

## **High Speed Rail (Crewe to Manchester and West Midlands to Leeds)**

**Working Draft Environmental Statement**

**Volume 2: Community Area report**

**LA02: Birchmoor to Austrey**

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**LA02: Birchmoor to Austrey**



Department  
for Transport

High Speed Two (HS2) Limited has been tasked by the Department for Transport (DfT) with managing the delivery of a new national high speed rail network. It is a non-departmental public body wholly owned by the DfT.

High Speed Two (HS2) Limited,  
Two Snowhill  
Snow Hill Queensway  
Birmingham B4 6GA

Telephone: 08081 434 434

General email enquiries: [HS2enquiries@hs2.org.uk](mailto:HS2enquiries@hs2.org.uk)

Website: [www.hs2.org.uk](http://www.hs2.org.uk)

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# Preface

## The working draft Environmental Statement

This report forms part of Volume 2 of the working draft Environmental Statement (ES) for Phase 2b of High Speed Two (HS2). The purpose of the working draft ES is to provide the public and other stakeholders with an opportunity to review and comment on preliminary environmental information for Phase 2b of HS2, which is based on a stage in the ongoing design development and environmental assessment process. Nothing included at this stage is intended to limit the form of the final scheme that will be presented in the hybrid Bill and formal ES in light of further scheme development and the ongoing discussions with stakeholders such as Transport for the North and Midlands Connect. Consultation on the working draft ES is being undertaken to help inform the ongoing design and environmental assessment in advance of producing a statutory formal ES. The formal ES will accompany the deposit of the hybrid Bill for Phase 2b of HS2.

Phase 2b comprises the section of the proposed HS2 rail network, from Crewe to Manchester (and a connection onto the West Coast Main Line (WCML)) (the western leg), and from the West Midlands to Leeds (and a connection onto, and part electrification of, the Midland Main Line (MML) and a connection onto the East Coast Main Line (ECML)) via the East Midlands and South Yorkshire (the eastern leg). Collectively, this is referred to in this working draft ES as the 'Proposed Scheme'. The working draft ES describes the Proposed Scheme and reports its likely significant environmental effects and the measures proposed to mitigate those effects, based on a stage in the ongoing design and environmental assessment.

The hybrid Bill for Phase One of the HS2 network, between London and the West Midlands, was the subject of an ES deposited in November 2013, followed by ESs deposited with Additional Provisions to that Bill in 2014 and 2015. The Phase One hybrid Bill received Royal Assent in February 2017 and pre-construction work on Phase One commenced in July 2017.

The hybrid Bill for Phase 2a of the HS2 network, between the West Midlands and Crewe, was the subject of an ES deposited in July 2017, followed by a subsequent ES deposited with an Additional Provision to that Bill in March 2018. The Phase 2a Bill is expected to receive Royal Assent in 2019.

## Consultation on the working draft Environmental Statement

The public has an opportunity to comment on this working draft ES. The period of public consultation is taking place during October 2018 – December 2018; the first day of the consultation period being the date the Secretary of State for Transport formally announces the consultation and the publication of the working draft ES documents on [www.gov.uk/hs2](http://www.gov.uk/hs2).



# Structure of the HS2 Phase 2b working draft Environmental Statement

This report forms part of Volume 2 of the working draft ES for Phase 2b of HS2. The working draft ES describes the design of the Proposed Scheme and reports the likely significant environmental effects of the construction and operation of the Proposed Scheme and proposed mitigation and monitoring measures, based on a stage in the ongoing design and environmental assessment process. The report will be updated for the formal ES to reflect further work on the design, assessment and mitigation and monitoring measures between now and when the hybrid Bill is deposited. The structure of the working draft ES is shown Figure 1.

This working draft ES has been prepared by persons who have sufficient expertise to ensure the completeness and technical quality of the statement.

The working draft ES comprises the following documents:

## Non-technical summary

This provides a summary in non-technical language of the following, identified at a stage in the ongoing design and environmental assessment:

- the Proposed Scheme and the reasonable alternatives studied;
- the likely significant beneficial and adverse effects of the Proposed Scheme;
- the means to avoid or reduce likely significant environmental effects; and
- an outline of the monitoring measures to manage the effects of construction and the effectiveness of mitigation post construction, as well as appropriate monitoring during operation.

## Glossary of terms and list of abbreviations

This contains terms and abbreviations, including units of measurement, used throughout the working draft ES.

## Volume 1: Introduction and methodology

This provides:

- a description of HS2, the environmental impact assessment (EIA) process and the approach to consultation and engagement;
- details of the permanent features of the Proposed Scheme and general construction techniques, based on a stage in the ongoing design;
- a summary of the scope and methodology for the environmental topics;
- an outline of the general approach to mitigation;
- an outline of the approach to monitoring, including measures to manage the effects of construction, the effectiveness of mitigation post construction, as well as the approach to monitoring during the operational phase, based on a stage in the ongoing design; and

- a summary of the reasonable alternatives studied (including local alternatives studied prior to the Government's announcement of the preferred route in July 2017). Local alternatives studied post July 2017 are reported in the relevant Volume 2: Community area reports.

## Volume 2: Community area reports and map books

These cover the following community areas:

- western leg: MA01 Hough to Walley's Green; MA02 Wimboldsley to Lostock Gralam; MA03 Pickmere to Agden and Hulseheath; MA04 Broomedge to Glazebrook; MA05 Risley to Bamfurlong; MA06 Hulseheath to Manchester Airport; MA07 Davenport Green to Ardwick; MA08 Manchester Piccadilly Station; and
- eastern leg: LA01 Lea Marston to Tamworth; LA02 Birchmoor to Austrey; LA03 Appleby Parva to Ashby-de-la-Zouch; LA04 Coleorton to Kegworth; LA05 Ratcliffe-on-Soar to Long Eaton; LA06 Stapleford to Nuthall; LA07 Hucknall to Selston; LA08 Pinxton to Newton and Huthwaite; LA09 Stonebroom to Clay Cross; LA10 Tibshelf to Shuttlewood; LA11 Staveley to Aston; LA12 Ulley to Bramley; LA13 Ravenfield to Clayton; LA14 South Kirkby to Charlston Common; LA15 Warmfield to Swillington and Woodlesford; LA16 Garforth and Church Fenton; LA17 Stourton to Hunslet; and LA18 Leeds Station.

The reports provide the following information for each area, as identified at a stage in the ongoing design and environmental assessment:

- an overview of the area;
- a description of the construction and operation of the Proposed Scheme within the area;
- a summary of the local alternatives considered since the Government's announcement of the preferred route in July 2017;
- a description of the environmental baseline;
- a description of the likely significant beneficial and adverse effects of the Proposed Scheme;
- the proposed means of avoiding, reducing or managing the likely significant adverse effects; and
- where possible, the proposals for monitoring, including measures during and post construction, and during the operational phase.

The maps relevant to each community area are provided in a separate Volume 2: Community area map book. These maps include the location of the key environmental features (Map Series CT-10), key construction features (Map Series CT-05) and operation features (Map Series CT-06) of the Proposed Scheme. There are also specific maps showing proposed viewpoint and photomontage locations (Map Series LV-00, LV-02, LV-03, and LV-04, to be read in conjunction with Section 11, Landscape and visual of the Volume 2: Community area reports), operational sound contour maps (Map Series SV-01, to be read in conjunction with Section 13, Sound, noise and vibration of the Volume 2: Community area reports) and maps showing key surface water and groundwater features (Map Series WR-01 and WR-02, to be read in conjunction with Section 15, Water resources and flood risk of the Volume 2: Community area reports).

In addition to the community areas detailed above, reports are provided for community areas within which electrification of a section of the MML is proposed: MML01 Danesmoor to Brierley Bridge and MML02 Unstone Green to Sheffield Station. These reports are provided at an earlier stage of the design and environmental assessment process, following the amendment of the route of the Proposed Scheme to include the electrification of a section of the MML between Clay Cross and Sheffield Midland Station. This would enable high speed trains to connect to Chesterfield and Sheffield as part of the Proposed Scheme. They include for each area:

- an overview of the area;
- a description of the proposed works within the area, based on a stage in the ongoing design;
- an outline of potential effects; and
- an overview of stakeholder engagement and consultation to be carried out as part of the EIA process.

Mitigation measures have not been identified at this stage of the design and environmental assessment process in relation to the likely effects arising from construction and operation of the Proposed Scheme for the MML01 Danesmoor to Brierley Bridge and MML02 Unstone Green to Sheffield Station areas. Any required mitigation measures will be reported in the formal ES. In addition, any required environmental monitoring during operation of the Proposed Scheme will be reported in the formal ES.

### **Volume 3: Route-wide effects**

This describes the effects that are likely to occur at a geographical scale greater than the community areas described in the Volume 2: Community area reports, based on a stage in the ongoing design and environmental assessment.

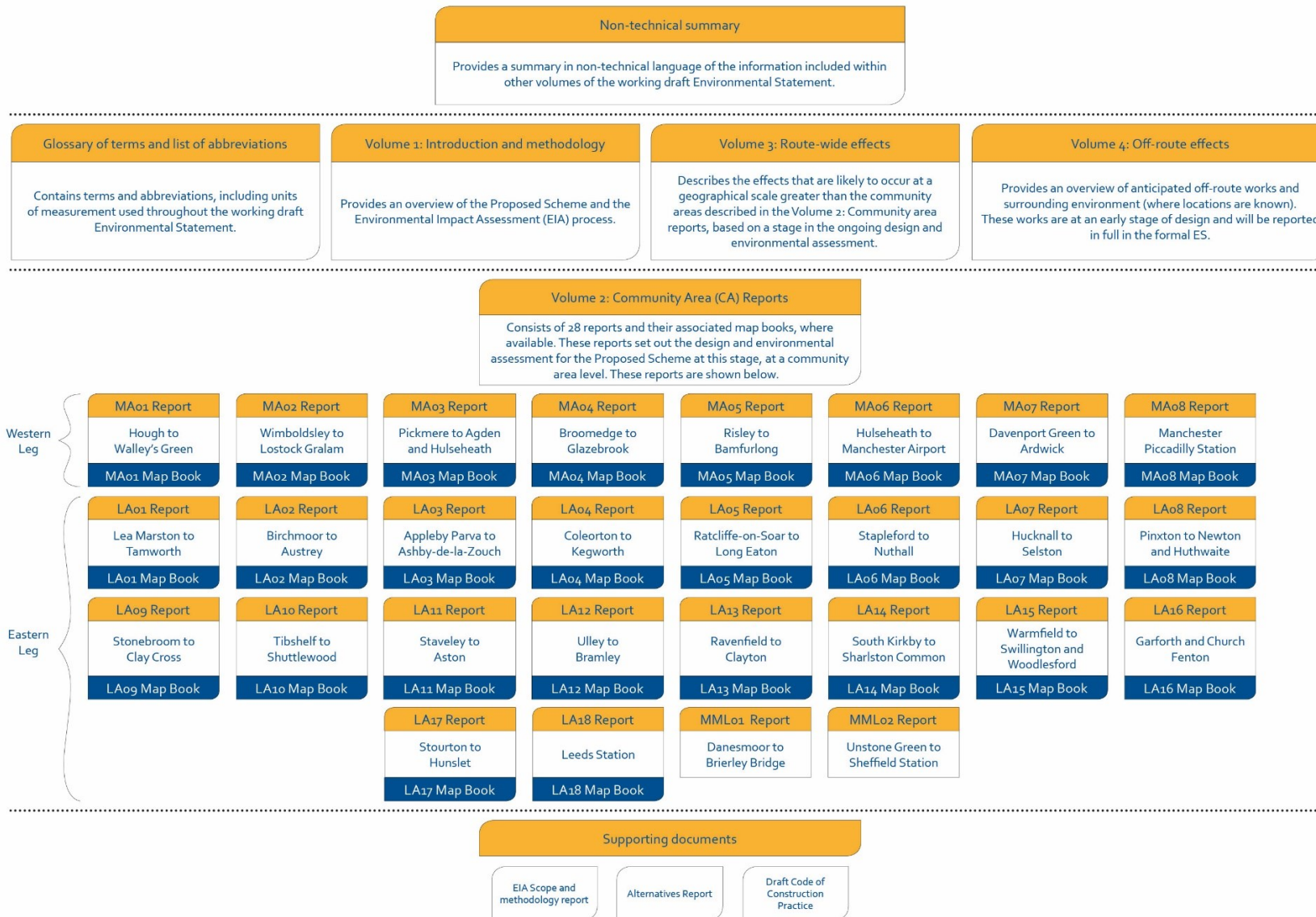
### **Volume 4: Off-route effects**

This provides an overview of anticipated off-route works and surrounding environment (where locations are known). These works are at an early stage of design and will be reported in full in the formal ES.

### **Supporting documents**

- EIA Scope and Methodology Report: this outlines the scope and methodology adopted for the EIA. HS2 Ltd consulted on a draft of the EIA Scope and Methodology Report (SMR) between July and September 2017. This updated version takes into consideration comments received, where appropriate, in addition to changes required as a result of updates to legislation or industry best practice guidance.
- Alternatives report: this describes the evolution of the Proposed Scheme and the reasonable alternatives considered at this stage of the design, at the strategic, route-wide, route corridor and local levels.
- Draft Code of Construction Practice (CoCP): this sets out measures and standards to provide effective planning, management and control of potential impacts on individuals, communities and the environment during construction.

Figure 1: Structure of the working draft Environmental Statement





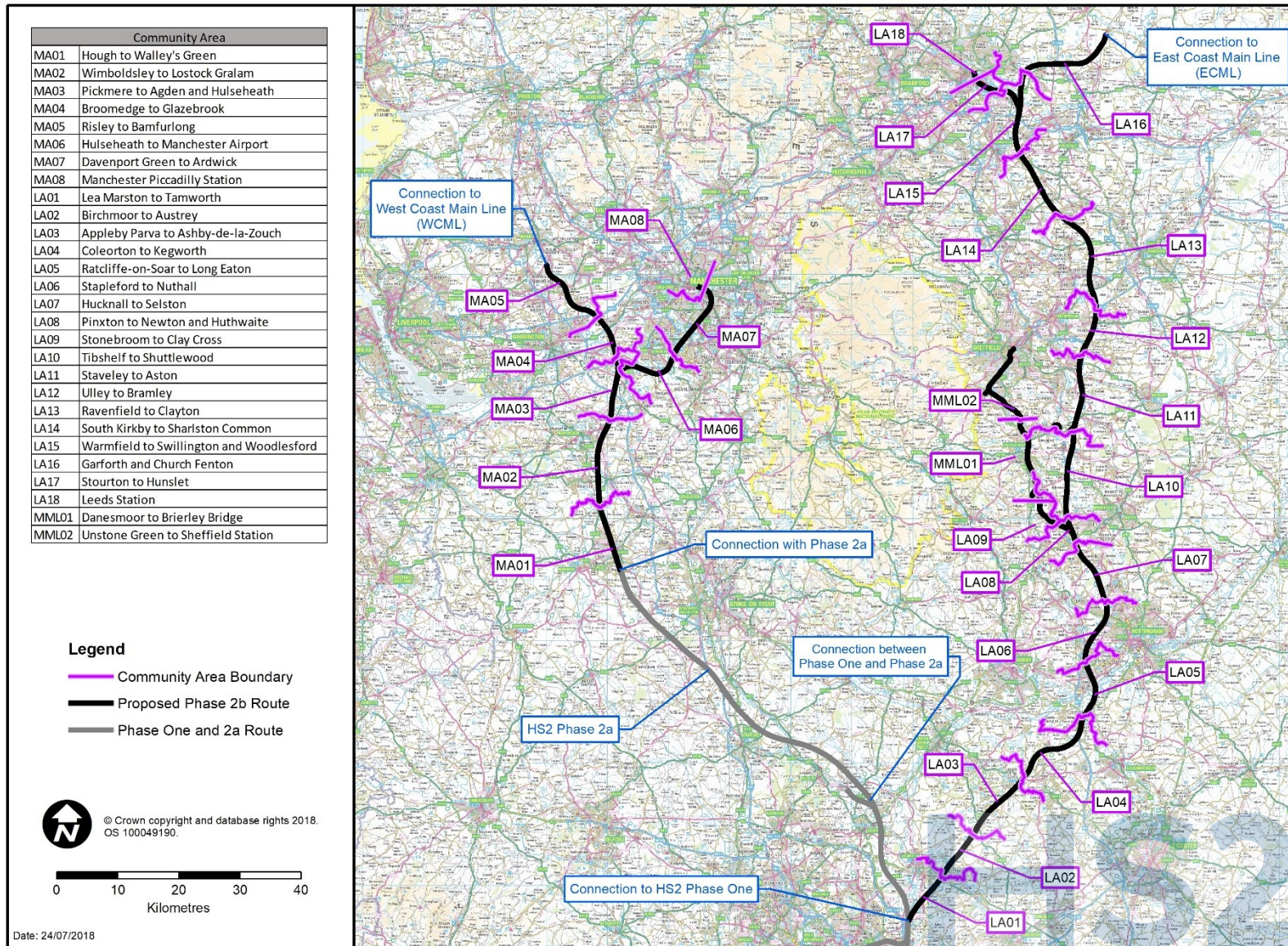
# 1 Introduction

## 1.1 Introduction to HS2

- 1.1.1 High Speed Two (HS2) is a new high speed railway proposed by the Government to connect major cities in Britain. Stations in London, Birmingham, Leeds, Manchester, East Midlands and South Yorkshire will be served by high speed trains running at speeds of up to 360 kilometres per hour (kph) (225 miles per hour (mph)).
- 1.1.2 HS2 will be built in phases. Phase One comprises the first section of the HS2 network of approximately 230km (143 miles) between London and the West Midlands that will commence operations in 2026. It was the subject of an Environmental Statement (ES) deposited with the High Speed Rail (London - West Midlands) Bill in November 2013. Subsequent ESs were deposited with Additional Provisions to that Bill in 2014 and 2015. The High Speed Rail (London - West Midlands) Bill received Royal Assent in February 2017 and pre-construction work on Phase One commenced in 2017.
- 1.1.3 Phase Two of HS2 will extend the route from Phase One in the West Midlands to the north-west to Manchester (approximately 80km (50 miles) with connections to the West Coast Main Line (WCML) at Crewe and Golborne, and to the north-east to Leeds with a connection to the Erewash Valley Line and Midland Main Line (MML) south-east of Chesterfield and the East Coast Main Line (ECML) approaching York (approximately 198 km (123 miles)), completing what is known as the 'Y network'.
- 1.1.4 Phase Two of HS2 is being taken forward in two stages, referred to as Phase 2a and Phase 2b. Phase 2a of HS2 includes the section of the route between the West Midlands and Crewe. The High Speed Rail (West Midlands - Crewe) Bill, together with an ES, was prepared for the Phase 2a proposals and deposited in Parliament in July 2017. A subsequent ES was deposited with Additional Provisions to that Bill in March 2018.
- 1.1.5 Phase 2b (the Proposed Scheme), the subject of this working draft ES, comprises the route from Crewe to Manchester (and connections into the WCML) (referred to as the 'western leg'), and from the West Midlands to Leeds (and connections into the Midland Main Line (MML and the ECML)) via the East Midlands and South Yorkshire (referred to as 'the eastern leg'). The connection to and electrification of an approximately 30km (19 miles) section of the existing MML would enable high speed trains to connect to Chesterfield and Sheffield. Construction of the Proposed Scheme would commence in 2023, with operation planned to start in 2033.
- 1.1.6 For environmental assessment and community engagement purposes, the Proposed Scheme has been divided into 28 community areas (CA). These are shown in Figure 2. This CA report relates to the Birchmoor to Austrey area (CA number LA02) which is located on the eastern leg of the Proposed Scheme.



Figure 2: The HS2 Phase 2b route and community areas



## 1.2 Purpose of this report

- 1.2.1 This working draft ES sets out the preliminary environmental information and the key features of a point in time design for the Proposed Scheme. It provides a description of the design of the Proposed Scheme, environmental baseline information, and the likely impacts (and where practicable, the significant effects) of the construction and operation of the Proposed Scheme on the environment within the Birchmoor to Austrey area. The report also describes the proposed mitigation measures that have been identified, at this stage, to avoid, reduce or manage the likely significant adverse effects of the Proposed Scheme on the environment within the area, along with proposed monitoring measures.
- 1.2.2 The design development and environmental assessment process is ongoing. Consultation on the working draft ES is being carried out to assist early engagement with those potentially affected by the Proposed Scheme and to help inform the design and assessment of the Proposed Scheme. Parliamentary Standing Orders do not require a working draft ES. Developing a working draft ES and consulting on it in advance of the formal ES means that consultees have the opportunity to comment on the Proposed Scheme earlier in the process.
- 1.2.3 As this is a working draft ES, where information is not available at this time, professional judgement and reasonable worst-case assumptions have been used to provide an indication of the likely impact to inform the consultation.
- 1.2.4 The likely significant environmental effects of the Proposed Scheme will be described in the formal ES to be deposited in accordance with the requirements of Parliamentary Standing Order 27A (SO27A)<sup>1,2</sup>. It is possible that the effects and mitigation described in the formal ES may differ from those presented in this working draft ES, due to the provisional nature of the environmental and design information that is currently available and as a result of consultation on the Proposed Scheme, as appropriate.
- 1.2.5 The working draft ES has been undertaken on the assumption that the policies adopted for Phase One and Phase 2a will also apply to Phase 2b. The assessment also assumes that any general mitigation measures required as a result of those policies are implemented appropriately in the delivery and operation of the proposed Scheme. Where policies are referred to in this working draft ES it is on this basis.

## 1.3 Structure of this report

- 1.3.1 This report is divided into the following sections:
- Section 1: an introduction to HS2 and the purpose and structure of this report;
  - Section 2: overview of the community area, description of the Proposed Scheme within the community area and its construction and operation, and a description of the local alternatives considered;

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<sup>1</sup> Standing Order 27A of the Standing Orders of the House of Commons relating to private business (environmental assessment), House of Commons  
<sup>2</sup> House of Lords (2005), *Standing Orders of the House of Lords - Private Business*, The Stationery Office



- Section 3: consultation and stakeholder engagement; and
- Sections 4 to 15: an assessment of the following environmental topics:
  - agriculture, forestry and soils (Section 4);
  - air quality (Section 5);
  - community (Section 6);
  - ecology and biodiversity (Section 7);
  - health (Section 8);
  - historic environment (Section 9);
  - land quality (Section 10);
  - landscape and visual (Section 11);
  - socio-economics (Section 12);
  - sound, noise and vibration (Section 13);
  - traffic and transport (Section 14); and
  - water resources and flood risk (Section 15).

1.3.2 Each environmental topic section (Section 4 to 15) comprises:

- an introduction to the topic;
- a description of the existing environmental baseline within the community area;
- a description of the impacts or likely significant environmental effects identified to date arising during construction and operation of the Proposed Scheme; and
- a description of any proposed mitigation and monitoring measures that have been identified to date to address any significant adverse effects.

1.3.3 Environmental effects have been assessed in accordance with the methodology set out in Volume 1 and the EIA Scope and Methodology Report (SMR)<sup>3</sup>.

1.3.4 The maps relevant to the Birchmoor to Austrey area are provided in a separate corresponding document entitled Volume 2: LA02 Map Book, which should be read in conjunction with this report.

1.3.5 The Proposed Scheme described in this report is that shown on the Map Series CT-05 (construction) and CT-06 (operation) (Volume 2: LA02 Map Book). There is some flexibility during detailed design to alter the horizontal and vertical alignments and other details within the limits shown on the plans and sections submitted to Parliament and as set out in the Bill, and this flexibility is included within the scope of

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<sup>3</sup> Supporting document: HS2 Phase 2b Environmental Impact Assessment Scope and Methodology Report

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the environmental assessment. Further explanation is provided in Volume 1, Section 1.

- 1.3.6 In addition to the environmental topics covered in Sections 4 to 15 of this report, electromagnetic interference is addressed in Volume 1 and climate change, major accidents and natural disasters, and waste and material resources are addressed in Volume 3 on a route-wide basis.

## 2 Overview of the area and description of the Proposed Scheme

### 2.1 Overview of the area

#### General

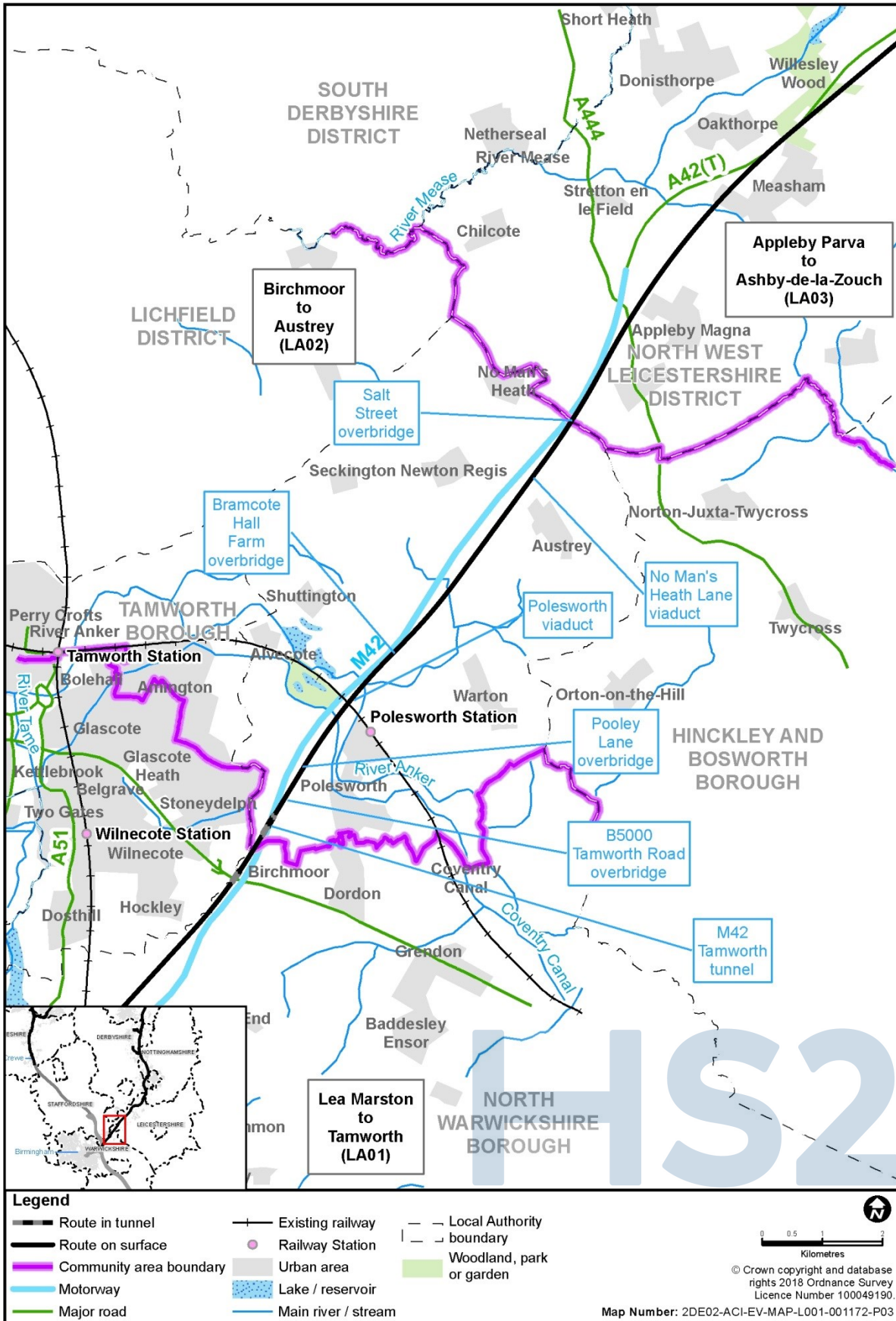
- 2.1.1 The Birchmoor to Austrey area covers an approximately 8.9km section of the Proposed Scheme passing through the parishes of Polesworth and Austrey, within the local authority areas of North Warwickshire Borough Council (NWBC) and Warwickshire County Council (WaCC).
- 2.1.2 The boundary between Dordon parish and Polesworth parish forms the southern boundary of this section. The boundary between Austrey and Appleby Magna parish forms the northern boundary of this section.
- 2.1.3 As shown in Figure 3, the Lea Marston to Tamworth area (LA01) lies to the south and the Appleby Parva to Ashby-de-la-Zouch area (LA03) lies to the north.

#### Settlement, land use and topography

- 2.1.4 The Birchmoor to Austrey area is predominantly rural in character, with agriculture being the main land use. This is interspersed with woodland, villages and a scattering of isolated dwellings, farmsteads and commercial land uses. The area is characterised by gently undulating lowland and settled river valley landscapes, with occasional floodplain pastures present at lower levels around the River Anker and Bramcote Brook. The M42 cuts through the rural landscape of the Birchmoor to Austrey area from south to north, providing a notable urban influence, with open views both to and from the M42.
- 2.1.5 The following settlements are within the Birchmoor to Austrey area: Stoneydelph and Wilncote within the district of Tamworth, Birchmoor, Polesworth, Austrey and Newton Regis.
- 2.1.6 In the southern end of the Birchmoor to Austrey area the land falls from a high point of approximately 105m above Ordnance Datum (AOD) to the west of Birchmoor to approximately 60m AOD in the River Anker valley north-west of Polesworth. Pooley Country Park lies to the south of the River Anker, west of Polesworth. The highest point within Pooley Country Park is approximately 100m AOD to the west of the M42. Alvecote Pools Site of Special Scientific Interest (SSSI) is partially located within the Country Park.
- 2.1.7 North of the River Anker is an area of agricultural land, the landscape is gently undulating with a low point of 65m AOD in the Bramcote Brook valley. North of Bramcote Brook the land steadily rises to peak at approximately 120m AOD at Salt Street.

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Figure 3: Community area context map



## Key transport infrastructure

- 2.1.8 The M42 passes through the Birchmoor to Austrey area in a south-west to north-east direction. The route of the Proposed Scheme would broadly follow the alignment of the M42 from Birchmoor to Austrey, crossing under the M42 north of junction 10 to the east of Tamworth. The B5000 Tamworth Road runs through the area in an east-west alignment, connecting Tamworth in the west with Polesworth in the east.
- 2.1.9 The Coventry Canal and West Coast Main Line (WCML) run through the Birchmoor to Austrey area in a south-east to north-west direction.
- 2.1.10 The Proposed Scheme would cross several public rights of way (PRoW) including local access roads, bridleways and public footpaths, which provide links between scattered dwellings and surrounding villages. In the Birchmoor to Austrey area this includes the Coventry Canal towpath which would be crossed by the route of the Proposed Scheme.

## Socio-economic profile

- 2.1.11 In the NWBC area, the construction sector accounts for the largest proportion of business (12%)<sup>4</sup>, with the professional, scientific and technical sector (12%) as the second largest followed by business administration and support services (10%) and transport and storage (8%).
- 2.1.12 According to the Annual Population Survey (2016)<sup>5</sup>, the employment rate<sup>6</sup> within the NWBC area was 83% (32,400 people), with unemployment at 3%<sup>7</sup>.
- 2.1.13 According to the Annual Population Survey (2016), 40% of NWBC residents aged 16-64 were qualified to National Vocational Qualification Level 4 (NVQ4) and above, while 6% of residents had no qualifications.

## Notable community facilities

- 2.1.14 The main concentrations of community facilities are located in the larger settlements of Tamworth and Polesworth in the southern part of the Birchmoor to Austrey area. The villages of Birchmoor, Austrey and Newton Regis, which are all in proximity to the route of the Proposed Scheme, provide fewer local services.
- 2.1.15 Birchmoor village is located north-east of junction 10 of the M42. The village has a limited number of community facilities including St. John's Church, a social club, a public house, an allotment area and Polesworth Recreation Ground.
- 2.1.16 Polesworth village is located north-east of Birchmoor, south of the WCML. The village has a number of community facilities including Polesworth Baptist Church, Polesworth Congregational Church and the Nethersole Church of England (C of E)

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<sup>4</sup> Office for National Statistics; UK Business count – Local Units 2016. Available online at: <https://www.nomisweb.co.uk>

<sup>5</sup> Nomis Official Labour Market Statistics; Annual Population Survey (2016). Available online at: <http://www.nomisweb.co.uk>

<sup>6</sup> The proportion of working age (16-64 year olds) residents that is in employment.

<sup>7</sup> Refers to people without a job who were available to start work in the two weeks following their interview and who had either looked for work in the four weeks prior to interview or were waiting to start a job they had already obtained. As the unemployed form a small percentage of the population, the APS unemployed estimates within local authorities are based on very small samples so for many areas would be unreliable. To overcome this ONS has developed a statistical model that provides better estimates of total unemployed for unitary authorities and local authority districts (unemployment estimates for counties are direct survey estimates), NOMIS.

Academy. Polesworth also has community centres, health and social care facilities, public houses, a social club and sports facilities.

- 2.1.17 The villages of Austrey and Newton Regis are located to the north of the Birchmoor to Austrey area, with Austrey to the east of the M42 and Newton Regis to the west of the M42. The village of Austrey has a number of community facilities including Austrey C of E Primary School, St. Nicholas Church, Austrey Baptist Church and a public house. The village of Newton Regis has a number of community facilities including St Mary the Virgin Church, Newton Regis C of E Primary School, a public house and village hall.

### Recreation, leisure and open space

- 2.1.18 The Birchmoor to Austrey area is predominately rural, with a mixture of farmland and some woodland.
- 2.1.19 Pooley Country Park is a key area of open space covering approximately 62.5ha, located north-west of Polesworth and bisected by the M42. Within the County Park, there are recreational facilities such as walking and cycling trails and a children's play area. The Polesworth (Abbey) Scout Group activity centre and Pooley Fields Heritage Centre are located within the park's south-eastern extents.
- 2.1.20 The Coventry Canal is used by pleasure craft for recreational use. A towpath follows the line of the canal along the east bank.
- 2.1.21 Austrey Playing Fields are located south-west of Austrey, approximately 250m south-east of the M42. Austrey Playing Fields comprise two sports pitches and a play area. Austrey allotments and Discover Outdoors Forestry School are located to the east of the playing fields. Newton Regis has a cricket club with associated playing field and tennis court facilities.

### Policy and planning context

#### *Planning framework*

- 2.1.22 Volume 1 provides an overview of the policy case for HS2. Relevant development plan documents and policies have been considered in relation to environmental topics, as part of considering the Proposed Scheme in the local context.
- 2.1.23 The following local policies have been considered and referred to where appropriate to the assessment:
- Warwickshire County Council Minerals Local Plan for Warwickshire Written Plan (1995), saved September 2007<sup>8</sup>;
  - Warwickshire County Council Waste Core Strategy Adopted Local Plan 2013-2028 (2013)<sup>9</sup>;

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<sup>8</sup> Warwickshire County Council (1995), *Minerals Local Plan for Warwickshire Written Plan*. Available online at: <https://www.warwickshire.gov.uk/mlp>  
<sup>9</sup> Warwickshire County Council (2013), *Waste Core Strategy Adopted Local Plan 2013-2028*. Available online at: <https://www.warwickshire.gov.uk/wdf>



- Warwickshire County Council (2011) *The Third Warwickshire Local Transport Plan 2011-2026*<sup>10</sup>;
- the adopted (saved) policies of the North Warwickshire Local Plan (2006)<sup>11</sup> and the Core Strategy Forming Part of the Local Plan (2014)<sup>12</sup>; and
- the Austrey Neighbourhood Plan 2014-2029 (2017)<sup>13</sup>.

2.1.24 Emerging policies are not considered as part of this assessment unless a development plan has been submitted to the Secretary of State for examination.

2.1.25 The North Warwickshire emerging New Local Plan<sup>14</sup> (November 2017) was submitted for examination on 27 March 2018.

### Committed development

2.1.26 Committed developments are defined as developments with planning permission and sites allocated for development, or safeguarded for minerals in adopted development plans, on or close to the land required for the Proposed Scheme. Allocations in the submission draft of the North Warwickshire New Local Plan have also been included as committed development. These will be listed in the formal ES.

2.1.27 Where it is likely that committed developments will have been completed by 2023, these will be identified as 'future baseline' schemes and taken into account in the formal ES.

2.1.28 Where there are committed developments that are considered likely to be constructed between 2023 and 2033, i.e. at the same time as the Proposed Scheme, they would be considered as receptors for the operation of HS2, but also potentially to give rise to cumulative impacts with the Proposed Scheme during construction. Any cumulative impacts and likely significant effects will be reported in the formal ES.

2.1.29 Planning applications yet to be determined at the time of the formal ES and sites that are proposed allocations in development plans that have yet to be adopted, on or close to the Proposed Scheme, are termed 'proposed developments'. These will not be included in the assessment in the formal ES.

### Ongoing design development

2.1.30 Design development continues on this section of route as further engineering and environmental baseline is collated, including from field surveys, and as part of ongoing consultation and stakeholder engagement. Any further changes resulting

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<sup>10</sup> Warwickshire County Council (2011), *Warwickshire Local Transport Plan 2011-2026*. Available online at: <https://apps.warwickshire.gov.uk/api/documents/WCCC-630-116>

<sup>11</sup> The North Warwickshire Local Plan was adopted in July 2006. All but Core Policies 4, 7 and 9 were saved under direction from the Secretary of State. The Core Strategy was adopted in October 2014 and replaces some of the saved policies of the Local Plan 2006. North Warwickshire Borough Council (2006) *The North Warwickshire Local Plan*. Available online at:

[http://northwarks.devplan.org.uk/document.aspx?document=24&display=contents&\\_sm\\_au=iVV17H7qrPWbtT2Q](http://northwarks.devplan.org.uk/document.aspx?document=24&display=contents&_sm_au=iVV17H7qrPWbtT2Q)

<sup>12</sup> North Warwickshire Borough Council (2014) *Core Strategy Forming part of the Local Plan for North Warwickshire*. Available online at: [https://www.northwarks.gov.uk/downloads/file/7246/cd62b\\_core\\_strategy\\_2014](https://www.northwarks.gov.uk/downloads/file/7246/cd62b_core_strategy_2014)

<sup>13</sup> Austrey Parish Council (2017) *Austrey Neighbourhood Plan 2014-2029*. Available online at:

[https://www.northwarks.gov.uk/downloads/file/6828/austrey\\_neighbourhood\\_plan\\_adopted\\_2017](https://www.northwarks.gov.uk/downloads/file/6828/austrey_neighbourhood_plan_adopted_2017)

<sup>14</sup> North Warwickshire Local Plan Draft Submission, (November 2017). North Warwickshire Borough Council. Available online at: [https://www.northwarks.gov.uk/info/20002/planning/1357/new\\_local\\_plan/1](https://www.northwarks.gov.uk/info/20002/planning/1357/new_local_plan/1)

from this will be reported in the formal ES. The main areas of design development being considered include:

- review of the proposed lengths and heights of viaducts and other river crossing structures and associated replacement floodplain storage areas;
- temporary and permanent utility diversions;
- refinement of the realignment of roads and PRow crossing the Proposed Scheme;
- access roads or tracks to land or property and crossings of the route for private means of access;
- refinement of drainage features required for rail and highways;
- refinement of maintenance access routes and access to balancing ponds;
- environmental features required to mitigate likely significant environmental effects;
- refinement of construction compound locations and site haul routes; and
- refinement of auto-transformer station and auto-transformer feeder station locations.

## 2.2 Description of the Proposed Scheme

2.2.1 The following section describes the main features of the Proposed Scheme in the Birchmoor to Austrey area, including the proposed environmental mitigation measures that have been identified to date. Further general information on typical permanent features is provided in Volume 1, Section 5. Similarly, a general description of the approach to mitigation is explained in Volume 1, Section 9. Some of the ecological mitigation described in this section has been provided on a precautionary basis. This is set out in Section 7, Ecology and biodiversity.

2.2.2 Land required for operation of the Proposed Scheme is described in this section and is shown on Volume 2: Map Series CT-06. Land also required for construction is described in Section 2.3 and shown on Volume 2: Map Series CT-05.

### Overview

2.2.3 The Proposed Scheme through the Birchmoor to Austrey area would be approximately 8.9km in length and lie within the NWBC and WaCC areas. The route of the Proposed Scheme would extend from west of Birchmoor village in the south and continue north towards Polesworth and on to Austrey.

2.2.4 This section of route of the Proposed Scheme is illustrated on maps CT-06-406b to CT-06-412a in the Volume 2: LA02 Map Book.

2.2.5 All dimensions in the sections below are approximate.



2.2.6 In the Birchmoor to Austrey area the route of the Proposed Scheme would be carried on the following features:

- viaducts for a total length of 1.1km (Polesworth and No Man's Heath Lane viaducts);
- cuttings for a total length of 3.2km (M<sub>42</sub> Stoneydelph, Hermitage Lane, Pooley Lane, Bramcote, New Covert, Newton Regis and Salt Street cuttings);
- embankments for a total length of 3.7km (Pooley Lane, River Anker, New Covert, Bramcote Brook, Austrey and Pimlico embankments);
- tunnels for a total length of 700m (M<sub>42</sub> Tamworth tunnel including portals<sup>15</sup>); and
- sections of the route running at ground level for a total length of 160m.

2.2.7 The Proposed Scheme is described in five separate sections below.

2.2.8 In general, features are described along the route of the Proposed Scheme from south to north and west to east as they cross the Proposed Scheme, as shown on Map Series CT-06 in the Volume 2: LA02 Map Book.

#### *M<sub>42</sub> Stoneydelph cutting to Pooley Lane cutting*

2.2.9 The route of the Proposed Scheme would continue from the Lea Marston to Tamworth area (LA01) and would run north-east towards Birchmoor within the M<sub>42</sub> Stoneydelph cutting. The route would continue north entering the M<sub>42</sub> Tamworth tunnel towards the B5000 Tamworth Road, before passing into the Hermitage Lane cutting, then running for 160m at ground level.

