance the linkages between them, as part of the strategic framework for green infrastructure. Protected Species, and species and habitats identified in the Local Biodiversity Action Plan (LBAP), will be protected and conserved through a buffer or movement to alternative habitat. Identified important landscape features, including Historic Environment assets, trees protected by preservation orders, individual and groups of ancient trees, ancient and newly planted woodlands, ancient hedgerows and heritage assets of value to the locality, will be protected against loss or damage.

8.1.27. Policy GE4: Tree Protection – Part 1 and 2:

- “1. Development proposals will be positively considered provided:
 - a. there is no unacceptable loss of, or damage to, existing trees or woodlands during or as result of development, any loss should be supported by a tree survey
 - b. trees not to be retained as a result of the development are replaced with new trees as part of a well designed landscape Scheme; and
 - c. existing trees worthy of retention are sympathetically incorporated into the overall design of the Scheme including all necessary measures taken to ensure their continued protection and survival during construction.
- 2. Development proposals that seek to remove trees that are subject to ‘Protection’, without justification, will not be permitted.”
- Policy DE1 ‘Ensuring High Quality Design’ relates to Councils requirements to “*conserve, restore or enhance biodiversity*”; and should be considered within the development of design proposals for the Scheme.
- Policy GE1 ‘Green Infrastructure’ states ‘New development proposals should make provision for green infrastructure to ensure that such development is integrated into the landscape and contributes to improvements in connectivity and public access, biodiversity, landscape conservation, design, archaeology and recreation.’

Rugby Borough Council Local Plan 2011 – 2031

8.1.28. Policy NE1: Protecting Designated Biodiversity and Geodiversity Assets:

- Development will be expected to deliver a net gain in biodiversity and be in accordance with the mitigation hierarchy.
- Development that is likely to result in an adverse effect on the integrity of any European site (either alone or in combination), will not be permitted unless:
 - there are no alternative solutions
 - there are imperative reasons for overriding public interest

- adequate compensatory measures can be taken to ensure the overall coherence of Natura 2000 is protected.
- Development affecting nationally important Sites of Special Scientific Interest (SSSIs) either directly or indirectly will only be permitted in exceptional circumstances where the benefits of development clearly outweigh the impacts on the site or species.
- Development likely to result in the loss, deterioration, degradation or harm to habitats or species of local importance to biodiversity, geological or geomorphological conservation interests, either directly or indirectly, will not be permitted for Local Nature Reserves (LNRs); Local Wildlife Sites (LWS), Local Geological Sites (LGS), European and UK protected species, or Biodiversity Action Plan habitats unless:
 - the need for, and benefits of, the development in the proposed location outweighs the adverse effect on the relevant biodiversity interest. All Development proposals impacting on local wildlife sites will be expected to assess the site against the 'Green Book' (The Green Book: Guidance for the Selection of Local Wildlife Sites in Warwickshire, Coventry and Solihull (2015) Local Wildlife Sites Project: Habitat Biodiversity Audit for Warwickshire.) criteria to determine the status of the site and to ascertain whether the development clearly outweighs the impacts on the site
 - it can be demonstrated that it could not reasonably be located on an alternative site that would result in less or no harm to the biodiversity interest
 - measures can be provided (and secured through planning conditions or legal agreements), according to the mitigation hierarchy as set out above. The level of protection and mitigation should be proportionate to the status of the habitat or species and its importance individually and as part of a wider network
- Planning permission will be refused for development resulting in the loss or deterioration of ancient woodland, and/or the loss of aged or veteran trees found outside of ancient woodland unless the need for, and benefits of, the development in that location clearly outweighs the loss. All development proposals in the proximity of ancient woodland shall incorporate buffers having regard to Natural England's standing advice.
- All proposals likely to impact on the sites noted above will require an Ecological Assessment. The Ecological Assessment shall include due consideration of the importance of the natural asset, the nature of the measures proposed (including plans for long term management) and the extent to which they avoid and reduce the impact of the development.

Warwickshire, Coventry and Solihull Local Biodiversity Action Plan 2005

8.1.29. The Warwickshire, Coventry and Solihull Biodiversity Action Plan outlines the approach to biodiversity and sets out the habitats and species of conservation concern in the county.

8.2. Assessment methodology

8.2.1. A qualitative ecological assessment will be undertaken based upon the Design Manual for Roads and Bridges (DMRB) LA 108 Biodiversity (Highways England, 2020a) and the Chartered Institute of Ecology and Environmental Management's (CIEEM's) Guidelines for Ecological Impact Assessment for the UK and Ireland (2018). Desk studies and ecological surveys to inform the assessment would be undertaken in accordance with the DMRB LD 118 Biodiversity Design (Highways England, 2020b) and CIEEM's Guidelines for Preliminary Ecological Appraisal (2017), with surveys used to inform this PEIR and the ES updated if appropriate in accordance with CIEEM's Advice Note on the Lifespan of Ecological Reports & Surveys (2019).

8.2.2. The assessment which has been undertaken to inform this PEIR includes:

- establishment of the baseline through ecological survey
- a clear statement of the limitations of the baseline studies
- identification of potential impacts of the Scheme in the absence of mitigation
- an assessment of potential significant effects, accounting for mitigation, and characterisation of effects as neutral, adverse or beneficial
- recommendations for design intervention and mitigation

8.2.3. The assessment which will be undertaken and presented within the ES will include:

- an update to the screening exercise and the Habitats Regulations Assessment No Significant Effects Report (Highways England, 2021) previously undertaken to inform the options selection stage for the preliminary design stage and the DCO application
- consultation with statutory bodies and local groups to discuss the key ecological considerations for the Scheme
- a clear statement of the limitations of the baseline studies
- the results of barn owl *Tyto alba* (July 2023), wintering birds (October 2022, October 2023 – March 2024), and bat hibernation (January and February 2024) surveys to inform the baseline for these ecological features
- the results of badger *Meles meles* camera monitoring (May to August 2023) to determine badger use of the Hungerley Hall Farm accommodation bridge

- consideration of the future baseline with regard to climate change
- an assessment of the ecological impacts of the Scheme, accounting for any mitigation measures, including embedded mitigation, will be undertaken in the form of an EclA
- the EclA will also determine whether effects are ecologically significant, which includes determining the geographic level of importance of each of the features (international, regional, local etc), the characterisation of the effect (direct/indirect, frequency, reversibility etc) and whether the effect is significant or not
- recommendations for design intervention, mitigation and enhancement of biodiversity
- an assessment of residual significance of effects after mitigation

8.2.4. The relative importance of each ecological feature has been established in accordance with the guidance in Table 8-1. The relative importance of ecological features detailed within this PEIR is subject to change dependent upon any new survey data and consultation responses.

Table 8-1: Guidance for determining the importance of ecological features

Resource Importance		Description
International or European value	Sites	National Site Network sites including: Special Protection Areas (SPAs); Possible SPAs (pSPAs); Special Conservation Areas (SACs); Candidate SACs (cSACs) or Possible SACs (pSACs); Sites of Community Importance (SCIs) and Wetlands of International Importance (Ramsar sites). Biogenetic Reserves, World Heritage Sites and Biosphere Reserves. Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such
	Habitats	N/A
	Species	Resident, or regularly occurring, populations of species which may be considered at an International or European level where: <ul style="list-style-type: none"> - the loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale - the population forms a critical part of a wider population at this scale - the species is at a critical phase of its life cycle at this scale
UK or national value	Sites	Designated sites including: Sites of Special Scientific Interest (SSSIs); Marine Protected Areas (MPAs) including Marine Conservation Zones (MCZs); and National Nature Reserves (NNRs). Areas which meet the published selection criteria e.g., Joint Nature Conservation Committee (JNCC) (2019) for those sites listed above but which are not themselves designated as such.
	Habitats	Areas of key/priority habitats identified in the UK Biodiversity Action Plan (BAP), including those published in accordance with Section 41

Resource Importance		Description
		of the Natural Environment and Rural Communities (NERC) Act (2006) and those considered to be of principal importance for the conservation of biodiversity.
	Species	Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level where: <ul style="list-style-type: none"> - the loss of these populations would adversely affect the conservation status or distribution of the species at this scale - the population forms a critical part of a wider population at this scale - the species is at a critical phase of its life cycle at this scale
Regional value	Sites	Non-statutory designated sites, including heritage coasts.
	Habitats	Areas of key/priority habitats identified in the Regional BAP (where available); areas of key/priority habitat identified as being of Regional value in the appropriate Natural Area Profile (or equivalent); and areas that have been identified by regional plans or strategies as areas for restoration or re-creation of priority habitats.
	Species	Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level and key/priority species listed within the BAP where: <ul style="list-style-type: none"> - the loss of these populations would adversely affect the conservation status or distribution of the species at this scale - the population forms a critical part of a wider population - the species is at a critical phase of its life cycle Species identified in regional plans or strategies
County or equivalent authority importance	Sites	Wildlife/nature conservation sites designated at a county (or equivalent) level, including: Sites of Nature Conservation Importance (SNCIs); County Wildlife Sites (CWS); Local Wildlife Sites (LWS); Local Nature Conservation Sites (LNCS); Sites of Importance for Nature Conservation (SINCs) and LNRs. Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such.
	Habitats	Areas of key/priority habitats identified in the Local BAP; and areas of habitat identified in the appropriate Natural Area Profile (or equivalent).
	Species	Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level where: <ul style="list-style-type: none"> - the loss of these populations would adversely affect the conservation status or distribution of the species across the County or Unitary Authority Area - the population forms a critical part of a wider population - the species is at a critical phase of its life cycle Species identified in county or equivalent authority area plans or strategies.
Local value	Sites	Wildlife/nature conservation sites designated at a local level, including: SNCIs; LWS; LNCS; SINCs; Sites of Local Nature Conservation Importance (SLNCIs) and LNRs.

Resource Importance		Description
	Habitats	Areas of habitat considered to appreciably enrich the habitat resource within the local context, including features of importance for migration, dispersal, or genetic exchange. Trees that are protected by Tree Preservation Orders (TPOs).
	Species	Populations/communities of species considered to appreciably enrich the habitat resource within the local context (such as veteran trees), including features of value for migration, dispersal or genetic exchange.

Source: DMRB LA 108, Table 3.11

- 8.2.5. Characterisation of ecological impacts will be undertaken in accordance with the DMRB LA 108 and will take into consideration whether the impact is positive or negative, permanent or temporary (the impact duration), reversible or irreversible, the extent/magnitude of the impact and the frequency and timing of the impact.
- 8.2.6. The level of impact on ecological features will be based on Table 8-2. As required by DMRB LA 108 (paragraph 3.11.1) the EclA will conclude the level of impact on biodiversity resources in accordance with CIEEM's Guidelines for EclA. The importance of the resource and the level of impact will be used to determine the significance of effect based on Table 8-3 and the principles of DMRB LA 104 Environmental Assessment and Monitoring (Highways England 2020).

Table 8-2: Level of impact and typical descriptions

Level of impact (change)		Typical description
Major	Adverse	Permanent/irreversible damage to a biodiversity resource. The extent, magnitude, frequency, and/or timing of an impact negatively affects the integrity or key characteristics of the resource.
	Beneficial	Permanent addition of, improvement to, or restoration of a biodiversity resource. The extent, magnitude, frequency, and/or timing of an impact positively affects the integrity or key characteristics of the resource.
Moderate	Adverse	Temporary/reversible damage to a biodiversity resource. The extent, magnitude, frequency, and/or timing of an impact negatively affects the integrity or key characteristics of the resource.
	Beneficial	Temporary addition of, improvement to, or restoration of a biodiversity resource. The extent, magnitude, frequency, and/or timing of an impact positively affects the integrity or key characteristics of the resource.
Minor	Adverse	Permanent/irreversible damage to a biodiversity resource. The extent, magnitude, frequency, and/or timing of an impact does not affect the integrity or key characteristics of the resource.

Level of impact (change)		Typical description
	Beneficial	Permanent addition of, improvement to, or restoration of a biodiversity resource. The extent, magnitude, frequency, and/or timing of an impact does not affect the integrity or key characteristics of the resource.
Negligible	Adverse	Temporary/reversible damage to a biodiversity resource. The extent, magnitude, frequency, and/or timing of an impact does not affect the integrity or key characteristics of the resource.
	Beneficial	Temporary addition of, improvement to, or restoration of a biodiversity resource. The extent, magnitude, frequency, and/or timing of an impact does not affect the integrity of key characteristics of the resource
No change		No observable impact, either positive or negative.

Source: DMRB LA 108, Table 3.11

Table 8-3: Description of the significance of effect categories

	Level of Impact					
		No change	Negligible	Minor	Moderate	Major
Resource Importance	International or European importance	Neutral	Slight	Moderate or large	Large or very large	Very large
	UK or national importance	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Regional importance	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	County or equivalent authority importance	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Local importance	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

Source: DMRB LA 108, Table 3.13

8.2.7. Where Table 8-3 includes two significance categories, evidence will be provided to support the reporting of a single significance category. Significant effects typically comprise effects that remain within the moderate, large or very large categories once mitigation has been taken into account.

- 8.2.8. The significance of the impacts will be considered during the following phases of the Scheme:
- Construction
 - Operation
- 8.2.9. The output of the assessment will be an ES chapter presenting the baseline conditions of the Scheme, the potential impacts of the Scheme, design interventions, evaluation of effect significance as well as robust and appropriate mitigation measures as required. An assessment of any residual effects will also be provided. Prior to the production of the ES, and where survey seasonal constraints allow, the ecological baseline will be updated in response to any changes to the draft Order Limits at the preliminary design stage. The results of updates to the ecological baseline will be presented within the ES. Where survey seasonal constraints do not allow for required updates prior to the ES, a precautionary approach will be applied to the EclA pertaining to those ecological features in the ES, and surveys will be undertaken within the next suitable season.

8.3. Assessment assumptions and limitations

- 8.3.1. Baseline surveys for roosting bats and barn owl were limited at one location preventing internal access to farm buildings and courtyards between buildings due to the health and safety concerns associated with the integrity of the structures. Discussions are ongoing regarding access to these buildings and if granted a full suite of surveys for bats and barn owl will be undertaken.
- 8.3.2. The baseline within the respective study areas (see Section 8.4) along the B4082 to the west of Smite Brook has not yet been fully established due to a change in the Scheme boundary at the options selection stage and the draft Order Limits used for this PEIR. Baseline surveys undertaken in 2022 did not include this area as at that time these areas were located outside of the Scheme boundary and have only recently been brought within the draft Order Limits. Due to seasonal restrictions on survey timings, it has not been possible to undertake all required surveys of these additional areas for use within this PEIR as described in paragraph 8.2.9 of this PEIR.

8.4. Study area

- 8.4.1. DMRB LA 108 details how the study area will vary in response to the draft Order Limits, the construction footprint and the Scheme's zone of influence (ZoI) on the ecological features. The draft Order Limits and relevant survey buffers for the ecological features will be referred to as the 'study area' throughout the remainder of this chapter. This combined with best practice guidance and

professional judgement means that the study area will include suitable buffers for all ecological features that have the potential to be impacted by the Scheme.

- 8.4.2. As part of an updated desk study a search for European sites (including SACs, Ramsar sites and SPAs up to 30km from the draft Order Limits was carried out to identify those sites where bats are a primary reason for designation, or where potential impact pathways are present with regard to birds. SACs, SPAs and Ramsar sites were identified up to 10km from the draft Order Limits and national and local statutory and non-statutory nature conservation designations (where information was available) were identified up to 2km from the draft Order Limits. Ancient woodland and priority habitats within 500m of the draft Order Limits have been searched for using MAGIC mapping (Defra, 2023).
- 8.4.3. Data has been purchased from WBRC in summer 2023 for non-statutory designated sites, protected and notable species and invasive species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) within 2km of the draft Order Limits. MAGIC mapping (Defra, 2023) has been reviewed to identify records of European protected species (EPS) mitigation licences within 2km of the draft Order Limits.
- 8.4.4. The following study areas for protected and notable species, with regards to their extension beyond the draft Order Limits, have been adopted to inform the ecological assessment at the preliminary design stage:
- Badger – 50m
 - Barn owl – 1.5km
 - Bats (roosting) – 50m
 - Breeding birds – 50m
 - Great crested newt (GCN) *Triturus cristatus* – 500m
 - Otter *Lutra lutra* – 200m
 - Water vole *Arvicola amphibius* – 200m
 - Wintering birds – 500m, including the Coombe Pool SSSI
- 8.4.5. Commuting and foraging bats have been assessed within the draft Order Limits where suitable habitat exists.
- 8.4.6. Reptiles and invasive non-native species have been assessed within the draft Order Limits only. However, with regards to invasive non-native species where these have been identified in habitats adjacent to the draft Order Limits during targeted species surveys they have been recorded.

- 8.4.7. Notable species on Section 41 of the Natural Environment and Rural Communities Act 2006 (hedgehog *Erinaceus europaeus* and brown hare *Lepus europaeus*) have been assessed within the draft Order Limits only.

8.5. Baseline conditions

- 8.5.1. This section outlines the ecological features (designations, habitats and species) that have the potential to be affected by the Scheme. The ecological constraints plan (Figure 8.1 of Volume 2) shows the baseline conditions detailed in this section with baseline limitations detailed in section 8.3 of this PEIR chapter. Importance of ecological features, in accordance with DMRB LA 108, is included in Table 8-8.
- 8.5.2. Information regarding internationally important designated sites within 10km of the draft Order Limits, nationally and locally important designated sites within 2km of the draft Order Limits, and ancient woodland and priority habitats within 500m of the draft Order Limits, has been informed via a desk study and a review of MAGIC (Defra, 2023).
- 8.5.3. The habitat baseline has been established following UK Habitat classification (UKHab) surveys undertaken between June and August 2022.
- 8.5.4. The baseline with regards to protected species has been established following protected species surveys undertaken primarily in 2022 with otter and water vole surveys undertaken in 2023. Surveys were undertaken for the following species and species groups:
- Badger
 - Barn owl
 - Bats
 - Breeding birds
 - GCN
 - Otter
 - Water vole
- 8.5.5. Table 8-4 details the survey guidance used to inform the surveys undertaken to establish the ecological baseline detailed within this chapter.

Table 8-4: Survey guidance, surveys undertaken and future surveys

Ecological feature	Guidance	Dates of survey
Badger	Delahay et al., 2001 – The use of marked bait in studies of the territorial organisation of the European badger (<i>Meles meles</i>) Harris et al., 1989 – Surveying Badgers	Initial walkover survey – September 2022 Bait marking survey – October 2022 Camera monitoring – September to December 2022, May to August 2023
Bats (roosting, commuting and foraging)	Berthinussen and Altringham 2015 – WC1060 Development of a Cost Effective Method for Monitoring the Effectiveness of Mitigation for Bats Crossing Linear Transport Infrastructure. Final Report 2015 Collins, 2016 – Bat Conservation Trust Bat Surveys for Professional Ecologists Good Practice Guidelines Elmeros et al., 2016 – Fumbling in the dark – effectiveness of bat mitigation measures on roads, Bat mitigation measures on roads – a guideline	Ground level preliminary roost assessments – March 2022 Activity transect and static monitoring surveys – April to October 2022 Emergence/re-entry surveys – May to September 2022 Crossing point surveys – May to October 2022 Tree climbing inspections – June 2022 Hibernation surveys – Winter 2023/2024
Barn owl	Shawyer, 2012 – The Barn Owl and its Habitat	June to August 2022, July 2023
Breeding birds	British Trust for Ornithology, 2018 – Breeding Bird Survey Instructions Bird Survey Guidelines, 2023 – Breeding bird survey methodology	March to July 2022
Great crested newt	Oldham et al., 2001 – Evaluating the suitability of habitat for the Great crested newt (<i>Triturus cristatus</i>) ARG UK, 2010 – Advice Note 5: Great Crested Newt Habitat Suitability Index Biggs et al., 2014 – Analytical and methodological development for improved surveillance of the great crested newt. Technical advice note for field and laboratory sampling of Great crested newt (<i>Triturus cristatus</i>) environmental DNA	June 2022
Habitats	Butcher et al., 2020 – The UK Habitat Classification User Manual Version 1.1	June to August 2022
Invasive non-native species	No specific guidance for invasive non-native species. Invasive non-native species were recorded during the UKHab survey and targeted species surveys were recorded incidentally.	June to August 2022 (UKHab)
Otter	Chanin, 2003 – Monitoring the Otter <i>Lutra lutra</i>	September 2022 and May 2023
Water vole	Harris et al., 2009 – A method for assessing water vole habitat suitability	September 2022 and May 2023

Ecological feature	Guidance	Dates of survey
	Strachan et al., 2016 – The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series)	
Wintering birds	Bibby et al., 2000 – Bird Census Techniques (Second Edition) Gilbert et al., 1998 – Bird Monitoring Methods – a manual of techniques for key UK species	October 2022, October 2023 to March 2024

8.5.6. At the time of writing this PEIR, complete wintering bird surveys and bat hibernation surveys to inform the preliminary design stage had yet to be undertaken. These will be undertaken in the winter of 2023-2024. The results of the wintering bird survey undertaken in October 2022 will be reported within the ES with the results of the full suite of 2023-2024 surveys.

8.5.7. Additionally, barn owl surveys (as detailed in Section 8.3.1) have been undertaken in July 2023 and further badger monitoring surveys of the Hungerley Hall Farm overbridge began in May 2023 and will continue until August 2023. The results of these surveys will be reported on in the ES.

Statutory designated sites

8.5.8. There are no internationally designated sites within 10km of the draft Order Limits. Two nationally designated SSSIs and two locally designated LNRs are present within 2km of the draft Order Limits. Further detail of the sites is provided in Table 8-5. See Figure 8.1 of Volume 2 for the locations of the statutory designated sites in relation to the draft Order Limits. To the south of the Scheme, Herald Way Marsh SSSI and LNR (1.6km and 1.4km respectively) has been scoped out of further assessment within the Environmental Scoping Report (ESR) (National Highways, 2023) due to being a considerable distance from, and having no hydrological connections with the Scheme.

Table 8-5: Nationally important designated sites within 2km of the draft Order Limits scoped in for assessment

Site name/designation	Reason for designation	Location in relation to the draft Order Limits
Coombe Pool SSSI (The SSSI comprises 'Coombe Pool' itself, and the woodland (hereafter referred to as Coombe Pool SSSI woodland) surrounding the pool, primarily on the northern and western banks.	The site is one of the most important ornithological sites in Warwickshire for its herons <i>Ardea cinerea</i> , and other breeding birds, and for its wintering wildfowl.	Adjacent to the east of the draft Order Limits

Site name/designation	Reason for designation	Location in relation to the draft Order Limits
Coombe Pool SSSI refers to the site as a whole including the aquatic and woodland habitats.)		
Stoke Floods LNR	The site supports a large lake, reedbeds and scrub next to the River Sowe. The lake is the result of mining subsidence and supports many wetland plants such as yellow flag <i>Iris pseudoacorus</i> and reed canary grass <i>Phalaris arundinacea</i> . Bird life is varied with many species of duck, seven species of warbler in the summer and occasional unusual migratory visitors such as black tern <i>Chlidonias niger</i> and yellow wagtails <i>Motacilla flava</i> .	650m south-west of the draft Order Limits

8.5.9. A screening exercise was undertaken to inform the options selection stage, as reported in the Habitats Regulations Assessment No Significant Effects Report (Highways England, 2021), to determine whether an Appropriate Assessment would be required regarding the Scheme’s potential impact upon any European sites (SACs, cSACs or pSACs), SPAs, pSPAs and Ramsar sites). The report concluded there would be no likely significant effects on any European sites resulting from the Scheme.

Non-statutory designated sites

8.5.10. Ecosites is a term used by WBRC for sites which have ecological value. Ecosites include nationally, regional and locally important sites and sites which have no formal designations. LWS are county important sites defined in local plans and are a material consideration in planning applications.

8.5.11. Non-statutory sites located within 2km of the draft Order Limits include 23 LWSs, including three potential LWSs, and 38 Ecosites. Some designated sites are designated as both LWSs and Ecosites. The locations of these sites are shown on Figure 8.1 of Volume 2.

8.5.12. The Environmental Scoping Report (National Highways, 2023) scoped out five LWSs and two Ecosites within 2km of the draft Order Limits from further assessment due to their distance from and lack of a hydrological connection with the draft Order Limits.

8.5.13. Following the ESR (National Highways, 2023) an updated desk study was undertaken with data purchased from the Warwickshire Biological Records Centre, including details of non-statutory designated sites within 2km of the draft Order Limits. Table 8-6 details those non-statutory designated sites identified

within the updated desk study which were not previously identified in the Environmental Scoping Report (National Highways, 2023) and which have been scoped out of further assessment due to distance from the draft Order Limits (all are >620m from the draft Order Limits) and lack of hydrological connectivity.

Table 8-6: Scoped out non-statutory designated sites identified within the updated desk study

Site name/designation	Reason for designation	Location in relation to the draft Order Limits
Brinklow Slag Heap Ecosite	Habitats include semi-improved grassland, amenity grassland and a stream.	360m west of the draft Order Limits
Caludon Park Ecosite	A small park consisting mainly of grassy fields, with value for invertebrates.	620m west of the draft Order Limits
Lloyd Crescent Ecosite	A derelict site with mature trees, scrub and herbs present.	735m west of the draft Order Limits
St Bartholomew's Churchyard Ecosite	A well maintained churchyard with specimen trees present and a good diversity of common bird and butterfly species.	735m west of the draft Order Limits
Ansty Park Ponds LWS	Unknown. No data provided by Warwickshire Biological Records Centre.	990m north-east of the draft Order Limits
Ansty Road/Clifford Bridge Rd Roundabout Ecosite	An open grassy roundabout.	1km west of the draft Order Limits
Herald Way Marsh (Claybrookes Marsh) LWS Claybrookes Marsh Spoil Tip LGS	The site contains a range of wet communities which are scarce in the county including open water, swamp and fen, marsh, grassland, scrub and woodland. The site is of value to invertebrates. Claybrookes Marsh is designated for geological reasons.	1.3km south of the draft Order Limits
New Close and Birchley Wood LWS, New Close Ecosite	Ancient woodland with marshy areas.	1.4km south-east of the draft Order Limits
Stoneywood Road Ecosite	A public open space in a housing estate with remnant hedgerows, a pond and grassland areas.	1.4km north-west of the draft Order Limits
Brandon Wood LWS	The site comprises semi-natural ancient woodland, however much of the woodland has been replanted, with a high conservation value ground flora. Recent surveys have identified dormouse <i>Muscardinus avellanarius</i> within the wood, one of only a handful of sites in the county.	1.6km south of the draft Order Limits
Grassland adjacent to Brandon Wood LWS	Semi-improved grassland on previously disturbed ground. Other habitats include areas of tall ruderal, scrub, a small broadleaved woodland plantation and a pond.	1.6km south of the draft Order Limits
Hermes Crescent potential LWS	Forms part of the Wyken Croft Nature Park Ecosite.	1.7km north-west of the draft Order Limits

Site name/designation	Reason for designation	Location in relation to the draft Order Limits
St Margaret's Annexe School Ecosite	A disused school grounds with tall ruderals, a hedgerow, an overgrown main field and some trees.	1.7km west of the draft Order Limits
Potters Green Mineral Line LWS, Craven Colliery Ecosite	Consists of damp grassland and meadow, tall herb and scrub with value for invertebrates.	1.7km north-west of the draft Order Limits
Ernesford Grange School – Moat Ecosite	School grounds containing amenity grassland, two ponds and scrub habitat. Over 70 plants species have been recorded.	1.8km south-west of the draft Order Limits
Wigston Road Ecosite	A field corner with a pond and a remnant section of hedgerow. The ponds has reasonable flora and fauna, including smooth newt <i>Lissotriton vulgaris</i> , and is surrounded by trees.	1.8km north-west of the draft Order Limits
The Pools Ecosite and the Pools, Black Spinney and Long Spinney potential LWS	Designated ancient woodland, with wetter and drier areas of woodland.	1.8km south of the draft Order Limits
Woodhill Spinney and Verge Ecosite	Woodland strip part of the High Wood complex. A small pond is present.	1.8km east of the draft Order Limits
Cardinal Wiseman School Ecosite	A series of buildings intersected with small areas of fenced off pasture grazed by farm animals. Habitats include amenity grassland, poor semi-improved grassland, hedgerows and ditches.	1.9km north-west of the draft Order Limits

8.5.14. Table 8-7 details those non-statutory designated sites identified within the updated desk study and those within the Environmental Scoping Report (National Highways, 2023) which have been scoped in for further assessment due to distance from the draft Order Limits (<250m generally where no barriers to indirect impacts exist) and/or with hydrological connectivity to the draft Order Limits.

Table 8-7: Non-statutory designated sites within 2km of the draft Order Limits scoped in for assessment

Site name/designation	Reason for designation	Location in relation to the draft Order Limits
Smite Brook, headwaters and tributaries. Tributary of the River Sowe Ecosite	The site comprises a tributary of the River Sowe which runs through Coombe Pool SSSI and includes a small area of Smite Brook with historical records of white-clawed crayfish <i>Austropotamobius pallipes</i> , otter and water vole.	Within the draft Order Limits
Gainford Rise LWS/Hungerley Hall Farm Ecosite	The site comprises a floristically rich grassland with invertebrate interest. The southwest section of the site is designated as Gainford Rise LWS.	Adjacent to the west of the draft Order Limits (Gainford Rise LWS)

Site name/designation	Reason for designation	Location in relation to the draft Order Limits
		Located within the draft Order Limits (Hungerley Hall Farm Ecosite)
Coombe Abbey Pool (part SSSI) Ecosite	The ecosite includes areas designated as a nationally important SSSI designated for its ornithological interest, in particular a large heronry with water vole and otter present on site. The site is good for invertebrates including butterflies and moths.	Adjacent to the east of the draft Order Limits
Sowe Valley Dorchester Way LWS	The site comprises a considerable area of flood plain, including grassland, swamp, woodland, scrub, fen and mire. A variety of bird species have been recorded on the river. The site supports a strong colony of water vole on the Sowe. This species has disappeared from much of the county with the Coventry area being one of the few known remaining strongholds. Much of the river retains aquatic, emergent and bankside vegetation. Devil's-bit scabious <i>Succisa pratensis</i> , harebell <i>Campanula rotunifolia</i> and betony <i>Stachys officinalis</i> still survive along its length in patches.	50m east of the draft Order Limits
River Sowe and Tributaries Ecosite	Much of the river retains aquatic, emergency and bankside vegetation. Otter and water vole use the river. The considerable floodplain includes grassland, swamp, woodland, fen, scrub and mire. The river runs through a number of LWSs.	50m west of the draft Order Limits at its closest point
Sharman's Tip LWS	Unknown. No data provided by the Warwickshire Biological Records Centre.	50m west of the draft Order Limits.
Field by Caludon Castle School Ecosite	The site comprises an area of amenity grassland used as a football pitch, with an adjacent hedgerow. The sides of the pitch have a diverse flora, including lady's bedstraw <i>Galium verum</i> , great burnet <i>Sanguisorba officinalis</i> and meadowsweet <i>Filipendula ulmaria</i> .	150m west of the draft Order Limits
Unnamed watercourse, tributary of the River Sowe Ecosite	Stream with good marginal vegetation and a colony of water vole.	175m north-east of the draft Order Limits
Coombe Abbey LWS	The site consists of broadleaved woodland, coniferous plantation, a brook and standing water habitat. Species which use the site include water vole, otter and grass snake <i>Natrix helvetica</i> .	200m east of the draft Order Limits
Stoke Floods LWS	The site comprises part of the LNR of the same name but also includes two semi-improved grassland fields not part of the LNR. The site comprises a large lake, reedbeds and scrub next to the River Sowe. See Table 8-5 Stoke Floods LNR.	500m south-west of the draft Order Limits

Site name/designation	Reason for designation	Location in relation to the draft Order Limits
Jubilee Nature Reserve (University Hospital Coventry) Ecosite	Wetland nature reserve on the floodplain of the Sowe, consisting mainly of semi-improved grassland. A range of butterflies, dragonflies and birds.	515m west of the draft Order Limits
Hill Park Wood LWS	The site includes ancient woodland, including semi-natural broadleaved woodland, semi-improved grassland, wet areas, pits and ponds. Great crested newt were recorded breeding in the ponds and the site supports a colony of the county threatened small heath butterfly <i>Coenonympha pamphilus</i> .	760m north-east of the draft Order Limits
Sowe Valley: Wyken Croft to Ansty Road LWS	Much of the river retains aquatic, emergent and bankside vegetation. Otter and water vole use the river. The considerable floodplain includes grassland, swamp, woodland, fen, scrub and mire.	1.1km west of the draft Order Limits
Wyken Croft Nature Reserve Ecosite	Includes the Sowe Valley: Wyken Croft to Ansty Road LWS, Wyken Croft LWS and Hermes Crescent potential LWS. The site is a linear site along the valley of the River Sowe and comprises four semi-improved grassland fields.	1.1km west of the draft Order Limits
Coombe Countryside Park West Deer Park potential LWS	Part of Coombe Abbey Pool Ecosite (detailed within the ESR (National Highways, 2023)).	1.2kmeast of the draft Order Limits
The Elms Farm Ecosite	Habitats include fields, a hedgerow, ponds and a stream.	1.5km north-west of the draft Order Limits
Wyken Croft LWS	A mosaic of habitats includes rich semi-improved grassland, woodland and scrub with other 150 plant species recorded.	1.6km west of the draft Order Limits
Withybrook, headwaters and tributaries. Tributary of the River Sowe Ecosite.	The site includes the brook (a small stream with 1m high banks), headwaters and tributaries.	1.6km north-east of the draft Order Limits
Lower Sowe Meadows LWS	Meadows adjacent to the River Sowe. The river supports bankside vegetation, including in areas devil's bit scabious <i>Succisa pratensis</i> , harebell <i>Capanula rotundifolia</i> and betony <i>Stachy officinalis</i> .	No location data was provided by the WBRC
Sphinx Golf Club Ecosite	The site comprises areas of amenity grassland, broadleaved plantation and scattered trees.	1.4km south-west of the draft Order Limits
Sowe Valley: Stoke Aldermoor to London Road LWS and Aldermoor Fields Ecosite	Land bordering the River Sowe with high habitat diversity including woodland (ancient and plantation), scrub, tall herb, fen, open water and semi-improved grassland. The site is botanically important.	1.9km west of the draft Order Limits

- 8.5.15. Those non-statutory designated sites within 2km of the draft Order Limits previously identified upon which there are likely environmental effects from the Scheme have been scoped in for assessment in the ES in Table 8-8.

Habitats

- 8.5.16. The dominant habitat within the draft Order Limits comprises arable fields to the north of the A46 Walsgrave junction planted with cereal crops. The fields are bordered by native hedgerows (priority habitats) including boundaries adjacent to the A46.
- 8.5.17. The habitat to the east and south-east of the roundabout comprises other broadleaved woodland.
- 8.5.18. The majority of the land within the highway boundary comprises other broadleaved woodland with small areas of mixed scrub and bramble *Rubus fruticosus agg.*
- 8.5.19. Small parcels of modified grassland are present within the draft Order Limits along the northern edge of Coombe Pool SSSI woodland and adjacent to Hungerley Hall Farm.
- 8.5.20. Watercourses are present within the draft Order Limits including Smite Brook, the River Sowe and unnamed ditches and drains. The ditches and drains within the draft Order Limits are considered dry for most of the year (i.e., they are considered to hold water for less than four months of the year) and as such are not considered ditch habitats in accordance with UKHab and will not be considered further in this chapter. Smite Brook rises to the east, outside of the study area and flows westwards to feed into to Coombe Pool at its north-eastern end. The Brook discharges at the western end of Coombe Pool, via a weir, where it is culverted beneath the A46 and the B4082 before feeding into the River Sowe to the west of the draft Order Limits.

Ancient woodland

- 8.5.21. A review of MAGIC mapping and data from WBRC identified no areas of ancient woodland within 500m of the draft Order Limits.

Priority habitats

- 8.5.22. A review of MAGIC mapping (Defra, 2023) identified the following priority habitats within 500m of the draft Order Limits:
- Coastal and floodplain grazing marsh within approximately 20m north-east of the draft Order Limits along the River Sowe corridor.

- Deciduous woodland within the draft Order Limits in the highway boundary to the east and south of the A46 Walsgrave junction and adjacent to the draft Order Limits to the south-west and south-east in Coombe Pool SSSI at its closest locations.
 - Traditional orchard approximately 10m east of the draft Order Limits.
- 8.5.23. In addition to the above, the priority habitat lowland fens is identified on MAGIC mapping to the south-west of the draft Order Limits adjacent to the River Sowe approximately 600m from the draft Order Limits.
- 8.5.24. The priority habitat hedgerows were recorded within the draft Order Limits during the UKHab survey.

Protected and notable species

Great crested newt

- 8.5.25. A desk study review undertaken on MAGIC mapping (Defra, 2023) identified 10 EPS licence records pertaining to GCN within the study area to the north-east of the draft Order Limits. All licence records where the purpose was stated were to allow damage and destruction of a GCN resting place. Records were located at three locations; 1.1km north, 1.3km north-east and 1.4km east of the draft Order Limits. The most recent licence start date was 2020 and one licence was dated to end 2028. The review of MAGIC mapping also identified GCN survey licence returns at two waterbodies in Hill Park Wood approximately 900m north-east of the draft Order Limits, recording GCN presence in the wood in 2016 and 2017.
- 8.5.26. WBRC records included one record of GCN presence in a waterbody approximately 500m east of the draft Order Limits in which the species was found present during the 2022 surveys (see para 8.5.24). Further records of GCN presence were identified in records from the wider area (>2km from the draft Order Limits).
- 8.5.27. A desk study undertaken in June 2022 identified 13 ponds within the study area, five of which were scoped out of further survey due to either being unsuitable for GCN (e.g., Coombe Pool as a fishery), on the far side of barriers to GCN dispersal (e.g. the River Sowe) or being dry at the time of survey with no aquatic vegetation present which indicated that they are ephemeral.
- 8.5.28. Environmental DNA (eDNA) surveys undertaken in June 2022 confirmed GCN presence in one waterbody within the survey area to the north-east of the Walsgrave junction (Figure 8.1 of Volume 2). Given that GCN were absent from another pond located immediately to the east, it is assumed that GCN in this pond are present in low numbers. The dominant habitat between the pond and the draft Order Limits is arable fields which are unsuitable habitat for GCN. However, there is a well-managed hedgerow bordering the pond that connects

to the draft Order Limits although it is further than 500m from any works which would affect habitat outside the highway boundary. The eDNA survey was inconclusive regarding GCN presence/absence within one waterbody to the north-east of the draft Order Limits. While this pond is located within 500m of the draft Order Limits, it is more than 500m from any works which would affect habitat outside the highway boundary.

Breeding birds

- 8.5.29. The following notable species of bird (including those identified by WBRC as being listed on Section 41 of the Natural Environment and Rural Communities Act 2006, Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), the Birds of Conservation Concern (BoCC) and red list and amber list (Stanbury *et al.*, 2021)) have been recorded within 2km of the draft Order Limits as reported by WBRC: house martin *Delichon urbicum*, common tern *Sterna hirundo*, swift *Apus apus*, whooper swan *Cygnus cygnus*, willow warbler *Phylloscopus trochilus*, meadow pipit *Anthus pratensis*, mallard *Anas platyrhynchos*, reed bunting *Emberiza schoeniclus*, bullfinch *Pyrrhula pyrrhula*, song thrush *Turdus philomelos*, grasshopper warbler *Locustella naevia*, red kite *Milvus milvus*, greylag goose *Anser anser*, grey wagtail *Motacilla cinerea*, dunnoek *Prunella modularis*, tawny owl *Strix aluco*, house sparrow *Passer domesticus*, woodcock *Scolopax rusticola*, kingfisher *Alcedo atthis*, shoveler *Anas clypeata*, teal *Anas crecca*, gadwall *Anas strepera*, pochard *Aythya ferina*, black-headed gull *Chroicocephalus ridibundus*, herring gull *Larus argentatus*, common gull *Larus canus*, lesser black-backed gull *Larus fuscus*, marsh tit *Poecile palustris* and fieldfare *Turdus pilaris*.
- 8.5.30. Breeding bird surveys undertaken between March and July 2022 identified 53 species within the study area, with an additional two species identified during other ecological surveys. There were 22 species confirmed breeding, 17 probably breeding, 10 possibly breeding and six species considered non-breeding.
- 8.5.31. The majority of birds recorded within the study area were common, green-listed BoCC species. Notable species include a minimum of three pairs of the BoCC red-listed skylark *Alauda arvensis* within the arable land, the BoCC red-listed species linnet *Carduelis cannabina*, starling and swift, and the BoCC amber-listed song thrush. All of these BoCC red- and amber-listed species, apart from swift, are listed on Section 41 of the Natural Environment and Rural Communities Act 2006. The latter four species are likely to be using the land within the draft Order Limits for foraging, though linnet, starling and song thrush may potentially breed within the tall hedgerows and boundary trees along the A46. Further species listed as species of principal importance for biodiversity conservation on Section 41 of the Natural Environment and Rural Communities

Act 2006 recorded within the study area include dunnock (probably breeding, amber-listed), house sparrow (probably breeding, red-listed), house martin (possibly breeding, red-listed) and yellowhammer *Emberiza citrinella* (confirmed breeding, red-listed). Black-headed gull and the Section 41 species herring gull are amber- and red-listed BoCC species respectively and were concluded to be possibly breeding.

- 8.5.32. Species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) recorded within the study area include kingfisher, however this species was non-breeding.

Barn owl

- 8.5.33. The desk study identified three records of barn owl within 2km of the draft Order Limits. One historical record dated around 2010 is of a barn owl using an outbuilding in Coombe Country Park approximately 760m east of the draft Order Limits as a roost site. Two further records, dated from 2018, were of barn owl sightings approximately 690m from the draft Order Limits one of which recorded the species hunting along the grassland at the edge of the River Sowe.
- 8.5.34. Barn owl surveys undertaken in June and July 2021 and updated in July 2022 assessed habitat within 1.5km of the draft Order Limits for suitability to support barn owl. Five areas were classified in terms of suitability for barn owl foraging activity:
- An area to the east of the draft Order Limits, partially within parkland, adjacent to Coombe Country Park was assessed as optimal for foraging activity.
 - An area adjacent to the west of the River Sowe was considered sub-optimal and of transient value to barn owl.
 - An area to the south-west of the draft Order Limits adjacent to Smite Brook was assessed as poor habitat for barn owl prey.
 - A relatively small area in comparison to those mentioned above, situated to the north-west of the draft Order Limits to the west of the River Sowe was assessed as poor habitat for barn owl prey.
 - A relatively small area in comparison to the above-mentioned optimal and sub-optimal areas, and poor area along Smite Brook, situated to the north-east of the draft Order Limits adjacent to Walsgrave Hill Farm was assessed as poor habitat for barn owl prey.
- 8.5.35. Surveys identified four trees within Coombe Country Park, three trees within parkland adjacent to Coombe Country Park and one tree within arable land to the west of the draft Order Limits with features which have potential to support barn owl. Of these trees four were identified as potential nest sites, two as

temporary roost sites, one as both a potential nest site and temporary roost site and one as a possible temporary roost site.

- 8.5.36. Buildings with potential to support barn owl include the following, identified during 2021:
- Walsgrave Hill Farm – a potential nest site and a temporary roost site
 - Hungerley Hall Farm – a potential nest site
 - Hill Fields Farm – a possible potential nest site
 - Old Lodge Farm – a possible potential nest site
- 8.5.37. Hill Fields Farm and Old Lodge Farm are considered possible potential nest sites, as opposed to potential nest sites, as these farms were not accessible for survey at the time of this survey. Therefore, it cannot be ruled out that barn owls are breeding within the study area.
- 8.5.38. Anecdotal evidence from the Coombe Country Park Senior Estate Officer reports that barn owl sightings are occasional along the southern edge of Coombe Pool.
- 8.5.39. Further barn owl surveys were undertaken in July 2023. Preliminary outline results with regards to nesting barn owl in the study area confirmed six trees with poor suitability for nesting and one tree which was highly suitable for nesting barn owl with evidence of past barn owl use. Walsgrave Hill Farm to the north-east of the draft Order Limits was found to be suitable for nesting barn owl, however no evidence of use was identified.

Wintering birds

- 8.5.40. The desk study has identified a number of bird species within 2km of the draft Order Limits as detailed within Section 8.5.25.
- 8.5.41. One season of wintering bird surveys will be undertaken monthly between October 2023 and March 2024 which will inform an updated ecological baseline in the ES.

Bats – roosting

- 8.5.42. The desk study identified WBRC records of the following species within 2km of the draft Order Limits: soprano pipistrelle *Pipistrellus pygmaeus*, common pipistrelle *P. pipistrellus*, Natterer's *Myotis nattereri*, noctule *Nyctalus noctula*, *Myotis* sp., Nathusius' pipistrelle *P. nathusii* and Daubenton's *M. daubentonii*. Of these, records of soprano pipistrelle, *Pipistrelle* sp. and common pipistrelle pertained to roosting bats. The nearest roost record was located approximately 1.4km from the draft Order Limits.

- 8.5.43. A review of MAGIC mapping (Defra, 2023) has identified two EPS licence records pertaining to bats within 2km of the draft Order Limits. These licence records are for roosts occupied by brown long-eared *Plecotus auritus* and common pipistrelle bats however both are located more than 1km from the draft Order Limits.
- 8.5.44. Following ground-level preliminary roost assessments (PRAs) undertaken in March 2022 and tree climbing inspections undertaken in June 2022, 155 trees and one group of trees within the study area have been identified as having bat roosting potential. The group of trees was assessed as having low potential for roosting bats. Of the 155 individual trees, 122 were found to have low potential, 26 to have moderate potential and five to have high potential for roosting bats. Of these, three trees were also confirmed to have bat hibernation potential (see Figure 8.1 of Volume 2). Of the 31 trees found to have moderate or high potential for roosting bats, 17 were scoped out of further survey due to being within 50m of compensatory planting works only and more than 50m from the main works.
- 8.5.45. Hungerley Hall Farm accommodation bridge, Walsgrave Hill Farm overbridge and Smite Brook culvert were found to have negligible bat potential.
- 8.5.46. Emergence/re-entry roost surveys were undertaken between May and September 2022 on those 14 trees within 50m of the main works with moderate or high bat roosting potential following the tree climbing inspections. Surveys were also undertaken on buildings at Hungerley Hall Farm, with surveyors standing at a distance from the farm buildings and courtyard due to health and safety concerns. Potential roosts have been noted in three buildings, identified through observation of bats potentially emerging from or re-entering the buildings, however due to survey limitations (see Section 8.3) it has not been possible to confirm these roosts.
- 8.5.47. No bat roosts have been confirmed within the study area. Surveys recorded two instances of potential roosting activity within Coombe Pool SSSI woodland and concluded two potential roosts may be present within the woodland. These trees are outside of the study area and will not be impacted.

Bats – commuting and foraging

- 8.5.48. Bat activity surveys undertaken between April and October 2022 identified the following species present within the study area; common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, noctule, Daubenton's bat, Leisler's *Nyctalus leisleri* and brown long-eared. Additionally, *Myotis* sp. which could not be identified to species level, were recorded within the study area. In total, across

five static locations and seven five-night survey periods 32,754 bat passes were recorded.

- 8.5.49. Automated monitoring surveys recorded a higher level of bat activity within Coombe Pool SSSI woodland relative to other surveyed areas within the study area (such as surveyed arable field margins to the north of the Walsgrave junction east and west of the A46).
- 8.5.50. Bat crossing point surveys undertaken in 2022 at the Hungerley Hall Farm accommodation bridge, the hedge line perpendicular to the A46 in the location of the proposed new dumbbell junction and the Walsgrave Hill Farm overpass have identified a small number (less than five) of confirmed bat crosses in any one survey of the two overbridges. Bats confirmed crossing at the Hungerley Hall Farm accommodation bridge include soprano pipistrelle, common pipistrelle and noctule while the latter two species have been confirmed crossing the A46 at the Walsgrave Hill Farm overpass. No bats have been confirmed crossing at the location of the proposed dumbbell junction.

Badger

- 8.5.51. The desk study identified records of eight badger setts within 2km of the draft Order Limits, including one of the main setts identified within the surveys undertaken in 2022 (paragraph 8.5.48 of this PEIR chapter). Five records of badger road casualties were identified on the A46 with three to the south of Walsgrave junction and two to the north, and one road casualty was identified within the urban residential area off Brinklow Road to the south-west of the Walsgrave junction. Additionally, a badger road casualty was identified close to the proposed dumbbell junction during UKHab survey of the A46 verge in April 2022.
- 8.5.52. Badger surveys undertaken between September and December 2022 included a walkover survey, bait marking survey and camera-trap monitoring of two previously identified setts and the accommodation bridges at Hungerley Hall Farm and Walsgrave Hill Farm. Surveys identified one active main sett, one partially-active subsidiary sett and one partially-active outlier sett within the study area. Additionally, the surveys identified a second active main sett outside of the study area.
- 8.5.53. At the time of writing of this PEIR, additional camera-trap monitoring of the Hungerley Hall Farm accommodation bridge is being undertaken between May and August 2023. Data from these surveys will be used to further inform preliminary design with regards to mitigation for this species. Survey results and mitigation will be detailed within the ES.

Reptiles

- 8.5.54. The desk study has identified records of grass snake and slow worm *Anguis fragilis* within 2km of the draft Order Limits, with the nearest record being that of a grass snake located approximately 1km from the draft Order Limits.
- 8.5.55. A preliminary ecological appraisal (PEA) undertaken in 2018 (Highways England, 2018) for the options identification stage identified potential reptile habitat at two locations, however both locations are outside of the draft Order Limits and will not be subject to direct impacts.
- 8.5.56. Habitat within the draft Order Limits suitable to support reptile populations is limited to small areas of scrub and grassland within the highways boundary, which is isolated.

Otter

- 8.5.57. Records of otter identified within the desk study include a record of field signs on the River Sowe near Tesco off Clifford Bridge Road (considered to be within 750m of the draft Order Limits) and a further record on the River Sowe of a sighting approximately 1.35km from the draft Order Limits. A historical record which is dated from 2004 comprised field signs on Coombe Abbey Smite Brook footbridge which noted a “possible otter day rest downstream”.
- 8.5.58. Surveys undertaken on six waterbodies within the study area in September 2022 and May 2023 have confirmed otter presence on the River Sowe, Smite Brook and Coombe Pool with two confirmed couches on the northern banks of the pool (see Figure 8.1 of Volume 2). Five waterbodies and a section of the River Sowe within the study area were scoped out of further survey. Whilst these waterbodies are located at least partially within the study area for otter (the draft Order Limits plus 200m), they are located a minimum of 315m from any works which will impact on any semi-natural habitats outside of the current carriageway extent. A further five watercourses within the study area were found to be dry during both surveys.

Water vole

- 8.5.59. There were historical records only of water vole identified within the desk study on the far banks of Coombe Pool approximately 500m from the draft Order Limits and records on the River Sowe, the nearest of which is approximately 950m from the draft Order Limits.
- 8.5.60. Surveys undertaken in September 2022 assessed the suitability of six watercourses within the study area for water vole using a habitat suitability assessment (see Figure 8.1 of Volume 2). Stretches of watercourse considered

optimal for water vole exist within the study area on the River Sowe and Smite Brook, with sub-optimal water vole habitat within the study area on the river and the brook in addition to Coombe Pool and two further unnamed watercourses.

- 8.5.61. There were no confirmed water vole field signs recorded during the survey in September 2022, with just a potential feeding sign recorded on the River Sowe. A second water vole survey undertaken in May 2023 identified two potential water vole burrows on a linear watercourse to the south-east of the Walsgrave junction east of the draft Order Limits and one potential burrow on the River Sowe, however no confirmed field signs were recorded.

Fish

- 8.5.62. There were no records of fish identified in the desk study within 2km of the draft Order Limits. There is expected to be a diverse assemblage of fish present within Coombe Pool, Smite Brook and the River Sowe however as there are no potential impacts anticipated to any watercourse in the draft Order Limits, fish have not been considered further. If the Scheme design was to change and a watercourse was to be impacted, the effects on fish will be considered in the ES.

Other notable species (Section 41 Natural Environment and Rural Communities Act 2006 species)

- 8.5.63. There were 67 records of hedgehog identified in the desk study with the closest located 300m from the draft Order Limits. There were three records of brown hare the nearest located 300m from the draft Order Limits and one record of "true polecat" *Mustela putorius* located approximately 1.3km from the draft Order Limits.
- 8.5.64. There were no records of notable invertebrate or plant species identified in the desk study within 2km of the draft Order Limits. Therefore, notable plants and species have not been considered further.

Invasive non-native species

- 8.5.65. The desk study identified records of the following invasive non-native species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) within 2km of the draft Order Limits: rhododendron *Rhododendron ponticum*, Wels catfish *Silurus glanis*, Canada goose *Branta canadensis*, Canadian waterweed *Elodea canadensis*, Himalayan balsam *Impatiens glandulifera*, muntjac *Muntiacus reevesi*, American mink *Neovison vison*, wall cotoneaster *Cotoneaster horizontalis*, Egyptian goose *Alopochen aegyptiacus*, ring-necked parakeets *Psittacula krameri*, Himalayan cotoneaster *Cotoneaster simonsii*, variegated yellow archangel *Lamium galeobdolon subsp. argentatum*, grey squirrel *Sciurus carolinensis*, Nuttall's waterweed *Elodea nuttalli* and montbretia

Crococsmia x crocosmiiflora. No records pertained to invasive non-native species on or adjacent to the draft Order Limits. The closest record to the draft Order Limits was one of rhododendron 500m from the draft Order Limits.