2.2.10 This section of the Proposed Scheme is illustrated in the Volume 2: LA02 Map Book, Maps CT-06-406b to CT-06-407b.

2.2.11 Key features of this approximately 1.6km section would include:

- a section of the M<sub>42</sub> Stoneydelph cutting, 94m in length in this area, and continuing from the Lea Marston to Tamworth area. The cutting would be up to 134m in width and between 13m and 18m below ground level in this section. The cutting would incorporate retaining walls on both sides at its northern extent, for a length of 150m. The retaining wall to the west would be up to 3m in height and the retaining wall to the east up to 7m in height (see Volume 2: Map CT-06-406b, C5 to F6);
- a pumping station for railway drainage, to the west of the route of the Proposed Scheme, discharging to a balancing pond located to the west of the route with access via Green Lane (Birchmoor). There would be an area of grassland habitat creation around the pumping station to provide replacement habitat (see Volume 2: Map CT-06-406b, E5 and F5);

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<sup>15</sup> Tunnel entrances and exits

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- an area of landscape mitigation planting to the south of Green Lane (Birchmoor), to the east and west of the route of the Proposed Scheme would help to integrate the Proposed Scheme into the surrounding landscape (see Volume 2: Map CT-06-406b, E5 to G7);
- M42 Tamworth tunnel south portal, 150m in length. The external width of the portal would be up to 18m and the external height up to 22m, of which 2m would be above ground level. A central dividing wall would separate the northbound and southbound tracks in the portal, continuing into the tunnel (see Volume 2: Map CT-06-406b, F6);
- M42 Tamworth tunnel, 400m in length and up to 20m below ground level. The external width of the tunnel would be 18m and the external height up to 12m. The tunnel would consist of a box structure that would cross under Green Lane (Birchmoor) and the M42 (see Volume 2: Map CT-06-406b, F6 to H6);
- an area of landscape mitigation planting to the east of the M42 to provide visual screening of views to and from the motorway (see Volume 2: Map CT-06-406b, G6 to I5 and CT-06-407b, A5);
- reinstatement of Green Lane M42 overbridge, 74m in length, 6m above ground level to carry Green Lane (Birchmoor) on its existing alignment over the M42 and the route of the Proposed Scheme in the M42 Tamworth tunnel. The reinstated Green Lane (Birchmoor) would be realigned up to 1m above its existing level over the M42 (see Volume 2: Map CT-06-406b, G5 to G6);
- M42 Tamworth tunnel north portal, 150m in length. The external width of the portal would be up to 18m and the external height of the sidewalls would be up to 31m, of which up to 2m would be above ground level. A central dividing wall would separate the northbound and southbound tracks (see Volume 2: Map CT-06-406b, H6 to I6);
- Hermitage Lane cutting, 790m in length, up to 23m in depth and up to 163m in width. There would be a rescue area at the south section of the cutting to the east of the route of the Proposed Scheme. The rescue area would be a hardstanding area to accommodate any emergency evacuation of passengers and provide vehicular access for emergency services (see Volume 2: Map CT-06-406b, I5 to J6 and Map CT-06-407b, A5 to D6);
- an area of landscape mitigation planting to the west of the M42 which would provide visual screening of views to and from the motorway and help integrate the Proposed Scheme into the surrounding landscape (see Volume 2: Map CT-06-406b, I5 to J5 and CT-06-407b, A5 to D4);
- an area of landscape mitigation planting and grassland habitat creation to the west of the route of the Proposed Scheme which would help integrate the Proposed Scheme into the surrounding landscape and provide replacement habitat (see Volume 2: Map CT-06-406b, I5 to J5 and CT-06-407b, A5 to D5);

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- a balancing pond for highway drainage, to the west of the route of the Proposed Scheme with access from the north via the B5000 Tamworth Road (see Volume 2: Map CT-06-406b, J4 and CT-06-407b, B4);
- diversion of Hermitage Lane, 530m in length and 200m to the east of its existing alignment, to join the realigned B5000 Tamworth Road. There would be landscape mitigation planting to the west and to the east of the Hermitage Lane diversion and landscape earthworks to the east, which would help to integrate the Proposed Scheme into the surrounding landscape (see Volume 2: Map CT-06-406b I7 to J7 and CT-06-407b, A7 to D6);
- an area of woodland habitat creation to the north of the B5000 Tamworth Road to provide replacement habitat (see Volume 2: Map CT-06-407b, D5 to D7);
- realignment of the B5000 Tamworth Road, 30m to the south of its existing alignment on an embankment, 610m in length and up to 8m in height. The realigned road would cross the route of the Proposed Scheme on the B5000 Tamworth Road overbridge, up to 4m above ground level and up to 9m above track level. The existing junction with Hermitage Lane would be closed and realigned 200m to the east to meet the diverted Hermitage Lane (see Volume 2: Map CT-06-407b, D5 to D6);
- closure of Warwickshire Footpath AE17 to the east of the route of the Proposed Scheme. Users would be diverted along Hermitage Lane, the realigned B5000 Tamworth Road and the B5000 Tamworth Road overbridge (see Volume 2: Map CT-06-407b, C5 to D6); B5000 Tamworth Road culvert south, 65m west of the route of the Proposed Scheme for surface water drainage under the B5000 Tamworth Road (see Volume 2: Map CT-06-407b, D5);
- an area of landscape mitigation planting to the east of the M42 to provide visual screening of views to and from the motorway (see Volume 2: Map CT-06-4070b, D4 to J4 and CT-06-408, B4);
- Birchmoor express feeder auto-transformer station, to the west of the route of the Proposed Scheme, 30m north of the B5000 Tamworth Road. Access would be provided via an access road from the B5000 Tamworth Road to the north. There would be an area of woodland habitat creation around the feeder station to provide replacement habitat (see Volume 2: Map CT-06-407b, D5 to E5);
- B5000 Tamworth Road culvert north, 100m north-west of the B5000 Tamworth Road overbridge, for surface water drainage under an unnamed road (see Volume 2: Map CT-06-407b, E5);
- Birchmoor culvert, 205m north of the B5000 Tamworth Road for surface water drainage under the route of the Proposed Scheme (see Volume 2: Map CT-06-407b, E5 to E6);

- a noise bund, 180m in length and up to 2m in height, to the east of the route of the Proposed Scheme. The noise bund would extend from the B5000 Tamworth Road overbridge to Pooley Lane cutting, to provide acoustic screening for properties at Polesworth and help to integrate the Proposed Scheme into the surrounding landscape (see Volume 2: Map CT-06-407b, D5 to E6);
- a pumping station for highway drainage, to the east of the route of the Proposed Scheme, discharging to Coventry Canal with access from the east via the B5000 Tamworth Road (see Volume 2: Map CT-06-407b, D7);
- a balancing pond for railway drainage, to the east of the route of the Proposed Scheme, directly north of the B5000 Tamworth Road, with access from the east via the B5000 Tamworth Road (see Volume 2: Map CT-06-407b, E6 to E7); and
- a balancing pond for highway drainage, to the east of the Proposed Scheme, directly north of the B5000 Tamworth Road at the junction with Hermitage Close. Access to the balancing pond would be from the south, via the B5000 Tamworth Road (see Volume 2: Map CT-06-407b, E7).

2.2.12 There would also be maintenance access routes and hedgerow planting throughout this section. There would also be utilities works within this section, which may include works to low voltage overhead or underground lines, gas pipes, sewers and telecommunication cables.

2.2.13 Construction of this section would be managed from Stoneydelph satellite compound, M42 Tamworth tunnel satellite compound, M42 temporary realignment satellite compound and Polesworth main compound, which are described in Section 2.3, and shown on map CT-05-406b and map CT-05-407b in the Volume 2: LA02 Map Book.

### *Pooley Lane cutting to Polesworth viaduct*

2.2.14 The route of the Proposed Scheme would continue north-east into Pooley Lane cutting, towards Pooley Country Park Heritage Centre where the Proposed Scheme would emerge on Pooley Lane embankment.

2.2.15 This section of Proposed Scheme is illustrated in the Volume 2: LA02 Map Book, Map Series CT-06-407b to CT-06-408.

2.2.16 Key features of this approximately 958m section would include:

- Pooley Lane cutting, 760m in length, up to 8m in depth and up to 82m in width. There would be landscape mitigation planting to the east of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape. An area of woodland habitat creation to the west of the route would provide replacement habitat (see Volume 2: Map CT-06-407b, E5 to I6);
- realignment of both Pooley Lane and the adjacent Warwickshire Footpath AE16 225m to the south-west of their existing alignment on an embankment for 475m in length and up to 5m above ground level. The realigned Pooley

Lane and Warwickshire Footpath AE16 would cross the route of the Proposed Scheme on Pooley Lane overbridge (see Volume 2: Map CT-06-407b, G7 to I5);

- Pooley Lane overbridge, 60m in length, up to 5m above ground level and up to 9m above track level, to carry the realigned Pooley Lane and Warwickshire Footpath AE16 over the route of the Proposed Scheme (see Volume 2: Map CT-06-407b, H5 to H6);
- Pooley Lane culvert, located 35m east of the route of the Proposed Scheme and would provide surface water drainage under the realigned Pooley Lane (see Volume 2: Map CT-06-407b, G6 to H6);
- a balancing pond for highway drainage, east of the route of the Proposed Scheme, with access from the south via Pooley Lane (see Volume 2: Map CT-06-407b, H6);
- Pooley Lane scout hut access road, 440m in length, on an embankment up to 4m high. The access road would be located east of the route of the Proposed Scheme to provide access to Polesworth (Abbey) Scout Group activity centre (see Volume 2: Map CT-06-407b, H6 to J6 and CT-06-408, A6 to B6);
- Pooley Lane scout hut access culvert, located 75m east of the route of the Proposed Scheme and would provide surface water drainage under the Pooley Lane scout hut access road (see Volume 2: Map CT-06-407b, H6);
- Pooley Lane embankment, 198m in length and up to 5.5m in height. On the east side of the route of the Proposed Scheme there would be a noise fence barrier, 2m in height, running along the top of the embankment. The barrier would provide acoustic screening for residents of Polesworth (see Volume 2: Map CT-06-407b, I5 to J6 and Map CT-06-408, A5 to B6); and
- a balancing pond for railway drainage, west of the route of the Proposed Scheme with access from the west via Pooley Lane (see Volume 2: Map CT-06-407b, I5 and CT-06-408, A5).

2.2.17 There would also be maintenance access routes and hedgerow planting throughout this section. There would also be utilities works within this section, which may include works to low voltage overhead or underground lines, gas pipes, sewers and telecommunication cables.

2.2.18 Construction of this section would be managed from the Polesworth main compound, which is described in Section 2.3, and shown on map CT-05-407b in the Volume 2: LA02 Map Book.

### *Polesworth viaduct to Bramcote cutting*

2.2.19 The route of the Proposed Scheme would continue north-east on Polesworth viaduct crossing over the Coventry Canal, Pooley Country Park, the WCML, the River Anker and Linden Lane. North of Linden Lane, the Proposed Scheme would continue north-east on the River Anker embankment.

- 2.2.20 This section of Proposed Scheme is illustrated in the Volume 2: Map CT-06-407b and CT-06-408.
- 2.2.21 Key features of this approximately 1.4km section would include:
- Polesworth viaduct, 983m in length and up to 21m in height. On the east side of the route of the Proposed Scheme there would be a noise fence barrier, 2m in height, running along a section of the viaduct to the West Coast Main Line. The barrier would provide acoustic screening for residents of Polesworth (see Volume 2: Map CT-407b, J6 and CT-408, B6 to G6);
  - an area of grassland habitat creation to the east and west of the route of the Proposed Scheme and an area of woodland habitat creation to the west of the route, to provide replacement habitat (see Volume 2: Map CT-06-407b, J4 and CT-06-408, A8 to G5);
  - four ecological mitigation ponds, two to the east and two to the west of the route of the Proposed Scheme to provide replacement habitat for ponds lost as a result of the Proposed Scheme, with surrounding grassland habitat (see Volume 2: Map CT-407b, J7 to J8 and CT-06-408, B7 to E5);
  - replacement floodplain storage area, which would be located to the east of the route of the Proposed Scheme in the River Anker valley, adjacent to the Polesworth viaduct (see Volume 2: Map CT-06-408, E6 to F7);
  - an area of landscape mitigation planting to the west of the M42 to provide visual screening for residential receptors (see Volume 2: Map CT-06-408, G4 to G5); and
  - River Anker embankment, 388m in length and up to 13m in height with associated landscape earthworks to the east of the route of the Proposed Scheme and landscape mitigation planting to the east and west of the route to help integrate the Proposed Scheme into the surrounding landscape (see Volume 2: Map CT-06-408, G5 to I6 and CT-06-409, A6).
- 2.2.22 There would also be maintenance access routes and hedgerow planting throughout this section. There would also be utilities works within this section, which may include works to low voltage overhead or underground lines, gas pipes, sewers and telecommunication cables.
- 2.2.23 Construction of this section would be managed from the Polesworth viaduct satellite compound and Austrey main compound, which are described in Section 2.3, and shown on map CT-05-408 and map CT-05-411 in the Volume 2: LA02 Map Book.
- Bramcote cutting to Austrey embankment*
- 2.2.24 The route of the Proposed Scheme would continue north-east into Bramcote cutting before emerging on the New Covert embankment.
- 2.2.25 This section of Proposed Scheme is illustrated in the Volume 2: Map CT-06-408 to CT-06-410.

2.2.26 Key features of this approximately 3.1km section would include:

- Bramcote cutting, 430m in length, up to 9m in depth and up to 63m in width. There would be landscape mitigation planting to the west and east of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape. Raised landscape earthworks to the east of the route would provide visual screening (see Volume 2: Map CT-06-408, I6 to J6 and Map CT-06-409, A6 to C6);
- Bramcote Hall Farm overbridge, 114m in length, up to 5m above ground level, up to 11m above track level and approximately 9m above the M42. The overbridge would carry the realigned Warwickshire Bridleway AE3 and farm accommodation access track over the route of the Proposed Scheme and the M42 (see Volume 2: Map CT-06-408, J5 to J6 and CT-06-409, B5 to B6);
- realignment of Warwickshire Bridleway AE3 approximately 100m to the south-east of its current alignment, crossing the route of the Proposed Scheme on the Bramcote Hall Farm overbridge (see Volume 2: Map CT-06-408, J5 to J7 and CT-06-409, B5 to C8);
- New Covert embankment, 150m in length and up to 2m above ground level. There would be landscape mitigation planting the west of the route of the Proposed Scheme and adjacent to the M42 to help integrate the Proposed Scheme into the surrounding landscape (see Volume 2: Map CT-06-409, C6 to E5);
- New Covert culvert, located at New Covert embankment which would be a drop inlet culvert<sup>16</sup> for surface water drainage (see Volume 2: Map CT-06-409, D6);
- New Covert culvert east, located 250m east of the route of the Proposed Scheme, which would provide surface water drainage under Warwickshire Footpath AE2 (see Volume 2: Map CT-06-409, C8);
- New Covert cutting, 180m in length, up to 2m in depth and up to 30m in width. There would be landscape earthworks to the east of the route of the Proposed Scheme to provide visual screening for Bramcote Hall Farm and users of the surrounding landscape (see Volume 2: Map CT-06-409, D6 to E6);
- a balancing pond for railway drainage, east of the route of the Proposed Scheme, with access from the south via Bramcote Hall Farm track (see Volume 2: Map CT-06-409, E7);
- Bramcote Brook embankment, 1.6km in length and up to 9m in height. Associated landscape earthworks and landscape mitigation planting to the east and west of the route of the Proposed Scheme would help integrate the

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<sup>16</sup> A drop inlet culvert comprises a circular pipe or rectangular box culvert, usually with an inlet weir and open stepped 'cascade' on the upstream side to dissipate energy. Drop inlet culverts are used when a watercourse (or dry valley) crosses the route or road in cutting or close to existing ground level.

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Proposed Scheme into the surrounding landscape (see Volume 2: Map CT-06-409, E6 to J6 and Map CT-06-410, A6 to E7);

- replacement floodplain storage areas to the east and west of the route of the Proposed Scheme in the Bramcote Brook valley (see Volume 2: Map CT-06-409, F9 to G9 and H4 to I5 and Map CT-06-410, A4 to A5);
- Bramcote Brook culvert, 360m north-east of Bramcote Hall Farm Overbridge for the realignment of Bramcote Brook (a tributary of the River Anker). The watercourse would be realigned for 250m and would cross under the route of the Proposed Scheme 120m north of its existing alignment, (see Volume 2: Map CT-06-409, I6);
- Bramcote Brook PRoW culvert west, 150m west of the route of the Proposed Scheme, for the diversion of a tributary of Bramcote Brook under Warwickshire Footpath AE4 (See Volume 2: Map CT-06-409, J5 and CT-06-410, B5);
- Bramcote Brook PRoW culvert east, 170m east of the route of the Proposed Scheme, for the diversion of a tributary of Bramcote Brook under Warwickshire Footpath AE4 (See Volume 2: Map CT-06-409, J7 and CT-06-410, A7);
- Warwickshire Footpath AE4 underbridge, 30m in length and 5m in width to carry the footpath under the route of the Proposed Scheme in a subway structure through Bramcote Brook embankment. Warwickshire Footpath AE4 underbridge would have a clearance height of up to 5m to provide access for farm vehicles (see Volume 2: Map CT-06-409, J6 and CT-06-410, B6);
- a balancing pond for railway drainage, west of the route of the Proposed Scheme, with access from the south via an unnamed track off Warton Lane (see Volume 2: Map CT-06-410, D5 to E6);
- Newton Regis cutting, 760m in length, up to 2m in depth and up to 30m in width. On the east side of the route of the Proposed Scheme there would be a noise fence barrier, 3m in height, running along the top of the cutting. The barrier would provide acoustic screening for residents of Austrey (see Volume 2: Map CT-06-410, E6 to H6);
- an area of landscape mitigation planting to the east and west of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape (see Volume 2: Map CT-06-410, E6 to G6); and
- Austrey auto-transformer station, to the west of the route of the Proposed Scheme, 180m south-west of Newton Lane. Access would be provided via an unnamed access road from Newton Lane from the north (see Volume 2: Map CT-06-410, G5 to H6).

2.2.27 There would also be maintenance access routes and hedgerow planting throughout this section. There would be utilities works within this section, which may include



works to low voltage overhead or underground lines, gas pipes, sewers and telecommunication cables.

- 2.2.28 Construction of this section would be managed from the Bramcote Hall Farm overbridge satellite compound, Bramcote Brook satellite compound and Austrey main compound, which are described in Section 2.3, and shown on map CT-05-409, map CT-05-410 and map CT-05-411 in the Volume 2: LA02 Map Book.

### *Austrey embankment to Salt Street overbridge*

- 2.2.29 The route of the Proposed Scheme would continue north-east towards Austrey on Austrey embankment and continuing over No Man's Heath Lane on a short section of viaduct. The route would continue north-east on Pimlico embankment before entering into Salt Street cutting and continuing to the end of the Birchmoor to Austrey area.
- 2.2.30 This section of the Proposed Scheme is illustrated in the Volume 2: LA02 Map Book, Map Series CT-06-410 to CT-06-412a.
- 2.2.31 Key features of this approximately 1.9km section would include:
- Austrey embankment, 552m in length and up to 8m in height at its northern extent. On the east side of the route of the Proposed Scheme there would be a noise fence barrier, 3m in height, running along the top of the embankment. The barrier would provide acoustics screening for residents of Austrey (CT-06-410, H6 to J6 and Map CT-06-411, A6 to C6);
  - an area of landscape earthworks and landscape mitigation planting located on both sides of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape. (see Volume 2: Map CT-06-410, H6 to J6 and Map CT-06-411, A6 to C6);
  - Newton Lane culvert south, directly east of the M42, to provide surface water drainage under Newton Lane (see Volume 2: Map CT-06-410, I4 and CT-06-411, A4);
  - diversion of Newton Lane, 600m in length, which would run between and parallel to the M42 and the route of the Proposed Scheme, to join the realigned No Man's Heath Lane. The existing Newton Lane would be closed where it would cross the route of the Proposed Scheme with turning heads provided either side of the route. There would be landscape mitigation planting to the east of the diverted Newton Lane and east of the M42 which would help integrate the Proposed Scheme into the surrounding landscape (see Volume 2: Map CT-06-410, I4 to J5 and CT-06-411, A4 to D5);
  - an area of grassland habitat creation to the east and west side of the diverted Newton Lane to provide replacement habitat (see Volume 2: Map CT-06-410, H5 to J5 and CT-06-411, A4 to D5);
  - a balancing pond for highway drainage, to the west of the route of the Proposed Scheme with access from the south via Newton Lane (see Volume 2: Map CT-06-410, I5 to I6 and CT-06-411, A5 to A6);

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- realignment of Warwickshire Footpath T140, 450m north of its existing alignment, crossing under the route of the Proposed Scheme on No Man's Heath Lane (see Volume 2: Map CT-06-410, I4 to J5 and CT-06-411, A4 to C8);
- Austrey culvert, 150m north of Newton Lane to provide railway drainage under Austrey embankment (see Volume 2: Map CT-06-410, I6 and CT-06-411, A6);
- Newton Lane culvert north, 180m north-east of Newton Lane, to provide surface water drainage under the diverted Newton Lane (see Volume 2: Map CT-06-410, J5 and Ct-06-411, B5);
- a balancing pond for railway drainage, to the west of the route of the Proposed Scheme, with access from the west via the diverted Newton Lane (see Volume 2: Map CT-06-411, C5 to C6);
- No Man's Heath Lane culvert east, 285m south-east of the Proposed Scheme to provide surface water drainage under No Man's Heath Lane (see Volume 2: Map CT-06-411, B8 to C8);
- realignment of No Man's Heath Lane, 450m in length, 45m south of its existing alignment, running in a cutting up to 3m in depth (see Volume 2: Map CT-06-411, B8 to D5);
- No Man's Heath Lane viaduct, 92m in length and up to 8m in height which would enable the realigned No Man's Heath Lane to pass underneath the route of the Proposed Scheme. On the east side of the route of the Proposed Scheme there would be a noise fence barrier, 2m in height, running along the top of the viaduct. The barrier would provide acoustics screening for residents of Austrey (see Volume 2: Map CT-06-411, C6 to D6);
- No Man's Heath Lane culvert west, 125m west of the Proposed Scheme and would provide surface water drainage under the realigned No Man's Heath Lane (see Volume 2: Map CT-06-411, D4);
- Pimlico embankment, 809m in length and up to 9m in height at its southern extent. On the east side of the route of the Proposed Scheme there would be a noise fence barrier, 2m in height, running along the top of a section of the embankment adjacent to No Man's Heath Lane. The barrier would provide acoustics screening for residents of Austrey (see Volume 2: Map CT-06-411, D6 to G6);
- an area of landscape earthworks to the east side of the route of the Proposed Scheme; and landscape mitigation planting on both sides of the route of the Proposed Scheme to help integrate the Proposed Scheme into the surrounding landscape (see Volume 2: Map CT-06-411, D6 to G6);
- an area of grassland habitat creation to the west of the Proposed Scheme to provide replacement habitat (Map CT-06-411, D5 to H6);
- two balancing ponds, for railway drainage, to the west of the route of the Proposed Scheme, with access from the south via No Man's Heath Lane (see Volume 2: Map CT-06-411, D5 and G5 to G6);

- a section of Salt Street cutting, 740m in length, of which 400m would be located in the Birchmoor to Austrey area and 340m in the Appleby Parva to Ashby-de-la-Zouch area (LA03). The cutting in this area would be up to 16m in depth and up to 112m in width. There would be landscape mitigation planting to the west and east of the route of the Proposed Scheme, which would help integrate the Proposed Scheme into the surrounding landscape (see Volume 2: Map CT-06-411, G6 to J6 and Map CT-06-412a, A5 to C6); and
- realignment of Salt Street and Leicestershire Byway Q4a/3 15m north of their existing alignment, on an embankment 87m in length and up to 12m in height. The realigned road and byway would cross the route of the Proposed Scheme on Salt Street overbridge, which would be 25m in length and up to 15m above track level and 2m above ground level which would connect to the existing overbridge to the west side of the route (see Volume 2: Map CT-06-411, J5 to J7 and Map CT-06-412a, B5 to B7).

- 2.2.32 There would also be maintenance access routes and hedgerow planting throughout this section. There would also be utilities works within this section, which may include works to low voltage overhead or underground lines, gas pipes, sewers and telecommunication cables.
- 2.2.33 Construction of this section would be managed from the Austrey main compound and Salt Street satellite compound, which are described in Section 2.3, and shown on map CT-05-411 and map CT-05-412a in the Volume 2: LA02 Map Book.

### Demolitions

- 2.2.34 As set out in Volume 1, as the design develops, it is likely that not all the properties reported within the assessment would need to be demolished, for example where not all of the land is required for permanent works.
- 2.2.35 At this stage of the design development, it is anticipated that demolition of 18 existing residential properties, 12 commercial/business properties (including farm outbuildings) and three other structures would be required to construct the permanent features in the Birchmoor to Austrey area. These could be needed for construction of the permanent features or, in some cases, to enable the construction works for the Proposed Scheme. Demolitions would be managed from the same construction compounds as the permanent features with which they are associated. The identified demolitions are listed in Section 2.3 under the relevant construction compounds.

## 2.3 Construction of the Proposed Scheme

- 2.3.1 This section sets out the key construction activities that are envisaged to build the Proposed Scheme in the Birchmoor to Austrey area. The construction arrangements described in this section provide the basis for the assessment presented in this working draft ES.
- 2.3.2 Land used only for construction purposes would be restored as agreed with the owner of the land and the relevant planning authority once the construction works in that area are complete.

- 2.3.3 Land would be required permanently for the key features of the Proposed Scheme described in Section 2.2.
- 2.3.4 During the construction phase, public roads and PRow routes would remain open for public use wherever reasonably practicable. Where such routes would cross the Proposed Scheme and require diversion, the alternative road or PRow crossing the Proposed Scheme would be constructed prior to any closure of existing roads or PRow wherever reasonably practicable. Where they would cross the Proposed Scheme in proximity to their existing alignment, a temporary alternative alignment may be required. In some instances, diverted or realigned roads or PRow may need to pass through areas required for construction of the Proposed Scheme. Routes through these areas would be provided where it is safe and reasonably practicable to do so.
- 2.3.5 Volume 1, Section 5 and Section 6 provide details of the permanent features of the Proposed Scheme and typical construction techniques. For the purposes of the environmental assessment, standard construction techniques as provided in Volume 1, Section 6 have been assumed.

### Code of Construction Practice

- 2.3.6 All contractors will be required to comply with a Code of Construction Practice (CoCP). In addition, Local Environmental Management Plans (LEMPs) will be produced for each local authority area. The CoCP and LEMPs will be the means of controlling the construction works associated with the Proposed Scheme, and set out monitoring requirements, with the objective of ensuring that the effects of the works on people and the natural environment are reduced insofar as reasonably practicable. The CoCP will contain generic control measures and standards to be implemented throughout the construction process. The LEMPs will set out how the project will adapt and deliver the required environmental and community protection measures within each area through the implementation of specific measures required to control dust and other emissions from activities in the area.
- 2.3.7 In addition, HS2 Ltd has produced a Community Engagement Framework<sup>17</sup> which sets out how HS2 Ltd and its contractors, as well as their sub-contractors, would undertake community engagement during the construction of the HS2 project. The framework is being implemented on Phase One of HS2 and is applicable to all phases of HS2.
- 2.3.8 The objectives of the framework include:
- to set out how HS2 Ltd and its contractors would undertake community engagement during the construction of the project;
  - to provide clarity and reassurance to HS2 Ltd's stakeholders about how community engagement activity would be managed; and

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<sup>17</sup> HS2 Ltd (2017). Community Engagement Framework. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/625971/hs2\\_community\\_engagement\\_framework.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/625971/hs2_community_engagement_framework.pdf)

- to help HS2 Ltd be a good neighbour to local communities, including by providing accurate and timely information about construction works and offering opportunities to influence them, where appropriate.

2.3.9 A draft CoCP has been prepared and is published alongside this document. It will remain a draft document through the Parliamentary process and will be finalised by Royal Assent. The CoCP sets out measures to be implemented by the appointed construction contractor.

### Overview of the construction process

2.3.10 Building and preparing the Proposed Scheme for operation would comprise the following general stages:

- advance works including: site investigations further to those already undertaken; preliminary mitigation works; preliminary enabling works;
- civil engineering works including: establishment of construction compounds; haul routes, site preparation and enabling works; main earthworks and structure works; tunnelling; site restoration; removal of construction compounds where the compound is not required for railway installation works; and associated utility diversions;
- railway installation works including: establishment of construction compounds; infrastructure installation; connections to utilities; changes to the existing rail network; and removal of construction compounds;
- site finalisation works; and
- systems testing and commissioning.

2.3.11 General information about the construction process is set out in more detail in Volume 1, Section 6, and the draft CoCP including:

- the approach to environmental management during construction and the role of the CoCP (Section 2);
- working hours (Section 5);
- management of construction traffic (Section 14); and
- handling of construction materials (Section 15).

### Advance works

2.3.12 General information about advance works can be found in Volume 1, Section 6. Advance works will be required before the main construction works commence and typically include:

- further detailed site investigations and surveys for proposed construction compounds;
- further detailed environmental surveys;

- advance mitigation works including, where appropriate, contamination remediation, habitat creation and translocation, landscape planting and built heritage survey and investigation;
- advance site access works;
- site establishment with temporary fence construction; along with soil stripping and vegetation removal; and
- utility diversions and new utility connections for facilities associated with the Proposed Scheme.

## Engineering works

### *Introduction*

2.3.13 Construction of the Proposed Scheme would require the following broad types of engineering works along the entire length of the route of the Proposed Scheme, and within land adjacent to the route:

- civil engineering works, including earthworks such as embankments and cuttings and erection of bridges and viaducts; and
- works to install, test and commission railway systems, including track, overhead line equipment, communications and signalling equipment and traction power supply.

2.3.14 The construction of track and railway systems works in open areas would include the installation of track form, rails, infill material, minor drainage works, and installation of electrification, signalling and communication equipment.

2.3.15 The construction of the Proposed Scheme would be divided into sections, each of which would be managed from compounds. The compounds would act as the main interface between the construction work sites and the public highway, as well as performing other functions as described below. Compounds would either be main compounds or satellite compounds. Satellite compounds are generally smaller than main compounds. Compounds would either be used for civil engineering works, for railway installation works, or for both.

### General overview of construction compounds

2.3.16 Main compounds would be used for core project management staff (i.e. engineering, planning and construction delivery) and commercial and administrative staff. These teams would directly manage some works and coordinate the works at the satellite compounds. In general, a main compound would include:

- space for the storage of bulk materials;
- space for the receipt, storage and loading and unloading of excavated material;
- an area for the fabrication of temporary works equipment and finished goods;
- fuel storage;

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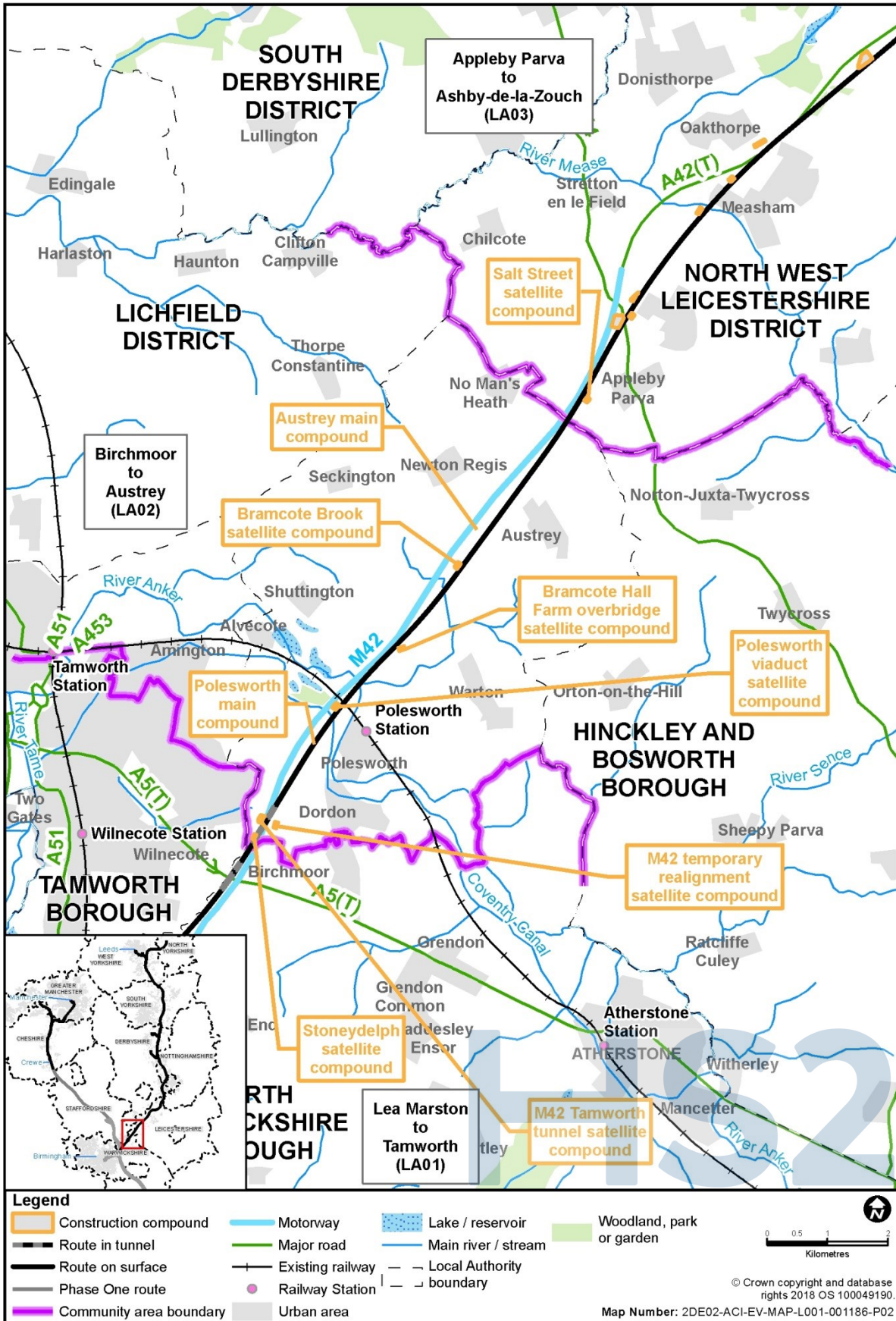
- plant and equipment storage including plant maintenance facilities; and
- office space for management staff, limited car parking for staff and site operatives, and welfare facilities.

- 2.3.17 Satellite compounds would be used as the base to manage specific works along a section of the route of the Proposed Scheme. Depending on the nature and extent of the works to be managed, these satellite compounds could include office accommodation for staff, local storage for plant and materials, car parking for staff and site operatives, and welfare facilities.
- 2.3.18 Two main civil engineering compounds, the Polesworth main compound and the Austrey main compound, would be located in the Birchmoor to Austrey area. Polesworth main compound would manage four civil engineering satellite compounds and the Austrey main compound would manage two civil engineering compounds in the Birchmoor to Austrey area. Polesworth main compound and Austrey main compound will continue to be used for railway systems works following completion of civils construction phase.
- 2.3.19 All satellite compounds would be managed from the Polesworth main compound and Austrey main compound during the civil engineering works phase.
- 2.3.20 Six civil engineering satellite compounds would be located in the Birchmoor to Austrey area, two of which would continue to be used as railway installation satellite compounds following the completion of civil engineering works at those compounds.
- 2.3.21 On completion of the civil engineering works, two engineering main compounds and two of the civil engineering satellite compounds would remain and continue to be used as railway installation satellite compounds. All railway installation satellite compounds in the Birchmoor to Austrey area would be managed from the Junction 13 main compound located in the Appleby Parva to Ashby-de-la-Zouch area (LA03).
- 2.3.22 One satellite compound, Salt Street satellite compound, located in the Appleby Parva to Ashby-de-la-Zouch area would manage civil engineering works within the Birchmoor to Austrey area (see Volume 2: Community area LA03, Appleby Parva to Ashby-de-la-Zouch). The location of construction compounds in the Birchmoor to Austrey area is shown on Map Series CT-05 (in the Volume 2: LA02 Map Book) show in detail the locations of the construction compounds described below.



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Figure 4: Location of construction compounds which would manage construction works in the Birchmoor to Austrey area





- 2.3.23 Figure 5 shows the management relationship for civil engineering works compounds and Figure 6 for the railway installation works. Details of the works associated with individual compounds are provided in subsequent sections of this report.
- 2.3.24 Soil stripped as part of the works, prior to it being used when the land is reinstated, would be stored for the duration of construction. The location of topsoil and subsoil storage areas would generally be adjacent to compounds and areas of construction activity. These areas are referred to as material stockpiles and those adjacent to compounds are shown on maps CT-05-406b to CT-05-412a, in the Volume 2: LA02 Map Book.
- 2.3.25 Further information on the function of compounds is provided in Section 6 of Volume 1 and Section 5 of the draft CoCP. This includes general provisions for the operation of compounds, such as security fencing, lighting, utilities supply, site drainage and codes of worker behaviour.

### **Construction traffic routes, site haul routes and transfer nodes**

- 2.3.26 The movement of construction vehicles, whether to carry materials, plant, other equipment and workforce, or moving empty, would take place within the construction compounds, on public roads and between the compounds and working areas. Where reasonably practicable, movements between the construction compounds and the working areas would be on designated haul routes within the construction site, often along the line of the route of the Proposed Scheme or running parallel to it.
- 2.3.27 The construction compounds would provide the interface between the construction works and the public road or railway network. The likely road routes to access compounds in the Birchmoor to Austrey area are described in the subsequent sections of this report.
- 2.3.28 It may be necessary to undertake minor works including a number of minor highways and junction improvements along public roads that would be used as construction traffic routes but are at a distance from the route of Proposed Scheme. These minor works will be reported in the formal ES.
- 2.3.29 Areas of land are also required for the storage, loading and unloading of bulk earthworks materials that are moved to and from the site on public roads. These areas would allow transfer of material between road vehicles and site vehicles during construction to balance traffic movements on the road network. These areas are referred to as transfer nodes.

### **Construction compounds**

- 2.3.30 This section provides a summary of the works to be managed from the construction compounds in the Birchmoor to Austrey area, as illustrated in Figure 5 and Figure 6. All dates and durations of activities and number of workers are indicative. All compounds would undertake initial site set-up works and, at the end of its use, finalisation works including site reinstatement, landscaping and planting (as necessary).

Figure 5: Construction compounds for civil engineering works

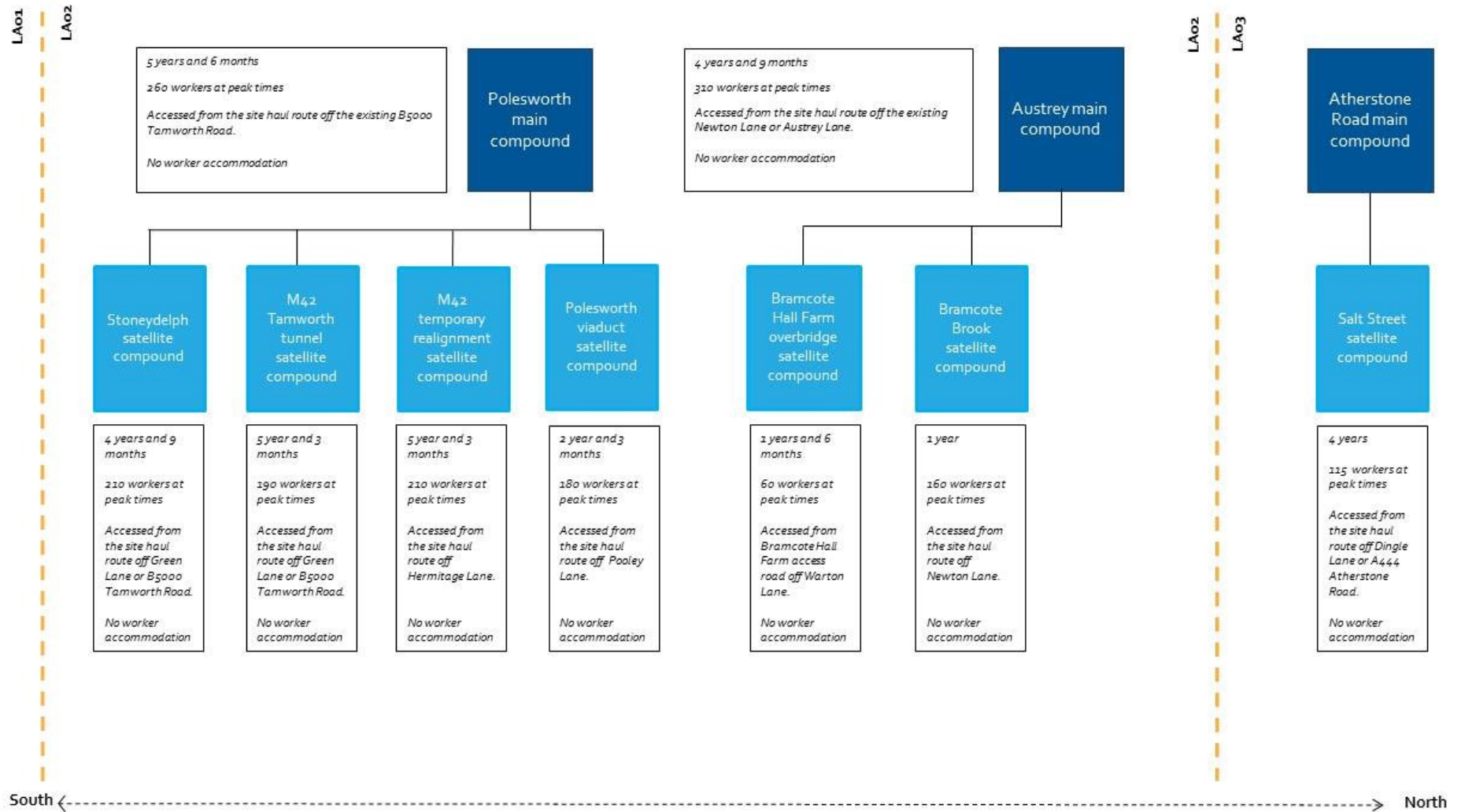
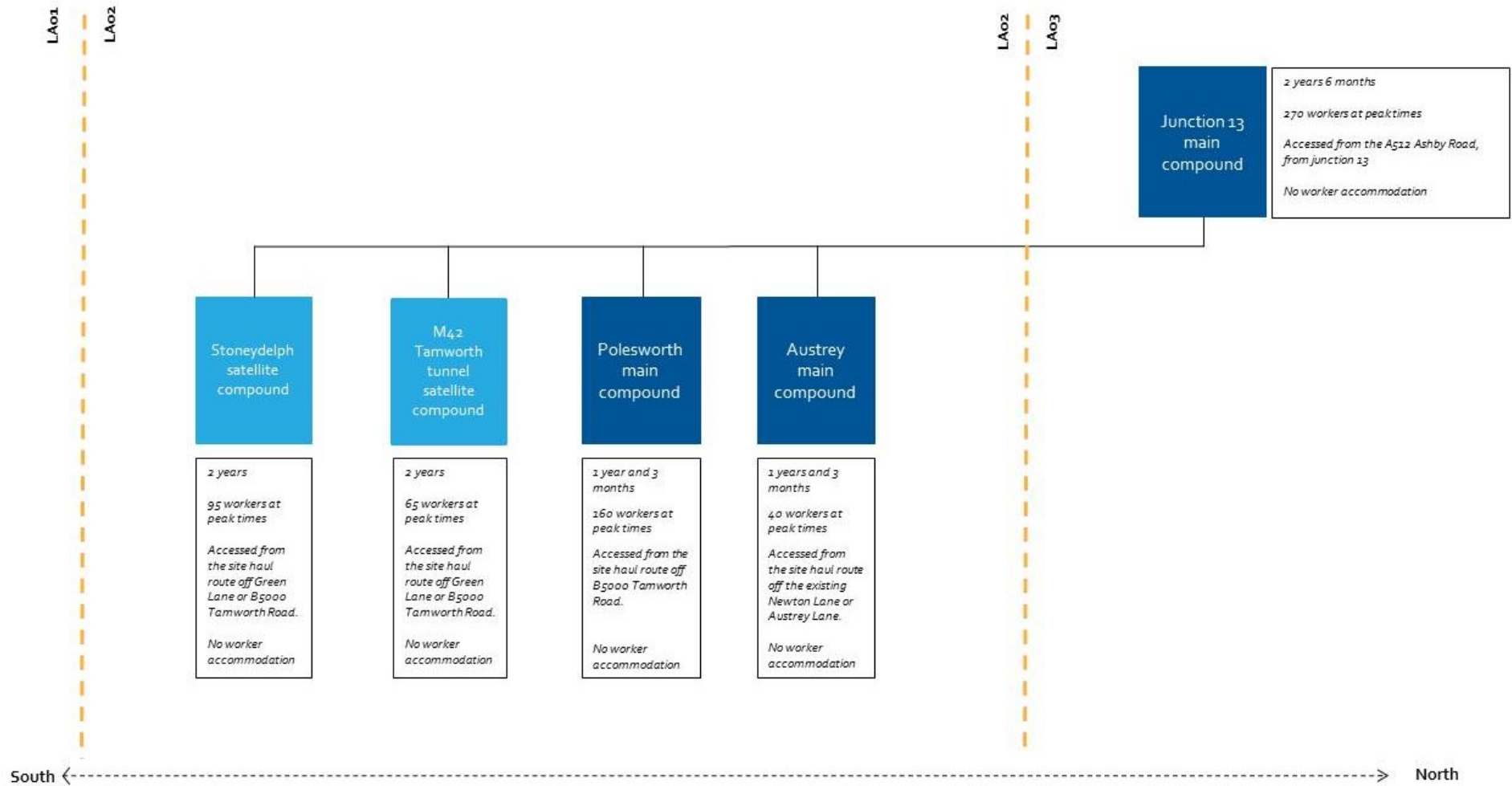


Figure 6: Construction compounds for railway systems works



### *Stoneydelph satellite compound*

- 2.3.31 This compound would be used to manage civil engineering works in the Birchmoor to Austrey area, as illustrated in Figure 5, for a period of four years and nine months. During this time, the satellite compound would also be used to support railway systems installation works for a period of two years, as illustrated in Figure 6 (see Volume 2: Map CT-05-406b).
- 2.3.32 No demolitions would be required as a result of the works to be managed from this compound.
- 2.3.33 The compound would be used to manage the construction of the M42 Stoneydelph cutting, which would take four years to complete.
- 2.3.34 The compound would be used to manage the construction of the M42 Tamworth tunnel south portal, which would take two years to complete.
- 2.3.35 The works to be managed from this compound would require the temporary closure of Green Lane (Birchmoor) as a result of the demolition of the Green Lane M42 Overbridge, for a period of three years and six months. During the construction period users would be diverted via alternative routes. Following the construction period, the Green Lane M42 Overbridge would be reinstated on its existing alignment and the road reopened to traffic.
- 2.3.36 Key railway systems works to be managed from this compound would include construction of a tunnel portal building and installation of railway systems equipment such as cabling and ventilation units. The construction and installation of the railway systems work would take two years to complete. The compound would be accessed from the site haul route off Green Lane and/or the B5000 Tamworth Road.

### *M42 Tamworth tunnel satellite compound*

- 2.3.37 This compound would be used to manage civil engineering works in the Birchmoor to Austrey area, as illustrated in Figure 5. During this time the satellite compound would also be used to support railway systems installation works for a period of two years, as illustrated in Figure 5 (see Volume 2: Map CT-05-406b).
- 2.3.38 The works to be managed from this compound would require demolitions of the following buildings and structures, as described in Table 1.

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Table 1: Demolitions required as a result of the works to be managed from M42 Tamworth tunnel satellite compound

| Description                                                | Location              | Feature resulting in the demolition               |
|------------------------------------------------------------|-----------------------|---------------------------------------------------|
| <b>Residential</b>                                         |                       |                                                   |
| Two residential properties on Westfields                   | Westfields, Birchmoor | M42 Tamworth tunnel and Green Lane M42 overbridge |
| Five residential properties and outbuildings on Green Lane | Green Lane, Birchmoor | M42 Tamworth tunnel and Green Lane M42 overbridge |
| <b>Other</b>                                               |                       |                                                   |
| Sheds                                                      | Green Lane, Birchmoor | M42 Tamworth tunnel                               |

2.3.39 The compound would be used to manage the construction of M42 Tamworth tunnel, which would take five years and three months to complete. Some of the works to construct this tunnel would also be managed from the M42 temporary realignment satellite compound.

2.3.40 Key railway systems works to be managed from this compound would include construction of a tunnel portal building and installation of railway systems equipment such as cabling and ventilation units. The construction and installation of the railway systems work would take two years to complete.

*M42 temporary realignment satellite compound*

2.3.41 This compound would be used to manage civil engineering works in the Birchmoor to Austrey area, as illustrated in Figure 5 (see Volume 2: Map CT-05-406b).

2.3.42 The works to be managed from this compound would require demolition of the following buildings and structures, as described in Table 2.

Table 2: Demolitions required as a result of the works to be managed from the M42 temporary realignment satellite compound

| Description                                                         | Location                                 | Feature resulting in the demolition               |
|---------------------------------------------------------------------|------------------------------------------|---------------------------------------------------|
| <b>Residential</b>                                                  |                                          |                                                   |
| Three residential properties and outbuildings at Lamphouse Cottages | Lamphouse Cottages, Dark Lane, Birchmoor | M42 temporary realignment and M42 Tamworth tunnel |

2.3.43 The compound would be used to manage the construction of the M42 Tamworth tunnel north portal, which would take four years and nine months to complete.

2.3.44 The works to be managed from this compound would include the temporary realignment of a 1.2km section of the M42, up to 100m to the east of its existing alignment during the construction of the M42 Tamworth tunnel. The M42 realignment would be in place for a period of approximately four years and six months. On completion of construction, the M42 would be reinstated on its existing alignment.

2.3.45 The compound would be accessed from the site haul route off Hermitage Lane.

*Polesworth main compound*

2.3.46 This compound would be used to manage civil engineering works and provide main compound support to four satellite compounds in the Birchmoor to Austrey area, as

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illustrated in Figure 5, for a period of five years and six months. During this time, the main compound would also be used to support the railway systems installation works for a period of one year and three months, as illustrated in Figure 5 (see Volume 2: Map CT-05-407b).

2.3.47 The works to be managed from this compound would require demolition of the following buildings and structures, as described in Table 3.

Table 3: Demolitions required as a result of the works to be managed from the Polesworth main compound

| Description                                                   | Location                                   | Feature resulting in the demolition |
|---------------------------------------------------------------|--------------------------------------------|-------------------------------------|
| <b>Residential</b>                                            |                                            |                                     |
| Residential property and outbuildings                         | The Dairy, Hermitage Lane, Polesworth      | Hermitage Lane cutting              |
| Residential property and outbuildings                         | Hermitage Farm, Birchmoor Lane, Polesworth | Hermitage Lane cutting              |
| Four residential properties and outbuildings on Tamworth Road | Tamworth Road, Polesworth                  | B5000 Tamworth Road realignment     |
| Residential property and outbuildings                         | Pond Cottage, Pooley Lane, Polesworth      | Pooley Lane overbridge              |
| <b>Commercial</b>                                             |                                            |                                     |
| Three commercial properties at The Hermitage                  | The Hermitage, Hermitage Lane, Polesworth  | Hermitage Lane cutting              |
| Eight commercial properties on Pooley Lane                    | Pooley Lane, Polesworth                    | Pooley Lane embankment              |
| Commercial property                                           | Pooley Lane, Polesworth                    | Pooley Lane overbridge              |

2.3.48 The compound would be used to manage the construction of the following overbridges:

- B5000 Tamworth Road overbridge, which would take one year and six months to complete; and
- Pooley Lane overbridge, which would take one year and three months to complete.

2.3.49 The compound would be used to manage the construction of the following earthworks:

- Hermitage Lane cutting, which would take five years to complete;
- Pooley Lane cutting, which would take two years and three months to complete; and
- Pooley Lane embankment, which would take one year and six months to complete.

2.3.50 The works to be managed from this compound would require the following works to public roads:

- permanent diversion of Hermitage Lane, 200m to the east of its existing alignment, which would take one year and three months to complete and would be constructed offline<sup>18</sup>. On completion of construction, temporary lane restrictions and traffic management measures would be implemented for approximately six weeks to enable connection between the realigned road and the existing road;
- permanent realignment of the B5000 Tamworth Road, approximately 30m to the south of its existing alignment, which would take one year and six months to complete and would be constructed offline. On completion of construction, temporary lane restrictions and traffic management measures would be implemented for six weeks to enable connection between the realigned road and the existing road; and
- permanent realignment of Pooley Lane, 500m to the south of its existing alignment, which would take one year and three months to complete and would be constructed offline. On completion of construction, temporary lane restrictions and traffic management measures would be implemented for six weeks to enable a connection between the realigned road and the existing Pooley Lane.

2.3.51 The works to be managed from this compound would require the following works to PRoW:

- temporary diversion of the Warwickshire Footpath AE17. On completion of construction, the eastern section of the Warwickshire Footpath AE17 would be permanently closed and an alternative route would be provided along the diverted Hermitage Lane and across the Proposed Scheme on the B5000 Tamworth Road overbridge; and
- temporary diversion of the Warwickshire Footpath AE16. On completion of construction, Warwickshire Footpath AE16 would be permanently realigned by approximately 150m to cross over the Proposed Scheme at Pooley Lane cutting.

2.3.52 The works to be managed from this compound would require the following works to drainage:

- construction of B5000 Tamworth Road culvert south, which would take three months to complete;
- construction of B5000 Tamworth Road culvert north, which would take three months to complete;

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<sup>18</sup> Offline works are works which are generally constructed along or nearby existing routes, which will remain open during construction.

- construction of Birchmoor culvert, which would take three months to complete;
- construction of Pooley Lane culvert, which would take three months to complete; and
- construction of Pooley Lane Scout Hut access culvert, which would take three months to complete.

2.3.53 Key railway systems works to be managed from this compound would include the construction and installation of the Birchmoor express feeder auto-transformer station, located 30m north of the realigned B5000 Tamworth Road. The construction of the express feeder auto-transformer station foundations, building and the installation of the express feeder auto-transformer station railway systems equipment would take one year and three months to complete. Construction works for the express feeder auto-transformer station would be accessed from the purpose built site haul route off B5000 Tamworth Road.

#### *Polesworth viaduct satellite compound*

2.3.54 This compound would be used to manage civil engineering works in the Birchmoor to Austrey area, as illustrated in Figure 5 (see Volume 2: Map CT-05-408).

2.3.55 The works to be managed from this compound would require demolition of the following buildings and structures, as described in Table 4.

Table 4: Demolitions required as a result of the works to be managed from the Polesworth viaduct satellite compound

| Description                                   | Location                | Feature resulting in the demolition |
|-----------------------------------------------|-------------------------|-------------------------------------|
| <b>Other</b>                                  |                         |                                     |
| Pooley Fields Heritage Centre and outbuilding | Pooley Lane, Polesworth | Polesworth viaduct                  |

2.3.56 The compound would be used to manage the construction of Polesworth viaduct, which would take two years and three months to complete.

2.3.57 The works to be managed from this compound would require the temporary closure of Linden Lane for less than three months. On completion of the construction of a section of Polesworth viaduct directly over Linden Lane, the road would be reopened to traffic.

2.3.58 The works to be managed from this compound would require temporary closure of the Coventry Canal. It is expected that the canal would be closed over four separate, one day closures. The canal and the towpath would be opened to pedestrians and boat traffic outside of these times.

#### *Bramcote Hall Farm overbridge satellite compound*

2.3.59 This compound would be used to manage civil engineering works in the Birchmoor to Austrey area, as illustrated in Figure 5 (see Volume 2: Map CT-05-409).

2.3.60 No demolitions would be required as a result of the works to be managed from this compound.



- 2.3.61 The compound would be used to manage the construction of Bramcote Hall Farm overbridge, which would take one year and six months to complete.
- 2.3.62 The works to be managed from this compound would require the temporary realignment of the Warwickshire Bridleway AE<sub>3</sub> during construction. On completion of construction, the Warwickshire Bridleway AE<sub>3</sub> would be permanently realigned by approximately 100m to the south-east to cross the Proposed Scheme on Bramcote Hall Farm overbridge.
- 2.3.63 The works to be managed from this compound would require the following works to drainage:
- construction of New Covert culvert east, which would take three months to complete; and
  - construction of New Covert culvert, which would take six months to complete.

#### *Bramcote Brook satellite compound*

- 2.3.64 This compound would be used to manage civil engineering works in the Birchmoor to Austrey area, as illustrated in Figure 5 (see Volume 2: Map CT-05-410).
- 2.3.65 No demolitions would be required as a result of the works to be managed from this compound.
- 2.3.66 The compound would be used to manage the construction of Warwickshire Footpath AE<sub>4</sub> underbridge, which would take one year to complete.
- 2.3.67 The works to be managed from this compound would require the temporary realignment of Warwickshire Footpath AE<sub>4</sub> during construction. On completion of construction, the Warwickshire Footpath AE<sub>4</sub> would return to its existing alignment and would pass beneath the Proposed Scheme in Warwickshire Footpath AE<sub>4</sub> underbridge, located within the Bramcote Brook embankment.
- 2.3.68 The works to be managed from this compound would require the following works to watercourses and drainage:
- construction of Bramcote Brook culvert for realignment of a section of Bramcote Brook under the route of the Proposed Scheme, which would take three months to complete;
  - construction of Bramcote Brook P<sub>RoW</sub> culvert west for the diversion of a tributary of Bramcote Brook, which would take three months to complete; and
  - construction of Bramcote Brook P<sub>RoW</sub> culvert east for the diversion of a tributary of Bramcote Brook, which would take three months to complete.

#### *Austrey main compound*

- 2.3.69 This compound would be used to manage both the civil engineering works and railway systems works and provide main compound support to two satellite compounds in the Birchmoor to Austrey area, as illustrated in Figure 5, for a period of four years and nine months. During this time, the main compound would be used to support the railway

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systems installation works, as illustrated in Figure 6 for a period of one year and three months (see Volume 2: Map CT-05-410).

2.3.70 The works to be managed from this compound would require demolition of the following buildings and structures, as described in Table 5.

Table 5: Demolitions required as a result of the works to be managed from the Austrey main compound

| Description          | Location                                     | Feature resulting in the demolition |
|----------------------|----------------------------------------------|-------------------------------------|
| Residential          |                                              |                                     |
| Residential property | Spring Cottage, No Man's Heath Lane, Austrey | No Man's Heath Lane realignment     |
| Other                |                                              |                                     |
| Stables/outbuildings | Newton Lane, Austrey                         | Austrey embankment                  |

2.3.71 The compound would be used to manage the construction of No Man's Heath Lane viaduct, which would take one year and six months to complete.

2.3.72 The compound would be used to manage the construction of the following earthworks:

- River Anker embankment, which would take one year and nine months to complete;
- Bramcote cutting, which would take two years to complete;
- New Covert embankment, which would take one year to complete;
- New Covert cutting, which would take one year to complete;
- Bramcote Brook embankment, which would take three years to complete;
- Newton Regis cutting, which would take one year to complete;
- Austrey embankment, which would take one year and six months to complete;
- Pimlico embankment, which would take one year and six months to complete; and
- Salt Street cutting, which would take two years to complete.

2.3.73 The works to be managed from this compound would require the following works to public roads:

- permanent diversion of Newton Lane, which would run between and parallel to the M42 and the route of the Proposed Scheme, which would take one year and three months to complete and would be constructed offline. On completion of construction, temporary lane restrictions and traffic management measures would be implemented for six weeks to connect the realigned road with the existing road;

- permanent realignment of No Man's Heath Lane, 30m to the south of its existing alignment, which would take one year and six months to complete and would be constructed offline. On completion of construction, temporary lane restrictions and traffic management measures would be implemented for six weeks to connect the realigned road with the existing road; and
- temporary closure of Salt Street during construction for a period of one year and three months. During this time, the permanent realignment of Salt Street would be constructed. Following the construction period, Salt Street would be permanently realigned by 15m to the north of its existing alignment.

2.3.74 The works to be managed from this compound would require the following works to PRow:

- temporary realignment of Warwickshire Footpath T140 would be required during construction. On completion of construction, the Warwickshire Footpath T140 would be permanently realigned by approximately 450m to the north to follow the Newton Lane diversion; and
- temporary closure of Leicestershire Byway Q4a/3 for a period of one year and three months. During this time, the permanent realignment of Leicestershire Byway Q4a/3 would be constructed. Following the construction period, Leicestershire Byway Q4a/3 would be permanently realigned 15m to the north of its existing alignment.

2.3.75 The works to be managed from this compound would require the following works to drainage:

- construction of Newton Lane culvert south, which would take three months to complete;
- construction of Austrey culvert, which would take three months to complete;
- construction of Newton Lane culvert north, which would take three months to complete;
- construction of No Man's Heath Lane culvert east, which would take three months to complete; and
- construction of No Man's Heath Lane culvert west, which would take three months to complete.

2.3.76 Key railway systems works to be managed from this compound would include the construction and installation of the Austrey auto-transformer station, located approximately 120m south of the existing Newton Lane. The construction of the Austrey auto-transformer station foundations, building and the installation of the Austrey auto-transformer station railway systems equipment would take one year and three months to complete. Construction works for the Austrey auto-transformer station would be accessed from the site haul route off Newton Lane.

### *Salt Street satellite compound*

- 2.3.77 This compound would be located within the Appleby Parva to Ashby-de-la-Zouch area (LA03). The compound would be used to manage civil engineering works in the Birchmoor to Austrey area, as illustrated in Figure 5 (see Volume 2: Map CT-05-412a).
- 2.3.78 No demolitions would be required as a result of the works to be managed from this compound.
- 2.3.79 The compound would be used to manage the construction of Salt Street overbridge, which would take one year and three months to complete.

### **Construction waste and material resources**

- 2.3.80 Excavated material (excluding topsoil and subsoil) generated across the Proposed Scheme would be reused as engineering fill material or in the environmental mitigation earthworks of the Proposed Scheme, where suitable and reasonably practicable, either with or without treatment.
- 2.3.81 Forecasts of the amount of construction, demolition and excavation waste (CDEW) that would be produced during construction of the Proposed Scheme are reported in Volume 3: Route-wide effects.
- 2.3.82 Local excess or shortfall of excavated material within the Birchmoor to Austrey area would be managed through the mitigation earthworks design approach adopted for the Proposed Scheme, with the aim of contributing to an overall balance of excavated material on a route-wide basis. The overall balance of excavated material will be presented in Volume 3 of the formal ES.

### **Commissioning of the railway**

- 2.3.83 Commissioning is the process of testing the infrastructure to ensure that it operates as expected. It would be carried out in the period prior to opening. Further details are provided in Volume 1, Section 6.

### **Construction programme**

- 2.3.84 A construction programme illustrating indicative periods for each of the core construction activities described above is provided in Figure 7. Construction durations referred to in the following sections of this report are based on this indicative programme.

### **Monitoring during construction**

- 2.3.85 The appointed contractor would be required to undertake the necessary monitoring for each environmental topic to comply with the requirements of the CoCP, the relevant LEMP and any additional consent requirements. Any actions that may be necessary for compliance would be reported to the nominated undertaker and remedial action identified.

- 2.3.86 The CoCP and the relevant LEMP would set out inspection and monitoring procedures to assess the effectiveness of measures to prevent or reduce environmental effects during construction. Relevant local authorities and consenting authorities, such as the Environment Agency, would be consulted on the monitoring procedures to be implemented prior to construction commencement.









## 2.4 Operation of the Proposed Scheme

### Introduction

- 2.4.1 This section describes the operational characteristics of the Proposed Scheme in the Birchmoor to Austrey area. Volume 1, Section 4 describes the envisaged operational characteristics of the Proposed Scheme as a whole, including Phase One, Phase 2a and Phase 2b.

### HS2 services

- 2.4.2 It is anticipated that there would be up to nine trains per hour each way passing through the Birchmoor to Austrey area. Services are expected to operate between 05:00 and midnight from Monday to Saturday and 08:00 and midnight on Sunday.
- 2.4.3 In this area, trains would run at speeds of up to 225mph (360kph). The trains would be either single 200m trains or two 200m trains coupled together, depending on demand and time of day.

### Maintenance

- 2.4.4 Volume 1, Section 4 describes the maintenance regime for the Proposed Scheme.
- 2.4.5 Asset performance and condition monitoring would be undertaken using asset condition monitoring and unattended measurement systems fitted to the HS2 passenger rolling stock. Intrusive inspections would be carried out during the maintenance period. The maintenance approach would be a combination of risk based, preventative and reactive maintenance.
- 2.4.6 Provision for railway maintenance vehicles along the eastern leg of the route of the Proposed Scheme would be made at the Staveley depot in the Staveley to Aston area (LA11). Further information on the Staveley depot can be found in Volume 2: Community area report LA11, Staveley to Aston.

### Operational waste and material resources

- 2.4.7 The assessment of the likely significant environmental effects associated with the disposal of operational waste will be undertaken for the Proposed Scheme as a whole and reported in Volume 3: Route-wide effects of the formal ES.
- 2.4.8 Forecasts of the amount of waste arising from track maintenance and ancillary infrastructure and the associated potential significant environmental effects will also be reported in the formal ES.

### Monitoring during operation

- 2.4.9 The nominated undertaker would be responsible for monitoring during operation of the Proposed Scheme. Proposed indicative area-specific monitoring measures for each environmental topic area are presented in Sections 4 to 15 of this report, based on the current level of assessment.
- 2.4.10 Relevant local authorities and consenting authorities, such as the Environment Agency, will be consulted on the monitoring procedures to be implemented during operation prior to construction commencement.

## 2.5 Route section alternatives

- 2.5.1 The strategic, route-wide and route corridor alternatives to the Proposed Scheme and local alternatives considered prior to July 2017 are presented in Volume 1, Introduction and methodology and in Supporting document: Alternatives report. The local alternatives considered for the Proposed Scheme within the Birchmoor to Austrey area since the route announcement in July 2017 are described in this section.
- 2.5.2 In this area, the route of the Proposed Scheme would be carried on viaducts and embankments, in cuttings and through tunnels.
- 2.5.3 As part of the design development process since July 2017, consideration has been given to the impact of the Proposed Scheme on local residents of the Birchmoor to Austrey area and environmental receptors. This includes agricultural holdings, Alvecote Pools Site of Special Scientific Interest (SSSI), Pooley Country Park, Polesworth Abbey (a scheduled monument), Bramcote Brook and Bramcote Covert Ancient Woodland.
- 2.5.4 Further consideration will be given to the construction and engineering options in this area, including design and construction methods and alternative engineering options. Further studies are ongoing and will be reported in the formal ES.

## 3 Stakeholder engagement and consultation

### 3.1 Introduction

- 3.1.1 HS2 Ltd's approach to stakeholder engagement and consultation on the Proposed Scheme is set out in Volume 1, Section 3.
- 3.1.2 Since the initial preferred route announcement in November 2016, HS2 Ltd has carried out a programme of informal stakeholder engagement and formal consultation with a broad range of stakeholders.
- 3.1.3 A variety of mechanisms have been used to enable an open and inclusive approach to engagement and consultation, reflecting the differing requirements and expectations of stakeholders.
- 3.1.4 Whilst stakeholders have informed the design and assessment of the Proposed Scheme to-date, it is important to note that this is an ongoing process. Feedback from the consultation on the working draft ES and emerging scheme design and ongoing engagement will continue to be considered as part of the ongoing design and assessment of the Proposed Scheme ultimately presented in the formal ES. There will be further consultation undertaken on the formal ES by Parliament following deposit of the hybrid Bill.

### 3.2 Key stages of Phase 2b engagement and consultation

- 3.2.1 The process of engagement remains ongoing. A summary of engagement undertaken or underway since the initial preferred route announcement in November 2016 is provided in Table 6.

Table 6: Mechanisms and timeline of stakeholder engagement since route announcement

| Engagement and consultation activity and mechanisms                                                                                                                                                  | Date                             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Phase 2b initial preferred route announcement                                                                                                                                                        | 15 November 2016                 |
| Phase 2b route refinement and property consultations                                                                                                                                                 | 15 November 2016 – 9 March 2017  |
| Phase 2b information events to support the route refinement and property consultations                                                                                                               | January -February 2017           |
| Confirmation of Phase 2b route announcement                                                                                                                                                          | 17 July 2017                     |
| Start date of engagement with local communities and stakeholders on the confirmed Phase 2b route                                                                                                     | July 2017                        |
| Consultation on the draft EIA and Equality Impact Assessment (EQIA) Scope and Methodology Report (SMR) to inform the EIA and EQIA and the proposed relocation of the Eastern Leg Rolling Stock Depot | 17 July 2017 – 29 September 2017 |
| Phase 2b information events to support SMR and Eastern Leg Rolling Stock Depot consultations                                                                                                         | September 2017                   |
| Phase 2b information events to provide update on design development                                                                                                                                  | June-July 2018                   |

| Engagement and consultation activity and mechanisms                  | Date                    |
|----------------------------------------------------------------------|-------------------------|
| Phase 2b consultation on the working draft ES and working draft EQIA | October – December 2018 |

### Draft EIA SMR consultation

- 3.2.2 The draft EIA SMR was formally consulted on between July and September 2017 and was issued to statutory bodies, non-government organisations and local authorities. It was also available on the Government’s website, allowing comment by local interest groups and the public. One hundred and seven responses to the draft SMR were received, as a result of which changes were made to the SMR. These are set out in the SMR Consultation Summary Report published alongside this working draft ES, and will be used to inform the assessment methodologies applied for the formal ES.

### Consultation on the working draft ES and ongoing engagement

- 3.2.3 As set out in Volume 1, the working draft ES is being formally consulted upon. The consultation is taking place during October 2018 to December 2018. A parallel consultation on the working draft EQIA is also being undertaken during this period. As part of the process of consultation, stakeholders are invited to comment on the Proposed Scheme and the working draft ES and EQIA Reports which inform it.
- 3.2.4 These consultations and wider feedback from ongoing stakeholder engagement will continue to be considered as part of the ongoing design of the Proposed Scheme and the assessment and identification of mitigation opportunities for the Birchmoor to Austrey area. A consultation summary report will be published with the formal ES explaining how the responses have been taken into consideration.

## 3.3 Informing the Proposed Scheme

- 3.3.1 The main purpose of stakeholder engagement and consultation at this early stage is to inform the Proposed Scheme. Volume 1 details the engagement and consultation undertaken prior to initial preferred route announcement in November 2016.
- 3.3.2 The main themes to emerge from stakeholder engagement in the Birchmoor to Austrey area since the initial preferred route announcement in November 2016, and which are informing the Proposed Scheme are:
- temporary and permanent land required for construction and operation;
  - refining the location of balancing ponds and environmental mitigation to reduce the loss of agricultural land;
  - provision of access to severed agricultural land, including access under viaducts and the provision of farm access tracks;
  - retention, realignment or diversion of PRow;
  - impacts on traffic in Birchmoor, Polesworth, Austrey, Newton Regis Seckington and No Man’s Heath during construction;
  - maintaining access between the villages of Austrey, Newton Regis, Seckington and No Man’s Heath;

- maintaining access to schools in Polesworth (Dordon Road) for children who live to the west of the M42 corridor;
- access to Pooley Country Park and in particular pedestrian and vehicular access to the activity centre run by Polesworth (Abbey) Scout Group;
- impacts on facilities at Pooley Country Park, including the World War One (WWI) war memorial dedicated to the men of Pooley Colliery, business interests and the private moorings situated on the Coventry Canal; and
- impacts on Austrey Playing Fields.

3.3.3 Stakeholder feedback will continue to be considered as part of the ongoing design of the Proposed Scheme and will be reported in the formal ES.

## 3.4 Engagement and consultation with stakeholder groups

### Communities

3.4.1 Community stakeholders in the Birchmoor to Austrey area include a range of local interest groups, local facility and service providers, places of worship, schools and educational establishments, cultural, leisure and sports stakeholders.

3.4.2 The purpose of this engagement has been to give affected communities the opportunity to raise issues in relation to the Proposed Scheme. Community stakeholders have been provided with information on the development of the Proposed Scheme, as a basis from which to identify potential impacts and opportunities for mitigation within the local area, reflecting local conditions and issues.

3.4.3 Engagement has been, and will continue to be, undertaken with schools and educational establishments, in particular, with those within proximity to the Proposed Scheme and those with specialist interests or catering to the needs of vulnerable people within the community. This has informed the assessment of community and health in the working draft ES, whilst also informing the separate EQIA being undertaken in parallel to the EIA.

3.4.4 As part of the consultation process for this working draft ES, public events are being held in communities across the route of the Proposed Scheme. Communities have been notified of these events through a range of publicity in the Birchmoor to Austrey area and also through the [www.gov.uk/hs2](http://www.gov.uk/hs2) website. Documents have been made available online and in community libraries. Members of local communities and other interested parties have been invited to engage on issues pertinent to the working draft ES and the development of the Proposed Scheme design.

3.4.5 Table 7 summarises key engagement undertaken with community stakeholders to date, including the focus of the engagement and how this has informed the design of the Proposed Scheme.

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Table 7: Engagement to date with community stakeholders

| Stakeholder                                                        | Area of focus                                                                                                                                                                            |
|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Birchmoor to Austrey Area councillors                              | Meeting to discuss the Proposed Scheme, progress and discuss concerns around construction and operational impacts in the local area.                                                     |
| Polesworth Society                                                 | Discussion around the Proposed Scheme including timescales and approach to assessment, gather feedback on local concerned and discuss potential impacts.                                 |
| MAPA (Measham, Appleby Magna, Packington and Austrey) Action Group | Discussion around the maintenance of access/relocation of the WWI war memorial within Pooley Country Park.<br>Discussion around the Proposed Scheme and mitigation of potential impacts. |
| Pooley Country Park (Warwickshire County Council)                  | Discussions around the impact of the Proposed Scheme on the park, during construction and operation, and potential mitigation                                                            |
| Polesworth (Abbey) and Tamworth District Scout Groups              | Discussions around potential impacts on scouting resources and potential mitigation.                                                                                                     |

### Local authorities and parish councils

- 3.4.6 Direct engagement has been offered to and undertaken with county, borough, district and parish councils within the Birchmoor to Austrey area. The purpose of this engagement is to collate local baseline information and knowledge to inform the design and assessment, identify and understand local issues and concerns, provide access to wider stakeholders and communities and provide a mechanism for ongoing dialogue and discussion on the assessment and design development.
- 3.4.7 Engagement has focused on the technical areas which inform the assessment, including, landscape and visual, sound, noise and vibration and traffic and transport, amongst other topics.
- 3.4.8 Key issues identified during engagement with local authorities and parish councils include those summarised in Table 8.

Table 8: Engagement to date with local authorities and parish councils

| Stakeholder                 | Area of focus                                                                                                                                                                                |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Warwickshire County Council | Engagement to provide an update on the Proposed Scheme and understand the local conditions and factors to inform scheme design and working draft ES                                          |
|                             | Meetings to discuss the operability of Pooley Country Park during construction and operation of the Proposed Scheme                                                                          |
|                             | Discussions around the proposed realignment of the M42 and other local road realignments as well as the effects of construction traffic on the local network.                                |
|                             | Meeting to discuss the traffic and transport assessment and gaining understanding of key local constraints                                                                                   |
|                             | Meeting to discuss sensitive ecological receptors, plans for mitigation and gather information to assist the ecological assessment within the working draft ES                               |
|                             | Engagement to discuss landscape and visual effects of Proposed Scheme on settlements throughout the Birchmoor to Austrey area and agreement of viewpoint locations for the visual assessment |

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| Stakeholder                                                | Area of focus                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Staffordshire County Council                               | Engagement to provide an update on the Proposed Scheme and understand the local conditions and factors to inform scheme design and working draft ES                                                                                                                                   |
|                                                            | Meeting to discuss the traffic and transport assessment and gaining understanding of key local constraints and discussion around Highways impacts.                                                                                                                                    |
|                                                            | Engagement around establishment of representative view point and photomontage locations for landscape assessment and surveys                                                                                                                                                          |
| Tamworth Borough Council                                   | To provide an update on the Proposed Scheme and to better understand the local conditions and factors to inform the design of the Proposed Scheme and the EIA.                                                                                                                        |
|                                                            | Engagement around highways impacts, including local roads and trunk roads and detail around the traffic and transport assessment and gaining understanding of key local constraints                                                                                                   |
|                                                            | Engagement around establishment of representative view point and photomontage locations for landscape assessment and surveys                                                                                                                                                          |
| Austrey Parish Council                                     | Local conditions and concerns regarding visual, traffic, noise and community impacts. Particular discussions around impacts of the Proposed Scheme on Austrey Playing Fields, road re-alignments of Newton Lane, No Mans Heath Lane and concerns regarding flooding and noise impacts |
| Polesworth Parish Council                                  | Engagement around the potential to avoid construction traffic through the village, weight restrictions on local bridges and noise impacts concerns over the impacts from the proposed re-alignment of Hermitage Lane and B500 Tamworth Road.                                          |
| Shuttington Parish council                                 | Engagement to discuss traffic impacts on local roads as a result of construction and the temporary realignment of M42 and construction works at junction 10 of the M42.                                                                                                               |
| Newton Regis, Seckington and No Man's Heath Parish Council | Meetings to discuss traffic impacts on local roads as a result of construction of the Proposed Scheme in particular potential disruption to junction 10 of the M42 and junction 11.                                                                                                   |
| Twycross Parish Council                                    | Communication to provide information on the Proposed Scheme and gather any feedback and concerns                                                                                                                                                                                      |

3.4.9 Councils will continue to be engaged as part of the design development of the Proposed Scheme with ongoing dialogue on key topics such as highways, PRow and the draft Code of Construction Practice (CoCP)<sup>19</sup>.

### Expert, technical and specialist groups

3.4.10 Engagement has also been undertaken with expert, technical and specialist groups to provide appropriate specialist input, as and where appropriate. Stakeholders engaged to date include:

- Animal and Plant Health Agency;
- British Geological Survey;
- Campaign to Protect Rural England;
- Canal & River Trust;

<sup>19</sup> Supporting document: Draft Code of Construction Practice

- Coal Authority;
- Department of Environment, Food and Rural Affairs;
- Environment Agency;
- Fera Science Ltd;
- Forestry Commission;
- Highways England;
- Historic England;
- Inland Waterways Association;
- National Farmers Union;
- National Trust;
- Natural England;
- Network Rail;
- Public Health England;
- Ramblers Association;
- Royal Agricultural Society;
- Royal Society for the Protection of Birds;
- Royal Society of Wildlife Trusts
- The Wildlife Trusts;
- Woodland Trust; and
- Warwickshire Wildlife Trust.

3.4.11 A key purpose of this engagement has been to obtain detailed specialist baseline information to inform the working draft ES and the design development of the Proposed Scheme.

3.4.12 Further information about topic-specific engagement is provided in Sections 4 to 15, where relevant.

### **Utilities**

3.4.13 Engagement is also ongoing with utility companies and statutory stakeholders such as Three, EE, Vodafone, Virgin Media, National Grid, South Staffordshire Water, and the Oil and Pipelines Agency to establish what infrastructure exists in the Birchmoor to Austrey area and how it may need to be modified as part of the Proposed Scheme.



### **Directly affected individuals, and major asset owners and businesses**

- 3.4.14 This group includes those with property potentially affected by the Proposed Scheme, including individuals, major asset owners and businesses within the Birchmoor to Austrey area.
- 3.4.15 Engagement is ongoing with farmers and growers whose land or property would be directly affected by the Proposed Scheme whether permanently or temporarily. The purpose of this engagement has been to obtain baseline information and provide them with the opportunity to raise issues and discuss mitigation in relation to the Proposed Scheme. For example, the location of environmental mitigation will seek to reduce the loss of agricultural land and the location of accommodation overbridges across the route will be considered to better reflect the needs of farmers.
- 3.4.16 Information gathered from five farm visits have informed the assessment presented in this working draft ES. Farm visits are ongoing and engagement will continue as the design and assessment develops.
- 3.4.17 Engagement is also continuing with key representatives for the farmers and growers industry, in particular with the National Farmers Union and Country Land and Business Association.
- 3.4.18 A route-wide programme of engagement is ongoing, in parallel to the working draft ES process. This engagement provides affected individuals, major asset owners and businesses the opportunity to raise issues and opportunities in relation to the Proposed Scheme and to gain an understanding of compensation and assistance available for property owners. Within the Birchmoor to Austrey area, an information event was held at The Tithe Barn, Polesworth on 18 July 2018. Facilities were available at the event for affected individuals, major asset owners and businesses to have private meetings with HS2 staff.
- 3.4.19 Engagement has been undertaken with businesses along the route of the Proposed Scheme.
- 3.4.20 HS2 Ltd is continuing to engage with directly affected individuals, major asset owners and businesses, as the design and assessment develops.

## 4 Agriculture, forestry and soils

### 4.1 Introduction

- 4.1.1 This section provides a description of the current baseline for agriculture, forestry and soils and the likely impacts and significant effects of the construction and operation of the Proposed Scheme within the Birchmoor to Austrey area. Consideration is given to the extent and quality of the soil and land resources underpinning the primary land use activities of farming and forestry, and the physical and operational characteristics of enterprises engaged in these activities. Consideration is also given to diversification associated with the primary land uses, and to related land-based enterprises, notably equestrian activities.
- 4.1.2 Engagement with farmers and landowners has commenced and is ongoing. The purpose of the engagement has been to obtain baseline information on the scale and nature of the farm and forestry operations and related farm-based uses, and to provide farmers and landowners with the opportunity to raise issues and discuss mitigation in relation to the Proposed Scheme. Engagement undertaken with farmers and landowners will be documented in a farm pack for each farm holding within a Phase 2b Farmers and Growers Guide<sup>20</sup>.
- 4.1.3 Maps showing the location of the key environmental features (Map Series CT-10) and the key construction (Map Series CT-05) and key operational (Map Series CT-06) features of the Proposed Scheme can be found in the Volume 2: LA02 Map Book.

### 4.2 Scope, assumptions and limitations

- 4.2.1 The assessment scope, key assumptions and limitations for the agriculture, forestry and soils assessment are set out in Volume 1 (Section 8) and the Scope and Methodology Report (SMR<sup>21</sup>).
- 4.2.2 The study area for the agriculture, forestry and soils assessment covers all land required for the construction and operation of the Proposed Scheme. The resources and receptors that are assessed within this area are agricultural land, forestry land and soils, together with farm and rural holdings. The assessments of the impacts on agricultural land quality and forestry land are made with reference to the prevalence of best and most versatile (BMV) land and forestry land in the general locality, taken as a 4km corridor centred on the route of the Proposed Scheme.
- 4.2.3 The quality of agricultural land in England and Wales is assessed according to the Agricultural Land Classification (ALC)<sup>22</sup> system, which classifies agricultural land into five grades from excellent quality Grade 1 land to very poor quality Grade 5 land. Grade 3 is subdivided into Subgrades 3a and 3b. The main issue in the assessment of

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<sup>20</sup> To be prepared for Phase 2b in due course, as per previous Phases found here: <https://www.gov.uk/government/publications/hs2-guide-for-farmers-and-growers>

<sup>21</sup> Supporting document: HS2 Phase 2b Environmental Impact Assessment Scope and Methodology Report

<sup>22</sup> Ministry of Agriculture, Fisheries and Food (1988), *Agricultural Land Classification of England and Wales – Revised guidelines and criteria for grading the quality of agricultural land*.

the impacts on agricultural land is the extent to which land of BMV agricultural quality (Grades 1, 2 and 3a) is affected by the Proposed Scheme.