8.5.66. Invasive non-native species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) identified within the study area include extensive stands of rhododendron within Coombe Pool SSSI woodland.

8.6. Potential impacts

8.6.1. The ecological features that could potentially be impacted by the Scheme and were scoped in within the ESR (National Highways, 2023) are presented in Table 8-8 with a summary of potential impacts.

Table 8-8: Potential impacts of the Scheme during construction and operation

Ecological feature	Feature importance	Potential impacts during construction	Potential impacts during operation
Coombe Pool SSSI	National	Potential impacts on SSSI and notable features (birds) through run-off (water pollution), dust (air pollution), vibration, lighting and/or noise from construction activities.	Potential impacts on SSSI and notable features (birds) through run-off (water pollution).
Stoke Floods LNR	Local	Potential impacts on LNR and notable features (habitats, flora and birds) through run-off (water pollution).	Potential impacts on LNR and notable features (habitats, flora and birds) through run-off (water pollution).
Hungerley Hall Farm Ecosite	Local	Potential impacts include permanent and temporary habitat loss. Potential impacts on qualifying features (habitats and flora) through run-off (water pollution) and dust (air pollution) from construction activities.	Potential impacts on qualifying features (habitats and flora) through run-off (water pollution).
Gainford Rise LWS	Local	Potential impacts on qualifying features (habitats and flora) through run-off (water pollution) and dust (air pollution) from	Potential impacts on qualifying features (habitats and flora) through run-off (water pollution).

Ecological feature	Feature importance	Potential impacts during construction	Potential impacts during operation
		construction activities.	
Sharman's Tip LWS, Brinklow Slag Heap Ecosite	Local	Potential impacts on site and habitats through dust (air pollution) from construction activities.	None
Coombe Abbey Pool (part SSSI) Ecosite, Coombe Abbey LWS	Local	Potential impacts on site and notable features (birds, otter, water vole, invertebrates) through run-off (water pollution), dust (air pollution), vibration, lighting and/or noise from construction activities.	Potential impacts on site and notable features (birds, otter, water vole, invertebrates) through run-off (water pollution).
Smite Brook, headwaters and tributaries Ecosite. Tributary of the River Sowe.	Local	Potential impacts on features of interest (otters and invertebrates) through run-off (water pollution), dust (air pollution), vibration, lighting and/or noise from construction activities. Potential loss of riparian corridor habitat due to land take for the Scheme.	Potential impacts on features of interest (otters and invertebrates) through run-off (water pollution).
Stoke Floods LWS, Sowe Valley Dorchester Way LWS Field by Caludon Castle School Ecosite, River Sowe and Tributaries Ecosite, unnamed watercourse Tributary of the River Sowe Ecosite, Jubilee Nature Reserve (University Hospital Coventry) Ecosite, Hill Park Wood LWS, Sowe Valley: Wyken	Local	Potential impacts on sites from run-off (water pollution) associated with construction activities.	Potential impacts on sites from run-off (water pollution).

Ecological feature	Feature importance	Potential impacts during construction	Potential impacts during operation
<p>Croft to Ansty Road LWS, Wyken Croft Nature Reserve Ecosite, Coombe Countryside Park West Deer Park potential LWS, The Elms Farm Ecosite, Wyken Croft LWS, Withybrook, headwaters and tributaries. Tributary of the River Sowe Ecosite, Sowe Valley: Stoke Aldermoor to London Road LWS and Aldermoor Fields Ecosite, Lower Sowe Meadows LWS, Sphinx Golf Club Ecosite</p>			
<p>Priority habitats: deciduous woodland and hedgerows</p>	<p>National</p>	<p>Permanent loss of deciduous woodland habitat to east and south-east of the A46 Walsgrave junction. Permanent loss and severance of native hedgerows within land north of the A46 Walsgrave junction. Potential impacts on habitats through run-off (water pollution) and dust (air pollution) from construction activities.</p>	<p>Potential impacts on habitats through run-off (water pollution).</p>
<p>Priority habitats: coastal and floodplain grazing marsh, traditional orchards</p>	<p>National</p>	<p>Potential impacts on habitats through run-off (water pollution) and dust (air pollution) from construction activities.</p>	<p>Potential impacts on habitats through run-off (water pollution).</p>
<p>On-site terrestrial habitats: cereal crops, modified grassland,</p>	<p>Site</p>	<p>Permanent loss of cereal crops, modified grassland, bramble scrub, mixed</p>	<p>Potential impacts on habitats through run-off (water pollution).</p>

Ecological feature	Feature importance	Potential impacts during construction	Potential impacts during operation
bramble scrub, mixed scrub and other broadleaved woodland		scrub and other broadleaved woodland. Potential impacts on habitats through run-off (water pollution) and dust (air pollution) from construction activities.	
Breeding birds	Local	Potential injury/mortality and loss of habitat (nest sites and foraging resource) from site clearance. Potential for impacts from noise, dust (air pollution) and light spill from construction activities.	Potential impacts through lighting. Mortality to birds from the creation of new road areas including the proposed dumbbell junction and link road.
Skylark, linnet	County	Potential injury/mortality and loss of habitat (nest sites and foraging resource) from site clearance. Potential for impacts from noise, dust (air pollution) and light spill from construction activities.	Potential impacts through lighting. Mortality to birds from the creation of new road areas including the proposed dumbbell junction and link road.
Barn owl	County	Potential injury/mortality and loss of habitat (foraging resource) from site clearance Potential for impacts through noise, dust (air pollution) and lighting.	Potential impacts from the new road layout being closer to potential nest sites at Hungerley Hall Farm.
Wintering birds	To be assessed once the baseline is established following surveys in winter 2023-2024	Potential injury/mortality and loss of habitat (roost sites and foraging resource) from site clearance. Potential impacts from noise, dust (air pollution) and light spill from construction activities.	Potential impacts through lighting. Mortality to birds from the creation of new road areas including the proposed dumbbell junction and link road.

Ecological feature	Feature importance	Potential impacts during construction	Potential impacts during operation
Bats (roosting, commuting and foraging)	Local	Loss of potential roosting locations. Loss of foraging and commuting habitat. Potential impacts to commuting and foraging bats through noise and lighting.	Potential impacts to future roosts, and to commuting and foraging bats, through lighting. Mortality to bats from the creation of new road areas including the proposed dumbbell junction and link road.
Badger	Local	Loss of a subsidiary sett. Loss of potential foraging habitat. Potential impacts through noise and lighting. Severance of habitat over Hungerley Hall Farm accommodation bridge. Potential impacts during site clearance and construction works.	Potential impacts through lighting. Increased mortality from incidents on newly created roads including the proposed dumbbell junction and link road.
Reptiles	Local	Potential injury/mortality from site clearance. Potential loss of habitat (including hibernation sites). Potential impacts through noise and lighting.	No operational impacts anticipated.
Otter and Water vole	County	Potential impact on aquatic habitat through increased run off (water pollution). Potential impacts through noise and lighting. Potential impacts during site clearance and construction works.	Potential impacts through run-off (water pollution).
Other notable species - hedgehog	County	Potential impacts during site clearance and construction works. Loss of potential habitat. Potential impacts from noise and lighting.	Increased mortality from incidents on newly created roads including the proposed dumbbell junction and link road.

Ecological feature	Feature importance	Potential impacts during construction	Potential impacts during operation
Other notable species – brown hare	Local	Potential impacts during site clearance and construction works. Loss of potential habitat. Potential impacts from noise and lighting.	Increased mortality from incidents on newly created roads including the proposed dumbbell junction and link road.
Other notable species – polecat	Local	Potential impacts during site clearance and construction works. Loss of potential habitat. Potential impacts from noise and lighting.	Increased mortality from incidents on newly created roads including the proposed dumbbell junction and link road.

8.7. Design, mitigation and enhancement measures

- 8.7.1. The design developed during the preliminary design stage will incorporate any necessary mitigation measures for baseline ecological features in accordance with the mitigation hierarchy as set out within the CIEEM’s Guidelines for EclA (2018).
- 8.7.2. Adverse impacts of the Scheme on ecological features would as a first measure be avoided where feasible, and where they cannot be avoided would be appropriately mitigated for. Compensation would be undertaken where significant effects upon ecological features exist after mitigation. At this stage it is not possible to fully identify the design, mitigation and compensation measures that are required as surveys to inform the baseline are still required for wintering birds, barn owl and hibernating bats and the Scheme designs are still being developed. Additionally, the baseline has not yet been fully established for the area of the draft Order Limits to the west of Smite Brook along the B4082 (see Section 8.3). However, based on the results of the desk study and the surveys undertaken to date, potential design (embedded) mitigation measures have been identified and are detailed in paragraphs 8.7.8 to 8.7.30 below.
- 8.7.3. Enhancement opportunities exist within the design of the landscaping for the Scheme. Habitat creation would preferably be within the draft Order Limits, the majority of which is the National Highway boundary, with off-site compensation if required.
- 8.7.4. Any habitats created as part of any mitigation or compensation required, would be implemented through planting works undertaken during the construction phase where feasible and in the first season available following completion of construction works.

- 8.7.5. A minimum five-year aftercare period would follow completion of the works for the Scheme. During this time, maintenance activities would be undertaken to ensure the successful establishment of planting and provision of new habitats.
- 8.7.6. An Environmental Management Plan (EMP) (first iteration) would be produced and implemented by the Principal Contractor and would include any avoidance and mitigation measures required for ecological features.
- 8.7.7. Mitigation and potential enhancement measures will be considered further throughout the preliminary design stage and within the ES.

Embedded (design) mitigation

Statutory designated sites

- 8.7.8. To reduce potential impacts upon the Coombe Pool SSSI the road realignment has been situated at the maximum possible distance from the SSSI whilst still achieving the required 50mph speed limit at the location of the current junction.
- 8.7.9. The design of the Scheme would mitigate the effects of operation such as a decrease in water quality caused by an increase in run-off from vehicular traffic, decrease in air quality and an increase in noise and light pollution. The drainage design, including sustainable urban drainage systems (SUDS), will mitigate for a decrease in water quality and a sensitive lighting design will mitigate for an increase in lighting. Whilst the mainline A46 is lit prior to the Scheme construction, the Scheme design does not include any lighting of the mainline and as such lighting in this area, adjacent to the SSSI, will be reduced. Mitigation measures to address any changes in noise and air quality during operation, if required will be identified through assessment and presented within the ES.

Non-statutory designated sites

- 8.7.10. Habitat creation incorporated into the landscape design is likely to include grassland, woodland, hedgerows, wet grassland and tree planting. Habitat creation will be composed primarily of native species and species of benefit to pollinators and birds and will contribute to habitat compensation.
- 8.7.11. The design of the Scheme would mitigate the effects of operation such as a decrease in water quality caused by an increase in run-off from vehicular traffic, decrease in air quality and an increase in lighting and noise. The drainage design, including SUDS, will mitigate for a decrease in water quality. A sensitive lighting scheme will be designed to mitigate potential impacts of increased lighting.

Priority habitats

- 8.7.12. Where feasible the design of the Scheme will minimise land take. Habitat creation on site will include native woodland and hedgerow planting which will contribute to habitat compensation.

Habitats

- 8.7.13. Habitat creation has been incorporated within the landscape design and would take place along the verges of the Scheme and is likely to include grassland, woodland, hedgerows, wet grassland, tree planting. An area within the draft Order Limits to the north-east of the existing junction is proposed for compensatory woodland planting to mitigate for loss of woodland due to the Scheme.
- 8.7.14. Mitigation embedded into the Scheme design includes the creation of sustainable urban drainage systems (SuDS) including attenuation basins. In addition to mitigating for impacts associated with increased run-off (water pollution) from the Scheme, the creation of these SuDS ponds will create habitat on site for biodiversity, including invertebrates and amphibians.
- 8.7.15. Habitat creation would be appropriate to those habitats lost and will be composed primarily of native species and species recognised of being of higher benefit to pollinators and birds with regards to food sources.

Breeding birds

- 8.7.16. Habitat loss would be reduced where feasible, with habitat temporarily lost to construction works focused on less valuable habitat such as the arable land within the draft Order Limits where feasible. Mitigation for the temporary loss of suitable breeding habitat during construction and the permanent loss of areas of suitable breeding habitat to the footprint of the Scheme would include habitat creation as part of the soft landscaping.

Barn owl

- 8.7.17. Detailed results of further surveys undertaken in July 2023 will inform the mitigation for barn owl and will be detailed in the ES. Mitigation is likely to include the planting and/or reinstatement of screens of taller vegetation along areas of road and the new dumbbell junction to mitigate against barn owl mortality.

Bats – commuting and foraging

- 8.7.18. Retention of the Hungerley Hall Farm accommodation bridge (subject to a structural survey in autumn 2023) will maintain this as a commuting route and crossing point over the A46 carriageway for bats.
- 8.7.19. The Scheme does not include any lighting on the A46 mainline within the draft Order Limits as described in PEIR Chapter 2. This will mitigate for bats commuting along and across the A46, in addition to mitigating for other species on site (including birds, badger and other mammals).
- 8.7.20. Further mitigation for commuting and foraging bats will include minimisation of habitat loss and landscaping designed to provide shelter, foraging opportunities and connected dark corridors throughout the Scheme.

Badger

- 8.7.21. The Scheme designs include the retention of the Hungerley Hall Farm accommodation bridge (subject to a structural survey in autumn 2023) which badgers currently use to cross the A46. Maintaining the bridge as a commuting route for badger (i.e., keeping the bridge open and unobstructed) during construction will reduce severance of habitat. If the structural survey shows the existing accommodation bridge is not suitable for retention, alternative solutions will be explored to mitigate the impact on badger.
- 8.7.22. At present the Scheme does not include any mitigation against an increase in mortality from badgers crossing the new link road. The creation of a new wildlife bridge or underpass embedded into the Scheme design would mitigate against the risk of mortality and severance of foraging habitat if feasible. The bridge or underpass should be placed as close as feasible to the Hungerley Hall Farm accommodation bridge with mammal-proof fencing installed to direct badger to the crossing. The creation of this overpass or underbridge will also benefit other notable species.

Otter

- 8.7.23. The design of the Scheme would mitigate the effects of operation such as a decrease in water quality caused by an increase in run-off from vehicular traffic through the provision of SuDS.

Other notable species (Section 41 Natural Environment and Rural Communities 2006 species)

- 8.7.24. Habitat creation incorporated into the landscape design is likely to include grassland, woodland, hedgerows, wet grassland and tree planting and will mitigate for loss of habitat during construction.
- 8.7.25. Retention of the Hungerley Hall Farm accommodation bridge (subject to structural survey) will reduce severance of habitat. Alternative mitigation measures will be explored should the accommodation bridge not be suitable for retention.
- 8.7.26. The creation of a wildlife bridge or underpass crossing the new link road will mitigate for severance of habitat and an increase in mortality.

Essential mitigation and enhancement

Statutory designated sites

- 8.7.27. To avoid impacts on designated sites the works will adhere to an EMP which will detail mitigation measures such as pollution prevention to avoid adverse impacts from construction activities on the designated sites.

Non-statutory designated sites and priority habitats

- 8.7.28. To avoid impacts on non-statutory sites and priority habitats the works will adhere to an EMP which will detail mitigation measures such as pollution prevention to avoid adverse impacts from construction activities. Where feasible the design will minimise the land take required of these sites and habitats.

Breeding birds

- 8.7.29. To avoid adverse impacts on breeding birds, habitat clearance should take place outside of the core breeding bird season (March to August inclusive). Where this is not possible, and habitats are cleared within the core breeding bird season (March to August inclusive), they should be subject to a nest check by a competent Ecological Clerk of Works (ECoW) one week and then no more than 24 hours prior to works. Any active nests identified would be left *in situ* with a suitable buffer of undisturbed vegetation around them until all young have fledged as confirmed by the ECoW.
- 8.7.30. To compensate the loss of suitable nesting opportunities for breeding birds appropriate bird boxes will be installed in suitable habitat areas. The exact number and location will be determined in agreement with statutory bodies and landowners.

8.7.31. To avoid impacts on breeding birds the works will adhere to the EMP which will detail mitigation required to avoid adverse impacts from construction activities.

Barn owl

8.7.32. To avoid impacts on barn owl the works will adhere to the EMP which will detail mitigation required to avoid adverse impacts from construction activities.

Wintering birds

8.7.33. Mitigation for wintering birds will be identified following the wintering bird surveys which will take place in winter 2023-2024 and will be detailed in the ES.

8.7.34. To avoid impacts on wintering birds the works will adhere to the EMP which will detail mitigation required to avoid adverse impacts from construction.

Bats - roosting

8.7.35. Trees with potential to support roosting bats will be retained wherever feasible and protected during construction. Where retention is not possible, avoidance of impacts could include trees with roosting potential being felled during a season most appropriate to avoid adverse impacts on roosting bats as follows:

- where required, trees where hibernation roosting potential has been ruled out will be felled during the hibernation season (November to March inclusive) where feasible to avoid impacts to summer roosting bats
- where required, trees where hibernation roosting potential has not been ruled out will be felled during the active season (April to October inclusive) where feasible to avoid impacts to hibernating bats

8.7.36. Sensitive pruning/felling techniques would be employed for trees with potential to support roosting bats, under the supervision of a suitably qualified ECoW following a check of all potential roost features prior to impact by a licensed ecologist. Mitigation for roosting bats will include:

- installation of Heras noise/acoustic barriers prior to and during construction along any work boundaries within 20m of Hungerley Hall Farm to mitigate for any roosting bats which might be utilising the farm buildings
- installation of bat boxes to compensate for the loss of roosting opportunities. The exact number will be determined during the design stage

Bats – commuting and foraging

8.7.37. Mitigation for commuting and foraging bats will include a wildlife sensitive lighting design for the construction and operational phases with construction night working and lighting kept to a minimum.

8.7.38. To avoid impacts on bats the works will adhere to the EMP which will detail mitigation required to avoid adverse impacts from construction activities.

Badger

8.7.39. Mitigation for badgers would include the closure of one subsidiary sett under a licence from Natural England, with mitigation appropriate to the closure detailed within a method statement.

8.7.40. Further mitigation for badgers as part of the Scheme will include the implementation of the EMP during construction which will include covering of trenches/excavations overnight or provision of a ramp and minimisation of night working and lighting with a sensitive lighting scheme in place. A wildlife sensitive lighting design will mitigate for badgers during the operational phase.

Reptiles

8.7.41. Areas suitable to support reptiles within the draft Order Limits are limited to small areas which are isolated (see section 8.5 of this chapter). Mitigation will include ECoW supervision of works in areas suitable for reptiles.

8.7.42. To avoid impacts on reptiles the works will adhere to the EMP which will detail mitigation required to avoid adverse impacts from construction activities.

Otter

8.7.43. To avoid impacts on otters the works will adhere to the EMP which will include the following measures:

- a wildlife sensitive lighting design for the construction phase with construction night working and lighting kept to a minimum
- utilising a 'soft-start' approach to works that create noise when working within 30m of Smite Brook
- avoidance of any works within 30m of Smite Brook a minimum of one hour after sunrise and one hour before sunset
- covering of trenches/excavations overnight or else the placement of a ramp in trenches/excavations overnight
- positioning of construction compounds, storage areas, temporary access tracks and other ancillary works, and main construction works, to avoid otter commuting routes as far as practicable
- adherence to pollution prevention measures during construction

Other notable species

- 8.7.44. To ensure there are no effects on notable species (hedgehog, brown hare and polecat) the works will adhere to the EMP which will include measures such as limiting night working and lighting, a sensitive lighting design, minimisation of habitat loss where feasible, and supervision of vegetation clearance by an ECoW where appropriate.

8.8. Assessment of likely significant effects

- 8.8.1. There is potential for significant effects arising from the Scheme as a result of potential impacts (detailed within Table 8-8) as outlined below and summarised in Table 8-9.
- 8.8.2. It may be possible to reduce significant effects through the adoption of appropriate and well-established mitigation techniques as outlined within section 8.7. This will be detailed further in the ES.

Construction

Designated sites

- 8.8.3. Potential effects are anticipated on Coombe Pool SSSI which is directly adjacent to the east of the draft Order Limits at the location of, and south of, the current Walsgrave junction even though the works will adhere to the EMP. In some locations the draft Order Limits are within the SSSI boundary. Potential impacts in these locations would be direct, minor and temporary with works limited to replacement of the fence between the highway boundary and the SSSI. Consultation with Natural England will be undertaken for these works and SSSI assent may be required. Adherence to mitigation measures detailed in the EMP would avoid and reduce potential effects on the notable features (birds) from construction activities causing a decrease in air and water quality and disturbance through an increase in light and noise pollution and vibration. The residual noise and vibration remaining after mitigation would have the potential to impact the notable features (birds) of the designated site. The Scheme would therefore be expected to have an **adverse effect** on the designated site during construction.
- 8.8.4. Potential effects are not anticipated on Stoke Floods Local Nature Reserve (LNR) as the Scheme would adhere to the EMP which would detail mitigation measures to avoid a decrease in water quality as a result of the construction activities. The Scheme would be expected to have a **neutral effect** on the designated site during construction.
- 8.8.5. Potential effects are anticipated on Hungerley Hall Farm Ecosite as it would be affected by land-take as a result of the Scheme, including permanent loss of

habitats such as hedgerows and woodland. The designated site Smite Brook, headwaters and tributaries Ecosite (tributary of the River Sowe) is considered to be the watercourse channel and bank face only. Should the Ecosite extend to include the bank tops and habitat back from the bank tops, potential effects on the Ecosite would include permanent loss of riparian habitat due to the proposed removal of bunds adjacent to the Brook. Consultation (section 8.1.3 of this chapter) will seek to confirm the extents of the Ecosite and any likely effects upon it. Adherence to mitigation measures detailed in the EMP would avoid and reduce potential effects on the habitats and supported species from construction activities which could cause a decrease in air and water quality and disturbance through an increase in light pollution and vibration. The Scheme would be expected to have an **adverse effect** on these non-statutory sites during construction.

- 8.8.6. Potential effects are anticipated on Gainford Rise LWS, Coombe Abbey Pool (part SSSI) Ecosite, Coombe Abbey LWS, Stoke Floods LWS and Sowe Valley Dorchester Way LWS from construction activities which could cause a decrease in air and water quality and an increase in light pollution. Potential effects anticipated upon Sharman's Tip LWS and Brinklow Slag Heap Ecosite are limited to those associated with a decrease in air quality. Potential effects upon Field by Caludon Castle School Ecosite, River Sowe and Tributaries Ecosite, unnamed watercourse Tributary of the River Sowe Ecosite, Jubilee Nature Reserve (University Hospital Coventry) Ecosite, Hill Park Wood LWS, Sowe Valley: Wyken Croft to Ansty Road LWS, Wyken Croft Nature Reserve Ecosite, Coombe Countryside Park West Deer Park potential LWS, The Elms Farm Ecosite, Wyken Croft LWS and Withybrook, headwaters and tributaries Ecosite. Tributary of the River Sowe Ecosite, Sowe Valley: Stoke Aldermoor to London Road LWS and Aldermoor Fields Ecosite, Lower Sowe Meadows LWS and Sphinx Golf Club Ecosite are limited to those associated with a decrease in water quality. To ensure there would be no effect on these sites construction would adhere to the EMP which would mitigate the effects of construction activities. The Scheme would be expected to have a **neutral effect** on these sites during construction.

Habitats

- 8.8.7. Potential effects are not anticipated on the priority habitat deciduous woodland from land-take as a result of the Scheme with the mitigation proposed. This is due to an area designated for compensatory woodland planting and incorporation of new areas of woodland within the landscape design covering approximately 70% of the area available for landscaping. Adherence to mitigation measures detailed in the EMP would avoid and reduce potential effects on the remaining woodland habitat from construction activities which could cause a decrease in air and water quality. The Scheme would be expected

to have an adverse effect on this priority habitat during the growth phase of landscape and ecological planting due to the loss of habitat. However this adverse effect will be temporary in nature and once the woodland is established would reduce to a **neutral effect**.

- 8.8.8. Potential effects are anticipated on the priority habitats coastal and floodplain grazing marsh and traditional orchards from construction activities which could cause a decrease in air and water quality. To ensure there will be no effect on these habitats the construction would adhere to the EMP which would mitigate the effects of construction activities. The Scheme would be expected to have a **neutral effect** on these habitats during construction.
- 8.8.9. Potential effects are not anticipated on the priority habitat hedgerows from land-take as a result of the current Scheme design with mitigation. Hedgerows and hedgerows with trees will be created within the draft Order Limits as part of the Scheme landscaping. The Scheme would be expected to have an adverse effect on this priority habitat during the growth phase of landscape and ecological planting due to the loss of habitat. However this adverse effect will be temporary in nature and once the hedgerow is established would reduce to a **neutral effect**.

Protected and notable species

- 8.8.10. Potential effects are anticipated on breeding birds from the loss of potential foraging and breeding habitat as a result of the Scheme. Habitat creation on site, on land that was previously arable with limited potential to support nesting birds, will mitigate for this loss of habitat. However, permanent loss of suitable nesting habitat for farmland birds and temporary loss of other habitats during construction would be expected to have an **adverse effect** on breeding birds. Adherence to mitigation measures detailed in the EMP would avoid and reduce potential effects on nesting sites during site clearance, the risk of direct injury and mortality of individual birds and effects from disturbance caused by construction activities through an increase in light and noise pollution and a decrease in air quality. As such potential effects on breeding birds are not anticipated from these impacts.
- 8.8.11. Potential effects are anticipated on barn owls from the loss of potential foraging habitat as a result of the Scheme. Habitat creation would in part mitigate for loss of foraging habitat, however temporary loss of habitat during construction would be expected to have an **adverse effect** on barn owls. A pre-commencement check for barn owl would confirm their presence prior to the onset of construction. Should they be found to be present, adherence to mitigation measures detailed in the EMP would avoid and reduce potential effects from disturbance caused by construction activities through an increase in light and

noise pollution and a decrease in air quality. As such potential effects on barn owls are not anticipated from these impacts.

- 8.8.12. Potential effects are anticipated on wintering birds from the loss of potential foraging habitat as a result of the Scheme and severance of habitat. The Scheme would be expected to have an **adverse effect** on wintering birds due to the permanent loss of arable habitat which provides a foraging resource for wintering birds. Adherence to mitigation measures detailed in the EMP would avoid and reduce potential effects of the risk of direct injury and mortality of individual birds and effects from disturbance caused by construction activities through an increase in light and noise pollution and a decrease in air quality. As such potential effects on wintering birds are not anticipated from these impacts
- 8.8.13. Potential effects are anticipated on bats from the loss of potential foraging and commuting habitat as a result of the Scheme. Habitat creation will in part mitigate for this loss, however the temporary loss of habitat during construction is expected to have an **adverse effect** on bats. Adherence to mitigation measures detailed in the EMP would avoid and reduce potential effects of disturbance to bats caused by construction activities through an increase in light and noise from construction activities. As such potential effects on bats are not anticipated from these impacts.
- 8.8.14. Potential effects are anticipated on badgers from the loss of a sett and potential foraging habitat as a result of the Scheme, and severance of habitat. A badger mitigation licence would be applied for the loss of a partially used subsidiary sett with appropriate mitigation agreed with Natural England. Habitat creation would in part mitigate for the loss of foraging habitat, however there would be a permanent loss of habitat due to the construction of the new slip road and dumbbell junction, and a temporary loss of further habitat during construction. This, in addition to the loss of the subsidiary sett, would be expected to have an **adverse effect** on badgers. Adherence to mitigation measures detailed in the EMP would avoid and reduce potential effects of disturbance caused by construction activities through an increase in light and noise pollution and the risk of injury or mortality from collisions or entrapment. As such potential effects on badgers are not anticipated from these impacts.
- 8.8.15. Potential effects are not anticipated on reptiles as the Scheme would adhere to a EMP which would detail mitigation measures to avoid direct injury or mortality or disturbance through an increase in noise or light pollution. The Scheme would be expected to have a **neutral effect** on these species during construction.
- 8.8.16. Potential effects are not anticipated on otters as the Scheme would adhere to the EMP which would detail mitigation measures to avoid direct injury or mortality from entrapment, disturbance through an increase in noise or light

pollution or a decrease in water quality. The Scheme would be expected to have a **neutral effect** on this species during construction.

- 8.8.17. Potential effects are not anticipated on water voles as the Scheme would adhere to the EMP which would detail mitigation measures to avoid direct injury or mortality, disturbance through an increase in noise or light pollution or a decrease in water quality. The Scheme would be expected to have a **neutral effect** on this species during construction.
- 8.8.18. Potential effects are not anticipated on notable species including hedgehog, brown hare and polecat as the Scheme would adhere to the EMP which would detail mitigation measures to avoid direct injury or mortality, or disturbance through an increase in noise or light pollution. The Scheme would be expected to have a **neutral effect** on these species during construction.

Operation

Designated sites and priority habitats

- 8.8.19. Potential adverse effects are not anticipated on the Coombe Pool SSSI habitats and notable features (birds) as the drainage design of the Scheme would mitigate potential pollution effects on the notable features following realignment of the A46 closer to the SSSI. The existing junction is currently lit however the Scheme has no lighting along the proposed A46 mainline in this area. Therefore, the Scheme would be expected to have a **beneficial effect** on the designated site during operation.
- 8.8.20. Potential effects are not anticipated on the Stoke Floods LNR habitats and notable features (birds), the Smite Brook, headwaters and tributaries Ecosite (tributary of the River Sowe) habitat and the Hungerley Hall Farm Ecosite habitat as the result of the Schemes operation. This is because the design of the Scheme would be expected to mitigate the effects of operation such as a decrease in water quality caused by an increase in run-off from vehicular traffic through the provision of SuDS ponds to treat the water before it is discharged into the natural water environment. Therefore, the Scheme would be expected to have a **neutral effect** on the statutory and non-statutory sites during operation.
- 8.8.21. Potential effects are not anticipated on Gainford Rise LWS, Coombe Abbey Pool (part SSSI) Ecosite, Coombe Abbey LWS, Stoke Floods LWS and Sowe Valley Dorchester Way LWS Ecosite Sharman's Tip LWS, Brinklow Slag Heap Ecosite, Field by Caludon Castle School Ecosite, River Sowe and Tributaries Ecosite, unnamed watercourse Tributary of the River Sowe Ecosite, Jubilee Nature Reserve (University Hospital Coventry) Ecosite, Hill Park Wood LWS, Sowe Valley: Wyken Croft to Ansty Road LWS, Wyken Croft Nature Reserve Ecosite, Coombe Countryside Park West Deer Park potential LWS, The Elms Farm

Ecosite, Wyken Croft LWS, Withybrook, headwaters and tributaries Ecosite, Tributary of the River Sowe Ecosite, Sowe Valley: Stoke Aldermoor to London Road LWS and Aldermoor Fields Ecosite, Lower Sowe Meadows LWS and Sphinx Golf Club Ecosite and the priority habitats deciduous woodland and coastal and floodplain grazing marsh as the drainage design of the Scheme would mitigate the potential pollution effects during operation. Therefore, the Scheme would be expected to have a **neutral effect** on these non-statutory sites and priority habitats during operation.

Protected and notable species

- 8.8.22. Potential effects are anticipated on breeding birds from an increase in mortality due to the creation of new road areas including the proposed dumbbell junction and link road. This effect is likely to impact only a small number of individuals and is unlikely to affect the overall breeding bird assemblage and as such is not expected to be a significant adverse effect. The design of the Scheme would be expected to mitigate the effects of increased lighting across the Scheme as a whole on breeding birds. The Scheme would be expected to have a **neutral effect** on breeding birds during operation.
- 8.8.23. Potential effects are anticipated on barn owl from an increase in disturbance to potential nest sites and an increased risk of mortality due to collision due to the creation of new road areas including the proposed dumbbell junction and link road. The landscape design for the Scheme would largely mitigate against an increase in collision risk through the planting of taller vegetation along the highways verge where feasible to encourage barn owl to fly higher above traffic. However, open sightlines are required in some areas of new road and will prevent the planting of tall vegetation in these locations. As such there would be expected to be an **adverse effect** on barn owl. The design of the Scheme would be expected to mitigate the effects of increased lighting on barn owl through a sensitive lighting scheme designed in liaison with an ecologist, and as such no adverse effects are anticipated from this impact.
- 8.8.24. Potential effects are anticipated on wintering birds from an increase in mortality to birds from the creation of new road areas including the proposed dumbbell junction and link road. This effect is likely to impact only a small number of individuals and is unlikely to affect the overall wintering bird assemblage and as such is not expected to be a significant adverse effect. The design of the Scheme would be expected to mitigate the effects of increased lighting on wintering birds through the design of a sensitive lighting scheme in liaison with an ecologist. The Scheme would be expected to have a **neutral effect** on wintering birds during operation.

- 8.8.25. Potential effects are anticipated on bats and badger from an increase in mortality from the creation of new road areas including the proposed dumbbell junction and link road. The Scheme would therefore be expected to have an **adverse effect** on bats and badger during operation from this impact. The retention of Hungerley Hall Farm accommodation bridge and construction of a mammal wildlife bridge or underpass to cross the new link road will reduce this potential effect in these locations, however the potential for increased mortality would still exist due to creation of other new areas of road. The design of the Scheme would be expected to mitigate the effects of increased lighting across the Scheme as a whole on bats and badger through design of a sensitive lighting scheme in liaison with an ecologist. As such potential effects on bats and badger are not anticipated from increased lighting.
- 8.8.26. No potential effects are anticipated on reptiles during the operation phase, as the design of the Scheme (i.e., the embedded mitigation provided by SuDS (see Section 8.7.10)) would be expected to mitigate an increase in run-off from vehicular traffic and associated water pollution and the effects of increased lighting through a sensitive lighting scheme. The Scheme would be expected to have a **neutral effect** on reptiles during operation.
- 8.8.27. Potential effects are not anticipated on otter and water vole as the design of the Scheme (i.e., the embedded mitigation provided by SuDS (see Section 8.7.10)) would be expected to mitigate an increase in run-off from vehicular traffic and associated water pollution impacting otter prey availability. Therefore, the Scheme would be expected to have a **neutral effect** on otter and water vole during operation.
- 8.8.28. Potential effects are anticipated on other notable species including hedgehog, brown hare and polecat from an increase in mortality from the creation of new road areas including the proposed dumbbell junction and link road. They are also expected to be impacted by the loss of foraging area due to the footprint of the Scheme and severance of habitat. Mitigation for these effects would be provided by the creation of habitat including hedgerows, woodland, grassland and SuDS, and the retention of the Hungerley Hall Farm accommodation bridge which would reduce severance impacts. The Scheme would be expected to have a **neutral effect** on other notable species during operation.

Table 8-9: Summary of assessment of significance of effect

Ecological feature		Summary of impacts	Mitigation	Sensitivity	Overall characterisation of effect with mitigation
Statutory designated sites	Coombe Pool SSSI	<p>Construction phase: Potential impacts through run-off (water pollution), dust (air pollution), vibration, lighting and/or noise.</p> <p>Operation phase: Potential impacts through run-off (water pollution).</p>	<p>The road realignment has been located the maximum distance from the SSSI whilst still achieving the 50mph speed limit.</p> <p>The existing junction is currently lit however the Scheme has no lighting along the proposed A46 mainline in this area.</p> <p>Works will adhere to an EMP which will detail measures to avoid adverse impacts, including pollution prevention.</p> <p>The drainage design of the Scheme would mitigate potential pollution effects on the notable features following realignment.</p>	National importance	Adverse (construction), Beneficial (operation)
	Stoke Floods LNR	<p>Construction and operation phases: Potential impacts through run-off (water pollution).</p>	<p>Works will adhere to an EMP which will detail measures to avoid adverse impacts, including pollution prevention.</p> <p>The design of the Scheme would mitigate</p>	Local importance	Neutral (construction and operation)

Ecological feature		Summary of impacts	Mitigation	Sensitivity	Overall characterisation of effect with mitigation
			the effects of operation such as a decrease in water quality caused by an increase in run-off from vehicular traffic through the provision of SuDS.		
Non-statutory designated sites	Hungerley Hall Farm Ecosite	<p>Construction phase: Potential impacts include permanent and temporary habitat loss and impacts through run-off (water pollution) and dust (air pollution).</p> <p>Operation phase: Potential impacts through run-off (water pollution).</p>	<p>Works will adhere to an EMP which will detail measures to avoid adverse impacts, including pollution prevention.</p> <p>Where feasible design will minimise land take.</p> <p>Habitat creation incorporated into the landscape design is likely to include grassland, woodland, hedgerows, wet grassland and tree planting. Habitat creation will be composed primarily of native species and species of benefit to pollinators and birds and will contribute to habitat compensation.</p>	Local importance	Adverse (construction), Neutral (operation)
	Gainford Rise LWS	<p>Construction phase: Potential impacts through run-off (water pollution) and dust (air pollution).</p> <p>Operation phase: Potential impacts through run-off (water pollution).</p>	<p>The design of the Scheme would mitigate the effects of operation such as a decrease in water quality caused by an increase in run-off from vehicular traffic</p>	Local importance	Neutral (construction and operation)

Ecological feature		Summary of impacts	Mitigation	Sensitivity	Overall characterisation of effect with mitigation
			through the provision of SuDS.		
	Sharman's Tip LWS, Brinklow Slag Heap Ecosite	Construction phase: Potential impacts through dust (air pollution).	Works will adhere to an EMP which will detail measures to avoid adverse impacts, including pollution prevention. The design of the Scheme will mitigate the effects of operation such as a decrease in water quality caused by an increase in run-off from vehicular traffic, a decrease in air quality and increase in lighting.	Local importance	Neutral (construction and operation)
	Coombe Abbey Pool (part SSSI) Ecosite, Coombe Abbey LWS	Construction phase: Potential impacts through run-off (water pollution), dust (air pollution), vibration, lighting and/or noise. Operation phase: Potential impacts through run-off (water pollution).		Local importance	Neutral (construction and operation)
	Smite Brook, headwaters and tributaries Ecosite. Tributary of the River Sowe.	Construction phase: Potential impacts through run-off (water pollution), dust (air pollution), vibration, lighting and/or noise. Potential loss of riparian corridor habitat due to land take. Operation phase: Potential impacts through run-off (water pollution).		Local importance	Adverse (construction), neutral (operation)
	Stoke Floods LWS, Sowe Valley Dorchester Way LWS	Construction phase:		Local importance	Neutral (construction and operation)

Ecological feature		Summary of impacts	Mitigation	Sensitivity	Overall characterisation of effect with mitigation
	Field by Caludon Castle School Ecosite, River Sowe and Tributaries Ecosite, unnamed watercourse Tributary of the River Sowe Ecosite, Jubilee Nature Reserve (University Hospital Coventry) Ecosite, Hill Park Wood LWS, Sowe Valley: Wyken Croft to Ansty Road LWS, Wyken Croft Nature Reserve Ecosite, Coombe Countryside Park West Deer Park potential LWS, The Elms Farm Ecosite, Wyken Croft LWS, Withybrook, headwaters and tributaries. Tributary of the River Sowe Ecosite, Sowe Valley: Stoke Aldermoor to London Road LWS and Aldermoor Fields Ecosite, Lower Sowe Meadows LWS, Sphinx Golf Club Ecosite	<p>Potential impacts from run-off (water pollution).</p> <p>Operation phase: Potential impacts from run-off (water pollution).</p>			
Priority habitats	Deciduous woodland and hedgerows	<p>Construction phase: Permanent loss of deciduous woodland habitat. Permanent loss and severance of native hedgerows. Potential impacts through run-off (water pollution) and dust (air pollution).</p> <p>Operation phase:</p>	<p>Works will adhere to an EMP which will detail measures to avoid adverse impacts, including pollution prevention.</p> <p>Where feasible design will minimise land take. Habitat creation on site will include native</p>	National importance	Neutral (construction and operation)

Ecological feature		Summary of impacts	Mitigation	Sensitivity	Overall characterisation of effect with mitigation
		Potential impacts through run-off (water pollution).	woodland and hedgerow planting.		
	Coastal and floodplain grazing marsh, traditional orchards	<p>Construction phase: Potential impacts through run-off (water pollution) and dust (air pollution).</p> <p>Operation phase: Potential impacts through run-off (water pollution).</p>		National importance	Neutral (construction and operation)
Non-priority habitats	On-site terrestrial habitats: cereal crops, modified grassland, bramble scrub, mixed scrub and other broadleaved woodland	<p>Construction phase: Permanent loss of cereal crops, modified grassland, bramble scrub, mixed scrub and other broadleaved woodland. Potential impacts through run-off (water pollution) and dust (air pollution).</p> <p>Operation phase: Potential impacts through run-off (water pollution).</p>	<p>Habitat creation incorporated into the landscape design is likely to include grassland, woodland, hedgerows, wet grassland and tree planting.</p> <p>A compensatory planting area is included within the draft Order Limits for proposed woodland planting.</p> <p>SuDS, including attenuation basins, will be included within the Scheme design.</p> <p>Habitat creation will be composed primarily of native species and species of benefit to pollinators and birds.</p>	Of site importance	Neutral (construction and operation)

Ecological feature		Summary of impacts	Mitigation	Sensitivity	Overall characterisation of effect with mitigation
Protected and notable species	Breeding birds	<p>Construction phase: Potential injury/mortality and loss of habitat (nest sites and foraging resource). Potential for impacts from noise, dust (air pollution) and light spill.</p> <p>Operation phase: Potential impacts through lighting. Mortality to birds from the creation of new road areas.</p>	<p>Where feasible habitat loss will be minimised and focused on less valuable habitat. Habitat will be created as part of the Scheme.</p> <p>Where feasible habitat clearance will take place outside of the core breeding bird season (March to August, inclusive). Clearance within the core breeding bird season will be preceded by a nest check by a competent ECoW.</p>	Local importance	Adverse (construction), neutral (operation)
	Skylark, linnet	<p>Construction phase: Potential injury/mortality and loss of habitat (nest sites and foraging resource). Potential for impacts from noise, dust (air pollution) and light spill.</p> <p>Operation phase: Potential impacts through lighting. Mortality to birds from the creation of new road areas.</p>	<p>Bird boxes will be installed in suitable habitat areas.</p> <p>The works will adhere to the EMP which will detail mitigation required to avoid adverse impacts from construction activities.</p>	County importance	Adverse (construction), Neutral (operation)
	Barn owl	<p>Construction phase: Potential injury/mortality and loss</p>	<p>Mitigation will be informed by detailed results of further surveys undertaken in July 2023 and is likely to include</p>	County importance	Adverse (construction and operation)

Ecological feature		Summary of impacts	Mitigation	Sensitivity	Overall characterisation of effect with mitigation
		<p>of habitat (foraging resource). Potential impacts through noise, dust (air pollution) and lighting.</p> <p>Operation phase: Potential impacts from the new road layout being closer to potential nest sites at Hungerley Hall Farm.</p>	<p>planting and/or reinstatement of screens of taller vegetation along areas of road and the new dumbbell junction to mitigate against barn owl mortality.</p> <p>A pre-commencement check for barn owl would confirm their presence prior to the onset of construction. The works will adhere to the EMP which will detail mitigation required to avoid adverse impacts from construction activities including disturbance.</p> <p>A wildlife sensitive lighting design will be employed during both construction and operation.</p>		
	Wintering birds	<p>Construction phase: Potential injury/mortality and loss of habitat (roost sites and foraging resource). Potential impacts from noise, dust (air pollution) and light spill.</p> <p>Operation phase: Potential impacts through lighting.</p>	<p>Mitigation for wintering birds will be identified following detailed surveys in the 2023-2024 survey season.</p> <p>The works will adhere to the EMP which will detail mitigation required to avoid adverse impacts from construction activities.</p>	To be assessed once the baseline is established following surveys in winter 2023-2024.	Adverse (construction), Neutral (operation)

Ecological feature		Summary of impacts	Mitigation	Sensitivity	Overall characterisation of effect with mitigation
		Mortality to birds from the creation of new road areas.			
	Bats (roosting, commuting and foraging)	<p>Construction phase: Loss of potential roosting locations. Loss of foraging and commuting habitat. Potential impacts to commuting and foraging bats through noise and lighting.</p> <p>Operation phase: Potential impacts to future roosts, and to commuting and foraging bats, through lighting. Mortality to bats from the creation of new road areas.</p>	<p>Habitat will be retained where feasible, including trees with roosting potential and Hungerley Hall Farm accommodation bridge (subject to structural survey) as a commuting route.</p> <p>Timed pruning/felling to avoid impacts to roosting bats and use of sensitive pruning/felling will be employed where retention of trees with roosting potential is not feasible.</p> <p>Absence of lighting on the A46 mainline will mitigate for disturbance.</p> <p>Landscaping will be designed to provide shelter, foraging opportunities and connected dark corridors throughout the Scheme.</p> <p>Installation of Heras noise/acoustic barriers along work boundaries within 20m of Hungerley Hall Farm will mitigate for</p>	Local importance	Adverse (construction and operation)

Ecological feature		Summary of impacts	Mitigation	Sensitivity	Overall characterisation of effect with mitigation
			roosting bats within the farm. Bat boxes will be installed as compensation for lost habitat. A wildlife sensitive lighting design will be employed during both construction and operation. The works will adhere to the EMP which will detail mitigation required to avoid adverse impacts from construction activities.		
	Badger	<p>Construction phase: Loss of a subsidiary sett. Loss of potential foraging habitat. Potential impacts through noise and lighting. Severance of habitat over Hungerley Hall Farm accommodation bridge. Potential impacts during site clearance and construction works.</p> <p>Operation phase: Potential impacts through lighting.</p>	Retention of the Hungerley Hall Farm accommodation bridge (subject to structural survey) will reduce severance of habitat for badger. Alternative mitigation measures will be explored should the accommodation bridge not be suitable for retention. The creation of a wildlife bridge or underpass crossing the new link road will mitigate for severance of habitat and an increase in mortality.	Local importance	Adverse (construction and operation)

Ecological feature		Summary of impacts	Mitigation	Sensitivity	Overall characterisation of effect with mitigation
		Increased mortality from incidents on newly created roads.	<p>The closure of one subsidiary sett would be undertaken under licence from Natural England, with appropriate mitigation measures detailed within the method statement.</p> <p>The works will adhere to the EMP which will detail mitigation required to avoid adverse impacts from construction activities.</p> <p>A wildlife sensitive lighting design will mitigate for badgers during the operational phase.</p>		
	Reptiles	<p>Construction phase: Potential injury/mortality from site clearance. Potential loss of habitat (including hibernation sites). Potential impacts through noise and lighting.</p>	<p>Mitigation will include ECoW supervision of works in areas suitable for reptiles.</p> <p>To avoid impacts on reptiles the works will adhere to the EMP which will detail mitigation required to avoid adverse impacts from construction activities.</p>	Local importance	Neutral (construction and operation)
	Otter and water vole	<p>Construction phase: Potential impact on aquatic habitat through increased run off (water pollution). Potential</p>	<p>To avoid impacts on otters the works will adhere to the EMP which will detail mitigation required to avoid adverse</p>	County importance	Neutral (construction and operation)

Ecological feature		Summary of impacts	Mitigation	Sensitivity	Overall characterisation of effect with mitigation
		<p>impacts through noise and lighting. Potential impacts during site clearance and construction works.</p> <p>Operation phase: Potential impacts through run-off (water pollution).</p>	<p>impacts from construction activities. Measures within the EMP will include, but not be limited to, working measures including a 'soft-start' approach within 30m of Smite Brook and limiting working within this buffer area.</p> <p>The design of the Scheme would mitigate the effects of operation such as a decrease in water quality caused by an increase in run-off from vehicular traffic through the provision of SuDS.</p>		
	Other notable species - hedgehog	<p>Construction phase: Potential impacts during site clearance and construction works. Loss of potential habitat. Potential impacts from noise and lighting.</p> <p>Operation phase: Increased mortality from incidents on newly created roads.</p>	<p>To ensure there are no effects on notable species (hedgehog, brown hare and polecat) the works will adhere to the EMP which will include measures such as limiting night working and lighting, a sensitive lighting design, minimisation of habitat loss where feasible, and supervision of vegetation clearance by an ECoW where appropriate.</p>	County importance	Neutral (construction and operation)
	Other notable species – brown hare	<p>Construction phase: Potential impacts during site clearance</p>		Local importance	Neutral (construction and operation)

Ecological feature		Summary of impacts	Mitigation	Sensitivity	Overall characterisation of effect with mitigation
		and construction works. Loss of potential habitat. Potential impacts from noise and lighting. Operation phase: Increased mortality from incidents on newly created roads.	Habitat creation incorporated into the landscape design is likely to include grassland, woodland, hedgerows, wet grassland and tree planting. Retention of the Hungerley Hall Farm accommodation bridge (subject to structural survey) will reduce severance of habitat. Alternative mitigation measures will be explored should the accommodation bridge not be suitable for retention.		
	Other notable species – polecat	Construction phase: Potential impacts during site clearance and construction works. Loss and severance of potential habitat. Potential impacts from noise and lighting. Operation phase: Increased mortality from incidents on newly created roads.	The creation of a wildlife bridge or underpass crossing the new link road will mitigate for severance of habitat and an increase in mortality.	Local importance	Neutral (construction and operation)

8.9. Conclusions

- 8.9.1. The construction of the Scheme is likely to result in adverse effects upon ecological features including designated sites, priority habitats and non-priority habitats due to a reduction in the quality of habitat from increased levels of disturbance (noise and light pollution and vibration) and changes to air and water quality.
- 8.9.2. The construction of the Scheme is likely to result in adverse effects upon protected species through disturbance and an increase in injury/mortality, of breeding birds, barn owl, wintering birds, bats and badger. The construction will also result in the loss of habitat and disturbance due to an increase in noise and lighting and changes in air and water quality. The construction effects upon badger are significant as they include severance of habitat and loss of habitat impacts include loss of a subsidiary sett.
- 8.9.3. The operation of the Scheme is anticipated to have a neutral effect on designated sites, priority habitats and non-priority habitats due to embedded design including SuDS to mitigate for impacts from water pollution. A likely beneficial effect is anticipated upon Coombe Pool SSSI during operation due to a reduction in lighting adjacent to the SSSI.
- 8.9.4. Operation phase effects on breeding birds, wintering birds, otter, water vole, reptiles and other notable species (hedgehog, brown hare and polecat) are anticipated to be neutral. Adverse effects are anticipated upon barn owl, bats and badger during the operation phase due to a potential increase in mortality from new areas of road, and in the case of barn owl from increased disturbance to nest sites.
- 8.9.5. The overall significance of the effects for each ecological feature is reliant on effective avoidance, mitigation and compensation measures being adopted. Conclusions of these preliminary assessments as well as further ecological surveys for wintering birds and hibernating bats will feed into further design development to help shape and inform the avoidance, mitigation and compensation proposals that are developed.
- 8.9.6. In addition to this, BNG calculations will also be conducted with the aim of determining precise areas of loss for each habitat and informing proposals for appropriate habitat retention, enhancement and creation. The further ecological surveys along with the BNG calculations will provide further confidence to the assessment of the Scheme's overall effect on biodiversity. The results of these assessments and surveys will be presented as part of the biodiversity assessment to be included with the ES, which will confirm the significance of the effects for ecological features. Should significant adverse effects on ecological

features remain after further design development and assessment work is completed, it will be necessary for the DCO application to demonstrate that all reasonable alternatives have been considered and that their loss or harm is unavoidable. Similarly, it will be necessary to demonstrate that the harm to such sites, species, habitats and interests is clearly outweighed by the national need for and benefits of the development. This information will be submitted as part of the DCO application.

9. Geology and soils

9.1. Introduction

- 9.1.1. This chapter considers the geology and soils issues (including contaminated land) which may impact, or may be impacted by, the construction and operation of the Scheme. This chapter has been prepared in accordance with the following standards: Design Manual for Roads and Bridges (DMRB) DMRB LA 103 and DMRB LA 109 Geology and Soils (Highways England, 2019) (hereafter referred to as DMRB LA 109).
- 9.1.2. DMRB LA 109 notes that the assessment to be reported in the Environmental Statement (ES) shall report on:
- the likely nature and scale of geology and soils effects (positive, neutral or negative) during the construction and the operational phase of the project
 - the likelihood of a project to result in significant effects
 - the issues requiring further assessment and the methods to be applied
- 9.1.3. The Scheme has the potential to impact upon both the geology and soils of the area. Constraints could be imposed on the Scheme construction as a result of existing ground conditions. The potential requirement for further assessment will therefore be identified where required.
- 9.1.4. This chapter is supported by Figure 2.3 of Volume 2: Environmental constraints plan.

Stakeholder engagement

- 9.1.5. No specific consultation has been undertaken at this stage in the design and assessment process and in the absence of ground investigation (GI) data regarding land quality aspects. Appropriate consultation will be undertaken with relevant stakeholders to inform the assessment for the Environmental Statement (ES).
- 9.1.6. An Environmental Scoping Report (ESR) was submitted to the Planning Inspectorate on 30 June 2023 to inform its Scoping Opinion. A response was received on 10 August 2023. Comments on the scope and approach to the assessment will be taken into account where appropriate and described in the ES.

Legislative and policy framework

- 9.1.7. The following legislation and policy are relevant to the geology and soils aspects of the Scheme.

Legislation

9.1.8. The overarching legislation in relation to geology and soils is provided by:

- The Town and Country Planning Act 1990 (as amended)
- The Building Regulations 2010
- The Pollution Prevention and Control Regulations 2000 (as amended 2003)
- The Control of Pollution (Oil Storage) (England) Regulations 2001
- The Control of Substances Hazardous to Human Health 2002 (as amended 2004)
- The Contaminated Land (England) Regulations 2006 (as amended)
- Environmental Quality Standards Directive 2008/105/EC
- DEFRA: Environmental Protection Act 1990: Part 2A – Contaminated Land Statutory Guidance
- The Control of Asbestos Regulations 2012 Guidance
- The Environmental Damage (Prevention and Remediation) Regulations 2015
- The Waste Framework Directive 2008/98/EC
- The Hazardous Waste (England and Wales) Regulations 2005 (as amended by The Waste (England and Wales) Regulations 2011)
- The Environmental Permitting (England and Wales) Regulations 2016 (as amended)
- The Industrial Emissions Directive 2010/75/EU
- Groundwater Daughter Directive 2006/118/EC
- The Groundwater Regulations 2009

National Policy

9.1.9. No formal policy exists that outlines how to undertake an assessment of contaminated or potentially contaminated land specifically for an EIA. The policy background is not intended to provide a full and exhaustive account of legislation relating to land contamination with the EU, or UK. However, it is intended to provide a thematic background to recent key policy and applicable regulations in force at the time of writing this PEI Report.

National Policy Statement for National Networks (NPSSN)

9.1.10. The NPSNN (Department for Transport (DfT), 2014) sets out the Government's policies to deliver the development of Nationally Significant Infrastructure Projects (NSIP) on the national road and rail networks in England. The Secretary of State (SoS) uses the NPSNN as the primary basis for making decisions on Development Consent Order applications.

9.1.11. Key policy from the NPSNN relevant to the Geology and Soils aspect is set out below:

- Paragraph 5.29: *“Where a proposed development on land within or outside a Site of Special Scientific Interest (SSSI) is likely to have an adverse effect on a SSSI (either individually or in combination with other developments), development consent should not normally be granted. Where an adverse effect on the site’s notified special interest features is likely, an exception should be made only where the benefits of the development at this site clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest, and any broader impacts on the national network of SSSIs. The Secretary of State should ensure that the applicant’s proposals to mitigate the harmful aspects of the development and, where possible, to ensure the conservation and enhancement of the site’s biodiversity or geological interest, are acceptable. Where necessary, requirements and/or planning obligations should be used to ensure these proposals are delivered”.*
- Paragraph 5.168: *“Applicants should take into account the economic and other benefits of the best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the Agricultural Land Classification). Where significant development of agricultural land is demonstrated to be necessary, applicants should seek to use areas of poorer quality land in preference to that of a higher quality. Applicants should also identify any effects, and seek to minimise impacts, on soil quality, taking into account any mitigation measures proposed. Where possible, developments should be on previously developed (brownfield) sites provided that it is not of high environmental value. For developments on previously developed land, applicants should ensure that they have considered the risk posed by land contamination and how it is proposed to address this”.*
- Paragraph 5.176: *“The decision-maker should take into account the economic and other benefits of the best and most versatile agricultural land. The decision-maker should give little weight to the loss of agricultural land in grades 3b, 4 and 5, except in areas (such as uplands) where particular agricultural practices may themselves contribute to the quality and character of the environment or the local economy”.*

National Planning Policy Framework (NPPF) 2023

9.1.12. The NPPF text relevant to contaminated land is outlined below.

9.1.13. Paragraph 119 – *“Planning policies and decisions should promote an effective use of land in meeting the need for homes and other uses, while safeguarding and improving the environment and ensuring safe and healthy living conditions. Strategic policies should set out a clear strategy for accommodating objectively*

assessed needs, in a way that makes as much use as possible of previously-developed or 'brownfield' land" ⁶.

9.1.14. Paragraph 174 – *"Planning policies and decisions should contribute to and enhance the natural and local environment by:*

- *Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and*
- *Remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate"*.

9.1.15. Paragraph 183 – *"Planning policies and decisions should ensure that:*

- *a site is suitable or its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation).*
- *after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990: and*
- *adequate site investigation information, prepared by a competent person, is available to inform these assessments"*.

9.1.16. Paragraph 184 – *"Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner"*.

9.1.17. The glossary of the NPPF states the following in relation to "site investigation information":

- *"Site investigation information: Includes a risk assessment of land potentially affected by contamination, or ground stability and slope stability reports, as appropriate. All investigations of land potentially affected by contamination should be carried out in accordance with established procedures (such as BS10175 Investigation of Potentially Contaminated Sites – Code of Practice"*.

9.1.18. The glossary further states that a "Competent person" involved in the preparation of site investigation information is *"a person with a recognised*

⁶ Except where this would conflict with other policies in this Framework, including causing harm to designated sites of importance for biodiversity

relevant qualification, sufficient experience in dealing with the type(s) of pollution or land instability, and membership of a relevant professional organisation”.

- 9.1.19. In addition to national planning policies, the remediation design should take into account the requirements of local planning policies and planning conditions in the assessment and management of land contamination.

Planning practice guidance (PPG)

- 9.1.20. PPG includes a dedicated section on the natural environment (2019), and this includes agricultural land geology and soils. It explains key issues in implementing policy to protect and enhance the natural environment. It notes that:
- 9.1.21. *“Information on biodiversity and geodiversity impacts and opportunities needs to inform all stages of development.”*
- 9.1.22. It also states that *“a local planning authority must consult Natural England before granting planning permission for large-scale non-agricultural development on best and most versatile land that is not in accord with the development plan.”*
- 9.1.23. *“Soil is an essential natural capital asset that provides important ecosystem services – for instance, as a growing medium for food, timber and other crops, as a store for carbon and water, as a reservoir of biodiversity and as a buffer against pollution.”* It refers readers to the Defra Code of practice for the sustainable use of soils on construction sites (2009) which may be helpful when setting planning conditions for development sites and provides advice on the use and protection of soil in construction projects, including the movement and management of soil resources.

25 Year Environment Plan

- 9.1.24. The Department for Environment, Food & Rural Affairs (Defra) 25 Year Environment Plan (2018) is a policy paper setting out what Government will do to improve the environment, including restoring and safeguarding wildlife habitats. This plan is being treated as the first Environmental Improvement Plan required under the Environment Act 2021. The plan sets out aims to improve soil health and restoring and protecting peatlands by addressing factors in soil degradation such as erosion, compaction and the decline in organic matter and by developing a soil health index and meaningful metrics to assess soil improvements.

National Highways Policy

9.1.25. National Highways policies of particular relevance to the assessment of geology and soils include:

- National Highways Environment Strategy seeking to help protect, manage, and enhance the quality of the surrounding environment.
- National Highways Sustainable Development Strategy sets out National Highways' approach and priorities related to sustainable development including carbon management to achieve efficiency in raw material consumption and waste generation, responsible sourcing of resources and circular economy.

Local Policy

Coventry City Council Local Plan (2011 – 2031)

9.1.26. Policy DS3: Sustainable Development Policy. “When considering development proposals, the Council will take a positive approach that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework. It will work proactively with applicants to find solutions to enable proposals to be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in the area, including:

- access to a variety of high-quality green and blue infrastructure
- access to job opportunities
- use of low carbon, renewable and energy efficient technologies
- the creation of mixed sustainable communities through a variety of dwelling types, sizes, tenures and range of community facilities
- increased health, wellbeing and quality of life
- measures to adapt to the impacts of climate change
- access to sustainable modes of transport
- preservation and enhancement of the historic environment
- sustainable waste management”

9.1.27. Policy GE3: Biodiversity, Geological, Landscape and Archaeological Conservation. Sites of Special Scientific Interest (SSSIs), Local Nature Reserves (LNRs), Ancient Woodlands, Local Wildlife and Geological Sites will be protected and enhanced. Proposals for development on other sites, having biodiversity or geological conservation value, will be permitted provided that they protect enhance and/or restore habitat biodiversity. Development proposals will be expected to ensure that they:

- lead to a net gain of biodiversity, where appropriate, by means of an approved ecological assessment of existing site features and development impacts
- protect or enhance biodiversity assets and secure their long term management and maintenance
- avoid negative impacts on existing biodiversity
- preserve species which are legally protected, in decline, are rare within Coventry or which are covered by national, regional or local Biodiversity Action Plans

9.1.28. Policy EM9 Safeguarding Mineral Resources. *“Mineral Safeguarding Areas are defined for mineral reserves that are of current or future economic importance. Where developments are proposed in these areas, the application needs to acknowledge the presence of these mineral reserves.”*

Rugby Borough Council Local Plan (2011 – 2031)

9.1.29. Policy NE1: Protecting Designated Biodiversity and Geodiversity Assets
“Development likely to result in the loss, deterioration, degradation or harm to habitats or species of local importance to biodiversity, geological or geomorphological conservation interests, either directly or indirectly, will not be permitted for Local Nature Reserves (LNRs); Local Wildlife Sites (LWS), Local Geological Sites (LGS), European and UK protected species, or Biodiversity Action Plan habitats unless:

- The need for, and benefits of, the development in the proposed location outweighs the adverse effect on the relevant biodiversity interest. All Development proposals impacting on local wildlife sites will be expected to assess the site against the ‘Green Book’ criteria to determine the status of the site and to ascertain whether the development clearly outweighs the impacts on the site.
- It can be demonstrated that it could not reasonably be located on an alternative site that would result in less or no harm to the biodiversity interest.
- Measures can be provided (and secured through planning conditions or legal agreements), according to the mitigation hierarchy as set out above. The level of protection and mitigation should be proportionate to the status of the habitat or species and its importance individually and as part of a wider network.”

9.2. Assessment methodology

9.2.1. The assessment for geology and soils (with the exclusion of those effects which have been scoped out of requiring further assessment in Section 9.8 of this PEIR) will be undertaken in accordance with DMRB LA 109.

- 9.2.2. Following DMRB LA 109, receptors for the assessment for disturbed historical contamination during construction and operation are:
- Human health
 - Surface water
 - Groundwater
- 9.2.3. The baseline for the environmental assessment will include data if available from the GI, which commenced in May 2023 and due to report at a later date in 2023. The findings of the GI will be considered when assessing the potential impacts of the Scheme.
- 9.2.4. Significance of effect will be determined by the predicted deviation from the baseline conditions and the scale of impact drawing on the criteria provided in DMRB LA 109.
- 9.2.5. Environmental information in relation to surface water and groundwater is provided within PEIR Chapter 12 Road Drainage and the Water Environment. Information related to population and human health is provided within PEIR Chapter 11.

9.3. Assessment assumptions and limitations

- 9.3.1. The baseline information is based on desk study of currently available information at the time of writing.
- 9.3.2. A GI report is anticipated later in 2023 and the findings will be considered if available during the production of the ES.
- 9.3.3. Potential impacts have been based on data presented in the Landmark Envirocheck Report (2023), the Preliminary Sources Study Report (PSSR) (Highways England, 2021) and Environmental Assessment Report (EAR) (National Highways, 2022), and have been assumed to be accurate.
- 9.3.4. To the extent that this chapter is based on information supplied by other parties, it has been assumed that this information is complete and correct. All sources used have been listed within Section 9.5.
- 9.3.5. Reported baseline conditions from the PSSR (Highways England, 2021) and EAR (National Highways, 2022) are assumed to be accurate. However, owing to the dynamic nature of the environment, conditions may change during the construction and operational phases.

- 9.3.6. To the extent that this chapter uses information obtained from a GI, persons using or relying on it should recognise that any such investigation can examine only a fraction of the subsurface conditions.
- 9.3.7. In relation to contaminated land, GIs may not identify small areas of historical/hidden contamination and there is the potential for previously unidentified contamination to be encountered during the construction process.

9.4. Study area

- 9.4.1. The study area has been set based on guidance held within DMRB LA 109 and professional judgement based on the activities planned with this development. The study area for this assessment considers all locations where physical works and ground disturbance would take place and extends to 250m beyond this in order to identify any past pollution incidents which could have affected soil within the works area and sensitive off-site receptors. The 250m buffer was chosen in line with DMRB LA 109 as the area in which potential significant effects could occur based on professional experience considering the scale and type of development proposed.

9.5. Baseline conditions

- 9.5.1. Sources of information include previous reporting, historical and geological mapping and online data sources. Key sources used include:
- A46 Coventry junctions Upgrade (Walsgrave junction) PSSR. (Highways England, 2021)
 - A46 Coventry junctions Upgrade (Walsgrave junction) Environmental Scoping Report (ESR). (Highways England, 2020)
 - A46 Coventry junctions Upgrade (Walsgrave junction) EAR. (National Highways, 2022)
 - A46 Coventry junctions Upgrade (Walsgrave junction) GI Scope Report. (Highways England, 2021)
 - Envirocheck Report 314685113_1_1 (Landmark, 2023)
 - Detailed Unexploded Ordnance (UXO) Threat & Risk Assessment (Alpha Associates, 2022)
 - Defra (2023). MAGIC Mapping. Accessed July 2023. <https://magic.defra.gov.uk/home.htm>
 - British Geological Survey (2023). GeoIndex Onshore. Accessed July 2023. <https://www.bgs.ac.uk/map-viewers/geoindex-onshore/>
 - UK Soil Observatory (2023). UKSO Map Viewer. Accessed July 2023. <https://www.ukso.org/>

- 9.5.2. GI work underway comprises site reconnaissance, intrusive investigation, sampling and analysis. This is designed to provide data to assess the extent, depth and composition of any contaminated soils alongside gaining geotechnical data for design and construction purposes. Reporting from the GI will be used to inform the baseline conditions reported in the ES, if available.
- 9.5.3. Currently available baseline data for the Scheme is set out in Table 9-1.
- 9.5.4. Effects on geomorphology, hydromorphology, and hydrogeology are covered in Chapter 12: Road drainage and the water environment. Geotechnical risk is not considered in this chapter.

Table 9-1: Geology and soils baseline data

Aspect	Details
Geology	<p>A basic summary of the geological sequence in the vicinity of the Scheme based on previous reporting including the PSSR and British Geological Survey (BGS) online mapping is as follows:</p> <p>Designated sites</p> <ul style="list-style-type: none"> • No statutory or non-statutory designated sites such as UNESCO or Sites of SSSI have been designated for geological or geomorphological interest in the study area. <p>Made ground</p> <ul style="list-style-type: none"> • Made ground – indicated to be present in the vicinity of, and under the existing roads and areas of infilled ground to the west of the A46, south of the existing roundabout and far north of the Scheme. <p>Superficial geology</p> <ul style="list-style-type: none"> • Alluvium – present in the vicinity of the River Sowe and Smite Brook as silty clay with sand and gravel. • River Terrace Deposits – located in areas across the study area described as sand and gravel, locally with lenses of silt, clay or peat. • Wolston Formation: Bosworth Clay Member – glacial lacustrine muds in the north of the study area. • Wolston Formation: Thrussington Member, Diamicton – brown or reddish-brown pebbly clay in the north of the study area and along the western flank of the A46. • Paignton Sand and Gravel Formation – located under parts of the northern and southern sections of the study area described as sands and gravels, with lenses of silt and clay. <p>Bedrock geology</p> <ul style="list-style-type: none"> • Mercia Mudstone – underlies the entirety of the study area described as a stiff to hard silty clay with occasional mudstone bands and a weathered thin to medium fine grained moderately strong to strong sandstone. <p>Previous GI data located within the PSSR indicate that topsoil, made ground, alluvium, River Terrace Deposits, Bosworth Clay Member, Baginton Sand and Gravel, Thrussington Member and Mercia Mudstone (weathered) were identified within the draft Order Limits.</p>

Aspect	Details	
	The 2023 GI will provide additional details of the geology within the Scheme study area and will be utilised to inform the Geology and Soils chapter of the ES.	
Sites of geological interest	Historical quarrying	<p>One historical surface mineral working is located on site and two off-site within 250m, according to the Envirocheck (2023) report:</p> <ul style="list-style-type: none"> • On-site – Coombe Woods, Coventry, Warwickshire. Located in the south. Commodity: sand and gravel. Operation ceased. • Off-site – Walsgrave Hill, Coventry, Warwickshire. 116m to east. Commodity sand and gravel. Operation ceased. • Off-site – Binley Gravel Pit, Coventry, Warwickshire. 67m west. Commodity: sand and gravel. Operation ceased.
	Local geological sites	No statutory or non-statutory designated geological sites such as UNESCO or SSSI sites in close proximity.
	BGS recorded mineral sites	Three BGS mines and quarry sites are located within the study area. These are for Coombe Wood, Walsgrave Hill and Binley Gravel Pit.
Hydrogeology	<p>The MAGIC mapping website indicates that the Scheme is not within or located nearby to any groundwater Source Protection Zones (SPZs). The closest SPZ is 3km to the west of the Scheme.</p> <p>The Environment Agency (2017) has designated aquifer properties of the strata as follows:</p> <p>The alluvium, River Terrace Deposits and Baginton Sand and Gravel Formation are classified as Secondary A Aquifers (can support local water supplies, and may form an important source of base flow to rivers).</p> <p>The Thrussington Member (Wolston Formation) and Bosworth Clay Member (Wolston Formation) are classified as a Secondary Undifferentiated (aquifer of minor value) and Unproductive stratum respectively (unable to provide usable water supplies).</p> <p>The Mercia Mudstone is classified as a Secondary B aquifer (may store and yield limited amounts of groundwater).</p> <p>Refer to Chapter 12: Road drainage and the water environment, for more information.</p>	
Hydrology	<p>Coombe Pool, a man-made feature located adjacent to the east of the Scheme and is designated as a SSSI as a standing open water and canals habitat.</p> <p>Smite Brook feeds into Coombe Pool at its north-eastern end. Water from Coombe Pool flows back into Smite Brook via a weir close to the Walsgrave junction. Smite Brook passes west underneath the A46 through a culvert, and is a tributary to the River Sowe, which runs north to south on the western boundary extent of the study area.</p> <p>A surface water pond is located within the draft Order Limits approximately 100m from the A46 to the north. Two ponds are located east of the draft Order Limits, approximately 250m east.</p> <p>Refer to Chapter 12: Road drainage and the water environment, for more information.</p>	
Soil survey	<p>The UK Soil Observatory map viewer identifies the soils as predominantly arable and horticultural, with a section of urban cover in the centre of the Scheme. Broadleaved woodland is present to the south and east, and improved grassland to the west.</p> <p>Agricultural land to the east of the A46 in the northern part of the study area is classified (MAFF, 1988) as a mixture of Grade 3a (good quality agricultural land) and</p>	

Aspect	Details
	<p>Grade 3b (moderate quality agricultural land) land with a small parcel of Grade 2 (very good quality agricultural land) listed agricultural land.</p> <p>Agricultural land to the west of the A46 is classified as Grade 2 and Grade 3. An agricultural soil survey will be undertaken in autumn 2023.</p>
Landfill records	<p>No active or recent landfills have been identified within a 250m radius of the Scheme.</p> <p>An on-site historical landfill (shown on Figure 2.3 of Volume 2) is located in the north of the study area (Walsgrave Hill Borrow Pit) with a further historical landfill located in the south of the study area (Coombe Fields), both within the Scheme and in close proximity.</p> <p>Wastes accepted by the landfills, where known, include inert, commercial and industrial material.</p> <p>Off-site landfills to the south-west of the Scheme include Hawkes Tip, approximately 20m to the west and Coombe Park 100m to the south-west. A further landfill, Coombe Estate, is identified 165m to the west of the Scheme which received inert waste.</p>
Current land use and man-made features	<p>The A46, also known as Coventry Eastern Bypass, is a two-lane dual carriageway with central reserve which leads south to a three-arm roundabout. The south-east arm of the roundabout extends the A46 to the south-east and the western arm exits onto the B4082. A bridge is located on the B4082 which crosses over Smite Brook.</p> <p>To the west of the B4082, another three-arm roundabout is present, the northern arm leads Clifford Bridge Road north towards Wyken. A bridge is located to the north which crosses the River Sowe. The southern arm leads onto Clifford Bridge Road towards Binley and the eastern arm leads towards Coombe Abbey Country Park.</p> <p>The principal land use within the Scheme area is agriculture to the north and east with urban areas to the west and south-west.</p> <p>The principal man-made features are the existing A46, B4082 and Clifford Bridge Road with associated bridges and roundabouts.</p> <p>The principal land uses surrounding the Scheme are:</p> <ul style="list-style-type: none"> • urban residential to the west and south • Hungerley Hall Farm to the north of the junction • Coombe Pool (ecological SSSI) to the east • agricultural to the north of Walsgrave junction <p>Drainage channels are located within the draft Order Limits which ultimately connect to the River Sowe.</p> <p>Smite Brook runs east-west across the Scheme from Coombe Pool with a section culverted beneath the A46.</p> <p>Coombe Pool is an artificial lake designated as a SSSI and is located directly east of the Scheme.</p>
Route history	<p>The historical development of the area had been summarised from historical Ordnance Survey (OS) mapping contained within the Envirocheck report.</p> <p>The study area is dominated by agricultural fields in the earliest map from 1886 with Coombe Pool (labelled as The Pool) shown directly to the east. Hungerley Hall Farm is shown in its current position.</p> <p>In 1926, the current Clifford Bridge Road was named Binley Lane to the north and Sowe Lane to the south. On the 1955 map, this shows the change to the current name of Clifford Bridge Road (B4082).</p> <p>In 1955 gravel pits are shown at the southern extent of the Scheme. These are no longer presented in the 1980 map.</p>

Aspect	Details
	1991 shows the current A46 layout which trends generally north-south through the Scheme with the A4082 heading west from the roundabout. The A4082 became the current B4082 in 2001.
Potential contamination risks	<p>No major environmental incidents have been recorded in the proximity to the Scheme. A single significant incident is recorded 144m to the east at Coombe Pool Fishery where dead fish were found floating. No cause of the incident is given.</p> <p>The potential sources of contamination which may be present at or near the Scheme comprise:</p> <ul style="list-style-type: none"> • former landfills • former and current scrap yard/metal recyclers and commercial premises • residual hydrocarbon contamination from any accidental releases of vehicle fuel or loads • agricultural chemicals and products applied to the agricultural land to the north and east • contaminated materials within imported fill material used for the road construction • residual contaminants from unspecified ground workings • unspecified tanks and below ground features <p>These potential sources present theoretical risks to construction materials, ground conditions, site workers, site users, neighbouring agricultural land and adjacent surface waters including the River Sowe, Smite Brook and Coombe Pool.</p>
UXO risk	The site comprises of medium risk and low risk areas of encountering UXO. The medium risk area is located to the north of the Scheme as detailed by the '1st Line Defence' Detailed UXO Risk Assessment within the PSSR. Risk mitigation measures are recommended.

9.6. Potential impacts

9.6.1. The assessment of potential impacts from construction and operational phases will consider the following potential receptors in the ES:

- public open space users, residential/commercial users, current site users
- construction workers and future site users
- agricultural land
- Coombe Pool SSSI
- Secondary A and B aquifers, and surface waters

Construction

9.6.2. Potential impacts are likely to be higher during the construction phase of the Scheme. Potential impacts during the construction phase include:

- disturbance and mobilisation of contamination

- mobilisation of silts and soils during dewatering events
- introduction of new sources of contamination through spills, leaks and accidental loss of fluids, fuels and oils
- potential to create preferential migration pathways through excavation and piling which may lead to impacts to receptors

Operation

9.6.3. The operational phase would have a lower probability to introduce potential impacts related to the Scheme. Potential impacts during the operational phase are:

- release of water incident on the road surfaces to the environment due to failure/bypassing of Scheme drainage
- accidental release of fuels, oils and traffic related pollutants relating to vehicle collisions

9.6.4. Potential impacts on groundwater and surface water associated with drainage and water discharge are considered within Chapter 12: Road drainage and the water environment.

9.7. Design, mitigation and enhancement measures

Embedded (design) mitigation

9.7.1. Mitigation measures for the protection of geology and soils during the operation of the Scheme relate to the implementation of a comprehensive and robust drainage design, as measures which protect the water environment are also likely to protect soils and groundwater.

Essential mitigation

9.7.2. Made ground underlies the Scheme with landfills in the north and south of the Scheme. Management of the associated potential risks during construction would be undertaken in accordance with good practice including:

- monitoring of potential ground gases and vapours in confined spaces during construction
- design of in-ground structures to appropriate concrete design classification
- suitable personal protective equipment (PPE) and hygiene practices for construction and maintenance workers

9.7.3. The findings of the GI work (reporting in 2023) would identify the requirement and scope of any potential remediation works required. The remediation strategy, if required, would examine feasible and sustainable options to manage, remove/dispose or treat identified contaminated material where it is cost

effective and practicable to do so. The potential effects would be established and reported in the ES.

- 9.7.4. The remediation strategy would address any particular regulatory requirements under development control for managing any previously unknown contamination encountered during the works.
- 9.7.5. In addition, the implementation of an Environmental Management Plan (EMP) would set out controls to ensure identified risks associated with contamination are appropriately managed and minimised. Mitigation measures within the EMP would include best practice environmental management procedures and appropriate waste management such as:
- ensuring adequate space for storage of topsoil and subsoil which must be segregated during excavation
 - protection of watercourses from entry of polluting matter
 - protection of aquifers from migration of potential contaminants
 - stripping, storing and reinstating of soils using best practice measures to minimise the risk of degradation to soils
 - suppression of odour and dust using best practice measures
- 9.7.6. UXO mitigation measures would be employed to reduce the risks to as low as reasonably practicable. These may include a UXO emergency response plan, safety and awareness briefings, magnetometer surveys, both intrusive and non-intrusive surveys and watching briefs prior to and during construction.
- 9.7.7. Operational maintenance activities, which may lead to potential risks to geology and soils, would be managed through the standard maintenance requirements and environmental protection measures which apply to the National Highways network and are documented in the Network Maintenance Manual (Highways Agency, 2009) and the Routine and Winter Service Code (Highways Agency, 2009).

9.8. Assessment of likely significant effects

Construction

- 9.8.1. Excavation works associated within the Scheme have the potential to directly affect underlying geological features. However, since the Scheme is not located within a geologically protected site, and there are no important geological deposits identified on site, it is not predicted that there would be significant effects on geology.
- 9.8.2. Table 10-2 provides a summary of potential construction effects on geology and soils for the Scheme.

Operation

- 9.8.3. It is predicted that operation of the Scheme is unlikely to give rise to any significant effects upon geology or soils. This phase would only include occasional maintenance and therefore would be of minimal impact.
- 9.8.4. Table 9-2 provides a summary of potential construction and operational effects on geology and soils for the Scheme.

Table 9-2: Summary of potential geology and soil effects

Potential construction effects	Potential operation effects
Potential to adversely effect agricultural land.	Potential to permanently take agricultural land resulting in an adverse effect.
Potential mobilisation of contaminants in made ground/landfills during construction activities affecting sensitive receptors including human health and controlled waters.	

Proposed level of scope and assessment

- 9.8.5. Table 9-3, in accordance with DMRB LA 109, sets out the proposed scope for the ES.

Table 9-3: Scope of assessment

Scoping questions	Response based on current understanding	Scope in?
Is the project likely to affect designated geological sites (statutory or non-statutory)?	No statutory or non-statutory geological sites recorded within the proposed construction extent.	No
Is the project likely to affect the function or quality of soil as a resource?	While additional land will be taken, the operational land use would remain largely the same compared to baseline conditions. It is not considered that the Scheme would significantly affect the function or quality of soil as a resource, however as the design is not finalised an assessment will be undertaken. The impact on agricultural land, through which the Scheme passes will be assessed separately (see question below).	Yes
Is the project likely to affect agricultural land classified as best and most versatile (BMV) or prime land?	The Scheme encroaches on land being used for agriculture. The Scheme is anticipated to potentially affect the quality of agricultural soils with Agricultural Land Classification Grades 2, 3a and 3b land present within the study area.	Yes
Is the project likely to disturb historical contamination?	Historical landfills are present in the north and south of the Scheme. The extent of the landfill and materials landfilled will need to be assessed further. No additional significant sources of confirmed historical contamination have been identified within the draft Order	Yes

Scoping questions	Response based on current understanding	Scope in?
	Limits, however, there is the possibility of unidentified contamination to be present.	
Is the project likely to introduce significant sources of contamination?	No significant sources of contamination are likely to be introduced as part of the Scheme's construction or operation.	No

9.9. Conclusions

- 9.9.1. This chapter provides a summary of the assessment that has been undertaken to date for geology and soils, including contaminated land in accordance with DMRB.
- 9.9.2. The Scheme is not located within a geologically protected site, and there are no important geological deposits identified on site, it is not predicted that there would be significant effects on geology. Excavation works associated within the Scheme have the potential to directly affect underlying geological features. Overall, it is predicted that operation of the Scheme is unlikely to give rise to any significant effects upon geology or soils. This phase would only include occasional maintenance and therefore would be of minimal impact.
- 9.9.3. GI work underway comprises site reconnaissance, intrusive investigation, sampling and analysis. This is designed to provide data to assess the extent, depth and composition of any contaminated soils alongside gaining geotechnical data for design and construction purposes. Reporting from the GI will be used to inform the baseline conditions reported in the ES.
- 9.9.4. Further surveys are to be undertaken in autumn 2023 to confirm this potential adverse effect of loss of agricultural land. Ongoing design development and the development of mitigation and/or compensation strategies are required.
- 9.9.5. Where considered necessary to undertake further work has been identified both in relation to ground investigation, soil surveys and reporting. These assessments which will incorporate the results of additional surveys including GI, ALC survey and soil nutrient survey to be undertaken in autumn 2023. The assessments and any necessary mitigation and compensation measures will be reported within the ES, to be submitted as part of the DCO application.

10. Noise and vibration

10.1. Introduction

- 10.1.1. This chapter presents the preliminary findings of the noise and vibration assessment. This comprises a review of the existing environment and identification of the potential impacts of the Scheme in the context of noise and vibration during its construction and operation. Consultation is identified where relevant to the content and focus of the chapter. This chapter also outlines proposed design measures to help mitigate potential noise and vibration impacts.
- 10.1.2. This chapter has been prepared in accordance with the process set out in the Design Manual for Roads and Bridges (DMRB) LA 111 Noise and vibration Revision 2 (Highways England, 2020) (hereafter referred to as DMRB LA 111). DMRB LA 111 describes a methodology for assessing and reporting the effects of highway noise and vibration from construction, operation and maintenance projects within the UK.

Stakeholder engagement

- 10.1.3. No consultation with Rugby Borough Council and Coventry City Council has been held to date.
- 10.1.4. A scoping opinion has been sought from the Planning Inspectorate, additional consultations in respect to specific technical aspects will occur as a result of that Opinion.

Legislative and policy framework

- 10.1.5. The following legislation and policy are relevant to the noise and vibration aspects of the Scheme.

Legislation

The Land Compensation Act 1973 Part 1

- 10.1.6. The Land Compensation Act 1973 Part 1 includes provision for compensation for loss in property value resulting from physical factors, including noise and vibration, resulting from the use of public works, such as new or improved roads.

The Noise Insulation Regulations 1975 (amended 1988)

- 10.1.7. The Noise Insulation Regulations 1975 (amended 1988) were made under Part 2 of the Land Compensation Act for the obligatory and discretionary provision of noise mitigation measures for dwellings adjacent to new highways. Among the criteria for a property to qualify for insulation in living rooms and bedrooms is the

façade noise level is at least 68 decibel (dB) LA10,18hr (the arithmetic average of the 18 LA10(1hr) levels for the period between 0600 hours and 2400 hours on any day), and that noise from the new or altered highway increases by at least 1 dB.

The Control of Pollution Act 1974 (sections 60 and 61)

10.1.8. Whilst people that live near to construction activities may accept that there would be some disturbance caused to them, the Control of Pollution Act 1974 offers further protection. Section 60 of the Act enables a local authority to serve a notice specifying its noise control requirements covering plant or machinery (which is or is not being used), hours of working, and levels of noise that can be emitted. Section 61 relates to prior consent in which the contractor consults with the local authority and provides an application prior to construction works commencing to obtain approval for the methods to be used and the steps proposed to minimise noise resulting from the works.

The Environmental Noise (England) Regulations 2006 (amended 2018)

10.1.9. The regulations implement European legislation requiring noise action plans to be developed on a five-year rolling programme. Action plans have to be developed for the major noise sources and areas for which maps have been produced and that identified 'Important Areas' for future mitigation. The action plans seek to manage noise issues and effects including noise reduction, if necessary, based on the results obtained through the mapping process.

The Environmental Protection Act 1990

10.1.10. The Environmental Protection Act 1990 places a duty on local authorities to serve abatement notices where noise from premises, vehicles and machinery are judged to constitute a statutory nuisance. Compliance with these controls is required, although the requirements fall outside the planning system.

The Highways Noise Payments and Movable Homes Regulations 2000

10.1.11. The Highways Noise Payments and Movable Homes Regulations 2000 makes provision for mobile home noise payments and limitations on these. The regulations define movable homes as being caravans or/and house boats.

National policy

National Policy Statement for National Networks (NPSNN)

10.1.12. The NPSNN (Department for Transport (DfT), 2014) sets out the Government's policies to deliver the development of Nationally Significant Infrastructure Projects (NSIP) on the national road and rail networks in England. The Secretary

of State (SoS) uses the NPSNN as the primary basis for making decisions on Development Consent Order (DCO) applications.

10.1.13. Key policy from the NPSNN relevant to this aspect is set out below:

- Paragraph 5.193 of the NPSNN states “*Due regard must have been given to the relevant sections of the Noise Policy Statement for England, National Policy Framework and the Government’s associated planning guidance on noise*”
- Paragraph 5.195 states “*The Secretary of State should not grant development consent unless satisfied that the proposals will meet, the following aims, within the context of Government policy on sustainable development:*
 - *avoid significant adverse impacts on health and quality of life from noise as a result of the new development*
 - *mitigate and minimise other adverse impacts on health and quality of life from noise from the new development*
 - *contribute to improvements to health and quality of life through the effective management and control of noise, where possible*”
- Paragraph 5.191 states “*Operational noise, with respect to human receptors, should be assessed using the principles of the relevant British Standards and other guidance. The prediction of road traffic noise should be based on the method described in Calculation of Road Traffic Noise*”
- Paragraph 5.198 states “*Mitigation measures for the projects should be proportionate and reasonable and may include one or more of the following:*
 - *Engineering: containment of noise generated*
 - *Materials: use of materials that reduce noise (for example low noise road surfacing)*
 - *Lay-out: adequate distance between source and noise-sensitive receptors; incorporating good design to minimise noise transmission through screening by natural or purpose-built barriers*
 - *Administration: specifying acceptable noise limits or times of use (for example in the case of railway station PA systems)*”

The National Planning Policy Framework (NPPF) 2023

10.1.14. Paragraph 174 of the NPPF states that: “*Planning policies and decisions should contribute to and enhance the natural and local environment by...preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.*”

10.1.15. Paragraph 185 of the NPPF states that planning policy and decisions should aim to: “*Mitigate, and reduce to a minimum, potential adverse impacts resulting from*

noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life; Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.”

Planning practice guidance (PPG)

10.1.16. PPG provides guidance on how the policy set out in NPPF may be interpreted in practice for a wide range of issues. There is a subsection of PPG relating specifically to noise (2019):

10.1.17. *“Local planning authorities’ plan-making and decision taking should take account of the acoustic environment and in doing so consider:*

- *whether or not a significant adverse effect is occurring or likely to occur*
- *whether or not an adverse effect is occurring or likely to occur*
- *whether or not a good standard of amenity can be achieved*

10.1.18. *In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during construction wherever applicable) is, or would be, above or below the significant observed adverse effect level...”*

10.1.19. Among the specific factors to consider where relevant the guidance states: *“In cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in the overall noise level may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur”*.

10.1.20. PPG provides a noise exposure hierarchy which describes the perception and outcomes associated with increasing effect levels.

The Noise Policy Statement for England (NPSE) 2010

10.1.21. The Noise Policy Statement for England (NPSE)185 purpose is to promote “good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.” The three main aims are to:

- Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
- Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

- Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

10.1.22. Within the aims stated above there are several key phrases that lead to additional concepts now considered in the assessment of noise impact; these and their definitions are detailed below:

- Lowest Observed Adverse Effect Level (LOAEL): this the level above which adverse effects on health and quality of life can be detected.
- Significant Observed Adverse Effect Level (SOAEL): this is the level above which significant adverse effects on health and quality of life occur.

10.1.23. There are no pre-defined levels for these effect levels as it is acknowledged that they will be different for different sources, different receptors and at different times.

National Highways policy

10.1.24. Noise is one of the environmental topic areas where the six strategic levers of the National Highways' Environment Strategy will be applied. The strategic levers will make a contribution towards the organisation's environment vision.

Local Policy

Coventry City Council Local Plan (2011 – 2031)

10.1.25. Policy DS3: Sustainable Development Policy. "When considering development proposals, the Council will take a positive approach that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework. It will work proactively with applicants to find solutions to enable proposals to be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in the area, including:

- access to a variety of high-quality green and blue infrastructure
- access to job opportunities
- use of low carbon, renewable and energy efficient technologies
- the creation of mixed sustainable communities through a variety of dwelling types, sizes, tenures and range of community facilities
- increased health, wellbeing and quality of life
- measures to adapt to the impacts of climate change
- access to sustainable modes of transport

- preservation and enhancement of the historic environment
- sustainable waste management”

Rugby Borough Council Local Plan 2011 – 2031

10.1.26. Policy HS5: Traffic Generation and Air Quality, Noise and Vibration.

“Development proposals should promote a shift to the use of sustainable transport modes and low emission vehicles (including electric/hybrid cars) to minimise the impact on air quality, noise and vibration caused by traffic generation. Proposals should be located where the use of public transport, walking and cycling can be optimised. Proposals should take full account of the cumulative impact of all development including that proposed in this Local Plan on traffic generation, air quality, noise and vibration.” Development proposals should “address the adverse impacts of noise and vibration on existing and future occupiers and users of the public realm”.

10.2. Assessment methodology

- 10.2.1. As set out in the scoping report (National Highways, June 2023) the Scheme has the potential to directly alter the noise and vibration baseline for several sensitive receptors both temporarily (during construction) and permanently (during operation). The scoping report sets out the proposed noise and vibration assessment methodology. Determination of the receptor sensitivity, magnitude of impact, and resultant significance of effect will be undertaken in accordance with the definitions and assessment methodology presented in DMRB LA 111.
- 10.2.2. At this stage, insufficient information is available to be able to undertake a full noise assessment of potential impacts, specifically traffic data. Assessments to establish significant effects and to inform the mitigation strategy are proposed to be undertaken as below when data becomes available, and their results will be set out in the ES.
- 10.2.3. The scope of the noise and vibration assessment is considered to comprise of the following:
- Construction noise
 - Construction vibration
 - Operational noise
- 10.2.4. As set out in the Scoping report, the assessment of operational vibration is scoped out of further assessment based upon DMRB LA 111 section 1.4 that states “*operational vibration is scoped out of the assessment methodology as a maintained road surface will be free of irregularities as part of project design and*

under general maintenance, so operational vibration will not have the potential to lead to significant adverse effects”.

- 10.2.5. A baseline noise survey will be undertaken during autumn winter 2023–24 subject to land owner permissions, weather and normal road traffic conditions occurring in the vicinity of the Scheme, with potential measurement locations identified where one or more of the following occurs:
- anticipated change in road traffic speed
 - anticipated change to either the vertical or horizontal alignment of the A46
 - noise sensitive receptors located close to the Scheme
- 10.2.6. In addition to the above, noise measurements will be taken within Coombe Pool SSSI to inform the assessment of effects on noise sensitive ecological receptors (discussed further in Chapter 8 Biodiversity of this PEIR). The biodiversity assessment will consider effects on noise sensitive ecological receptors, informed by baseline noise monitoring as set out above as well as outputs from the noise modelling at relevant representative receptor locations. Further detail regarding the ecological assessment can be found in Chapter 8 Biodiversity of this PEIR.

Significance of effects

- 10.2.7. The assessment of construction noise and vibration and operational noise impacts will be undertaken using the British Standard 5228 (Parts 1 and 2) (British Standards Institute, 2014) and the DMRB LA 111 methodology to identify potential significant effects.
- 10.2.8. The NPSNN requires that ‘due regard’ must be given to relevant sections of the NPPF, the NPSE and the associated National Planning Policy Guidance on noise. In order to comply with these policies, it is necessary to determine the Lowest Observed Adverse Effect Level (LOAEL) which is *“the level above which adverse effects on health and quality of life can be detected”*, and the Significant Observed Adverse Effect Level (SOAEL) which is the level *“above which significant adverse effects on health and quality of life occur”* for noise effects. The mitigation strategy will depend upon the magnitude of any impacts at sensitive receptors between LOAEL and SOAEL, in addition to exceedances of SOAEL.
- 10.2.9. In order to comply with these policies, it is necessary to determine the LOAEL which is *“the level above which adverse effects on health and quality of life can be detected”*, and the SOAEL which is the level *“above which significant adverse effects on health and quality of life occur”* for noise effects. The mitigation

strategy will depend upon the magnitude of any impacts at sensitive receptors between LOAEL and SOAEL, in addition to exceedances of SOAEL.

10.2.10. The environmental assessment of significant effects on human health and determination of mitigation measures will be completed in accordance with the requirements of DMRB LA 111. DMRB LA 111 Annex E/1 summarises the national policy requirements of NPSE and NPPF and NPSNN for environmental assessment.

Construction noise

10.2.11. For construction noise, LOAEL should be determined with reference to baseline noise levels and SOAEL should be set at the threshold level determined in accordance with BS 5228-1:2009+A1:2014.

10.2.12. The construction assessment will be carried out in accordance with the methodology in BS 5228: 2009+A1: 2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites.

10.2.13. BS 5228 contains a number of example methodologies for identifying significant construction noise effects based on fixed thresholds or noise level changes. For the purposes of this assessment the 'ABC' method will be adopted (Table 10-1). This will be clarified in consultation with the environmental health departments of the relevant local authorities in the area.

Table 10-1: Example threshold of potential significant effect at dwellings

Assessment category and threshold value period	Threshold value, in decibels (dB) ($L_{Aeq,T}$)		
	Category A	Category B	Category C
Night-time (23:00 – 07:00)	45	50	55
Evenings and weekends (19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays)	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

10.2.14. Category A threshold values are to be used when ambient noise levels (when round to the nearest for 5dB) are less than these values. The same approach is taken for Category B and C.

10.2.15. Table 10-2 below reproduces Table 3.12 from DMRB LA 111 and sets out the LOAEL and SOAEL threshold noise levels.

Table 10-2: Construction noise LOAELs and SOAELs

Time period	LOAEL	SOAEL
Day (07:00 – 19:00 weekday and 07:00 – 13:00 Saturdays)	Baseline noise levels ($L_{Aeq,T}$)	Threshold level determined as per BS 5228-1 Section E3.2 and Table E.1 (Replicated as Table 10-1)
Night (23:00 – 07:00)	Baseline noise levels ($L_{Aeq,T}$)	Threshold level determined as per BS 5228-1 Section E3.2 and Table E.1 (Replicated as Table 10-1)
Evening and weekends (time periods not covered above)	Baseline noise levels ($L_{Aeq,T}$)	Threshold level determined as per BS 5228-1 Section E3.2 and Table E.1 (Replicated as Table 10-1)

10.2.16. Table 10-3 and Table 10-4 set out the relevant magnitudes of impact for construction noise and construction traffic noise levels respectively.

Table 10-3: Magnitude of impact, construction noise levels

Magnitude of impact	Construction noise level
Major	Above or equal to SOAEL +5dB
Moderate	Above or equal to SOAEL and below SOAEL +5
Minor	Above or equal to LOAEL and below SOAEL
Negligible	Below LOAEL

Table 10-4: Magnitude of impact, construction traffic noise levels

Magnitude of impact	Increase in BNL of closest public road used for construction traffic (dB)
Major	Greater than or equal to 5.0
Moderate	Greater than or equal to 3.0 and less than 5.0
Minor	Greater than or equal to 1.0 and less than 3.0
Negligible	Less than 1.0

10.2.17. Construction noise and construction traffic noise is determined to be a potential significant effect where a moderate or major magnitude of impact will occur for a duration exceeding:

- 10 or more days or nights in any 15 consecutive days or nights
- a total number of days exceeding 40 in any six consecutive months as per DMRB LA 111 section 3.19

Construction vibration

10.2.18. For construction vibration, LOAEL is given as 0.3mm/s peak particle velocity (PPV) and for SOAEL, 1.0mm/s PPV.

10.2.19. According to DMRB LA 111, construction vibration shall constitute a likely significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

- 10 or more days or nights in any 15 consecutive days or nights
- a total number of days exceeding 40 in any consecutive months

10.2.20. Table 10-5 sets out the magnitude of impact for construction vibration.

Table 10-5: Magnitude of impact, construction vibration levels

Magnitude of impact	Construction Vibration Level
Major	Above or equal to 10mm/s PPV
Moderate	Above or equal to SOAEL and below 10mm/s
Minor	Above or equal to LOAEL and below SOAEL
Negligible	Below LOAEL

10.2.21. BS 7385 provides guidance on the levels of vibration that would be necessary to cause structural damage to different types of buildings. The standard indicates that continuous PPVs of more than about 7 mm/s would be required to cause structural damage to residential buildings. Potentially vulnerable buildings and appropriate mitigation will be identified. For residential buildings, limits will be placed based upon levels at which there is a likelihood of complaint, these being considerably lower than those at which building damage may occur.

Operational noise

10.2.22. The methodology within DMRB LA 111 will be adopted for the quantitative assessment of operational noise effects at sensitive receptors.

10.2.23. The level of road traffic noise from the road network will be predicted using the Calculation of Road Traffic Noise methodology (Department of Transport, 1988) from forecast traffic data provided in terms of 18-hour Annual Average Weekday Traffic (AAWT) flow between the hours of 06:00 to 24:00, along with speed pivoted vehicle speed and percentage of heavy goods vehicles. Calculations will determine road traffic noise levels using noise descriptors $LA_{10,18hr}$ and L_{night} . L_{night} values will be derived using Transport Research Laboratory (TRL) Method 3 in accordance with DMRB LA 111 Section A2.

10.2.24. Table 10-6 presents the operational noise LOAELs and SOAELs for all receptors in terms of absolute noise levels.

Table 10-6: Operational noise LOAELs and SOAELs

Time period	LOAEL	SOAEL
Day (06:00 – 24:00)	55dB $LA_{10,18hr}$ façade	68dB $LA_{10,18hr}$ façade

Time period	LOAEL	SOAEL
Night (23:00 – 07:00)	40dB L _{night,outside} (free-field)	55dB L _{night,outside} (free-field)

10.2.25. Noise change due to the Scheme will be determined at noise sensitive receptors within the study area for the following scenarios:

- Short-term: do-minimum opening year scenario (DMOY) compared against the do-something opening year scenario (DSOY).
- Long-term: DMOY compared against the do-something future year scenario (DSFY).
- Non-scheme noise change: do-minimum future year (DMFY) scenario compared against the DMOY.

10.2.26. In the above scenarios, 'do-minimum' means traffic growth with committed development only. 'Do-something' means committed growth with the Scheme.

10.2.27. The opening year is defined as the year the Scheme is open to the public. Similarly, the future assessment year is defined as the opening year +15 years.

10.2.28. DMRB LA 111 classifies the magnitude of noise level change as no change, negligible, minor, moderate or major and applies different criteria in the short-term and long-term. These changes may be beneficial (noise decrease) or adverse (noise increase). These magnitudes of change are defined in Table 10-7 below.

Table 10-7: Magnitude of change, short term and long term

Magnitude of change	Noise change (dB L _{A10,18hr} or L _{night})	
	Short term	Long term
Major	Greater than or equal to 5.0	Greater than or equal to 10.0
Moderate	3.0 to 4.9	5.0 to 9.9
Minor	1.0 to 2.9	3.0 to 4.9
Negligible	Less than 1.0	Less than 3.0

10.2.29. The initial assessment of potential significant effect on noise sensitive buildings should be determined using Table 10-8.

Table 10-8 Initial assessment of operational noise significance

Significance	Short term magnitude of change
Significant	Major
Significant	Moderate
Not significant	Minor
Not significant	Negligible

10.2.30. In all cases where the magnitude of noise level change in the short-term is found to be minor, moderate or major additional factors described in DMRB LA 111 Table 3.60 are considered to determine the final significance. These factors include:

- the magnitude of change with respect to minor and moderate boundaries
- the magnitude of impact in the long term and short-term
- consideration of absolute noise levels with respect to the LOAEL and SOAEL
- location of noise sensitive parts of the receptor
- acoustic context
- perception of change

10.3. Assessment assumptions and limitations

10.3.1. This chapter is based on a desk-top study and is qualitative in its approach. However, it is informed by the indicative noise level outputs shown in the web-based Department for Environment, Food and Rural Affairs (DEFRA) Noise map which is a product of the strategic noise mapping exercise which calculates the propagation of noise from sources such as road and rail. This was originally undertaken by DEFRA in 2012 to meet the requirements of the Environmental Noise Directive (Directive 2002/49/EC) and the Environmental Noise (England) Regulations 2006 (as amended). The strategic noise mapping is in its third iteration (made available in 2017) and is scheduled to be updated every five years.

10.3.2. The variable nature of construction noise is such that it is difficult to accurately predict the noise impacts at given receptors over the period of the construction phase until details of construction plant requirements and specifications become available.

10.3.3. Similarly, it is not possible to quantitatively predict the changes in road noise emissions from the Scheme in the absence of specific traffic modelling which is due to be available in winter 2023-2024.

10.4. Study area

10.4.1. The study area for operational noise is defined in accordance with DMRB LA 111 and predominantly involves:

- calculation of the noise levels at up to 600m from the carriageway edge of new road links or roads physically changed or bypassed by the Scheme

- consideration of any noise sensitive receptors within 50m of any other affected routes (where there is a change of at least 1dB in the short-term or 3dB in the long-term)

- 10.4.2. Consequently, the spatial extents of the operational noise assessment may extend beyond the physical works associated with the Scheme.
- 10.4.3. In line with DMRB LA 111, for construction activity, noise would be calculated at distances up to 300m and vibration up to 100m from the Scheme. These distances are also dependent on the noise and vibration characteristics of the plant that are used.
- 10.4.4. The impact of construction traffic on the local network will also be considered where noise sensitive receptors exist within 50m of any roads where a noise increase of more than 1 dB is predicted. The impacts of diversion traffic (where necessary) will be assessed where noise sensitive receptors exist within 25m of any diversion routes where a noise increase of more than 1 dB is predicted.

10.5. Baseline conditions

- 10.5.1. The Scheme will potentially affect noise levels within in the communities of Wyken and Walsgrave together with some receptors located around Coombe Abbey. The potentially affected areas include within them Pearl Hyde Community Primary School and the University Hospital Coventry.
- 10.5.2. The predominant noise sources in the area include the A46 together with the local road network, with contributions also from the nearby motorways (M6 and M69). There are some areas of commerce and industry, however their contribution to the noise levels is expected (anticipated) to only be within the immediate vicinity of those areas. Contributions from the existing road noise sources are considered further in the following paragraphs.
- 10.5.3. The modelled output of the DEFRA strategic noise mapping exercise (as described in Section 10.4 of this chapter) indicates that during the daytime most of the nearby noise sensitive receptors are beyond the 55dB $L_{Aeq,16h}$ (≈ 57 dB $L_{A10,18h}$) contour with only some to the north of the extents falling within the 55dB – 60dB $L_{Aeq,16h}$ (≈ 57 dB – 62dB $L_{A10,18h}$) contour. At night, most noise sensitive receptors along the draft Order Limits are predicted to be below the predicted contour of 50dB L_{night} . This is with the exception of receptors to the south of the Scheme where the closest noise receptors have predicted noise levels of 50dB L_{night} and above.
- 10.5.4. The baseline noise environment is likely to be dominated by road traffic, with some localised commercial sources (to be confirmed following the baseline noise

survey in autumn -winter 2023-24). In addition to the A46, there are a number of other potentially significant sources of road traffic noise, including:

- B4082 and Clifford Bridge Road
- a number of minor roads, in particular around the Star Industrial Park and University Hospital Coventry, which will contribute to ambient noise levels
- motorways (M6 & M69): the nearby motorways have the potential to significantly contribute to the existing noise levels in their immediate surrounding area. However, due to the intervening distances, the expected contributions within the draft Order Limits are expected to be much less significant when considered in the context of the immediately local road network
- other noise sources include noise associated with general urban and rural activities

10.5.5. The area around Walsgrave junction is a mix of residential, community and commercial use as well as areas of undeveloped semi-natural environment. When considering the definitions of noise sensitive receptors and sensitive buildings as presented in DMRB LA 111, the surrounding noise sensitive receptors have been identified:

- residential communities to the north (1km to the north), west (300m to the west) and south-west (100m to the south-west) of the existing junction
- schools such as Clifford Bridge Academy (350m to the west) and Pearl Hyde Community Primary School (600m to the north), and Wyken Community Centre (800m to the west)
- University Hospital Coventry (1km to the north)
- Coombe Pool Site of Special Scientific Interest (SSSI), located directly east of the junction, is designated for its ornithology. This SSSI is located within Coombe Abbey, which is a Grade II* Park and Garden
- public right of way which crosses the A46 to the north of the current draft Order Limits
- three Grade II listed buildings at Hungerley Hall Farm within the current draft Order Limits

10.5.6. Using the definitions presented in DMRB LA 111, the following 'other' receptor types (i.e., not noise sensitive) have been identified:

- the areas of farmland, including farm buildings, immediately surrounding the A46. Residential buildings within the farms are however considered noise sensitive
- there are commercial premises located intermittently throughout the study area, including retail and industrial buildings. Notable examples include:

- Tesco Superstore, Clifford Bridge Road. Located to the west of the Scheme (≈200m north of the works area)
- Crosspoint Business Park, located to the north of the draft Order Limits (≈120m north-east of the works area); approximately 650m² of industrial and commercial premises including DHL distribution, Asda Superstore etc. Note, a Holiday Inn hotel is located in this business park and is considered noise sensitive

10.5.7. There are no Noise Important Areas (NIAs) located within the draft Order Limits. NIAs are described as ‘hotspot’ locations where the highest 1% of noise levels at residential locations can be found and are used to provide a framework for National Highways to undertake further investigations. However, there are a number of NIAs located on surrounding roads. These include:

- one on the A46 south of the Binley junction, ≈1.5km from the Walsgrave junction (ID 14307)
- three NIAs situated on the A4600 Ansty Road, IDs 324 (≈2.4km north), 11796 (≈1.5km west) and 14385 (≈1.6km north-west)
- two on the A428 Brandon Road (ID 330, ≈1km south-west) and Binley Road (ID 11800, ≈1.3km south-west)

10.5.8. No Environmental Noise Directive (END) quiet areas or potential END quiet areas have been identified in the study area. However, any areas valued for their tranquillity will be identified through consultation responses and discussions with Coventry City Council and Rugby Borough Council and considered in terms of baseline monitoring and modelling respectively (as appropriate).