- 4.2.4 Forestry is considered as a commercial land use feature providing resources such as timber or fuel. The impacts on this feature have been calculated quantitatively in terms of the physical extent of commercial forestry land required. The qualitative effects on forestry land and woodland are addressed principally in Section 7, Ecology and biodiversity and Section 11, Landscape and visual.
- 4.2.5 The primary functions provided by soils other than for food and biomass production, such as flood water attenuation, carbon storage or the support of ecological habitats, are identified in this section and the ability of the soils to fulfil their primary functions after construction of the Proposed Scheme is assessed. Soil attributes, other than for food and biomass production, are identified in this section, but the resulting function or service provided is assessed in other sections, notably Section 7, Ecology and biodiversity; Section 9, Historic environment; Section 11, Landscape and visual; and Section 15, Water resources and flood risk.
- 4.2.6 The main issue for farm holdings is disruption by the Proposed Scheme of the physical structure of agricultural holdings and the operations taking place upon them, during both construction and operational phases. Where any part of a farm or rural holding is required for the construction and operation of the Proposed Scheme, the whole land holding is part of the study area for impacts on this receptor.
- 4.2.7 Common assumptions that have been used in assessing the effects of the Proposed Scheme are set out in Volume 1 (Section 8). These assumptions include the restoration of agricultural land that is required temporarily for construction to agricultural use, and the handing back of land used temporarily to the original landowner. It is also assumed that buildings and other farm infrastructure on the land holding will not be replaced as this would ultimately be at the discretion of the landowner. For this reason, financial compensation is not a consideration in the assessment of effects on farm holdings, as set out under Impacts on holdings below. In the majority of cases, the details of land use have been obtained from face-to-face interviews. Where this has not been possible, holding data has been obtained from publicly available sources.

## 4.3 Environmental baseline

### Existing baseline

- 4.3.1 This section sets out the main baseline features that influence the agricultural and forestry use of land within the Birchmoor to Austrey area. These include the underlying soil resources that are used for food and biomass production, as well as providing other services and functions for society, and the associated pattern of agricultural and other rural land uses.

#### *Soil and land resources*

#### **Geology and soil parent materials**

- 4.3.2 A full description of the geological characteristics of the Birchmoor to Austrey area is provided in Section 10, Land quality and Section 15, Water resources and flood risk.

- 4.3.3 The underlying geology of the study area is mapped by the British Geological Survey (BGS)<sup>23</sup>. Superficial deposits of alluvium overlie the bedrock in line with the River Anker and Bramcote Brook and variably comprise silty clay, silt, sand, peat and gravel. River terrace deposits of sand and gravel are present across the footslopes of the River Anker valley.
- 4.3.4 Superficial diamicton deposits of the Thruslington Member, which may include red-brown pebbly clay, with fragments of rock and subordinate sand, gravel and stoneless clay and silt, overlie the bedrock at Polesworth and at Bramcote Hall. A small area of glaciofluvial deposits is also at Bramcote Hall and typically includes sand and gravel.
- 4.3.5 Superficial peat deposits are also associated with Bramcote Brook, though their extent is limited.
- 4.3.6 In the south of the study area, the bedrock comprises Carboniferous-age sandstones, mudstone and siltstone of the Halesowen Formation of the Warwickshire Group, and the Pennine Middle Coal Measures Formation of the Pennine Coal Measures Group, which also includes common coal seams and marine fossils.
- 4.3.7 From Warton and continuing to the north of the study area, the bedrock geology is mainly formed of Triassic-age siltstone and mudstone of the Tarporley Siltstone Formation and the Radcliffe and Gunthorpe Members of the Sidmouth Mudstone Formation (all within the Mercia Mudstone Group).
- 4.3.8 The Halesowen Formation, to the north of Birchmoor and north-east of Polesworth, comprises grey-green sandstone and mudstone, with thin coals and limestone beds. The Pennine Middle Coal Measures Formation includes mudstone, siltstone and sandstone, though the main bedrock is interspersed with a variant dominated by sandstones.
- 4.3.9 The Halesowen Formation at Polesworth is also interspersed with the Hopwas Breccia Formation of the Sherwood Sandstone Group, which comprises a coarse breccia interbedded with sandstones and mudstones.
- 4.3.10 The Tarporley Siltstone Formation and Sidmouth Mudstone Formation generally include red-brown mudstone, siltstone and sandstone, which may be interbedded and interlaminated. Bands of a sandstone-dominant variant of the Tarporley Siltstone also intersperse the main bedrock around Austrey.

### **Topography and drainage**

- 4.3.11 The main topographic features of the study area are the valleys of the River Anker and the Bramcote Brook, which have cut channels into the underlying mudstone and siltstone. Land in the study area is level, to gently sloping, with shallow to moderate gradients of up to seven degrees.
- 4.3.12 The altitudes in the south of the study area fall from approximately 90m above Ordnance Datum (AOD) to around 60m AOD in the channels. North of Bramcote Hall and continuing north to Austrey, the land is relatively level at around 65m-70m AOD.

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<sup>23</sup> British Geological Survey (2018). *Geology of Britain viewer*. Available online at: <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

North of Austrey, the altitude begins to rise, reaching 130m AOD to the south-west of Appleby Parva.

- 4.3.13 Land at risk of flooding by rivers is associated with the River Anker at Pooley Country Park and Bramcote Brook, a tributary of the River Anker, north of Warton, and also with the low-lying ground around Austrey Meadows. This land is classed as predominantly Flood Zone 3, in which there is a 1 in 100, or greater annual probability of flooding. Further details are provided in Section 15, Water resources and flood risk.

### **Description and distribution of soil types**

- 4.3.14 The broad characteristics of the soils likely to be present in the study area are described by the Soil Survey of England and Wales<sup>24</sup> and their general distribution is shown on the National Soil Map<sup>25</sup>. Soils possessing similar characteristics are amalgamated into associations.
- 4.3.15 There are four mapped soil associations in this study area. The most prevalent is the Bardsey association to the north and north-west of Polesworth. These soils develop in mudstone and are characterised by clay loam or sandy clay loam topsoil over clay or silty clay subsoils. Soil profiles are imperfectly drained Wetness Class (WC)<sup>26</sup> III (WC III) to poorly drained (WC IV).
- 4.3.16 The Hodnet association is the second most prevalent and occurs north of Polesworth and to the north of the study area at Austrey. Hodnet soils are typically imperfectly drained (WC II or III) and include sandy silt loam or clay loam topsoils over clay loam subsoils which become slowly permeable at variable depth.
- 4.3.17 Soils of the Fladbury 2 association are the next most prevalent and are developed in alluvium and occur across the level and gently sloping land between Bramcote Hall and Austrey. Soil profiles comprise stoneless clay throughout and are affected by groundwater, such that they are typically poorly drained (WC IV).
- 4.3.18 Soils of the Rivington 1 association are the least prevalent within the study area and restricted to the very south of the Birchmoor to Austrey area. The association develops in outcrops of coal measures and comprises sandy loam or sandy silt loam topsoil overlying sandstone or extremely stony sandy loam. Profiles are well drained (WC I) and affected by droughtiness<sup>27</sup>.

### *Soil and land use interactions*

#### **Agricultural land quality**

- 4.3.19 The principal soil/land use interaction is the quality of the agricultural land resource. The ALC is based on the identification of physical limitations to the agricultural capability of land resulting from the interactions of soil, climate, topography and drainage.

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<sup>24</sup> Soil Survey of England and Wales (1984), *Soils and their use in Midland and Western England*, Soil Survey of England and Wales, Bulletin No. 12, Harpenden.

<sup>25</sup> Cranfield University (2001), *The National Soil Map of England and Wales 1:250,000 scale*. Cranfield University: National Soil Resources Institute.

<sup>26</sup> The wetness class of a soil is classified according to the depth and duration of waterlogging in the soil profile and has six categories from WC I which is well drained to WC VI which is very poorly drained.

<sup>27</sup> A measure of the likely moisture stress in a crop arising from the crop's requirement for water exceeding the available water capacity in the soil.

- 4.3.20 The main soil properties that affect the cropping potential and management requirements of land are texture, structure, depth, stoniness and chemical fertility.
- 4.3.21 Climate within this area does not in itself place any limitation on agricultural land quality. However, the interactions of climate with soil characteristics are important in determining the wetness and droughtiness limitations of the land.
- 4.3.22 The local agro-climatic data have been interpolated from the Meteorological Office's standard 5km grid point dataset<sup>28</sup> for three points within the study area. The data show the area to have a mild climate. The number of Field Capacity Days<sup>29</sup> (FCDs), when the moisture deficit<sup>30</sup> is zero, ranges from 143 to 144 days per annum which is slightly below average for lowland England (150 days). Moisture deficits, which give an indication of the liability of soils to droughtiness in summer, are moderate to moderately large.
- 4.3.23 Site factors include flood risk, which affects agricultural land quality within the River Anker and Bramcote Brook valleys and their tributaries, limiting land quality to Subgrade 3b. Further details are provided in Section 15, Water resources and flood risk.
- 4.3.24 The main physical limitations that result from interactions between soil, climate and site factors are soil wetness and soil droughtiness. For soil wetness, each soil can be allocated a WC based on soil structure, evidence of waterlogging and the number of FCDs. The topsoil texture then determines its ALC grade. Soil droughtiness is determined by the moisture retention of different soil textures and thicknesses of each soil horizon, soil structures, stone content and moisture deficits.
- 4.3.25 Soils of the Bardsey association, which are the most prevalent within the study area, comprising imperfectly (WC III) or poorly (WC IV) drained, loamy over clayey soils, are affected by wetness and workability. Imperfectly drained (WC III) profiles with medium loamy topsoils are limited to Subgrade 3a. Soil profiles which include heavy loam topsoils and all poorly drained soil profiles of WC IV are Subgrade 3b.
- 4.3.26 Soils of the Hodnet association are affected by wetness to a lesser extent than the Bardsey soils. Profiles comprise sandy silt loam or clay loam topsoils overlying clay loam which becomes slowly permeable at depth. Under the climatic conditions of the study area, profiles of WC II are limited to Grade 2 at worst, whilst profiles of WC III would be limited to Grade 2 or Subgrade 3a.
- 4.3.27 The poorly drained (WC IV) alluvial Fladbury 2 soils are likely to be waterlogged for long periods throughout the year. Combined with clayey topsoil textures under the climatic conditions of the study area, these soils are limited to Subgrade 3b.

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<sup>28</sup> Meteorological Office (1989), *Gridpoint Meteorological data for Agricultural Land Classification of England and Wales and other Climatological Investigations*.

<sup>29</sup> Field Capacity Days (FCD) is a meteorological parameter which estimates the duration of the period when the soil moisture deficit is zero. Soils usually return to field capacity (zero deficit) during the autumn or early winter and the field capacity period, measured in days, ends in the spring when evapotranspiration exceeds rainfall and a moisture deficit begins to accumulate.

<sup>30</sup> The moisture deficit is a crop-related meteorological variable which represents the balance between rainfall and potential evapotranspiration calculated over a critical portion of the growing season.

- 4.3.28 Coarse loamy soil profiles of the Rivington 1 association are freely draining (WC I) and affected mostly by droughtiness. The extent to which the land is limited by soil droughtiness is determined by factors such as topsoil texture, stone content and depth to the sandstone bedrock. As moisture deficits are moderate to moderately large<sup>31</sup>, droughtiness limitations are most likely to be to Grade 2 or Subgrade 3a.
- 4.3.29 As set out in the SMR, the sensitivity of BMV land in the study area is determined relative to the abundance of such land in the area, set as a 4km corridor centred on the route of the Proposed Scheme. Department for Environment, Food and Rural Affairs (Defra) predictive mapping<sup>32</sup> shows that there is a medium likelihood of encountering BMV agricultural land in the locality, which makes such land a resource of medium sensitivity in this study area.
- 4.3.30 The preceding assessment of agricultural land quality attributed to the soil associations is based on interpretation of publicly available data and will be confirmed by detailed soil survey, as will be the detailed distribution of soil types and land in the various grades of the ALC. The results will be reported in the formal ES.

### Other soil interactions

- 4.3.31 Soil fulfils a number of functions and services for society in addition to those of food and biomass production, which are central to social, economic and environmental sustainability. These are outlined in sources such as the Soil Strategy for England<sup>33</sup> and the Government's White Paper, *The Natural Choice: securing the value of nature*<sup>34</sup>, and include:
- the storage, filtration and transformation of water, carbon and nitrogen in the biosphere;
  - the support of ecological habitats, biodiversity and gene pools;
  - support for the landscape;
  - the protection of cultural heritage;
  - the provision of raw materials; and
  - the provision of a platform for human activities, such as construction and recreation.
- 4.3.32 Forestry resources represent a potentially multifunctional source of productive timber, landscape amenity, biodiversity and carbon storage capacity. An assessment of the value and sensitivity of woodland resources is reported in Section 7, Ecology and biodiversity and Section 11, Landscape and visual.
- 4.3.33 The floodplains of the River Anker and Bramcote Brook occupy land where water has to flow or be stored in times of flood, as set out in Section 15, Water resources and

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<sup>31</sup> Moderate to moderately large crops moisture deficits are defined as those with a deficit (the balance between rainfall and potential evapotranspiration) of 75-110mm.

<sup>32</sup> Defra (2005), *Likelihood of Best and Most Versatile Agricultural Land*.

<sup>33</sup> Defra (2009), *Soil Strategy for England*.

<sup>34</sup> HM Government (2011), *The Natural Choice: securing the value of nature*.



flood risk. The soils and floodplains in this study area function as water stores for flood attenuation, as well as providing ecological habitat.

### *Land use*

#### **Land use description**

- 4.3.34 Agricultural land use in the Birchmoor to Austrey area is predominantly arable production in large holdings, with some smaller non-commercial equestrian holdings on the fringes of the villages. Two of the identified holdings within the study area support beef cattle herds in addition to arable cropping.
- 4.3.35 Woodland in the Birchmoor to Austrey area consists mostly of a number of non-commercially managed coppices. Pooley Country Park located to the west of the M42 is the largest area of woodland within the study area, part of which is a potential local wildlife site.
- 4.3.36 A number of environmental designations influence land use within the study area. The Birchmoor to Austrey area is a nitrate vulnerable zone, where statutory land management measures apply limiting the average amount of nitrogen from manufactured fertiliser and organic manures that can be applied to agricultural land in order to reduce nitrogen losses from agricultural sources to the natural water environment.
- 4.3.37 Some agricultural land is also subject to agri-environment management prescriptions that seek to retain and enhance the landscape and biodiversity qualities and features of farmland. These are associated with the Environmental Stewardship Scheme (the Entry Level Stewardship (ELS) or Higher Level Stewardship (HLS)), or the Countryside Stewardship Scheme (CSS), which has been the main agri-environment scheme in England since 2015. The CSS incorporates elements of Environmental Stewardship, the England Woodland Grant scheme and Catchment Sensitive Farming grants.
- 4.3.38 Most Environmental Stewardship agreements, which were extensive and covered approximately 70% of agricultural land in England, have now ended although existing agreements will run their course. The higher tier and mid-tier options in the CSS are more focussed than Environmental Stewardship, with applications for funding being competitive and the area covered by the scheme less than that covered under Environmental Stewardship. However, four new simpler non-competitive offers have been introduced in 2018 to complement the higher tier and mid-tier options and open up the scheme to more farmers and land managers. Holdings that have land entered into an agri-environment scheme are identified in Table 9.

#### **Number, type and size of holdings**

- 4.3.39 Table 9 sets out the current understanding of main farm holdings within this study area. The details of holdings have been obtained from face-to-face interviews with farm owners and occupiers. Publicly available sources have been used to obtain information about farm holdings where it has not yet been possible to arrange interviews and this information will be validated as survey work continues. Other farm holdings may be identified as survey work continues and the design develops. Effects on these farm holdings will be reported in the formal ES.

4.3.40 Table 9 also sets out the sensitivity of individual holdings to change. This is determined by the extent to which they have the capacity to absorb or adapt to impacts, which in turn is determined primarily by their nature and scale. In general terms, larger holdings have a greater capacity to change enterprise mix and scale, can better absorb impacts and are less sensitive. Units that rely on the use of buildings (such as intensive livestock and dairy farms, and horticultural units) are less able to accommodate change and have a higher sensitivity. Non-commercial land uses and units, such as pony paddocks associated with residential properties, have a low sensitivity.

Table 9: Summary of characteristics of holdings

| Holding name                                 | Holding type           | Holding size (ha) | Diversification                       | Agri-environment scheme | Sensitivity to change |
|----------------------------------------------|------------------------|-------------------|---------------------------------------|-------------------------|-----------------------|
| Birchmoor Farm (part of Baddesley Park Farm) | Arable and beef cattle | 242               | None                                  | None                    | Medium                |
| Pooley Hall Farm (part of Park Farm)         | Arable                 | 505               | Commercial lets and rental properties | HLS                     | Medium                |
| Donative Farm                                | Arable and beef cattle | 173               | Equestrian and holiday lets           | None                    | Medium                |
| Bramcote Hall Farm                           | Arable                 | 721               | None                                  | None                    | Medium                |
| Land east of Newton Lane                     | Equestrian             | 6                 | Not known                             | None                    | Low                   |
| Land at Newton Lane*                         | Equestrian             | 5                 | None                                  | None                    | Low                   |
| Land west of No Mans Heath Lane*             | Sheep                  | 13                | Not known                             | None                    | Medium                |
| Land east of No Mans Heath Lane*             | Arable                 | 67                | Not known                             | None                    | Medium                |

\* It has not yet been possible to arrange farm impact assessment interviews with these holdings. Publicly available sources have been used to obtain the information presented.

## 4.4 Effects arising during construction

### Avoidance and mitigation measures

4.4.1 In addition to design features that would be included in the Proposed Scheme to mitigate the impacts on farm holdings, there is a need to avoid or reduce environmental impacts to soils during construction. Soil resources from the areas required temporarily and permanently for the Proposed Scheme would be stripped and stored. This would enable agricultural land that is required temporarily for construction to be returned to agricultural use. It would also enable soils to be returned to other uses, such as to support landscape planting and biodiversity, and to a suitable condition whereby they would be able to fulfil the identified function.

4.4.2 Compliance with the Code of Construction Practice<sup>35</sup> (CoCP) will avoid or reduce environmental impacts during construction. Those measures that are particularly relevant to agriculture, forestry and soils are set out in the draft CoCP and relate to:

- the reinstatement of agricultural land that is used temporarily during construction to agriculture, where this is the agreed end use (Section 6);
- the provision of a method statement within the farm pack for stripping, handling, storing and replacing agricultural and woodland soils to reduce risks associated with soil degradation on areas of land to be returned to agriculture and woodland following construction, based on detailed soil survey work to be undertaken prior to construction. This would include any remediation measures necessary following the completion of works (Section 6);
- special provisions for handling peat and peaty soils, where the disturbance of these soils cannot be avoided (Section 6);
- a requirement for contractors to monitor and manage flood risk and other extreme weather events, insofar as reasonably practicable, that may affect agriculture, forestry and soil resources during construction (Sections 5 and 16);
- arrangements for the maintenance of farm and field accesses affected by construction (Section 6);
- the protection and maintenance of existing land drainage and livestock water supply systems, where reasonably practicable (Sections 6 and 16);
- the protection of agricultural land adjacent to the construction site, including the provision and maintenance of appropriate stock-proof fencing (Sections 5, 6, 9 and 12);
- the adoption of measures to control the deposition of dust on adjacent agricultural crops (Section 7);
- the control of invasive and non-native species; and the prevention of the spread of weeds generally from the construction site to adjacent agricultural land (Section 9);
- the adoption of measures to prevent, insofar as reasonably practicable, the spread of soil-borne, tree, crop and animal diseases from the construction area (Sections 6 and 9); and
- liaison and advisory arrangements with affected landowners, occupiers and agents, as appropriate (Sections 5 and 6).

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<sup>35</sup> Supporting document: Draft Code of Construction Practice.

- 4.4.3 As part of the ongoing development of the design, the following measures have been incorporated at this stage to avoid or mitigate adverse impacts on agriculture, forestry or soils:
- Pooley Lane overbridge at Pooley Lane would enable Pooley Hall Farm to access land between the M42 and the Proposed Scheme (see Volume 2: Map CT-06-407b, H5 to H6);
  - Bramcote Hall Farm overbridge would provide access to the farm holding across the route of the Proposed Scheme and the M42 (see Volume 2: Map CT-06-409, B5 to B6); and
  - Warwickshire Footpath AE4 underbridge would provide agricultural access to severed land at Birchmoor Farm and Bramcote Hall Farm between the Proposed Scheme and the M42 (see Volume 2: Map CT-06-410, B6).

4.4.4 As the design develops it will be necessary to continue to assess the requirement for access to severed parcels of agricultural land.

4.4.5 Upon completion of construction, it is currently anticipated that soils replaced for agricultural, forestry or landscape uses would be monitored to identify any unsatisfactory growing conditions during the five-year aftercare period.

4.4.6 Where agricultural uses are to be resumed on land disturbed during the construction of the Proposed Scheme, the design objective is to avoid any reduction in long term capability, which would downgrade the quality of the disturbed land, through the adoption of good practice techniques in handling, storing and reinstating soils on that land. Some poorly or very poorly drained land or land with heavier textured soils (such as the Bardsey and Fladbury 2 association soils) may also require particularly careful management, such as the timing of cultivation and livestock grazing, during the aftercare period to ensure this outcome.

### **Assessment of impacts and effects**

- 4.4.7 The acquisition and use of land for the Proposed Scheme would interfere with existing uses of that land and, in some locations, preclude existing land uses or sever and fragment individual fields and operational units of agricultural and forestry land. This could result in potential effects associated with the ability of affected agricultural and forestry interests to access and effectively use residual parcels of land. There may also be the loss of, or disruption to, buildings and operational infrastructure such as drainage. The Proposed Scheme seeks to reduce this disruption and, where appropriate and reasonably practicable, incorporate residual parcels of land no longer effective for agricultural use due to their size and/or shape as part of environmental mitigation works, such as ecological habitat creation.
- 4.4.8 Land used to construct the Proposed Scheme would fall into the following main categories when work is complete:
- part of the operational railway or associated infrastructure and kept under the control of the operator;

- returned to agricultural use (with aftercare management to ensure stabilisation of the soil structure);
- used for drainage or replacement floodplain storage areas, which may also retain some agricultural use; or
- used for ecological and/or landscape mitigation.

### *Temporary effects during construction*

#### **Impacts on agricultural land**

- 4.4.9 Interpretation of publicly available data shows that the Proposed Scheme is likely to require approximately 250ha of agricultural land within the Birchmoor to Austrey area during the construction phase, of which approximately 150ha (60%) are likely to be classified as BMV land (Grades 2 and 3a). This is a high magnitude of impact on BMV land.
- 4.4.10 As BMV land in this local area is a receptor of medium sensitivity, it is currently expected that the likely effect of the Proposed Scheme on BMV land during the construction phase would be major/moderate adverse, which would be significant.
- 4.4.11 Following completion of construction, temporary facilities would be removed and the topsoil and subsoil reinstated in accordance with the agreed end use for the land. Some permanently displaced soils may be used to restore land to agriculture or other uses with slightly deeper topsoil and subsoil layers, where appropriate.

#### **Nature of the soil to be disturbed**

- 4.4.12 The sensitivity of the soils disturbed by construction activity reflects their textural characteristics, in light of local FCDs, as set out in the SMR. In areas with the highest number of FCDs, and during the wettest times of the year, soils with high clay and silt fractions are most susceptible to the effects of handling during construction and the re-instatement of land; whereas soils with a high sand fraction in areas with the fewest number of FCDs and during the driest times of the year are the least susceptible.
- 4.4.13 Successful soil handling is dependent upon movements being undertaken under appropriate weather and ground conditions using the appropriate equipment. The principles of soil handling are well established and set out in advisory material such as Defra's Code of Practice for the Sustainable Use of Soils<sup>36</sup>. These principles would be followed throughout the construction period.
- 4.4.14 Clayey and seasonally waterlogged soils (including Bardsey and Fladbury 2 associations) are least able to remain structurally stable if moved in wet conditions or by inappropriate equipment. They are susceptible to compaction and smearing, which could affect successful reinstatement.
- 4.4.15 The disturbance of peat soils has implications for carbon emissions and biodiversity. Design development of the Proposed Scheme would seek to reduce disturbance of

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<sup>36</sup> Defra (2009), *Construction Code of Practice for the Sustainable Use of Soils on Construction Sites*

any deep peat soils as far as possible. Where disturbance cannot be avoided, the peat soils would be handled with particular care to avoid compaction when wet and wind erosion when dry. When reinstated, opportunities would be taken to use peat soils to create habitats, enhance biodiversity and build carbon reserves.

- 4.4.16 Implementation of the measures set out in the draft CoCP would reduce the magnitude of impact on soil. The detailed soil survey data will define the sensitivity of soil, and the assessment of the effects on soils to be disturbed will be reported in the formal ES.

### Impacts on holdings

- 4.4.17 Land may be required for the Proposed Scheme from holdings temporarily, during the construction period, or permanently. In most cases, the temporary and permanent land requirement would occur simultaneously at the start of the construction period and it is the combined effect of both that would have the most impact on the holding. During the construction period, some agricultural land would be restored and the impact on individual holdings would reduce.
- 4.4.18 The effects of the Proposed Scheme on individual agricultural and related interests during the construction period will be reported in the formal ES. The formal ES will present the total area of land required on a particular holding during the construction period in absolute terms and as a percentage of the total area farmed. It will also show the area of land that would be returned to the holding following the construction period. The disruptive effects, principally of construction noise and dust, will be reported in the formal ES and assessed according to their effects on land uses and enterprises.
- 4.4.19 The potential temporary effects from the construction of the Proposed Scheme on individual agricultural and related interests are summarised in Table 10 for those holdings currently identified. The scale of the impact of land required to construct the Proposed Scheme is based on the likely proportion of land required from the holding during construction. The effects of severance will be judged on the ease and availability of access to severed land. With the implementation of the measures set out in the draft CoCP, these would generally be the same during and post construction.
- 4.4.20 The potential scale of effect is determined by combining the highest impact on the farm holding with the sensitivity of that holding, as set out in the SMR.

Table 10: Summary of temporary effects on holdings from construction

| Holding name/sensitivity to change                                 | Land potentially required | Potential severance impact | Potential scale of effect |
|--------------------------------------------------------------------|---------------------------|----------------------------|---------------------------|
| Birchmoor Farm (part of Baddesley Park Farm)<br>Medium sensitivity | Medium                    | Medium                     | Moderate adverse          |
| Pooley Hall Farm (part of Park Farm)<br>Medium sensitivity         | Low                       | Medium                     | Moderate adverse          |

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| Holding name/sensitivity to change                           | Land potentially required | Potential severance impact | Potential scale of effect |
|--------------------------------------------------------------|---------------------------|----------------------------|---------------------------|
| Donative Farm<br>Medium sensitivity                          | Low                       | Negligible                 | Minor adverse             |
| Bramcote Hall Farm<br>Medium sensitivity                     | Medium                    | Medium                     | Moderate adverse          |
| Land to the east of Newton Lane<br>Low sensitivity           | High                      | Negligible                 | Moderate adverse          |
| Land at Newton Lane<br>Low sensitivity                       | High                      | Negligible                 | Moderate adverse          |
| Land to the west of No Mans Heath Lane<br>Medium sensitivity | High                      | Negligible                 | Major/moderate adverse    |
| Land east of No Mans Heath Lane<br>Medium sensitivity        | High                      | Negligible                 | Major/moderate adverse    |

- 4.4.21 Overall, the construction of the Proposed Scheme could potentially affect eight holdings in the Birchmoor to Austrey area temporarily. On the basis of information currently available, seven holdings could experience moderate or major/moderate adverse permanent effects from construction, which would be significant for each holding.
- 4.4.22 Two farm holdings are currently expected to experience major/moderate adverse temporary effects due to the high proportion of land required for the Proposed Scheme from relatively small land holdings.
- 4.4.23 Five farm holdings would experience moderate adverse temporary effects. In the case of Birchmoor Farm, Bramcote Hall Farm and Pooley Hall Farm, this is due to medium impacts as a result of land required for the Proposed Scheme and/or severance impacts on medium sensitivity farm holdings. In relation to two farm holdings (land at Newton Lane and land to the east of Newton Lane), this is due to the high land requirements on low sensitivity holdings.
- 4.4.24 Although financial compensation would be available under existing statutory arrangements to offset these impacts, it is not a consideration in the assessment of effects on farm holdings.

*Permanent effects of construction*

**Impacts on agricultural land**

- 4.4.25 Interpretation of publicly available data shows that the Proposed Scheme is likely to require approximately 110ha of agricultural land permanently within the Birchmoor to Austrey area, of which approximately 70ha (64%) are likely to be classified as BMV land (Grades 2 and 3a). This would be an impact of high magnitude on BMV land.

- 4.4.26 As BMV land in this local area is a receptor of medium sensitivity, it is currently expected that the likely effect of the Proposed Scheme on BMV land following construction would be major/moderate adverse, which would be significant.

### Impacts on forestry land

- 4.4.27 It is currently expected that no areas of commercial forestry land would be required for the Proposed Scheme in this study area. The qualitative assessment of loss of woodland is presented in Section 7, Ecology and biodiversity.

### Impacts on holdings

- 4.4.28 The potential permanent effects from the construction of the Proposed Scheme on individual agricultural and related interests are summarised in Table 11 for those holdings currently identified. The scale of the impact of land required to operate the Proposed Scheme is based on the likely proportion of land required from the holding. The potential effects of severance are judged on the ease and availability of access to severed land once construction is completed. The impact on farm infrastructure refers mainly to the potential loss of or damage to farm capital, such as property, buildings and structures, and the consequential effects on land uses and enterprises.
- 4.4.29 The potential scale of effect is determined by combining the highest impact on the farm holding with the sensitivity of that holding, as set out in the SMR.

Table 11: Summary of permanent effects on holdings from construction

| Holding name/Sensitivity to change                                 | Land potentially required | Potential severance impact | Potential impact on farm infrastructure | Potential scale of effect |
|--------------------------------------------------------------------|---------------------------|----------------------------|-----------------------------------------|---------------------------|
| Birchmoor Farm (part of Baddesley Park Farm)<br>Medium sensitivity | Low                       | Medium                     | High                                    | Major/moderate adverse    |
| Pooley Hall Farm (part of Park Farm)<br>Medium sensitivity         | Negligible                | Medium                     | Low                                     | Moderate adverse          |
| Donative Farm<br>Medium sensitivity                                | Low                       | Negligible                 | Low                                     | Minor adverse             |
| Bramcote Hall Farm<br>Medium sensitivity                           | Low                       | Medium                     | Low                                     | Moderate adverse          |
| Land to the east of Newton Lane<br>Low sensitivity                 | High                      | Medium                     | High                                    | Moderate adverse          |
| Land at Newton Lane<br>Low sensitivity                             | High                      | High                       | High                                    | Moderate adverse          |
| Land to the west of No Mans Heath Lane<br>Medium sensitivity       | High                      | High                       | Low                                     | Major/moderate adverse    |



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| Holding name/Sensitivity to change                    | Land potentially required | Potential severance impact | Potential impact on farm infrastructure | Potential scale of effect |
|-------------------------------------------------------|---------------------------|----------------------------|-----------------------------------------|---------------------------|
| Land east of No Mans Heath Lane<br>Medium sensitivity | High                      | Negligible                 | Low                                     | Major/moderate adverse    |

4.4.30 Overall, the construction of the Proposed Scheme is currently expected to affect eight holdings in the Birchmoor to Austrey area permanently. On the basis of information currently available, seven holdings are currently expected to experience moderate or major/moderate adverse permanent effects from construction, which would be significant for each holding.

4.4.31 Three farm holdings are currently expected to experience major/moderate adverse permanent effects due either to high proportions of land required on relatively small holdings or the high impact on farm infrastructure on Birchmoor Farm. Four farm holdings would experience moderate adverse permanent effects due either to the proportion of the farm's land required for the Proposed Scheme and high impacts on farm infrastructure on low sensitivity holdings or medium severance impacts on medium sensitivity holdings.

4.4.32 Although financial compensation will be available under existing statutory arrangements, there can be no certainty that this would be used to reduce the above adverse effects by the purchase of replacement land or the construction of replacement buildings. Therefore, the above assessment should be seen as the worst case, which could be reduced if the owner and/or occupier is able, and chooses, to use compensation payments to replace assets.

### Other mitigation measures

4.4.33 Other mitigation would incorporate climate change adaptation and resilience measures, insofar as reasonably practicable. For example, restored soils in areas that could be prone to drought with climate change could potentially be replaced at greater depths than at present to make them resilient to drought.

4.4.34 A farm pack within the Phase 2b Farmers and Growers Guide would be provided to all farmers and landowners, setting out baseline conditions on the farm and the assurances and obligations that HS2 Ltd would accept upon entering the land. This would include advice and appropriate assistance where there is a need for the landowner to relocate or re-provide agricultural buildings displaced by the Proposed Scheme.

### Summary of likely residual significant effects

4.4.35 Although the extent of land required by ALC grade is not yet known in the Birchmoor to Austrey area, current indications based on publicly available information are that the effect on BMV agricultural land would be major/moderate adverse temporarily during construction and permanently from construction, which would both be significant. The area of land required by ALC grade will be assessed and reported in the formal ES.

4.4.36 Seven of the eight farm holdings identified are currently expected to experience moderate or major/moderate adverse temporary effects during construction and permanently from construction, which would both be significant for each holding.

4.4.37 Effects on forestry land and soils to be disturbed will be reported in the formal ES.

## **4.5 Effects arising from operation**

### **Avoidance and mitigation measures**

4.5.1 No measures are currently anticipated to be required to mitigate the operational effects of the Proposed Scheme on agriculture, forestry and soils.

### **Assessment of impacts and effects**

4.5.2 Potential impacts arising from the operation of the Proposed Scheme would include:

- noise emanating from moving trains; and
- the propensity of operational land to harbour noxious weeds.

4.5.3 No farm buildings have been identified within approximately 100m of the route of the Proposed Scheme. The potential for significant effects on sensitive housed livestock receptors from noise will be assessed and reported in the formal ES.

4.5.4 The propensity of linear transport infrastructure to harbour and spread noxious weeds is a consequence of:

- the management of the highway and railway land; and
- the propensity of the weeds to spread onto such land from adjoining land, which could be exacerbated by the effects of climate change.

4.5.5 The presence of noxious weeds (particularly ragwort) would be controlled using an appropriate management regime that identifies and remedies areas of weed growth that might threaten adjoining agricultural interests.

### **Other mitigation measures**

4.5.6 No other mitigation measures have been identified at this stage.

### **Summary of likely residual significant effects**

4.5.7 No residual significant effects on agriculture, forestry and soils have been identified at this stage as a result of the operation of the Proposed Scheme.

### **Monitoring**

4.5.8 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.

4.5.9 There are no area-specific requirements identified for monitoring agriculture, forestry and soil during the operation of the Proposed Scheme in the Birchmoor to Austrey area.

## 5 Air quality

### 5.1 Introduction

- 5.1.1 This section of the report provides an assessment of the impacts and likely significant effects on air quality identified to date arising from the construction and operation of the Proposed Scheme within the Birchmoor to Austrey area. Oxides of nitrogen (NO<sub>x</sub>) including nitrogen dioxide (NO<sub>2</sub>), fine particulate matter<sup>37</sup> (PM<sub>10</sub>, PM<sub>2.5</sub>) and dust have been considered in the assessment. Emissions of all or some of these air pollutants are likely to arise from construction activities, demolition, site preparation work and the use of site haul routes. Emissions would also arise from road traffic during construction and operation of the Proposed Scheme.
- 5.1.2 Engagement with North Warwickshire Borough Council (NWBC) and Tamworth Borough Council (TBC) has commenced and is ongoing. The purpose of this engagement has been to obtain relevant baseline information, which includes monitoring data in this area.
- 5.1.3 Maps showing the location of the key environmental features (Map Series CT-10) and the key construction (Map Series CT-05) and key operational (Map Series CT-06) features of the Proposed Scheme can be found in the Volume 2: LA02 Map Book.

### 5.2 Scope, assumptions and limitations

- 5.2.1 The scope, assumptions and limitations for the air quality assessment are set out in Volume 1 (Section 8) and the Scope and Methodology Report (SMR)<sup>38</sup>.
- 5.2.2 The study areas for the air quality assessment have been determined on the basis of where impacts on local air quality may occur<sup>39</sup>: from construction;
- from changes in the nature of traffic during construction and operation; for example, increases in traffic flows during construction or where road closures or restrictions cause diversions and heavier traffic on adjacent roads;
  - where road alignments have changed; or
  - from the operation of combustion plant at buildings.
- 5.2.3 The assessment of construction traffic will be reported in the formal ES. The assessment will incorporate HS2 Ltd's policies on vehicle emissions. These include the use of Euro VI heavy goods vehicles, Euro 4 petrol and Euro 6 diesel cars and light goods vehicles during the construction of the Proposed Scheme.
- 5.2.4 The assessment of construction traffic impacts will use traffic data based on an estimate of the average daily flows in the peak year during the construction period (2023-2032). The assessment will assume vehicle emission rates and background

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<sup>37</sup> PM<sub>2.5</sub> and PM<sub>10</sub> describe two size fractions of airborne particles that can be inhaled and therefore are of concern for human health. The designations refer to particles of size less than 2.5 and 10 microns in diameter.

<sup>38</sup> Supporting document: HS2 Phase 2b Environmental Impact Assessment Scope and Methodology Report

<sup>39</sup> The assessment of construction dust emissions has been undertaken where sensitive receptors are located up to a distance of 350m from dust generating activities. The assessment of traffic emissions will be undertaken where sensitive receptors are located up to a distance of 200m from roads screened in for further assessment.

pollutant concentrations from year 2023. As both pollutant emissions from vehicle exhausts and background pollutant concentrations are anticipated to reduce year by year as a result of vehicle emission controls, the year 2023 represents the worst case for the construction assessment.

## 5.3 Environmental baseline

### Existing baseline

#### *Background air quality*

- 5.3.1 The main sources of air pollution in the Birchmoor to Austrey area are emissions from road vehicles and agricultural activities. The main roads within the area are the M42 and B5000 Tamworth Road.
- 5.3.2 There are two industrial installations (regulated by the Environment Agency) with permits for emissions to air, namely Tamworth Waste Disposal Ltd and CP Motors. The contribution of all industrial processes and other emission sources to local air quality is included within the background concentrations.
- 5.3.3 Estimates of background air quality have been obtained from the Department for Environment, Food and Rural Affairs (Defra)<sup>40</sup> for the baseline year of 2017. The data are estimated for 1km grid squares for NO<sub>x</sub>, NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>. Background concentrations are within the air quality standards for all pollutants within the Birchmoor to Austrey area.

#### *Local monitoring data*

- 5.3.4 There are currently no local authority diffusion tube sites located within the Birchmoor to Austrey area.

#### *Air quality management areas*

- 5.3.5 There are no air quality management areas (AQMAs) within the Birchmoor to Austrey area.

#### *Receptors*

- 5.3.6 Several locations have been identified in the area as sensitive receptors, which are considered to be susceptible to changes in air quality due to their proximity to dust generating activities or traffic routes during construction or operation of the Proposed Scheme.
- 5.3.7 Most of the receptors which may be affected by the Proposed Scheme are residential. Other receptors include The Polesworth School, Birchwood Primary School and Pooley Hall Farm buildings.

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<sup>40</sup> Department for Environment, Food and Rural Affairs (Defra); Defra Background Pollutant Concentration Maps. Available online at: <http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2015>

5.3.8 There is one statutory designated ecological site identified within the Birchmoor to Austrey area, namely Alvecote Pools Site of Special Scientific Interest (SSSI). Further details of this ecological receptor are set out in Section 7, Ecology and biodiversity.

## 5.4 Effects arising during construction

### Avoidance and mitigation measures

5.4.1 Emissions to the atmosphere will be controlled and managed during construction through the route-wide implementation of the Code of Construction Practice (CoCP)<sup>41</sup>. The draft CoCP includes a range of mitigation measures that are accepted by the Institute of Air Quality Management (IAQM) as being suitable to reduce impacts to as low a level as is reasonably practicable. These measures are generally sufficient to avoid any significant effects from dust during construction.

5.4.2 The assessment has assumed that the general measures detailed in Section 7 of the draft CoCP be implemented. These include:

- contractors being required to manage dust, air pollution, odour and exhaust emissions during construction works;
- inspection and visual monitoring, undertaken in consultation with the local authorities, to assess the effectiveness of the measures taken to control dust and air pollutant emissions;
- cleaning (including watering) of vehicle routes and designated vehicle waiting areas to suppress dust;
- the use of water spray systems on demolition sites to dampen down fugitive dust;
- keeping soil stockpiles away from sensitive receptors where reasonably practicable, also taking into account the prevailing wind direction relative to sensitive receptors;
- the use of enclosures to contain dust emitted from construction activities; and
- soil spreading, seeding and planting of completed earthworks as soon as reasonably practicable following completion of earthworks.

5.4.3 The draft CoCP includes the requirement for site-specific traffic management measures, such as the use of site haul routes for construction vehicles to minimise the need to use public roads.

### Assessment of impacts and effects

#### *Temporary effects*

5.4.4 Impacts from construction of the Proposed Scheme could arise from dust-generating activities and emissions from construction traffic. As such, the assessment of

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<sup>41</sup> Supporting document: Draft Code of Construction Practice

construction impacts has been undertaken for dust and exposure to NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations.

### **Construction dust effects**

- 5.4.5 The risks of demolition of existing buildings, earthworks, construction of new structures and trackout<sup>42</sup> have been assessed for their effect on dust soiling, human health<sup>43</sup> and ecological sites. There are residential receptors and one ecological receptor located within the Birchmoor to Austrey area.
- 5.4.6 It has been identified that for demolition, the risk of dust effects would range from negligible to medium within this area, depending on the location of sensitive receptors and the magnitude of the demolition activities. There would also be a negligible to low risk of human health effects from demolition. For earthworks and construction, the risk of dust effects would range from low to high, depending on the location of sensitive receptors and the magnitude of the earthworks and construction activities. There would also be a low to medium risk of human health effects from earthworks and construction. For trackout, there would be a high risk of dust effects and a low risk of human health effects. There would be a negligible risk of ecological effects from demolition and trackout activities and a low risk from the other dust generating activities.
- 5.4.7 With the application of the established national best practice mitigation measures contained in the draft CoCP, no significant effects are anticipated from the risks associated with the dust generating activities.