10.5.9. With regards to existing environmental vibration, there are no significant vibration sources identified within the draft Order Limits. A railway line is noted to exist approximately 2.8km to the south, running due east/west between Coventry and Rugby. Contributions from this within the study areas are expected to be negligible.

10.5.10. As such, existing environmental vibration conditions at the receptors are expected to be controlled by localised sources, typically building services plant or transient local traffic/construction events.

10.6. Potential impacts

Construction

10.6.1. Temporary noise and vibration effects would occur during the 21 month construction phase as a result of on-site activities along the whole route, including:

- demolition of existing structures and carriageway

- excavation, compaction and foundations works
- construction of bridges, retaining structures, services, drainage and the new carriageway surfacing
- installation of noise barriers, signage, gantries and road markings
- construction traffic on the local road networks and diversions of 'normal' traffic associated with road closures/construction works

10.6.2. The duration of noise impacts will vary, depending on the location relative to the route, site access/compounds and structure locations.

10.6.3. The main sources of construction vibration will likely be vibratory compaction (during earthworks and pavement construction) and piling, particularly for foundations for raised structures. These impacts will be short duration and/or intermittent.

Operation

10.6.4. Operational impacts from noise could arise from changes in traffic composition and flow (volume and speed), new carriageways, access and slip roads and re-alignment of existing carriageways.

10.6.5. The predominant potential operational adverse noise impact will be due to the construction of new road links in relative proximity to nearby noise sensitive receivers and the redistribution of existing traffic.

10.6.6. The operation of the Scheme has the potential to result in permanent beneficial noise effects at some receptors, diverting existing traffic flows away from minor roads such as the B4082.

10.7. Design, mitigation and enhancement measures

Embedded (design) mitigation

10.7.1. Information regarding detailed design and extent of the Scheme is still evolving at the time of writing this PEIR. This along with limited information regarding traffic flows and construction phasing has prevented any form of quantitative assessment from being undertaken to inform this PEIR chapter.

10.7.2. As such, the need for and extent of embedded mitigation measures for the control of noise and vibration are still being determined. There is an intent to construct the Scheme using low noise road surfaces, which should result in reduced noise emissions when compared to traditional hot rolled asphalt. Additionally, it is proposed that sections of the Scheme will incorporate reduced speed limits, including a stretch of 50 mph limit on the mainline near Coombe Pool and 40 mph on the B4082. This will reduce noise emissions from these

road links. Further details of the existing and proposed speed limits are provided in PEIR Chapter 2.

- 10.7.3. Further noise mitigation measures such as local acoustic barriers and bunds for both permanent and temporary effects are likely to be incorporated into the design as proposals develop if they are identified as being required in the full assessment undertaken in accordance with DMRB LA 111.

Essential mitigation

- 10.7.4. Mitigation measures to reduce and manage noise and vibration during construction will be included where required and may include measures such as:
- implementation of best practicable means (BPM) with reference to the methods for the control noise and vibration arising from construction activity described within BS 5228
 - control of the timing of works
 - restrictions on the noisiest of activities (hours of operation or duration of operation in a working day)
 - shielding noisy items of plant
 - use of acoustic screening or enclosures around noisy items of plant and/or machinery
 - careful siting of haul routes
 - early construction of mitigation or screening where required for operational purposes
 - careful site layout to minimise noise and vibration impacts
 - noise and vibration monitoring (where significant effects are anticipated)
 - noise insulation or temporary rehousing
 - training of onsite staff with regard to onsite noise control measures, both for operation of equipment and for other site noise
- 10.7.5. By implementing these measures, typical noise levels from construction works can be reduced by approximately 5 to 10 dBA.
- 10.7.6. During the construction phase appropriate mechanisms to communicate with local residents would be set up to highlight potential periods of disruption (such as web-based, newsletters, newspapers, radio announcements etc.), and an appropriate communication strategy will be developed.

Enhancement

- 10.7.7. Enhancements will be investigated during the assessment process following the identification of mitigation measures.

10.8. Assessment of likely significant effects

Construction

- 10.8.1. As stated in section 10.7.1 of this chapter no quantitative assessment has been undertaken, so the likely significant effects have **not yet been established**. However, it is considered that subject to appropriate control of construction activity in accordance with BS 5228 and the Scheme environmental management plan (EMP), noise and vibration will be controlled as far as practicably achievable. As such, significant effects are expected to be unlikely, pending the results of the detailed assessments.
- 10.8.2. The increase in traffic resulting from the construction phase of works is anticipated to be minimal in context of existing flows and pending appropriate traffic control measures, the potential for significant effects occurring is considered to be low.
- 10.8.3. The increase in traffic resulting from traffic diversions associated with the construction phase of works is anticipated to be minimal in context of existing flows and pending appropriate traffic control measures, the potential for significant effects occurring is considered to be low.
- 10.8.4. Cumulative effects due to construction works in the vicinity will be determined during detailed assessment and considered, where appropriate, in the ES.

Operation

- 10.8.5. As set out in section 10.7 of this chapter, some mitigation measures designed to minimise the impact of noise on nearby noise sensitive receptors during operation have been embedded into the design. The effectiveness (plus the need for further measures) will be confirmed during the detailed assessments. These measures will reduce noise emissions from the Scheme to the neighbouring noise sensitive receivers and therefore the likelihood of significant effects occurring as far as practicably achievable.
- 10.8.6. Cumulative effects due to other committed road development schemes in the vicinity will be determined during detailed assessment and considered, where appropriate, in the ES.

10.9. Conclusions

- 10.9.1. This chapter provides a summary of the assessments that have been undertaken so far on noise and vibration for the scheme, in accordance with DMRB LA 111. It sets out the criteria to determine the significance of noise and vibration effects of the scheme and presenting anticipated changes in noise level in the short-term and long-term.

- 10.9.2. Noise and vibration sensitive receptors have been identified around the Scheme extents, however as information necessary to undertake the assessment is currently not available, the assessment of either construction or operational noise and vibration at those locations is still to be undertaken.
- 10.9.3. The details of the assessments proposed to be undertaken are set out in the PEIR with the findings reported in the ES that will be submitted to support the DCO application.

11. Population and human health

11.1. Introduction

- 11.1.1. This chapter presents the preliminary findings of the population and human health assessment. This comprises a review of the environmental baseline, stakeholder engagement, identification of the potential impacts and the likely significant effects as a result of the current design proposals for the Scheme.
- 11.1.2. This chapter includes mitigation and enhancement measures based on current understanding of the design and current level of assessment. This will be refined and expanded upon as the design progresses. The Environmental Statement (ES) will reflect the finalised mitigation and enhancement and include an explanation of the design progression. This chapter considers the potential impacts on the following sub-aspects of land use and accessibility:
- Private property and housing
 - Community land and assets
 - Development land and business
 - Agricultural land holdings
 - Walking, cycling and horse riding (WCH)
- 11.1.3. This chapter also considers the potential impacts on human health, drawing on the assessments of other ES chapters in this Preliminary Environmental Information Report (PEIR) to determine potential health outcomes for local communities.
- 11.1.4. This chapter is supported by the following figure in Volume 2:
- Figure 11.1: Population and human health constraints

Stakeholder engagement

Walking, cycling and horse riding

- 11.1.5. A consultation meeting was held on 29 March 2023 with officers responsible for Active Travel at Coventry City Council and Warwickshire County Council to discuss existing conditions for walkers, cyclists and horse riders (WCH) in the vicinity of the Scheme, the evolving Scheme and its potential impacts on WCH. Discussion was also had regarding WCH infrastructure that could potentially be provided by other developments being promoted close to the A46 corridor, however, it was confirmed that no details are currently available for the allocated housing site to the west. Land to the east identified for emerging employment

use is not allocated for development in the current Rugby Borough Council Local Plan 2011-2031.

- 11.1.6. Coventry City Council provided an update on progress with implementation of the Binley Cycleway scheme and that consideration was being given to promoting the Sowe Valley leisure route to public right of way (PRoW) status. Coventry City Council also indicated that surveys of the B4082 link had revealed some pedestrian and cyclist use of this road even though dedicated infrastructure for WCH is not provided. Coventry City Council was not aware of the informal routes around the B4082 link roundabout. Although the land in question is understood to be owned by a third party, it is thought to be maintained by Coventry City Council since the land adjacent is Council parkland.
- 11.1.7. Warwickshire County Council confirmed that the bridleway which crosses the A46 to the north and the connecting permissive route are very well used for pedestrian and cyclist trips between the built-up areas to the west of the A46 and Coombe Country Park (the Park), some of which are hospital staff undertaking recreational trips on break periods. Warwickshire County Council also provided an overview of schemes to be delivered under the draft Warwickshire Local Cycling and Walking Infrastructure Plan (LCWIP).
- 11.1.8. Both Coventry City Council and Warwickshire County Council expressed the preference for any new WCH infrastructure to be installed as part of the Scheme. Also, WCH facilities to be provided at the proposed dumbbell junction should be segregated provision to Local Transport Note 1/20 (LTN 1/20) standard incorporating signalised crossings on all arms of the roundabouts. With regard to improving connectivity for WCH in the study area, Coventry City Council and Warwickshire County Council identified the following opportunities for consideration as part of the Scheme:
- a link to the residential area close to Pearl Hyde Community Primary School
 - links to the emerging employment area
 - improved links to Coombe Country Park, although acknowledging that:
 - a connection would need to pass through third party land outside of the draft Order Limits
 - a new link may affect the heronry/Coombe Pool Site of Special Scientific Interest (SSSI) site
 - re-use of the Hungerley Hall Farm accommodation bridge to provide a WCH crossing of the A46
- 11.1.9. Separate meetings were held with officers from Coventry City Council and Warwickshire County Council on Tuesday 11 July 2023 and Wednesday 12 July 2023, respectively, to discuss the emerging strategy for WCH. In particular, the

views of the Councils were sought on the proposal to provide a signalised pedestrian crossing on the eastern arm of Clifford Bridge Road and provide passive provision (i.e., verge widening) to accommodate the future provision of a WCH route from Clifford Bridge Road along the B4082 link road, over the Hungerley Hall Farm accommodation bridge and connecting into Coombe Country Park. The rationale being that the Scheme would safeguard land for the delivery of a WCH route between Clifford Bridge Road and Coombe Country Park by others in the future.

11.1.10. The key points from the meeting with Coventry City Council officers are as follows:

- providing passive provision for a WCH route between Clifford Bridge Road and Coombe Country Park was not supported by the Council. Stated preference was for permanent facilities to be provided
- an empty widened verge might encourage unauthorised use along the link road, i.e., the public might walk along the widened verge that would lead to nowhere.
- LTN 1/20 cross section widths are preferred
- could consideration be given to providing passive provision between the Hungerley Hall Farm accommodation bridge and the western dumbbell roundabout, i.e., along the link road

11.1.11. The key points from the meeting with Warwickshire County Council officers are as follows:

- providing passive provision for a WCH route from Clifford Bridge Road to Coombe Country Park was not supported by the Council
- the Council asked if options could be considered to provide a route which runs parallel to the A46 and if options could be considered to connect into the Farber Road Bridleway located to the north of the draft Order Limits. In addition, the Council asked if consideration could be given to providing connections to the industrial park located to the northeast of the draft Order Limits
- Warwickshire County Council need to understand the extents and provision of the development being promoted by Segro to understand how the Scheme accommodates the potential future development. Warwickshire County Council stated that the infrastructure and facilities to be provided as part of the Scheme should not pre-judge planning for potential developments
- Warwickshire County Council stated that all funding for improvements as part of its Local Walking and Cycling Infrastructure Plan were targeted at improving facilities for utility trips and not leisure trips. As such, no funding is available for the provision of new or improved WCH routes into Coombe Country Park

11.1.12. A meeting was held with representatives of Coombe Country Park on 20 July 2023 to obtain the views of the Park on the potential need for an additional crossing of the A46 for pedestrians/cyclists and the provision of routes into the Park from the west. The key points from the meeting are as follows:

- Regarding routes into the Park from the west, the bridleway and the Centenary Way (the permissive route) are well used by walkers and cyclists even though the condition of the permissive route is poor (liable to flooding). The bridge over the ditch into the Park is also in a poor condition.
- The Park indicated that it has a problem with off-road bikes so security on any new route into the Park would be a key issue.
- Conditions for cyclists along the B4027 Brinklow Road were poor due to the lack of dedicated infrastructure. Also, there is no bus stop provision at the entrance to the Park. Any improvements would be well received.
- An additional route across the A46 would be welcomed.
- The Park has an aspiration to open up a circular walk around Coombe Pool so an additional route across the A46 using the Hungerley Hall Farm accommodation bridge would fit well with this aspiration. However, security would be a key issue for any such route given the existing problem with off road bikes.
- Regarding connecting any new route across the accommodation bridge into the Park, two options were presented: (i) a route straight across for the bridge into the Park to connect to a potential circular route around Coombe Pool; (ii) a connection at the field boundary to existing paths within the Park above the bird hide.
- The Park stated that it has no funding for the provision of an additional walking and cycling route.

11.1.13. An additional consultation meeting was held on 19th April 2023 with local user groups including the British Horse Society (BHS), Warwickshire, Coventry and Solihull Local Access Forum; and the Rugby Ramblers to discuss the evolving Scheme and its potential impacts on WCH.

11.1.14. The BHS indicated that the current bridleway to the north of the Scheme does not have much usage by horses as it is effectively a dead end (not a circular route so horse riders have to come back the way they came). As such, they indicated that if any routes are incorporated into the Scheme, they should link to other routes allowing horse riders to become circular routes and that any provision should be multi-user and be future proofed for horse riders.

11.1.15. The BHS also indicated that there should be no loss of any PRow and any extensions to existing provision would be welcomed.

- 11.1.16. All groups indicated that the Scheme should include a link to the University Hospital Coventry as existing conditions make access to the hospital difficult and the Scheme should also include improvements to the River Sowe path network.
- 11.1.17. The user groups also highlighted a scheme in Leeds (the East Leeds Orbital Route) that has incorporated multi user WCH provision along its length which the Scheme should try to emulate.
- 11.1.18. The key points raised will be investigated as part of the design process. The design, mitigation and enhancement measures to be incorporated into the Scheme are part of the evolving WCH strategy set out later in this chapter.

Human health

- 11.1.19. Following the submission of the Environmental Scoping Report (ESR) a Scoping Opinion will be received from the Secretary of State (SoS). As part of the Environmental Impact Assessment (EIA) process, the Scoping Opinion will shape the assessment as reported in the ES, as well as future consultation prior to completion of the impact assessment. Coventry City Council and Rugby Borough Council Public/Environmental Health teams will be consulted during the ES stage. This will be to discuss and agree the health determinants identified for the Scheme, potential impacts identified and resulting health outcomes, and any mitigation required. Any comments raised on the approach to the assessment in the Scoping Opinion will also be discussed as required.

Legislative and policy framework

- 11.1.20. The following legislation and policy are relevant to the population and human health aspects of the Scheme.

Legislation

- 11.1.21. The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (Department for Communities and Local Government, 2017), 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 population and human health.
- 11.1.22. The Countryside Rights of Way Act, 2000 is the main legal framework governing public footpaths, bridleways, traffic and restricted byways. The Act makes provision for public access to the countryside; sets out provision for the management and maintenance of Public Rights of Way; and makes allowance for temporary diversions to rights of way in order to carry out certain types of work.

11.1.23. The Environment Act 2021 is the new framework for environmental protection in the UK, aiming to improve air quality and other environmental pollutions which may have impacts on local human health.

11.1.24. The Equality Act 2010 requires decision making to have due regard to the need to remove discrimination and support equality of opportunity for a range of 'protected characteristic' groups. This will be further considered within the Equality Impact Assessment for the scheme.

National policy

National Policy Statement for National Networks (NPSNN)

11.1.25. The National Policy Statement for National Networks (NPSNN) (Department for Transport (DfT), 2014) sets out the Government's policies to deliver the development of Nationally Significant Infrastructure Projects (NSIP) on the national road and rail networks in England. The SoS uses the NPSNN as the primary basis for making decisions on Development Consent Order (DCO) applications.

11.1.26. Key policy from the NPSNN relevant to this aspect is set out below:

- In delivering new schemes, the Government expects applicants to avoid and mitigate the environmental and social impacts and there is an expectation that impacts on accessibility for non-motorised users should be mitigated. With regard to the promotion of sustainable transport, the Government expects applicants to use reasonable endeavours to address the needs of pedestrians and cyclists in the design of new schemes. Furthermore, it expects applicants to identify opportunities to invest in infrastructure in locations where the national network severs communities and acts as a barrier to cycling and walking.
- The Government expects applicants to avoid and mitigate the environmental and social impacts associated with national road networks, and reduce associated impacts on human health such as air and noise pollution, increasing well-being and quality of life for the population. Access to high quality green infrastructure and open space should also be provided and promoted.

National Planning Policy Framework (NPPF) 2023

11.1.27. The NPPF sets out the Government's planning policies for England and the requirements for the planning system. It provides a framework within which Local Authorities and residents can produce local and neighbourhood plans reflecting the needs and priorities of communities.

11.1.28. Section 8 sets out core planning principles of the NPPF to achieve healthy, inclusive and safe places by promoting social interaction, ensuring safety and accessibility of public areas and supporting healthy lifestyles. This also includes

addressing identified local health and wellbeing needs through provision of safe and accessible green infrastructure.

- 11.1.29. The same section presents core principles to support access to a network of high quality open spaces and opportunities for sport and physical activity. Planning policies and decisions should protect and enhance PRow and National Trails to support population health.
- 11.1.30. Section 9 encourages developments that provide opportunities for sustainable transport, particularly by giving priority to pedestrian and cycle movements, and providing access to high quality public transport facilities.

Planning practice guidance (PPG)

- 11.1.31. PPG provides guidance on how the policy set out in NPPF may be interpreted in practice for a wide range of issues. There is a dedicated subsection of PPG relating to health and safe communities (2022). This details how positive planning can contribute to healthier communities. It describes a health place as *“one which supports and promotes healthy behaviours and environments and a reduction in health inequalities for people of all ages.”*

25 Year Environmental Plan

- 11.1.32. The Department for Environment, Food & Rural Affairs (Defra) 25 Year Environment Plan (2018) is a policy paper setting out what Government will do to improve the environment, including restoring and safeguarding wildlife habitats. This plan is being treated as the first Environmental Improvement Plan required under the Environment Act 2021. The plan sets out aims to:
- *“Help people improve their 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’ our towns and cities by creating green infrastructure and planting one million urban trees.*
 - *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.”*

National Highways Policy

National Highways Environment Strategy

- 11.1.33. Section 1.3.5.2 states that the National Highways Environment Strategy sets out National Highways’ vision that will guide its environmental actions and activities over the next five years. The strategy outlines National Highways’ commitment to

improving its environmental outcomes. The part of the strategy with particular relevance to this chapter is the 'lever' which focusses on protecting the health, safety and wellbeing of people living within the vicinity of National Highways schemes.

National Highways Air Quality Strategy

11.1.34. Section 1.3.5.3 states that the National Highways Air Quality Strategy sets out National Highways' strategy to improve air quality on and around the strategic network, through to 2021. Air quality is a factor which can impact human health and one which is considered within this chapter.

National Highways Delivery Plan (2020- 2025)

11.1.35. Section 1.3.6 sets out the National Highways Delivery Plan 2020- 25, which details how National Highways will invest in the network over the second road period (2020-25) and have set out deliverables for 2020-21. A key aim of the strategy is to deliver environmental, social and economic benefits both nationally and regionally, highlights its relevance to this chapter.

National Highways sustainable development strategy

11.1.36. Section 1.3.8 sets out the National Highways sustainable development strategy. The strategy states that sustainable development can be put into practice by focussing on the five capitals of sustainability. The pillars of 'human' and 'social' are of particular relevance to this chapter.

Local policy

Coventry City Council Local Plan (2011 – 2031)

11.1.37. Environmental policies relating to population and human health from the local plan relevant to the Scheme include:

- Policy DS1: Overall Development Needs
- Policy DS2: The Duty to Cooperate
- Policy DS3: Sustainable Development Policy
- Policy HW1: Health Impact Assessments (HIA)
- Policy JE1: Overall Economy and Employment Strategy
- Policy JE2: Provision of Employment Land and Premises
- Policy JE3: Non-Employment Uses on Employment Land
- Policy JE7: Accessibility to Employment Opportunities
- Policy GE1 Green Infrastructure
- Policy AC1: Accessible Transport Network

- Policy AC4: Walking and Cycling
- Policy AC5: Bus and Rapid Transit
- Policy AC6: Rail
- Policy AC7: Freight

11.1.38. The Local Plan also sets out their policy to support Health and Wellbeing within Coventry. The policy is supported by:

- Coventry Joint Strategic Needs Assessment (2012)
- Coventry Joint Health and Wellbeing Strategy (2013)
- Indices of Multiple Deprivation (2012)

11.1.39. Coventry is one of seven UK cities selected to become a 'Marmot City' participating in the UK Marmot Network. Coventry experiences high levels of inequality, therefore the recommendations of the Marmot Network have been adopted.

11.1.40. The Local Plan details that Health Impact Assessments (HIA) are a tool to be used in planning applications where there are expected to be significant impacts on health and wellbeing. It details that this can be undertaken as part of an EIA. The Policy HW: Health Impact Assessments (HIA) states that the HIA should be undertaken in accordance with the Council's SPD.

Coventry City Council Transport Strategy

11.1.41. The Strategy has been drawn up to help the city's residents, businesses and visitors travel safely, easily, and sustainably over the coming years ensuring to support a thriving economy and a healthy population. The strategy sets out the Council's vision to ensure that all parts of the transport system are accessible to everyone with all forms of transport are covered, including walking and cycling.

11.1.42. The main objectives with regard to walking and cycling are to further reduce the city's reliance on car travel, by significantly improving conditions to encourage more people to walk and cycle, as well as introducing new forms of micro-mobility. This will be done in an inclusive way, ensuring that areas are designed to be accessible to everyone. A separate, more detailed Local Cycling and Walking Infrastructure Plan is currently being developed and will provide more details on how these objectives will be achieved.

11.1.43. Local to the A46, work is already underway on the next generation of cycleways, which will initially connect the city centre to Coundon and to Binley but the aim is to introduce dedicated cycleways across the city, to make cycling safer and to ensure that cyclists do not have to share road space with car users on busy routes.

11.1.44. Other objectives include: pedestrianisation of areas of the City Centre; liveable neighbourhoods and school streets.

Rugby Borough Council Local Plan 2011 – 2031

11.1.45. Environmental policies relating to population and human health from the local plan relevant to the Scheme include:

- Policy GP4: Safeguarding Development Potential
- Policy DS1: Overall Development Needs
- Policy DS4: Employment Allocations
- Policy DS5: Comprehensive Development of Strategic Sites
- Policy H1: Informing Housing Mix
- Policy H2: Affordable Housing Provision
- Policy H3: Housing for Rural Businesses
- Policy H4: Rural Exceptions Sites
- Policy H5: Replacement Dwellings
- Policy H6: Specialist Housing
- Policy ED1: Protection of Rugby's Employment Land
- Policy ED2: Employment Development Within Rugby Urban Area
- Policy ED3: Employment Development Outside Rugby Urban Area
- Policy ED4: The Wider Urban and Rural Economy
- Policy HS1: Healthy, Safe and Inclusive Communities
- Policy HS3: Protection and Provision of Local Shops, Community Facilities and Services unities
- Policy HS2: Health Impact Assessments
- Policy HS4: Open Space, Sports Facilities and Recreation
- Policy HS5: Traffic Generation and Air Quality, Noise and Vibration
- Policy D1: Transport
- Policy D2: Parking Facilities

Warwickshire County Council

Warwickshire Local Transport Plan 3 (2011 – 2026)

11.1.46. The Local Transport Plan (LTP) 3 covers the period up to 2026 and sets out Warwickshire's six main objectives for transport. These are as follows:

- To promote greater equality of opportunity for all citizens in order to promote a fairer, more inclusive society.

- To seek reliable and efficient transport networks which will help promote full employment and a strong, sustainable local and sub-regional economy.
- To reduce the impact of transport on people and the [built and natural] environment and improve the journey experience of transport users.
- To improve the safety, security, and health of people by reducing the risk of death, injury or illness arising from transport, and by promoting travel modes that are beneficial to health.
- To encourage integration of transport, both in terms of policy planning and the physical interchange of modes.
- To reduce transport's emissions of carbon dioxide and other greenhouse gasses; and address the need to adapt to climate change.

11.1.47. Warwickshire are currently updating the LTP (known as LTP4) and are currently consulting on the four main themes which are Environment, Economy, Place and Wellbeing along with some of the key benefits and issues associated with each theme.

Draft Warwickshire Local Cycling and Walking Infrastructure Plan 2022

11.1.48. This Draft Local Cycling and Walking Infrastructure Plan aims to provide the context and network planning to prioritise a list of walking and cycling routes that should be targeted for improvement in the future. Although there are no specific improvements outlined for the cycling and walking within the study area, the plan outlines that any improvements to infrastructure should provide the opportunity to create attractive environments and build in coherent, convenient, and safe links for walking and cycling.

11.2. Assessment methodology

11.2.1. This assessment has been undertaken in accordance with the Design Manual for Roads and Bridges (DMRB) LA 112 Population and Human Health Revision 1 (Highways England, 2020g) (hereafter referred to as DMRB LA 112). Cognisance has been given to the following Institute for Environmental Management and Assessment (IEMA) guidance documents, however for the purposes of this Scheme, the structure and general approach follows the DMRB:

- effective Scoping of Human Health in EIA (2022)
- determining Significance for Human Health in EIA (2022)

11.2.2. Within DMRB there are two different assessment methods, one for land-use and accessibility, and the other for human health. These are described in further detail in the following sections.

Land-use and accessibility

- 11.2.3. The assessment focuses on those impacts that are likely to have significant effects on land use and accessibility, in accordance with the DMRB LA 112. Significance is determined by considering the sensitivity of the receptor against the anticipated magnitude of the impact on those receptors as a result of the Scheme.
- 11.2.4. The assessment considers both the sensitivity (or value) of the receptor and the magnitude of impact (or change) as a result of the proposals. DMRB LA 112 sets out the criteria for assigning value and identifying change, which are used in this assessment.

Sensitivity

- 11.2.5. The sensitivity of land use and accessibility receptors are determined using the criteria presented in Table 11-1, as per DMRB LA 112.

Table 11-1 Sensitivity of receptors

Receptor value (sensitivity)	Description
Very high	<p>Private property and housing:</p> <ol style="list-style-type: none"> 1) Existing private property or land allocated for housing located in a local authority area where the number of households are expected to increase by >25% by 2041 (Office of National Statistics (ONS) data). 2) Existing housing and land allocated for housing (e.g., strategic housing sites) covering >5ha and/or >150 houses. <p>Community land and assets where there is a combination of the following:</p> <ol style="list-style-type: none"> 1) Complete severance between communities and their land/assets, with little/no accessibility provision 2) Alternatives are only available outside the local planning authority area. 3) The level of use is very frequent (daily). 4) The land and assets are used by the majority (>=50%) of the community. <p>Development land and businesses:</p> <ol style="list-style-type: none"> 1) Existing employment sites (excluding agriculture) and land allocated for employment (e.g., strategic employment sites) covering >5ha. <p>Agricultural land holdings:</p> <ol style="list-style-type: none"> 1) Areas of land in which the enterprise is wholly reliant on the spatial relationship of land to key agricultural infrastructure. 2) Access between land and key agricultural infrastructure is required on a frequent basis (daily).

Receptor value (sensitivity)	Description
	<p>WCH:</p> <ol style="list-style-type: none"> 1) National trails and routes likely to be used for both commuting and recreation that record frequent (daily) use. Such routes connect communities with employment land uses and other services with a direct and convenient WCH route. Little/no potential for substitution. 2) Routes regularly used by vulnerable travellers such as the elderly, school children and people with disabilities, who could be disproportionately affected by small changes in the baseline due to potentially different needs. 3) Rights of way for WCH crossing roads at-grade with >16,000 vehicles per day.
High	<p>Private property and housing:</p> <ol style="list-style-type: none"> 1) Private property or land allocated for housing located in a local planning authority area where the number of households are expected to increase by 16-25% by 2041 (ONS data). 2) Existing housing and land allocated for housing (e.g., strategic housing sites) covering >1-5ha and/or >30-150 houses. <p>Community land and assets where there is a combination of the following:</p> <ol style="list-style-type: none"> 1) There is substantial severance between community and assets, with limited accessibility provision. 2) Alternative facilities are only available in the wider local planning authority area. 3) The level of use is frequent (weekly). 4) The land and assets are used by the majority (>=50%) of the community. <p>Development land and businesses:</p> <ol style="list-style-type: none"> 1) Existing employment sites (excluding agriculture) and land allocated for employment (e.g., strategic employment sites) covering >1 - 5ha. <p>Agricultural land holdings:</p> <ol style="list-style-type: none"> 1) Areas of land in which the enterprise is dependent on the spatial relationship of land to key agricultural infrastructure. 2) Access between land and key agricultural infrastructure is required on a frequent basis (weekly). <p>WCH:</p> <ol style="list-style-type: none"> 1) Regional trails and routes (e.g., promoted circular walks) likely to be used for recreation and to a lesser extent commuting, that record frequent (daily) use. Limited potential for substitution. 2) Rights of way for WCH crossing roads at-grade with >8,000 - 16,000 vehicles per day.
Medium	Private property and housing:

Receptor value (sensitivity)	Description
	<ul style="list-style-type: none"> 1) Houses or land allocated for housing located in a local authority area where the number of households are expected to increase by >6-15% by 2041 (ONS data). 2) Existing housing and land allocated for housing (e.g., strategic housing sites) covering <1ha and/or <30 houses. <p>Community land and assets where there is a combination of the following:</p> <ul style="list-style-type: none"> 1) There is severance between communities and their land/assets but with existing accessibility provision. 2) Limited alternative facilities are available at a local level within adjacent communities. 3) The level of use is reasonably frequent (monthly). 4) The land and assets are used by the majority (>=50%) of the community. <p>Development land and businesses:</p> <ul style="list-style-type: none"> 1) Existing employment sites (excluding agriculture) and land allocated for employment (e.g., strategic employment sites) covering <1ha. <p>Agricultural land holdings:</p> <ul style="list-style-type: none"> 1) Areas of land in which the enterprise is partially dependent on the spatial relationship of land to key agricultural infrastructure. 2) Access between land and key agricultural infrastructure is required on a reasonably frequent basis (monthly). <p>WCH:</p> <ul style="list-style-type: none"> 1) PRoW and other routes close to communities which are used for recreational purposes (e.g., dog walking), but for which alternative routes can be taken. These routes are likely to link to a wider network of routes to provide options for longer, recreational journeys. 2) Rights of way for WCH crossing roads at-grade with >4,000 – 8,000 vehicles per day.
Low	<p>Private property and housing:</p> <ul style="list-style-type: none"> 1) Proposed development on unallocated sites providing housing with planning permission/in the planning process. <p>Community land and assets where there is a combination of the following:</p> <ul style="list-style-type: none"> 1) Limited existing severance between community and assets, with existing Equality Act 2010 compliant accessibility provision. 2) Alternative facilities are available at a local level within the wider community 3) The level of use is infrequent (monthly or less frequent). 4) The land and assets are used by the minority (>=50%) of the community. <p>Development land and businesses:</p>

Receptor value (sensitivity)	Description
	<p>1) Proposed development on unallocated sites providing employment with planning permission/in the planning process.</p> <p>Agricultural land holdings:</p> <p>1) Areas of land which the enterprise is not dependent on the spatial relationship of land to key agricultural infrastructure.</p> <p>2) Access between land and key agricultural infrastructure is required on an infrequent basis (monthly or less frequent).</p> <p>WCH:</p> <p>1) Routes which have fallen into disuse through past severance or which are scarcely used because they do not currently offer a meaningful route for either utility or recreational purposes.</p> <p>2) Rights of way for WCH crossing roads at-grade with <4,000 vehicles per day.</p>
Negligible	<p>Private property and housing:</p> <p>1) N/A.</p> <p>Community land and assets where there is a combination of the following:</p> <p>1) No or limited severance or accessibility issues.</p> <p>2) Alternative facilities are available within the same community.</p> <p>3) The level of use is very infrequent (a few occasions yearly).</p> <p>4) The land and assets are used by a minority (>=50%) of the community.</p> <p>Development land and businesses:</p> <p>1) N/A.</p> <p>Agricultural land holdings:</p> <p>1) Areas of land which are infrequently used on a non-commercial basis.</p> <p>WCH:</p> <p>1) N/A.</p>

DMRB LA 112 Table 3.11 Environmental value (sensitivity) and descriptions.

Magnitude

11.2.6. The magnitude of impacts on land use and accessibility is assessed using the criteria set out in Table 11-2, as per DMRB LA 112.

Table 11-2 Impact magnitude criteria for receptors

Magnitude of impact (change)	Typical description
Major	<p>Private property and housing, community land and assets, development land and businesses and agricultural land holdings:</p> <ol style="list-style-type: none"> 1) Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements. e.g. direct acquisition and demolition of buildings and direct development of land to accommodate highway assets. 2) Introduction (adverse) or removal (beneficial) of complete severance with no/full accessibility provision. <p>WCH:</p> <ol style="list-style-type: none"> 1) >500m increase (adverse)/decrease (beneficial) in WCH journey length.
Moderate	<p>Private property and housing, community land and assets, development land and businesses and agricultural land holdings:</p> <ol style="list-style-type: none"> 1) Partial loss of/damage to key characteristics, features or elements, e.g., partial removal or substantial amendment to access or acquisition of land compromising viability of property, businesses, community assets or agricultural holdings. 2) Introduction (adverse) or removal (beneficial) of severe severance with limited/moderate accessibility provision. <p>WCH:</p> <ol style="list-style-type: none"> 1) >250m - 500m increase (adverse) or decrease (beneficial) in WCH journey length.
Minor	<p>Private property and housing, community land and assets, development land and businesses and agricultural land holdings:</p> <ol style="list-style-type: none"> 1) A discernible change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements, e.g., amendment to access or acquisition of land resulting in changes to operating conditions that do not compromise overall viability of property, businesses, community assets or agricultural holdings. 2) Introduction (adverse) or removal (beneficial) of severance with adequate accessibility provision. <p>WCH:</p> <ol style="list-style-type: none"> 1) >50m - 250m increase (adverse) or decrease (beneficial) in WCH journey length.
Negligible	<p>Private property and housing, community land and assets, development land and businesses and agricultural land holdings:</p> <ol style="list-style-type: none"> 1) Very minor loss or detrimental alteration to one or more characteristics, features or elements. e.g., acquisition of non-operational land or buildings not directly affecting the viability of property, businesses, community assets or agricultural holdings. 2) Very minor introduction (adverse) or removal (beneficial) of severance with ample accessibility provision. <p>WCH:</p>

Magnitude of impact (change)	Typical description
	1) <50m increase (adverse) or decrease (beneficial) in WCH journey length.
No change	No loss or alteration of characteristics, features, elements or accessibility; no observable impact in either direction.

Source: DMRB LA 112 Table 3.12 Magnitude of impact and typical descriptions

Significance of effect

- 11.2.7. The significance of effect for each element of the land use and accessibility sub-topic is derived by combining the assigned value (sensitivity) of the receptor and the magnitude of the change (impact) arising from the Scheme. This is in accordance with the significance matrix set out in DMRB LA 104, Table 3.8.1 and presented in Chapter 4 Assessment methodology of this PEIR.
- 11.2.8. Effects can be positive, neutral, negative or uncertain, and temporary or permanent. Only effects that are moderate or greater are considered significant as per DMRB LA 104.

Human health

- 11.2.9. As per DMRB LA 112, the assessment of human health is qualitative with evidence provided to support conclusions. The assessment considers three aspects of human health:
- Health profiles of affected communities
 - Health determinants (e.g., noise or air pollution)
 - Likely health outcomes
- 11.2.10. The baseline for health profiles of affected communities is informed by health profile data, and professional judgement including information available, future trends and project experience. During the EIA process, public consultation feedback will also further inform the baseline to be presented in the ES.
- 11.2.11. The health profile of communities within the study area is established based on the likely sensitivity of the population and categorised as (in accordance with DMRB LA 112):
- Low
 - Medium
 - High
- 11.2.12. Health determinants applicable to the Scheme are identified from the following:

- the location and type of community, recreational and education facilities and severance/separation of communities from such facilities
- the location of green/open space and severance/separation of communities from such facilities
- the location of healthcare facilities and severance/separation of communities from such facilities
- outline spatial characteristics of the transport network and usage in the area, including the surrounding road network, Public Rights of Way (including bridleways), cycle ways, non-designated public routes and public transport routes
- air quality management areas and ambient air quality
- areas recognised as being sensitive to noise (e.g., noise important areas, noise management areas) and the ambient noise environment
- sources and pathways of potential pollution (e.g., land/water contamination)
- landscape amenity
- safety information associated with the existing affected road network (e.g., numbers of killed and seriously injured)
- where available, information collated from stakeholder consultation

11.2.13. Health determinants are informed by the other relevant environmental factors scoped into the EIA and reported in this PEIR. Pertinent chapters are:

- 5 Air quality
- 7 Landscape and visual
- 9 Geology and soils
- 10 Noise and vibration
- 12 Road drainage and the water environment

11.2.14. The geographical extent of the impacts are dependent upon the nature and characteristics of the Scheme and identified sensitivity of receptors.

11.2.15. Once the sensitivity of communities and applicable health determinants have been identified, the likely health outcome(s) for the Scheme on the local communities are identified in line with the categories in Table 11-3 below.

Table 11-3 Human health outcome categories

Health outcome category	Health outcome description
Positive	A beneficial health impact is identified
Neutral	No discernible health impact is identified
Negative	An adverse health impact is identified

Health outcome category	Health outcome description
Uncertain	Where uncertainty exists as to the overall health impact

DMRB LA 112 Table 3.32 Human health outcome categories

11.2.16. As per DMRB LA 112, although the assessment of human health effects describes the likely qualitative health outcomes at this stage, it is not possible to quantify the severity or extent of the effects which give rise to these outcomes. Primary data collection of the baseline health conditions of the local communities has not been undertaken and therefore the outcomes cannot be compared against this information. The potential health outcomes during construction and operation are based on broad categories for the qualitative impacts identified in accordance with Table 11-3.

11.3. Assessment assumptions and limitations

- 11.3.1. The initial assessment of the potential for significant effects has been carried out for this PEIR against a benchmark of current baseline conditions within the study area. As with any dataset, these may be subject to change over time, which may influence the findings of the assessment and could lead to the assessment being subject to statistical time lag. The most up to date Census and Office for Health Improvement and Disparities (OHID) data is used to collate the baseline for this assessment and is considered to be the most accurate publicly available data and robust approach in combination with professional judgement.
- 11.3.2. It is assumed that the construction process would not render local properties unusable and that there would be no temporary or permanent displacement of local residents.
- 11.3.3. It is assumed that the construction compounds will require temporary land take, but that the land will be reinstated.
- 11.3.4. The design of the Scheme has not been finalised, which means any further change might result in this section being updated iteratively.

11.4. Study area

Land-use and accessibility

11.4.1. A 500m study area from the draft Order Limits has been determined using DMRB LA 112 and professional judgement for both construction and operational phases of the Scheme. It is not anticipated that there would be significant effects on receptors related to land use and accessibility outside of 500m from the draft Order Limits. The area is predominantly rural and beyond 500m it is not anticipated that access for receptors to and from nearby communities would be significantly impacted. The study area is shown on Figure 11.1 of Volume 2.

Human health

11.4.2. The human health assessment for the construction and operational phases will be conducted within the following wards (refer to Figure 11.1 of Volume 2):

- Revel and Binley Woods Ward
- Henley Ward
- Wyken Ward

11.4.3. Study areas relating to the other relevant environmental aspect chapters that will inform this assessment are described in the respective chapters of this PEIR.

11.5. Baseline conditions

Land-use and accessibility

Private property and housing

11.5.1. There are approximately 3,475⁷ residential properties within the study area. The majority of the residential properties within the study area are located within the City of Coventry's administrative boundary, located to the west of the Scheme. Most properties are set back from the draft Order Limits, however the closest property to the Scheme is Hungerley Hall Farm, located approximately 67m west of the existing A46 carriageway at its closest point.

11.5.2. The Coventry City Council Local Plan 2011-2031 and interactive map show the location and extent of allocated residential development land in Coventry. There is a housing allocation (H2:3 Walsgrave Hill Farm) west of the Scheme. The allocation is for 900 houses and includes retention and enhancement of the setting of listed buildings at Hungerley Hall Farm.

11.5.3. As per DMRB LA 112, the number of households in Coventry and Rugby are expected to increase by 6-15% and therefore the sensitivity of private property and development land in Coventry and Rugby is considered to be Medium⁸.

Community land and assets

11.5.4. Within the study area, there are the following community assets:

- 8 medical facilities, including University Hospital Coventry, approximately 427m west of the existing A46 at its closest point
- 14 educational facilities
- 1 emergency/rescue service

⁷ Source: Census 2021. Full reference in Chapter 16- References.

⁸ Using Census 2018 household projections for 2041 as a percentage increase from the 2023 household projections

- 1 leisure facility

11.5.5. There are the following areas of community land within the study area:

- play park located approximately 83 m west of the existing A46 at its closest point
- play park located adjacent to the west of the A46
- Coombe Country Park, a 500-acre park open to the public with walking trails, lakes, a restaurant and craft studios is located adjacent to the east of the existing A46 at its closest point

11.5.6. There are no other areas of community land (including village greens or registered common land) within the study area.

11.5.7. As per DMRB LA 112, community land and assets in the study area are considered to be **low**, as there are alternative facilities available at a local level within the wider community, within the City of Coventry.

Development land and businesses

11.5.8. Based upon Ordnance Survey Address Base Premium data, within the study area, there are the following commercial and business-related properties:

- 22 commercial/retail properties
- 5 offices
- 25 industrial properties
- 8 areas of storage land
- 65 utility-related properties

11.5.9. As described in paragraph 13.3.4 of this PEIR, the Coventry City Local Plan and interactive map identifies development land allocated adjacent to the western boundary of the located adjacent to the west of the existing A46 at its closest point, for 900 houses and associated works.

11.5.10. There are a number of planning applications within the study area shown on the Coventry City Council Planning Register interactive map. These will be identified (as discussed further in Chapter 14 Cumulative assessment of this PEIR), reviewed at the ES stage and will also be considered within the cumulative effects assessment of the ES.

11.5.11. As per DMRB LA 112, receptors within the sub-heading of development land and business in the study area are considered to be **medium**, as there are existing employment sites present.

Agricultural land holdings

- 11.5.12. Grade 2, 3a and 3b agricultural land is located within the study area, east of the existing A46. The agricultural land within the draft Order Limits is Grade 3a and 3b only.
- 11.5.13. There are two existing crossings of the A46 within the draft Order Limits, to access agricultural land.
- 11.5.14. Agricultural surveys in autumn 2023 and farm questionnaires will be undertaken prior to drafting the ES to understand the extent to which construction and operation of the Scheme will impact agricultural holdings within the study area. The sensitivity of agricultural land holdings within the study area will be determined following the receipt of farm questionnaires and surveys.

Walkers, cyclists and horse-riders

Existing routes and facilities

- 11.5.15. The key WCH routes and facilities in the study area are as shown in Figure 11.1 of Volume 2. These routes provide an important means of access for local people and visitors to community assets, leisure facilities and the wider study area as described below.
- 11.5.16. Footways are provided as part of the highway on both frontages of Clifford Bridge Road.
- 11.5.17. On the western frontage, a continuous footway is provided with uncontrolled crossings at junctions. The footway is typically 2m wide although a section adjacent to the B4082 link roundabout is locally widened. The footway adjacent to the Tesco roundabout is segregated from the carriageway by a wide verge before re-joining the carriageway edge further to the north. Between the two roundabouts, a link is provided to the leisure footpath that follows the River Sowe. An informal footpath has also been created by local residents which runs across the field towards Keswick Walk.
- 11.5.18. On the eastern frontage, a continuous footway is provided with uncontrolled crossings at junctions. The footway is typically 2m wide although a section between the two roundabouts is locally widened. To the north of the Tesco roundabout the footway is set back around 30m from the carriageway by a wooded area and continues as a footpath as far as Dorchester Way before returning to run alongside the carriageway as footway. Numerous other footpaths intersect this route providing links through the residential area to the east and to the crossing facilities provided on Clifford Bridge Road at its junction with Belgrave Road.

- 11.5.19. In addition to the sections of footway and footpath described above, Coventry City Council is currently constructing a new segregated cycleway known as the Binley Cycleway. Further details of the cycleway are provided in paragraph 11.5.30 below.
- 11.5.20. At the Tesco roundabout there is a footpath that runs along the southern side of the supermarket providing links to the adjacent residential area as well as connections to the footpath that runs alongside the River Sowe. The River Sowe leisure route passes under Clifford Bridge Road providing grade separated pedestrian access to the footway on the western frontage of the carriageway.
- 11.5.21. Two informal paths have been created by local residents in the vicinity of the B4082 link roundabout. These paths pass through the wooded area to the south-east of the roundabout providing a linkage to a footpath which serves the adjacent residential area. This latter footpath facilitates access between Clifford Bridge Road and Brinklow Road as well as the residential area and the footway network immediately adjacent to this route.
- 11.5.22. A footway is provided along the northern frontage of Brinklow Road which links the residential areas around Clifford Bridge Road to Coombe Country Park. The footway is typically 1.5m wide from the point where it passes under the A46 up to the Country Park access some 1.9km to the east beyond which the footway ends. There is no footway on the southern frontage of Brinklow Road to the east of the A46 overbridge except for a small section leading to a private access. To the west of the A46 overbridge, footways are provided on both frontages of Brinklow Road that are typically 2m wide.
- 11.5.23. Bridleway 235, a PRoW, is shown on the Definitive Public Rights of Way Map to run from the city/county boundary (as a continuation of PRoW 156/R75x/1 in Warwickshire) in the east to Highbridge (namely the bridge crossing the River Sowe) in the west. The route follows a farm access track and is fronted by farmland. Although not recorded on the Definitive Map, the PRoW officer from Coventry City Council has confirmed that the section of the route between Highbridge and Farber Road is also a bridleway.
- 11.5.24. A claimed PRoW also follows the same route as PRoW 235. This claim has been applied under a Definitive Map Modification Order (DMMO), application CAP282, to convert the existing bridleway to a Byway Open to All Traffic (BOAT) and extend it between High Bridge and the end of Farber Road to the west.
- 11.5.25. As indicated, bridleway 156/R75x/1 runs as a continuation of PRoW 235 in Coventry from the county boundary in the west to the junction of PRoW 156/R75b/1 and PRoW 156/R75y/1 in the east. The route continues along the farm access track and is fronted by farmland. The bridleway is earmarked for

improvement in the emerging LCWIP for Warwickshire to make the route more suitable for cycling.

- 11.5.26. In addition to the above PRow, a permissive route is also provided between PRow 156/R75x/1 and Coombe Country Park.
- 11.5.27. The Centenary Way Long Distance walking trail is a 159km footpath originating in the Tame Valley and ending in the Ilmington Downs. The route passes close to several major local settlements, including Coventry, Warwick, and Leamington. The route passes through Coombe Country Park connecting with Bridleway 156 R75x/1 via the permissive route outlined above and continues east towards the southern section of Ansty Business Park.
- 11.5.28. Numerous PRow are defined under The City of Coventry (Footpath 61A to 214) Modification Order 2003 which cover a series of footpaths that serve the properties in the Dorchester Way residential area.
- 11.5.29. The above Footpath Order also covers a series of footpaths that serve the residential properties located to the east and west of Clifford Bridge Road south of the B4082 link roundabout.
- 11.5.30. There are further WCH facilities in the study area such as footways, cycle tracks and road crossings which will be identified in further detail in the ES if required.

Proposed routes and facilities

- 11.5.31. The following paragraphs provide details of proposed WCH routes and facilities that are either under construction or proposed that will likely form part of the future baseline networks. The provision of these routes and facilities may influence the design of the Scheme.
- 11.5.32. The Binley Cycleway forms part of a 10km strategic east to west connection between the hospital in the east and Coventry City Centre and further on to the Coundon Cycleway in the west. The segregated route will connect the city centre with major trip generators, such as the hospital and Binley Business Park, with the intention of making cycling a safe and attractive option for many journeys.
- 11.5.33. At the time of writing, the section of the cycleway on Clifford Bridge Road between the hospital and the Tesco roundabout was nearing completion and is expected to be open in summer 2023. The section of the cycleway between the Tesco roundabout and the A4082/A428 junction to the south and west is still in consultation with the final design to be confirmed. However, it is understood that construction work is anticipated to start by 2024.

11.5.34. The cycleway will be a fully segregated two-way cycle track that will run on the eastern side of Clifford Bridge Road between the hospital and the Tesco roundabout. Just prior to the Tesco roundabout the cycleway will cross Clifford Bridge Road and continue on the western side to the south on to the A428 where it will link to other sections of the cycleway that are currently under construction.

WCH usage surveys

11.5.35. To provide an indication of the level of usage of WCH facilities in the vicinity of the Scheme, WCH surveys were undertaken in June 2023 at five locations, as shown on Figure 11.1 of Volume 2 and listed below:

- Site 1: Clifford Bridge Road/B4082 roundabout
- Site 2: Clifford Bridge Road links to river side path
- Site 3: Clifford Bridge Road/Tesco roundabout
- Site 4: PRow Bridleway/permissive path junction
- Site 5: Brinklow Road/Valencia Road junction

11.5.36. The surveys were carried out between 0700 and 1900 hours for seven consecutive days between Wednesday 14 June and Tuesday 20 June 2023, inclusive, using CCTV video cameras. In the main, the weather during the surveys was dry.

11.5.37. A brief summary of the results for each site is provided below. Full details of the collected usage information will be reported in the ES.

Site 1: Clifford Bridge Road/B4082 roundabout

11.5.38. The results show that on a weekday an average total of 796 individual movements were recorded at this survey location. The number of recorded movements reduces by more than half to an average of only 363 movements between Saturday and Sunday. Just over a third (302 movements) are attributed to unaccompanied minors on a weekday, reflecting pupils making their way to and from the nearby high school. Also, there is a notable flow of movements across the B4082 link at the uncontrolled pedestrian crossing point.

Site 2: Clifford Bridge Road links to riverside path network

11.5.39. The results show that on a weekday an average total of 652 individual movements were recorded at this survey location. The number of recorded movements reduces by more than half to an average of only 291 movements between Saturday and Sunday. Just under half (274 movements) are attributed

to unaccompanied minors on a weekday, reflecting pupils making their way to and from the nearby high school.

Site 3: Clifford Bridge Road/Tesco roundabout

11.5.40. The results show that on a weekday an average total of 735 individual movements were recorded at this survey location. The number of recorded movements reduces by around a half to an average of only 368 movements between Saturday and Sunday. Just under a third (194 movements) are attributed to unaccompanied minors on a weekday, reflecting pupils making their way to and from the nearby high school. The results also suggest that some WCH users are using the informal paths that lead to the river path to avoid having to cross Clifford Bridge Road at the roundabout.

Site 4: PRow Bridleway/permissive path junction

11.5.41. The results show that there is a notable daily flow of pedestrians and cyclists using the bridleway from Farber Road and the permissive path to access Coombe Country Park on both a weekday and on a Saturday and Sunday.

Site 5: Brinklow Road/Valencia Road junction

11.5.42. The results show that on a weekday an average total of 273 individual movements were recorded at this survey location. At the weekend the recorded usage is at a similar level with an average of 269 movements between Saturday and Sunday. The majority of the recorded movements were between Brinklow Road west and Valencia Road for all pedestrian types and there are some movements along Brinklow Road and between Valencia Road and Brinklow Road east. This suggests that there are some walking trips to/from Coombe Country Park. In addition, the majority of cyclists travel along Brinklow Road with minimal movements between Brinklow Road and Valencia Road. These cyclists make use of both the footways and carriageway.

Human health

Health profiles of affected communities

Population

11.5.43. There are approximately 6,407 people living in the Revel and Binley Woods Ward (town of Rugby) 21,195 in Henley Ward and 16,898 in Wyken Ward (Coventry City)⁹. Residential housing is located predominantly to the west of the Scheme.

⁹ Source: Census 2021. Full reference in Chapter 16- References.

Health indicators

11.5.44. Table 11-4 presents key health indicators for the wards located wholly or partially within the study area.

Table 11-4 Public health baseline data

Local health indicator	Walsgrave					England
	Revel and Binley Woods	Henley	Wyken	Rugby	Coventry	
Census 2021*						
Population	6,407	21,195	16,898	114,366	345,328	59,597,546
Population aged under 16 (%)	14.4	24	20.2	18.4	19.8	18.5
Population aged 65 and over (%)	29	14.9	17.9	18.2	14.6	18.6
General health - number of people with bad or very bad health	318 5%	1,378 6.5%	839 5%	4,891 4.3%	18,495 5.4%	3,127,013 (England and Wales) 5.2%
Office for Health Improvement and Disparities- Fingertips- Local Health**						
Emergency hospital admissions for Chronic Obstructive Pulmonary Disease (COPD), standardised admission ratio***	51 (per 100)	184.5 (per 100)	102.3 (per 100)	76.1 (per 100)	124.8 (per 100)	100 (per 100)
Deaths from respiratory disease (as percentage of deaths from all causes, all ages)	10.9%	12.9%	13.3%	11.1%	12.6%	12.9%
Percentage of community with long term limiting illness or disability	18.6%	20.5%	16.6%	16.1%	17.7%	17.6%
Life expectancy (years) (males)	80.4	76.8	79.2	79.8	78.1	79.5
Life expectancy (years) (females)	83.6	82.1	83.3	83.6	82.1	83.2
Income deprivation (people living in income-deprived households as % of population)	6.1%	22.7%	10.6%	8.7%	15.4%	12.9%

* Source: Census 2021- Available at: <https://www.ons.gov.uk/census>

** Source: Office for Health Improvement and Disparities- Fingertips- Local Health- Available at: <https://fingertips.phe.org.uk/profile/local-health>

*** The source notes that there are concerns about the quality of the data.

11.5.45. Revel and Binley Woods ward has a significantly higher percentage of residents over 65 compared with the region and national average. Henley and Wyken wards have a significantly higher percentage of residents aged under 16 compared with the region and national average.

11.5.46. Henley ward has notably higher general health than the national average. Revel and Binley Woods ward and Wyken ward have general health slightly below the national average.

11.5.47. NPSNN expects applicants to use reasonable endeavours to address the needs of pedestrians and cyclists and support sustainable travel in the design of new schemes. These demographics and local health profiles are considered as part of the assessment and influences the types and location of mitigation and enhancement put forward.

11.5.48. The sensitivity of communities within Revel and Binley Woods, Henley and Wyken wards are considered to be high.

Health determinants

11.5.49. The following health determinants will be included in the assessment of construction and operational effects in line with DMRB LA 112.

Community, recreational and educational facilities

11.5.50. Within the wards of Revel and Binley Woods ward, Henley ward and Wyken ward, there are community, recreational and educational facilities. These facilities consist of schools, retail, and hotels and are shown on Figure 11.1 of Volume 2.

Green/open space

11.5.51. Coombe Country Park, a 500-acre park open to the public with walking trails, lakes, a restaurant and craft studios is located adjacent to the southern extents of the Scheme. There are two play parks located near the Scheme; one is located approximately 83 m west of the existing A46 at its closest point and one is located adjacent to the west of the existing A46 at its closest point.

Healthcare facilities

11.5.52. There are 8 healthcare facilities located within the study area, including the University Hospital Coventry.

Transport network

- 11.5.53. The main roads within the study area providing connectivity between communities are the A46, the M6, the M69 Ansty Road, the A444, the B4082 and the B4428.
- 11.5.54. There are no bus stops within the draft Order Limits. The closest bus stops to the Scheme are located on Ansty Road, to the west of the Scheme.
- 11.5.55. Coventry Arena train station is located to the north-west of the Scheme and Coventry train station is located to the south-west of the Scheme.

Air quality management

- 11.5.56. The existing A46 Walsgrave junction is located on the boundary of the Coventry AQMA, which encompasses all land within the City of Coventry's administrative boundary, as detailed in Chapter 5 Air Quality. The AQMA was declared due to historic exceedances of the annual mean NO₂ objective in the centre of Coventry.
- 11.5.57. Rugby Borough Council have declared a single AQMA in the borough, located across the urban area of Rugby, however this is located 8km to the east of the draft Order Limits and is unlikely to be adversely affected by the Scheme.
- 11.5.58. Further information is detailed within Chapter 5 air quality, of this PEIR.

Noise and vibration

- 11.5.59. Sensitive noise receptors include residential properties and businesses, in addition to other community assets. The Scheme does not lie within any noise important areas (NIAs) as detailed in Chapter 10 noise and vibration, however, there are a number of NIAs located on surrounding roads. These include:
- three NIAs situated on the A4600 Antsy Road (IDs 324, 11796 and 14385)
 - two to the south-west on Brandon Road (ID 330) and Binley Road (ID 11800)
 - one on the A46 at Binley junction (ID 14307)
- 11.5.60. Further information is detailed within Chapter 10 noise and vibration, of this PEIR.

Sources and pathways of potential pollution

- 11.5.61. The baseline conditions at A46 Walsgrave junction are summarised in Chapter 9 Geology and soils, and Chapter 12 road drainage and the water environment. Both of these environmental factors will consider the potential impact of pollution on human health at the assessment stage. Potential sources of pollution will be

considered where a potential pathway is present in relation to the health of local communities, and therefore, the potential to influence health outcomes.

Landscape amenity

11.5.62. It is not anticipated that there would be significant effects on landscape character as detailed in Chapter 7 of this PEIR. However, it is noted that there may be adverse landscape effects on Project Character area (PCA) 1 which includes Hungerley Hall Farm. The potential impacts on landscape amenity and the resulting health outcomes for the local community will be considered in the ES.

Safety

11.5.63. Safety is inherent to the Scheme and a reason for the inception of the Scheme as part of the Government’s Road Investment Strategy (RIS2). A road safety audit will be undertaken which will estimate the improvement to accidents and collisions that is anticipated with the Scheme in place.

11.6. Potential impacts

11.6.1. Table 11-5 and Table 11-6 summarise the potential impacts identified for the Scheme during construction and operation respectively.

Table 11-5 Potential construction impacts

Receptor	Potential impact
Land use and accessibility	
Residents, businesses, development land and community assets	Temporary changes to journey length and increases in traffic from construction activities may impact a number of residential properties, community land and assets and businesses in the study area in Coventry, to the west of the Scheme, where access would be obtained via the B4082, and the east, where access would be obtained via the B4027 Brinklow Road. Construction may require temporary and permanent land take from Hungerley Hall Farm, however the property will be retained. The proposed grade separated junction, B4082 extension, proposed ponds and the haul road is proposed through the area of development land allocated for housing.
Agricultural Land Holdings	Construction of the Scheme would require temporary and permanent land take from agricultural land holdings associated with Hungerley Hall Farm, and agricultural land holdings east and west of the A46, to the north of Hungerley Hall Farm to accommodate the proposed grade separated junction, B4082 extension and proposed ponds.
WCH	The construction works may require the temporary closure of the existing uncontrolled pedestrian crossing facility on the B4082 eastern arm of the Clifford Bridge Road roundabout. All other existing WCH routes or facilities are unlikely to be impacted.
Human health	
Local community	Temporary changes to amenity within the local environment (changes to noise, air pollution/dust, and overall severance; disruption to the transport network and access to community assets and green/open space) may impact the amenity,

Receptor	Potential impact
	access, health and wellbeing of the local community. Health outcome categories for these potential impacts will be identified in the ES.

Table 11-6 Potential operational impacts

Receptor	Potential impact
Land use and accessibility	
Residents, businesses and community land and assets	The Scheme has the potential to change severance for road users in operation. The Scheme would increase journey lengths when accessing residential properties, businesses and community land and assets to the west of the Scheme in Coventry when accessing from the A46 to the south.
WCH	The Scheme has the potential to provide improvements to safety and to reduce severance for pedestrians and cyclists due to the provision of new and improved facilities.
Human health	
Local community	<p>Operation of the Scheme may result in permanent changes to amenity within the local environment (changes to noise, air quality, and overall severance; the transport network and access to community assets and green/open space); which may adversely and beneficially impact the amenity, health and wellbeing of the local community.</p> <p>The health outcome category for severance is anticipated to be neutral. Whilst there would be an increase in journey length when travelling from the B4082 to access the south of the A46 (or vice versa, which would increase journey time to access the community land to the south of the B4082 when accessing from the south of the A46), journey lengths would not be increased (or would be marginally increased) from other directions, and journey length increases are anticipated to be outweighed by the safety benefits of the Scheme.</p> <p>Health outcome categories for the other potential health impacts will be identified in the ES.</p>

11.7. Design, mitigation and enhancement measures

Embedded (design) mitigation

Essential mitigation

11.7.1. Potential mitigation measures during construction include:

- use of appropriate mitigation measures through the implementation of an Environmental Management Plan (EMP) in accordance with DMRB LA 120 to mitigate air quality, noise, traffic and visual effects
- liaison with stakeholders prior to the commencement of construction works, including local businesses, to understand mitigation requirements to ensure their continued operation
- maintaining access to all affected residential properties, community and businesses within a Traffic Management Plan (TMP)
- liaison with bus companies in advance of works so that they plan their services and advise passengers accordingly

Enhancement

11.7.2. Potential enhancement measures during operation include:

- provision of a signalised pedestrian crossing on the eastern arm of the Clifford Bridge Road roundabout to facilitate north to south movements across the B4082
- passive provision (i.e., verge widening) to accommodate the future installation of a segregated footway and cycleway between Clifford Bridge Road and the western side of Hungerley Hall Farm accommodation bridge, which would lie to the east of the B4082 link road. This includes the installation of ducting to facilitate the future provision of a signalised crossing to enable pedestrians and cyclists to access the accommodation bridge and any future route for pedestrians and cyclists provided to the east of the A46
- improved amenity such as appropriate planting. Improvements to amenity will benefit the aesthetic of the area, and consequently benefit wellbeing
- climate resilience and adaptation measures to future proof access routes to/from green spaces and community amenities
- increased infrastructure and investment that reflects the demographic and local challenges with greater proportion in areas with lower health including rest areas, joined up WCH with public transport, and access to green space

11.8. Assessment of likely significant effects

Construction

Land-use and accessibility

11.8.1. The potential significant effects on land-use and accessibility in construction are as follows:

- For residents, users of local businesses and community assets access may be disrupted during construction, in relation to easy access to their properties and community resources. Diversion routes will be required which could result in journey length changes predominantly at night and during weekends due to closures of the A46 northbound and southbound carriageways, which may result in an **adverse** effect.
- There is expected to be some permanent and temporary loss of land as a result of construction of the Scheme. This would result in loss of land from Hungerley Hall Farm, loss of land from agricultural land holdings, and loss of land from the housing allocation H2:3 Walsgrave Hill Farm which may result in an **adverse** effect. Housing allocation H2:3 Walsgrave Hill Farm will be considered using the most up to date information regarding the likelihood of development at the time of drafting the ES.

11.8.2. In the ES the effects for each sub-aspect of land use and accessibility (as described in paragraph 11.1.2) will be assessed and presented.

Human health

- 11.8.3. Temporary changes to the local environment (arising from a combination of noise, air quality, visual, and traffic effects) may potentially result in **adverse** and **beneficial outcomes** affecting the amenity and/or health of communities, with appropriate mitigation in place (as set out in section 11.7 of this chapter). Further assessment will inform the design, mitigation and enhancement, and will be reported in the ES.

Operation

Land-use and accessibility

- 11.8.4. The Scheme has the potential to improve safety and to support the smooth flow of traffic on the A46, with potentially **significant beneficial** effects in supporting the future economic growth aspirations of the region.
- 11.8.5. The Scheme would include the provision of a new signalised pedestrian crossing on the eastern arm of the Clifford Bridge Road roundabout to facilitate north to south movements and reduce severance across the B4082. The Scheme would include retention of the Hungerley Hall Farm accommodation bridge (subject to structural survey in autumn 2023) and passive provision (i.e., verge widening) to accommodate the future installation of a new WCH route across the A46 which in turn would reduce severance for cyclists, walkers and other vulnerable road users between the urban areas of Coventry and Coombe Country Park.
- 11.8.6. In the ES the effects for each sub-aspect of land use and accessibility (as described in paragraph 11.1.2) will be assessed and presented.

Human health

- 11.8.7. The Scheme has the potential to reduce the number of accidents and collisions at the junction bringing potential **significant beneficial** health outcomes.
- 11.8.8. There is the potential for **adverse and beneficial** human health outcomes due to changes to amenity (arising from a combination of noise, air quality, visual, and traffic effects) as a result of the operation of the Scheme. Further assessment will inform the design, mitigation and enhancement, and will be reported in the ES.

11.9. Conclusions

- 11.9.1. This chapter provides a summary of the assessment that has been undertaken so far to identify population and human health effects of the scheme in accordance with DMRB LA 112 and IEMA guidelines. The chapter sets out the methodology to identify and assess significant effects, the baseline environment,

presents potential impacts on private property and housing, community land and assets, development land and businesses, agricultural land holdings and walking, cycling and horse riding receptors in the short- and long-term, and identifies potential changes to human health outcomes for the local community. The chapter also identifies potential mitigation and enhancement measures than can be identified as this stage.

- 11.9.2. The preliminary assessment shows there is potential for receptors to experience changes in access and amenity during the construction period as a result of construction activities. This includes potential temporary or permanent land take, as well as changes in amenity stemming from increases in traffic (from HGVs and diverted standard traffic), construction works and associated changes in determinants of health such as noise, air quality, visual landscape and the presence of construction workforce. A number of receptors, including residential properties, community land and assets, agricultural land holdings, development land and businesses and WCH routes are within the draft Order Limits and will potentially experience significant adverse and beneficial effects for a temporary period during construction.
- 11.9.3. During operation, both beneficial and adverse effects are anticipated, as a result of road improvements and the anticipated creation of new motorised and WCH routes. Whilst there is the potential for some adverse effects, changes in traffic flows once the scheme is operational are expected to result in an overall beneficial effect for population and human health receptors in terms of access. There is the potential for both adverse and beneficial changes to health outcomes in relation to changes to amenity (arising from a combination of noise, air quality, visual, and traffic effects). Further assessment will inform the design, mitigation and enhancement, and will be reported in the ES.
- 11.9.4. Findings in this report should be considered indicative on the basis that they represent an early stage of the assessment process with incomplete information. Further assessment will be reported within the ES.

12. Road drainage and the water environment

12.1. Introduction

- 12.1.1. This chapter has been prepared in accordance with Design Manual for Roads and Bridges (DMRB) LA 113 Road Drainage and the Water Environment (Highways England, 2020) (hereafter referred to as DMRB LA 113).
- 12.1.2. The topic includes surface water and groundwater, water resources and flood risk. It comprises of a review of existing environmental baseline information, as well as design measures that will be implemented to help mitigate against potential impacts on the water environment. The proposed scope of assessment and assessment methodologies are also presented.

Stakeholder engagement

- 12.1.3. A meeting with Coventry City Council was undertaken on 25 July 2023 to outline the current drainage plan. Coventry City Council noted:
- attenuation for 1 in 100-year rainfall required with 40% climate change allowance
 - preference to have no attenuation in the piped network, prefers free flowing
 - the bunds to the east of Smite Brook do get breached in extreme circumstances and they have undertaken assessments on providing flood prevention measures
 - flood modelling should be undertaken.
- 12.1.4. Further consultation will be undertaken with the Lead Local Flood Authorities (LLFA) of Coventry City Council and Warwickshire County Council to discuss flood risk and water quality.

Legislative and policy framework

- 12.1.5. The following legislation and policy are relevant to the road drainage and water environment aspects of the Scheme.

Legislation

Water Environment (Water Framework Directive) (England and Wales) Regulations 2017

- 12.1.6. These regulations aim to protect inland and coastal waters and prevent deterioration of aquatic ecosystems, including groundwaters. A key aim of the Water Framework Directive (WFD) is to achieve 'good' ecological status for all waterbodies by 2015, with a secondary aim to gradually reduce the release of pollutants which may pose significant risks to the aquatic ecosystems. The

environmental objectives of the WFD are implemented through actions described in the River Basin Management Plans (RBMPs).

- 12.1.7. The WFD requires a single system of water resource management (through characterisation, protection and enhancement of water resources) to be considered within the context of a river basin district (RBD). Within England and Wales, 11 RBDs have been identified, including three cross-border RBDs, one of which crosses the borders of England and Scotland. The 2017 Regulations require 'the appropriate agency' (the Environment Agency in England) to prepare RBMPs for each RBD, for the approval of 'the appropriate authority' (the Secretary of State (SoS) in England).

Land Drainage Act 1991

- 12.1.8. The Land Drainage Act 1991 requires that a watercourse be maintained by its owner in such a condition that the free flow of water is not impeded. The riparian owner must accept the natural flow from upstream but need not carry out work to cater for increased flows resulting from some types of works carried out upstream, for example a new housing development.
- 12.1.9. If a riparian owner fails to carry out their responsibilities under the Land Drainage Act, or if anyone else causes a watercourse to become blocked or obstructed, the County and District Councils have powers of enforcement by serving a notice under the Act. If this is ignored, the Council concerned may carry out the necessary works itself and then recharge the person responsible for the full cost incurred.

Land Drainage Act 1994

- 12.1.10. This Act amends the Land Drainage Act 1991 in relation to the functions and duties of internal drainage boards and local authorities. It makes particular provision for duties with respect to Sites of Special Scientific Interest (SSSI).

Flood and Water Management Act 2010

- 12.1.11. The Flood and Water Management Act's aims are:
- Greater security for people and their property from the risk of flooding and coastal erosion by creating clearer structures and responsibilities for managing that risk, building on the Government's response to Sir Michael Pitt's report following the 2007 floods. It improves local leadership on flood risk, improves management of risk from surface run-off and enables better planning for and prediction and warning of floods. It also introduces modern risk-based approaches to reservoir safety as well as greater security of water supply in the event of water company failure, and improved protection of essential supplies during drought.

- Better service for people through new ways of delivering major water and sewerage infrastructure projects and improving existing complaints and enforcement procedures.
- Greater sustainability by helping people and their communities adapt to the increasing likelihood of severe weather events due to climate change, encouraging sustainable drainage systems in new developments, protecting communities and the environment better from the risk of flooding, protecting water resources and improving water quality.

The Water Resources Act 1991 (as amended)

12.1.12. An Act to consolidate enactments relating to the National Rivers Authority and the matters in relation to which it exercises functions, with amendments to give effect to recommendations of the Law Commission.

The Flood Risk Regulations 2009

12.1.13. These Regulations transposed the European Floods Directive into law for England and Wales and came into force on 10th December 2009. The Floods Directive sets out requirements to manage flood risk from all sources in order to reduce the consequence of flooding on human health, economic activity and the environment.

The Environment Act 2021

12.1.14. The Environment Act sets clear statutory targets for the recovery of the natural world in four priority areas: air quality, biodiversity, water and waste. Of particular relevance to water is the requirement for water companies to secure a progressive reduction in the adverse impacts of discharges from storm overflows and for the Government to publish a plan to reduce sewage discharges from storm overflows by September 2022, and report to Parliament on the progress towards implementing the plan.

National policy

National Policy Statement for National Networks (NPSNN)

12.1.15. The National Policy Statement for National Networks (NPSNN) (Department for Transport (DfT), 2014) sets out the Government's policies to deliver the development of Nationally Significant Infrastructure Projects (NSIP) on the national road and rail networks in England. The Secretary of State (SoS) uses the NPSNN as the primary basis for making decisions on Development Consent Order (DCO) applications.

12.1.16. Relevant to the road drainage and the water environment assessment, the NPSNN states:

- with regard to flood risk, if a flood risk assessment (FRA) is required, the applicant should:
 - consider the risk of all forms of flooding arising from the project (including in adjacent parts of the United Kingdom), in addition to the risk of flooding to the project, and demonstrate how these risks will be managed and, where relevant, mitigated, so that the development remains safe throughout its lifetime
 - take the impacts of climate change into account, clearly stating the development lifetime over which the assessment has been made
 - consider the vulnerability of those using the infrastructure including arrangements for safe access and exit
 - include the assessment of the remaining (known as 'residual') risk after risk reduction measures have been taken into account and demonstrate that this is acceptable for the particular project
 - consider if there is a need to remain operational during a worst case flood event over the development's lifetime
 - provide the evidence for the Secretary of State to apply the Sequential Test and Exception Test as appropriate
- the Secretary of State should be satisfied that flood risk will not be increased elsewhere and should only consider development appropriate in areas at risk of flooding where it can be demonstrated that:
 - within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location
 - development is appropriately flood resilient and resistant, including safe access and escape routes where required; and that any residual risk can be safely managed, including by emergency planning; and that priority is given to the use of Sustainable Drainage Systems (SuDS)
- with regards to water quality the Secretary of State should be satisfied the proposal considers the River Basin Management Plans and the requirements of the Water Framework Directive (WFD) (including Article 4.7) and its daughter directives. This includes requirements on priority substances and groundwater
- where a development is subject to Environmental Impact Assessment (EIA) and the development is likely to have significant adverse effects on the water environment, the applicant should ascertain its existing status and carry out impact assessments. These are included as part of the environmental statement and describe:
 - the existing quality of waters affected by the proposed project
 - existing water resources affected by the proposed project and the impacts of the proposed project on water resources

- existing physical characteristics of the water environment (including quantity and dynamics of flow) affected by the proposed project, and any impact of physical modifications to these characteristics
- any impacts of the proposed project on water bodies or protected areas under the Water Framework Directive and source protection zones (SPZs) around potable groundwater abstractions
- any cumulative effects

National Planning Policy Framework 2023

12.1.17. When determining any planning application, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific FRA. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

- within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location
- the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment
- it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate
- any residual risk can be safely managed
- safe access and escape routes are included where appropriate, as part of an agreed emergency plan

12.1.18. Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate. The systems used should:

- take account of advice from the Lead Local Flood Authority
- have appropriate proposed minimum operational standards
- have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development
- where possible, provide multifunctional benefits

Planning Practice Guidance (PPG)

12.1.19. PPG provides guidance on how the policy set out in NPPF may be interpreted in practice for a wide range of issues. There is a dedicated subsection of PPG relating to flood risk and coastal change (2022), which advises how to take account of and address the risks associated with flooding and coastal change in the planning process, and water supply, wastewater and water quality (2019),

which advises on how planning can ensure water quality and the delivery of adequate water and wastewater infrastructure.

25 Year Environmental Plan

12.1.20. The Department for Environment, Food & Rural Affairs (Defra) 25 Year Environment Plan (2018) is a policy paper setting out what Government will do to improve the environment, including restoring and safeguarding wildlife habitats. This plan is being treated as the first Environmental Improvement Plan required under the Environment Act 2021. The plan sets out aims to achieve clean and plentiful water by improving at least three quarters of England's waters to be close to their natural state as soon as is practicable by:

- Reducing the damaging abstraction of water from rivers and groundwater, ensuring that by 2021 the proportion of water bodies with enough water to support environmental standards increases from 82% to 90% for surface water bodies and from 72% to 77% for groundwater bodies.
- Reaching or exceeding objectives for rivers, lakes, coastal and ground waters that are specially protected, whether for biodiversity or drinking water as per River Basin Management Plans.
- Supporting ambitions on leakage, minimising the amount of water lost through leakage year on year, with water companies expected to reduce leakage by at least an average of 15% by 2025.
- Minimising by 2030 the harmful bacteria in our designated bathing waters and continuing to improve the cleanliness of our waters; we will make sure that potential bathers are warned of any short-term pollution risks.

12.1.21. The plan also aims to reduce the risk of harm to people, the environment and the economy from natural hazards including flooding by:

- Bringing the public, private and third sectors together to work with communities and individuals to reduce the risk of harm.
- Making sure that decisions on land use, including development, reflect the level of current and future flood risk. Boosting the long-term resilience of our homes, businesses and infrastructure.

National Highways policy

12.1.22. The National Highways Environment Strategy outlines the following objectives for National Highways in relation to road drainage and the water environment:

- to continue to mitigate existing discharges that pose a risk of pollution
- to identify opportunities for restoring waterbodies to a more natural condition and removing obstacles for fish and eel migration

- to update forward programme of water quality schemes in collaboration with the Environment Agency
- to commission further research to explore microplastic pollution in road runoff, and any associated impacts on the wider environment

Local policy

Coventry City Council Local Plan 2013 – 2031

12.1.23. The relevant Local Plan policies are:

- Policy DS3: Sustainable Development Policy
- Policy EM4 Flood Risk Management
- Policy EM5 Sustainable Drainage Systems (SuDS)
- Policy EM6: Redevelopment of Previously Developed Land

Rugby Borough Council Local Plan 2011 – 2031

12.1.24. The relevant Local Plan policies are:

- Policy SDC5: Flood Risk Management
- Policy SDC6: Sustainable Drainage
- Policy NE2: Strategic Green and Blue Infrastructure
- Policy SDC7: Protection of the Water Environment and Water Supply

12.2. Assessment methodology

12.2.1. DMRB LA 113 provides the methodologies for the assessment and management of the impacts that new construction, improvement, technology and maintenance projects may have on the water environment.

Surface water quality

12.2.2. A Highways England Water Risk Assessment Tool (HEWRAT) assessment would be undertaken to assess potential impacts of routine runoff and accidental spillages on water quality in the receiving waterbodies. This assessment will also establish the requirements for mitigating measures to reduce the risk.

12.2.3. The following methods will be adopted:

- Simple assessment of pollution impacts from routine runoff to surface waters using HEWRAT. This will use updated drainage information and traffic data to establish potential impacts of pollutants in routine highway runoff and impacts of spillages for the Scheme on the receiving watercourses within the study area and inform the requirement for mitigation measures to adequately reduce the risk.

- If required, and dependent on the results of the HEWRAT assessment and identification of outfall discharge location, a detailed assessment of pollution impacts from routine runoff may be required using the Metal – Bioavailability Assessment Tool (M-BAT) developed by the WFD Technical Advisory Group (WFD-TAG, 2014).

Aquatic ecology

12.2.4. The environmental assessment will review potential impacts on water quality and status of the receiving surface water bodies. Any consequential impact on the aquatic ecology will be considered in the biodiversity assessment of the ES.

Water Environment (WFD) Regulations

- 12.2.5. The construction and operation stages could result in potential adverse effects on waterbodies classified under the Water Environment (WFD) (England and Wales) Regulations 2017. The preliminary design of the Scheme is ongoing. However, it is anticipated that a new drainage ditch connection to an existing watercourse may be required at the new roundabout to maintain an existing drainage ditch. This will be confirmed in the drainage survey in autumn 2023 and as the design progresses. The assessment will be carried out with due regard to the Planning Inspectorate advice note eighteen: Water Framework Directive Guidance (Planning Inspectorate, 2017) and Environment Agency guidance (Environment Agency, 2016).
- 12.2.6. A preliminary Water Environment (WFD) Regulations compliance assessment will be carried out using the methodology given in the Environment Agency's documents (Environment Agency, 2016), to screen if the Scheme has the potential to have an effect on the WFD status of the waterbodies within the study area. Any potential significant adverse impacts on these waterbodies will trigger the need for a detailed Water Environment (WFD) Regulations compliance assessment.
- 12.2.7. The detailed Water Environment (WFD) Regulations compliance assessment will include an assessment of effects on all quality elements, including hydromorphology and will identify mitigation. It may also identify opportunities for enhancement measures, where possible, to assist with the implementation of any outstanding River Basin Management Plan (RBMP) measures.
- 12.2.8. A hydromorphological (simple) assessment and survey in autumn 2023, as noted in DMRB LA 113 will also be undertaken as part of the environmental assessment. The methodology will be confirmed with the Environment Agency if a detailed assessment is required.

Flood risk and drainage

12.2.9. An FRA will assess the impact to and of the Scheme on all sources of flood risk. The FRA will be undertaken in accordance with the requirements of the applicable government policy (such as NPSNN), and the Environment Agency's climate change allowances (Environment Agency, 2022e). A drainage strategy will also be prepared. The proposed scope of work required for the FRA is as follows:

- Undertake a desk-based review of existing flood risk information for all sources, including output from any existing hydraulic model for the Coventry area and the A46 Coventry Junctions (Walsgrave) Flood Risk Assessment, located in Appendix F of the Environmental Assessment Report (National Highways, 2022).
- The Environment Agency accepted the baseline model undertaken at the options selection stage and this will be utilised as a basis to assess the fluvial flood risk impacts from the Scheme.
- Proposed development modelling will be undertaken in winter 2023 – 2024 to consider the risk of flooding arising from and to the Scheme and will take the impacts of climate change into account.
- The FRA will demonstrate how these risks will be managed and, where relevant, mitigated. The assessment of residual risk will also be included.
- The FRA will ensure the Scheme passes the Sequential and Exception tests.
- The FRA will incorporate the model output findings and any mitigation proposed as part of the drainage strategy in line with DMRB LA 113.
- The FRA will also consider construction flood risk, which will be used to inform the environmental assessment.

Groundwater

12.2.10. A groundwater assessment will assess the impact to and of the Scheme on all sources of risk and will form an appendix to the ES. The groundwater assessment will include the following:

- Groundwater level, flow and quality assessment. This will include the development of a conceptual model of the study area and identification of potential features that are susceptible to groundwater level, flow and quality impacts. The assessment will also consider key construction activities and design features that are likely to affect groundwater and will identify whether they have potential to have an impact, using a “source – pathway – receptor” approach. The assessment will be used to identify any mitigation requirements to be incorporated into the Scheme design. The assessment will also include preliminary dewatering calculations to inform the dewatering outline design and permitting requirements.

- Groundwater dependent terrestrial ecosystems (GWDTE) assessment. This will assess potential linkages between the Scheme and identified GWDTEs, the importance of the GWDTEs, and the potential impacts and risk to the GWDTEs. The assessment will consider any mitigation requirements to be incorporated into the Scheme design.
- Groundwater quality and runoff assessment. A simple assessment (including spillage assessment) would be undertaken if the road drainage design includes infiltration of routine runoff to ground, unlined road drainage, or discharge to a watercourse that dries up in most years or has a Q₉₅ flow of one litre per second or less (i.e., the flow that is exceeded 95% of the time). The simple assessment will use the HEWRAT groundwater assessment to identify whether discharges to ground are acceptable, or whether further mitigation is required to be incorporated into the proposed drainage design. If required, and dependent on the results of the HEWRAT groundwater assessment, a detailed assessment may also be required. The scope of this will be developed in consultation with the Environment Agency.

Climate change

12.2.11. The impact of climate change and the occurrence of a major event or disaster will be considered as part of the FRA and drainage strategy. It is considered that the occurrence of an extreme flooding event is the primary major natural event to impact the Scheme.

Assessment criteria

12.2.12. In accordance with DMRB LA 113, the value, criteria, including typical examples for estimating the importance of water environment attributes are defined in Table 12-1. Definitions for estimating the magnitude of impact including typical examples are given in Table 12-2 and are based on values set out in DMRB LA 113. The overall significance of effect is determined using the significance matrix in DMRB LA 104 and the significance definitions and examples provided in Table 12-3. Effects can be beneficial or adverse. Effects that are moderate, large, or very large, are considered significant effects. Effects that are slight or neutral are not significant.

Table 12-1: Criteria for estimating the importance of water environment attributes (adapted from DMRB LA 113)

Value	Criteria	Typical example
Very High	Nationally significant attribute of high importance	Surface water: Watercourse having a WFD classification shown in a RBMP and Q ₉₅ ≥ 1 .0 m ³ /s. Site protected/designated under international or UK legislation (Special Area of Conservation (SAC), Special Protected Area) (SPA, Sites of Special Scientific Interest (SSSI), Ramsar site, salmonid water)/Species protected by international legislation Ecology and Nature Conservation. The watercourse is free from

Value	Criteria	Typical example
		<p>any modification or human influence and is in natural equilibrium exhibiting a range of morphological features.</p> <p>Groundwater: Principal aquifer providing a regionally important resource and/or supporting a site protected under EC and UK legislation Ecology and Nature Conservation. Groundwater locally supports GWDTE. SPZ1.</p> <p>Flood Risk: Essential infrastructure or highly vulnerable development.</p>
High	Locally significant attribute of high importance	<p>Surface water: Watercourse having a WFD classification shown in a RBMP and $Q_{95} < 1.0\text{m}^3/\text{s}$. Species protected under International or UK legislation Ecology and Nature Conservation. The watercourse shows very limited signs of modification or other human influence on morphology.</p> <p>Groundwater: Principal aquifer providing locally important resource or supporting a river ecosystem. Groundwater supports a GWDTE. SPZ2.</p> <p>Flood Risk: More vulnerable development.</p>
Medium	Of moderate quality and rarity	<p>Surface water: Watercourses not having a WFD classification shown in a RBMP and $Q_{95} > 0.001\text{m}^3/\text{s}$. Limited range of morphological diversity and features, the watercourse shows signs of modification changed by channel modification or other human pressures.</p> <p>Groundwater: Aquifer providing water for agricultural or industrial use with limited connection to surface water. SPZ3.</p> <p>Flood Risk: Less vulnerable development.</p>
Low	Lower quality	<p>Surface water: Watercourses not having a WFD classification shown in a RBMP and $Q_{95} \leq 0.001\text{m}^3/\text{s}$. No morphological diversity, the watercourse is highly modified changed by channel modification or other human pressures.</p> <p>Groundwater: Unproductive strata.</p> <p>Flood Risk: Water compatible development.</p>

Table 12-2: Estimating the magnitude of an impact on an attribute (adapted from DMRB LA 113)

Magnitude	Criteria	Example
Major adverse	Results in loss of attribute and/or quality and integrity of attribute	<p>Surface water</p> <p>Failure of both acute-soluble and chronic-sediment related pollutants in HEWRAT and compliance failure with EQS values. Calculated risk of pollution from a spillage $\geq 2\%$ annually (spillage assessment). Loss of regionally important public water supply. Loss or extensive change to a designated nature conservation site. Reduction in water body WFD classification. Extensive change to or replacement of natural bed and bank with artificial interventions.</p> <p>Groundwater</p> <p>Loss of, or extensive change to, an aquifer. Loss of regionally important water supply. Potential high risk of pollution to groundwater from routine runoff - risk score > 250 (Groundwater quality and runoff assessment).</p>

Magnitude	Criteria	Example
		<p>Calculated risk of pollution from spillages $\geq 2\%$ annually (Spillage assessment). Loss of, or extensive change to GWDTE or baseflow contribution to protected surface water bodies. Reduction in water body WFD classification. Loss or significant damage to major structures through subsidence or similar effects.</p> <p>Flood risk Increase in peak flood level ($> 100\text{mm}$).</p>
Moderate adverse	Results in effect on integrity of attribute, or loss of part of attribute	<p>Surface water Failure of both acute-soluble and chronic-sediment related pollutants in HEWRAT but compliance with EQS values. Calculated risk of pollution from spillages $\geq 1\%$ annually and $< 2\%$ annually. Degradation of regionally important public water supply or loss of major commercial/industrial/agricultural supplies. Contribution to reduction in water body WFD classification. Considerable hydromorphological change to or replacement of natural bed and bank with artificial interventions.</p> <p>Groundwater Partial loss or change to an aquifer. Degradation of regionally important public water supply or loss of significant commercial/industrial/agricultural supplies. Potential medium risk of pollution to groundwater from routine runoff - risk score 150-250. Calculated risk of pollution from spillages $\geq 1\%$ annually and $< 2\%$ annually. Partial loss of the integrity of GWDTE. Contribution to reduction in water body WFD classification. Damage to major structures through subsidence or similar effects or loss of minor structures.</p> <p>Flood risk Increase in peak flood level ($> 50\text{mm}$).</p>
Minor adverse	Results in some measurable change in attribute's quality or vulnerability	<p>Surface water Failure of either acute soluble or chronic sediment related pollutants in HEWRAT. Calculated risk of pollution from spillages $\geq 0.5\%$ annually and $< 1\%$ annually. Minor effects on water supplies. Slight hydromorphological change from the baseline of channel bed and banks though changes to or replacement of natural bed and bank with artificial intervention.</p> <p>Groundwater Potential low risk of pollution to groundwater from routine runoff - risk score < 150. Calculated risk of pollution from spillages $\geq 0.5\%$ annually and $< 1\%$ annually. Minor effects on an aquifer, GWDTEs, abstractions and structures.</p> <p>Flood risk Increase in peak flood level ($> 10\text{mm}$).</p>
Negligible	Results in effect on attribute, but of insufficient magnitude to affect the use or integrity	<p>The proposed project is unlikely to affect the integrity of the water environment.</p> <p>Surface water No risk identified by HEWRAT (pass both acute-soluble and chronic-sediment related pollutants). Risk of pollution from spillages $< 0.5\%$. No hydromorphological change from the baseline of channel bed and banks.</p> <p>Groundwater No measurable impact upon an aquifer and/or groundwater receptors and risk of pollution from spillages $< 0.5\%$.</p> <p>Flood risk</p>

Magnitude	Criteria	Example
		Negligible change to peak flood level ($\leq \pm 10\text{mm}$).
Minor beneficial	Results in some beneficial effect on attribute or a reduced risk of negative effect occurring	<p>Surface water HEWRAT assessment of either acute soluble or chronic-sediment related pollutants becomes pass from an existing site where the baseline was a fail condition. Calculated reduction in existing spillage risk by 50% or more (when existing spillage risk is $<1\%$ annually). Slight hydromorphological change from the baseline of channel bed and banks through changes to or replacement of artificial bed and bank with natural interventions.</p> <p>Groundwater Calculated reduction in existing spillage risk by 50% or more to an aquifer (when existing spillage risk $<1\%$ annually). Reduction of groundwater hazards to existing structures. Reductions in waterlogging and groundwater flooding.</p> <p>Flood risk Creation of flood storage and decrease in peak flood level ($> 10\text{mm}$).</p>
Moderate beneficial	Results in moderate improvement of attribute quality	<p>Surface water HEWRAT assessment of both acute-soluble and chronic-sediment related pollutants becomes pass from an existing site where the baseline was a fail condition. Calculated reduction in existing spillage by 50% or more (when existing spillage risk $>1\%$ annually). Contribution to improvement in water body WFD classification. Considerable hydromorphological change to or replacement of artificial bed and bank with natural interventions to include a range of morphological features.</p> <p>Groundwater Calculated reduction in existing spillage risk by 50% or more (when existing spillage risk is $>1\%$ annually). Contribution to improvement in water body WFD classification. Improvement in water body catchment abstraction management Strategy (CAMS) (or equivalent) classification. Support to significant improvements in damaged GWDTE.</p> <p>Flood risk Creation of flood storage and decrease in peak flood level ($> 50\text{mm}$).</p>
Major beneficial	Results in major improvement of attribute quality	<p>Surface water Removal of existing polluting discharge or removing the likelihood of polluting discharges occurring to a watercourse. Improvement in water body WFD classification. Extensive hydromorphological change to or replacement of artificial bed and bank with natural interventions to include a range of morphological features.</p> <p>Groundwater Removal of existing polluting discharge to an aquifer or removing the likelihood of polluting discharges occurring. Recharge of an aquifer. Improvement in water body WFD classification.</p> <p>Flood risk Creation of flood storage and decrease in peak flood level ($> 100\text{mm}$).</p>
No change		No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Table 12-3: Significance categories and typical descriptions

Significance	Examples
Very large	Effects at this level are material in the decision-making process.
Large	Effects at this level are likely to be material in the decision-making process.
Moderate	Effects at this level can be considered to be material decision-making factors.
Slight	Effects at this level are not material in the decision-making process.
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

12.3. Assessment assumptions and limitations

- 12.3.1. This report has been prepared using publicly available information and reports produced at the options selection stage. The assessment presented within this report is based on a desk-based study only. No flood modelling has been carried out for this assessment but was undertaken as part of the option selection stage. No surface water or groundwater quality data, or sediment sampling data were available at the time of writing, and available groundwater level data was limited.
- 12.3.2. It is unlikely that current data limitations present any uncertainties with respect to surface water and flood risk and available information is therefore assumed to be representative of general conditions. For groundwater, there are no substantial uncertainties, however, some minor uncertainties may arise surrounding groundwater levels. A site visit and Water Features Survey (WFS) is planned in autumn – winter 2023 as part of the forthcoming ES, which will also be informed by a ground investigation (GI) and groundwater level and quality monitoring programme.
- 12.3.3. The drainage design is currently under development, and it is assumed this will be informed by a drainage survey to be undertaken in autumn 2023. However, it is assumed the Scheme will drain to existing and new outfall locations. Runoff from existing highway drainage would be maintained at existing rates or less and runoff arising from additional impermeable areas introduced as part of the Scheme would be attenuated within attenuation basin and discharged at the greenfield runoff rate into the surrounding watercourses. It is assumed if water quality mitigation is required, this would take the form of SuDS, where practicable.
- 12.3.4. It is assumed the existing pipework which connected the unnamed watercourse local to the northern attenuation basin will be retained. It is assumed the field drain to the south of this will be connected to a new drainage ditch and

redirected to the north. This will be confirmed as the design progresses and a drainage survey has been undertaken.

- 12.3.5. It is assumed that the Smite Brook culverts under the A46 and the B4082 will not be amended or replaced. This will be confirmed as the design progresses.
- 12.3.6. No assessment of pollution impacts from routine runoff to surface water has been undertaken using the HEWRAT to inform this chapter or within the Environmental Assessment Report (EAR) (National Highways, 2022). At present the drainage design assume the basins included in the drainage design will be adequate to mitigate water quality impacts but this will be confirmed through the HEWRAT assessment, which will also identify any additional mitigation required.

12.4. Study area

- 12.4.1. This assessment identifies surface water and groundwater features, groundwater conditions, surface water and groundwater flood risk within the study area. The study area comprises a 1km buffer around the draft Order Limits. It has been extended to 2km or further where there are sensitive groundwater features that may be affected further downstream or down-hydraulic gradient respectively. The study area is based on professional judgement to ensure the effects of the Scheme are sufficiently identified. This is except for the fluvial flood risk assessment which is governed by the extent of the model. The full extent of the study area will be confirmed in the ES when further design details are available.

12.5. Baseline conditions

- 12.5.1. Information to assist defining the existing baseline conditions has been obtained from the following sources:
- British Geological Survey (BGS) Geindex (onshore) (BGS, 2023a)
 - BGS Groundwater Flooding. (BGS, 2023b)
 - Drainage Data Management System (DDMS) (National Highways, 2023)
 - Department for Environment, Food and Rural Affairs (DEFRA) Magic Map (Defra, 2023a)
 - Environment Agency water discharge consents database (Environment Agency, 2023b)
 - Environment Agency catchment data explorer (Environment Agency, 2023c)
 - Environment Agency flood map for planning (Environment Agency, 2023d)
 - Environment Agency long term flood risk service (Environment Agency, 2023e)

- Environment Agency historic flood map (Environment Agency, 2023f)
- Environment Agency water quality archive (Environment Agency, 2023g)
- Environmental Assessment Report (EAR) (National Highways, 2022)
- Environmental Scoping Report (National Highways, 2020)
- Preliminary Sources Study Report (including Groundsure report) (National Highways, 2021)
- UK National River Flow Archive (Centre for Ecology and Hydrology, 2023)
- Natural England Designated Sites (Natural England, 2023a)
- Ordnance Survey Online Map (Ordnance Survey, 2023a)
- Ordnance Survey Open Rivers (Ordnance Survey, 2023b)
- Coventry City Council Strategic Flood Risk Assessment (SFRA) (Coventry City Council, 2015)
- Warwickshire County Council Joint SFRA (URS, 2013)

Surface water features

12.5.2. The Scheme is situated in close proximity to multiple watercourses/features. These will be confirmed during a site walkover as part of the EIA. There are two main rivers located within the 1km study area (see Figure 12.1 of Volume 2):

- River Sowe is located to the west of the Scheme. It flows from the west then south adjacent to the draft Order Limits at the south-west boundary.
- Withy Brook is a tributary of the River Sowe. It flows in a southerly direction, crossing under the existing A46, north of the draft Order Limits, before its confluence with the River Sowe.

12.5.3. Smite Brook, an ordinary watercourse, is partially located within the draft Order Limits. It rises to the east, outside of the study area and flows westwards into Coombe Pool. It discharges at the west of Coombe Pool where it is culverted under the existing A46 and flows into the River Sowe after being culverted under the B4082.

12.5.4. An unnamed watercourse, located within the draft Order Limits north of the existing roundabout, flows in a westerly direction under the existing A46 via pipework to the River Sowe (National Highways, 2023). South of this a drainage ditch flows in a westerly direction though it is unclear if this flows under the existing A46 or adjacent to it. A drainage survey in autumn 2023 will confirm this.

12.5.5. Birchley Wood Brook, an ordinary watercourse located within the study area, is formed from a number of smaller ordinary watercourses originating to the south-east of the Scheme, local to Birchley Wood. Birchley Wood Brook flows in a westerly direction to the south of Coombe Pool before its confluence with Smite

Brook, to the east of the A46. Before it is culverted under the A46, a tributary drains into it from the south. In addition to this, there are approximately five unnamed smaller ordinary watercourses located within the study area, outside of the draft Order Limits (Ordnance Survey, 2023a).

- 12.5.6. The nearest gauging station to the Scheme is located approximately 13.5km downstream on the River Sowe at Stoneleigh where the Q_{95} (the flow that is exceeded 95% of the time) is $1.218\text{m}^3/\text{s}$ (Centre for Ecology and Hydrology, 2023). Areal scaling of the Q_{95} flows at this gauging station was undertaken to estimate the Q_{95} flows for Smite Brook, River Sowe and Withy Brook at the Scheme and was calculated to be $0.197\text{m}^3/\text{s}$, $0.576\text{m}^3/\text{s}$ and $0.130\text{m}^3/\text{s}$ respectively. The Q_{95} at these locations will be reassessed during the environmental assessment.
- 12.5.7. Coombe Pool is a reservoir situated approximately 70m to the east of the Scheme, within Coombe Country Park.
- 12.5.8. There are three ponds located within the study area, outside of the draft Order Limits (see Figure 12.1 of Volume 2), which are hydraulically connected to watercourses during extreme flood events as they lie within Flood Zones 2 and 3. These include two to the south-west of the study area, one within and one local to Stoke Floods Nature Reserve and one to the north of the study area. In addition to this there are 11 ponds within the study area which are hydraulically disconnected from watercourses.
- 12.5.9. A Groundsure report (National Highways, 2021), undertaken in 2020, notes there is one active licenced abstraction for spray irrigation located 1.2km east of the Scheme outside of the study area (see Figure 12.1 of Volume 2). This will be confirmed during the environmental assessment.
- 12.5.10. There is one consented discharge within the study area, south-east of the Scheme, from a domestic property (multiple) (including farmhouse) (Environment Agency, 2023b). Due to the location, it is presumed this consented discharge is to a watercourse (see Figure 12.1 of Volume 2).
- 12.5.11. The Environment Agency water quality archive (Environment Agency, 2023g) notes there is a routine water quality monitoring point on Smite Brook at the B4082 culvert. In addition to this, there are three locations within the study area that are sampled as part of the routine monitoring regime:
 - River Sowe - Hungerley Hall Farm, located 300m north-west of the existing roundabout.
 - Coombe Pool, located 150m east of the existing roundabout.
 - Withy Brook - High Bridge, located 1.5km north of the existing roundabout.

12.5.12. The draft Order Limits does not lie within an Internal Drainage Board area. In addition to the desktop study presented in this PEIR, a site walkover and a drainage survey will be carried out in autumn 2023. Consultation with the LLFAs will also be undertaken to establish any watercourses that may have remained unidentified through the desktop study and field surveys.

Groundwater

12.5.13. BGS 1:50,000 mapping (BGS, 2023a) indicates that the bedrock underlying the study area is the Mercia Mudstone Group (MMG), consisting of mudstones with subordinate siltstones and sandstones and potentially thin beds of gypsum and anhydrite. The MMG is underlain by the Helsby Sandstone Formation (HSF) of the Sherwood Sandstone Group (SSG), consisting of sandstones and conglomerates of fluvial origin with occasional thin lenticular beds of siltstone and mudstone. The MMG pinches out or is down-faulted against the underlying the HSF approximately 1 - 2km to the north-west and west respectively.

12.5.14. Aquifer classification within the study area varies (Figure 12.2 of Volume 2). A summary of aquifer designations is provided in Table 12-4. The SSG is classed as a Principal aquifer, defined as providing significant quantities of water that can support water supply and/or baseflow to rivers, lakes and wetlands on a strategic scale. The MMG is classed as a Secondary B aquifer, defined as a lower permeability layer that may store and yield limited amounts of groundwater through characteristics such as cracks, openings and eroded layers (Defra, 2023a). Fissuring has been identified in the MMG, which is likely to be due to weathering (National Highways, 2021).

Table 12-4: Aquifer designations for the geological units underlying the Scheme

Aquifer Class	Formation	Aquifer description
Principal	Sherwood Sandstone Group	Permeable deposits with high intergranular and/or fracture permeability; usually provide a high level of water storage; may support water supply and/or baseflow to rivers, lakes and wetlands on a strategic scale.
Secondary A	Alluvium Baginton Sand and Gravel Formation River Terrace Deposits	Permeable deposits capable of supporting water supplies at a local rather than strategic scale; may be an important source of baseflow to rivers.
Secondary B	Mercia Mudstone Group	Predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.
Secondary Undifferentiated	Glaciofluvial Deposits	Permeable deposits with variable characteristics so cannot be categorised A or B; assumed for groundwater protection purposes to have similar resource value to Secondary A aquifers.

Aquifer Class	Formation	Aquifer description
Unproductive	Bosworth Clay Thrussington Member - Diamicton	Deposits with low permeability that have negligible significance for water supply or river base flow.

- 12.5.15. To the east of the River Sowe, the HSF is confined by up to 80m of MMG, although the latter thins significantly towards the west and north-west. Within the study area, the true thickness of the MMG has not been confirmed, although borehole records indicate it to be at least 12.5m thick (National Highways, 2021). Less than 500m west of the Scheme, adjacent to the River Sowe, BGS borehole records such as Binley NO.2 SP37NE870 (437570 279630) and Binley NO.5 SP37NE858 (437570 279500) indicate that the SSG is as shallow as 6.4m below ground level (mbgl) (BGS, 2023a).
- 12.5.16. Superficial deposits overlie the MMG across most of the study area. Alluvium, comprising clay, silt, sand and gravel, is associated with the River Sowe and Smite Brook, while Quaternary River Terrace Deposits and Pleistocene Baginton Sand and Gravel Formation, both comprising sands and gravels with subsidiary clay and silt are associated with the earlier Proto-Soar River. Diamicton (glacial till) clays and silts of the Anglian Bosworth Clay Member and Thrussington Member are present to the north and east of the study area, although they also underlie the Scheme around Walsgrave Hill Farm. Areas of made ground are present towards the southern and northern areas of the Scheme.
- 12.5.17. Sands and gravels associated with the Alluvium, River Terrace Deposits and Baginton Sand and Gravel Formation are classed as Secondary A aquifers, defined as permeable layers that can support local water supplies, and may form an important source of baseflow to rivers (Defra, 2023a).
- 12.5.18. The Thrussington Member is classed as a secondary (undifferentiated) aquifer while the Bosworth Clay Member is classed as unproductive strata. Secondary undifferentiated aquifers are defined as having variable characteristics associated with either Secondary A aquifers (permeable layers that can support local water supplies) and Secondary B aquifers (mainly lower permeable layers that may store and yield limited amounts of groundwater). Unproductive strata are defined as having negligible significance for water supply or baseflow to rivers, lakes and wetlands.
- 12.5.19. The permeable superficial deposits are between 0.15m and 5.2m thick (National Highways, 2021) and have a groundwater vulnerability classification of high, meaning that there is only limited protection against pollutants being transmitted to groundwater. Elsewhere, the vulnerability classification is medium - high, except where the MMG is overlain by the Bosworth Clay Member to the east of the River Sowe where the groundwater vulnerability classification is medium.

- 12.5.20. It is likely that the permeable superficial deposits associated with the River Sowe, Smite Brook and Coombe Pool are in hydraulic continuity with surface water, although it is not known at present whether Coombe Pool is lined. BGS borehole records also indicate the presence of perched water (BGS, 2023a).
- 12.5.21. There are no SPZs within 2km of the Scheme. However, a SPZ 3 for boreholes that are likely to be abstracting from the SSG is located approximately 3km west and south-west of the Scheme (Defra, 2023a). One active, licensed groundwater abstraction within 1km of the Scheme was identified in the Groundsure report included in the PSSR (National Highways, 2021) with the following details:
- Licence number 18/54/11/0141, issue number 103, held by Brita Finish Ltd. NGR 437520 280320 (853m north-west of Scheme). Active abstraction of 50,000m³/year from sands and gravels beneath Bodmin Road for industrial and commercial processes.
- 12.5.22. Three further historical (no longer active) licensed abstractions were identified approximately 2km west of the Scheme, all with an abstraction rate of 200,000m³/year.
- 12.5.23. A data request will be submitted to the Environment Agency during the environmental assessment to confirm the location of any other current licensed abstractions, additional information on unlicensed abstractions will be acquired through liaison with the relevant Environmental Health local authority.
- 12.5.24. There is currently not enough data to estimate the general groundwater flow direction within the underlying superficial deposits, though the River Sowe flows in a south-westerly direction locally. Groundwater levels are likely to be shallow given water strikes in historical BGS Geoindex borehole records, but it is unclear to the extent which this water is contained within perched horizons.