### **Construction traffic effects**

- 5.4.8 Construction activity could also affect local air quality through the additional traffic generated on local roads as a result of construction vehicles and through changes to traffic patterns arising from temporary road diversions and realignments.
- 5.4.9 The M<sub>42</sub>, A<sub>5</sub>, the B<sub>5080</sub> Pennine Way, the B<sub>5000</sub> Tamworth Road, B<sub>5493</sub>, No Man's Heath Lane/Austrey Lane, Newton Lane, Hermitage Lane, Pooley Lane, Austrey Road/Appleby Hill and Warton Lane/Bishops Cleeve/Main Road would likely provide the primary access for construction vehicles in this area. An increase in traffic flows as a result of construction traffic, temporary closures or diversions is anticipated on the M<sub>42</sub>, Green Lane (Birchmoor), Linden Lane and Salt Street. A detailed assessment of air quality impacts from traffic emissions in the area will be undertaken and reported in the formal ES.
- 5.4.10 Direct and indirect effects from changes in air quality, such as those arising from increased levels of construction traffic, will be considered for all sensitive receptors within 200m of construction routes. These will include human receptors and those ecological habitats considered to be sensitive to changes in air quality. These effects will be reported in the formal ES.

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<sup>42</sup> Trackout refers to the transport of dust and dirt from the construction site(s) onto the public road network, where it may be deposited and then re-suspended by vehicles using the network.

<sup>43</sup> Human health effects relate mainly to short-term exposure to particles of size between 2.5µm to 10µm, measured as PM<sub>10</sub>.

### *Permanent effects*

- 5.4.11 No permanent effects on local air quality are likely to arise during construction of the Proposed Scheme.

### **Other mitigation measures**

- 5.4.12 No other mitigation measures are proposed at this stage in relation to air quality during construction of the Proposed Scheme in this area.

### **Summary of likely residual significant effects**

- 5.4.13 The methods outlined within the draft CoCP would be effective at reducing dust emissions and, therefore, no significant residual effects would be anticipated. Any significant residual effects from construction traffic emissions will be reported in the formal ES.

## **5.5 Effects arising from operation**

### **Avoidance and mitigation measures**

- 5.5.1 No specific mitigation measures for air quality are proposed during operation of the Proposed Scheme.

### **Assessment of impacts and effects**

- 5.5.2 Impacts from the operation of the Proposed Scheme would arise from changes in the volume, composition and/or speed of road traffic and changes in road alignment.
- 5.5.3 There would be no direct atmospheric emissions from the operation of trains that would cause an impact on air quality, and therefore no assessment is required. Indirect emissions from sources such as rail wear and brakes have been assumed to be negligible.

### **Operational traffic effects**

- 5.5.4 Direct and indirect effects from changes in air quality, such as those arising from increased levels of traffic, will be considered for all receptors within 200m of affected roads. These will include human receptors and those ecological habitats considered to be sensitive to changes in air quality. Any effects will be reported in the formal ES.

### **Other mitigation measures**

- 5.5.5 No other mitigation measures are proposed at this stage in relation to air quality in this area during operation of the Proposed Scheme.

### **Summary of likely residual significant effects**

- 5.5.6 Any significant residual effects for air quality from the operation of the Proposed Scheme will be reported in the formal ES.

## Monitoring

- 5.5.7 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.
- 5.5.8 Any area specific requirements for monitoring air quality effects during operation of the Proposed Scheme in this area will be reported in the formal ES.



## 6 Community

### 6.1 Introduction

- 6.1.1 This section of the report describes the impacts and likely significant effects identified to date on local communities resulting from the construction and operation of the Proposed Scheme in the Birchmoor to Austrey area.
- 6.1.2 The assessment draws on information gathered from engagement with the users and operators of community facilities including Staffordshire County Council (SCC); Warwickshire County Council (WaCC); North Warwickshire Borough Council (NWBC); Leicestershire Local Access Forum; and Polesworth (Abbey) and Tamworth District Scout Groups. The purpose of this engagement has been to understand how the facilities are used and to obtain relevant baseline information to inform the design development and assessment of the Proposed Scheme. Engagement will continue with these and other stakeholders to inform the formal ES.
- 6.1.3 Maps showing the location of the key environmental features (Map Series CT-10) and the key construction (Map Series CT-05) and key operational (Map Series CT-06) features of the Proposed Scheme can be found in the Volume 2: LA02 Map Book.

### 6.2 Scope, assumptions and limitations

- 6.2.1 The assessment scope, key assumptions and limitations for the community assessment are set out in Volume 1 (Section 8) and the Scope and Methodology Report (SMR)<sup>44</sup>.
- 6.2.2 The assessment of in-combination effects will draw upon the findings of other technical disciplines (e.g. air quality, sound, noise and vibration, landscape and visual and traffic and transport). Likely significant in-combination effects on community facilities and resources will be reported in the formal ES.
- 6.2.3 Effects relating to the severance of public rights of way (PRoW) (public footpaths and bridleways) and highway and pedestrian diversions, are assessed under the traffic and transport topic. However, where PRoW and other routes are a 'promoted' destination in their own right as a recreation resource, they will be considered within the community assessment. Where impacts on open space and PRoW are considered, these have been informed by open space and PRoW condition surveys, where it has been possible to undertake such surveys.
- 6.2.4 Where reasonably practicable, public footpaths and routes would be reinstated or convenient alternatives provided. HS2 Ltd will seek to provide a temporary or permanent alternative route in advance of a closure of a road or PRoW. No significant effects on these routes are likely once the mitigation measures have been implemented. Alternative temporary routes have not been defined in all cases due to the relatively early stage of design of the Proposed Scheme. Where this is the case they will be reported in the formal ES.

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<sup>44</sup>Supporting document: HS2 Phase 2b Environmental Impact Assessment Scope and Methodology Report

- 6.2.5 If a temporary or permanent alternative route cannot be provided in advance of any road or PRow closure then this will be discussed with the relevant local authority and local groups and reported in the formal ES.
- 6.2.6 The assessment in the working draft ES is based on the design information, including demolitions as set out in Section 2 available at the time of the assessment. This is subject to change as a result of design changes confirmed in advance of the submission of the hybrid Bill.
- 6.2.7 The construction of the Proposed Scheme could lead to isolation effects in one or more communities in this area. These will be assessed in the formal ES.
- 6.2.8 Overall, the study area is taken as the area of land that encompasses the likely significant effects of the Proposed Scheme. The study area includes the area of land required both temporarily and permanently for the construction and operation of the Proposed Scheme. It also includes a wider corridor within which receptors or resources could be affected by a combination of significant residual effects arising from, for example, noise, vibration, poor air quality, HGV traffic and visual intrusion. These in-combination effects will be identified in the formal ES. In addition, the study area has regard to the proposed routes of construction traffic and takes account of catchment areas for community facilities that could be affected where intersected by the Proposed Scheme.
- 6.2.9 For the working draft ES, the full details of the construction traffic routes and geographical scope of likely in-combination (amenity) effects are yet to be determined. In the formal ES, the study area and associated baseline of community resources will be updated to take account of these.

### **6.3 Environmental baseline**

- 6.3.1 The Proposed Scheme through the Birchmoor to Austrey area would be approximately 8.9km in length and lies within the NWBC and WaCC areas. It would extend from Birchmoor in the south to Austrey and Newton Regis in the north, passing close to the settlements of Polesworth and Austrey.
- 6.3.2 The Birchmoor to Austrey area is predominantly rural in nature with only a few settlements and scattered dwellings. In general, the majority of community facilities are located within Polesworth.

#### **Birchmoor**

- 6.3.3 The main part of the village of Birchmoor is located approximately 380m east of Stoneydelph (a district ward situated within Tamworth) with a smaller number of residential properties adjacent to the district ward. The village comprises approximately 250 residential properties. The majority of the village is located east of the M42, with some properties situated west of the M42. West of the M42, the nearest residential properties would be adjacent to the route of the Proposed Scheme. East of the M42, the nearest residential properties would be approximately 120m from the route of the Proposed Scheme. Birchmoor is connected to the larger urban areas of Stoneydelph to the west and Polesworth to the north.

- 6.3.4 Within the study area, the community resources include Birchmoor Working Mens Club, The Gamecock Inn public house, St John's Church, an allotment area and Polesworth Recreation Ground which includes a small playground.

### **Polesworth**

- 6.3.5 The village of Polesworth is located approximately 900m east of Stoneydelph and approximately 500m east of the M42. The village comprises approximately 2,800 residential properties. The nearest residential properties would be approximately 380m east of the route of the Proposed Scheme. Polesworth is bounded by agricultural fields to its east and west. The north of the village is bordered by the West Coast Main Line (WCML). To the south of Polesworth lies Dordon village. Polesworth is connected to Stoneydelph by the B5000 Tamworth Road.
- 6.3.6 Within the study area, there are a wide range of community resources in Polesworth including outdoor play and sport spaces (including Abbey Green Park); open spaces; Polesworth Baptist Church; Polesworth Congregational Church; the Nethersole Church of England Academy; community centres including Polesworth Library & Information Centre and Polesworth Memorial Hall; health and social care facilities; The Spread Eagle and Bulls Head public houses; the Polesworth Sports and Social Club and a fire station. A clinic (Meet Your Miracle Studio) offering private antenatal and postnatal services is located to the west of Polesworth. Pooley Country Park is a key area of open space covering approximately 62.5ha. The River Anker and the Coventry Canal also pass through the Country Park. Within Pooley Country Park, there are recreational facilities such as walking and cycling trails and a children's play area. The Polesworth (Abbey) Scout Group activity centre and Pooley Fields Heritage Centre are located within the park's south-eastern extents. The activity centre comprises several activity rooms and an outside area suitable for camping and outdoor leisure activities.

### **Austrey and Newton Regis**

- 6.3.7 The village of Austrey is located approximately 1.9km south-east of the village of No Man's Heath and approximately 550m east of the M42. The village of Newton Regis is located approximately 1.5km south-west of the village of No Man's Heath and approximately 710m west of the M42. In total, Austrey and Newton Regis comprise approximately 450 residential properties. In Austrey, the nearest residential properties would be approximately 400m east of the route of the Proposed Scheme. Austrey is connected to the village of No Man's Heath by No Man's Heath Lane and the village of Warton, approximately 2.4km south-west of Austrey, by Warton Lane.
- 6.3.8 Within the study area, the community resources in Austrey include St Nicholas Church; Austrey Baptist Church; a play area the Bird In Hand public house; Austrey allotments and Austrey Church of England Primary School. In addition, to the west of the village, Austrey Playing Fields comprise two sports pitches, a play area as well as a pavilion and changing facilities. Austrey Playing Fields are used by a local forestry group, named Discover Outdoors, which organises outdoor activities for children.
- 6.3.9 Within the study area, the community resources in Newton Regis include St Mary the Virgin Church, Newton Regis Church of England Primary School, Newton Regis Village Hall, and a cricket club with associated playing field and tennis court facilities. There is

an equestrian centre which is located approximately 500m west of the route of the Proposed Scheme.

## 6.4 Effects arising during construction

### Avoidance and mitigation measures

6.4.1 As part of design development, the following measures have been incorporated into the Proposed Scheme design to avoid or reduce adverse environmental impacts during construction:

- provision of the M<sub>42</sub> Tamworth tunnel under the M<sub>42</sub> and Green Lane M<sub>42</sub> Overbridge which would reduce adverse impacts on residential properties located in Birchmoor village;
- provision of the Polesworth viaduct, which would enable the Proposed Scheme to pass over the Coventry Canal and enable the canal to continue to be suitable for recreational activities; and
- maintaining the existing alignment of Newton Lane to the east of the route of the Proposed Scheme to provide continued access to Austrey allotments during construction.

6.4.2 The draft Code of Construction Practice (CoCP)<sup>45</sup> includes a range of provisions that would help mitigate community effects associated with construction within this area, including:

- implementation of a community engagement framework to provide appropriate information and resolve community issues (Section 5 of the draft CoCP);
- sensitive layout of construction sites to reduce nuisance as far as possible (Section 5);
- maintenance of PRoW during construction where reasonably practicable (Section 14);
- monitoring and management of flood risk and other extreme weather events, where reasonably practicable, which may affect community resources during construction (Section 16);
- specific measures relating to air quality and noise will also reduce impacts for the neighbouring communities including discretionary noise insulation for sensitive community resources and in special circumstances, temporary rehousing (Sections 7 and 13); and
- where practicable, the avoidance of HGVs operating adjacent to schools during drop-off and pick-up periods (Section 14).

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<sup>45</sup> Supporting document: Draft Code of Construction Practice

## Assessment of impacts and effects

### *Temporary effects*

#### **Residential properties**

- 6.4.3 Within the Polesworth area, the construction of Polesworth viaduct would affect two residential houseboat moorings on the Coventry Canal, located within the settlement of Polesworth. It is expected that the canal would be closed for four separate one-day closures to allow construction of the viaduct. In addition, access to these residential houseboat moorings would be severed during construction activities. These residential properties would be temporarily impacted. Proposed mitigation regarding accessibility to these two residential houseboat moorings and an updated assessment of the likely effects will be reported in the formal ES.

#### **Community facilities**

- 6.4.4 Within the Polesworth area, the land in Pooley Country Park surrounding the Polesworth (Abbey) Scout Group activity centre would be temporarily required for the construction of Pooley Lane embankment which would last for approximately one year and six months. Construction of the Proposed Scheme would affect the capacity of the scout group to use the area for outdoor activities. In addition to being used by Polesworth (Abbey) Scout Group, the activity centre is also hired for corporate use and by schools and other youth groups. The nearest scout group offering similar activities, 6th Tamworth (Amington) Scout Group, is located approximately 2.5km away while Polesworth Memorial Hall is a community centre located approximately 800m away and comprises three rooms which can be hired. The temporary loss of land would have a major adverse effect on Polesworth (Abbey) Scout Group, which would be significant.

#### **Recreational facilities**

- 6.4.5 No temporary effects on recreational facilities have been identified as a result of the land required for construction of the Proposed Scheme.

#### **Open space and recreational PRow**

- 6.4.6 Within Polesworth, the route of the Proposed Scheme would pass through Pooley Country Park parallel to the M42, to the west of the route. Approximately 22.3ha of the park equating to 36% of the resource would be required for approximately five years and six months for the construction of Pooley Lane cutting, Polesworth viaduct and Pooley Lane embankment. The affected area comprises the main park entrance, which is located in the south of the park, the Pooley Fields Heritage Centre and the visitor car park. The pedestrian entrance located in the northern part of the country park would remain accessible and unaffected. Pooley Country Park is used by the local community including Polesworth (Abbey) Scout Group which uses the resource for recreational activities, as well as people living across the West Midlands region. Land required for the Proposed Scheme would affect the functionality of Pooley Country Park, in particular the loss of the car park. The temporary loss of land at Pooley Country Park would have a moderate adverse effect which would be significant.

Proposed mitigation regarding accessibility to the resource and an updated assessment of the likely effects will be reported in the formal ES.

- 6.4.7 Within Polesworth, the Coventry Canal, which runs through Pooley Country Park, would be temporarily closed for two weeks to allow construction of Polesworth viaduct over the canal. A section of the Coventry Canal, approximately 225m (representing approximately 0.4% of the entire length of the canal), is expected to be disrupted for four separate one-day closures, which would enable canal boats to navigate outside of the construction period. The Coventry Canal is used for leisure activities such as kayaking or canoeing by local residents. The temporary closure of the canal would have a minor adverse effect, which would not be significant.
- 6.4.8 Within Austrey, the woodland adjacent to Austrey Playing Fields would lie within the land required for the construction of Newton Regis cutting. Approximately 0.05ha of the woodland adjacent to Austrey Playing Fields (equivalent to 5% of the resource) would be required for approximately two years. The woodland is used by a forestry group, named Discover Outdoors, for outdoor activities in relation to the surrounding nature. The group includes children from the local school, Austrey Church of England Primary School. The proximity of construction activities would potentially impact the group's ability to use the woodland. The temporary loss of land from this woodland would have a moderate adverse effect, which would be significant.

### *Permanent effects*

#### **Residential properties**

- 6.4.9 Within Birchmoor, west of the M42, a total of seven properties situated on Green Lane (Birchmoor) and Westfields would be located within the land required for the construction of the M42 Tamworth tunnel and the earthworks required for Green Lane M42 overbridge. These residential properties would be permanently lost. The permanent loss of these residential properties would have a moderate adverse effect, which would be significant.
- 6.4.10 Within Birchmoor, east of the M42, the temporary realignment of the M42 and construction of M42 Tamworth tunnel would require the demolition of three residential properties located on Dark Lane. These residential properties would be permanently lost.
- 6.4.11 Within Polesworth, the realignment of B5000 Tamworth Road and the construction of Hermitage Lane cutting would require the demolition of six residential properties located on Hermitage Lane, Birchmoor Lane and B5000 Tamworth Road. These properties would be permanently lost. The permanent loss of these residential properties would have a moderate adverse effect, which would be significant.
- 6.4.12 Within Polesworth, the construction of Pooley Lane overbridge and associated earthworks would require the demolition of one residential property located on Pooley Lane. This residential property would be permanently lost.
- 6.4.13 Within Austrey settlement, the realignment of No Man's Heath Lane would require the demolition of one residential property on No Man's Heath Lane. This residential property would be permanently lost.

- 6.4.14 Within Austrey settlement, the construction of Austrey embankment, No Man's Heath Lane viaduct and the realignment of No Man's Heath Lane would require a small proportion of the garden at three properties on No Man's Heath Lane. The loss of this outside space would not impact on the ability of the residents to use their dwellings and access would be modified. The permanent loss of garden space at these properties is not considered to have a significant community effect.

### **Community facilities**

- 6.4.15 Within Polesworth settlement, Pooley Lane cutting would sever Pooley Lane and the access to Polesworth (Abbey) Scout Group activity centre which is situated within Pooley Country Park. In addition to being used by Polesworth (Abbey) Scout Group, the facility is also hired for corporate use and by schools or other youth groups. An alternative access to the resource would be provided, but it is currently unknown when it would be built. Proposed mitigation and an assessment of the likely effects will be reported in the formal ES.
- 6.4.16 Within Polesworth, the construction of the Proposed Scheme would result in the loss of a private antenatal and postnatal services clinic, the Meet Your Miracle Studio Tamworth, due to earthworks associated with Hermitage Lane cutting which would require the demolition of its premises within the Hermitage Lane Business Park. The next nearest resource is located in Coventry, approximately 31km away (Meet Your Miracle Studio Coventry). The permanent loss of the resource would result in a moderate adverse effect, which would be significant.

### **Recreational facilities**

- 6.4.17 No permanent effects on recreational facilities have been identified as a result of the land required for construction of the Proposed Scheme.

### **Open space and recreational PRow**

- 6.4.18 Within Polesworth settlement, a proportion of Pooley Country Park would lie within the land required for Pooley Lane cutting, Pooley Lane embankment and Polesworth viaduct. It would represent a permanent loss of approximately 2.5ha open space land (equating to 4.0% of the resource), including the Pooley Fields Heritage Centre and part of the car park. Pooley Lane cutting would sever Pooley Lane, a vehicular road, as well as the vehicular access road off connecting Pooley Lane and Pooley Country Park. Users of the resources are drawn from both the local community, including Polesworth (Abbey) Scout Group's members, and people living within the West Midlands region. Land required for the Proposed Scheme would affect the functionality of Pooley Country Park. The permanent loss of land from this open space would result in a moderate adverse effect, which would be significant. Proposed mitigation regarding accessibility to the resource and an updated assessment of the likely effects will be reported in the formal ES.
- 6.4.19 Within Austrey, it is estimated that approximately 0.06ha of the land located in the north-west corner of Austrey Playing Fields (equivalent to 5.5% of one of the two fields) would be permanently lost as a result of Newton Regis cutting. The affected playing fields would no longer be usable given that the loss of land would impair the ability of users to utilise the resource for its intended purpose. In addition to being



used for regular sporting activities, Austrey Playing Fields are occasionally used for local events (e.g. Austrey Bonfire) and to host local archery clubs activities during the summer. There is no adequate alternative resource in the local area. The permanent loss of this resource would result in a major adverse effect, which would be significant.

- 6.4.20 Within Austrey, the children's play area at Austrey Playing Fields would lie within the land required for the construction of Newton Regis cutting. The resource would be permanently lost. The play area is suitable only for young children aged under five years old and is likely to be used primarily by users of the Austrey Playing Fields, given that the resource is located approximately 400m from Austrey. Approximately 750m north-east of the resource, there is an alternative children's play area, which is suitable for children aged under five years old. The permanent loss of the children's play area at Austrey Playing Fields would result in a major adverse effect, which would be significant.
- 6.4.21 The woodland adjacent to Austrey Playing Fields would lie within the land required for Newton Regis cutting. Approximately 0.01ha woodland adjacent to Austrey Playing Fields (equivalent to 1% of the resource) would be permanently lost. The woodland is used by a forestry group, named Discover Outdoors, for outdoor activities. The proximity of the Proposed Scheme would potentially impact the group's ability to use the woodland. The permanent loss of this resource would result in a moderate adverse effect, which would be significant.

### **Other mitigation measures**

- 6.4.22 HS2 Ltd will continue to engage with owners/operators to identify reasonably practicable measures to help mitigate potential significant effects identified in this assessment.
- 6.4.23 Any other mitigation measures will be described in the formal ES.

### **Summary of likely residual significant effects**

- 6.4.24 Land required for construction of the Proposed Scheme is likely to result in temporary residual significant effects on the following community resources:
- Polesworth (Abbey) Scout Group activity centre;
  - Pooley Country Park; and
  - the woodland adjacent to Austrey Playing Fields.
- 6.4.25 Land required for construction of the Proposed Scheme is likely to result in permanent residual significant effects:
- loss of residential properties on Green Lane (Birchmoor) in Birchmoor;
  - loss of residential properties on Hermitage Lane, the B5000 Tamworth Road and Hermitage Close in Polesworth;
  - loss of the Meet Your Miracle Studio Tamworth in Polesworth;
  - loss of land at Pooley Country Park in Polesworth;



- loss of land at Austrey Playing Fields in Austrey;
- loss of the children's play area at Austrey Playing Fields in Austrey; and
- loss of land at the woodland adjacent to Austrey Playing Fields in Austrey.

### **Cumulative effects**

- 6.4.26 Community wide effects occur where a number of individual impacts on resources come together within a location and have a wider impact on the community, such that they change the experience of a considerable proportion of people within that community.
- 6.4.27 No cumulative effects have been identified at this time. Any combined effects on a community during construction of the Proposed Scheme, which would result in cumulative community effects, will be reported in the formal ES.

## **6.5 Effects arising from operation**

### **Avoidance and mitigation measures**

- 6.5.1 Avoidance and mitigation measures will be reported in the formal ES.

### **Assessment of impacts and effects**

- 6.5.2 Operation of the Proposed Scheme could lead to in-combination effects on the community in this area which will be reported in the formal ES.

### **Other mitigation measures**

- 6.5.3 Any other mitigation measures will be described in the formal ES.

### **Summary of likely residual significant effects**

- 6.5.4 A summary of the likely residual significant effects will be reported in the formal ES.

### **Cumulative effects**

- 6.5.5 Community wide effects occur where a number of individual impacts on resources come together within a location and have a wider impact on the community, such that they change the experience of a considerable proportion of people within that community.
- 6.5.6 No cumulative effects have been identified at this time. Any combined effects on a community during operation of the Proposed Scheme, which would result in cumulative community effects, will be reported in the formal ES.

## Monitoring

- 6.5.7 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.
- 6.5.8 There are no area-specific community monitoring requirements during operation of the Proposed Scheme. Any area-specific operational monitoring requirements in relation to air quality effects, noise and vibration effects, traffic effects and visual effects that would contribute to the in-combination assessments, will be described in the relevant topic sections of the formal ES.

## 7 Ecology and biodiversity

### 7.1 Introduction

- 7.1.1 This section of the report identifies the predicted impacts and likely significant effects on species and habitats identified to date in the Birchmoor to Austrey area as a consequence of the construction and operation of the Proposed Scheme. This includes effects on sites recognised or designated on the basis of their importance for nature conservation.
- 7.1.2 Engagement with stakeholders including Natural England, Environment Agency, Warwickshire Wildlife Trust, Staffordshire Wildlife Trust, Leicestershire Wildlife Trust, National Forest Company, Warwickshire County Council (WaCC) and Leicestershire County Council (LeCC) has commenced and is ongoing. The purpose of this engagement has been to discuss the Proposed Scheme and potential effects, obtain relevant baseline information and consider alternative locations for environmental mitigation. Engagement with these stakeholders and other local groups will continue as part of the development of the Proposed Scheme and inform the formal ES.
- 7.1.3 Maps showing the location of the key environmental features (Map Series CT-10) and the key construction (Map Series CT-05) and key operational (Map Series CT-06) features of the Proposed Scheme can be found in the Volume 2: LA02 Map Book.
- 7.1.4 All distances and area measurements in this section are approximate.

### 7.2 Scope, assumptions and limitations

- 7.2.1 The scope, assumptions and limitations for the ecological assessment are set out in Volume 1 (Section 8) and the Scope and Methodology Report (SMR)<sup>46</sup>.
- 7.2.2 In the absence of field surveys and fully developed mitigation, the assessment has been undertaken on a realistic precautionary approach.
- 7.2.3 Field surveys are ongoing, but are limited to locations where landowner permission has been obtained and to areas accessible to the public. The surveys include (but are not limited to) broad habitat and detailed plant surveys, great crested newt surveys, wintering and breeding bird surveys, bat surveys, otter and water vole surveys. The findings from these ongoing surveys will be taken into account in the formal ES.

### 7.3 Environmental baseline

#### Existing baseline

##### *Introduction*

- 7.3.1 This section describes the ecological baseline relevant to the assessment: the designated sites, habitats and species recorded in this area as known at this time.
- 7.3.2 The Proposed Scheme would broadly follow the alignment of the M42 in this area. Land required for the Proposed Scheme in the Birchmoor to Austrey area consists

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<sup>46</sup> Supporting document: HS2 Phase 2b Environmental Impact Assessment Scope and Methodology Report

mainly of agricultural land under arable cultivation. Other habitats include woodland, hedgerows, grassland and ponds. The Proposed Scheme would cross the Coventry Canal, the River Anker, Bramcote Brook and their floodplains, as well as a number of associated smaller tributaries and other minor watercourses.

7.3.3 Statutory and non-statutory designated sites are shown on Map Series CT-10, Volume 2: LA02 Map Book.

#### *Designated sites*

7.3.4 There are no internationally important sites relevant to the assessment in the Birchmoor to Austrey area.

7.3.5 There are two nationally important sites of special scientific interest (SSSI) that are relevant to the assessment in the Birchmoor to Austrey area. For each of these sites, the land required for the Proposed Scheme in this area is within the Impact Risk Zone<sup>47</sup> relevant to railway infrastructure as identified by Natural England. They are:

- Birches Barn Meadows SSSI, covering an area of 10.8ha, is designated for unimproved floodplain hay meadow habitat. It supports a high diversity of grasses and herbs, as well as bird and plant species which occur in few other localities in the county. This SSSI is located 1.9km south-east of the land required for the Proposed Scheme, upstream of the proposed Polesworth viaduct over the River Anker; and
- Alvecote Pools SSSI, covering an area of 128.7ha, is designated for a series of shallow pools on the floodplain of the River Anker which have arisen as a result of colliery subsidence and which constitute one of the most extensive and diverse wetland areas in the county. The pools are surrounded by a mixture of grassland and scrub. Deposits of colliery spoil have been extensively colonised by many mosses, liverworts, fungi and lichens, several of which are rare in the Midlands. The SSSI supports a regionally important bird community, including a large herd (average 115 birds) of mute swans during the autumn moult, a large autumn passage roost (several thousand) of hirundines (swallows and martins), and is important for overwintering waterfowl and waders. Little ringed plover, a Schedule 148 bird species, breeds at the SSSI. Alvecote Pools is also important for its aquatic and terrestrial invertebrates. This SSSI is located 140m west of the land required for the Proposed Scheme, and is downstream of the proposed Polesworth viaduct over the River Anker.

7.3.6 There is one local nature reserve (LNR) relevant to the assessment in the Birchmoor to Austrey area, which is of up to county/metropolitan value. This is Abbey Green LNR which covers an area of 2.1ha and includes a riverside public park with mature trees and aquatic habitats. This LNR is located entirely within the boundary of a designated

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<sup>47</sup> The Impact Risk Zones are a GIS tool developed by Natural England to make a rapid initial assessment of the potential risks to SSSI posed by development proposals and indicate the types of development proposal which could potentially have adverse impacts.

<sup>48</sup> Schedule 1 of the Wildlife and Countryside Act 1981 (as amended)

local wildlife site (LWS), Polesworth Abbey Green Park LWS. The LNR is located 250m east of the land required for the Proposed Scheme, in Polesworth.

7.3.7 There are four LWS relevant to the assessment in the Birchmoor to Austrey area, each of which is of county/metropolitan value. For this assessment, formally notified LWS have been included here, and habitats within potential<sup>49</sup> and deferred LWS are described below under the relevant habitat and species subsections. The notified LWS in the Birchmoor to Austrey area are:

- Polesworth Abbey Green Park LWS, covering an area of 2.3ha, comprises a matrix of formal and (according to the wildlife site citation<sup>50</sup>) unmanaged habitats situated on the south side of the River Anker. Habitats include swamp of the S5 reed sweet grass swamp NVC<sup>51</sup> community, semi-improved neutral grassland, and plantation woodland. This LWS is located 250m east of the land required for the Proposed Scheme, in Polesworth;
- Polesworth Abbey Marsh LWS, covering an area of 4.5ha. The main interest feature is the botanically diverse marsh habitat adjacent to the River Anker. Other habitats present include swamp, species poor semi-improved neutral grassland, scattered scrub, willow carr and a pond. This LWS is located 610m south-east of the land required for the Proposed Scheme, in Polesworth;
- Alvecote Wood LWS, covering an area of 4.5ha, designated for its botanically diverse ancient woodland. Alvecote Wood LWS comprises species-diverse, damp, semi-natural deciduous woodland that is typical of the W10 oak-bracken-bramble woodland NVC community. A woodland clearing supports damp semi-improved grassland of the MG9 Yorkshire fog-tufted hair grass grassland NVC community, and there is also a pond supporting wetland and aquatic flora. Notable fauna recorded from the LWS include a population of the purple hairstreak butterfly, grass snake, common toad, and a diverse community of woodland birds. The LWS is located 570m west of the land required for the Proposed Scheme, east of Tamworth and south-west of Pooley Country Park; and
- The Bushes, Donative Farm LWS, covering an area of 0.6ha, is a small but species-rich area of traditionally managed semi-improved neutral grassland which shows a calcareous influence not often seen in North Warwickshire. This LWS is located 500m east of the land required for the Proposed Scheme, west of Warton.

7.3.8 There are two Ancient Woodland Inventory Sites (AWIS), both of which are ancient semi-natural woodlands, relevant to the assessment in this area. Due to the habitats

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<sup>49</sup> A site which has been identified as having the potential to meet the criteria to be fully designated as a LWS, but for which additional information is required to enable LWS evaluation to take place. Therefore these sites are retained on record as potential LWS

<sup>50</sup> Polesworth Abbey Green Park – Local Wildlife Sites Evaluation Form 2013

<sup>51</sup> National Vegetation Classification (NVC) is a survey method used to classify vegetation within the Great Britain based solely on the plant species that are present. The NVC breaks down each broad vegetation type (e.g. woodland, mires) into communities, designated by a number and name e.g. W12 Beech – Dogs mercury woodland

and species present, these sites are considered to be up to county/metropolitan value. They are:

- Alvecote Wood, a 4.5ha AWIS located 570m west of the land required for the Proposed Scheme. This woodland is also designated as a LWS; and
- Bramcote Covert, a 3.4ha AWIS located 140m west of the land required for the Proposed Scheme and west of the M42.

7.3.9 A review is being undertaken to identify any additional woodlands that are not currently listed on the AWI but that may nevertheless be ancient. These will be identified and assessed in the formal ES.

### *Habitats*

7.3.10 The following habitat types which occur in this area are relevant to the assessment.

#### **Woodland**

7.3.11 In addition to the woodlands located within designated sites, there are six other areas of lowland deciduous and mixed woodland (likely to qualify as habitats of principal importance<sup>52</sup>, and/or as local Biodiversity Action Plan (BAP)<sup>53,54</sup> habitats), which would be within or partly within the land required for the Proposed Scheme. These areas of woodland are at the following locations:

- on the embankments of the M42 at Birchmoor, between Lamphouse Cottages and the B5000 Tamworth Road, where the woodland is a combination of broadleaved and mixed plantation;
- between Pond Cottage and Pooley Fields Heritage Centre, where the woodland is predominantly mixed plantation but with small parcels of broadleaved semi-natural woodland;
- Pooley Country Park east of the M42 (part of which is a potential LWS), which includes broadleaved semi-natural woodland;
- the confluence of Bramcote Brook with the River Anker, where the woodland is broadleaved plantation;
- near the existing Bramcote Hall Farm Overbridge over the M42, where the woodland is broadleaved plantation; and
- near the existing Newton Lane Overbridge over the M42, where the woodland is broadleaved plantation.

7.3.12 On a precautionary basis, pending the findings of field surveys, the broadleaved semi-natural woodland of Pooley Country Park is considered to be of up to

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<sup>52</sup> Habitats listed under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006

<sup>53</sup> Warwickshire Wildlife Trust; *Warwickshire, Coventry and Solihull Biodiversity Action Plan*. Available online at: <http://www.warwickshirewildlifetrust.org.uk/LBAP>

<sup>54</sup> Staffordshire Wildlife Trust; *Staffordshire Biodiversity Action Plan*. Available online at: <http://www.sbap.org.uk/>

county/metropolitan value, whilst the other woodlands described above are considered to be of district/borough value.

### **Grassland**

- 7.3.13 Grasslands outside designated sites occur within the land required for the Proposed Scheme. This includes locally extensive, semi-improved floodplain and other grasslands at Pooley Country Park potential LWS, and also semi-improved grasslands immediately north of Newton Lane that may qualify as habitats of principal importance and local BAP habitats. On a precautionary basis, pending the findings of field surveys, the grasslands at Pooley Country Park potential LWS are considered to be of up to county/metropolitan value and other grasslands are considered to be of up to district/borough value, including those north of Newton Lane.

### **Hedgerows**

- 7.3.14 Many of the hedgerows in the Birchmoor to Austrey area, including hedgerows within the land required for the Proposed Scheme, are likely to qualify as a habitat of principal importance and a local BAP habitat. Some may also meet the wildlife and landscape criteria to be 'important' hedgerows as defined in the Hedgerows Regulations 1997<sup>55</sup>. In addition, they could also provide commuting corridors, nesting and feeding habitats for wildlife. On a precautionary basis, pending the findings of field surveys, the hedgerow network is considered to be of up to district/borough value.

### **Watercourses**

- 7.3.15 The River Anker, Bramcote Brook, the Coventry Canal and several smaller watercourses would be crossed by the Proposed Scheme. The River Anker and Bramcote Brook may qualify as habitats of principal importance and local BAP habitats; this is supported by the identification of the section of the River Anker crossed by the Proposed Scheme as a potential LWS. The Coventry Canal may also qualify as a local BAP habitat. On a precautionary basis, pending the findings of field surveys, the River Anker, Bramcote Brook and Coventry Canal are considered to be of up to county/metropolitan value, and the smaller watercourses, including unnamed land drainage channels, are considered to be of up to district/borough value.

### **Water bodies**

- 7.3.16 There are nine ponds that would be located within the land required for the Proposed Scheme. Some may qualify as habitats of principal importance, or local BAP habitats (e.g. if they support fauna species of high conservation importance such as great crested newts). On a precautionary basis, pending the findings of field surveys, these ponds are considered to be of up to county/metropolitan value.

### **Ancient and veteran trees**

- 7.3.17 Pending the results of the field surveys, it is possible that ancient and veteran trees will be present within land required for the Proposed Scheme. On a precautionary

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<sup>55</sup> Statutory Instrument 1997 No. 1160 Hedgerows Regulations 1997

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basis and pending the results of surveys, it is considered that ancient and veteran trees would be of district/borough value. Information on ancient and veteran trees will be confirmed upon further survey and reported in the formal ES.

*Protected and notable species*

7.3.18 A summary of the likely value of fauna species of relevance to the assessment (excluding any features of species interest for which the sites described above are designated) is provide in Table 12.

Table 12: Species potentially relevant to the assessment within the Birchmoor to Austrey area

| Resource/feature | Value               | Rationale                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bats             | Up to regional      | <p>At least seven bat species have been recorded in the Birchmoor to Austrey area, based on field and desk study data. Surveys have recorded five bat species within 100m of land required for the Proposed Scheme. These are common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, Daubenton's bat and Natterer's bat. Noctule and brown long-eared bat activity has also been recorded in the area. There are recent records of a Daubenton's bat maternity roost and a Natterer's bat roost (unknown type) in a bridge over the River Anker in Polesworth, located 500m to the east of the land required for the Proposed Scheme.</p> <p>The local BAP for Warwickshire<sup>56</sup> identifies that in addition to the bat species listed above, a further six bat species have been recorded in Warwickshire: whiskered, Brandt's, Leisler's, serotine, barbastelle and lesser horseshoe.</p> <p>Relatively higher quality habitat for bats within and adjacent to the land required for the Proposed Scheme is concentrated around Polesworth, including woodland and wetland habitats within Pooley Country Park and riparian habitats along the Coventry Canal and the River Anker. These habitats, as well as the buildings and structures to be affected by the Proposed Scheme, have the potential to support important roost sites, foraging areas and commuting routes of bat species in the Birchmoor to Austrey area. Important sites for bat species present or potentially present within vicinity of the land required for the Proposed Scheme that are scarce (Natterer's, Leisler's, serotine, lesser horseshoe) or rare (Nathusius' pipistrelle, barbastelle) in Warwickshire, could be of up to regional value.</p> |
| Otter            | County/metropolitan | <p>There are numerous desk study records of otter in proximity to the Proposed Scheme, with a concentration of records (covering at least 2006 to 2012) at the confluence of Bramcote Brook with the River Anker, within the land required for the Proposed Scheme. The riparian woodland and scrub habitats at this location (between the River Anker, M42 and Bramcote Brook) are likely to be suitable habitat for otter.</p> <p>There are also records for the Coventry Canal upstream and downstream of the land required for the Proposed Scheme near Alvecote and Grendon.</p> <p>Given the number of records, otter are expected to use the wider Bramcote Brook and connecting minor watercourses. Otter may use suitable riparian habitats, including woodland, scrub and other dense vegetation, along all of these watercourses as resting places or as breeding holts.</p> <p>The local BAP for Warwickshire states that surveys indicate a trend in otter re-colonisation through both the Severn and Trent catchments. Otter signs have been recorded throughout the county including on small streams and canals. It is considered that the population is breeding and is likely to be in double figures (as of 2012) but unlikely to exceed 20 animals<sup>57</sup> suggesting it is a rare species in the county. However, since 2012 there has been a continued increase in the</p>                                                                                                                                                                                                                                                                                                                                               |

<sup>56</sup> Warwickshire Wildlife Trust (2016), *Warwickshire, Coventry and Solihull Local Biodiversity Action Plan – Revised Plan February 2016 – Bats*. Available online at [http://www.warwickshirewildlifetrust.org.uk/sites/default/files/files/Bats%202016\\_1.pdf](http://www.warwickshirewildlifetrust.org.uk/sites/default/files/files/Bats%202016_1.pdf)

<sup>57</sup> Warwickshire Wildlife Trust (2015), *Warwickshire, Coventry and Solihull Local Biodiversity Action Plan for Otter – Draft Revised Plan – August 2015*. Available online at: <http://www.warwickshirewildlifetrust.org.uk/sites/default/files/files/Otter%20-%20August%202015.pdf>



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| Resource/feature      | Value                     | Rationale                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       |                           | national population, therefore the Warwickshire population is now likely to be much larger.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Water vole            | Up to county/metropolitan | The local BAP indicates that the status of water voles in Warwickshire is unfavourable. Water voles have historically been recorded on the River Anker and the Coventry Canal and there is suitable habitat within the land required for the Proposed Scheme for water vole. Water vole may occur along watercourses and connecting drainage ditches within the land required for the Proposed Scheme.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Polecat               | Up to county/metropolitan | Polecat has been recorded in Warwickshire with records being widely dispersed <sup>58</sup> . As the species occupies a variety of habitat types, from farmland to woodland, potentially suitable habitat is widespread within the land required for the Proposed Scheme.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Great crested newt    | Up to county/metropolitan | <p>The great crested newt is relatively widespread in Warwickshire<sup>59</sup>. There are several desk study records of great crested newt within the locality of the Proposed Scheme including at Alvecote Pools SSSI and close to Newton Regis.</p> <p>Water bodies potentially suitable to support great crested newt are widespread within this area. There are at least 69 water bodies present within 500m of the land required for the Proposed Scheme. Twenty-eight of these are located within a 250m radius and nine within the land required for the Proposed Scheme. Terrestrial habitats suitable to support this species are present within the land required for the Proposed Scheme.</p> <p>Ongoing surveys have confirmed that three ponds, two within 250m of the land required for the Proposed Scheme and one within 500m, support great crested newt. Through environmental DNA (eDNA) surveys carried out in 2017, three ponds (one to the east of Hermitage Lane cutting, one to the east of Polesworth viaduct and one to the west of Newton Regis cutting) within the land required for the Proposed Scheme returned a negative result for great crested newt eDNA. Negative results were also returned for two ponds within 500m of the land required for the Proposed Scheme.</p> |
| Birds                 | Up to county/metropolitan | <p>The farmland, wetland and woodland habitats along the route of the Proposed Scheme are suitable for breeding and wintering birds.</p> <p>Records from Warwickshire Biological Records Centre include breeding red list and Schedule 1 birds including, among others, kingfisher, pochard, little ringed plover, grasshopper warbler and hobby.</p> <p>The citation for Alvecote Pools SSSI identifies a number of bird species that breed, overwinter and roost as part of the designated interest. Similar assemblages may also regularly feed within farmland beyond the boundary of the SSSI.</p> <p>Barn owl may occur within the wider landscape given the likelihood of suitable nesting and feeding habitat being available. There are estimated to be at least 100 breeding pairs of this species in Warwickshire, with records concentrated in South Warwickshire<sup>60</sup>. Staffordshire Wildlife Trust's Barn Owl Action Group recorded 68 nesting pairs in 2017<sup>61</sup>, although numbers fluctuate significantly from year to year.</p>                                                                                                                                                                                                                                              |
| White-clawed crayfish | Up to county/metropolitan | The citation for Alvecote Pools SSSI, located 140m to the west of the land required for the Proposed Scheme, identifies that white-clawed crayfish are part of the designated interest of the SSSI, and populations of this species may extend into adjacent land required for the Proposed Scheme at Pooley Country Park. The population of white-clawed crayfish in Warwickshire is declining and only historic records of the species were identified in the River Anker in excess                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

<sup>58</sup> The Vincent Wildlife Trust (2016) *The Distribution and Status of the Polecat (Mustela putorius) in Britain 2014-2015*. Available online at: <http://www.vwt.org.uk/wp-content/uploads/2016/04/Polecat-Report-2016.pdf>

<sup>59</sup> Warwickshire, Coventry and Solihull Local Biodiversity Action Plan, Great Crested Newt – Draft Revised Plan 2015

<sup>60</sup> Warwickshire Wildlife Trust; *Warwickshire, Coventry and Solihull Local Biodiversity Action Plan for Barn Owl (Draft Revised Plan, 2017)* Available online at: [http://www.warwickshirewildlifetrust.org.uk/sites/default/files/files/BarnOwl\\_January%202017.pdf](http://www.warwickshirewildlifetrust.org.uk/sites/default/files/files/BarnOwl_January%202017.pdf)

<sup>61</sup> Staffordshire Wildlife Trust; 2017 is a record year for barn owl group. Available online at: <https://www.staffs-wildlife.org.uk/news/2017/11/14/2017-record-year-barn-owl-group>

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| Resource/feature          | Value                     | Rationale                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           |                           | of 3km from the land required for the Proposed Scheme. While the presence of this species is unlikely, there is habitat with the potential to support white-clawed crayfish in the River Anker, the Coventry Canal, Bramcote Brook, other smaller watercourses and water bodies.                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Aquatic invertebrates     | Up to district/borough    | The assemblage of aquatic invertebrates is also part of the designated interest of the Alvecote Pools SSSI, and this interest may extend into adjacent land required for the Proposed Scheme in Pooley Country Park. In addition, habitats with the potential to support notable assemblages of aquatic invertebrates are associated with the River Anker, the Coventry Canal, Bramcote Brook, other smaller watercourses and water bodies. Where suitable habitats coincide with the Proposed Scheme these habitats may be important for maintenance of the nature conservation status of associated notable aquatic invertebrates in North Warwickshire.                                               |
| Terrestrial invertebrates | Up to district/borough    | The citation for Alvecote Pools SSSI identifies that terrestrial invertebrates are part of the designated interest of the SSSI and some populations may extend into adjacent land required for the Proposed Scheme in Pooley Country Park. In addition, there are other habitats with the potential to support notable assemblages of terrestrial invertebrates, but these are localised and small in area given prevailing land management for agriculture. Where suitable habitats coincide with the Proposed Scheme these habitats may be important for maintenance of the nature conservation status of associated notable terrestrial invertebrates in North Warwickshire.                          |
| Fish                      | Up to county/metropolitan | There are records in the river catchments affected by the Proposed Scheme, primarily the River Anker, of spined loach and European bullhead (both Annex II species), and European eel from 2015, 500m from the land required for the Proposed Scheme. The Coventry Canal, Bramcote Brook, other smaller watercourses and water bodies also provide suitable habitat for fish species.                                                                                                                                                                                                                                                                                                                    |
| Reptiles                  | Up to district/borough    | There are records of grass snake within 100m of the land required for the Proposed Scheme, as well as within the land required for the Proposed Scheme (east of Pooley Lane embankment). Habitats with potential to support reptiles are localised and of limited extent given prevailing land management for agriculture. The most suitable habitats for reptiles are likely to be associated with Pooley Country Park, the River Anker floodplain, the Coventry Canal, Bramcote Brook, smaller watercourses and water bodies. Suitable habitats within the land required for the Proposed Scheme may be important for maintenance of the nature conservation status of reptiles in North Warwickshire. |

## 7.4 Effects arising during construction

### Avoidance and mitigation measures

7.4.1 The following measures have been included as part of the design of the Proposed Scheme (in addition to the landscape planting shown on the Map Series CT-o6 in the Volume 2: LA02 Map Book, along the rail corridor which would be largely a mixture of woodland/scrub and grassland), and would contribute towards mitigation for the losses of habitat and effects on species:

- Polesworth viaduct over the Coventry Canal and the River Anker floodplain would avoid direct impacts to these watercourses and allow free passage for wildlife beneath them, including along the rivers and their banks;
- new woodland habitat creation and landscape mitigation planting (38.4ha) would contribute to compensation for losses of woodland (for example at Birchmoor, B5000 Tamworth Road and Pooley Country Park), increase woodland cover and enhance connectivity between remaining woodlands;

- provision of new ponds (e.g. at Pooley Country Park); which would form part of the measures to address loss of water bodies and effects on great crested newt and other species;
- new species-rich hedgerows (9.7km), using appropriate native species would contribute to compensation for the loss of hedgerows and re-connect the ecological network in the surrounding areas. This includes plantings along the margins of the Proposed Scheme and in specific areas, such as near Pooley Fields Heritage Centre and Austrey; and
- new grassland habitats (30.7ha), including species-rich grasslands would contribute to compensation for the losses from the Proposed Scheme.