Water Framework Directive

- 12.5.25. The current Severn RBMP, as shown by the Environment Agency's catchment data explorer (Environment Agency, 2023c), indicates the Scheme sits within three WFD surface water body catchments (see Figure 12.1 of Volume 2):
- Withy Bk – source to conf R Sowe (WBID: GB109054044640) covers some of the northern section of the draft Order Limit. The ecological status is limited to poor by biological quality elements (poor for macrophytes and phytobenthos combined) and physico-chemical quality elements (moderate for phosphate). The ecological status is expected to reach good by 2027, however there is low confidence in this. The chemical status is limited to fail by priority hazardous substances (fail for mercury and its compounds, perfluorooctane sulphonate (PFOS) and polybrominated diphenyl ethers

(PBDE)). The chemical status is expected to reach good by 2063. Reasons for not achieving good (RNAG) include poor nutrient management.

- Sowe – conf Withy Bk to conf R Avon (WBID: GB109054044540) covers some of the northern section of the draft Order Limit. The ecological status is limited to moderate by biological quality elements (moderate for macrophytes and phytobenthos combined) and physico-chemical elements (poor for phosphate). The ecological status is expected to remain at moderate. The chemical status is limited to fail by priority hazardous substances (fail for benzo(g-h-i) perylene, mercury and its compounds, PFOS and polybrominated diphenyl ethers (PBDE)). The chemical status is expected to reach good by 2063. The RNAG include poor livestock management, poor nutrient management and sewage discharge (intermittent).
- Smite Bk – source to conf R Sowe (WBID: GB109054044630) covers the central and northern section of the draft Order Limit. The ecological status is limited to poor by biological quality elements (moderate for fish and poor for macrophytes and phytobenthos combined) and physico-chemical quality elements (moderate for phosphate). The ecological status is not expected to exceed moderate. The chemical status is limited to fail by priority hazardous substances (fail for mercury and its compounds, PFOS and PBDE). The chemical status is expected to reach good by 2063. The RNAG includes poor livestock management.

12.5.26. Outside of the Scheme, three further WFD waterbodies are located within the study area (see Figure 12.1 of Volume 2):

- Coombe Pool (WBID: GB30937926) is located to the east of the existing roundabout. The ecological status is limited to moderate by physico-chemical quality elements (poor for total nitrogen and bad for total phosphorus) and supporting elements (moderate for expert judgement). The ecological status is expected to reach good by 2027, however there is low confidence in this. The chemical status is limited to fail by priority hazardous substances (fail for mercury and its compounds, PFOS and PBDE). The chemical status is expected to reach good by 2063. The RNAG includes poor livestock management, sewage discharge (continuous) and urban development.
- Sowe – conf Breach Bk to conf Withy Bk (WBID: GB109054044660) is located to the west of the Scheme. The ecological status is limited to poor by biological quality elements (moderate for fish and invertebrates, and poor for macrophytes and phytobenthos combined) and physico-chemical quality elements (poor for phosphate). The ecological status is expected to reach good by 2027, however there is low confidence in this. The chemical status is limited to fail by priority hazardous substances (fail for mercury and its compounds, PFOS and PBDE). The chemical status is expected to reach good by 2063. The RNAG includes urban development, poor livestock management and groundwater abstraction.
- Avon – ClaycotonYelvertoft Bk to conf R Sowe (WBID: GB109054043920) is located at the southern extent of the study area but has been scoped out as this water body is hydraulically disconnected from the Scheme.

12.5.27. The classifications for the five WFD surface waterbodies that will be considered in the assessment are summarised in Table 12-5.

Table 12-5: WFD surface water bodies

Water Body Name:	River Sowe – conf Withy Bk to conf R Avon	Withy Brook – source to conf R Sowe	Smite Brook – source to conf R Sowe	Coombe Pool	Sowe – conf Breach Bk to conf Withy Bk
Water Body ID:	GB109054044540	GB109054044640	GB109054044630	GB30937926	GB109054044660
Hydromorphological designation	Not designated artificial or heavily modified	Not designated artificial or heavily modified	Not designated artificial or heavily modified	Heavily modified	Not designated artificial or heavily modified
Overall Ecological Status/Potential	Moderate	Poor	Poor	Moderate	Poor
Overall Chemical Class	Fail	Fail	Fail	Fail	Fail
Reasons for deterioration/not achieving Good	Poor nutrient management.	Poor livestock management, poor nutrient management and sewage discharge (intermittent).	Poor livestock management	Poor livestock management, sewage discharge (continuous) and urban development	Urban development, poor livestock management and groundwater abstraction

- 12.5.28. The Scheme is underlain by the Warwickshire Avon – Secondary Mudrocks groundwater body (WBID GB40902G990900). The Environment Agency’s Catchment Data Explorer website (Environment Agency, 2023c) indicates that the Cycle 3 (2019) overall status of this groundwater body is good with good quantitative status and good chemical status.
- 12.5.29. The Warwickshire Avon – PT Sandstone Warwick/Avon Confined groundwater body (GB40901G300700) underlies the study area approximately 900m north-west of the Scheme. The overall status of this groundwater body is poor with a poor quantitative status and good chemical status.
- 12.5.30. The classifications for the two WFD groundwater bodies underlying the Scheme are summarised in Table 12-6 and their locations are shown in Figure 12.2 of Volume 2.
- 12.5.31. The Scheme lies within the Warwickshire Avon – Secondary Mudrocks Drinking Water Protected Area (DWPA), with the western extent of the study area also within the Warwickshire Avon – PT Sandstone Warwick/Avon Confined DWPA. The study area does not lie within a groundwater drinking water safeguard zone (Defra, 2023a).
- 12.5.32. The study area is not located within a surface water drinking water safeguard zone or DWPA but is within the River Avon (to confluence with River Severn) surface water Nitrate Vulnerable Zone (NVZ) (Defra, 2023a).

Table 12-6: WFD groundwater bodies

Water Body Name:	Warwickshire Avon – Secondary Mudrocks	Warwickshire Avon – PT Sandstone Warwick/Avon Confined
Water Body ID	GB40902G990900	GB40901G300700
Location	Entire study area	West of the draft Order Limits by around 700m at the junction between the B4082 and A4600.
Overall status	Good	Poor
Quantitative status	Good	Poor
Chemical status	Good	Good
Reasons for deterioration/not achieving Good	None	Disproportionately expensive: Unfavourable balance of costs and benefits.

Flood risk

Surface water

- 12.5.33. The River Sowe is not tidal and therefore tidal flooding has been scoped out of this assessment.
- 12.5.34. The majority of the Scheme and study area is located within Flood Zone 1 (see Figure 12.1 of Volume 2). Flood Zone 1 is associated with a low risk of flooding from fluvial and coastal sources (an annual probability of less than 0.1% of river and sea flooding). Land immediately surrounding the River Sowe, Smite Brook, Withy Brook, Birchley Wood Brook, and its tributary are primarily designated as Flood Zone 2 (between 0.1% and 1% annual probability) and Flood Zone 3 (see Figure 12.1 of Volume 2). Flood Zone 3 is split into two separate zones; 3a and 3b:
- Flood Zone 3a comprises of land assessed as having a 1% or greater annual probability of river flooding
 - Flood Zone 3b comprises as land where water has to flow or be stored in times of flood. The functional floodplain will normally comprise:
 - land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively
 - land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding)
 - land identified by local planning authorities in their Strategic Flood Risk Assessments as areas of functional floodplain, in agreement with the Environment Agency
- 12.5.35. A small area of the draft Order Limits encroaches on Flood Zone 2 and Flood Zone 3 to the south of the existing roundabout and on the B4082. In addition to this, a small area of Flood Zone 2 associated with a tributary of Birchley Wood Brook encroaches the draft Order Limits at Brinklow Road and at the northern most point of the draft Order Limits (see Figure 12.1 of Volume 2).
- 12.5.36. Hydraulic modelling of the existing flood risk was undertaken at the options selection stage and reported in the EAR (National Highways, 2022). The updated baseline model predicts a significant increase on peak flood levels and localised increases in flood extent shown by a widening of the floodplain, compared to the existing Environment Agency baseline model. The most notable increases in flood extent occur upstream of the A46 on Smite Brook where the culvert and embankment provide significant flow restrictions. This baseline model was accepted by the Environment Agency and their online maps have been updated to reflect this.

12.5.37. The Scheme lies between two LLFAs, Coventry City Council immediately to the west of the existing A46 carriageway and Warwickshire County Council to the east of this. Warwickshire County Council joint SFRA (URS, 2013), which includes Rugby Borough Council, indicates Flood Zone 3 associated with Withy Brook, Smite Brook, the River Sowe, and Birchley Wood Brook and its tributary as being in Flood Zone 3a. However, Coventry City Council SFRA (Coventry City Council, 2015) indicates that these are either in Flood Zone 3b or its indicative extent.

12.5.38. The Environment Agency's long term flood map (Environment Agency, 2023e) indicates the majority of the Scheme is at very low risk of flooding from pluvial sources (surface water) (see Figure 12.1 of Volume 2). This indicates this area has a chance of flooding of less than 0.1% each year. However, there are isolated areas of low to high surface water flood risk. These are classified by the Environment Agency as:

- low – each year, the area has between 1 in 1000 (0.1%) and 1 in 100 (1%) chance of flooding in any given year
- medium – each year, the area between 1 in 100 (1%) and 1 in 30 (3.3%) chance of pluvial flooding in any given year
- high – each year, the area has greater than 1 in 30 (3.3%) chance of pluvial flooding in any given year

12.5.39. To the north of the existing roundabout, the northbound existing carriageway is at risk of low to high surface water flooding. This flow pathway originates in the carriageway from the north and flows south to the B4082. At the south of the draft Order Limits there is an area on and to the side of the existing carriageway that is at low to high risk of surface water flooding. This appears to originate to the west and pool at the western side of the carriageway. The eastern area of surface water flood risk appears to be associated with the unnamed watercourse.

12.5.40. Within the study area, outside of the draft Order Limits, there are a number of areas at risk of low to high surface water flooding, which are associated with the main rivers or watercourses local to it.

12.5.41. DDMS (National Highways, 2023) indicates the existing A46 has experienced flooding at the roundabout, and to the immediate north and south of this. Seven flood events have occurred in this area, three of these being in the past three years due to overgrown channels and filter drains. The underlying cause remains unresolved. Other flood events have occurred on the remaining carriageway within the draft Order Limits and study area but the cause underlying these events has been rectified.

- 12.5.42. Warwickshire County Council, joint with Rugby Borough Council, SFRA (URS, 2013) shows no instances of sewer flooding in the area. However, Coventry City Council Strategic Flood Risk Assessment (SFRA) (Coventry City Council, 2015) indicates there have been two instances of sewer flooding within the CV3 2 postcode area, though the locations of this are unknown.
- 12.5.43. The Environment Agency's long term flood map (Environment Agency, 2023e) indicates in the event of Coombe Pool reservoir failing, part of the B4082 could be affected. However, when reservoir failure coincides with flooding from rivers the roundabout, the area to the immediate north, south and part of the B4082 is at risk.

Groundwater

- 12.5.44. There are few BGS Geindex borehole records with groundwater level information for the superficial deposits and strata likely to be encountered by the Scheme within the study area (BGS, 2023a). However, the record for the Brita Finish licensed abstraction borehole at NGR 437520 280320 (853m north-west of the Scheme) indicates a groundwater level within granular superficial deposits of approximately 2.7m below ground level (bgl) prior to a pumping test in March 1995.
- 12.5.45. Ground investigation boreholes records for the Coventry Eastern Bypass indicate water strikes in superficial deposits and MMG bedrock, although some GI boreholes were recorded as dry. A slow seepage was observed in granular superficial deposits at 1.7m bgl in BGS borehole reference SP37NE584 (NGR 438374 279207) in the vicinity of Smite Brook, south of the existing roundabout (National Highways, 2022).
- 12.5.46. Due to potentially high groundwater levels within the study area, the Scheme is considered to be at risk from groundwater flooding. Both Warwickshire County Council, joint with Rugby Borough Council, (URS, 2013) and Coventry City Council (Coventry City Council, 2015) SFRA's have been taken into consideration during analysis of the baseline flood risk from groundwater as outlined in the ESR (National Highways, 2020). The SFRA's indicate the susceptibility to groundwater flooding is between 25% and 75%.
- 12.5.47. The BGS groundwater flooding map (BGS, 2023b) indicates that much of the Scheme either has the potential for groundwater flooding to occur at surface or the potential for groundwater flooding of property situated below ground level (see Figure 12.3 of Volume 2). Within the study area, permeable superficial deposits associated with the River Sowe and Smite Brook have potential for groundwater flooding to occur at surface, including where Smite Brook crosses the Scheme.

- 12.5.48. The Groundsure report within the PSSR (National Highways, 2021) contains no incidents of groundwater flooding within the draft Order Limits at the time the report was prepared, but does note that DDMS (National Highways, 2023) indicates there is generally a moderate – high risk due to potential groundwater continuity with the River Sowe and Smite Brook.
- 12.5.49. DDMS (National Highways, 2023) also indicates a high potential for groundwater flooding to occur at the surface in the western section of the Scheme, particularly adjacent to the River Sowe and along Clifford Bridge Road, and below ground level in the southern section of the Scheme. There is limited to no risk of groundwater flooding further north.

Drainage

- 12.5.50. DDMS (National Highways, 2023) indicates that there are five outfalls within the draft Order Limits:
- Four moderate pollution risk status, three of which discharge to the River Sowe via ditches and one to Withy Brook via a ditch to the north of the Scheme.
 - One not determined pollution risk status which discharges to Smite Brook at the A46 crossing.
- 12.5.51. Within the study area there are an additional 20 outfalls:
- Four very high pollution risk status outfall discharge to a tributary of Birchley Wood Brook south of Coombe Pool
 - 11 moderate pollution risk status:
 - one outfall discharge to the River Sowe downstream of its confluence with Withy Brook
 - three outfalls discharge to Smite Brook and one to the River Sowe to the west of the existing A46 roundabout
 - five outfalls discharge to a tributary of Birchley Wood Brook, south of Coombe Pool
 - one outfall discharge to a tributary of Birchley Wood Brook to the south of the draft Order Limits
 - Four low pollution risk status outfalls are located to the south of the Scheme at the A428 roundabout; however, it is unclear which water body they discharge into
 - One pollution risk addressed outfall is located south of the A428 roundabout, however it is unclear which water body they discharge into
- 12.5.52. DDMS (National Highways, 2023) indicates that the drainage network is predominantly piped with surface water runoff collected via catchpits and gullies.

Surface and sub-surface filter drains are also present along the existing carriageway.

- 12.5.53. DDMS (National Highways, 2023) indicates that there are no discharges of road runoff via soakaways to groundwater within the study area.

Designated water dependent sites

- 12.5.54. There are several water dependent designated conservation sites within the vicinity of the Scheme (see Figure 12.1 and Figure 12.2 of Volume 2), as follows:
- 12.5.55. Coombe Pool SSSI is designated for its ornithological importance located on site and to the east of the construction area immediately adjacent to the draft Order Limits. Designated features of Coombe Pool include its heronry, associated reed beds and ancient woodland. The site also supports wintering wildfowl and many rare breeding birds such as the kingfisher, tufted duck, water rail and shoveler. Downstream of Coombe Pool but within the SSSI, Smite Brook is likely to be in hydraulic continuity with groundwater in the permeable superficial deposits. It is not known at present whether Coombe Pool is lined, but it may have at least a partial connection to groundwater within the superficial deposits.
- 12.5.56. Stoke Floods Local Nature Reserve (LNR) is located 300m south-west from the Scheme and is a similarly important site for wintering birds.
- 12.5.57. There is coastal and floodplain grazing marsh priority habitat within approximately 20m north-east of the draft Order Limits along the River Sowe corridor.
- 12.5.58. There are several additional conservation sites situated south of the Scheme, outside of the 1km study area. These include Herald Way Marsh SSSI/LNR, designated for its range of wetland habitats and assemblages of invertebrates, and Brandon Marsh SSSI, a diverse complex of flooded gravel pits, fen and scrub. The sites are considered to be potential GWDTE.
- 12.5.59. Details of aquatic ecology can be found in Chapter 8, Biodiversity.

Hydromorphology

- 12.5.60. A watercourse walkover was undertaken as part of the option selection stage (National Highways, 2022), which assessed the hydromorphology of Birchley Wood Brook, Smite Brook and the River Sowe and this is described below.
- 12.5.61. Birchley Wood Brook upstream (east) of Coombe Pool, lies within a wide gently sloping floodplain surrounded predominantly by pastoral farmland. The watercourse has likely been modified historically for agricultural use with typically

uniform flow conditions and channel profile. The watercourse was typically silty and the channel bed not visible.

- 12.5.62. Further downstream where Birchley Wood Brook runs through woodland adjacent to Coombe Pool, the watercourse increased in flow diversity, with flow types ranging from pooled flows to gravelly run features. Gravel sediment deposits were also observed downstream of woody features. Birchley Wood Brook confluences with Smite Brook immediately upstream (east) of the A46.
- 12.5.63. Smite Brook downstream of the A46 has also been historically modified, prior to this it was more sinuous. The watercourse was also straightened in the vicinity of the A46, the channel is also over-wide at this location given the establishment of in-channel vegetation acting to narrow the channel. The lateral connectivity of the watercourse to the floodplain is relatively good, a flow route over the right bank floodplain was observed during the site visit, which is possibly indicative of a previous channel course of the river. Locally diverse flow conditions were observed, which are created by woody features in the channel. The riverbed is likely to be composed of gravel with a sinuous planform within the corridor of alluvium at this location.
- 12.5.64. The River Sowe is a watercourse subject to a range of modifications such as mills, channelisation and straightening to benefit the adjacent agricultural land use. During the walkover, water levels were high and the watercourse was very turbid, so the riverbed and bedforms were not visible. However, information provided by the Environment Agency suggests the presence of gravel features. The channel was observed to be very over-deep and disconnected from the floodplain, due to anthropogenic modification. Localised bank erosion was observed, likely due to straightening and the over-deep nature of the channel creating relatively high flows.

Recreation and human health

- 12.5.65. Licensed groundwater abstractions within the area are used to provide process water for manufacturing and make up or top up water.
- 12.5.66. The western half of Coombe Pool, closest to the A46, is reserved for angling.
- 12.5.67. The River Sowe is used for recreation, navigation and angling.

Climate change

- 12.5.68. The Met Office UK climate averages (Met Office, 2023) for Coventry indicate that:

- average monthly maximum temperatures range from 7.24 to 21.51°C and average monthly minimum temperatures range from 1.79 to 12.64 °C in the climate period 1991-2020. The average annual maximum temperature for the region is 14.17°C and average annual minimum temperature for the region is 6.62°C for the climate period 1991-2020
- average annual sunshine in the region is 1507.22 hours in the climate period 1991-2020
- average annual rainfall in the region is 698.30mm and there are an average 123.33 days of rainfall annually in the climate period 1991-2020

12.5.69. As the Scheme is classed as 'essential infrastructure' and partly lies within Flood Zone 3b, the higher central climate change allowance applies (Environment Agency, 2022). This is to be confirmed during consultation at the preliminary design stage. The potential anticipated change in peak river flow in the Avon Warwickshire Rivers Management Catchment for the higher central is 12% for the 2020s (2015 to 2039), 14% for the 2050s (2040 to 2069) and 32% for the 2080s (2070 to 2115) (Defra, 2023b). The anticipated changes in peak rainfall intensity in the catchment for 2050s (2022 to 2060) is between 20% and 40%, and for 2070s (2061 to 2125) is between 25% and 40%, for the central and upper end allowances, respectively for the 1% annual exceedance rainfall event (Defra, 2023c).

Major accidents and/or disasters (events)

12.5.70. Warwickshire County Council, joint with Rugby Borough Council, SFRA (URS, 2013) and the Environment Agency historic flooding map (2023f) indicates there have been no recorded events within the draft Order Limits or the study area. However, Coventry City Council SFRA (Coventry City Council, 2015) indicates that there have been a number of flood incidents within the study area, outside of the draft Order Limits, since 1990. Two to five incidents have occurred in one location to the south of the study area adjacent to the existing carriageway. The majority of the other incidents in the study area are associated with the River Sowe.

Sensitivity of receptor

12.5.71. The following receptors/features have been identified that could potentially be affected by the construction and/or operation of the Scheme. In accordance with DMRB LA 113, the importance of these features in terms of their attributes are summarised in Table 12-7 below.

12.5.72. Watercourses and water features within the study area that are assumed to be hydrologically isolated from the Scheme have not been included in this assessment.

12.5.73. The value of the features may change during the environmental assessment when more information is received.

Table 12-7 Value of water environment attributes in the study area with potential to be impacted by the Scheme

Feature	Attribute	Importance	Reason for assigned value
Withy Brook and its tributaries (within Withy Bk – source to conf R Sowe WFD waterbody)	Water supply/quality	Low	No known abstractions within the study area or draft Order Limits.
	Dilution and removal of waste products	Low	No known consented discharges. Q95 flow = 0.130m ³ /s
	Recreation	Low	No known recreational use.
	Value to economy	Low	Low economical value.
	Conveyance of flow	Medium	Not designated artificial or heavily modified. Q95 flow = 0.130m ³ /s Floodplain includes areas of 'less vulnerable' receptors such as buildings used for shops, amenity and open space.
	Biodiversity	Low	Unknown fish quality.
Smite Brook and its tributaries (within Smite Bk – source to conf R Sowe WFD waterbody)	Water supply/quality	Low	One active licenced abstraction for agricultural purposes within the study area.
	Dilution and removal of waste products	Low	One consented discharge from a domestic property within the study area. Q95 flow = 0.197m ³ /s
	Recreation	Low	No known recreational use.
	Value to economy	Low	One active licenced abstraction for agricultural purposes.
	Conveyance of flow	Medium	Not designated artificial or heavily modified . Q95 flow = 0.197m ³ /s Floodplain includes areas of 'less vulnerable' receptors such as amenity open space.
	Biodiversity	Very high	Coombe Pool SSSI, otters present within the study area.
River Sowe and its tributaries (within Sowe – conf Breach Bk to conf Withy Bk and Sowe – conf Withy Bk to conf R Avon WFD waterbodies)	Water supply/quality	Low	No known abstractions.
	Dilution and removal of waste products	Low	No known consented discharges. Q95 flow = 0.577m ³ /s
	Recreation	Medium	Used for recreation, navigation and angling.
	Value to economy	Low	Low economical value.
	Conveyance of flow	High	Not designated artificial or heavily modified. Q95 flow = 0.577m ³ /s Floodplain includes areas of 'more vulnerable' receptors such as residential properties.

Feature	Attribute	Importance	Reason for assigned value
	Biodiversity	Very high	Coastal and floodplain grazing marsh priority habitat and otters present within the study area.
Coombe Pool (WBID: GB30937926) Hydraulically connected ponds	Water supply/quality	Low	No known abstractions.
	Dilution and removal of waste products	Low	No known consented discharges.
	Recreation	Medium	The western half of Coombe Pool, closest to the A46, is reserved for angling.
	Value to economy	Low	Low economical value.
	Biodiversity	Very high	Coombe Pool SSSI and otters present within the study area.
Hydraulically connected ponds	Water supply/quality	Low	No known abstractions from ponds within the draft Order Limits or study area.
	Dilution and removal of waste products	Low	No known consented discharges.
	Recreation	Medium	Stoke Floods LNR used for bird watching.
	Value to economy	Low	Low economical value.
	Biodiversity	High	Includes Stoke floods LNR, a locally significant attribute.
Smite Brook floodplain	Conveyance of flow	Medium	Floodplain includes areas of 'less vulnerable' receptors such as amenity open space.
River Sowe floodplain	Conveyance of flow	High	Floodplain includes areas of 'more vulnerable' receptors such as residential properties.
Withey Brook and its tributaries floodplain	Conveyance of flow	Medium	Floodplain includes areas of 'less vulnerable' receptors such as buildings used for shops, amenity and open space.
Sandstone Principal Aquifer (Warwickshire Avon – PT Sandstone Warwick/Avon Confined groundwater body)	Water supply/quality	High	Principal aquifer providing strategic public water supply, local private water supplies (agricultural purposes) and baseflow to rivers. Locally important resource for commercial and industrial supply. One licensed abstraction located within the study area. No SPZs within 2km of the draft Order Limits, SPZ 3 is 3km to the west.
	Soakaway	Low	No soakaways. No consented discharges currently known.
	Vulnerability	High	Aquifer groundwater vulnerability classification of medium to high.
	Economic value	Very High	Principal aquifer providing local commercial and industrial water supply, local private water supplies (from both groundwater and surface water). These are considered indirect receptors.

Feature	Attribute	Importance	Reason for assigned value
	Conveyance of flow	High	Principal aquifer providing moderate baseflow to the River Sowe downstream, this is considered an indirect receptor.
	Biodiversity	Low	No known connection to any designated ecological sites locally.
Secondary superficial aquifers	Water supply/quality	Medium	Secondary aquifers supporting local water supply, likely hydraulic connection to Sandstone Principal aquifer.
	Soakaway	Low	No soakaways. No consented discharges currently known.
	Vulnerability	Very High	Aquifer groundwater vulnerability classification of high, meaning that there is only limited protection against pollutants being transmitted to groundwater.
	Economic value	Medium	Supports local abstractions.
	Conveyance of flow	High	Likely hydraulic continuity with the Sandstone Principal aquifer. May indirectly support baseflow to surface water bodies.
	Biodiversity	High	Secondary A aquifers surrounding Coombe Pool SSSI are likely in hydraulic continuity.

12.6. Potential impacts

12.6.1. Potential impacts on the water environment could arise from a number of direct and indirect sources during the construction and operational phases. This section summarises the potential impacts associated with the Scheme. These will be further developed in detail as part of the environmental assessment.

Construction

Surface water quality

12.6.2. During construction, there is the potential for mobilisation of sediment and contaminants from road construction activities such as earthworks, ground improvements, plant and vehicle washing. This could lead to degradation of surface water quality and designated sites.

12.6.3. Construction activities, including any demolition and demobilisation of site compounds, for the Scheme could increase the risk of a pollution incident from accidental spillages or leakage of fuels, oils, chemicals, wastewater, concrete or cement admixtures used. This could adversely impact surface water quality and designated sites local to the Scheme.

12.6.4. Construction works (for example, regrading and construction of new embankments) will have the greatest potential to impact on the surface water environment when they take place within, adjacent, over or close to surface

water features, including the fluvial floodplain. There is also a higher risk where works will take place close to the existing highways drainage network of areas of surface water flooding, creating a pathway for pollutants to reach the watercourses.

- 12.6.5. There could be an increased pollution risk from foul waste (treated or untreated) from site compounds and sediments and other pollutants being mobilised in surface water runoff which could reach watercourses and impact water quality. This could occur during earthworks (for example, regrading and construction of new embankments), and the movement of heavy plant and runoff from stockpiles. There could be an increased pollution risk from foul waste (treated or untreated) from site compounds and there is high likelihood of silt being generated from construction activities associated with the Scheme which will be greater after rainfall events.
- 12.6.6. There could be an increased pollution risk from foul waste (treated or untreated) from site compounds which could reach watercourses and impact water quality.

Hydromorphology

- 12.6.7. During construction, existing drainage channels and hydrological connectivity within the catchment may be altered, which may affect hydromorphological processes in downstream receptors. This could include altered flow velocities, altered discharge and sediment volumes. In addition to this, there could be a change in sediment transport regime which would alter erosion and deposition patterns, altering the bed and bank substrate distribution.
- 12.6.8. Any in-channel works has the potential to damage morphological features of watercourses. This could have a direct impact on the hydromorphology of the watercourse, altering longitudinal and lateral connectivity.
- 12.6.9. Any bankside works, including reprofiling, could increase bank erosion, fine sediment delivery and may be at risk of failure. In turn, this could alter the channel morphology and hydromorphological processes.

Groundwater

- 12.6.10. Risks to groundwater will depend upon the design and location of below ground structures, piling and excavations. Ground investigation, including groundwater level and quality monitoring, is planned as part of the current stage of the Scheme and this will inform the groundwater conceptual model and assessment of impacts on groundwater.
- 12.6.11. Given the shallow groundwater levels and likely hydraulic connection between surface water and groundwater, dewatering is likely to be required for

excavations associated with, for example, the attenuation basins, bridge foundations and service trenches. Dewatering may reduce groundwater levels at, or groundwater flow to receptors such as surface water courses, GWDTE and abstraction boreholes. Discharges from dewatering activities may also impact on receiving surface water or groundwater.

- 12.6.12. Changes in groundwater levels and flow pathways may also affect groundwater quality at receptors, particularly if groundwater intersects former landfills and is potentially contaminated.
- 12.6.13. Below ground structures or piles may create vertical pathways between aquifers or through confining layers such as the MMG, potentially allowing the potential migration of contaminants towards or into the underlying SSG Principal aquifer.
- 12.6.14. Lateral groundwater flow pathways through permeable superficial deposits or within more permeable horizons in the MMG may allow the migration of contaminants to groundwater receptors, particularly those within the Scheme such as Smite Brook. Potential contaminants entering watercourses, either from direct runoff or indirectly via groundwater pathways, may reach the SSG principal aquifer to the south-west of the Scheme where the MMG is absent, and the River Sowe flows through permeable superficial deposits overlying sandstone bedrock.
- 12.6.15. Potential contaminants may arise from the accidental spillage of fuels, lubricants, cements, hydraulic fluids or other harmful substances and runoff from stockpiles stored on site during the construction phase.
- 12.6.16. Demolition and ground disturbance associated with, for example, soil stripping, construction of foundations and piles and excavations for drainage and services, may generate groundwater turbidity. Turbidity may adversely affect groundwater receptors such as abstractions and watercourses.
- 12.6.17. The pollution risk to groundwater bodies, from the disturbance of contaminated ground specifically, is covered in Chapter 10: Geology and soils.
- 12.6.18. Interception of overland flows through the introduction of impervious structures, or compaction of soils, and the movement and storage of earth materials within the study area, could disrupt local groundwater recharge. Increases in areas of impermeable hardstanding, new structures and lined attenuation basins may also reduce infiltration. Reduced recharge to the permeable superficial deposits may affect groundwater receptors receiving baseflow from the permeable superficial deposits such as surface watercourses, GWDTEs and abstractions through reduced groundwater flow and levels, and also potentially groundwater quality. Furthermore, reduced recharge to the permeable superficial deposits may adversely affect recharge to the SSG principal aquifer down-gradient of the

study area, where the superficial and bedrock aquifers are in hydraulic continuity.

Flood risk

- 12.6.19. During construction, works may lead to temporary changes in the surface water runoff regime by the alteration of ground elevations and overland flow pathways, or the construction of above ground structures acting as a barrier to flow. Due to this, there is an increased risk of flooding during and following extreme rainfall events, including those areas identified as at risk of surface water flooding. This could cause localised flooding to the Scheme and others due to changes in surface water flood flow pathways.
- 12.6.20. There will be an increase in new impermeable hardstanding areas, which includes the new carriageway and compounds. This could increase the volume and flow rate of runoff from the construction areas resulting in increased localised flooding to the Scheme and others.
- 12.6.21. The drainage network is currently unconfirmed; however, a new culvert may be required to carry flow under the proposed link road to maintain an existing drainage ditch. Any alterations to culverts, pipework and other structures conveying water could result in a temporary loss of capacity, and the potential blocking of drainage systems with construction debris could result in overflowing drains. This could result in an increased flood risk to the Scheme or others.
- 12.6.22. Construction works which take place within, adjacent, over or close to surface water features, including the fluvial floodplain, may impact existing floodplain storage or channel capacity. In turn, this may increase or divert flood risk to the Scheme or others.
- 12.6.23. Earthworks and below ground structures such as foundations, piles and lined attenuation basins intercepting shallow groundwater may act as groundwater dams, increasing the risk of groundwater flooding up-gradient of the structure or diverting groundwater flow from receptors down-gradient of the structure. Earthworks may additionally compress the underlying ground, particularly if this is cohesive, reducing permeability and increasing the risk of groundwater flooding.
- 12.6.24. Depending on the drainage strategy during construction, potential dewatering discharges to ground could cause local groundwater mounding and increase the risk of groundwater flooding.

Operation

Surface water quality

- 12.6.25. There is a risk of pollution to surface water features resulting from accidental spillage or pollution incidents. This risk would increase with the increase in the volume of traffic as a result of the Scheme. Such accidental spillages could result in short term adverse impacts on water quality of receiving watercourses, aquatic ecology and adjacent designated sites.
- 12.6.26. There would be an increase in highway drainage area discharging to surface water, as a result of the Scheme. This coupled with the associated increase in traffic volumes could result in an increase in pollutant loads in highway runoff. This in turn could result in a long-term increase in diffuse pollution, adversely impacting on water quality of receiving watercourses, aquatic ecology and adjacent designated sites.
- 12.6.27. Data relating to environmental permits for water discharge activities have been obtained. Data relating to abstraction licences has been taken from the Groundsure report (National Highways, 2021) and will be confirmed during the ES.

Hydromorphology

- 12.6.28. Potential impacts to hydromorphology during operation include changes to physical form, hydraulic processes and sediment dynamics, constriction of flows, loss of habitats in watercourses and their floodplains and an increase in sediment in downstream reaches leading to degradation of the watercourse habitat. These impacts could result from:
- culverting works on a watercourse
 - earthworks when adjacent to watercourses
 - potential new drainage channels
 - new impermeable surfaces
- 12.6.29. In the absence of the existing drainage network being confirmed there are potential for impacts resulting from modifications to existing outfall structures, new outfall structures if required and discharge from outfalls to a watercourses or main rivers. This could cause erosion and impact on channel stability, structural damage and an increase in sediment in downstream watercourses leading to degradation of the watercourse habitat.

Groundwater

- 12.6.30. Permanent below ground structures such as attenuation basins, foundations and piles intercepting groundwater within the permeable superficial deposits may divert groundwater flow from receptors such as surface watercourses, GWDTEs and abstractions. Changes in groundwater flow pathways may also affect groundwater quality at receptors.
- 12.6.31. Attenuation basins are assumed to be lined. However, if they were to be unlined then lateral groundwater flow pathways through permeable superficial deposits or within more permeable horizons in the MMG may allow the migration of contaminants from routine runoff or accidental spillages to groundwater receptors.
- 12.6.32. As surface watercourses such as Smite Brook and the River Sowe are likely to be in hydraulic continuity with groundwater, permanent drainage discharging to surface water may also allow potential contaminants to migrate to groundwater receptors.
- 12.6.33. Potential contaminants entering watercourses, either from direct discharges from the permanent drainage or indirectly via groundwater pathways, may reach the SSG principal aquifer to the south-west of the Scheme where the MMG is absent, and the River Sowe flows through permeable superficial deposits overlying sandstone bedrock.
- 12.6.34. Below ground structures or piles may create vertical pathways between aquifers or through confining layers such as the MMG, potentially allowing the potential migration of contaminants towards or into the underlying SSG principal aquifer.
- 12.6.35. Increases in areas of impermeable hardstanding, new structures and lined attenuation basins may reduce infiltration to groundwater, particularly where these are installed in permeable superficial deposits.
- 12.6.36. Furthermore, embankments would increase the underlying soil load, potentially reducing the permeability of compressible ground and restricting groundwater flow to receptors such as abstractions.
- 12.6.37. Changes in groundwater flow pathways may also affect groundwater quality at receptors.

Flood risk

- 12.6.38. The Scheme could lead to a change in the surface water runoff regime by the alteration of ground elevations or overland flow pathways. This could result in

the diversion of flood flow pathways, increased localised flooding next to the Scheme with potential increased flood risk to the Scheme and to others.

- 12.6.39. The creation of the new carriageway hardstanding areas would result in an increase in impermeable area which, could increase the peak flow rate of runoff as well as the volume from the carriageway. This could result in increased localised flooding to the Scheme and to others.
- 12.6.40. Although the Scheme and drainage design is currently unconfirmed, the options selection stage Scheme design does not encroach on Flood Zone 3 and the alignment would include an elevated profile preventing water from encroaching the Scheme. Therefore, flood risk impacts to the Scheme and to nearby receptors are considered to be minimal. However, this will be reviewed during the environmental assessment as the design develops.
- 12.6.41. Below ground structures such as foundations, piles and lined attenuation basins intercepting groundwater within the permeable superficial deposits may act as groundwater dams, increasing the risk of groundwater flooding up-gradient of the groundwater dam or diverting groundwater flow from receptors down-gradient. Earthworks may additionally compress the underlying ground, particularly if this is cohesive, reducing permeability and increasing the risk of groundwater flooding.
- 12.6.42. Depending on the permanent drainage strategy, potential dewatering discharges to ground could cause local groundwater mounding and increase the risk of groundwater flooding.

12.7. Design, mitigation and enhancement measures

- 12.7.1. To avoid impacts on the water environment as far as practically possible the following section will provide detail of mitigation measures and best practice techniques to be implemented. The avoidance of impacts will be considered as the design progresses.
- 12.7.2. The design will include embedded mitigation measures in order to avoid or prevent adverse environmental effects. They are generally incorporated into operation of the Scheme, as part of the design, and these will be outlined in the ES.
- 12.7.3. Enhancements will also be considered as the design progresses and these will be based around incorporating green solutions, soft engineering and following best design approaches where practicable.

Embedded (design) mitigation

Construction

- 12.7.4. Impacts from the disturbance of shallow groundwater, including generation of turbidity, and groundwater ingress, would be mitigated through the temporary works design and an Environmental Management Plan (EMP) which will be informed by a groundwater assessment.
- 12.7.5. The Scheme has the potential to create vertical pathways to aquifers during foundation works such as piling. Mitigation would be through the Scheme design, informed by groundwater assessment and piling risk assessment.

Operation

- 12.7.6. A water quality assessment using the HEWRAT will be undertaken on any new and existing outfalls that will receive road runoff from impermeable areas within the draft Order Limits. The results of this assessment will detail the requirement for any mitigation measures to be included within the drainage design in order to reduce pollution from routine runoff and spillage pollution risks to the surface water environment. Any additional mitigation may take the form of SuDS, where practicable. SuDS features should be designed in accordance with DMRB standards and where appropriate the SuDS Manual (Construction Industry Research and Information Association (CIRIA), 2015).
- 12.7.7. The design of new permanent works affecting watercourses (for example, new outfalls and drainage ditch connections) will be informed by appropriate hydromorphological and ecological surveys and assessments. Mitigation will be included, if required, as part of the Scheme. This would involve constructing bed and bank material of the ditches in accordance with best practice design guidance to mimic natural conditions as close as possible. New outfalls should be set into river banks to avoid flood risk impacts and erosion. Scour protection may be required to avoid bank/in-channel erosion. Outfalls should be designed in accordance with DMRB standards, and where appropriate, the Culvert, Screen and Outfall Manual C786 (CIRIA, 2019). The design of such works will be agreed with the Environment Agency and LLFAs.
- 12.7.8. The drainage strategy would be designed to collect all surface water runoff from the carriageway which would be attenuated to ensure no increase in surface water runoff peak flow rate or volume. Three attenuation basins are to be constructed to attenuate the increase in impermeable area, before discharging to the River Sowe to the west via new outfalls. The drainage design will consider relevant climate change allowances, to be agreed with the LLFAs. However, it's assumed runoff from existing highway drainage will be maintained at existing

rates or less and runoff from new areas of hardstanding would be discharged at the greenfield runoff rate into the surrounding watercourses.

- 12.7.9. The Scheme design does not encroach on Flood Zone 3. However, any loss of floodplain storage will be checked and confirmed as the design progresses.
- 12.7.10. Impacts from permanent earthworks and below ground structures intercepting shallow groundwater and acting as a barrier to flow will be informed by a groundwater assessment. Any impacts will be mitigated through the Scheme and earthworks design.
- 12.7.11. Mitigation for the creation of long-term pollution pathways, such as piling, to the underlying principal aquifer would be through the Scheme design, informed by groundwater assessment and piling risk assessment.
- 12.7.12. The Scheme is partially underlain by permeable superficial deposits, though there are no known soakaways within the study area, the assessment of filter drains along the Scheme will likely form part of the drainage strategy due to the potential for pathways to groundwater. HEWRAT assessments would be undertaken for any infiltration features, including unlined road drainage, to inform mitigation requirements to be included in the drainage strategy.
- 12.7.13. As the Scheme is partially underlain by permeable superficial deposits, the impact from reduced groundwater recharge is considered to be a risk. Mitigation would be informed by groundwater assessment.

Essential mitigation

Construction

- 12.7.14. Mitigation during construction would be managed through the implementation of an EMP which is considered to be essential mitigation. The EMP will be prepared in alignment with DMRB LA 120: Environmental Management Plans (Highways England, 2020j) and include best practice measures to limit the risk of pollutants entering surface water and groundwater features. The first iteration of the EMP will detail the procedures and methods that should be followed to minimise the potential environmental effects of construction activities and this will be produced to support the environmental assessment.
- 12.7.15. For groundwater and surface water protection the EMP will be in accordance with CIRIA Guidelines (Control of water pollution from construction sites (CIRIA C532, 2002); Control of water pollution from linear construction projects: technical guidance (CIRIA C648, 2006a) and Control of water pollution from linear construction projects. Site guide (CIRIA C649, 2006b; and Environmental good practice on site guide (CIRIA C741, 2014)). The EMP will also be in

accordance with the Environment Agency's groundwater protection guidance (Environment Agency, 2023a).

- 12.7.16. Groundwater level and quality monitoring is currently being undertaken to establish baseline conditions. Given the likely degree of hydraulic continuity between surface water and groundwater receptors, and the potential requirement for excavation dewatering, a groundwater monitoring plan is likely to be required during construction and potentially also during early operation of the Scheme. Due to undertaking construction activities close to designated sites, main rivers and the floodplain, a surface water quality monitoring plan is also likely to be required with water quality monitoring to be undertaken prior to and during the construction phase. Any impact and mitigation of these activities will be considered as the preliminary design progresses and the requirements are confirmed.
- 12.7.17. Groundwater and surface water monitoring plans would be implemented through the EMP. These would be produced at the detailed design stage and be based upon the detailed design. However, the monitoring plans would be considered dynamic and subject to change as Scheme construction progresses.
- 12.7.18. Potential dewatering requirements would be informed by a dewatering assessment. Dewatering activities would be undertaken in accordance with regulatory requirements.
- 12.7.19. Where works will lead to temporary changes in the surface water runoff regime by the alteration of ground elevations and overland flow pathways, a temporary surface water drainage strategy would be developed for the Scheme and incorporated into the EMP to ensure that there will be no increase in runoff and flood risk during the construction phase. The temporary surface water drainage strategy would detail construction site and compound drainage, including foul, and drainage during construction of permanent drainage. It will also detail an appropriate treatment train to prevent runoff and accidental spillages reaching groundwater and surface watercourses, remove sediment and other contaminants as well as attenuating runoff. SuDS would be implemented where practicable.
- 12.7.20. Any construction activities, including any demolition, on or near a main river, or in the floodplain of a main river, would require a flood risk activity permit from the Environment Agency. Any construction activities, including any demolition, on or near an ordinary watercourse would require consent from the LLFAs as appropriate. The requirements for demolition are yet to be confirmed as part of the preliminary design.

12.8. Assessment of likely significant effects

Construction

- 12.8.1. The implementation of a robust EMP, which will include supporting management plans, is likely to be sufficient to mitigate potential significant impacts. Due to this any residual significance of effects relating to surface and groundwater quality, and hydromorphology are likely to be **neutral to adverse**.
- 12.8.2. Due to the immediate proximity of works to Smite Brook and its floodplain, a potential residual flood risk impact may remain. However, the residual significance of effects are likely to be **neutral to adverse**.
- 12.8.3. Impacts upon existing environmental permits and abstraction licences are not anticipated to be significant due to distance from the Scheme.

Operation

Surface water quality

- 12.8.4. The increase in hardstanding and traffic flow may lead to a deterioration in water quality to downstream receptors. The significance of effect to surface water quality of receiving waters cannot be determined at this time in the absence of existing drainage information and the proposed drainage design. Potential for any significant effects will be identified during the ES and mitigating measures would be included in the design, as required, and due to this the significance of effects are likely to be **beneficial to adverse** based on the extent of the mitigation requirements.

Hydromorphology

- 12.8.5. The significance of effect to hydromorphology is currently unknown, however, they are likely to be **neutral to adverse** following the implementation of mitigation measures. Potential for any significant effect will be identified during the ES and mitigating measures would be included in the design, as required.

Groundwater

- 12.8.6. The likely significance of effect to groundwater levels, flow and quality cannot be determined at this time due to lack of GI and monitoring data, and temporary and permanent works design information, particularly relating to earthworks and drainage. The potential for any significant effects will be assessed during the environmental assessment and any mitigation identified as required. However, with robust mitigation during construction and operation of the Scheme, residual significance of effects are likely to be **neutral to adverse**.

Flood risk

- 12.8.7. The significance of effect to flood risk is currently unknown. The nature and extent of mitigation required will be determined through the FRA and drainage strategy. Where mitigation is required, for example attenuation basins, this would be incorporated where practicable to comply with NPSNN policy requirements and DMRB standards. These requirements and standards will also be applied should mitigation be required for flood compensation. Due to this the residual significance of effects are likely to be **neutral to adverse**.

12.9. Conclusions

- 12.9.1. This chapter provides a summary of the assessments that have been undertaken so far relating to the water environment of the scheme.
- 12.9.2. The assessment carried out within this chapter has been carried out at a qualitative level in terms of receptor value, predicted magnitude of impacts and significance of effect in accordance with DMRB LA 113. To prevent surface and groundwater pollution, prevent changes to flow regime from new structures and underground works, to attenuate surface water run-off, and to mitigate for any increase in flood risk, standard mitigation measures will be included in the EMP and embedded measures will be incorporated within the design.
- 12.9.3. Due to the location of groundwater and surface waterbodies within the study area and assuming a worst-case scenario at this stage, even with the outlined mitigation measures, the scheme has the potential to have a slight adverse effect on some receptors. The ES will update this assessment, based on additional information from the FRA, WFD compliance assessment, site surveys in autumn 2023, final design and other sources to be identified.

13. Climate

13.1. Introduction

13.1.1. This chapter presents the preliminary findings of the climate assessment. This comprises a review of the existing environment and identification of the potential impacts of the Scheme in the context of climate. The chapter also addresses the potential impacts on climate from the Scheme and the impacts of future climate change on the resilience of the Scheme.

13.1.2. To align with the requirements of the Environmental Impact Assessment (EIA) Regulations 2017 (as amended) and the Design Manual for Roads and Bridges (DMRB) LA 114: Climate (Highways England, 2021) (hereafter referred to as DMRB LA 114), consideration of climate effects is divided into two aspects:

- Greenhouse gas (GHG) impact assessment – considers the impact on the climate of GHG emissions arising from the Scheme during its lifetime, including how the Scheme will affect the ability of Government to meet its carbon reduction plan targets.
- Climate change resilience assessment – considers the resilience of the Scheme to climate change impacts, including how the Scheme design will take account of the projected impacts of climate change.

13.1.3. This chapter outlines potential impacts relevant to climate that are anticipated from preliminary studies in relation to the Scheme. Since the quantitative assessment has still to be undertaken pending receipt of the bill of quantities from the option selection stage, this chapter only includes a high level qualitative assessment. A more detailed assessment on climate, based on the Scheme information, will be reported in the Environmental Statement (ES).

Stakeholder engagement

13.1.4. No external consultation has been undertaken for the assessment at this stage. This would be undertaken, where necessary, as part of the ES. Consultation with the Scheme design team and environmental specialists is currently ongoing and outcomes would be reported within the ES.

Legislative and policy framework

13.1.5. The following legislation and policy are relevant to the Scheme.

Legislation

Climate Change Act 2008, (as amended)

13.1.6. On 27th June 2019 the UK Government amended the Climate Change Act (2008) and set a legally binding target to achieve net zero GHG emissions from

across the UK economy by 2050. In October 2021 the UK Government released their net-zero strategy, further outlining how this reduction is to be achieved.

- 13.1.7. The UK has in place carbon budgets for five-year periods up to 2037. The UK is currently in the third carbon budgetary period (2018-2022), the budget for which is 2,544 MtCO₂e and cannot legally emit more GHGs than this within the budgetary period. The carbon budget for the 2023–2027 budgetary period is 1,950 MtCO₂e, and the budget for 2028-2032 is 1,725 MtCO₂e. The sixth carbon budget requires a 63% reduction in emissions from 2019 to 2035 (78% relative to 1990). Whilst budgets are not set beyond this, there is a legal requirement for the UK to reach 0 MtCO₂e by 2050

National policy

National Policy Statement for National Networks (NPSNN)

- 13.1.8. The National Policy Statement for National Networks (NPSNN) (Department for Transport (DfT), 2014) sets out the Government’s policies to deliver the development of Nationally Significant Infrastructure Projects (NSIP) on the national road and rail networks in England. The Secretary of State (SoS) uses the NPSNN as the primary basis for making decisions on Development Consent Order (DCO) applications.
- 13.1.9. Key policy from the NPSNN relevant to this aspect is set out below:
- The NPSNN covers delivery of NSIPs and contains a section on climate change adaptation which sets out how the effects of climate change should be considered when developing infrastructure, a section on the assessment of carbon emissions and a section on climate change mitigation of carbon emissions.
 - NPSNN includes relevant guidance, stating that the latest UK climate projections should be used to assess the potential impacts of climate change and to influence adaptation measures, covering the estimated lifetime of the new infrastructure. The current UK climate projections, produced by the Met Office, are referred to as the UK Climate Projections (UKCP18), which were updated in 2022 (v4.0).
 - Regarding climate change mitigation, the NPSNN notes that carbon emissions should be considered as part of an application for a DCO and assessed against the Government’s carbon budgets, stating “*it is very unlikely that the impact of a road project will, in isolation, affect the ability of Government to meet its carbon reduction plan targets*”. It notes that “*any increase in carbon emissions is not a reason to refuse development consent, unless the increase in carbon emissions resulting from the Scheme are so significant that it would have a material impact on the ability of Government to meet its carbon reduction targets*”, although a definition of ‘material impact’ is not given. It subsequently requires evidence of any mitigation efforts (for example use of materials or value engineering) to be presented.

13.1.10. It is worth noting that the NPSNN may be outdated with respect to climate having been written prior to the Government's commitment to Net Zero. However, an update to this is currently out for consultation and is expected prior to the end of 2023. Any relevant updates will be taken into account in preparation of the ES.

National Planning Policy Framework (NPPF) 2023

13.1.11. Paragraph 11 of the NPPF states "*Plans and decisions should apply a presumption in favour of sustainable development. For plan-making this means that: a) all plans should promote a sustainable pattern of development that seeks to: mitigate climate change (including by making effective use of land in urban areas) and adapt to its effects.*"

13.1.12. Section 14 of the NPPF deals with meeting the challenge of climate change, which includes paragraph 154, which states that "*New development should be planned for in ways that: a) avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure; and b) can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards.*"

Planning policy guidance (PPG)

13.1.13. PPG provides guidance on how the policy set out in NPPF may be interpreted in practice for a wide range of issues. There is a subsection of PPG relating specifically to climate change which advises how to identify suitable mitigation and adaptation measures in the planning process to address the impacts of climate change. It also advises how planning can deal with the uncertainty of climate risks when promoting adaptation in particular developments.

BSI (British Standards Institution) PAS 2080 – Carbon management in infrastructure in 2016

13.1.14. This Publicly Available Specification (PAS) includes requirements for all value chain members to show the right leadership and to establish effective governance systems for reducing whole life carbon through the use of a carbon management process. The individual value chain requirements in the carbon management process are structured around the following components:

- Setting appropriate carbon reduction targets.

- Determining baselines against which to assess carbon reduction performance.
- Establishing metrics (e.g., Key Performance Indicators) for credible carbon emissions quantification and reporting.
- Selecting carbon emissions quantification methodologies (to include defining boundaries and cut off rules).
- Reporting at appropriate stages in the infrastructure work stages to enable visibility of performance.
- Continual improvement of carbon management and performance.

Department for Transport: Decarbonising Transport: A Better, Greener Britain (2021)

13.1.15. The UK Transport Decarbonisation Plan (A Better, Greener Britain) outlines plans to meet the medium-term carbon reduction targets to 2035 in the transport system and deliver net zero by 2050. Mitigation actions comprise (but not exclusively) the electrification of the road transport, encourage active travel and the use of public transport, and manage carbon in transport infrastructure. A Better, Greener Britain states the following:

13.1.16. *“Alongside this plan, the Department for Transport (DfT) has initiated a Carbon Management Programme to embed an integrated system for managing whole life carbon of infrastructure projects at a portfolio level. The framework will include capital carbon, i.e., emissions associated with the creation or major modification of an infrastructure asset and be guided by the principles of PAS 2080 – the foremost industry-wide standard for carbon management.”*

25 Year Environment Plan

13.1.17. The Department for Environment, Food & Rural Affairs (Defra) 25 Year Environment Plan (2018) is a policy paper setting out what Government will do to improve the environment, including restoring and safeguarding wildlife habitats. This plan is being treated as the first Environmental Improvement Plan required under the Environment Act 2021. The plan sets out aims to take all possible action to mitigate climate change, while adapting to reduce its impact, by:

- Continuing to cut GHG emissions including from land use, land use change, the agriculture and waste sectors and the use of fluorinated gases.
- Making sure that all policies, programmes and investment decisions take into account the possible extent of climate change this century.

National Highways

National Highways Net Zero (2021)

13.1.18. In addition to the UK Government, National Highways have outlined their net zero strategy to achieve net zero:

- Corporate emissions – net zero by 2030
- Maintenance and construction emissions – net zero by 2040
- Road user emissions – net zero by 2050

13.1.19. To enable net zero by 2040 for construction and maintenance the following interim targets are proposed: a trajectory of 0-10% reduction by 2025, 40-50% by 2030, 70-80% by 2035 and net zero by 2040 against a 2020 baseline. National Highways also target the use of only zero carbon plant on their sites by 2030. The scheme will directly affect the maintenance and construction emissions of National Highways.

National Highways: Preparing for climate change on the strategic road network - third adaptation report under the Climate Change Act (200)

13.1.20. The third report, published under the Climate Change Act's (2008).

13.1.21. Adaptation Reporting Power (ARP):

- re-evaluates significant climate risks threatening the safe operation of England's SRN using more up-to-date climate projections
- assesses progress against previously identified adaptation actions
- Identifies areas for improvement and appropriate actions
- building on advice from the Climate Change Committee's CCRA3 report, the report aims to address the increased risk brought to the UK's Strategic Road Network with the overarching vision that in 2050 'The SRN is resilient to climate change and incidents, such as flooding, poor weather conditions, blockages on connecting transport networks'. The report carries out a risk assessment of likely highways impacts which include, but are not limited to:
 - overwhelming of drainage due to fluvial (river) and pluvial (surface) and groundwater flooding
 - ground saturation affecting stability of geotechnical assets
 - destabilisation of earthworks due to standing water
 - waterlogging of pavement surface

National Highways: Strategic business plan 2020-2025 (2020)

13.1.22. The Strategic business plan 2020-2025 sets out National Highways' response to Government's second Road Investment Strategy (RIS2). It presents the careful

balancing between maintaining and operating the strategic road network (SRN) safely and providing new capacity where it is needed. It supports Government's ambition to achieve net zero UK carbon emissions by 2050. It notes that National Highways has a shared responsibility to tackle climate change and is dedicated to minimising the GHGs generated from the activities within National Highways' control including designing the schemes and services to be carbon and energy efficient, reducing carbon footprint through initiatives such as introducing energy-saving measures for maintenance depots and using low-energy lighting and control systems for motorways.

Topic-specific guidance

Institute of Environmental Management & Assessment (IEMA) Guide: Assessing Greenhouse Gas Emissions and Evaluating their Significance 2nd Edition (2022)

13.1.23. Whilst DMRB LA 114 remains the sole standard which the PEIR will speak to, the IEMA guidance will be used to assist, as it provides a complementary narrative to some elements of DMRB LA 114. IEMA states that this guidance is to assist GHG practitioners with addressing GHG emissions assessment, mitigation and reporting in statutory and non-statutory EIA. It is a revision of the 2017 IEMA guidance on Assessing Greenhouse Gas Emissions and Evaluating their Significance.

Local Policy

Coventry City Council Local Plan (2011 – 2031)

13.1.24. The relevant Local Plan policies are:

- Policy DS3: Sustainable Development Policy
- Policy EM1: Planning for Climate Change Adaptation
- Policy EM2: Building Standards
- Policy EM3 Renewable Energy Generation

Rugby Borough Council Local Plan 2011 – 2031

- Policy HS5: Traffic Generation and Air Quality, Noise and Vibration
- Policy NE2: Strategic Green and Blue Infrastructure
- Policy SDC8: Supporting the Provision of Renewable Energy and Low Carbon Technology

13.2. Assessment methodology

Climate change (GHG) impact assessment

13.2.1. DMRB LA 114 (Section 3.5.1) provides questions on the quantity of data in the required timescales to accurately assess GHG emissions. Available quantitative data will be reviewed at the preliminary design stage to allow the impact on

climate for GHG emissions to be assessed and reported in the ES. Section 5 of guidance from Institute of Environmental Management and Assessment (IEMA) on Assessing Greenhouse Gas Emissions and Evaluating Their Significance provides information on different steps need to be taken to ensure that a robust GHG emissions assessment has been conducted. According to IEMA guidance a robust GHG emissions assessment should follow a framework of 5 steps as follows:

- Define goal and scope of GHG emissions assessment
- Set study boundaries
- Decide upon assessment methodology
- Collect the necessary calculation data
- Calculate/determine the GHG emission inventory

13.2.2. In first step the goal of the GHG emissions calculation should be defined. Then, the task of identifying the scope should start with understanding what is included and excluded from the study. The scoping exercise should consider what life cycle stages to include, whether there would be a consideration of asset construction or operational emissions, etc. In order to undertake a through GHG emissions assessment, it is important to collect the necessary Bill of Quantities (BoQ) including the type and mass/volume of construction materials, transport of materials to the site and type of vehicle. Once the BoQ has been received, quantification of GHG emissions will be undertaken.

13.2.3. At this stage, all aspects noted will be considered to determine the carbon footprint of the Scheme, despite some aspects being likely to contribute a relatively small proportion to the total emissions. However, it may be determined at a later stage that some of the lifecycle stages can be scoped out due to either lack of data availability or if the emissions are likely to be negligible in comparison to the other lifecycle stages. Where data is lacking at the preliminary design stage, appropriate assumptions would be made to ensure a robust assessment.

Assessment of construction impacts

13.2.1. The assessment of the construction effects on climate will be in accordance with DMRB LA 114 and will include assessment of the carbon emitted during construction using recognised calculation methodologies and tools outlined below:

- the National Highways Carbon Tool
- the Royal Institution of Chartered Surveyors (RICS) guidance and assumptions on the transport of materials to site

- Environmental Product Declarations detailing the emissions for certain design aspects where appropriate for bespoke items
- the Woodland Carbon Code (WCC) for the soil carbon change unless an alternative site-specific methodology is determined

13.2.2. The assessment will be conducted using data from the BoQ based on the Scheme design. This will include an assessment of emissions from all materials used and their transportation to (and from in the case of surplus material) site. The assessment will account for the emissions arising from waste materials produced and its transportation, as well as construction/plant emissions from onsite activities. This will be complemented with data on land-use change during construction.

Assessment of operational impacts

13.2.3. The assessment of the operational effects on climate will include:

- Assessment of carbon emitted over the 60-year assessment period for the Scheme operation through an appraisal of carbon for the Scheme opening year and forecast year to derive the change in emissions assessed in accordance with DMRB LA 114. The use of the Transport Analysis Guidance (TAG) database allows the implementation of the study area, and assessment of change in carbon emissions, as defined by DMRB LA 114.
- The Emissions Factors Toolkit (EFT) v11.0 (November 2021), published by the Department for Environment, Food and Rural Affairs (Defra), will be used to estimate the change in carbon emissions from end-users over the design life of the Scheme. The final output will be entered into the TAG assessment sheet to obtain monetary data.
- Assessment of the emissions associated with electricity requirements for the operation of the Scheme. This will utilise the data determined through design and publicly available emission factors for grid electricity.
- Assessment of the emissions associated with maintenance of the Scheme through the assessment period (for example resurfacing of pavement) will be in line with the methodology for construction detailed above. This will include a value analysis of these emissions to consider the projected improvements in reduction techniques for construction.

Significance of effect

13.2.4. For the purpose of the Scheme, the assessment of significance will follow DMRB LA 114, which is the most relevant to a National Highways scheme on the strategic road network. Furthermore, as there is no globally agreed methodology to date, DMRB LA 114 provides a clear methodology to be used.

13.2.5. DMRB LA 114 states that “projects shall only report significant effects where increases in GHG emissions will have a material impact on the ability of

Government to meet its carbon reduction targets”. It also notes that National Planning Policy Statement states that "It is very unlikely that the impact of a road project will, in isolation, affect the ability of Government to meet its carbon reduction plan targets" and that in this context “it is considered unlikely that projects will in isolation conclude significant effects on climate”.

- 13.2.6. The assessment will include a comparison of estimated carbon emissions arising from the Scheme with UK carbon budgets, and the associated reduction targets, in line with DMRB LA 114.

Climate change resilience assessment

- 13.2.7. The climate change resilience assessment will follow the method detailed in DMRB LA 114. This will be completed in liaison with the project design team and the other EIA technical aspects by considering the UKCP18 projections for the geographical location and timeframe of the Scheme (from construction through to operation).
- 13.2.8. DMRB LA 114 details how to assess the relevance of potential impacts during operations, significance criteria, evaluation of significance and when further design and mitigation measures are required. During the construction phase, impacts will be assessed qualitatively. Once climate hazards have been identified, the likelihood and consequences will be assessed in accordance with the criteria in Table 13-1 and Table 13-2.

Table 13-1: Likelihood categories

Likelihood	Description (probability and frequency of occurrence)
Very high	The event occurs multiple times during the lifetime of the project (60 years), for example approximately annually, typically 60 events.
High	The event occurs several times during the lifetime of the project (60 years), for example approximately once every five years, typically 12 events.
Medium	The event occurs limited times during the lifetime of the project (60 years), for example approximately once every 15 years, typically 4 events.
Low	The event occurs during the lifetime of the project (60 years), for example once in 60 years.
Negligible	The event can occur once during the lifetime of the project (60 years).

Table 13-2: Description of consequences

Consequence of impact	Description
Very High	Operation - national level (or greater) disruption to strategic route(s) lasting more than 1 week.

Consequence of impact	Description
High	Operation - national level disruption to strategic route(s) lasting more than 1 day but less than 1 week or regional level disruption to strategic route(s) lasting more than 1 week.
Medium	Operation - regional level disruption to strategic route(s) lasting more than 1 day but less than 1 week.
Low	Operation - regional level disruption to strategic route(s) lasting less than 1 day.
Negligible	Operation - disruption to an isolated section of a strategic route lasting less than 1 day.

13.2.9. The significance of each effect will then be evaluated through a matrix as detailed in Table 13-3. Any significant conclusions will be based on and incorporate confirmed design and mitigation measures, as described by LA 114. Any further design and mitigation measures will then be incorporated, and then residual risks will be reassessed until a non-significant acceptable level is achieved.

Table 13-3: Significance matrix

	Magnitude of Impact (degree of change)					
	No change	Negligible	Minor	Moderate	Major	
Environmental Value (likelihood of change)	Very High	Neutral	Slight	Moderate or large	Large or very large	Very large
	High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Medium	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

13.2.10. A statement will be provided within the climate assessment of the ES to describe how the Scheme will be designed and monitored to improve its resilience to future climatic conditions.

13.3. Assessment assumptions and limitations

13.3.1. There is currently no preferred methodology for the assessment of climate change (mitigation or adaptation) within EIA. Therefore, a qualitative methodology for assessing the vulnerability of the Scheme to climate change has been used in line with DMRB LA 114 and will be reported within the ES.

- 13.3.2. While the climate projections (as presented in Section 13.1) represent anticipated average weather conditions, they do not capture the full range of possible future severe weather events (such as droughts, heatwaves and prolonged heavy rainfall).
- 13.3.3. The operational assessment will be based upon the traffic data produced from a traffic model for the Scheme. The assumptions and limitations of this model will be detailed within the ES.
- 13.3.4. Where feasible, GHG calculations will be based on the available data. Where specific data is absent, calculations will be based on clearly specified assumptions and proxies.
- 13.3.5. All assumptions, limitations and exclusions (including exclusion criteria applied to input and output data) will be documented as part of the assessment.

13.4. Study area

- 13.4.1. The climate assessment considers the carbon emission potential of the Scheme for both construction and operation (for this assessment the operation is considered to be the design life of the Scheme).
- 13.4.2. In the subsequent ES, embodied carbon emissions associated with the Scheme construction would encompass sourcing, manufacturing and transport of materials where practicable, as well as fuel associated with construction plant.
- 13.4.3. Assessment of the emissions associated with maintenance of the Scheme through the assessment period (for example resurfacing of pavement) will be in line with the methodology for construction detailed above. This will include a value analysis of these emissions to consider the projected improvements in reduction techniques for construction.
- 13.4.4. Operational carbon emissions associated with end-users of the Scheme (namely vehicle tailpipe emissions) will be assessed and reported in line with DMRB LA 114.
- 13.4.5. The emissions associated with the end of life stage (decommissioning) will not be reported due to the uncertainty associated with the length of operation (use stage).
- 13.4.6. The study area for the resilience assessment will be the area of temporary and completed works within the Scheme and affected receptors identified within other environmental factors 'scoped in' to the assessment.

13.5. Baseline conditions

Climate change (GHG) impact assessment

- 13.5.1. At this stage it is not possible to include the Scheme specific operational baseline carbon emissions as this relies on detailed information yet to be determined, particularly from the traffic model. The construction carbon assessment conducted at the preliminary design stage will be compared against the carbon baseline produced at the options selection stage. A carbon reduction target from concept stage to the end of construction stage will be agreed between the project parties, with the ES confirming this target and progress to achieving this from concept to preliminary design.
- 13.5.2. The following baseline information is based on national and county-wide data as carbon emissions do not have a local receptor, and once they are emitted, they are not limited to geographic boundaries.
- 13.5.3. The UK Government (2021 UK Greenhouse Gas Emissions, Final Figures) published that in 2021, UK net emissions were estimated at 427MtCO_{2e}, an increase of 5% in comparison to 2020 levels. During 2021, 29% of UK carbon emissions were from the transport sector which is a 10% increase in comparison to 2020. It must be noted that the Covid-19 pandemic and resulting restrictions is likely to have had a significant impact on the emissions throughout the UK over 2019 and 2020 and the rebound is the primary reason for this increase.
- 13.5.4. The Scheme falls within the Coventry Local Authority area where the emissions total for 2021 was 1,344 ktCO_{2e}, of which 9% (117.3 ktCO_{2e}) is accountable to transport on A-class roads (Data sourced from the UK local authority and regional greenhouse gas emissions national statistics (Department for Energy Security and Net Zero, 2023)).
- 13.5.5. According to the Sixth Carbon Budget (Climate Change Committee, 2020), for 2018, carbon emissions from manufacturing and construction in the UK were estimated at 66 MtCO₂. Although the data accounts for manufacturing in addition to construction, this gives the best indication of the proportion of UK emissions associated with construction. Data is not available for the UK construction sector alone, but the World Green Building Council estimated that building materials and construction were responsible for approximately 11% of global energy related GHG emissions in 2018.
- 13.5.6. The projections from the Department for Energy Security and Net Zero (formerly the Department for Business, Energy & Industrial Strategy (BEIS)) show a decline in total emissions to 2040 (emissions are projected to fall by 24% from 2019 levels). In 2018, 97% of transport final energy consumption was from oil-

based fossil fuels, but by 2040 this is projected to fall to 89% due to an increase in electric vehicles and increasing biofuels use.

13.5.7. The UK Government, as part of the Climate Change Act 2008, has set legally binding carbon budgets capping the amount of carbon that can be emitted in the UK over a five-year period, as shown in Table 13-4.

Table 13-4: UK Government carbon budgets

Carbon budget	Carbon budget level	Reduction below 1990 levels
Fourth Carbon Budget (2023-2027)	1,950 MtCO _{2e}	51% by 2025
Fifth Carbon Budget (2028-2032)	1,725 MtCO _{2e}	57% by 2030
Sixth Carbon Budget (2033-2037)	965 MtCO _{2e}	78% by 2035

13.5.8. The projections show shortfalls for the Fourth Carbon Budget and Fifth Carbon Budget of 188 MtCO_{2e} and 253 MtCO_{2e}, respectively. Meanwhile, the Committee on Climate Change (CCC) has stated that emissions will need to fall more rapidly than these targets. As such, an ambitious Sixth Carbon Budget has been proposed by the CCC and accepted by the UK Government to allow the UK to meet net-zero carbon by 2050, with a commitment to a reduction of almost 80% by 2035 compared to 1990 levels.

13.5.9. The CCC has also determined a balanced net-zero pathway for construction and manufacturing that includes a reduction of 43% by 2030, 75% by 2035 and 90% by 2040, to achieve the 97% reduction by 2050. This pathway considers that a proportion of the reduction will come from improved resource efficiency in production and material substitution. Therefore, significant effort is required to ensure that all contributing emissions are reduced as far as possible through the design, construction and operation of all schemes.

Climate change resilience assessment

13.5.10. A current climate baseline for the wider region has been compiled using Met Office (2016) regional climate data. High level climate observations over a 30-year averaging period (1981-2010) are presented in Table 13-5 for West Midlands, which comprises Birmingham, Coventry, Dudley, Sandwell, Solihull, Walsall and Wolverhampton according to Midlands: climate (Met Office 2016). This information has been used as a baseline against which, the potential vulnerability of the Scheme, when subjected to the climate change projected by the Met Office, will be determined.

Table 13-5: Historic climate baseline for West Midlands (1981-2010)

Climate variables	Climate observations
Temperature	Mean daily minimum temperatures can range from 0°C to 1.5°C in winter, whilst summer daily maximum temperatures can exceed 22°C.
Rainfall	Rainfall is generally well-distributed through the year, but the wettest month varies across the region. In the wetter upland areas of the north and west, there is a pronounced winter maximum when the Atlantic depressions are at their most vigorous. Over much of the Midlands, the number of days with rainfall totals of 1mm or more ('wet days') tends to follow a pattern similar to the monthly rainfall totals. In the higher parts of the west and north in winter (December - February), 40 to 45 days is the norm but this decreases to near 30 days in summer (June - August).
Wind	The Midlands area is one of the more sheltered parts of the UK, the windiest areas being in western and northern Britain, closer to the Atlantic. The strongest winds are associated with the passage of deep areas of low pressure close to or across the UK. The frequency and strength of these depressions is greatest in the winter half of the year, especially from December to February, and this is when mean speeds and gusts (short duration peak values) are strongest.
Air Frost	The average number of days with air frost in the Midlands varies from about 40 days per year in the lower Severn Valley to over 60 days per year in the Peak District and sheltered areas of the Welsh Marches. Ground frost occurs on average on about 100 to 125 days per year, with a similar distribution to air frost.

- 13.5.11. The future baseline is obtained from the UK Climate Projections developed by the Met Office Hadley Centre which include regional climate projection data, for which the Scheme is included in the West Midlands region.
- 13.5.12. The UKCP18, published November 2018 provide regional climate projection information within the West Midlands Administrative Region (where the Scheme is located). The West Midlands region is predicted to experience changes in temperature, rainfall, and increase in frequency of extreme weather events as a consequence of climate change. These changes are predicted to occur under all emissions scenarios (low, medium and high levels of carbon emissions), which are incorporated into the climate change models used by the Intergovernmental Panel on Climate Change (IPCC). The general trend for the region is warmer, drier summers and milder, wetter winters.
- 13.5.13. Under the highest emissions scenario (RCP8.5) for the 2080s (2080-2099), estimated changes in climatic conditions are as outlined in Table 13-6.

Table 13-6: Future climate projections for Midlands (2080s; RCP8.5)

Climate variables	Climate observations
Temperature	The average annual temperature modelled to occur within 2080s, under the RCP8.5 scenario at the 50th percentile, is an increase of approximately 4-5°C. Summer temperature is projected to increase by 5-6°C under the central estimate, which represents 'as likely as not' probability of change (50th percentile). Average winter temperature is estimated to increase by 3-4°C (50th percentile).
Rainfall	The average annual rainfall rate predicted to occur between 2080 and 2099, under the RCP8.5 scenario at the 50th percentile, is an increase in precipitation anomaly between 0 and 10%. The average summer rainfall rate is projected to decrease by 30-40%, whereas the average winter rainfall rate is estimated to increase by 20-30% (in the 50th percentile or central estimate for both).

13.6. Potential impacts

Climate change (GHG) impact assessment

- 13.6.1. The key anticipated GHG emission sources during the construction and operation phases are set out in Table 13-7. This approach is consistent with the principles set out in the DMRB LA 114, BS EN 15804 (British Standards Institution, 2012), PAS 2080:2023 (Carbon Management in Infrastructure and Buildings) and IEMA guidance (Assessing Greenhouse Gas Emissions and Evaluating their Significance, 2022).
- 13.6.2. DMRB LA 114 (Section 3.3) states that during the scoping exercise, consideration should be given to the following questions to understand the need to undertake further GHG assessment:
- Are construction GHG emissions (or GHG-emitting activity), compared to the baseline scenario (when compared to GHG emissions and energy use associated with existing maintenance activities), increasing by >1%.
 - During operation, will roads meet or exceed any of the following criteria.
 - A change of more than 10% in annual average daily traffic (AADT).
 - A change of more than 10% to the number of heavy-duty vehicles.
 - A change in daily average speed of more than 20km/h.
- 13.6.3. It is considered likely that during construction, GHG emissions will increase by more than 1% compared to baseline of maintaining the existing road network in the area. Further assessment will therefore be undertaken for the Scheme.
- 13.6.4. The lifecycle stages (or modules) have been based on BS EN 17472:2022, the same standard given in the PAS 2080:2023.

Table 13-7: Impact of the Scheme on climate

Lifecycle stage	Lifecycle module	Potential impacts to be assessed in EIA
Capital GHG emissions (construction stage)	A1-A5	GHG emissions associated with raw material extraction and manufacturing of products required for the Scheme GHG emissions associated with the construction process GHG emissions associated with the transport of construction materials (where not included in embodied GHG emissions), on-site construction activity, transport of construction workers, and disposal of any waste or water generated by the construction processes
Operational GHG emissions	B1-B5	GHG emissions associated with the operation of associated road and signalling, any energy use, and maintenance (including re-surfacing)
End user GHG emissions	B8	GHG emissions associated with vehicle journeys

Climate change resilience assessment

13.6.5. Due to the relatively short period anticipated for construction and considering the effects from climate change are felt over a much greater period, it is unlikely that climate change will be experienced during construction of the Scheme. As such this aspect has been scoped out.

13.6.6. The potential risks associated with climate change that could occur through operation are identified below:

- pavements that may be affected by climate change due to:
 - increased winter precipitation which could increase sub-surface moisture and induce premature pavement failure
 - changes in the future precipitation regime (varying from drought conditions to heavy rainfall) causing pavements to heave
 - summer temperature which could result in surface failure, rutting and warping
 - extreme weather events, including heavy rainfall, snow and ice build-up, which may reduce perceived and actual skid resistance
- structures that may be affected due to increased temperature and precipitation which could result in greater risk of joint, bearing or surface failure
- drainage that may be affected due to increased precipitation increasing standing water, build-up of particulates in road surface, and flood risk
- earthworks that may be affected due to changes in the future precipitation regime increasing the risk to earthworks stability
- signs and lightweight structures that may be affected due to frequency of extreme wind events

- road markings that may be affected due to increased temperature accelerating the weathering
- electronic equipment that may be affected due to temperatures greater than the tolerance of the equipment resulting in failure
- maintenance activities that may be affected due to:
 - safety concerns associated with extreme weather which may result in reduced likelihood of maintenance
 - longer vegetation growing season leading to increased need for maintenance (due to warmer winters and wetter summers)
- mitigation planting that may be affected due to increased temperature and likelihood of disease, and changing precipitation patterns

13.7. Design, mitigation and enhancement measures

Climate change (GHG) impact assessment

- 13.7.1. All construction and operational activities and materials associated with the Scheme will result in GHG emissions contributing to a negative impact on the climate. Residual effects will arise as it is not currently feasible to fully eliminate emissions resulting from the production of road building materials, construction activities and energy use during Scheme operation.
- 13.7.2. As specified in the Design and Mitigation section of DMRB LA 114, where residual (non-significant) climate effects have been identified in the environmental assessment, measures to manage the ongoing risks would be identified.
- 13.7.3. Furthermore, limitations exist in terms of feasible design alternatives for the Scheme due to legal requirements for quality and safety considerations in UK road schemes.
- 13.7.4. In an attempt to reduce GHG emissions, the following measures will be applied as advised by the carbon emissions reduction hierarchy of PAS 2080:2023:
- **Avoid:** the design will seek to increase the potential for re-using and/or refurbishing existing assets to reduce the extent of new construction required or explore alternative lower carbon options to deliver the project objectives.
 - **Switch:** apply low carbon solutions (including technologies, materials and products) to reduce resource consumption during the construction, operation, user's use of the project, and at end-of-life; and **construct efficiently:** use techniques that reduce resource consumption over the lifecycle of the project.
 - **Improve:** after addressing steps 1 and 2, projects will identify, assess and integrate measures to further reduce carbon through on-site or off-site offsetting or sequestration.

- 13.7.5. The final selection of the most appropriate mitigation measures will be detailed as part of the lifecycle GHG impact assessment in the EIA and reported in the ES. This will include GHG emission mitigation measures concerning construction and operation of the Scheme.
- 13.7.6. A carbon management plan would be produced, and emissions associated with the construction and operation of the asset would be appraised and monitored as recommended by PAS 2080:2023.

Climate change resilience assessment

- 13.7.7. A number of general mitigation and adaptation measures will be considered to address potential risks, many of which will have been identified by other technical assessments and the Scheme design. The assessment will identify and take into account the existing resilience measures for each climate risk either already in place or in development for infrastructure and assets.

13.8. Assessment of likely significant effects

Climate change (GHG) impact assessment

- 13.8.1. The significance of effects have **not yet been established**. Further assessment is required as part of the ES to determine significance of effect. An assessment of the significance of the Scheme to contribute to climate change will be made following the assessment of emissions from construction and operation. This will be quantified and reported in the ES.
- 13.8.2. The assessment of significance associated with the estimated emissions, as advised by IEMA (2022) guidance, will consider proposed mitigation and the Scheme's ability to meet regional and national policy requirements such as those listed in the West Midlands Combined Authority (WMCA) Five Year Plan (WSP, 2021), the Coventry Local Plan (Coventry City Council, 2017) and Climate Change (UK) Act 2008 (2050 Target Amendment) Order 2019. As informed by DMRB LA 114, the significance will be determined by the level of impact the Scheme's GHG emissions is estimated to have on the Government's ability to meet its carbon reduction targets. The Carbon Impact Assessment will include opportunities for mitigation to be considered in the design of the Scheme in line with the design hierarchy of 'build less, build clever, build efficiently' as set out in IEMA guidance (IEMA, 2022) and PAS 2080. At a local level there some climate change strategies that can be implemented through the Scheme, including Warwickshire Sustainable Futures Strategy (Warwickshire County Council, 2022) and Rugby Borough Council's Climate Change Strategy (Rugby Borough Council, 2022).

Climate change resilience assessment

13.8.3. Significance of effects will be determined in accordance with DMRB LA 114. This involves using a matrix comparing the likelihood of climate hazards, leading to an in-combination impact, with the consequence of in-combination impacts. The likelihood of climate hazards leading to an in-combination impact will be defined using an assessment of the regional climatic data, derived from the UKCP18 Climate Projections, combined with professional judgement. The consequence of in-combination effects will be based on the change to the significance of the effect of the Scheme on the resource or receptor for each relevant environmental aspects, taking into account the existing mitigation measures.

13.9. Conclusions

13.9.1. This chapter presents the preliminary findings of the climate assessment. This comprises a review of the existing environment and identification of the potential impacts of the Scheme in the context of climate. The chapter also addresses the potential impacts on climate from the Scheme and the impacts of future climate change on the resilience of the Scheme in accordance with DMRB LA 114. At this stage a construction carbon assessment has been undertaken, alongside a desktop study of future climate projections. Future detailed assessments of both the effects on climate and the resilience of the scheme to climate change as per DMRB LA 114 will be detailed in the ES. An assessment of the significance of the Scheme to contribute to climate change will be made following the assessment of emissions from construction and operation. The effects on the resilience of the scheme to climate change are predicted not to be significant.

14. Combined and cumulative effects

14.1. Introduction

14.1.1. Combined and cumulative effects result from multiple actions on receptors over time and are generally additive or interactive (synergistic) in nature. They can also be considered as effects resulting from incremental changes caused by other past, present or reasonably foreseeable actions together with the Scheme, identified as:

- combined effects from a single scheme (e.g., numerous different effects from the Scheme impacting a single receptor)
- cumulative effects with other schemes (when considered alongside the Scheme)

Stakeholder engagement

14.1.2. An Environmental Scoping Report (ESR) was submitted to the Planning Inspectorate on 30 June 2023 to inform its Scoping Opinion. A response was received on 10 August 2023. Comments on the scope and approach to the assessment will be taken into account where appropriate and described in the Environmental Statement (ES).

14.1.3. Consultation with the relevant local planning authorities; Coventry City Council, Warwickshire County Council and Rugby Borough Council, is required to obtain relevant planning application information in advance of the production of the ES. There is ongoing liaison with the local planning authorities to agree the list of committed developments for inclusion in the cumulative effects assessment.

Legislative and policy framework

14.1.4. The following legislation, standards and best practice guidelines are considered relevant to the Scheme with regard to combined and cumulative effects:

- The Infrastructure Planning (Environmental Impact Assessment (EIA)) Regulations 2017 (the EIA Regulations).
- National planning Statement for National Networks (NPSNN) (Department for Transport, 2014).
- Advice Note Seventeen: Cumulative effects assessment (Planning Inspectorate, 2019).
- Design Manual for Roads and Bridges (DMRB) LA 104 – Environmental assessment and monitoring (Highways England, 2020).

14.1.5. Schedule 4 of the Infrastructure Planning EIA Regulations 2017 requires an EIA to identify and assess the likely significant cumulative effects of a development,

either cumulatively with other developments or the in-combination environmental effects on receptors.

- 14.1.6. The requirement to assess the cumulative effects of development is also set out in Regulation 5(2)(e) of the 2017 Regulations. This regulation states that the EIA must identify, describe and assess in an appropriate manner the direct and indirect significant effects of the proposed development arising from the interaction between the following factors: population and human health; biodiversity; land, soil, water, air and climate; material assets, cultural heritage and the landscape.
- 14.1.7. The NPSNN states “*In considering any proposed development, and in particular, when weighing its adverse impacts against its benefits, the Examining Authority and the Secretary of State should take into account its potential adverse impacts, including any longer-term and cumulative adverse impacts, as well as any measures to avoid, reduce or compensate for any adverse impacts.*”

14.2. Assessment methodology

- 14.2.1. The methodologies for both the combined and cumulative effects assessments are described in this section.

Combined effects methodology

- 14.2.2. In line with DMRB LA 104, the assessment methodology for combined effects involves the identification of effect interactions associated with the Scheme upon a receptor or group of receptors, to better understand the overall environmental effect of the Scheme.
- 14.2.3. The study area for the assessment of combined effects, for both construction and operation, will be defined by the study areas identified within the relevant environment aspects of the ES, ranging from 200m (for air quality receptors) to 2km (for biodiversity receptors).
- 14.2.4. The significance of construction and operational phase environmental effects from the preceding aspect chapters of the ES will be brought forward into matrices, providing an overview of the potential effects on individual receptors. The assessment will consider residual effects, after mitigation has been taken into account. An assessment of significance of combined effects upon each environmental receptor or group of receptors would then be made based upon the balance of scores and using professional judgement.
- 14.2.5. DMRB LA 104 also states that the assessment will be most successful when the assessment of all other environmental effects of the project has been undertaken and reported. As such, the assessment of potential combined effects

has not been further considered within this Preliminary Environmental Information Report (PEIR) but will be reported in the ES.

Cumulative effects methodology

- 14.2.6. The assessment of cumulative effects involves the identification of incremental changes likely to be caused by reasonably foreseeable 'other developments' considered together with the Scheme.
- 14.2.7. In line with the Planning Inspectorate's advice note seventeen (Planning Inspectorate, 2019) on cumulative effects assessment, the methodology utilises the following four stages of assessment:
- Stage 1: Establish the Zone of Influence (Zol) and identify a long list of 'other developments'
 - Stage 2: Apply threshold criteria to the long list to identify a shortlist of 'other developments'
 - Stage 3: Information gathering
 - Stage 4: Assessment

Stage 1 – Establish the Zol and identify a long list of 'other developments'

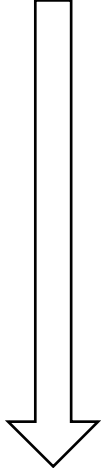
- 14.2.8. To identify relevant 'other developments' to be included in the long list for assessment of potential cumulative effects, a Zol has been established which applies to each environmental aspect. A Zol of 2km from the draft Order Limits will be applied, which is considered to cover the proposed developments likely to contribute to cumulative effects, whilst being proportionate to the scope and scale of the Scheme. The study area will be discussed with the local planning authorities and account for any relevant feedback through the Scoping Opinion.
- 14.2.9. To establish the long list of 'other developments', the following sources will be reviewed within the 2km Zol:
- the Uncertainty Log produced for the traffic assessment at the option selection stage and the current preliminary design stage.
 - a search of the National Infrastructure Planning Projects site <https://infrastructure.planninginspectorate.gov.uk/projects/> (at the time of writing, no other Nationally Significant Infrastructure Projects have been identified within 2km of the Scheme)
 - Coventry City Council, Warwickshire County Council and Rugby Borough Council planning portals, identifying developments within the Zol that have either been consented within the last five years, or currently have an EIA screening letter, scoping report or ES on the planning portal that are pending determination

- Coventry City Council and Rugby Borough Council Local Plans adopted 2017 and 2019 respectively, identifying any committed developments and land allocations within the Zol

14.2.10. As noted in Section 14.1 consultation with local planning authorities is ongoing in order to agree the list of committed developments.

14.2.11. In line with the Planning Inspectorate's advice note seventeen, 'other developments' will be grouped into tiers, reflecting the likely degree of certainty attached to each development, as shown in Table 14-1. Tier 1 developments are the most certain, whilst developments falling into Tier 3 are least certain and most likely to have limited publicly available information to inform assessments. The relevant tier for each development will be informed by the Uncertainty Log and publicly available information.

Table 14-1 Likely degree of certainty assigned to each tier

Tier	Likely degree of certainty	Decreasing level of detail likely to be available
Tier 1	<ul style="list-style-type: none"> • Under construction* • Permitted application(s), whether under the Planning Act 2008 or other regimes, but not yet implemented • Submitted application(s) whether under the Planning Act 2008 or other regimes but not yet determined 	
Tier 2	<ul style="list-style-type: none"> • Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has been submitted 	
Tier 3	<ul style="list-style-type: none"> • Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has not been submitted • Identified in the relevant Development Plan (and emerging Development Plans – with appropriate weight being given as the move closer to adoption) recognising that much information on any relevant proposals will be limited • Identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward 	

Advice Note Seventeen: Cumulative Effects Assessment relevant to nationally significant infrastructure projects (Planning Inspectorate, 2019)

*Where other developments are expected to be completed before construction of the Scheme commences and the effects of those projects are fully determined, these developments will be considered as part of the future baseline in line with standard EIA practice, rather than being considered within the cumulative effects assessment

14.2.12. As such, the methodology for the assessment of cumulative effects focuses on where the potential for significant effects is most likely, informed by the degree of certainty and information available, rather than report on every interaction identified.

Stage 2 – Establish a shortlist of ‘other developments’

14.2.13. To generate a shortlist of ‘other developments’, the indicative threshold criteria in Schedule 1 and Schedule 2 of the Town and Country Planning Act (EIA) Regulations will be applied to the long list.

14.2.14. Other developments that have characteristics likely to give rise to significant cumulative effects, or for which could give rise to a cumulative effect by virtue of its proximity to the Scheme, will also be considered on an individual aspect by aspect basis, using professional judgement.

14.2.15. Consultation with the local planning authorities will be carried out to agree the shortlist at the ES stage.

Stage 3: Information gathering

14.2.16. In line with the Planning Inspectorate's advice note seventeen, the following information on the 'other developments' shortlisted will be compiled from publicly available information, including:

- Proposed design and location information.
- Proposed programme of construction, operation and decommissioning.
- Environmental assessments that set out baseline data and predicted effects arising from these other developments.

Stage 4: Assessment

14.2.17. As outlined in the 'combined effects methodology' section above in this chapter, DMRB LA 104 notes that cumulative effects would be best assessed when the conclusions of individual environmental factor assessments have been reported. The assessment of significance of the cumulative effects will therefore be presented in the ES.

14.2.18. As highlighted in the stages above, the assessment will focus on 'other development' with the greatest degree of certainty and information available to ensure a robust but proportionate approach.

14.2.19. The ES will report the results of the assessment with particular consideration given to any significant cumulative effects that are identified, and the need for mitigation to be developed for the Scheme. In instances where any significant cumulative effects beyond those identified as residual effects from the Scheme in isolation have been identified, additional mitigation measures will be considered. Additional mitigation measures will be appropriately secured within the Development Consent Order (DCO) (for example through an Environmental Management Plan (EMP) and/or other DCO requirements or articles).

Significance criteria

14.2.20. The significance of cumulative effects will be assessed within the EIA and based upon the definitions within Table 14-2. The significance of effects would be reported as 'Significant' or 'Not Significant', where effects could be beneficial or adverse in nature. Where effects are identified that are neither beneficial nor adverse in nature, these would be reported as 'Neutral'. Significant effects are generally those where the significance of the effect is 'moderate' or greater (both adverse and beneficial).

- 14.2.21. For the purposes of the assessment, the value of a receptor or group of receptors, and magnitude of impact would be determined according to the criteria set within the preceding aspect chapters of the ES. The significance of effect is then carried forward from preceding chapters to enable a balanced assessment of combined significance upon receptors, as well as to identify the significance of cumulative effects with other developments. Typical descriptors of cumulative significance are included within Table 14-2, which reflects this balanced approach. Overall significance is determined with mitigation included, as shown in Table 14-2.
- 14.2.22. Significance descriptors have also been aligned with the considerations included within the Planning Inspectorate’s advice note seventeen. Accordingly, where effects are likely to be temporary, the overall significance of effect is considered to be reduced compared to a permanent effect on a receptor of the same value. Equally, localised and infrequent effects are likely to be of lower magnitude than those that cover a greater geographical scale and/or regularly occur, resulting in a reduced significance of effect. Effects can be additive (such as the loss of two pieces of woodland of 1ha, resulting in 2ha cumulative woodland loss) or synergistic (such as two separate discharges to a watercourse combining to have an effect on a species that would not otherwise be affected by each discharges in isolation).

Table 14-2 Combined and cumulative significance criteria

Significance		Definition
Significant (Adverse or Beneficial)	Very Large	Where the combined effects of the Scheme or cumulative effects of the Scheme in association with other existing or more than likely/near certain development upon an individual or collection of environmental receptors would be highly significant.
	Large	Where the combined effects of the Scheme or cumulative effects of the Scheme in association with other existing or more than likely/near certain development upon an individual or collection of environmental receptors would be significant.
	Moderate	Where the combined effects of the Scheme or cumulative effects of the Scheme in association with other existing or more than likely/near certain development upon an individual or collection of environmental receptors would be noteworthy but not significant.
Not Significant (Adverse or Beneficial)	Slight	Where the combined effects of the Scheme or cumulative effects of the Scheme in association with other existing or more than likely/near certain development upon an individual or collection of environmental receptors would be slight.
Neutral	Neutral	Where the combined effects of the Scheme or the cumulative effects of the Scheme in association with other existing or more than likely/near certain development would balance.

Based on DMRB LA 104: Environmental assessment and monitoring, and professional judgment

14.3. Assessment assumptions and limitations

- 14.3.1. At this stage, mitigation has not been fully identified in order to avoid, reduce or offset any significant effects identified on key aspects or receptors, but measures will emerge and evolved through the iterative EIA process. As such, it is not possible to determine if any identified combined effects are likely to be significant or not. The combined effects assessment will therefore be undertaken at the ES stage once the assessment of residual effects, and any required mitigation, has been undertaken and reported for each of the environmental aspects.
- 14.3.2. For Stages 1 and 2 of the cumulative assessment, a long list and refined shortlist will be drafted and subject to consultation with the local planning authorities in attempting to agree the scope and content of both lists for the EIA, and in order to identify any other developments to be taken forward to the Information Gathering and Assessment stages (Stages 3 and 4).

14.4. Potential impacts

Assessment of combined effects

- 14.4.1. The baseline for the combined effects assessment is described in the individual environmental aspects that precede this chapter.
- 14.4.2. During construction and operation, there is the potential for combined effects on receptors relating to all of the environmental aspects considered in the preceding chapters of this PEIR.
- 14.4.3. During construction, it is generally assumed at this stage that effects would be temporary in nature and best practice mitigation measures included in the EMP would ensure that any potential significant combined effects would be reduced as far as possible.
- 14.4.4. It is generally assumed at this stage that combined effects during operation, which may be permanent, would be reduced through best practice mitigation. Enhancement measures providing multiple benefits would be developed as part of the Scheme design and any monitoring requirements would be specified.
- 14.4.5. The assessment of combined effects, including the assignment of significance of effects and requirements for any additional mitigation, will be determined at the ES stage.

Assessment of cumulative effects

- 14.4.6. During construction, there would be the potential for cumulative effects on key receptors, as a result of the Scheme with other developments, where construction stages overlap. Relevant other developments will be identified in

the shortlist to take through to Stages 3 and 4. As set out above, it is generally assumed at this stage that impacts would be temporary in nature and best practice measures would be included in the EMP.

- 14.4.7. During operation, it is generally assumed that appropriate mitigation would be implemented to avoid or reduce any significant cumulative effects identified and monitoring of residual effects would also be in place for developments that have gone through the statutory EIA process.
- 14.4.8. As noted in preceding sections of this chapter, the likely residual effects and proposed mitigation for each of the other developments, which have the highest level of certainty and most information publicly available, would be identified and incorporated into the cumulative effects assessment at the ES stage.

14.5. Assessment of likely significant effects

- 14.5.1. The significance of effects have **not yet been established**, further assessment is required as part of the ES to determine significance of effect. This chapter of the ES will bring together the findings of each EIA aspect chapter to identify and assess the combined and cumulative effects of the Scheme in association with other existing or future developments within the study area.
- 14.5.2. In instances where any significant cumulative effects beyond those identified as residual effects from the Scheme in isolation have been identified, additional mitigation measures will be identified and considered. Additional mitigation measures will be secured within the EMP for the Scheme.

14.6. Conclusions

- 14.6.1. The methodology for the assessment of combined and cumulative effects has been considered within this chapter. It is recommended that the assessment for combined and cumulative effects is undertaken as part of the ES following completion of environmental assessments contained within the ES (for combined effects), and further understanding of the other developments within the vicinity (for cumulative effects).
- 14.6.2. The approach to the assessment within the ES needs to align with the standards outlined in the DMRB LA 104 Environmental assessment and monitoring, and the Planning Inspectorate (PINS) Advice Note Seventeen: Cumulative Effects Assessment.

15. Summary

Summary of likely significant effects

- 15.1.1. Table 15-1 provides a summary of the potential residual significant environmental effects associated with the Scheme's construction and operation. Where possible mitigation measures have been identified for this preliminary assessment to avoid or reduce environmental effects. Consideration of these mitigation measures has been taken into account when determining the significance of effects.
- 15.1.2. The conclusions presented in Table 15-1 are preliminary, and subject to the ongoing design and environmental assessment process which includes further surveys, studies, and mitigation development. The final results of the environmental assessment will be reported in the Environmental Statement (ES)

Table 15-1: Summary of preliminary assessment of likely significant effects

Aspect	Overall likely significance of residual effect post mitigation	
	Construction	Operation
Air quality	No likely significant effects identified.	<p>Potential for significant effects on:</p> <ul style="list-style-type: none"> Human health as a result of changes in air quality resulting from changes in traffic flows. <p>At this stage it is not possible to assess the likely significant effects in the absence of traffic data. Traffic modelling will be undertaken during winter 2023–2024 and this will be used to inform the air quality assessment and will be reported within the ES.</p> <p>Not yet established. Further assessment required as part of the ES to determine significance of effect.</p>
Cultural heritage	<p>Potential for significant effects on:</p> <ul style="list-style-type: none"> listed buildings at Hungerley Hall Farm Coombe Abbey Registered Park and Garden historic landscape setting of designated historic buildings including Hungerley Hall Farm and Coombe Abbey Registered Park and Garden 	<p>Potential for significant effects on:</p> <ul style="list-style-type: none"> setting of Hungerley Hall Farm and Coombe Abbey Registered Park and Garden <p>At this stage it is not possible to assess the likely significant effects as mitigation has not yet been identified and agreed. This will be assessed in the ES.</p> <p>Not yet established. Further assessment required as part of the ES to determine significance of effect.</p>

Aspect	Overall likely significance of residual effect post mitigation	
	Construction	Operation
	<p>At this stage it is not possible to assess the likely significant effects as mitigation has not yet been identified and agreed. This will be assessed in the ES.</p> <p>Not yet established. Further assessment required as part of the ES to determine significance of effect.</p>	
Landscape and visual effects	No likely significant effects identified.	No likely significant effects identified.
Biodiversity	<p>Potential effects are anticipated on Coombe Pool Site of Special Scientific Interest (SSSI) which borders the eastern boundary of the Scheme. The residual noise and vibration remaining after mitigation would have the potential to impact the notable features (birds) of the designated site. The Scheme would therefore be expected to have an adverse effect on the designated site during construction.</p> <p>Potential effects are anticipated on Tributary of the River Sowe – Smite Brook, headwaters and tributaries Ecosite and Hungerley Hall Farm Ecosite as they would be affected by land-take as a result of the Scheme, including removal of bunds adjacent to Smite Brook to accommodate the new mainline. This would result in the permanent loss of habitats including floristically rich grassland and riparian habitats. The Scheme would be expected to have an adverse effect on these non-statutory sites during construction.</p> <p>The Scheme will result in the permanent loss of suitable nesting habitat for farmland birds, the temporary loss of potential foraging habitat for barn owls and the permanent</p>	<p>Potential effects are anticipated on barn owl from an increase in disturbance to potential nest sites and an increased risk of mortality due to collision due to the creation of new road areas including the proposed dumbbell junction and link road. As such there would be expected to be an adverse effect on barn owl.</p> <p>The Scheme would be expected to have an adverse effect on bats and badgers during operation. Potential effects are anticipated on from an increase in mortality from the creation of new road areas including the proposed dumbbell junction and link road.</p>

Aspect	Overall likely significance of residual effect post mitigation	
	Construction	Operation
	<p>loss of arable foraging habitat for wintering birds. The Scheme would be expected to have an adverse effect on these species during construction.</p> <p>The Scheme would be expected to have an adverse effect on breeding birds, barn owls, wintering birds, bats and badgers during construction. This is due to the loss of potential foraging, breeding and commuting habitat.</p>	
Geology and soils	No likely significant effects identified.	No likely significant effects identified.
Noise and vibration	<p>Potential for significant effects on:</p> <ul style="list-style-type: none"> human health from noise and vibration <p>No assessments have been undertaken in the absence of baseline survey data, so it is not possible to identify likely significant effects. Based upon professional judgement of schemes of a similar nature and extent with best practice mitigation measures significant effects are not expected, this will be confirmed in the ES.</p> <p>Not yet established. Further assessment required as part of the ES to determine significance of effect.</p>	<p>Potential for significant effects on:</p> <ul style="list-style-type: none"> human health as a result changes to noise levels resulting from changes in traffic flows <p>No assessments have been undertaken due to a lack in traffic data, so it is not possible to identify likely significant effects. Traffic modelling will be undertaken during winter 2023 – 2024 and this will be used to inform the air quality assessment and will be reported in the ES. Based upon the requirements of Design Manual for Roads and Bridges (DMRB), standard mitigation will be incorporated into the design to reduce effects. With this mitigation significant effects are not expected, this will be confirmed in the ES.</p> <p>Not yet established. Further assessment required as part of the ES to determine significance of effect.</p>
Population and human health	For residents, users of local businesses and community assets access may be disrupted during construction, in relation to easy access to their properties and community	There is the potential for adverse and beneficial human health effects due to changes to amenity (arising from a combination of noise, air quality, visual, and traffic effects) as a result of the

Aspect	Overall likely significance of residual effect post mitigation	
	Construction	Operation
	<p>resources. Diversion routes will be required which could result in journey length changes predominantly at night and during weekends due to closures of the A46 northbound and southbound carriageways, which may result in an adverse effect.</p> <p>There is expected to be some permanent and temporary loss of land as a result of construction of the Scheme. This would result in loss of land from Hungerley Hall Farm, loss of land from agricultural land holdings, and loss of land from the housing allocation H2:3 Walsgrave Hill Farm which may result in an adverse effect. Housing allocation H2:3 Walsgrave Hill Farm will be considered using the most up to date information regarding the likelihood of development at the time of drafting the ES.</p>	<p>operation of the Scheme. Further assessment will inform the design, mitigation and enhancement, and will be reported in the ES.</p>
Road drainage and the water environment	No likely significant effects identified.	No likely significant effects identified.
Climate	<p>Potential for significant effects on:</p> <ul style="list-style-type: none"> • effects on climate due to greenhouse gas emissions. • resilience of the Scheme to climate change - Whilst the scheme's construction is not expected to be so far in the future that the climate will adversely change further prior to construction, the construction site may be vulnerable to extremes of weather, leading to the risk of delay in activities. Climate change could result 	<p>Potential for significant effects on:</p> <ul style="list-style-type: none"> • effects on climate - the scheme would produce emissions due to traffic and through maintenance. • resilience to climate change - the climate of the study area has already changed from its natural state, as a result of climate change, and will change significantly over the lifetime of the project. There is the potential for various effects to occur on the scheme.

Aspect	Overall likely significance of residual effect post mitigation	
	Construction	Operation
	<p>in a change in the risk of severe weather through the construction period.</p> <p>An assessment of the significance of the Scheme to contribute to climate change will be made following the assessment of emissions from construction and operation. This will be quantified and reported in the ES.</p> <p>Not yet established Further assessment required as part of the ES to determine significance of effect.</p>	<p>An assessment of the significance of the Scheme to contribute to climate change will be made following the assessment of emissions from construction and operation. This will be quantified and reported in the ES.</p> <p>Not yet established. Further assessment required as part of the ES to determine significance of effect.</p>
Cumulative effects	<p>Cumulative effects as a result of the combined multiple effects from the Scheme upon a receptor and from effects with other schemes will be assessed and reported within the ES.</p> <p>Not yet established. Further assessment required as part of the ES to determine significance of effect.</p>	

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Chapter 1 Introduction

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Chapter 2 The Scheme

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17. Abbreviations and glossary

17.1. Acronyms

Table 17-1: Acronym list

Acronym	Meaning
AADT	Annual average daily traffic
ARG UK	Amphibian and Reptile Group
AQMA	Air quality management area
AOD	Above Ordnance Datum
BAP	Biodiversity Action Plan
BGS	British Geological Survey
BMV	Best and most versatile agricultural land
BNG	Biodiversity Net Gain
BPM	Best Practicable Means
BoCC	Birds of Conservation Concern
CCC	Committee on Climate Change
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CO2e	carbon dioxide equivalent
CRTN	Calculation of Road Traffic Noise
cSACs	Candidate Special Area of Conservation
CWS	County Wildlife Site
dB	decibel
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMFT	Do-minimum future scenario
DMOY	Do-minimum opening year
DMRB	Design Manual for Roads and Bridges
DSFY	Do-something future year
DSM	Digital Surface Model
DWPA	Drinking Water Protected Area
EA	Environment Agency
EclA	Ecological Impact Assessment
ECoW	Ecological Clerk of Works
eDNA	Environmental DNA
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
END	Environmental Noise Directive
EPS	European Protected Species
ERTs	Emergency Roadside Telephones
ES	Environmental Statement
ESR	Environmental Scoping Report

Acronym	Meaning
FRA	Flood Risk Assessment
GCN	Great crested newt
GHG	Greenhouse gas
GI	Ground investigation
GLVIA	Guidelines for Landscape and Visual Impact Assessment
GWDTE	Groundwater Dependent Terrestrial Ecosystems
HER	Historic Environment Records
HEWRAT	Highways England Water Risk Assessment
HLC	Historic Landscape Characterisation
HSF	Helsby Sandstone Formation
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for the Conservation of Nature
JNCC	Joint Nature Conservation Committee
LA	Local Authority
LBAP	Local Biodiversity Action plan
LCT	Landscape Character Type
LED	Light Emitting Diodes
LLFA	Lead Local Flood Authority
LNCS	Local Nature Conservation Sites
LNR	Local Nature Reserve
LVIA	Landscape and Visual Impact Assessment
LWS	Local Wildlife Site
MAGIC	Multi-Agency Geographic Information for the Countryside
M-BAT	Metal Bioavailability Assessment Tool
MCZs	Marine Conservation Zones
MMG	Mercia Mudstone Group
NCA	National Character Areas
NERC	Natural Environment and Rural Communities
NNR	National Nature Reserve
NPSNN	National Policy Statement for National Networks
NSIP	Nationally Significant Infrastructure Project
NVZ	Nitrate Vulnerable Zone
OFT	Open for Traffic
OHID	Office for Health Improvement and Disparities
OS	Ordnance Survey
PCAs	Project Character Areas
PEA	Preliminary Ecological Appraisal
PEIR	Preliminary Environmental Information Report
PPE	Personal Protective Equipment
PRA	Preferred Route Announcement
PRAs	Preliminary Roost Assessments
pSACs	Possible Special Area of Conservation
pSPAs	Possible Special Protection Area

Acronym	Meaning
PSSR	Preliminary Sources Study Report
PRoW	Public rights of way
RBMP	River Basin Management Plan
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SCI	Sites of Community Importance
SFRA	Strategic Flood Risk Assessment
SINC	Site of Importance for Nature Conservation
SLNCI	Site of Local Nature Conservation Importance
SNCIs	Sites of Nature Conservation Importance
SoCC	Statement of Community Consultation
SoS	Secretary of State
SoW	Start of Works
SPA	Special Protection Area
SPZs	Source Protection Zones
SRN	Strategic Road Network
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Urban Drainage Systems
TAG	Transport Analysis Guidance
TPOs	Tree Preservation Orders
TRL	Transport Research Laboratory
UNFCCC	United Nations Framework Convention on Climate Change
UKHab	UK Habitat classification
VMS	Variable Message Sign
VRS	Vehicle Restraint System
WBRC	Warwickshire Biological Records Centre
WCC	Woodland Carbon Code
WCH	Walking, Cycling and horse riding
WFD	Water Framework Directive
ZoI	Zone of Influence
ZTV	Zone of theoretical visibility

Table 17-2 Glossary

Glossary term	Definition
Access	The means by which to approach or enter land, property and assets.
Accessibility	The ability of users to access land, property, infrastructure, businesses and community facilities.
Affected road network	All roads that trigger the traffic screening criteria and adjoining roads within 200m
Agricultural land holdings	Land and associated infrastructure for the purpose of agricultural production, e.g. arable farming, dairy farming etc.