7.4.2 The assessment assumes implementation of the measures set out within the draft CoCP<sup>62</sup>, which includes translocation of protected species where appropriate.

7.4.3 Section 9 of the draft CoCP requires contractors to implement a range of measures to protect ecological receptors including the following:

- manage impacts from construction, including the timing of works, on designated sites, protected and notable species and other features of ecological importance such as ancient woodlands and watercourses;
- reduce habitat loss by keeping the working area to the reasonable minimum;
- reinstatement of areas of temporary habitat loss;
- restoration and replacement planting; implement management measures for potential ecological impacts to control dust, water quality and flow, noise and vibration, and lighting;
- provision of a watching brief, where relevant;
- relocation or translocation of species, soil and/or plant material, as appropriate;
- consultation with Natural England, the Environment Agency, local wildlife trusts and relevant planning authorities prior to and during construction; and
- compliance with all wildlife licensing requirements, including those for protected and invasive species and designated sites.

### **Assessment of impacts and effects**

7.4.4 The following section considers the impacts and effects on ecological features as a consequence of construction of the Proposed Scheme. All assessments have been undertaken on a precautionary basis, in the absence of survey information, and take account of the baseline value as presented in Section 7.3.

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<sup>62</sup> Supporting document: Draft Code of Construction Practice

### *Designated sites*

- 7.4.5 Birches Barn Meadows SSSI would not be directly affected by construction of the Proposed Scheme. The nearest point of construction would be 1.9km west of the SSSI. Whilst there is connectivity to the land required for the Proposed Scheme via the River Anker, the SSSI is located upstream. It is anticipated that implementation of measures in the draft CoCP would reduce potential indirect construction impacts to a level where there would be no significant effects.
- 7.4.6 Alvecote Pools SSSI would not be directly affected by construction of the Proposed Scheme. The land required for the Proposed Scheme would be 140m east of the SSSI, and is separated from it by the M42. Potential indirect effects on designated features of interest through changes to groundwater and surface water flows are not expected, due to the Proposed Scheme being on viaduct at this location and separated from the Proposed Scheme by the M42. It is anticipated that implementation of measures in the draft CoCP would reduce other potential indirect construction impacts to a level where there would be no significant effects.
- 7.4.7 Loss of farmland habitats near Alvecote Pools SSSI and disturbance may result in adverse effects for birds that are interest features of the SSSI, if they are using such habitats regularly e.g.as a feeding resource. Habitat losses would be relatively small in the context of the extent of similar habitat in the wider landscape and some of the affected habitats are considered suboptimal given their proximity to the M42. It is anticipated that implementation of measures in the draft CoCP would reduce the magnitude of these impacts to a level where there would be no significant effects. However, on a precautionary basis and in the absence of further information, at this stage it is considered that there would be a temporary adverse effect on the integrity of the SSSI which would be significant at up to a national level.

### *Habitats*

#### **Woodland**

- 7.4.8 Construction of the Proposed Scheme would result in the loss of 11.8ha of broadleaved woodland, of which 3.9ha is broadleaved semi-natural woodland, 3.5ha is broadleaved plantation woodland, and 4.4ha is mixed plantation woodland. This would be a permanent adverse effect at the county/metropolitan level for the woodland in Pooley Country Park potential LWS and district/borough level for the other areas of woodland. The proposed planting of woodland (woodland habitat creation and landscape mitigation planting) would compensate for losses of existing woodland so that the residual effect (following establishment of new woodland) would be significant at up to the district/borough level for woodland at Pooley Country Park potential LWS and not significant for other woodlands. However, if the ongoing review identifies the presence of additional ancient woodland the residual effect would be significant at up to the county/metropolitan level.

#### **Grassland**

- 7.4.9 In the absence of further survey data, it is estimated that the Proposed Scheme could result in the loss of up to 22.8ha of semi-improved grassland outside designated sites, including 7.6ha within Pooley Country Park potential LWS. This is a permanent

adverse effect that is significant at up to the county/metropolitan level for grasslands within Pooley Country Park potential LWS and at district/borough level for other grasslands. Whilst the proposed grassland creation would compensate for loss of existing grassland, until further surveys and assessment are completed the permanent loss of these grasslands is considered on a precautionary basis to have a residual adverse effect (following establishment of new grassland) that would be significant at up to district/borough level for the grassland lost within Pooley Country Park potential LWS. For other losses of grasslands, it is considered that the residual adverse effect would not be significant.

### **Hedgerows**

- 7.4.10 Construction of the Proposed Scheme would result in the permanent loss of 8km of hedgerows, some of which may qualify as a habitat of principal importance, local BAP habitat or 'important' hedgerows. This would result in severance of the hedgerow network in many places, adversely affecting connectivity with the surrounding area. The Proposed Scheme includes new hedgerow planting which would help compensate for losses, and further hedgerow planting would be proposed as part of the ongoing design development. In the absence of this additional mitigation, the loss of these hedgerows would result in a permanent adverse effect on the integrity of the hedgerow network that would be significant at up to the district/borough level.

### **Watercourses**

- 7.4.11 The Proposed Scheme would cross the River Anker and Coventry Canal on Polesworth viaduct. Polesworth viaduct would span the watercourses and the floodplain from 50m south of the Coventry Canal to 140m north of the River Anker. Shading from Polesworth viaduct is not anticipated to result in a significant effect. Some construction works would be required on the floodplain, but no in-channel works would be required that would alter the form or function of the Coventry Canal or River Anker. Indirect construction effects on the watercourses, such as runoff and siltation, would be controlled through the implementation of measures in the draft CoCP, and no significant effects are expected.
- 7.4.12 The Proposed Scheme would result in the loss of sections of other smaller watercourses, including three sections of Bramcote Brook which would be realigned or diverted for a total length of 1.6km. Sections of other smaller watercourses would be lost and watercourses would be crossed by culverts. Pending assessment of habitat conditions and species diversity, this has the potential to result in a permanent adverse effect that would be significant at up to the county/metropolitan level for Bramcote Brook and district/borough level for smaller watercourses.

### **Water bodies**

- 7.4.13 Up to nine ponds would be lost as a result of the Proposed Scheme. The loss of these ponds could result in a permanent adverse effect that would be significant at up to county/metropolitan level. Replacement ponds are to be created within Pooley Country Park and elsewhere in this area which would compensate for habitat losses. On a precautionary basis, pending further survey information and assessment, it is considered that the residual effect would be significant at up to district/borough,

particularly if it is confirmed through field surveys that they support species of higher conservation importance.

### **Ancient and veteran trees**

- 7.4.14 It is assumed that if any ancient and veteran trees are within the land required for the Proposed Scheme in the Birchmoor to Austrey area, they would be permanently lost. Ancient and veteran trees are an irreplaceable resource and their potential loss would result in a permanent adverse effect that would be significant at up to the district/borough level in each case.

### *Species*

#### **Bats**

- 7.4.15 At least seven bat species are present in the Birchmoor to Austrey area, including species that are scarce (Natterer's) and rare (Nathusius' pipistrelle) in Warwickshire. There is also the potential for the presence of other bat species that are scarce (Leisler's, serotine, lesser horseshoe) or rare (barbastelle) in Warwickshire. The demolition of buildings and structures and the permanent removal of vegetation may have an impact on bats, including potential loss of roost sites, reduction in the availability of foraging resources and fragmentation of commuting routes. This could particularly affect breeding populations of bats within the area. Bats would potentially be affected by lighting associated with construction works, although it is expected that this would be controlled through measures in the draft CoCP.
- 7.4.16 The proposed woodland, grassland and hedgerow planting will help to reduce impacts to bats and further mitigation will be identified following ongoing surveys and assessment. On a precautionary basis, in the absence of further survey information, it is considered that impacts would result in a permanent adverse effect on the conservation status of the bat populations that would be significant at up to the regional level.

#### **Otter**

- 7.4.17 Otters are likely to use watercourses and associated terrestrial habitat within and adjacent to the land required for the Proposed Scheme. Their territories are likely to be focused on the main watercourses of the River Anker, Coventry Canal and Bramcote Brook. The only loss of watercourse habitats would occur in the upper reach of the Bramcote Brook. The brook would be realigned at this location so there would be no permanent habitat loss, but the Proposed Scheme would result in the loss of habitat connectivity. There is potential for indirect effects as a result of disturbance from construction activities, though it is expected that these indirect impacts would be controlled through measures in the draft CoCP.
- 7.4.18 On a precautionary basis, in the absence of survey data, it is considered that there would be a permanent adverse effect on the conservation status of otter that would be significant at the county/metropolitan level.

### **Water vole**

- 7.4.19 The Polesworth viaduct would cross over the Coventry Canal, River Anker and a section of Bramcote Brook, thereby avoiding impacts to potential water vole habitat in those watercourses. If water vole is present, construction would result in the permanent loss and severance of habitat along the realigned section of Bramcote Brook. It is anticipated that indirect effects to water vole would be controlled through measures in the draft CoCP.
- 7.4.20 On a precautionary basis, in the absence of survey data, it is considered that there would be an adverse effect on the conservation status of water vole that would be significant at up to the county/metropolitan level.

### **Polecat**

- 7.4.21 The loss of woodland, grassland and hedgerows could affect polecat if surveys show this species to be present within the land required for the Proposed Scheme. On a precautionary basis, in the absence of survey information, the species is assumed to be present. The effects of permanent habitat loss on this species would be significant at up to the county/metropolitan level.

### **Great crested newt**

- 7.4.22 It is assumed that, pending further survey information, six of the nine ponds and surrounding terrestrial habitat within the land required for the Proposed Scheme support breeding populations of great crested newt and that these ponds would be lost as a result of the Proposed Scheme. Surveys carried out in spring 2017 for eDNA indicated that great crested newt was absent from the three other ponds located within the land required for the Proposed Scheme. The loss of six ponds which could support great crested newt and associated terrestrial habitat would adversely impact the great crested newt populations if present. The impact of habitat severance and isolation may also have a significant effect on the conservation status of great crested newt.
- 7.4.23 There are 28 ponds within 250m of the land required for the Proposed Scheme which could support great crested newt. The loss of terrestrial habitat associated with these ponds could have an adverse effect on great crested newt present within these ponds.
- 7.4.24 Where great crested newt is present, two new ponds will be created for every one that is lost, and this would contribute towards reducing the effects to not significant. Suitable terrestrial habitat would be required around all new ponds created along with links to encourage dispersal (e.g. by incorporating existing habitat or creating new habitat) and this would require further design development. In the absence of the full mitigation, the loss of the ponds and surrounding land would result in a permanent adverse effect on the conservation status of great crested newt that would be significant at up to the county/metropolitan level.

### **Birds**

- 7.4.25 The Proposed Scheme would result in the loss of habitat used for nesting, foraging and roosting by a range of breeding and wintering birds, predominantly farmland and woodland species, potentially including species of waders and wildfowl (primarily

swans and geese). Barn owl and kingfisher, both Schedule 1 species, may be affected, particularly if any nest sites or important feeding areas are identified within the land required for the Proposed Scheme. On a precautionary basis, in the absence of further survey information, it is considered that the Proposed Scheme would result in a permanent adverse effect on birds that would be significant at up to the county/metropolitan level.

### **White-clawed crayfish**

- 7.4.26 The Proposed Scheme would result in direct and indirect impacts to habitat suitable for white-clawed crayfish, notably through realignment of Bramcote Brook. On a precautionary basis, in the absence of survey information, it is considered that the Proposed Scheme would result in a permanent adverse effect on the conservation status of white-clawed crayfish that would be significant at up to the county/metropolitan level.

### **Aquatic invertebrates**

- 7.4.27 The land required for the Proposed Scheme would result in loss of habitat suitable for aquatic invertebrates (other than white-clawed crayfish), potentially including protected species and species of principal importance. On a precautionary basis, in the absence of survey information, it is considered that the Proposed Scheme would result in a permanent adverse effect on aquatic invertebrates that would be significant at up to the district/borough level.

### **Terrestrial invertebrates**

- 7.4.28 The land required for the Proposed Scheme would result in loss of habitat suitable for terrestrial invertebrates, including species of principal importance. On a precautionary basis, in the absence of survey information, it is considered that the Proposed Scheme would result in a permanent adverse effect on terrestrial invertebrates that would be significant at up to the district/borough level.

### **Fish**

- 7.4.29 There are records of fish from the main watercourses, primarily the River Anker including species such as European bullhead and spined loach (listed on Annex II of the EC Habitats Directive<sup>63</sup>) and European eel. The Proposed Scheme would pass over the River Anker on the Polesworth viaduct, and any indirect impacts to the watercourses during construction would be controlled through measures set out in the draft CoCP.
- 7.4.30 Bramcote Brook would be directly affected by the realignment of a section of the brook and the diversion of two tributaries, which may require assessment under the Water Framework Directive<sup>64</sup>. On a precautionary basis, in the absence of survey information, it is considered that the Proposed Scheme would result in a permanent adverse effect on fish that would be significant at up to the county/metropolitan level.

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<sup>63</sup> Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora

<sup>64</sup> EU Water Framework Directive. Available online at: [http://ec.europa.eu/environment/water/water-framework/index\\_en.html](http://ec.europa.eu/environment/water/water-framework/index_en.html)



### *Reptiles*

- 7.4.31 There is potential for reptiles such as grass snake, slow worm and common lizard to be affected where suitable habitat, such as grassland, wetland and scrub habitats is present within the land required for the Proposed Scheme. Potential impacts include loss of foraging habitat and hibernation sites. Grassland, scrub and hedgerow planting and pond creation would contribute towards reducing impacts on reptiles. On a precautionary basis, in the absence of survey information, it is considered that the Proposed Scheme would result in a permanent adverse effect on reptiles that would be significant at up to the district/borough level.
- 7.4.32 Effects on other habitats and species that are significant at the local/parish level will be reported in the formal ES.
- 7.4.33 Indirect effects from changes in air quality, such as that arising from increased levels of construction traffic, will be considered where appropriate. These effects will be reported in the formal ES.

### **Other mitigation measures**

- 7.4.34 Further measures currently being considered, but which are not yet part of the design and will be informed by the findings of the ongoing field surveys and engagement with relevant stakeholders, include:
- reinstatement and compensation for the losses of grassland and woodland habitats within Pooley Country Park potential LWS, and enhancement of existing retained woodland and grassland habitats;
  - opportunities to enhance Bramcote Brook and its associated riparian corridor along the realigned sections;
  - provision of additional broadleaved woodland to replace losses of non-ancient woodland, and/or enhancement of remaining woodlands;
  - provision of additional hedgerows which would mitigate the losses and maintain the connectivity of the network;
  - options to create new species-rich grasslands (including translocation where appropriate) to compensate for grassland losses;
  - provision of additional measures to facilitate connectivity where significant foraging or commuting routes of fauna species would be affected;
  - use of temporary fencing or retention of existing habitat links to reduce the risk of disturbance to otter during construction;
  - design of watercourse culverts and underpasses to allow the free passage of wildlife;
  - provision of alternative roosting habitat for bats;
  - structures to reduce severance effects on bats; and

- provision of additional ponds where necessary (on a two to one basis where existing ponds supporting great crested newts are lost), outside the area required for the permanent works but within the land required for construction of the Proposed Scheme, and suitable terrestrial habitat around these ponds with habitat links to allow dispersal.

7.4.35 Some of the above may also be achieved through strategic mitigation, which is currently being discussed with relevant stakeholders.

### Summary of likely residual significant effects

7.4.36 Taking into account mitigation proposed in the design of the Proposed Scheme set out above, the anticipated significant residual ecological effects during construction are described in Table 13.

Table 13: Residual significant effects on ecological resources/features during construction

| Resource/feature          | Residual effect                                                                                                                                                                                                    | Level at which the effect would be significant                                                  |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Alvecote Pools SSSI       | Potential adverse effect as a result of impacts on the birds that are features of the SSSI.                                                                                                                        | Up to national                                                                                  |
| Woodland                  | Loss of woodland including at Pooley Country Park. Potential adverse effect on ancient woodland. New woodland planting is included in the Proposed Scheme design.                                                  | Up to county/metropolitan                                                                       |
| Grassland                 | Permanent loss of up to 22.8ha of semi-improved grassland, including 7.6ha of potential species-rich grassland in Pooley Country Park potential LWS. Grassland creation is included in the Proposed Scheme design. | Up to district/borough in Pooley Country Park potential LWS                                     |
| Hedgerows                 | Permanent loss and severance of up to 8km of hedgerows. Hedgerow creation is included in the Proposed Scheme design.                                                                                               | Up to district/borough                                                                          |
| Watercourses              | Potential adverse effects on realigned Bramcote Brook and loss of other smaller watercourses.                                                                                                                      | Up to county/metropolitan - Bramcote Brook<br>Up to district/borough for all other watercourses |
| Water bodies              | Permanent loss of up to nine ponds. New water bodies are included in the Proposed Scheme design to address losses.                                                                                                 | Up to district/borough                                                                          |
| Ancient and veteran trees | Permanent loss.                                                                                                                                                                                                    | Up to district/borough                                                                          |
| Bats                      | Potential permanent adverse effect on conservation status due to loss of roosts, foraging habitat and fragmentation.                                                                                               | Up to regional                                                                                  |
| Otter                     | Potential permanent adverse effect on conservation status due to loss of habitat in the form of resting sites and foraging habitat.                                                                                | County/metropolitan                                                                             |

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| Resource/feature          | Residual effect                                                                                                                                                          | Level at which the effect would be significant |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| Water vole                | Potential permanent adverse effect on conservation status due to loss of habitat.                                                                                        | Up to county/metropolitan                      |
| Polecat                   | Potential permanent adverse effect on conservation status due to loss of foraging habitat and fragmentation.                                                             | Up to county/metropolitan                      |
| Great crested newt        | Potential permanent adverse effect on conservation status due to loss of existing breeding and terrestrial habitats, along with further habitat severance and isolation. | Up to county/metropolitan                      |
| Birds                     | Potential permanent adverse effect on conservation status due to loss, fragmentation and/or severance of habitat for nesting and feeding.                                | Up to county/metropolitan                      |
| White-clawed crayfish     | Potential permanent adverse effect on conservation status due to loss of habitat.                                                                                        | Up to county/metropolitan                      |
| Aquatic invertebrates     | Potential permanent adverse effect on conservation status due to loss of habitat.                                                                                        | Up to district/borough                         |
| Terrestrial invertebrates | Potential permanent adverse effect on the conservation status of species or assemblages due to habitat loss and fragmentation.                                           | Up to district/borough                         |
| Fish                      | Potential permanent adverse effect on conservation status due to loss of habitat through watercourse realignment.                                                        | Up to county/metropolitan                      |
| Reptiles                  | Potential permanent adverse effect on conservation status due to loss of habitat.                                                                                        | Up to district/borough                         |

## 7.5 Effects arising during operation

### Avoidance and mitigation measures

7.5.1 There are no specific measures currently identified to avoid or mitigate ecological effects during operation of the Proposed Scheme within this section of the route.

### Assessment of impacts and effects

7.5.2 This section considers the impacts and effects on ecological features during operation of the Proposed Scheme. All assessments are based on a precautionary basis, in the absence of survey information.

7.5.3 Bats are at risk of being struck by trains or possibly harmed by turbulence, particularly at frequently used commuting/foraging routes which cross the Proposed Scheme. This represents a potential permanent adverse effect on conservation status of the bat species concerned that would be significant at up to the regional level.

- 7.5.4 Barn owls are at risk of colliding with trains, particularly near the River Anker, where there is suitable grassland foraging habitat. The grassland vegetation that would grow along the embankments of the Proposed Scheme may encourage barn owls to forage close to trains, with the risk that they may be killed. Mortality, even if infrequent, could affect the conservation status of this Schedule 1 species and the ongoing reduction in numbers would result in a permanent adverse effect that would also be significant at up to county/metropolitan level.
- 7.5.5 Effects on other habitats and species that are significant at the local/parish level during operation will be assessed and reported in the formal ES.

### Other mitigation measures

- 7.5.6 Additional mitigation measures currently being considered include:
- updating the HS2 barn owl mitigation plan<sup>65</sup> which has been developed to provide measures that will be implemented to reduce the effects of the Proposed Scheme to a level that is not significant. This is likely to include seeking opportunities to provide barn owl nest boxes and where feasible habitat enhancement opportunities at least 3km from the Proposed Scheme in consultation with landowners; and
  - structures to reduce mortality to bats.

### Summary of likely residual significant effects

- 7.5.7 Taking into account mitigation included as part of the Proposed Scheme design, the anticipated significant residual ecological effects during operation are detailed in Table 14.

Table 14: Residual significant effects on ecological resources/features during operation

| Resource/feature | Residual effect                                                                         | Level at which the effect would be significant |
|------------------|-----------------------------------------------------------------------------------------|------------------------------------------------|
| Bats             | Potential permanent adverse effect on conservation status due to collision with trains. | Up to regional                                 |
| Barn owl         | Potential permanent adverse effect on conservation status due to collision with trains. | Up to county/metropolitan                      |

### Monitoring

- 7.5.8 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.
- 7.5.9 There are no area-specific requirements for monitoring ecology and biodiversity effects or mitigation during the operation of the Proposed Scheme in the Birchmoor to Austrey area.

<sup>65</sup> Currently in development for HS2 Phase One

## 8 Health

### 8.1 Introduction

- 8.1.1 This section identifies the communities within the Birchmoor to Austrey area that would be subject to impacts associated with the Proposed Scheme and describes the changes that are considered to be potentially important for the health and wellbeing of people within these communities, where these effects are considered to be consequential.
- 8.1.2 Engagement with key public health bodies is underway, including with Public Health England (PHE), Directors of Public Health and Health and Wellbeing Boards. The purpose of the engagement has been to increase the understanding of health issues that may not be identified solely through a review of publicly available data. Engagement with key public health bodies will continue as part of the development of the Proposed Scheme.
- 8.1.3 This section deals specifically with impacts and effects at a local level within the Birchmoor to Austrey area. Health effects across the Proposed Scheme as a whole are assessed in the route-wide health assessment contained in Volume 3: Route-wide effects.
- 8.1.4 Maps showing the location of the key environmental features (Map Series CT-10) and the key construction (Map Series CT-05) and key operational (Map Series CT-06) features of the Proposed Scheme are provided in the Volume 2: LA02 Map Book.

### 8.2 Scope, assumptions and limitations

- 8.2.1 The scope, assumptions and limitations for the health assessment are set out in Volume 1 (Section 8) and the Scope and Methodology Report (SMR)<sup>66</sup>.
- 8.2.2 As set out in the SMR, the health assessment is based on a broad understanding of health, consistent with the World Health Organization (WHO) definition of health as 'a state of complete physical, mental and social well-being and not merely an absence of disease or infirmity'. An individual's health is mostly determined by genetics and lifestyle factors, but for a large enough population many other factors, or 'health determinants', are known to be important, and these factors may be affected by the Proposed Scheme.
- 8.2.3 The assessment has considered the impacts of the Proposed Scheme on a range of environmental and socio-economic 'health determinants', which could result in adverse or beneficial effects on health and wellbeing.
- 8.2.4 The health determinants of relevance within the Birchmoor to Austrey area are:
- for impacts during construction (temporary and permanent):
    - neighbourhood quality;

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<sup>66</sup> Supporting document: HS2 Phase 2b Environmental Impact Assessment Scope and Methodology Report

- access to services, health and social care;
  - access to green space, recreation and physical activity; and
  - social capital<sup>67</sup>.
- for impacts during operation (permanent):
    - neighbourhood quality.

8.2.5 The geographic extent of the health assessment covers those areas where impacts on health determinants are predicted to occur.

8.2.6 The health assessment is based on a review of evidence linking changes in health determinants to potential health outcomes. This information will be presented in a concise review of the key literature and included in the formal ES. The evidence varies in its strength; for example, the evidence linking physical activity to health outcomes is strong, whereas the evidence linking social capital with health outcomes is moderate. The strength of evidence does not necessarily determine the importance of a health effect, but is an indication of the level of certainty in the assessment. Additionally, there is greater certainty in the prediction of an impact on a health determinant than the consequent effect on health.

8.2.7 There is no established or widely accepted framework for assessing the significant health effects of a development proposal. The SMR sets out a methodology for describing the impacts on health determinants in terms of the magnitude and duration of the change and the extent of the population exposed to this change. It also draws attention to the strength of evidence that links a change in health determinant with health effects. This framework permits the assessment to describe the impacts on determinants in a largely qualitative manner, with some structure to the relative scale of these impacts to give a sense of the importance of the potential health effects. This does not, however, provide a clear basis for drawing conclusions as to whether a health effect is likely to be 'significant'.

8.2.8 Potential health effects have been identified based on information that is available at this stage of the assessment. A full assessment of health effects, applying the assessment criteria set out in the SMR, will be provided in the formal ES.

## 8.3 Environmental baseline

### Existing baseline

#### *Description of communities in the Birchmoor to Austrey area*

8.3.1 For the purposes of the health assessment, the study area is divided into the communities described below, including those settlements which are situated within 1km of the route of the Proposed Scheme. A description of community facilities is provided in Section 6, Community.

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<sup>67</sup> The connections between the individuals within communities, and the inclination that arises through these networks for individuals to feel valued, to feel a sense of belonging, to have companionship and to tangibly support each other.

- 8.3.2 The route of the Proposed Scheme would run through mainly rural areas, with some built-up areas associated with Tamworth to the south-west, and the villages of Birchmoor, Polesworth, Newton Regis and Austrey.

### **Birchmoor and surrounds**

- 8.3.3 Birchmoor is a village which comprises approximately 250 properties, the closest of which are located adjacent to the route of the Proposed Scheme. Birchmoor is connected to the urban areas of Stoneydelph to the west via Green Lane (Birchmoor) and Polesworth to the north via Birchmoor Road/Fairfields Hill.

- 8.3.4 The community resources in Birchmoor include the Birchmoor Working Men's Club, the Gamecock Inn public house, St John's Church, Polesworth Recreation Ground, a small playground and an allotment area.

### **Polesworth and surrounds**

- 8.3.5 Polesworth is a village which comprises approximately 2,800 residential properties, the closest of which are located approximately 380m east of the route of the Proposed Scheme. Polesworth is bounded by agricultural fields to its east and west, with Pooley Country Park located approximately 250m to the north-west. The north of the village is bordered by the West Coast Main Line, and the southern part of Polesworth is bordered by Dordon village. Polesworth is connected to Stoneydelph by the B5000 Tamworth Road.

- 8.3.6 There is a wide range of community resources in Polesworth, including outdoor play and sport spaces, open spaces, places of worship (Polesworth Baptist Church, Polesworth Congregational Church), community centres (including Polesworth Library & Information Centre and Polesworth Memorial Hall), health and social care facilities, a private antenatal and postnatal services clinic (Meet Your Miracle Studio), two public houses (The Spread Eagle and Bulls Head), and a social club. Pooley Country Park is approximately 62.5ha in area and offers open space, recreational trails and a children's play area. The Polesworth (Abbey) Scout Group activity centre and Pooley Fields Heritage Centre are located within the country park.

### **Austrey, Newton Regis and surrounds**

- 8.3.7 Austrey is a village within which the closest properties are located approximately 400m east of the route of the Proposed Scheme. It is connected to Newton Regis by Newton Lane. Newton Regis is situated approximately 1km to the north-west of Austrey and lies approximately 900m west of the route of the Proposed Scheme. In total, Austrey and Newton Regis comprise approximately 450 residential properties.

- 8.3.8 The community resources in Austrey include places of worship (St Nicholas Church and Austrey Baptist Church), a play area, the Bird In Hand public house, Austrey allotments, and Austrey Church of England Primary School. To the west of the village, Austrey Playing Fields comprise two sports pitches and a play area. The woodland attached to Austrey Playing Fields is used by a local forestry group, named Discover Outdoors, which organises outdoor activities for children.

- 8.3.9 Community resources within Newton Regis include St Mary the Virgin Church, Newton Regis Church of England Primary School Newton Regis Village Hall, and a

cricket club with associated playing field and tennis court facilities. There is also an equestrian centre which is located approximately 500m west of the route of the Proposed Scheme.

### *Demographic and health profile of the Birchmoor to Austrey area*

- 8.3.10 The local communities potentially directly affected by the Proposed Scheme in the Birchmoor to Austrey area have a relatively low population density, commensurate with the mainly rural nature of the area.
- 8.3.11 Data provided by the Office for National Statistics<sup>68</sup> show that this population has a broadly similar health status to the national (England) averages.
- 8.3.12 The population is less deprived than the national average with regard to the combined indices of multiple deprivation and the health domain (a sub-set of the indices of multiple deprivation)<sup>69</sup>.
- 8.3.13 This area as a whole is considered to be more resilient than the national average with regard to changes in the relevant health determinants, and with some vulnerabilities in terms of the health status of the population.
- 8.3.14 The available data provide detail down to ward level and enable a profile to be made of the whole population in the Birchmoor to Austrey area. The description of the whole population, and the populations within wards, does not exclude the possibility that there will be some individuals or small groups of people who do not conform to the overall profile.

## **8.4 Effects arising during construction**

### **Avoidance and mitigation measures**

- 8.4.1 Consideration of potential health issues is an integral part of the planning and design of the Proposed Scheme, alongside consideration of other environmental, community and economic issues. As far as reasonably practicable, mitigation measures incorporated into the design of the Proposed Scheme with the aim of avoiding or reducing adverse health effects. Examples of the mitigation measures incorporated into the design of the Proposed Scheme include the following:
- reducing the loss of property and community assets, insofar as reasonably practicable;
  - reducing visual intrusion and noise, insofar as reasonably practicable;
  - incorporating landscape design and screening into the design; and
  - permanent realignment and diversion of a number of public rights of way (PRoW) and roads to maintain access (see Section 14, Traffic and transport for further detail).

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<sup>68</sup> The Office of National Statistics (ONS) provides spatial data on levels of deprivation, using indicators of: 'multiple deprivation', 'employment', 'education', 'barriers to housing and social services', 'crime' and 'living environment'. These data are available by Lower Super Output area.

<sup>69</sup> Department for Communities and Local Government (2015) English Indices of Deprivation 2015. Available online at: <https://www.gov.uk/government/statistics/english-indices-of-deprivation-2015>



- 8.4.2 The locations of construction compounds and site haul routes have been selected to reduce exposure to construction impacts insofar as reasonably practicable.
- 8.4.3 HS2 Ltd would require its contractors to comply with the environmental management regime for the Proposed Scheme, which would include the measures set out in the draft Code of Construction Practice (CoCP)<sup>70</sup>, which provides a general basis for route-wide construction environmental management. Contractors would also be required to comply with the measures in Local Environmental Management Plans (LEMP), which apply the environmental management strategies at a local level.
- 8.4.4 The CoCP will be the means of controlling the construction works associated with the Proposed Scheme to ensure that the effects of the works upon people and the natural environment are reduced or avoided so far as reasonably practicable.
- 8.4.5 The CoCP will require the nominated undertaker and its contractors to: produce and implement a community engagement framework and provide appropriately experienced community relations personnel to implement the framework; provide appropriate information; and to be the first point of contact to resolve community issues. The nominated undertaker would be required to take reasonable steps to engage with the community, focusing on those who may be affected by construction impacts, including local residents, businesses, landowners and community resources, and the specific needs of protected groups (as defined in the Equality Act 2010).
- 8.4.6 In the event of any loss of a community facility, the options for mitigating significant community effects to be explored by HS2 Ltd would include:
- improving or altering the remaining portion of the community facility;
  - improving other existing community facilities in the area that could reduce the effect;
  - improving accessibility to other community facilities; and/or
  - identifying land owned by the relevant local authority that could be brought into use as a community facility with its agreement.

## Assessment of impacts and effects

### *Neighbourhood quality*

- 8.4.7 The term 'neighbourhood quality' is used in this assessment to describe the combination of environmental factors that influence people's experience of, and feelings about, their local environment. When these factors are altered people's levels of satisfaction with their living environment may change. In turn, this could affect mental wellbeing or behaviours such as the use of outside space.
- 8.4.8 The construction of the Proposed Scheme will affect neighbourhood quality through impacts such as noise, air emissions, visual impacts and additional traffic, including heavy goods vehicles (HGV). These will be assessed in the relevant sections of the formal ES, with a focus on those receptors, or groups of receptors, that are most

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<sup>70</sup> Supporting document: Draft Code of Construction Practice

affected. The Community section of the formal ES will provide a combined assessment, which will identify locations that are subject to significant environmental effects on two or more topics (e.g. noise and visual).

- 8.4.9 In contrast, a qualitative approach is taken to assessing impacts on neighbourhood quality. The assessment looks at changes in character, tranquillity and amenity across the neighbourhood as a whole, including streets and other public and private outdoor areas. This is judged on a case-by-case basis, taking into account the characteristics of each neighbourhood. It will be informed by the findings from other assessments, but does not rely on the same significance thresholds, as it is not focused on individual receptors. The assessment of health and wellbeing effects considers issues such as people's feelings of attachment to, and pride in, their neighbourhood and enjoyment of outside space, and how these may change.
- 8.4.10 The sections most relevant to the neighbourhood quality assessment are: Section 5, Air quality; Section 11, Landscape and visual; Section 13, Sound, noise and vibration; and Section 14, Traffic and transport.
- 8.4.11 Dust emissions from construction activities are considered in Section 5, Air quality, which identifies no adverse effects with respect to the effects of construction activities on dust soiling and human health within the Birchmoor to Austrey area, taking account of mitigation measures contained in the CoCP. Therefore, it is not expected that dust emissions around construction sites would contribute to adverse impacts on neighbourhood quality.
- 8.4.12 The construction of the Proposed Scheme would have temporary and permanent<sup>71</sup> impacts on neighbourhood quality in areas close to construction sites, including those at Birchmoor, Polesworth and Austrey. Impacts on neighbourhood quality have the potential to affect the wellbeing of residents adversely during the construction phase, by giving rise to negative feelings in relation to quality of life and the local environment, and potentially changing behaviours, such as deterring the use of outdoor space.
- 8.4.13 Construction noise would have the potential to generate a noticeable change in noise at outdoor areas and at neighbourhoods in proximity to the route of the Proposed Scheme, as listed in Section 13, Sound, noise and vibration. It is currently expected that the construction of the Proposed Scheme may be visible from a number of locations, as listed in Section 11, Landscape and visual. These impacts have the potential to contribute to impacts on neighbourhood quality. This will be assessed in the formal ES.
- 8.4.14 Traffic and transport impacts in the Birchmoor to Austrey area would include:
- construction vehicle movements to and from the various construction compounds and sites;

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<sup>71</sup> The SMR defines temporary changes (impacts) to health determinants as short term (<6 months), medium term (6 months-2 years), and long term (2 years +). Permanent impacts have not been defined in the SMR. A change in a health determinant lasting 4 years or more will be considered as a permanent impact. A professional judgement will be made as to when an impact would lead to a permanent effect on the health of the population.

- temporary and permanent road closures and associated diversions; and
- temporary and permanent alternative routes for PRoW.

- 8.4.15 Construction traffic, including HGV, would be present on a number of roads in the area, as listed in Section 14, Traffic and transport.
- 8.4.16 The link between health and the aesthetic value of the public realm is not well understood, but there is moderate evidence to suggest that an attractive environment can improve people's enjoyment and sense of wellbeing. Conversely, poor quality environments have been shown to have negative effects on people's health. There is moderate evidence that people have a preference for views of natural environments over man-made environments, and that exposure to views of natural environments is associated with increased wellbeing.
- 8.4.17 Settlements in the Birchmoor to Austrey area include the rural villages of Birchmoor, Polesworth, Newton Regis and Austrey. Construction activities and permanent structures would be visible from a number of locations due to the scale of the Proposed Scheme. Section 11, Landscape and visual, identifies locations that may experience changes in existing views, including country roads, PRoW and views from properties close to the Proposed Scheme. Impacts on views of the rural landscape may have adverse effects on residents' perceptions of the quality and character of their local environment, which could lead to a reduction in wellbeing.
- 8.4.18 Overall, it is considered that the construction of the Proposed Scheme has the potential to affect wellbeing through changes to neighbourhood quality. This will be assessed in the formal ES.

#### *Access to services, health and social care*

- 8.4.19 There is strong evidence linking access to healthcare facilities with health outcomes, and there is also weak to moderate evidence to suggest that transport problems are a key barrier to people's ability to access these services. There is moderate evidence to suggest that access to shops and other local services can affect health. This is based on a range of factors affecting quality of life and includes issues such as reducing feelings of isolation and enabling participation in society, as well as accessing basic needs such as food shopping.
- 8.4.20 The Birchmoor to Austrey area is a predominantly rural in character. Typically there is a reliance on shops and services in nearby towns and villages. Opportunities to access alternative services and facilities are limited, resulting in the necessity to travel longer distances to access alternative facilities. There is potential for communities to experience increased difficulty in accessing shops and community services (such as post offices, banks, libraries) as a result of increased journey times during construction. This will be assessed and reported in the formal ES.
- 8.4.21 Construction of the Pooley Lane embankment would take place in Pooley Country Park. The Proposed Scheme would occupy land used by the Polesworth (Abbey) Scout Group activity centre for its outdoor pursuits and would temporarily (one year and six months) affect the ability of the scout group to use the area for activities. In addition to being used by Polesworth (Abbey) Scout Group, the space is also hired for corporate use and by clubs and youth groups for activities and events. The closest

alternative facility offering similar activities is the 6<sup>th</sup> Tamworth (Amington) Scout Group located approximately 2.5km away. Polesworth Memorial Hall is located 800m away and offers alternative hireable community meeting space. The Proposed Scheme would have an adverse effect on the health and wellbeing of users of the centre for scouting activities, dependent on their ability to access alternative scout groups nearby. However, the users of the facility for community and meeting room space are unlikely to be similarly affected, given the nearby alternative facilities available which are easily accessible to users such as Polesworth Memorial Hall.