Glossary term	Definition
Air quality management area	Is an area declared by a local authority which has been determined will exceed the relevant air quality strategy objective.
Ambient noise	Ambient noise is the total sound in a given situation at a given time usually composed of sound from many sources, near and far.
Ancient woodland	Any area that's been wooded continuously since at least 1600 AD, or a date otherwise specified by the Overseeing Organisation including: <ol style="list-style-type: none"> 1) ancient semi-natural woodland mainly made up of trees and shrubs native to the site, usually arising from natural regeneration plantations on ancient woodland sites; 2) replanted with conifer or broad-leaved trees that retain ancient woodland features, such as undisturbed soil, ground flora and fungi; 3) wood pastures identified as ancient; 4) historic parkland, which is protected as a heritage asset in the relevant planning policy
Annual average daily traffic	A description of daily traffic characteristics for the representative average 7 day period (Monday to Sunday).
Baseline scenario	A description of the current state of the environment without implementation of the project
Best and most versatile agricultural land	Land in grades 1, 2 and 3a of the Agricultural Land Classification.
Biodiversity	The variability among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems CIEEM (Guidelines) [Ref 11.N]
Biodiversity resources	Ecological receptors that are present in the surrounding environment.
Businesses	Land and buildings for the purpose of commercial/industrial enterprise.
Calculation of road traffic noise	The technical memorandum that describes the procedures for calculating noise from road traffic CRTN [Ref 3.N].
Carbon budgets	UK GHG targets over defined periods of time
Carbon emissions/CO ₂ e	Shorthand for emissions of any of the seven greenhouse gases (GHGs) that contribute to climate change NOTE 1: Definition from the Kyoto Protocol UNFCCC [Ref 7.N] NOTE 2: Carbon emissions are usually expressed as CO ₂ e (carbon dioxide equivalent).
Characteristics	Elements or combination of elements, which make a particular contribution to distinctive character.
Climate	Long-term weather conditions prevailing over a region NOTE: Measured in terms of average precipitation, maximum and minimum seasonal temperatures, and other factors, throughout a year
Community	A group of people living in the same place or having a particular characteristic in common.
Community land and assets	Land, buildings and infrastructure providing a service/resource to a community, e.g. open spaces, village greens, village halls, healthcare and education facilities etc

Glossary term	Definition
Competent authority	An authority that is legally responsible for discharging the requirements of the EIA Directive 2014/52/EU via the development consenting process
Construction GHG emissions	GHG emissions associated with the construction phase of a project
Critical phase of a species life cycle	A seasonal activity or behaviour upon which survival or reproduction depends.
Cultural heritage	Historic monuments, historic groups of buildings and/or historic sites. NOTE 1: Monuments: architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features; NOTE 2: Groups of buildings: groups of separate or connected buildings (recognised for their architecture, homogeneity or their place in the landscape); NOTE 3: Sites: material remains resulting from the works of humans or the combined works of nature and humans, and areas including archaeological sites. UNESCO 1972 [Ref 10.I]; NOTE 4: Other cultural aspects are dealt with in LA 108 [Ref 1.N], and LA 107 [Ref 12.I] Landscape and visual effects
Cumulative effects	Impacts that result from incremental changes caused by other present or reasonably foreseeable actions together with the project. NOTE: For the purposes of this guidance, a cumulative impact can arise as the result of: a) the combined impact of a number of different environmental factors- specific impacts from a single project on a single receptor/resource; and/or b) the combined impact of a number of different projects within the vicinity (in combination with the environmental impact assessment project) on a single receptor/resource
Decommissioning	The act of ceasing operation of an asset to a non-active status
Designated habitats	Internationally, nationally and locally designated sites of ecological conservation importance on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity
Designated Site	A area/site given a specified status
Detailed assessment	Detailed field surveys and/or quantified modelling techniques to understand complex environmental effects
Development land	Land identified in national or local plans, policies or strategies for development (including intensification of existing uses) and land subject to planning permission
Do minimum	The scenario that represents the situation that would occur without the project in operation, which includes permitted developments.
Do something	The scenario that represents the situation that would occur with the project in operation, which includes permitted developments.
Draft Order Limits	The extent of the area within which the Scheme may be carried out.
Ecological feature	Habitats, species or ecosystems CIEEM (Guidelines) [Ref 11.N] which for the purposes of this document are collectively referred to as biodiversity resources
Effect	Term used to express the consequence of an impact (expressed as the 'significance of effect').
Elements	Parts of factors

Glossary term	Definition
	NOTE: For example, protected species are part of biodiversity
Embodied carbon	Carbon (GHG) emissions associated with energy consumption and chemical processes during the extraction, transport and/or manufacture of construction materials or products NOTE: Typical embodied carbon datasets are 'cradle-to-gate' (i.e., all emissions to the point of delivery from the factory gate) and expressed in kilograms of CO ₂ e per kilogram of product or material
Enhancement	A measure that is over and above what is required to mitigate the adverse effects of a project.
Environmental assessment	A process by which information about environmental effects is collected, assessed and used to inform decision-making. NOTE: This includes Environmental Impact Assessment and non-statutory environmental assessment.
Environmental factors	1) Population and human health; 2) Biodiversity; 3) Land, soil, water, air and climate; 4) Material assets, cultural heritage, and landscape; 5) The interaction between the factors listed above
Environmental Impact Assessment	Statutory process consisting of: 1) preparation of an Environmental Statement; 2) consultation; 3) examination by the competent authority of the information contained within the Environmental Statement; 4) the reasoned (justified or evidenced) conclusion by the competent authority on the significant effects of the project on the environment; and 5) the reasoned (justified or evidenced) decision by the competent authority to grant or refuse development consent.
Environmental management plan	A 'live' document for the purpose of implementing mitigation measures and compliance with legislation during the detailed design, construction and handover phases of a project.
Environmental Noise Directive quiet area	A location formally designated as an 2002/49/EC [Ref 10.N] (END) quiet area.
Environmental Statement	A statutory report produced by the developer including: 1) a description of the project; 2) a description of the likely significant effects of the project on the environment; 3) a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment; 4) a description of the reasonable alternatives; 5) a non-technical summary; and 6) any additional information relevant to the characteristics of a project.
Embedded mitigation	Design measures which are integrated into a project for the purpose of minimising environmental effects.

Glossary term	Definition
Essential mitigation	Mitigation critical for the delivery of a project which can be acquired through statutory powers.
Extreme weather	A weather event which is significantly different from the average or usual weather pattern
Features	Particularly prominent, “eye-catching” elements or characteristic components (i.e. tree clumps, church towers, or wooded skylines).
Flood zone types	Flood zones 2 and 3 are shown on Environment Agency flood maps, with Flood Zone 1 being all the land falling outside Zones 2 and 3. These flood zones refer to the probability of sea and river flooding only, ignoring the presence of existing defences. “areas at risk of flooding” means land within Flood Zones 2 and 3; or land within Flood Zone 1 which has critical drainage problems and which has been notified to the local planning authority by the Environment Agency
Future baseline scenario	An outline of the likely evolution of the current state of the environment without implementation of the project.
Geology	The physical structure, substance and history of the earth (rocks and minerals).
Geomorphology	The structure, origin, and development of the topographical features of the earth’s surface.
Grade separated junction	A grade separated junction has at least two carriageway links at different levels, and usually involves the provision of a structure to accommodate carriageways crossing.
Greenhouse gas (GHG)	A gaseous compound that absorbs infrared radiation and traps heat in the atmosphere NOTE: Greenhouse gases are usually expressed in terms of carbon dioxide equivalents (see ‘carbon emissions’).
Groundwater	Water found underground in porous geological strata and soils.
Groundwater body	A distinct volume of groundwater within an aquifer or aquifers.
Habitat	The place or type of site where an organism or population naturally occurs. Often used in the wider sense referring to major assemblages of plants and animals found together CIEEM (Guidelines) [Ref 11.N].
Health Determinants	Personal, social, economic and environmental factors which determine the health status of individuals and communities.
Health outcome	The health status of an individual, group or population, attributable to a planned intervention (e.g., a project).
Health profile	Statistical picture of the baseline health conditions and trends within an area. NOTE: A profile can be built up for a variety of scales (e.g., ward, Local Authority or more strategic levels e.g., Local Enterprise Partnerships)
Historic	Associated with past human activity.
Historic Environment Record	A recording system representing data on the wider historic environment. Records are combined into a single database with monuments (these can define any type of heritage feature, including buildings) and events ((fieldwork such as excavation or building survey) linked to layers in a Geographical Information System (GIS), such as those presented on PEIR Figure 6.2 in Volume 2. The GIS data is presented separately for points, linear features and areas to ensure these are visible at the appropriate scale within the mapping.

Glossary term	Definition
Human health	A state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.
Impact	Action being taken. NOTE 1: Source of definition GLVIA 3 GLVIA [Ref 1.I]. NOTE 2: For consistency within LVIA “impact” cannot be used interchangeably with “effect” nor to mean a combination of several effects.
Journey length	Physical length of a journey
LA10 ^{18hr}	The noise level, in dB, that is exceeded 10% of the time between 0600 and 2400.
L _{Aeq}	The equivalent continuous sound level (L _{Aeq}) is the level of a notional steady sound, which at a given position and over a defined period of time, would have the same A-weighted acoustic energy as the fluctuating noise.
L _{night}	A I noise index derived from the LA10,18hr using the TRL conversion method TRL PR/SE/451/02 [Ref 7.N].
Landscape	'An area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors.' ELC 2000 [Ref 10.N] NOTE 1: About the relationship between people and place. NOTE 2: Inclusive, covering natural, rural, urban, and peri-urban areas and applies not only to special or designated landscapes or countryside but to everyday or degraded landscapes. NOTE 3: A resource 'that 'results from the way that different components of our environment - natural and cultural - interact together and are perceived'. Source of definition GLVIA 3 GLVIA [Ref 1.I].
Landscape character	A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse. NOTE: Source of definition GLVIA 3 GLVIA [Ref 1.I]
Landscape character area	Single unique “areas ”which are the discrete geographical areas of particular landscape “type.” NOTE: Source of definition GLVIA 3 GLVIA [Ref 1.I]
Landscape character assessment	Process of identifying and describing variation in character of the land-cape - the unique combination of elements and features that make landscapes distinctive - to assist in managing change in the landscape. NOTE: Source of definition GLVIA 3 GLVIA [Ref 1.I]
Landscape character type	Distinct types of relatively homogeneous landscape, generic in nature “It ”...share broadly similar combinations of geology, topography, drainage patterns, vegetation and historical land use and settlement pattern, and perceptual and aesthetics attributes.” NOTE: Source of definition GLVIA 3 GLVIA [Ref 1.I].
Landscape component	Interplay of physical, natural and cultural factors of our surroundings.
Landscape effects	The consequence of an impact (expressed as the 'significance of effect') on the landscape as a resource in its own right. NOTE: Source of definition GLVIA 3 GLVIA [Ref 1.I]
Landscape receptor	Defined aspect of the landscape resource that potentially could be affected by the project. NOTE: Source of definition GLVIA 3 GLVIA [Ref 1.I]

Glossary term	Definition
Landscape and visual impact assessment "IA)	A "... tool used to identify and assess the significance of and the effects of change resulting from..." a project on both the landscape as a resource and on people's views and visual amenity. NOTE: Source of definition GLVIA 3 GLVIA [Ref 1.I].
Land take	Temporary or permanent use of land for a project which takes it from private or public landholdings.
Local air quality	Assessment of the impact of pollutant concentrations on sensitive receptors within 200m of a road.
Local planning authority area	A local authority's administrative boundary
Long-term	Noise change based on the +15 year assessment (for example Do-minimum opening year scenario (DMOY) against Do-minimum future year scenario (DMFY) and DMOY against Do-something future year scenario (DSFY)).
Low carbon	Activities/assets which minimise carbon footprint
Lowest observed adverse effect level	Level above which adverse effects on health and quality of life can be detected
Mainline	The major route within a junction that typically is a higher road classification and/or carries greater traffic volumes
Material impact	An event/outcome that is a key decision making consideration
Noise	Unwanted sound.
Noise mapping	The production of computer software generated maps showing how the predicted levels of outdoor noise vary with location
Noise sensitive receptor	Receptors which are potentially sensitive to noise. NOTE: Examples include dwellings, hospitals, healthcare facilities, education facilities, community facilities, END quiet areas or potential END quiet areas, international and national or statutorily designated sites, public rights of way and cultural heritage assets.
Non-continuous route	A route between two primary destinations that is not continuous in its numbering along the route.
Non-Statutory Site	Sites receive local protection from development and damage
Opening year	First year of operation
Operational GHG emissions	GHG emissions associated with 1) the operation and maintenance of the asset, i.e., lighting, maintenance activities etc); and 2) users of the asset (i.e., vehicle emissions)
Outfall	Point of discharge into a waterbody
Pollutant concentrations	Concentrations of pollutants normally reported as micrograms per cubic metre of air ($\mu\text{g}/\text{m}^3$).
Pollution climatic mapping model	Government's national air quality modelling used to assess and report on compliance with the Air Quality Directive [Ref 4.N] to the European Commission.
Population	All individuals located in a particular location (this can be local, regional or at a national scale).

Glossary term	Definition
Potential END quiet area	A location with potential to be formally designated as a END quiet area, but not officially designated as such.
Preliminary sources study report	A combination of desk study and site reconnaissance, the purpose of which is to develop an initial conceptual site model
Prime land	Land in grades 1, 2 and 3.1 of the Land Capability for Agriculture Classification.
Priority habitats and species	Those species and habitats which are defined in CIEEM's Guidelines for Preliminary Ecological Appraisal CIEEM (Preliminaries) [Ref 12.N] as: <ol style="list-style-type: none"> 1) listed as a national priority for conservation (such as those listed as habitats and species of principal importance for the conservation of biodiversity); 2) listed as a local priority for conservation, for example in the relevant local Biodiversity Action Plan (BAP); 3) Red Listed using International Union for the Conservation of Nature (IUCN) criteria or, where a more recent assessment of the taxonomic group has not yet been undertaken, listed in a Red Data Book; 4) listed as Near Threatened or Amber Listed; 5) listed as a Nationally Rare or Nationally Scarce species or listed as a Nationally Notable species where a more recent assessment of the taxonomic group has not yet been undertaken; and/or 6) endemic to a country or geographic location.
Private property and housing	Land, buildings and infrastructure for the purpose of residential use
Project	Construction works, installations, schemes, or interventions (in the natural surroundings and landscape) including those involving the extraction of mineral resources.
Scheme	The plan put forward by the Applicant as described in the Environmental Scoping Report (National Highways, 2023)
Proposed Scheme extent	The geographical area which is required to construct, operate and maintain the proposed Scheme as described in the Environmental Scoping Report (National Highways, 2023)
Protected area	Area registered under Article 6 of the 2000/60/EC [Ref 4.N].
Q ⁹⁵	The flow equalled or exceeded in a watercourse 95% of the time.
Reach	A stretch of a river used in the assessment of river water quality
Reasonable alternatives	Different project design, technology, location, size and scale solutions considered by the developer.
Regional	Geographical regions in the United Kingdom Climate Projections as follows: <ol style="list-style-type: none"> 1) North-east England; 2) North-west England; 3) Yorkshire and the Humber; 4) East Midlands; 5) West Midlands; 6) East of England; 7) London; 8) South-east England;

Glossary term	Definition
	9) South-west England; 10) Wales; 11) Scotland; and 12) Northern Ireland.
Resilience	The capacity of a project (or lack thereof) to withstand the adverse effects of climate change
River Basin Management Plan	A regional plan that sets out how organisations, stakeholders and communities will work together to improve the water environment and fulfil the requirements of the 2000/60/EC [Ref 4.N]
Routine runoff	The normal runoff from roads including any contaminants washed off the surface in rainfall events which can result in either acute or chronic impacts. NOTE: Routine runoff excludes the effect of spillages and major leaks which usually result in acute impacts
Scheme	The plan put forward by the Applicant as described in this report.
Scoping	The process of considering the information required for reaching a (reasoned) conclusion on the likely significant effects of a project on the environment.
Sensitive receptor	Includes residential properties, back gardens, schools, hospitals, care homes, public open spaces, public access
Sensitivity	Term applied to specific receptors, combining judgements of the susceptibility of the receptor to specific type of change proposed and the value related to that receptor. NOTE: Source of definition GLVIA 3 GLVIA [Ref 1.I]
Setting	The surroundings in which a cultural heritage resource is experienced. NOTE 1: Its extent is not fixed and can change as the resource and its surroundings evolve. NOTE 2: Elements of a setting can make a positive or negative contribution to the significance of a resource and can affect the ability to appreciate that significance or can be neutral.
Short-term	Noise change based on parallel assessment year (for example DMOY against Do-something opening year scenario (DSOY)).
Significant effect	An effect categorised as Moderate, Large or Very Large (in accordance with Table 3.7 of DMRB LA 104) can be considered to constitute a Significant effect. The approach to assigning significance of effect ultimately relies on reasoned argument, the professional judgement of competent experts and using effective consultation to ensure the advice and views of relevant stakeholders are taken into account.
Significant observed adverse effect level	The level above which significant adverse effects on health and quality of life occur.
Simple assessment	The collection and assessment of data and information that is readily available to reach an understanding of the likely environmental effects of a project. NOTE: This informs the final design or need for further 'detailed assessment'.
Soakaway	A special pit or depression in the land surface that allows water to drain into the ground.

Glossary term	Definition
Soil	An assemblage of mineral particles and/or organic matter which includes variable amounts of water and air (and sometimes other gases)
Speed band	A range of categories for which outputs from the traffic model are grouped into to describe their emissions.
Statutory Site	Sites protected under UK, European and International law
Strategic employment sites	Large scale sites/land allocated in local planning policy for the provision of employment land use.
Strategic housing sites	Large scale sites/land allocated in local planning policy for the provision of residential land use.
Surface water	Water that collects on the surface of the ground
Surface water body	A discrete and significant element of surface water. NOTE: Examples of surface water body can include a lake, a reservoir, a stream, river or canal, part of a stream, river or canal, transitional water or a stretch of coastal water
Susceptibility	Ability of a defined landscape or visual receptor to accommodate the specific proposed change without negative consequences. NOTE: Source of definition GLVIA 3 GLVIA [Ref 1.I].
Topsoil	Natural topsoil or manufactured topsoil, usually covering the top 25cm in which plants can grow healthily.
UKCP	The name given to the UK Climate Projections NOTE 1: provides the future climate projections and observed (historical) climate data for UK regions. NOTE 2: This will in turn be superseded by updates such as UK CP18 [Ref 3.N].
Value	Relative value or importance of a landscape's quality, special qualities including perceptual aspects such as scenic beauty, tranquillity, or wildness, cultural associations or other conservation issues. NOTE 1: Source of definition GLVIA 3 GLVIA [Ref 1.I].
Veteran trees	A tree that has decay features, such as branch death or hollowing which contribute to its biodiversity, cultural and heritage value. NOTE: All ancient trees are veteran trees, but not all veteran trees are ancient.
Vibration	A to-and-fro motion which oscillates about a fixed equilibrium position
Visual amenity	Overall enjoyment of a particular area, surroundings, or views in terms of people's activities - living, recreating, travelling through, visiting, or working. NOTE: Source of definition GLVIA 3 GLVIA [Ref 1.I]
Vulnerability	The degree to which a system/asset is exposed and resilient to adverse effects of climate change
Visual receptor	Individuals and/or defined groups of people who potentially could be affected by a project. NOTE: Source of definition GLVIA 3 GLVIA [Ref 1.I].
Zone of influence	The area(s) over which biodiversity resources can be affected by biophysical changes as a result of the proposed project and associated activities CIEEM (Guidelines) [Ref 11.N]
Zone of theoretical visibility	Map produced (usually digitally) to specific criteria to illustrate the area(s) from which a project can theoretically be visual.

Glossary term	Definition
	NOTE: For cumulative visual effects assessment it is the areas of overlap with the ZTV which can prove significant.



Appendix A. Heritage Gazetteer

Known heritage assets within the study area

Table A-1. Known heritage assets within the study area

HER/Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
NHLE1014044	Caludon Castle: a moated site and part of an associated water management system	Caludon Castle is a well preserved example of a moated site together with an associated water management system. The moated site will retain structural and artefactual evidence for both the original house which existed here from the end of the 12th century, for the later rebuilding and additions in the mid- 14th century, and for the additions made during the early post-medieval period. The moat ditches and the sample section of the floor of the pool will retain both artefactual and environmental information regarding the occupation of Caludon Castle and for the economy of its inhabitants as well as the landscape in which it was set. Additionally the existence of the pool to the north of the moated site provides evidence for the wider setting of the house, and thus an insight into the way in which the wealth and social status of its occupants in the medieval and early post-medieval periods was made manifest. The interest of Caludon Castle is enhanced by the survival of contemporary documentary records which relate to the site's ownership and the buildings that existed here. As a monument which is open to the public, Caludon Castle serves as a valuable educational and recreational resource.	437386	280164	Medieval	Schedule d Monument	High
NHLE 1014045	Moated site 190m south of Caludon Castle	The moated site 190m south of Caludon Castle is a well preserved example of this class of monument and is unencumbered by modern	437404	279962	Medieval	Schedule d	High

HER/Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
		development. The moated island will retain structural and artefactual evidence for buildings and other structures which originally existed, including evidence of their form, date and function. The moat ditches, which have silted naturally, will contain both artefactual and environmental information relating to the site's occupation and illustrating the landscape in which it was used. The ruins, earthwork and buried remains of Caludon Castle, a high status residence which was originally constructed in the late 12th century and occupied through to the late 17th century, are situated to the north of the moated site. These remains are the subject of a separate scheduling. A relationship with Caludon Castle is highly likely, and the moated site to the south was probably a secondary associated enclosure of similar date.				Monument	
NHLE 1000408	Coombe Abbey	Late C18 park landscaped by Lancelot Brown with structures designed by Henry Holland, together with mid and late C19 formal gardens laid out by William Andrews Nesfield and William Miller which incorporate elements of late C16 and early C17 formal gardens.	440090	279515	Post-Medieval	Grade II* Registered Park and Garden	High
NHLE 1034896	Old Lodge Farmhouse	Farmhouse, Early C17 with large late C19 addition to rear. Flemish stretcher bond brick with some flared headers, and sandstone dressings. Old plain-tile roof; large brick external stack to rear.	439553	278295	Post-Medieval	Grade II Listed Building	High
NHLE 1034897	Old Lodge Farm, Barn Approximately 10 metres south of Farmhouse	Barn. C17 with C19 rebuilding. Timber framed with brick infill; largely rebuilt in brick. Old plain-tile roof. 5 bays. Double-leaf plank doors. Left return side has plank door with wood lintel. Interior has C19 brick buttresses to central bay.	439570	278266	Post-Medieval	Grade II Listed Building	High

HER/Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
		Trenched purlin queen strut roof has renewed struts. Included for group value.					
NHLE 1076629	Church of St Bartholomew	1771-3 for William Lord Craven of Coombe Abbey. Nave with sanctuary apse, recessed west porch. Attributed to Robert Adam, Ashlar, cement slurry. North transept leading to vestry with semi-circular ends. Coved ceiling with garlands and medallions in relief. Similar wall decoration. East end niches flanking alabaster columns, Tower of the Winds capitals. Greek Ionic alabaster north screen. Madonna and Child east window. West gallery.	437729	278494	Post-Medieval	Grade I Listed Building	High
NHLE 1076630	The Vicarage	Late C18 west block. Cement rendering, hipped Welsh slated roof. 2 storeys, 2 full height canted bays, sash windows with glazing bars. Cornice. Early front block, C16, altered. 2 storeys, 2 gables on right. Casement windows. C19 porch with ornamental bargeboards. Interior: C16 stone chimneypiece. Very fine mid C18 chimneypiece, carved wood, Rococo design, in drawing room.	437675	278559	Post-Medieval	Grade II Listed Building	High
NHLE 1076631	1 and 2, Brinklow Road	C17 refaced C18 with C19 back wing. Timber frame, whitewashed brick nogging. Tiled roof. Front of whitewashed brick with 1st floor band. 2 casement windows, ground floor cambered arches. Back wing of red brick, casement window with glazing bars, bracketed door hood.	437945	278578	Post-Medieval	Grade II Listed Building	High
NHLE 1076632	6, Brinklow Road	Late C16 or early C17. Timber frame, whitewashed brick nogging. Tiled roof. 2 storeys, casement window with glazing bars. Single storey back wing. 1 building with No 8.	438023	278577	Post-Medieval	Grade II Listed Building	High
NHLE 1076633	8, Brinklow Road	Late C16 or early C17. Stone plinth, timber frame with gable end to road, red brick nogging. 2 storeys and attic, casement window with glazing bars.	438032	278577	Post-Medieval	Grade II Listed Building	High

HER/Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
NHLE 1076634	10 and 12, Brinklow Road	C16, refronted with red brick, No 10 refaced with whitewashed pebbledash. Tiled roof. Timber frame exposed at left angle and side elevation. 1 storey and attics, 2 casement windows flush set, cambered arch and glazing bars and louvered shutters on left. Gabled C19 casement dormer on right.	438037	278576	Post-Medieval	Grade II Listed Building	High
NHLE 1076645	Remains of Caludon Castle	Circa 1354, or earlier. John Segrave was granted a licence to crenellate 1305. Another licence granted 1354. Descended to Thomas Mowbray, Duke of Norfolk. Fell into dereliction after his banishment 1398. Rebuilt circa 1580 by Henry Lord Berkeley. Ruined by the later C17. Sole remaining fragment consists of tall sandstone wall containing 2 large pointed arched windows above 2 smaller. Remnants of stone window tracery.	437379	280159	Medieval	Grade I Listed Building	High
NHLE 1087021	Stoke House	Early to mid C19, Stucco, Welsh slated roof. 3 storeys, 1st floor simplified entablature; frieze and bracketed cornice at eaves. 3 sash windows with glazing bars, central 1st floor pediment on consoles. Doric closed porch with pilasters.	437163	279034	Post-Medieval	Grade II Listed Building	High
NHLE 1226789	Barn Approximately 50 metres north of Hungerley Hall Farmhouse	Barn. Mid C18. Red brick with some decorative flared headers. Plain-tile roof. Brick plinth. Central double doorway. Opening to upper right. Interior: 4-bay tie-beam truss roof with double trenched purlins and coupled rafters.	438422	279528	Post-Medieval	Grade II Listed Building	High
NHLE 1233531	Walsgrave Hill Farmhouse	Late C18. Brick, with C20 tile roof and brick stack to ridge. 2 storeys plus attic; 3-window range. C19 part-glazed door with overlight within C19 brick porch. To left and right of ground and first floors 24-pane, 3-light casements, those to ground floor with gauged brick arches, those to first floor with segmented brick arches. 16-pane, 2-light casement above door. Gabled dormers with C20	439389	280853	Post-Medieval	Grade II Listed Building	High

HER/Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
		casements. The house rests upon a plinth and has a first floor storey band. Brick dentilled eaves cornice. C19 one-bay extension abutted to left of 2 storeys. C18 wing to rear. Interior: some chamfered beams, with stops.					
NHLE 1233532	West Lodge	House, formerly lodge. Late C18. Sandstone ashlar with some brick to ends. Lead roof removed. Brick stacks to ends. 2 storeys; 2-window range, with one-storey, one-bay wings to left and right. In style of a Roman triumphal arch. Central archway. To left and right a round-headed sash of 12-panes, with further 12-pane sashes to wings with wedge lintels. Above round-headed sashes to left and right a blind window with wedge lintels. Flanking arch, and to corners of main range, Corinthian pilasters supporting entablature. Plinth, and first floor storey band. Parapet to flanking wings. Urns to left and right corners of main range decorated with festoons.	439609	278948	Post-Medieval	Grade II* Listed Building	High
NHLE 1233533	The Woodlands	Hunting Lodge, now house. Late C18 with C19 additions. Probably by Capability Brown. Sandstone ashlar, with some brick. Slate and lead roofs with ashlar stacks. Complex plan of polygonal wing to left, centre range and projecting cross-wing to right. 2 storeys; 5-window range. C20 plank door within hexagonal porch with wood modillion eaves cornice. 12-pane unhorned sashes to ground floor of left polygonal range, to right of door and to front of wing to right. One blind window to right facade of wing. 9-pane unhorned sashes to first floor of polygonal range, those to main range and right wing with keyblocks. Plinth and first floor storey band. Stone modillion eaves cornice. Interior: some panelled, some plank doors. One chamfered beam with ogee stop.	438862	278998	Post-Medieval	Grade II* Listed Building	High

HER/Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
NHLE 1233663	Menagerie Farmbuildings to north-west of The Woodlands	Menagerie farm buildings. c1778. Built to serve the Menagerie designed by Lancelot (Capability) Brown. Red brick with plain tile roofs. Two 1-plan ranges linked by a gate. The larger northern range has a 2 storey wing to the west, with 4 segment-headed carriage arches, that to the right with double plank doors. Beyond to the right a stable door flanked by single 2-light glazing bar casements all with segment heads. Above 3 tall 2-light glazing bar casements to the eaves. Beyond to the right a slightly set back lower range with a single stable door. This range continues at right angles with a further stable door and becomes single storey with two stable doors and a shuttered opening between. The smaller southern range, single storey, with the 2 cart entrances to the north range, and 2 bricked-up cart shed entrances to the south range that to the left with a 3-light glazing bar casement. Beyond a single plank door flanked by single light glazing bar casements. These buildings are extremely rare, they were built to store food and bedding for the animals in the Menagerie, and they also provided space for sheltered winter accommodation for these exotic beasts.	438866	279075	Post-Medieval	Grade II Listed Building	High
NHLE 1233703	Wall to south of The Woodlands Coombe Abbey	Boundary wall. c1770-78, with later alterations. By Lancelot (Capability) Brown. Red brick with coping in part and remains of bases for urns. This wall extends south-east of The Woodlands (qv) to the edge of The Pool and is approx 2-3m in height but has the occasional gap or area of collapse. The wall was originally built by Brown together with that to north (qv) of The Woodlands to cut off the area of land bordering The Pool which he had formed into a Menagerie. The area	438948	278945	Post-Medieval	Grade II Listed Building	High

HER/Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
		is named as such and the wall is shown in a plan of 1778.					
NHLE 1265638	Granary, Cowshed and Stable Range Approximately 15 metres north-west of Hungerley Hall Farmhouse	Granary, cowshed and stable range. Mid/late C18, the stable with early C19 roof. Red brick with plain-tile roofs. L-plan, stable projecting forward on right. 2-storey granary to left has double and single doors, brick dentilled eaves and doorway to granary on left-end. Single-storey cowshed to centre has 4 stable doors. 2-storey stable has stable door to centre, blind window above and a shuttered window either side on both floors. Lean-to on left end, loft door on right end. Interiors. Granary has 2-bay roof with coupled rafters, old purlins and brick partition. Cowshed has 8-bay roof with chamfered ties, clasped principals and trenched overlapping purlins. Plank ridge. Stable has hay loft, chamfered beams with run-out stops and early C19 3-bay king-post truss roof.	438389	279499	Post-Medieval	Grade II Listed Building	High
NHLE 1265694	Hungerley Hall Farmhouse	Farmhouse. Probably late C17/early C18 with mid C18 extensions and late C18/C19 alterations. Red brick with plain-tile roof and brick ridge and end stacks. Complex plan. Main front faces garden. 2 storeys and cellar. 4-window range of 3-light casement windows the 2 to centre under brick cambered arches. Under these the door within wooden lattice porch with gabled hood. Similar 3-light casement to right and 2-light to left. Two 2-light casement to far right. Blocked window to far left, where also 1st floor band. The differences in brickwork together with interior evidence suggest that a timber-framed 3-unit-plan house was extended on either end in brick in mid C18, then the framing refronted in brick late C18/early C19 and then the section of roof to centre and left slightly raised	438428	279477	Post-Medieval	Grade II Listed Building	High

HER/Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
		mid C19. The rendered left end has a 4-light casement with 3-light over, and the right end various casements, lean-tos and steps leading to 1st floor doorway. Rear has mainly 3-light casements, and a cross-wing projecting to centre-left with a 2nd span extension to its left, gable facing left. Further single-storey extension to centre right with doorway to left and small canted bay to right of it. Interior: chamfered beams; open fireplace and bressumer, Cellar has brick thrawls. Plank door and 2-panel door on 1st floor, together with hood to open fireplace, timber- framed partition)old floor boards, a 2nd fireplace hood and wall posts.					
NHLE 1276492	Boat House on south Side of The Pool, Coombe Abbey	Boat House on south side of The Pool, Coombe Abbey - II Boathouse. c1770-78, with later alterations. Probably by Lancelot (Capability) Brown. Red brick and plain-tile roof. Single storey. Open ended to The Pool and entrance door opposite. King-post roof construction possibly early C19. The boathouse is marked on a plan of 1778.	439334	279334	Post-Medieval	Grade II Listed Building	High
NHLE 1276493	Wall to north of The Woodlands, Coombe Abbey and Attached Farm Buildings	Boundary wall. c1770-78, with later alterations. By Lancelot (Capability) Brown. Red brick with coping in part. This wall extends north and north-west of The Woodlands (qv) to the edge of The Pool and is approx. 3m in height but has the occasional gap or area of collapse. The wall was originally built by Brown together with that to south (qv) of The Woodlands to cut off the area of land bordering The Pool which he had formed into a Menagerie. The area is named as such and the wall shown in a plan of 1778. Attached to the western side of this wall a range of single storey outbuildings. Red brick with plain tile roofs and a single ridge stack. Central range has to	438842	279058	Post-Medieval	Grade II Listed Building	High

HER/Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
		right 2 doorways with plank doors flanked by single 2-light glazing bar casements. Set back to right a remodelled C19 wing. Set back to left an original wing with 2 plank doors and two 2-light casements. These buildings were built to serve the Menagerie, to provide feed storage and winter quarters for the exotic animals kept here.					
NHLE 1335842	14, School House Lane	C16 or early C17. Timber-frame, whitewashed plaster infilling, medieval tiled roof. 2 casement windows with segmental heads, metal glazing bars. 2 nailed and boarded doors.	438044	280783	Post-Medieval	Grade II Listed Building	High
NHLE 1342892	White House	Early to mid C19 front to earlier house. Whitewashed brick, Welsh slated roof. 2 storeys, 5 sash windows with glazing bars in reveals, ground floor cambered arches. 6 fielded panel door, oblong fanlight with glazing bars, slim reeded pilasters, simplified entablature.	438024	280748	Post-Medieval	Grade II Listed Building	High
NHLE 1342904	22, Brandon Road	C18. Red brick, tiled roof. 2 storeys, 3 flush casement windows with glazing bars under rusticated stone lintels. Glazed C19 porch.	437791	278325	Post-Medieval	Grade II Listed Building	High
NHLE 1342922	34, Brandon Road	C17 or earlier, slightly altered. Whitewashed pebbledash, old tiled roof. 2 storeys, 3 casement windows with glazing bars. Timber framework exposed internally.	437826	278281	Post-Medieval	Grade II Listed Building	High
NHLE 1365086	The Cocked Hat Restaurant and Hotel, Binley Common House	Farmhouse, now restaurant and hotel. Late C17 with mid/late C19 additions and alterations, and late C20 alterations. Flemish bond brick with sandstone splayed plinth, moulded string course and alternating quoins. Plain-tile hipped roof has deep eaves. Large brick left end and right external stacks have gables and roofs and partly rebuilt shafts. U-plan with wings to garden to rear. 2 storeys and attic; 4-window range. Symmetrical fronts. C20 moulded 6-panelled door in simple painted moulded stone doorcase	438692	277640	Post-Medieval	Grade II Listed Building	High

HER/Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
		with heavy dentil cornice. Painted stone chamfered cross windows have glazing bars. Outer bays are widely spaced. 4 hipped roof dormers have C20 two-light casements with glazing bars. C19 single-storey wing at right angles on left has end stack. Late C20 windows. Right external stack has moulded stone string course and cornices. Garden front of 4 bays. Recessed centre has late C20 six-panelled door. Painted moulded stone eared architrave has pulvinated frieze and pediment. Panel of sandstone blocks above. Flanking windows. Late C20 top-hung sashes throughout have brick flat arches with painted keystones to centre, and C19 rusticated painted rendered flat arches to wings. Wings have C19 canted bays to ground floor. Four C20 two-light nipped roof dormers. Small C19 single-storey range at right angles on right. Interior is altered but retains dog-leg staircase with turned balusters.					
MCT60	An Elizabethan coin (1588-1603) found in the Binley area	6d of Elizabeth (1588-1603)	438400	278500	Undated	None	None
MCT65	Ridge and Furrow	Cropmark of Ridge and Furrow (roughly N-S) N of allotments. Visible on 2005 aerial photographs.	437813	279631	Medieval	None	Low
MCT304	Ridge and Furrow	Part of large, well-preserved area of ridge and furrow c300m W of Walsgrave Hill surveyed by plane-table, with photographic and sketch records of remainder. In excess of 90% since been destroyed by road corridor and removal of hill for construction use. Close dating not possible though several phases of activity were represented. Of particular interest were clear signs of at least 2 main phases where furlongs intersected and a possible third phase where low,	439200	280700	Medieval	None	Low

HER/Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
		flat-topped ridges were noted between many of higher ones.					
MCT581	Area of ridge and furrow, Walsgrave on Sowe	An area of ridge and furrow cultivation that was visible on a 1977 aerial photograph was evaluated in 2002 but no dating evidence was found.	438427	280531	Medieval	None	Low
MCT891	Ridge and Furrow	A small area of ridge and furrow was recorded during a field investigation in this area. Post-1800 finds of coins and a belt buckle were also found.	438300	279300	Post-Medieval	None	Low
DCT1176	Area of ridge and furrow north Clifford Bridge Road allotments	An area of ridge and furrow north Clifford Bridge Road allotments, visible on 1980 aerial photograph.	437823	279438	Unknown	None	Low
MWA3720	High Bridge, Walsgrave on Sowe	High Bridge, the site of a modern bridge. A map of 1823 suggests that this might be the site of an earlier bridge. The site is located 700m west of Walsgrave Hill.	438727	280703	Medieval to Modern	None	Low
MWA3732	Site of Brickworks 400m S of The Woodlands	The site of brick and tile works dating to the Imperial period which were indicated on an estate map of 1823. No surface evidence remains. The site is south of the southwest end of Coombe Country Park	438968	278643	Post-Medieval	None	Low
MWA3733	Quarry within Coombe Abbey Deer Park	The site of a gravel pit from which gravel was extracted during the Post Medieval period. It is marked on an estate map of 1823. The gravel pit was situated inside Coombe Abbey Deer Park.	438816	279099	Post-Medieval	None	Negligible
MWA3737	Possible Quarry, 'Marlpit Close', Walsgrave on Sowe	The possible site of a marl pit dating to at least the Imperial period is suggested by documentary evidence. Evidence of ridge and furrow cultivation also exists in this area and survives as earthworks. These features are situated 500m north of Walsgrave	439458	281079	Post-medieval	None	Negligible

HER/Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
MWA4788	Turnpike road from Market Harborough to Coventry	A toll road that was in use during the Imperial period. Travellers had to pay a toll to use the road. It ran from Coventry to Market Harborough.	438588	278719	Post-medieval	None	Low
MWA6724	Site of Gravel Pit SW of Walsgrave Hill	The site of a gravel pit from which gravel was extracted during the Imperial period. The site is marked on the Ordnance Survey map of 1886. It was situated 500m south-west of Walsgrave Hill.	439011	280167	Post-medieval	None	Negligible
MWA6853	Site of Fish Pond NE of Oak Farm	The site of a fishpond, used for the breeding and storage of fish. It is marked on the Ordnance Survey map of 1886. It dates to the Imperial period, and is situated north of Lyttleton Close, Binley Woods.	438459	278500	Post-Medieval	None	Low
MWA6929	Site of Gravel Pit NW of The Woodlands	The site of a gravel pit from which gravel was extracted during the Imperial period. It was marked on the Ordnance Survey map of 1886, and was situated 100m northeast of the Boat House of Coombe Country Park Pool.	438793	279148	Post-Medieval	None	Negligible
MWA6986	Findspot - Post Medieval coin	Findspot - a Post Medieval coin was found 500m north-east of Binley.	438401	278498	Post-medieval	None	None
MWA8193	The Menagerie within Coombe Abbey Deer Park	The site of a menagerie or zoo associated with the Coombe Abbey estate. It dated to the Imperial period and was situated within Coombe Abbey Deer Park.	438849	279022	Post-medieval	Duplicate of designated asset	High
MWA8277	Ridge and furrow, Coventry Eastern Bypass Site 4	The remains of Medieval ridge and furrow cultivation which survived as earthworks. Much of the ridge and furrow has been destroyed by recent road building and pipeline installation. The site is located north-west of Walsgrave Hill.	439199	280702	Medieval	None	Low
MCT15261	Road	Road on the 1888 OS map; no Tithe Map available	436987	278516	Post-Medieval	None	Unknown

HER/Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
MCT15391	River Sowe	River Sowe on the 1888 OS map; no Tithe Map available. Natural feature.	437673	278834	Natural feature	None	None (natural feature)
MCT15955	Stream	Stream at Walsgrave on the 1887 OS map; no Tithe map available	438605	281269	Post-Medieval	None	None (natural feature)
MCT15956	Pingle	Pingle at Walsgrave on the 1887 OS map; no Tithe map available	438633	280714	Post-Medieval	None	Low
MCT15973	Sheepwash	Sheepwash at Walsgrave on the 1887 OS map; no Tithe map available	438713	280655	Post-Medieval	None	Low
MCT15982	Old Quarry?	Old Quarry at Walsgrave on the 1887 OS map; no Tithe map available	438966	280907	Post-Medieval	None	Negligible
MCT16039	Road	Road at Walsgrave on the 1887 OS map; no Tithe map available	438550	280750	Post-Medieval	None	Unknown
MCT16043	Stream	Stream at Walsgrave on the 1887 OS map; no Tithe map available	439160	280996	Post-Medieval	None	None (natural feature)
MCT16045	High Bridge	High Bridge at Walsgrave on the 1887 OS map; no Tithe map available. Potential duplicated asset	438725	280695	Post-Medieval	None	Low
MCT16200	Stream	Stream at Walsgrave on the 1887 OS map; no Tithe map available	439094	281236	Post-Medieval	None	None (natural feature)
MCT16481	Ridge and Furrow	The course of the pipeline [in area E] cut-well defined ridge and furrow earthworks in a field (Field 1507) under pasture to the south of a stream north-west of Walsgrave Hill Farm. This ridge and furrow orientated north-west to south-east terminated at a bank [headland] orientated northeast-south-west. A later field boundary bank aligned north-west to south-east incorporated a mature tree and cut across the ridge and furrow.	439305	280884	Early Medieval to Modern	None	Low

HER/Designation Ref	Name	Description	Easting	Northing	Period	Status	Value
		Traces of similarly aligned ridge and furrow were also noted in adjacent fields to the east and south (Fields 1057a, 2680 and 1648). ... [Area F] In a field (Field 0778) under pasture, immediately to the south of field 1507, north of Farber Road the route cut ridge and furrow orientated north-west, south-east. Traces of similarly aligned ridge and furrow were also noted in a field to the south of Farber Road (Field 1648).					
MCT16482	Ridge and Furrow	Ridge and furrow recorded during a watching brief in 1993/4. It is visible as an earthwork on 2005 aerial photographs.	438843	280789	Early Medieval to Modern	None	Low
MCT16484	Deposit of Charcoal, Coventry Pipeline Phase 2	To the south [North?] ¹⁰ of this structure [MCT16483] also in Field 8700, a large deposit of charcoal approx 10m long and 5m wide overlaying natural gravels was exposed by topsoil stripping approximately 520m south {north?} of the A428. No dating evidence was recovered from this deposit.	438814	278350	Unknown	None	None
MWA31267	Walsgrave Hill Trig Point, Coombe Fields	Trig point pillar	439266	280630	Post-Medieval to Modern	None	Low

Previous archaeological events within the study area

Table B-2 Previous archaeological events within the study area

Event Ref	Name	Description	Easting	Northing
ECT36	Coventry Eastern Bypass Site 4, 1987	Survey, 1987	439116	280714

¹⁰ Information included within this table has been taken directly from the data provided. '?' denoted inherent uncertainty in the base data as provided. Further data gathering will be undertaken for the ES, which may clarify the location of this asset.

Event Ref	Name	Description	Easting	Northing
ECT37	Coventry Eastern Bypass Site 4, 1994	Intervention, 1994	439008	280729
ECT63	Coventry Eastern Bypass Site 3 Fieldwalking	Survey, 1987-1988	438297	279301
ECT64	Coventry Pipeline Phase 2	Intervention, 1993-4	438196	279269
ECT76	Eastern Bypass Site 3	Field Observation, 1987	438301	279301
ECT77	Eastern Bypass Site 4	Survey, 1987	439205	280703
ECT93	Coventry Pipeline Phase 2 (north-east)	Intervention, 1993-4	438707	280602
ECT117	University Hospital Coventry	Intervention, 2002	438373	280576
ECT144	University Hospital Coventry	Interpretation	438127	280533
ECT492	EDP 209 Walsgrave	Survey, 2006	438688	280295
EWA1871	Site visit to the Brickworks 400m south of The Woodlands, Coombe Fields	A site visit was made to the location of a brickworks, 400m south of The Woodlands, Coombe Fields by Warwickshire Museum on the 16th November 1983.	438974	278651
EWA9620	Site visit to Coombe Abbey, Coombe Fields, Rugby	by J Lovie c1996	439471	279376
EWA9683	Coombe Abbey Country Park Management Plan 2001-2011	Management plan assessing the historic landscape of the park and suggesting management strategies for each	439471	279376

Appendix B. Lighting assessment

Introduction and study area

A lighting impact assessment will be included as part of the EIA process to determine the likely effects of the lighting design of the Scheme on the surrounding environment. The assessment will ensure that the lighting design at the preliminary design stage will conform to maximum allowable obtrusive lighting levels and will provide recommended luminaire types, mounting heights and angles for use within various areas of the Scheme.

The lighting assessment will inform the landscape and ecology impact assessments and will be included as a technical appendix to the Landscape and Visual chapter within the Environmental Statement (ES). The lighting assessment will be used to inform the assessment of potential effects on protected species and nearby residential properties, including any proposed mitigation.

Lighting design

Lighting extent

The Scheme will include new lighting. The Scheme lighting extents are summarised below.

It is proposed to light the following:

- the new B4082 link road
- the new junction eastern and western roundabouts and the Walsgrave bridge over the A46 mainline carriageway
- the northbound and southbound on-slips and off-slips to the A46 mainline carriageway from the junction roundabouts

It is not currently proposed to light the A46 mainline carriageway within the draft Order Limits as the existing A46 mainline is currently unlit, except in the vicinity of Walsgrave roundabout which will be removed.

Lighting design

It is currently proposed that lighting columns will be 10m in height.

The lighting design is still to be developed; however, it is assumed that efficient full cut-off lighting technology and LEDs (light emitting diodes) would be used.

Luminaires would be oriented toward the carriageway and would, as far as is reasonably practicable, minimise light spilled beyond the highways boundary.

The use of modern LED luminaires would reduce energy consumption, and when integrated into the National Highways maintenance contractor's central management system (CMS), further energy reductions could be achieved.

Guidance and best practice

In considering the potential effects of the Scheme, the following aspects of obtrusive light, taken from the Institute of Lighting Professionals (ILP) Guidance Note for the Reduction of Obtrusive Light GN01:2021 must be considered and assessed:

- sky glow
- light intrusion (nuisance)
- luminaire/luminous intensity
- building or façade luminance

The assessment to be reported within the ES will be undertaken in accordance with the following legislation and guidance (the following list is not exhaustive):

- UK Government (1990). Environmental Protection Act. Accessed July 2023. <https://bills.parliament.uk/bills/293/stages>
- UK Government (2005). Clean Neighbourhoods and Environment Act. Accessed July 2023. <https://www.legislation.gov.uk/ukpga/2005/16/contents>
- Bat Conservation Trust (2014). Artificial lighting and wildlife. Accessed July 2023. [Bat Conservation Trust Artificial Lighting and Wildlife](#)
- British Standard European Norm (2014). 12464-2 Light and Lighting. Lighting of work places. Outdoor work places. Accessed July 2023. <https://knowledge.bsigroup.com/products/light-and-lighting-lighting-of-work-places-outdoor-work-places/standard>
- British Standard European Norm (2016). 13201-2 Road Lighting Performance Requirements. Accessed July 2023. <https://landingpage.bsigroup.com/LandingPage/Series?UPI=BS%20EN%2013201>
- British Standard Institute (2020) 5489-1 Code of Practice for the Design of Road Lighting and Public Amenity Areas. Accessed July 2023. <https://knowledge.bsigroup.com/products/design-of-road-lighting-lighting-of-roads-and-public-amenity-areas-code-of-practice/tracked-changes>
- Commission Internationale de l'Eclairage (1997). CIE 126: Guidelines for Minimising Sky Glow. Accessed July 2023. <https://cie.co.at/publications/guidelines-minimizing-sky-glow>
- Commission Internationale de l'Eclairage (2017). CIE 150: Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations. Accessed July 2023. <https://cie.co.at/publications/guide-limitation-effects-obtrusive-light-outdoor-lighting-installations-2nd-edition>

- Department for Environment, Food & Rural Affairs (2006). Statutory Nuisance from Insects and Artificial Light. Accessed July 2023. [DEFRA 2006](#)
- Institution of Lighting Professionals (2013). ILP Professional Lighting Guide 04, Guidance on Undertaking Environmental Lighting Impact Assessments. Accessed July 2023. <https://theilp.org.uk/publication/plg04-guidance-on-undertaking-environmental-lighting-impact-assessments/>
- Institution of Lighting Professionals (2018). Guidance Note 08/18 Bats and artificial lighting in the UK, part of the Bats and the Built Environment series. Accessed July 2023. <https://theilp.org.uk/publication/guidance-note-8-bats-and-artificial-lighting/>
- Institution of Lighting Professionals (2021). Guidance Notes for the Reduction of Obtrusive Light (GN01). Accessed July 2023. <https://theilp.org.uk/publication/guidance-note-1-for-the-reduction-of-obtrusive-light-2021/>
- The Landscape Institute (2013). Guidelines on Landscape and Visual Impact Assessment, 3rd Edition. Accessed July 2023. <https://www.landscapeinstitute.org/technical/glvia3-panel/>
- The Chartered Institution of Building Services Engineers (CIBSE) (2016). Lighting Guide 06 The Exterior Environment. Accessed July 2023. <https://www.cibse.org/knowledge-research/knowledge-portal/lighting-guide-06-the-exterior-environment-2016>

Proposed methodology and scope

The assessment to be reported in the ES will follow best practice guidance detailed in the ILP's 2013 Guidance on Undertaking Environmental Lighting Impact Assessments. Potential receptors will be identified and discussed with the local planning authorities (LPA), as well as the project landscape and ecology teams to agree the proposed receptor locations, identify any further survey requirements and to inform the ongoing lighting design work and mitigation.

A baseline survey will be carried out during the EIA to provide lux measurements and photographs at an agreed survey viewpoint for each receptor. This will provide a baseline against which any obtrusive light from the Scheme design can be compared and assessed. Information gathered on baseline surveys will facilitate agreement with the LPAs in determining which environmental lighting zone the site falls under and therefore the maximum permissible levels of obtrusive light.

Environmental zones are set out in Table C-1. The lighting environment is based on the quality of dark skies measured with a Unihedron Sky Quality Meter (SQM). Higher values of SQM indicate darker skies.

Table C-1: Environmental zones

Zone	Surrounding	Lighting environment	Examples
E0	Protected	Dark (SQM 20.5+)	Astronomical Observable dark skies, UNESCO starlight reserves, International Dark Sky Association (IDA) dark sky places
E1	Natural	Dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, designated National Parks and Areas of Outstanding Natural Beauty, IDA buffer zones
E2	Rural	Low District Brightness (SQM ~15 to 20)	Sparsely inhabited rural areas, village or relatively dark outer suburban locations
E3	Suburban	Medium District Brightness	Well inhabited rural and urban settlements, small town centres of suburban locations
E4	Urban	High District Brightness	Town and city centres with high levels of night-time activity

Source: Guidance Notes for the Reduction of Obtrusive Light GN01:2021 (ILP, 2021)

Potential effects, including monitoring and mitigation measures

The Scheme is likely to result in obtrusive light impacts associated with construction such as temporary lighting for safety and security, lighting of haul routes, laydown areas, offices and temporary parking areas. There are also likely to be obtrusive lighting impacts during Scheme operation as a result of any proposed lighting or changes to existing lighting.

Where mitigation is required, it would be zone and use-specific (i.e., it will be specific to areas of the Scheme). Mitigation measures would also take into account the findings of the landscape and ecological impact assessments and any relevant mitigation measures which are reported in the ES to avoid or reduce the effects of lighting on key receptors.

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