- 8.4.22 Construction of the Proposed Scheme would result in the loss of a private antenatal and postnatal services clinic, Meet Your Miracle Studio, due to earthworks associated with Hermitage Lane cutting which would require the demolition of its premises within the Hermitage Lane Business Park. Access to antenatal services makes a positive contribution to the wellbeing of individuals by providing access to treatment which is not universally available through the National Health Service. The nearest Meet Your Miracle Studio is located in Coventry, approximately 31km away, and offers similar services by the same operator. The permanent loss of this facility may potentially adversely affect the wellbeing of users of the facility depending on their ability to access an alternative facility. The loss of this facility is unlikely to affect the majority of the population living within the local area, as only a small number of residents living within and surrounding the Birchmoor to Austrey area are likely to use the service.

#### *Access to green space, recreation and physical activity*

- 8.4.23 There is moderate evidence to show that access to green space contributes to good mental health. There is also moderate evidence that environmental factors such as access to high quality green space, safety and local amenity, can influence participation in physical activity. Physical activity is strongly linked to health outcomes.
- 8.4.24 Construction of the Proposed Scheme may impact on levels of access to green space and physical activity, including:
- impacts on PRoW, including temporary closures, diversions and loss of amenity, which may deter the use of these routes by walkers, cyclists and equestrians;
  - any loss of green space or facility used for physical activity; and
  - the presence of construction traffic, including HGV, on the local road network, which may deter their use by walkers, cyclists and equestrians.
- 8.4.25 The route of the Proposed Scheme would intersect a number of PRoW in the Birchmoor to Austrey area. The impacts on amenity and recreational value of these footpath networks, and therefore levels of physical activity and associated health and wellbeing benefits, will be reported in the formal ES.
- 8.4.26 Construction traffic would mainly use site haul routes along the route of the Proposed Scheme. Some construction traffic, however, including HGVs, would be present on a number of roads in this area, as outlined in Section 14 Traffic and transport. This could obstruct or deter pedestrians, cyclists and equestrians from using these routes. In the

case of recreational users, it is considered that alternative routes would be available in most cases, and therefore that impacts on the affected roads would not reduce overall levels of recreational non-motorised users. For those using affected routes for active travel to work or to access shops and services, there is the possibility that people would choose instead to travel by car, temporarily reducing levels of physical activity and associated health and wellbeing benefits. This will be assessed in the formal ES.

- 8.4.27 It is currently expected that that approximately 36% of Pooley Country Park would be inaccessible for a period of five years and six months during construction, and 4% of the park would be permanently lost due to the construction of the Pooley Lane cutting, Pooley Lane embankment and Polesworth viaduct. The construction of the Proposed Scheme would affect the main entrance located in the southern part of the park and the visitor car park. The Pooley Fields Heritage Centre within Pooley Country Park would be permanently lost. Pooley Country Park provides access to the countryside and offers a range of walks and informal recreational routes within a pleasant outdoor area with attractive outlooks. The Park is also used by the Polesworth (Abbey) Scout Group for outdoor activities. The park makes a positive contribution to the wellbeing of local communities by providing opportunities for physical activity and access to green space, encouraging healthy lifestyles among all age groups. Activity affecting 36% of the park during construction, and the permanent loss 4% of the park would have an adverse effect on the health and wellbeing of the community.
- 8.4.28 It is estimated that approximately 6% of the north-west corner of one of the two playing fields at Austrey would be permanently lost due to the construction of Newton Regis cutting. In addition to being used for regular sporting activities, Austrey Playing Fields is occasionally used for local community events (e.g. Austrey bonfire) and activities. Access to the playing fields provides a positive contribution to the wellbeing of local communities through providing opportunities for physical activity and encouraging healthy lifestyles. The permanent loss of approximately 6% of the affected playing field would have an adverse effect on the health and wellbeing of the community.
- 8.4.29 The construction of Newton Regis cutting would result in the permanent loss of the children's play area at Austrey Playing Fields. It provides a small area of equipped play space suitable for children aged under five years old, and is likely to be used primarily by users of Austrey Playing Fields. There is one other playground situated within Austrey (approximately 750m north-east of the existing facility) which may provide suitable alternative facilities for children to play. Access to the playground makes a positive contribution to the wellbeing of local residents through the provision of an area for recreation for children, encouraging active play and healthy lifestyles. The permanent loss of this facility would have an adverse effect on health and wellbeing.
- 8.4.30 Within Austrey, woodland adjacent to Austrey Playing Fields would be required for the construction of the Newton Regis cutting, leading to 5% of the woodland being temporarily lost for a period of approximately two years, and 1% permanently lost. The woodland is used by a children's forestry group, Discover Outdoors, for recreational outdoor activities and play and parties, events, and teaching in conjunction with local schools. The temporary loss of approximately 5% and permanent loss of approximately 1% of the woodland is unlikely to result in an adverse

effect given the small area of space lost compared to the overall area remaining and would not result in health and wellbeing effects for users.

### *Social capital*

- 8.4.31 The connections between individuals within communities, and the increased likelihood that arises through these networks for individuals to feel valued, to feel a sense of belonging, to have companionship and to support each other, is important for health and wellbeing. A measure of the effectiveness of these connections within communities is termed 'social capital' and is a recognised determinant of health. The Office for National Statistics defines social capital as follows:
- 'In general terms, social capital represents social connections and all the benefits they generate. Social capital is also associated with civic participation, civic-minded attitudes and values which are important for people to cooperate, such as tolerance or trust.'<sup>72</sup>
- 8.4.32 There is moderate evidence for a link between social capital and health and wellbeing outcomes. A change in social capital has the potential to influence health effects that are gained through social contact and support, social participation, reciprocity and trust. Adverse effects on health from changes in social capital could be experienced as a reduction in wellbeing or as physiological effects on the body's hormonal and immune systems, with increased susceptibility to mental and physical illness.
- 8.4.33 Settlements in the Birchmoor to Austrey area support well-established communities. The size of the temporary construction workforce would be substantial relative to the size of these local communities. During the day, the workforce would be present on construction sites and compounds throughout the area, including satellite compounds in the vicinity of Birchmoor, Polesworth and Austrey. The duration of the works at each site would range from approximately one to six years. The presence of construction workers is likely to be noticeable, with construction vehicles using local roads to access compounds and workers using facilities such as shops, restaurants and public houses within local villages, particularly Birchmoor, Polesworth and Austrey.
- 8.4.34 The introduction of a temporary construction workforce into communities which have the characteristics identified above has the potential to alter people's perceptions and interactions within their communities, modifying behaviour and the value they place on social capital. Such a reduction in social capital has the potential to adversely affect wellbeing and may influence behaviours that are beneficial to wellbeing such as the use of community facilities.
- 8.4.35 The draft CoCP<sup>73</sup> includes a commitment to produce and implement a community engagement framework and provide appropriately experienced community relations personnel. HS2 Ltd will engage with local authorities and community representatives to identify measures aimed at fostering and maintaining good relationships between

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<sup>72</sup> Office for National Statistics; Measuring Social Capital;  
[http://webarchive.nationalarchives.gov.uk/20160105160709/http://www.ons.gov.uk/ons/dcp171766\\_371693.pdf](http://webarchive.nationalarchives.gov.uk/20160105160709/http://www.ons.gov.uk/ons/dcp171766_371693.pdf)

<sup>73</sup> Supporting document: Draft Code of Construction Practice

the workforce and local communities. Any measures identified will be included within the community engagement framework as appropriate.

- 8.4.36 The Community section of the formal ES will include an assessment of impacts resulting from the loss of residential properties. The loss of five properties is identified as the threshold for a significant community effect. In some cases the Community assessment may identify significant effects below this threshold, for example where the demolitions make up a significant proportion of a very small community.
- 8.4.37 The health assessment considers changes to the social environment and loss of social networks experienced by the remaining community following the loss of residential properties. For this to have an adverse impact on overall levels of social capital, the loss of homes would need to make up a sizeable proportion of the local community, with the potential to result in the direct loss of contacts in the local area and/or a noticeable reduction in the number of people using local facilities. This will be judged on a case-by-case basis, taking account of the size of the community and its characteristics. Therefore, not all of the significant effects identified in the Community section will result in adverse health and wellbeing effects.
- 8.4.38 In Birchmoor, there is a potential for such effects to occur, where it is currently anticipated that three residential properties would be demolished as a result of the construction of the M42 Tamworth tunnel and the temporary realignment of the M42. The erosion of social networks resulting from these demolitions would have the potential to reduce social capital, reducing the beneficial health effects that are gained through social contact and support for the remaining community.
- 8.4.39 In Polesworth, the construction of Hermitage Lane cutting, Pooley Lane overbridge and the realignment of B5000 Tamworth Road would require the demolition of seven residential properties. However, the demolition of these properties would not constitute an erosion of social networks and impact on residents' health and wellbeing, and no health effects are anticipated on the remaining community.
- 8.4.40 Within Austrey, the realignment of No Man's Heath Lane would require the demolition of one residential property. However, the demolition of this property would not constitute an erosion of social networks and impact on residents' health and wellbeing, and no health effects are anticipated on the remaining community.
- 8.4.41 Effects on residents directly impacted by demolitions are assessed in Volume 3, Section 7, Health.
- 8.4.42 Road closures and diversions required for the construction of the Proposed Scheme would have the potential to reduce community connectivity by increasing journey times between rural communities. Potential health and well-being effects will be reported in the formal ES.

### **Other mitigation measures**

- 8.4.43 Any other mitigation identified to reduce adverse impacts on health determinants during the construction of the Proposed Scheme will be described in the formal ES.
- 8.4.44 HS2 Ltd will engage with local authorities and community representatives to identify measures aimed at fostering positive relationships between local communities and



the temporary construction workforce. Any measures identified will be included within the Community Engagement Framework.

- 8.4.45 HS2 Ltd will continue to engage with owners/operators to identify reasonably practicable measures to help mitigate potential adverse effects identified in this assessment. Any other mitigation measures will be described in the formal ES.

## 8.5 Effects arising from operation

### Avoidance and mitigation measures

- 8.5.1 Adverse impacts on health determinants would be reduced insofar as reasonably practicable through mitigation measures incorporated into the design of the Proposed Scheme to reduce adverse effects on people. The mitigation measures incorporated into the design of the Proposed Scheme in Birchmoor to Austrey area will be reported in the formal ES.

### Assessment of impacts and effects

#### *Neighbourhood quality*

- 8.5.2 Operational noise would have the potential to generate a noticeable change in noise at outdoor areas and at neighbourhoods in proximity to the route of the Proposed Scheme, as listed in Section 13, Sound, noise and vibration. The permanent features of the Proposed Scheme would be visible from nearby neighbourhoods, as described in Section 11, Landscape and visual. These impacts have the potential to contribute to impacts on neighbourhood quality. This will be assessed in the formal ES.

### Other mitigation measures

- 8.5.3 If a need is identified for mitigation to reduce adverse impacts on health determinants during the operation of the Proposed Scheme in this area, the mitigation will be described in the formal ES.

### Monitoring

- 8.5.4 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.
- 8.5.5 No area-specific monitoring of health effects during the operation of the Proposed Scheme have been identified at this stage.



## 9 Historic environment

### 9.1 Introduction

- 9.1.1 This section of the report provides a description of the current baseline for heritage assets and the likely impacts and significant effects identified to date resulting from the construction and operation of the Proposed Scheme within Birchmoor to Austrey area. Consideration is given to the extent and value (significance) of heritage assets including archaeological and palaeo-environmental remains, historic buildings, the built environment and historic landscape.
- 9.1.2 Engagement has been undertaken with Historic England, Warwickshire County Council (WaCC) and Leicestershire County Council (LeCC). The purpose of this engagement has been to discuss the assessment approach, to obtain relevant baseline information and to inform the design development and assessment of the Proposed Scheme. Engagement will continue as part of the development of the Proposed Scheme and to inform the formal assessment.
- 9.1.3 Maps showing the location of the key environmental features (Map Series CT-10) and the key construction (Map Series CT-05) and key operational (Map Series CT-06) features of the Proposed Scheme can be found in the Volume 2: LA02 Map Book. Only designated heritage assets within the Birchmoor to Austrey area are shown on maps CT-10-352b to CT-10-355a. Non-designated heritage assets have also been assessed as part of this work, although they are not illustrated on these maps.
- 9.1.4 A gazetteer of designated and non-designated heritage assets with accompanying maps will be included in the formal ES. The formal ES will also include a Historic Landscape Characterisation Report, which will identify historic landscape character areas potentially affected by the Proposed Scheme.
- 9.1.5 Assets have been identified in this section of the report using their National Heritage List for England (NHLE) or Historic Environment Record (HER) name and number (numbers prefixed MWA). If no record number is known (e.g. an asset identified from historic mapping), then the asset is referred to by name. Project-specific asset identification numbers will be used for the formal ES.

### 9.2 Scope, assumptions and limitations

- 9.2.1 The scope, key assumptions and limitations for the historic environment assessment are set out in full in Volume 1 (Section 8) and the Scope and Methodology Report (SMR)<sup>74</sup>, including the method for determining the value of a heritage asset and magnitude of impact (tables 19 and 20 in the SMR, respectively).
- 9.2.2 The assessment focuses on the extent to which the Proposed Scheme would affect designated and non-designated heritage assets. Impacts on assets as a result of the Proposed Scheme would occur largely through the physical removal and alteration of heritage assets and changes to their setting.

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<sup>74</sup>Supporting document: HS2 Phase 2b Environmental Impact Assessment Scope and Methodology Report

- 9.2.3 The study area within which a detailed assessment of all assets, designated and non-designated, has been carried out is defined as the land required for the Proposed Scheme plus 250m in urban areas and 500m in rural areas. This is referred to in the remainder of this assessment as the 250m, or 500m study area.
- 9.2.4 The setting of all designated heritage assets within a study area up to 2km from the land required for the Proposed Scheme has been considered. This is referred to in the remainder of this assessment as the 2km study area.
- 9.2.5 The historic environment methodology includes the consideration of the relevant intra-project effects. These interactions will be included in the assessment of impacts and effects in the formal ES.
- 9.2.6 Where noise is considered, this is within the context of the contribution that this makes to the heritage value of the assets, and is not a reference to absolute noise levels or sound, or the noise or vibration impacts on the health and quality of life of people who live in or visit the area.
- 9.2.7 The baseline studies informing this assessment have been drawn from a wide and comprehensive range of information sources. These will be supported by a programme of non-intrusive survey, including geophysical survey, the results of which will be reported in the formal ES.
- 9.2.8 At this stage of design development, heritage assets within the land required to construct the Proposed Scheme are assumed to require complete removal and the assessment has, in the main, been undertaken on that basis. In relation to the following assets, although the asset is within the land required for the construction of the Proposed Scheme and may be affected, any effect is unlikely to be significant:
- the site of a former quarry on Tamworth Road (MWA6536);
  - the site of a possible Roman settlement 200m SE of Bramcote Hall (MWA220);
  - the site of a fishpond at Bramcote Hall (MWA6424);
  - the site of fishponds at Bramcote Hall (MWA4824);
  - the possible site of a deserted medieval village at Bramcote (MW224);
  - ridge and furrow north of Pooley Hall (MWA10271);
  - Pooley Hall garden (MWA12568);
  - the Coventry Canal (MWA4373);
  - Austrey medieval settlement (MWA9490); and
  - the site of Pooley Hall Colliery's mineral railway (MWA6512).
- 9.2.9 With respect to overhead line diversions/realignments in particular, it is likely that the majority of the heritage assets can in fact be retained, as the land is only required to allow for raising or lowering of pylons and/or re-stringing of cables, or to provide an access route to the works.

- 9.2.10 Common features of the historic landscape such as marl pits, field boundaries and former areas of ridge and furrow are not individually considered but have been included in the baseline, as part of the historic landscape character and will be considered as part of the overall assessment of impacts on historic landscape and reported in the formal ES.
- 9.2.11 In undertaking the assessment the following limitations were identified and assumptions made:
- field surveys are ongoing, and are subject to land access and site conditions. The result of field surveys will be included as part of the formal ES;
  - desk-based assessment is ongoing and data on non-designated heritage assets will be described more fully in the formal ES and accompanying technical appendices; and
  - intra-project topic assessments are ongoing and will be considered as part of the assessment of historic environment effects as part of the formal ES.

## 9.3 Environmental baseline

### Existing baseline

- 9.3.1 Baseline data was collated from a variety of sources, including:
- the NHLE (Historic England register of designated heritage assets);
  - Leicestershire HER;
  - Warwickshire HER;
  - conservation area appraisals;
  - historic maps and aerial photography; and
  - relevant documentary and published sources at Warwickshire County Record Office.
- 9.3.2 In addition to collating documentary baseline data, site visits have been undertaken.

### Designated assets

- 9.3.3 There are no designated heritage assets located partially or wholly within the land required for the Proposed Scheme.
- 9.3.4 The following designated heritage assets (listed from south to north) are located partially or wholly within the 2km study area:
- three scheduled monuments comprising Polesworth Bridge (NHLE 1005771), Polesworth Abbey (NHLE 1005735) and the remains of the medieval Benedictine Priory at Alvecote including a dovecote (NHLE 1020623), all of which are of high value;
  - seven Grade II\* listed buildings comprising the Church of St. Editha, (NHLE 1252564), Abbey Gatehouse (NHLE 1262202), 22 High Street (NHLE 1252595),

and Gate House (NHLE 1252594) in Polesworth Conservation Area; Pooley Hall, Chapel and Farmhouse (NHLE 1365179) and the Church of St. Nicholas (NHLE 1365184) in Austrey; and the Church of St. Mary (NHLE 1116451) in Newton Regis Conservation Area, all of which are of high value;

- forty-three Grade II listed buildings comprising eleven Grade II listed buildings in Polesworth Conservation Area, ten Grade II listed buildings in Newton Regis Conservation Area, plus a further 22 Grade II listed buildings comprising: 12 domestic dwellings, five churches, a telephone kiosk, the village cross at Austrey and a public house, all of moderate value. The extant remains of the Benedictine Priory at Alvecote (NHLE 1262207) and its associated dovecote (NHLE 1252601) are listed as Grade II structures, as well as being designated as a scheduled monument, and are of high value; and
- two conservation areas at Polesworth and Newton Regis, both of moderate value.

### Non-designated assets

9.3.5 The following non-designated assets of low value lie wholly or partially within the land required for the Proposed Scheme:

- the site of Birch Coppice Colliery Number 1 (MWA6504) and colliery tramway (MWA13151);
- the site of a former quarry on Tamworth Road (MWA6536);
- the Hermitage which is the possible site of a chapel built above St. Edith's Well (MWA13159; this may correspond to the Hermitage noted on the mapping);
- assets in the vicinity of Pooley Hall including the site of Pooley Hall Colliery (MWA6507) and mineral railway (MWA6512), Pooley Hall Colliery Wharf (MWA4386) and canal basin (MWA6522), on the line of the Coventry Canal (MWA4373); Pooley Hall garden (MWA12568), ridge and furrow to the north of Pooley Hall (MWA10271); a World War Two (WWII) Nissen hut, a World War One (WWI) war memorial dedicated to the men of Pooley Colliery along Pooley Lane, and the Pithead Baths of Pooley Colliery (also known as Stormking, Pooley Lane);
- assets in the vicinity of Bramcote Hall including the site of a possible Roman settlement 200m south-east of Bramcote Hall (MWA220), the possible site of a deserted medieval village (MWA224), and two records of probable medieval fishponds (MWA4824 and MWA6524);
- metal detecting findspots<sup>75</sup> of a Roman bead and a medieval coin in 'Polesworth Field 45', north-west of Pooley Hall (MWA20759 and MWA20773);

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<sup>75</sup> Findspot is a term used to describe the location where an artefact has been discovered. Findspots tend to record isolated finds from antiquarian discoveries, fieldwalking programmes, or metal detecting. The location information is often inaccurate and in such cases this is usually noted in the HER description.

- the medieval settlement at Austrey (MWA9490);
- the cropmark<sup>76</sup> of an enclosure of unknown date at Salt Street (MLE4252); and
- an extant house at Spring Cottage on No Man's Heath Lane, which appears on the Austrey tithe map of 1840.

9.3.6 Non-designated heritage assets of low value located partially or wholly within the 500m study area include:

- one asset of Bronze Age date comprising a findspot of a flint arrowhead;
- five assets from the Roman period comprising possible settlement remains and findspots of coins and a brooch;
- nineteen assets of medieval and post-medieval date comprising settlement evidence and artefact findspots; and
- twenty-four assets of the industrial and Victorian period comprising extant buildings, including chapels, a market building, a steam mill, a school, houses and shops, and the locations of sites of former buildings, comprising mills, houses and outbuildings. There are also industrial remains largely associated with the exploitation of the Warwickshire coalfield for coal and clay extraction, and remains of infrastructure including a turnpike road, a tramway, a bridge and a pump house.

### Historic environment overview

9.3.7 There is limited evidence for early prehistoric activity within the 2km study area. A Bronze Age arrowhead was found near the Coventry Canal in Polesworth. Cropmark features and Late Bronze Age artefacts have been recorded to the west and north-west of the village of Warton, and a cropmark enclosure has been recorded approximately 220m south-west of Bramcote Hall.

9.3.8 During the Iron Age, the counties of Leicestershire, Staffordshire and Warwickshire were within the territory of the Corieltuvi, the Cornovii and the Dobunni. At this time the area was characterised by small farmsteads and working sites enclosed by boundary ditches. Larger settlements were also located at hillfort sites, although these were fewer in number. No remains or features from this period have been identified within the 2km study area.

9.3.9 Known Roman activity presents a picture of a rural farming landscape. A possible Roman settlement is recorded south-east of Bramcote Hall (MWA220) whilst a possible enclosure, also of potential Roman date, is recorded to the south-west of Bramcote Hall. Roman artefacts, including coins and a brooch, have been recorded to the north-west of the village of Warton, and Salt Street, at the northern end of the Birchmoor to Austrey area, is purported to be a Roman route linking Ermine Street to

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<sup>76</sup> Cropmark is a term used to describe features identified through differential growth patterns observed in crops or grasses. They indicate the presence of buried features and are normally identified from the air.

the Fosse Way. This interpretation is based largely on its straight alignment and its name, although there is no other evidence that it is, in fact, Roman.

- 9.3.10 In the early medieval period, Polesworth Abbey (encompassing a scheduled monument (NHLE 1005735) was founded by King Egbert. The former gatehouse to the Abbey survives as a Grade II\* listed building (NHLE 1262202). A crossing at the site of Polesworth Bridge (NHLE 1005771) is likely to have been established during this period. Other settlements established during this period include the villages of Shuttington and Austrey<sup>77</sup>.
- 9.3.11 Settlement changes emerged during the medieval period. The medieval settlement at Polesworth expanded, with a second focus of settlement on Bridge Street. The Benedictine Priory at Alvecote (NHLE 1020623, 1262207 and 1252601) was founded in 1159 and the Manor of Newton Regis is also first referenced. Remains of the medieval settlement at Austrey (MWA9490) have been recorded to the south of the village and extant ridge and furrow earthworks, representing the remains of medieval ploughing, are present in the fields around the settlement core.
- 9.3.12 Other medieval and early post-medieval sites in the area comprise the Grade II\* listed Pooley Hall (NHLE 1365179), constructed in the early 16th century, and the site of a possible deserted village at Bramcote Hall (MWA224). In addition, the site of The Hermitage in Polesworth (MWA13159) may be of medieval date and is the purported site of a chapel built above St. Edith's Well.
- 9.3.13 The completion of the Coventry Canal (MWA4373) in 1790 resulted in settlement growth and rapid industrialisation. The canal linked Polesworth with other market towns and it became an important centre for a number of different industries, such as coal mining, quarry workings and brick and tile manufacturing. The improved transportation links encouraged the development of coal mining and in 1848 the first deep shaft of Pooley Hall Colliery was sunk (MWA6507) within the Pooley Hall estate, with its own wharf constructed on the Coventry Canal (MWA4386). This was followed by Gorby Knob pit at Pooley Hall, Birchmoor Colliery and Birch Coppice Colliery No. 1 (MWA6504). Later in the 19th century a new canal basin (MWA6522) was constructed on the Coventry Canal linked to Pooley Hall Colliery and a mineral railway branch line (MWA6512) was also added to connect the colliery to the West Coast Main Line, further improving the transportation links in this area. The continued development of settlements during this period reflects the new prosperity arising from industrialisation, as well as the prosperity arising from farming as several substantial farmhouses, such as Bramcote Hall (NHLE 1034690), were established during this period, and settlement expanded at Polesworth, Newton Regis and Austrey, with Spring Cottage, which is still extant, marking the northern extent of Austrey village on No Man's Heath Lane.
- 9.3.14 Settlement continued to grow at Polesworth during the late post-medieval and modern period, but there was little significant expansion of the smaller villages at Shuttington, Newton Regis and Austrey. Extensive open cast mining surrounded Polesworth during the 20th century, and Pooley Hall Colliery continued to thrive. After WWI a memorial was erected by the workers and owners of Pooley Hall Colliery

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<sup>77</sup> Oxford Archaeology (2014) *Historic Environment Assessment of Potential Development Areas within North Warwickshire*

on Pooley Lane. It commemorates 32 men from the colliery who lost their lives in the conflict and is still extant. Pooley Hall Colliery was improved in the early 20th century with the addition of its Pithead Baths building, which is still extant and in commercial use. This building was a relatively early pithead baths, opening in 1928 as a 'demonstration baths' to advocate for the benefits of installing similar provisions at other collieries in the area<sup>78</sup>. Other assets of this period include a Nissen hut situated along Pooley Lane. It appears on Ordnance Survey maps for the first time in 1956, suggesting that it may date to WWII, although its purpose in this location is not known. Beyond the collieries around Polesworth, the predominantly agricultural landscape remained relatively unchanged.

## 9.4 Effects arising during construction

### Avoidance and mitigation measures

- 9.4.1 The design of the Proposed Scheme has sought to avoid impacts on heritage assets within the area insofar as reasonably practicable.
- 9.4.2 Section 8 of the draft Code of Construction Practice (CoCP)<sup>79</sup> sets out the measures that will be adopted, insofar as reasonably practicable, to control effects on heritage assets. These include:
- management measures that will be implemented for heritage assets that are to be retained within the land required for the Proposed Scheme;
  - route-wide principles, standards and techniques for works affecting heritage assets; and
  - a programme of historic environment investigation and recording (including archaeology and historic buildings) to be undertaken prior to or during construction works affecting the heritage assets.
- 9.4.3 In addition to these, specific mitigation is proposed for the WWI war memorial on Pooley Lane. This asset will be relocated as part of the Proposed Scheme. Details will be provided within the formal ES.

### Assessment of impacts and effects

#### *Temporary effects*

- 9.4.4 The construction works, comprising excavations and earthworks and including temporary works such as construction compounds, storage areas, and diversion of existing roads and services, have the potential to affect heritage assets during the construction period. Impacts would occur to assets both within the land required for the Proposed Scheme and assets in the wider study area as a result of changes to their settings.

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<sup>78</sup> The Science and Art of Mining, 13 July 1929, 404, column 1, accessed through <http://www.dmm.org.uk/news19/9290713b.htm>

<sup>79</sup> Supporting document: Draft Code of Construction Practice

- 9.4.5 No significant effects are expected to occur as a result of temporary impacts on designated heritage assets.
- 9.4.6 The non-designated war memorial on Pooley Lane has historical and communal value as a memorial to those killed in WWI. It was erected by the workers and owners of Pooley Hall Colliery to commemorate 32 men from the colliery who lost their lives in the conflict. The memorial is located on the approach to Pooley Country Park, a public park on the site of the former colliery; however it remains separated from it as a standalone monument. Although of historic and communal interest, the memorial is considered to be of low heritage value as a conventional example of commemorative architecture. The war memorial is located within the land required for the construction and operation of the Proposed Scheme and will be removed and relocated during the construction phase. The temporary removal of the memorial would amount to the total loss of the asset's heritage value for the duration of the construction period; until such time that the relocated memorial is once again accessible to the public. This would constitute a high magnitude of impact and a moderate adverse significance of effect.

#### *Permanent effects*

- 9.4.7 Permanent significant effects can occur either as a result of physical impacts on heritage assets within the land required for the Proposed Scheme, or through changes to the setting of heritage assets through the presence of the Proposed Scheme.
- 9.4.8 No significant effects are expected to occur as a result of permanent impacts on designated heritage assets.
- 9.4.9 The following significant effects are currently expected to occur as a result of permanent physical impacts on non-designated heritage assets within the land required for the construction and operation of the Proposed Scheme.
- 9.4.10 The Hermitage (MWA13159) is the possible site of a chapel above St. Edith's Well. There are no extant remains associated with a chapel, but there is potential for sub-surface foundations of evidential value to survive. The site is of local interest and is assessed to be of low value. It is located within the land required for the construction of the Proposed Scheme and archaeological remains associated with the site would be physically impacted by the construction of the Proposed Scheme. This would result in a total loss of the asset's heritage value, constituting a high magnitude of impact and a moderate adverse effect.
- 9.4.11 The following non-designated assets date to the 19th and 20th century exploitation of the Warwickshire coalfield. They derive their heritage value from their illustrative historical value and evidential value in association with the industrial heritage of the local area. They are all of low heritage value and are located wholly within the land required for the Proposed Scheme. The archaeological remains associated with these assets would be physically impacted by the construction of the Proposed Scheme and the standing buildings would be removed, resulting in a total loss of the assets' heritage value. This would constitute a high magnitude of impact, and result in a moderate adverse effect:



- Birch Coppice Colliery Number 1 (MWA6504);
- Pooley Hall Colliery (MWA6507);
- the Pithead Baths building at Pooley Hall Colliery;
- Pooley Hall Colliery Wharf (MWA4386); and
- the canal basin (MWA6522) north of Pooley Hall Colliery.

9.4.12 The non-designated WWII Nissen hut on Pooley Lane has evidential value as part of the influx of temporary buildings during WWII. It is of low heritage value. It is located within the land required for the construction of the Proposed Scheme; therefore there will be total loss of the asset. This would amount to the total loss of the asset's heritage value, constituting a high magnitude of impact and a moderate adverse effect.

9.4.13 The cropmark of an enclosure on No Man's Heath is recorded in the Leicestershire HER (MLE4252) and lies partially within the LA02 Birchmoor to Austrey area. It is a non-designated asset of low heritage value. Impacts to this asset are assessed in the Historic Environment section for LA03 Appleby Parva to Ashby-de-le-Zouch.

9.4.14 No permanent significant effects arising from impacts to the setting of designated heritage assets have been identified.

9.4.15 The non-designated colliery tramway (MWA13151) at Birch Coppice Colliery is of low value and derives its heritage value from its illustrative historical value and evidential value, in association with the industrial heritage of the local area. The tramway is located partially within the land required for the construction of the Proposed Scheme. A proportion (approximately 30%) of the asset would be lost which would constitute a medium impact on the asset's heritage value, which would in isolation result in a minor adverse effect. However, the setting of the asset and the ability to understand and appreciate the resource would be totally altered by the loss of Birch Coppice Colliery Number 1 (MWA6504), which would constitute a high magnitude of impact in conjunction with the partial physical loss. The significance of effect is therefore assessed as moderate adverse.

### Other mitigation measures

9.4.16 No additional construction phase mitigation measures beyond those included within the Proposed Scheme design have been identified at this stage, however potential opportunities for further mitigation measures will continue to be considered through detailed design. These may include the identification of:

- suitable locations for advance planting, to reduce impacts on the setting of heritage assets; and
- locations where the physical impacts on below ground heritage assets can be reduced through the design of earthworks.

## Summary of likely residual significant effects

9.4.17 The temporary effects of construction activity on the setting of heritage assets have been considered. However, they are largely reversible in nature and would be restricted to the duration of the construction works.

9.4.18 As no specific mitigation measures have yet been identified in relation to the heritage assets described above, the residual effects are the same as those reported under permanent effects

## 9.5 Effects arising from operation

### Avoidance and mitigation measures

9.5.1 The following measures have been incorporated into the design of the Proposed Scheme, which would reduce the impacts and effects on heritage assets as shown on the CT-06 Map Series within the Volume 2: LA02 Map Book:

- noise mitigation measures have been included within the Proposed Scheme that could reduce potential impacts on some heritage assets; and
- landscape planting could increasingly reduce impacts on the setting of the designated assets within the study area as it matures.

### Assessment of impacts and effects

9.5.2 The assessment considers the Proposed Scheme once operational and all effects are considered to be permanent.

9.5.3 During the operation of the Proposed Scheme, no further ground works are anticipated, and as such there would be no further physical impacts on heritage assets arising from the operation of the Proposed Scheme.

9.5.4 Impacts on heritage assets due to changes in their settings arising from the presence of the Proposed Scheme are reported as permanent construction effects and are not repeated in detail here, although they would continue throughout the operation of the Proposed Scheme.

9.5.5 Further effects could occur in relation to heritage assets during the operation of the Proposed Scheme where additional, permanent, changes to the asset's settings have an additional detrimental effect on the way that the asset is understood or appreciated, for example as a result of increased noise or the movement of the trains in combination with the effect of the presence of the Proposed Scheme.

9.5.6 It is currently anticipated that in relation to the colliery tramway (MWA13151) at Birch Coppice Colliery there would be no significant effects as a result of the operation of the Proposed Scheme and that therefore the significance of effect would remain as described for the permanent construction phase effect.

### Other mitigation measures

9.5.7 The Proposed Scheme includes a number of design measures to address potential impacts and significant effects. At this time, no additional operational mitigation measures beyond those included within the Proposed Scheme design have been

identified. Potential opportunities for further mitigation have not been identified, and will be considered as part of the detailed design process.

### **Summary of likely residual significant effects**

- 9.5.8 As no mitigation beyond that described has been identified, it is currently anticipated that the residual effects would be the same as those reported in the assessment of effects during operation.

### **Monitoring**

- 9.5.9 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.
- 9.5.10 No area-specific heritage monitoring requirements during operation of the Proposed Scheme have been identified at this stage.

## 10 Land quality

### 10.1 Introduction

- 10.1.1 This section of the report presents the baseline conditions that exist along the Proposed Scheme in the Birchmoor to Austrey area in relation to land quality, and reports the likely impacts and significant effects identified to date resulting from construction and operation of the Proposed Scheme. Consideration is given to land that potentially contains contamination and land that has special geological significance, either from a scientific, historical, mineral exploitation or mineral resources point of view including geological sites of special scientific interest (SSSI) and local geological sites (LGS) and areas of designated mineral resources. Consideration is also given to petroleum (including gas) prospects and licensing.
- 10.1.2 Engagement has been undertaken with the British Geological Survey (BGS), North Warwickshire Borough Council (NWBC), Warwickshire County Council (WaCC), Staffordshire County Council (SCC), the Environment Agency, the Coal Authority, the Animal and Plant Health Agency (APHA), GeoConservation Staffordshire, the Staffordshire Ecological Record, the Geological Society Regional Group West Midlands, Warwickshire Geological Conservation Group, the Geology Trust and the Open University Geological Society West Midlands. The purpose of this engagement has been to discuss the Proposed Scheme and potential effects, and obtain relevant baseline information. Engagement will continue as part of the development of the Proposed Scheme and to inform the formal assessment.
- 10.1.3 Maps showing the location of the key environmental features (Map Series CT-10) and the key construction (Map Series CT-05) and key operational (Map Series CT-06) features of the Proposed Scheme can be found in the Volume 2: LA02 Map Book.
- 10.1.4 Land contamination issues are closely linked with those involving water resources and waste. Issues regarding groundwater resources are addressed in Section 15, Water resources and flood risk. Issues regarding the disposal of waste materials, including contaminated soils, are addressed in Volume 3: Route-wide effects (Section 15).

### 10.2 Scope, assumptions and limitations

- 10.2.1 The scope, assumptions and limitations for the land quality assessment are set out in Volume 1, Section 8 and the Scope and Methodology Report (SMR)<sup>80</sup>.
- 10.2.2 In accordance with the SMR, a risk based approach was undertaken to identify contamination that may have an impact upon the construction of the Proposed Scheme. To support this, a desk based assessment has been undertaken for the study area, defined as the land required for construction of the Proposed Scheme plus a 250m buffer. In the case of groundwater abstractions, this buffer is increased up to 1km.
- 10.2.3 The majority of new and diverted utilities would be laid in the boundaries of existing highways within normal road construction layers and natural soils below. These have

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<sup>80</sup> Supporting document: HS2 Phase 2b Environmental Impact Assessment Scope and Methodology Report

been considered in the context of the conceptual site model (CSM) approach, and the lack of contact with nearby potentially contaminated sites, and the absence of sensitive receptors within the roadways reduces the risk of an impact occurring to very low levels. The impact of laying these new and diverted utilities has therefore been scoped out of the assessment as they are unlikely to cause any significant land quality effects.

- 10.2.4 Potentially contaminated areas of land have been identified that could affect, or be affected by, the construction of the Proposed Scheme (e.g. contaminated soils may need to be removed or construction may alter existing contamination pathways). Each of these areas has been studied to evaluate the scale of potential impacts caused by existing contamination (if present) and what needs to be done to avoid significant consequences to people and the wider environment.
- 10.2.5 The location of the Proposed Scheme was viewed from points of public access initially. In addition, visits to some key sites have been undertaken to verify desktop information.
- 10.2.6 A CSM approach has been used to provide an understanding of the types of contaminants that may be present, the likely sources and/or pathways by which contamination can spread and the potential receptors (i.e. people and the wider environment) that could be affected. It indicates the types of impacts that existing contamination may be having at present and may have during and after construction.
- 10.2.7 The minerals assessment is based upon the mineral resources<sup>81</sup> identified on published minerals plans, and existing planning or licensed areas. Any inference of minerals provided by geological maps/reports is excluded (except where these are covered by the relevant minerals plans).
- 10.2.8 The geo-conservation assessment is based upon local authority and publicly available geological trust records.

### **10.3 Environmental baseline**

#### **Existing baseline**

- 10.3.1 Baseline data have been collected from a range of sources including Ordnance Survey mapping, the BGS, the Coal Authority, NWBC, WaCC, SCC, Public Health England (PHE), the Environment Agency, Natural England (NE), APHA, as well as from local geological trusts.

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<sup>81</sup> Defined in the SMR as 'mineral body including aggregates, salt, coal and other hydrocarbons, Petroleum Extraction Development Licences (PEDL), Shale Protection Area (ShPA)'

## Geology

- 10.3.2 This section describes the underlying ground conditions within the Birchmoor to Austrey area. Recent changes in lithostratigraphic classifications by the BGS have been incorporated where appropriate<sup>82,83</sup>.
- 10.3.3 Table 15 provides a summary of the geology (made ground, superficial and bedrock units) underlying the study area.

Table 15: Summary of the geology underlying the land quality study area

| Geology                                             | Distribution                                                                                                                                                                 | Formation description                                                                      | Aquifer classification                                                                        |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| Made ground                                         |                                                                                                                                                                              |                                                                                            |                                                                                               |
| Made ground                                         | Located at Pooley Fields Heritage Centre, Pooley Country Park, the former Birch Coppice Colliery and the former Midlands/Ensor Works site.                                   | Artificial ground comprising variable deposits of reworked natural and man-made materials. | Not classified                                                                                |
| Superficial                                         |                                                                                                                                                                              |                                                                                            |                                                                                               |
| Peat                                                | Located near to Bentley Farm.                                                                                                                                                | Organic, partially decomposed vegetation.                                                  | Unproductive                                                                                  |
| Alluvium                                            | Associated with the River Anker, and Bramcote Brook.                                                                                                                         | Clay, silt, sand and gravel.                                                               | Secondary A                                                                                   |
| River terrace deposits                              | Associated with the River Anker between the Coventry Canal and Linden Lane and north of Pooley Fields Heritage Centre.                                                       | Sands and gravels, locally with silt, clay or peat.                                        | Secondary A                                                                                   |
| Glaciofluvial deposits                              | Present near to Bramcote Hall and to the south of Salt Street, in the north of the study area.                                                                               | Sands and gravels.                                                                         | Secondary A                                                                                   |
| Glacial till <sup>84</sup>                          | Present to the west of the M42 in the south of the study area. Till known as the Thrussington Member is located between Polesworth and Linden Lane and around Bramcote Hall. | Variable pebbly and silty clay.                                                            | Unproductive (glacial till)<br>Secondary (Undifferentiated) (Thrussington Member)             |
| Bedrock                                             |                                                                                                                                                                              |                                                                                            |                                                                                               |
| Mercia Mudstone Group – Sidmouth Mudstone Formation | Outcrops at the northern limits of the study area around Appleby Hill, No Man's Heath and Salt Street.                                                                       | Mudstone and siltstone with thin beds of dolomitic siltstone and sandstone.                | Secondary B (younger mudstone and siltstone)<br>Secondary (Undifferentiated) (older mudstone) |

<sup>82</sup>British Geological Survey (2008), *A formational framework for the Mercia Mudstone Group (Triassic) of England and Wales*. Available online at: <http://www.bgs.ac.uk/downloads/start.cfm?id=866>

<sup>83</sup>British Geological Survey (2012), *Lithostratigraphy of the Sherwood Sandstone. Research Report RR/14/01*. Available online at: <http://www.bgs.ac.uk/downloads/start.cfm?id=2904>

<sup>84</sup>Glacial till is sometimes described as diamicton in the BGS lexicon. The term relates to sediment deposited from land based erosion (such as from landslides and debris flows). In this case the term 'glacial till' refers to diamicton of glacial origin.

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| Geology                                                              | Distribution                                                                                                                 | Formation description                                                                 | Aquifer classification                                                           |
|----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Mercia Mudstone Group - Tarporley Siltstone Formation                | Present around Bramcote Hall and Shuttington extending to the north of Newton Regis and Austrey.                             | Sandstones, mudstones and siltstones with gypsum nodules.                             | Secondary A (sandstone)<br>Secondary (Undifferentiated) (siltstone and mudstone) |
| Sherwood Sandstone Group - Hopwas Breccia Formation                  | Two localised outcrops present around Bramcote Hall.                                                                         | A coarse breccia <sup>85</sup> with sandstone and mudstone.                           | Principal                                                                        |
| Warwickshire Group - Halesowen Formation                             | Present in the south of the study area up to the area between Tamworth and Polesworth, extending south around Bramcote Hall. | Sandstone and mudstone with thin coal and limestone beds, and localised conglomerate. | Secondary A                                                                      |
| Pennine Coal Measures Group - Pennine Middle Coal Measures Formation | Present from the area between Tamworth and Polesworth up to the north-east of Potford Bridge on Linden Lane.                 | Mudstone, siltstone, and sandstone with coal seams.                                   | Secondary A                                                                      |

### Made ground

- 10.3.4 Made ground is a term used to denote man-made deposits such as landfill, colliery spoil heaps or earthworks associated with construction or ground improvement. Such deposits may be poorly mapped and are often very variable in composition. Minor deposits of made ground may be encountered within this area, for example where ponds, sand or marl pits have been backfilled. There is evidence of historical and authorised landfilling within the area, which may comprise more significant deposits of made ground.
- 10.3.5 The BGS geological mapping<sup>86,87,88</sup>, including artificial ground mapping data<sup>89</sup>, indicates the presence of made ground at Pooley Fields Heritage Centre and Pooley Country Park. The largest extents of made ground within the study area are likely to be associated with infilled land at the former Pooley Hall Colliery and brick yard and the infilled land relating to the former Midlands Works/Ensor Works. In addition, there are areas of made ground associated with the former Birch Coppice Colliery and other quarrying activities.
- 10.3.6 Further areas of made ground are associated with the M42 (embankments), the former North Warwick Colliery railway sidings and disused tip/slag heap, and the potential backfilling of gravel pits and ponds.
- 10.3.7 No known farm burial or pyre sites associated with the 1967 and 2001 outbreaks of foot and mouth disease (FMD) are known to be present within the Birchmoor to Austrey area. The 2001 to 2002 FMD outbreak risk assessment map<sup>90</sup> identifies the Birchmoor to Austrey study area to lie within a FMD free county. However, older

<sup>85</sup> A breccia comprises angular rock fragments cemented together

<sup>86</sup> BGS (1964) geological map sheet 154 (Lichfield) 1:63,360 scale (solid)

<sup>87</sup> BGS (1971) geological map sheet 154 (Lichfield) 1:63,360 scale (drift)

<sup>88</sup> BGS (2010) geological map sheet 155 (Coalville) 1:50,000 scale (solid and drift)

<sup>89</sup> BGS (2016), Geology – 50,000 (DiGMapGB-50) Artificial Version 8

<sup>90</sup> Animal Plant and Health Agency (2001), Foot and Mouth Disease 2001 County Status Map 01.10.2001

unrecorded sites may be present from the 1967 outbreak. Similarly, anthrax-infected cattle burials may be present, generally relating to burials over 50 to 100 years ago. However, no records have been found of such burials.

### **Superficial geology**

- 10.3.8 A localised area of peat is mapped directly to the west of Bentley Farm, associated with the Bramcote Brook. Alluvial deposits variably comprising silty clay, silt, sand, peat and gravel are present associated with River Anker and Bramcote Brook. The Proposed Scheme passes through large areas of alluvium at Pooley Country Park and Austrey Meadows.
- 10.3.9 River terrace deposits consisting of sands and gravels are present associated with the River Anker between the Coventry Canal and Linden Lane.
- 10.3.10 Several small areas of glaciofluvial deposits comprising sand and gravel are present within the study area to the east and west of the Proposed Scheme at Bramcote Hall. A small area is also located within the northern part of the study area near to Salt Street.
- 10.3.11 Glacial till deposits, including the Thrussington Member, are present in the south of the study area to the west of the M42, and between Polesworth and Linden Lane, intersecting the Proposed Scheme around Bramcote Hall. These deposits comprise red-brown pebbly clays and silty clays with pockets of gravel, sand, silt and clay.

### **Bedrock geology**

- 10.3.12 The Mercia Mudstone Group underlies the area extending to the north of the Warton Fault around Bramcote Hall and Shuttington up to the northern limit of the study area. The Tarporley Siltstone Formation extends north of the fault to the area north of Newton Regis and Austrey where there is a transition to the younger Sidmouth Mudstone Formation.
- 10.3.13 The Sidmouth Mudstone Formation comprises mudstones and siltstone with occasional thin beds of dolomitic siltstone and sandstone with frequent gypsum (sulphate rich mineral) veins and nodules. The Tarporley Siltstone Formation comprises siltstones, mudstones and sandstones in approximately equal proportions. Gypsum occurs sporadically in the mudstones as small nodules.
- 10.3.14 Two small areas of the Hopwas Breccia Formation of the Sherwood Sandstone Group outcrop to the east of the Proposed Scheme around Bramcote Hall. The Hopwas Breccia Formation comprises a coarse breccia composed of locally derived material including limestone, with sandstone and mudstone beds.
- 10.3.15 The Halesowen Formation of the Warwickshire Group underlies the south of the study area up to where the Proposed Scheme passes between Tamworth and Polesworth. The Halesowen Formation is typically mudstone, siltstone and sandstone with thin coal and limestone beds. The Halesowen Formation is also present in an area east of the Proposed Scheme near to Bramcote Hall, extending south-east.
- 10.3.16 The Pennine Middle Coal Measures Formation underlies the study area from where the Proposed Scheme passes between Tamworth and Polesworth, extending north up to Bramcote Hall and Shuttington. They comprise mudstone, siltstone, and sandstone



with coal seams. The Warton Fault runs north-east to south-west and forms an abrupt transition between the Pennine Middle Coal Measures Formation and the younger Tarporley Siltstone Formation of the Mercia Mudstone Group.

## Radon

- 10.3.17 Radon is a radioactive gas formed by the radioactive decay of naturally occurring uranium in rocks and soils. The occurrence of radon gas is shown in the BGS Radon Potential Dataset<sup>91</sup>.
- 10.3.18 The route of the Proposed Scheme extending from the south of junction 10 of the M42, to the area north of Shuttington and Bramcote Hall is within a radon affected area. In the area of the Relay Business Park and around Green Lane (Birchmoor), it is stated that between 3% and 5% of homes are estimated to have radon levels at or above the action level of 200 becquerels per cubic metre of air (Bq/m<sup>3</sup>) for residential properties. For the rest of this section between M42 junction 10 and to the north of Shuttington, 1% to 3% of homes are indicated to be at or above the radon action level. For the remainder of the study area to the north, less than 1% of homes are indicated to be at or above the radon action level.

## Groundwater

- 10.3.19 Four categories of aquifer have been identified within the study area, as defined by the Environment Agency:
- the Hopwas Breccia Formation of the Sherwood Sandstone Group is designated a Principal aquifer;
  - the Halesowen Formation of the Warwickshire Group, the Pennine Middle Coal Measures of the Pennine Coal Measures Group, the sandstone of the Tarporley Siltstone Formation belonging to the Mercia Mudstone Group, the river terrace deposits, alluvium and the glaciofluvial deposits are designated as Secondary A aquifers;
  - the younger mudstone and siltstone of the Sidmouth Mudstone Formation of the Mercia Mudstone Group are designated Secondary B aquifers; and
  - the older mudstones of the Sidmouth Mudstone Formation and mudstones and siltstones of the Tarporley Siltstone Formation, both of the Mercia Mudstone Group and the glacial till are designated as Secondary (Undifferentiated) aquifers.
- 10.3.20 The Environment Agency reports that there is one licensed groundwater abstraction located within the study area. This is positioned to the north-east of Austrey, 670m from the land required for the construction of the Proposed Scheme. It relates to a private non-industrial licence held by The Kirtland Family Trust for amenity use

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<sup>91</sup> Available at: <http://www.bgs.ac.uk/radon/hpa-bgs.html>. Accessed May 2018. This dataset underpins Public Health England's Indicative Atlas of Radon in England and Wales (Miles J.C.H, Appleton J.D, Rees D.M, Green B.M.R, Adlam K.A.M and Myers, A.H. (2007). Indicative Atlas of Radon in England and Wales. Public Health England. ISBN: 978-0-85951-608-2. 29 pp) available at [www.ukradon.org/information/ukmaps](http://www.ukradon.org/information/ukmaps)

including lake and pond through flow<sup>92</sup>. It is recognised that other unlicensed abstractions may exist.

- 10.3.21 The Proposed Scheme, as it passes between Newton Regis and Austrey, lies within a total catchment groundwater source protection zone (SPZ) which extends to the eastern and western limits of the study area between Newton Regis and Austrey. The study area is not identified to lie within a groundwater drinking water safeguard zone.
- 10.3.22 Three BGS water wells are identified within the land required for the construction of the Proposed Scheme which are likely to have been used historically for controlling groundwater levels associated with mine water. Two of these abstractions are associated with shafts at the former Pooley Hall Colliery and the third one is associated with former Birch Coppice Colliery.
- 10.3.23 Details of licensed abstractions are provided in Section 15, Water resources and flood risk. It should be noted that all abstractions that are used directly or indirectly for human consumption are designated as SPZ. In such cases the abstraction point qualifies for a default 10m radius SPZ<sub>1</sub> and a default 250m radius SPZ<sub>2</sub>. There is no default SPZ<sub>3</sub> for total catchment with respect to this type of abstraction.
- 10.3.24 Further information on the groundwater in the Birchmoor to Austrey area is provided in Section 15, Water resources and flood risk.

### *Surface water*

- 10.3.25 The Coventry Canal which is designated an inland waterway and the River Anker which is designated as a main river, are the principal watercourses within the study area. The Proposed Scheme would cross the Coventry Canal at the eastern extent of Pooley Fields Heritage Centre and the River Anker just west of Polesworth. The Proposed Scheme would also cross Bramcote Brook, which is a main river and a tributary of the River Anker.
- 10.3.26 Other surface water features which would be crossed by the Proposed Scheme include two tributaries of Bramcote Brook which are designated as minor ditches. A number of ponds are also located within the study area. A series of shallow pools relating to the Alvecote Pools SSSI are located 140m to the north-west of the route of the Proposed Scheme.
- 10.3.27 Surface water bodies in the Birchmoor to Austrey area are described in more detail in Section 15, Water resources and flood risk.
- 10.3.28 There is one licensed surface water abstraction located within the study area. A surface water abstraction from the River Anker is registered to Wheatmoor Farm, Polesworth for agricultural spray irrigation. This abstraction lies within the land required for construction of the Proposed Scheme. The study area does not lie within a surface water drinking water safeguard zone. There are no registered private unlicensed surface water abstractions within the study area. As there is no obligation to register private water supplies, unregistered private surface water supplies may be present.

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<sup>92</sup> Through flow is the supply of a continuous flow of water to maintain water quality

### *Current and historical land use*

- 10.3.29 Current potentially contaminative land uses within the study area include three industrial and commercial sites. The key potentially contaminative sites are:
- various depots at the Relay Business Park (which is an industrial estate including sub-stations and tanks);
  - one scrap yard at Pooley Hall; and
  - one tool manufacturing premises near Pooley Hall Heritage Centre.
- 10.3.30 Historical land uses identified within the study area with the potential to have caused contamination include nine historical landfill sites, four mining sites and one industrial site. The key historical potentially contaminative sites are:
- Coventry Canal and Potsford Bridge historical landfills;
  - former Midlands Works/Ensor Works (which is also a former clay pit and landfill and historical mining site);
  - former brick yard and colliery at Pooley Hall Colliery/North Warwick Colliery; and
  - former Birch Coppice Colliery.
- 10.3.31 Further details of these current and historical contaminative land uses within the study area are shown in Table 16, Table 17 and Table 18.

Table 16: Current and historical landfill sites located in the study area

| <b>Name and Area Reference</b> | <b>Location</b>                                                                                                                                                              | <b>Description</b>                                                                                                                                                                                                                                                                  |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ensor Works (LA02-18)          | Located to the south of the B5000 Tamworth Road, Polesworth east of the land required for the construction of the Proposed Scheme.                                           | The Environment Agency records that the historical landfill was licensed to accept commercial waste. The last input of waste was in June 1975. The closure date and licence surrender date are not known.<br>NWBC records that the landfill accepted colliery spoil.                |
| The Lynch (LA02-86)            | Located to the north of the B5000 Tamworth Road, Polesworth within the Lynch residential area and 85m east of the land required for the construction of the Proposed Scheme. | There are no Environment Agency records for this site.<br>NWBC records the location of the landfill, but does not provide any further information.                                                                                                                                  |
| M42 Polesworth (LA02-31)       | Located to the north of the Coventry Canal, within Pooley Country Park and 130m to the north-west of the land required for the construction of the Proposed Scheme.          | The Environment Agency records this area as a historical landfill, but provides no further information.<br>NWBC records that the landfill accepted colliery spoil.                                                                                                                  |
| Pooley Lane Landfill (LA02-30) | Located to the south of the Coventry Canal and 170m north-west of the land required for the construction of the Proposed Scheme.                                             | The Environment Agency records that the historical landfill was licensed to Tarmac National Construction in March 1984 to accept inert waste. The first deposit of waste occurred in December 1984 and the last input was in April 1985. The licence was surrendered in April 1985. |

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| Name and Area Reference                                                                | Location                                                                                                                                                                           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Coventry Canal, off Robeys Lane, Polesworth (LA02-112)                                 | Located within the site of the former Pooley Hall Colliery, and now the Pooley Fields Heritage Centre. It is within the land required for the construction of the Proposed Scheme. | There are no Environment Agency records for this site.<br>Historical mapping shows that this location is an infilled pit and part of the former brickworks.<br>NWBC records that canal dredgings have been placed here.                                                                                                                                                                                                                                                                             |
| Potsford Bridge (spoil from M42), Polesworth (LA02-36)                                 | Located 240m east of the M42 motorway, 48m north-west of the land required for the construction of the Proposed Scheme.                                                            | There are no Environment Agency records for this site.<br>NWBC records that the landfill received spoil from the M42.<br>Whilst this landfill is plotted by NWBC adjacent to the M42 near to Woodside House, it is possible that it may relate to an infilled quarry identified 285m to the east of its plotted location, as there is no other supporting evidence of a landfill at this location. The NWBC landfill locations are noted to have a degree of uncertainty in their plotted location. |
| Former Open cast Site (1950), Polesworth (local authority recorded landfill) (LA02-39) | Located to the west of the M42, approximately 668m north of Bramcote Hall and 185m west of the land required for the construction of the Proposed Scheme.                          | There are no Environment Agency records for this site.<br>NWBC records that the landfill is within a former open cast site, having received colliery spoil waste.<br>Whilst this landfill is plotted by NWBC adjacent to the M42, it is possible that it may relate to a labelled disused pit shown on current Ordnance Survey maps and formerly marked as a gravel pit, further west than the local authority records indicate. This former gravel pit is located north of Cook's Spinney          |

Table 17: Current and historical mining, mineral sites and colliery spoil sites located within the study area

| Name and Area Reference                     | Location                                                                                                                                               | Description                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Former Birch Coppice Colliery (LA02-13)     | North of the Birchmoor residential area and associated with Lamphouse Cottages. The route of the Proposed Scheme would pass through the site.          | Former colliery and three mine entries are associated with this site. An available record for one of these mine shafts, 'Birch Coppice Colliery Cocks spur or No. 4 Pit', indicates Pennine Middle Coal Measures Formation to 80m depth onto Pennine Lower Coal Measures Formation to 244m depth with notably more coal seams present within the Pennine Lower Coal Measures. |
| Pooley Hall Colliery (LA02-112)             | Now the Pooley Fields Heritage Centre, the majority of which lies within the land required for the construction of the Proposed Scheme.                | Within the former Pooley Hall Colliery site there are four mine entries. Three mine shafts are within the land required for the construction of the Proposed Scheme and these are known to have been treated. Available records suggest the Pennine Middle Coal Measures extend from the surface with the base of two shafts indicated to be 207m below ground level.         |
| Anker West and Anker East <sup>93</sup>     | Within and adjacent to the land required for the construction of the Proposed Scheme between the West Coast Main Line (WCML) and Bramcote Covert.      | This relates to two licensed open cast areas with potential for future open cast mining, but not currently being worked.                                                                                                                                                                                                                                                      |
| Former Midlands Works/Ensor Works (LA02-18) | Located to the south of the B5000 Tamworth Road, Polesworth and adjacent to the east of the land required for the construction of the Proposed Scheme. | Former clay pit providing minerals for the former Midlands Works/Ensor Works.                                                                                                                                                                                                                                                                                                 |

<sup>93</sup> No site reference is assigned as this concerns a licensed area of potential future working

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Table 18: Current and historical industrial sites located within the study area

| Name and Area Reference                             | Location                                                                                                                            | Description                                                                                                                                                                                                                                                         |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Former Midlands Works/Ensor Works (LA02-18)         | Located off the B5000 Tamworth Road, Polesworth and directly east of the land required for the construction of the Proposed Scheme. | This historical site manufactured brick, terracotta, and sanitary pipe and is also marked as an area of infilled land/landfill (see Table 6). The site later became the Ensor Works and manufactured clay-based building products. This became residential by 1997. |
| Various depots at the Relay Business Park (LA02-07) | Located 11m north west of the land required for the construction of the Proposed Scheme, and west of junction 10 of the M42.        | Historically undeveloped and farmland and then developed into the Relay Business Park from around 1990. Contains a number of depots including electrical sub-stations and tanks in the northern and north-eastern areas.                                            |
| Pooley Hall tool machining works (LA02-65)          | Between the M42 and the Pooley Fields Heritage Centre and within the land required for the construction of the Proposed Scheme.     | A factory/works comprising a number of buildings formerly associated within Pooley Hall Colliery, with a historical filter bed and tank present within the current footprint. Current garage first present in 1938.                                                 |
| Scrap yard (LA02-64)                                | Located north of Pooley Fields Heritage Centre within the land required for the construction of the Proposed Scheme.                | Historically a factory/works associated with Pooley Hall Colliery, and currently a scrap yard located partially on infilled land.                                                                                                                                   |

10.3.32 Contaminants commonly associated with sites in tables Table 16, Table 17 and Table 18 could include metals, semi-metals, asbestos, organic and inorganic compounds. Additionally, infilled pits and landfills could also give rise to landfill gases such as methane or carbon dioxide and leachate.

10.3.33 Contaminants commonly associated with mining and mineral sites could include heavy metals, acid mine waters with low pH values and mine gases such as methane, carbon dioxide and hydrogen sulphide.

### *Other regulatory data*

10.3.34 The regulatory data reviewed included pollution incidents (major, significant and minor categories), radioactive and hazardous substances consents, and environmental permits (previously landfill, integrated pollution control and integrated pollution prevention and control licences). There were five minor (Category 3) pollution incidents to controlled waters over a three year period between 1995 and 1998.

10.3.35 There are no Control of Major Accident Hazards (COMAH) sites in the study area.

10.3.36 The Environment Agency reports that there are two consented discharges to groundwater within the study area, one of which is within the land required for the construction of the Proposed Scheme. Further details on groundwater within the Birchmoor to Austrey area can be found in Section 15, Water resources and flood risk.

10.3.37 There are eight discharge consents to surface water within the study area, four of which are within the land required for the construction of the Proposed Scheme.

- 10.3.38 There is one current scrap yard facility near Pooley Fields Heritage Centre which is within the land required for the construction of the Proposed Scheme. An Environment Agency permitted waste operation is registered to this facility, referring to it as C P Motors at Pooley Lane and it being an 'end of life vehicle facility'.
- 10.3.39 There is one nationally significant ecological designated site as defined in the land quality section of the SMR within the study area. This is Alvecote Pools SSSI situated alongside the River Anker. At its closest point, the boundary of the SSSI is located 140m to the west of the land required for the construction of the Proposed Scheme. Further information on ecologically designated sites in the study area is provided in Section 7, Ecology and biodiversity.

### *Mining/mineral resources*

- 10.3.40 There are a range of mining and mineral resources located within the study area that have the potential to be affected by the Proposed Scheme. These can include sand, gravel, clay, stone and coal, which can be protected via local or county level minerals plans and by the Coal Authority, as well as other forms of petroleum hydrocarbons such as shale gas and oil which are regulated by the Oil & Gas Authority (OGA) via the issue of Petroleum Exploration Development Licences (PEDLs).

### **Mineral plans**

- 10.3.41 WaCC is responsible for the overall minerals local plan for Warwickshire. The Minerals Local Plan (MLP) for Warwickshire<sup>94</sup> was adopted in 1995 but is to be replaced with the Warwickshire Minerals Plan<sup>95</sup> that is currently in draft and yet to be formally adopted. A further consultation is planned for Summer 2018 following a period of site assessments and appraisals. The new Warwickshire Minerals Plan will identify where new minerals sites should be located, and set out the policies to assess new minerals development proposals over the next 15 years.
- 10.3.42 The 1995 extant MLP does not list any mineral extraction allocation sites within the study area. The draft Warwickshire Minerals Plan under consultation also confirms that no current or preferred mineral sites are present within the study area.
- 10.3.43 The 1995 extant MLP shows the distribution of mineral resources based on BGS sources but it does not define mineral safeguarding areas (MSA). However, a BGS report<sup>96</sup> does include plans of WaCC MSA which also corresponds to the MSA defined in the draft Warwickshire Minerals Plan under consultation.
- 10.3.44 SCC is responsible for the overall mineral and waste local plans for Staffordshire. The MLP was adopted in February 2016. Only a small part of the study area, between the M42 junction 10 and the B5000 Tamworth Road, is located within the SCC area. There are no mineral sites or MSA within the SCC part of the study area.
- 10.3.45 The location of specific mining and mineral resources within the study area are described below.

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<sup>94</sup> Warwickshire County Council (1995), *Minerals Local Plan for Warwickshire Written Plan*

<sup>95</sup> Warwickshire Minerals Plan (2016), *Publication Consultation December 2016* (draft)

<sup>96</sup> British Geological Survey (2009) *Mineral Safeguarding Areas for Warwickshire Economic Minerals Programme OR/08/065*

### **Sand, gravel and clay deposits**

- 10.3.46 There is a proposed MSA within the study area, as defined in the draft Warwickshire MLP, relating to unconsolidated sand and gravel. The MSA is located along the Proposed Scheme from Pooley Fields Heritage Centre extending towards the north end of the study area.
- 10.3.47 A proposed MSA, as defined in the draft Warwickshire MLP relating to brick clay spans the Proposed Scheme from the B5000 Tamworth Road to the north of Austrey, extending north-west and south-east.
- 10.3.48 The MSA listed above are proposed and not within the adopted minerals plan. They have therefore not been considered further in the assessment.

### **Building stone**

- 10.3.49 A proposed MSA, as defined in the draft Warwickshire MLP, relating to building stone extends from the north-west to the south-east, crossing the route of the Proposed Scheme in two areas. One area is present in the south of the study area extending to the north of the B5000 Tamworth Road. This concerns the sandstones of the Halesowen Formation. The second area is present from north of Alvecote, to No Man's Heath and concerns the sandstones of the Tarporley Siltstone Formation.
- 10.3.50 The building stone MSA is proposed and is not within the adopted minerals plan. It has therefore not been considered further in the assessment.

### **Coal mining**

- 10.3.51 Within the southern parts of the study area and extending north to Bramcote Hall, the Coal Authority and the BGS identify mineral resources of coal.

#### *Open cast coal mining*

- 10.3.52 Between the WCML and Bramcote Covert, the Proposed Scheme would run adjacent to two open cast licensed areas with potential for future open cast mining. These sites are named Anker West and Anker East.

#### *Deep coal mining*

- 10.3.53 A proposed MSA relating to shallow coal, as defined in the draft Warwickshire MLP, extends from the north-west to the south-east, spanning the Proposed Scheme from the B5000 Tamworth Road to the village of Warton. A proposed MSA relating to deep coal spans the Proposed Scheme from south of the study area to north of the B5000 Tamworth Road, with an area east of the Proposed Scheme located around Polesworth and Warton. Brick clay and fireclay are also noted as mineral reserves within the coal measures.
- 10.3.54 The coal MSA are proposed and not within the adopted minerals plan. They have therefore not been considered further in the assessment.
- 10.3.55 Available records from the Coal Authority show that the Proposed Scheme would pass through areas of recorded historical underground coal mining activities within the south of the study area extending north towards Bramcote Hall.

- 10.3.56 Probable shallow mine workings are indicated along the route of the Proposed Scheme to the north of where the Proposed Scheme would cross the Coventry Canal, and continue to the north-east.
- 10.3.57 The coal mining activities described in Table 17 have a number of mine entries that indicate the recorded <sup>97</sup>(charted) entrance to a mine working. There are no mine entries plotted directly along the route of the Proposed Scheme. The areas where mine entries are indicated include around the former Birch Coppice Colliery and Pooley Hall Colliery. Within the former Pooley Hall Colliery site three shafts are known to have been treated; one was filled in 1924 and capped in 1996, one was filled and capped in 1966 and one was filled and capped in 1996.
- 10.3.58 Fifteen coal seams were worked in the underground mines but not all seams are present in the same areas due to faulting and the pinching out<sup>98</sup> of certain seams over distance. There are 15 potential worked seams present in the records for Pooley Hall Colliery, with thicknesses of between 0.2m and 1.5m indicated. No records have been viewed for the former Birch Coppice Colliery.
- 10.3.59 The Coal Authority has defined coal mining development referral areas in Warwickshire to help planning authorities identify higher risk areas that may be affected by legacy issues from coal mining. Parts of Pooley Country Park, immediately to the west of the Proposed Scheme, are considered development high risk areas. The study area extending from the area to the south-west of Austrey to the southern extent of the study area falls within a development low risk area.

### **Petroleum exploration and development Licences (PEDL/hydrocarbons)**

- 10.3.60 There are no current licences for coal bed methane, shale gas, oil or natural gas exploitation<sup>99</sup>.

### *Geo-conservation resources*

- 10.3.61 No geological SSSI or LGS sites have been identified within the study area.

### *Receptors*

- 10.3.62 The sensitive receptors that have been identified within the study area are summarised in Table 19. A definition of receptor sensitivity is given in the SMR.

Table 19: Summary of sensitive receptors

| Issue              | Receptor type | Receptor description                                                            | Receptor sensitivity |
|--------------------|---------------|---------------------------------------------------------------------------------|----------------------|
| Land contamination | People        | Residents of existing properties, schools and public open space.                | High                 |
|                    |               | Employers and visitors at commercial areas, retail parks and areas, and hotels. | Moderate             |
|                    |               | Industrial.                                                                     | Low                  |

<sup>97</sup> By the Coal Authority

<sup>98</sup> The term 'pinching out' is a geological term for the thinning or tapering out of geological units or seams

<sup>99</sup> Oil and Gas Authority, Onshore Interactive Maps. Available online at:

<https://ogauthority.maps.arcgis.com/apps/webappviewer/index.html?id=29c31fa4b00248418e545d222e57ddaa>



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| Issue                                                         | Receptor type        | Receptor description                                                                                                                                                                               | Receptor sensitivity |
|---------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
|                                                               | Groundwater          | Principal aquifer - Hopwas Breccia Formation.                                                                                                                                                      | High                 |
|                                                               |                      | Secondary A aquifers - alluvium, river terrace deposits, glaciofluvial deposits, Halesowen Formation, Pennine Middle Coal Measures Formation, and sandstones of the Tarporley Siltstone Formation. | Moderate             |
|                                                               |                      | Secondary B aquifer - Sidmouth Mudstone Formation.                                                                                                                                                 | Low                  |
|                                                               |                      | Secondary (Undifferentiated) aquifers- glacial till, the siltstone and mudstone of the Tarporley Siltstone Formation, and the older mudstone of the Sidmouth Mudstone Formation.                   | Low                  |
|                                                               | Surface waters       | The River Anker, Coventry Canal, Bramcote Brook and Alvecote Pools SSSI.                                                                                                                           | High                 |
|                                                               | Built environment    | Underground structures and buried services.                                                                                                                                                        | Low                  |
|                                                               | Natural environment  | Alvecote Pools SSSI.                                                                                                                                                                               | High                 |
| Impacts on mining/mineral sites (severance and sterilisation) | Mining/mineral sites | Proposed MSA for sand and gravel, shallow and deep coal, brick clay and building stone.                                                                                                            | Moderate             |

## 10.4 Effects arising during construction

### Avoidance and mitigation measures

10.4.1 The construction assessment takes into account the mitigation measures described in the draft CoCP<sup>100</sup>. The draft CoCP sets out the measures and standards of work that would be applied to the construction of the Proposed Scheme and includes requirements to ensure the effective management and control of work in contaminated areas.

10.4.2 The requirements in the draft CoCP relating to work in contaminated areas would ensure the effective management and control of the work. These requirements include:

- methods to control noise, waste, dust, odour, gases and vapours (Sections 5, 7, 11, 13, 14 and 15);
- methods to control spillage and prevent contamination of adjacent areas (Section 5, 11 and 16);
- the management of human exposure for both construction workers and people living and working nearby (Section 5, 7, 11, 13 and 14);

<sup>100</sup> Supporting document: Draft Code of Construction Practice

- methods for the storage and handling of excavated materials (both contaminated and uncontaminated) (Sections 6, 7, 11 and 15);
- management of any unexpected contamination found during construction (Section 11 and 15);
- a post-remediation permit to work system (Section 11);
- storage requirements for hazardous substances such as oil (Section 5, 11 and 16);
- traffic management to ensure that there is a network of designated haul routes to reduce compaction/degradation of soils (Section 5, 6 and 14);
- methods to monitor and manage flood risk and other extreme weather events which may affect land quality during construction (Section 5 and 16); and
- methods to manage discovery of unknown animal burial pits (Section 6).

- 10.4.3 The draft CoCP would require that prior to and during construction, a programme of further detailed investigations, which may include both desk based and site based work, takes place in order to confirm the full extent of areas of contamination. It also requires a risk assessment to be undertaken to determine what, if any, site specific remediation measures are required to allow the Proposed Scheme to be constructed safely and to prevent harmful future migration of contaminants. The investigation and assessment of potentially contaminated sites would be undertaken in accordance with Environment Agency CLR11<sup>101</sup> and British Standards BS10175<sup>102</sup> and BS8576<sup>103</sup>, and Construction Industry Research and Information Association (CIRIA) SP32<sup>104</sup>.
- 10.4.4 Where significant contamination is encountered, a remedial options appraisal would be undertaken to define the most appropriate remediation techniques. Where appropriate, this appraisal would be undertaken based on multi-criteria attribute analysis that considers environmental, resource, social and economic factors in line with the framework set out by the Sustainable Remediation Forum UK<sup>105</sup>. The preferred option would then be developed into a remediation strategy.
- 10.4.5 Contaminated soils excavated within the site, where practicable, would be treated to remove or render contamination inactive and reused within the Proposed Scheme where needed and suitable for use. Treatment techniques are likely to include stabilisation, soil washing and bio-remediation. Contaminated soil removed off-site would be taken to a soil treatment facility, another construction site (for treatment and reuse) or to an appropriately permitted landfill.

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<sup>101</sup> Environment Agency, (2004), *CLR11 Model Procedures for the Management of Land Contamination*

<sup>102</sup> British Standard, (2011), *BS10175+A2:2017 Investigation of Potentially Contaminated Sites*

<sup>103</sup> British Standard (2013), *BS8576 Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs)*

<sup>104</sup> CIRIA (1983) SP32 Construction over abandoned mine workings

<sup>105</sup> Sustainable Remediation Forum UK, (2010), *A Framework for Assessing the Sustainability of Soil and Groundwater Remediation*

## Assessment of impacts and effects

- 10.4.6 Construction of the Proposed Scheme in this area would require earthworks, utility diversions, deep foundations grouting, ground stabilisation and other activities, including the construction of the various viaducts and road infrastructure works. These aspects of the Proposed Scheme, along with other construction features, are shown on the Map Series CT-05 in the Volume 2: LA02 Map Book.

### *Land contamination*

- 10.4.7 In line with the assessment methodology, as set out in the SMR, an initial screening process has been undertaken to identify areas of current or historical contaminative use within the study area and to consider which of these areas might pose contaminative risks for the Proposed Scheme. Sites that present a low risk have not been taken further in the assessment. Any moderate to higher risk sites have been taken forward to more detailed risk assessments, in which the potential risks are assessed more fully. The majority of the areas that have undergone the more detailed risk assessments are historical or current landfills, industrial, commercial and mining sites.
- 10.4.8 CSMs have been produced for those areas taken to detailed risk assessments. The following factors determine the need for detailed risk assessments:
- whether the site is located on or off the route of the Proposed Scheme or associated off line works;
  - the vertical profile of the route;
  - the presence of underlying sensitive groundwater aquifers (Principal or Secondary A) or nearby watercourses; and
  - the presence of adjacent residential properties or sensitive ecological receptors.
- 10.4.9 Clusters of potentially contaminated sites of a similar nature have been grouped, and assessed together, where appropriate.
- 10.4.10 A simple summary of the baseline CSM is provided in Table 20. The potential impacts and baseline risks quoted are those before any mitigation is applied. The assessed baseline risk is based on the information provided at the time of the assessment. Where limited information is available, the assessment is based on precautionary, worst case assumptions and may therefore report a higher risk than that which actually exists. A screening assessment of the effects of contamination has been completed by comparing the detailed CSM developed for potential contaminated areas at baseline with construction and post-construction stages.

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Table 20: Summary of baseline CSM for sites which may pose a contaminative risk for the Proposed Scheme

| Area reference <sup>106</sup>                                       | Area name                                                                                                                                                                                         | Human health risk        | Ground water risk | Surface water risk | Ecosystem risk | Buildings risk      |
|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------|--------------------|----------------|---------------------|
| On site <sup>107</sup>                                              |                                                                                                                                                                                                   |                          |                   |                    |                |                     |
| LA02-17, LA02-28, LA02-69, LA02-71, LA02-73, LA02-110, and LA02-168 | Sites include; the former Hermitage Farm and outbuildings, former 'Oxhovels', area of current silos, farm buildings, a current unnamed farm, and the former Top Barn Farm.<br><br>(Farms group)   | Low                      | Low               | N/A <sup>108</sup> | Very low       | Low                 |
| LA02-06, LA02-11, LA02-16, LA02-23 and LA02-104                     | Sites include; Tamworth Service Station (excluding petrol station), pumping station, electric sub-stations and Hermitage Business Park.<br><br>(Light industrial/commercial group)                | Very low to low          | Low               | N/A                | Low            | Low                 |
| LA02-115 and LA02-21                                                | Former sewage works/ filter beds.<br><br>(Sewage works group)                                                                                                                                     | Low                      | Low               | N/A                | Low            | Very low to low     |
| LA02-155, LA02-156, LA02-157 and LA02-170                           | Current marshland sites.<br><br>(Marshland group)                                                                                                                                                 | Very low to moderate/low | N/A               | N/A                | N/A            | Low                 |
| LA02-15 and LA02-33                                                 | Sites include; a former mineral railway line and the WCML between Polesworth and Tamworth.<br><br>(Railway land group)                                                                            | Very low to low          | Low               | Moderate/low       | Low            | Low                 |
| LA02-13, LA02-32, LA02-117, and LA02-175                            | Sites include; infilled land at the former Birch Coppice Colliery, the former North Warwick Colliery railway sidings and disused tip/slag heap, disused mineral railway (North Warwick Colliery), | Very low to low          | Low               | Low                | Low            | Low to moderate/low |

<sup>106</sup> Each potentially contaminated site is allocated a unique reference number

<sup>107</sup> 'On site' is within the area of land required for construction of the Proposed Scheme

<sup>108</sup> N/A refers to the receptor being absent or a receptor being not applicable to the contaminant source being assessed

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| Area reference <sup>106</sup>                                           | Area name                                                                                                                                                                                                                                                                      | Human health risk        | Ground water risk   | Surface water risk  | Ecosystem risk      | Buildings risk      |
|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---------------------|---------------------|---------------------|---------------------|
|                                                                         | and probable shallow coal mining areas.<br><br>(Shallow coal mining areas and mining sites group excluding Pooley Hall Colliery which is considered separately)                                                                                                                |                          |                     |                     |                     |                     |
| LA02-64,<br>LA02-65 and<br>LA02-112                                     | Former Pooley Hall Colliery, including a local authority landfill, infilled land, current Pooley Hall garage/scrap yard and the current garage/former Pooley Hall tool machining works.                                                                                        | Very low to moderate/low | Low                 | Low                 | Low                 | Low to moderate/low |
| LA02-20                                                                 | Infilled land associated with the 'old quarry' south of Tamworth Road.                                                                                                                                                                                                         | Very low to low          | Low                 | N/A                 | Low                 | Low                 |
| Off site <sup>109</sup>                                                 |                                                                                                                                                                                                                                                                                |                          |                     |                     |                     |                     |
| LA02-25,<br>LA02-70,<br>LA02-79,<br>LA02-150                            | Sites include; the former and current Pooley Hall Farm buildings, the former Woodside Farm.<br><br>(Off site farms group)                                                                                                                                                      | Very low to low          | Very low            | Very low            | Very low            | Low                 |
| LA02-107 and<br>LA02-35                                                 | Sites include; former sewage tank/current pump house and a former sewage filter/sludge bed.<br><br>(Off site sewage works group)                                                                                                                                               | Low                      | Low                 | Low                 | Low                 | Very low to low     |
| LA02-18,<br>LA02-30,<br>LA02-31,<br>LA02-36,<br>LA02-39, and<br>LA02-86 | Sites include; the former Midlands/Enzor Works, Pooley Lane historical landfill, the M42 Polesworth historical landfill and three Local Authority recorded landfills including the Lynch, M42 Polesworth and Potsford Bridge landfills.<br><br>(Off site landfill sites group) | Very low to low          | Low to moderate/low | Low to moderate/low | Low to moderate/low | Low                 |

<sup>109</sup>'Off site' is beyond the land required for construction of the proposed scheme but within 250m of it

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| Area reference <sup>106</sup> | Area name                                                                                                                                                       | Human health risk | Ground water risk | Surface water risk | Ecosystem risk      | Buildings risk |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|--------------------|---------------------|----------------|
| LA02-24 and LA02-149          | Sites include; the probable shallow coal working area and a former coal pit/shaft by Pooley Hall.<br><br>(Off site shallow mining areas and mining sites group) | Very low to low   | Low               | Low                | Low to moderate/low | N/A            |
| LA02-07                       | Relay Business Park.                                                                                                                                            | Very low to low   | Low               | N/A                | Low                 | Low            |
| LA02-158                      | Current marshland sites.                                                                                                                                        | Low               | N/A               | N/A                | N/A                 | Low            |

### Temporary effects

- 10.4.11 In order to identify potential temporary effects, the baseline and construction CSM have been compared to determine the change in level of risk at receptors during the construction stage, and thus to define the level of effect at the construction stage.
- 10.4.12 Where there is no change between the main baseline risk and the main construction risk, the temporary effect significance is deemed to be negligible even if the risk is deemed to be high. For example, this would be the case where the construction of the Proposed Scheme does not alter the risks from an existing potentially contaminated site that is outside the area required for construction.
- 10.4.13 A worsening risk at construction stage compared to baseline would result in a negative effect, and conversely, an improvement would result in a positive effect. The assessment assumes that contamination would be controlled through the general measures in the draft CoCP.
- 10.4.14 In the event that unexpected contamination is encountered during the construction of the route in this area, this would be remediated as described in the draft CoCP resulting in an overall beneficial effect.
- 10.4.15 All of the sites set out in Table 21 have been assessed for the change in impact associated with the construction stage of the work. Table 21 presents a summary of resulting construction effects that have been found to be significant. All other sites referenced in Table 21 were found to have non-significant effects.

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Table 21: Summary of construction CSM effects

| Name and area ref                                                                                                                                                                                                                                                                                                                                                                                                 | Receptor                                                                                                                               | Main baseline risk       | Main construction risk   | Temporary effect                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------------------------------------|
| <b>On site</b>                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                        |                          |                          |                                                        |
| LA02-64, LA02-65 and LA02-112<br><br>Former Pooley Hall Colliery, including a local authority landfill, infilled land, current Pooley Hall garage/scrap yard and the current garage/former Pooley Hall tool machining works.                                                                                                                                                                                      | Human health (direct contact, ingestion, inhalation of vapours from contaminated soils, waters and inhalation of ground gases on site) | Very low to moderate/low | Moderate                 | Minor to moderate adverse (significant)                |
|                                                                                                                                                                                                                                                                                                                                                                                                                   | Controlled waters – groundwater                                                                                                        | Low                      | Moderate                 | Moderate adverse (significant)                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                   | Controlled waters - surface waters                                                                                                     | Low                      | Moderate                 | Moderate adverse (significant)                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                   | Property – ground gas and aggressive ground                                                                                            | Low to moderate/low      | Moderate                 | Minor to moderate adverse (significant)                |
| LA02-13, LA02-32, LA02-117 and LA02-175<br><br>Sites include; infilled land at the former Birch Coppice Colliery, the former North Warwick Colliery railway sidings and disused tip/slag heap, disused mineral railway (North Warwick Colliery), and probable shallow coal mining areas.<br><br>(Shallow coal mining areas and mining sites group excluding Pooley Hall Colliery which is considered separately). | Human health (direct contact, ingestion, inhalation of vapours from contaminated soils, waters and inhalation of ground gases on site) | Very low                 | Moderate/low             | Moderate adverse (significant)                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                   | Controlled waters – groundwater                                                                                                        | Low                      | Moderate                 | Moderate adverse (significant)                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                   | Controlled waters - surface waters                                                                                                     | Low                      | Moderate                 | Moderate adverse (significant)                         |
| <b>Off site</b>                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                        |                          |                          |                                                        |
| LA02-24 and LA02-149<br><br>Sites include; the probable shallow coal working area and a former coal pit/shaft by Pooley Hall.<br><br>(Off site shallow mining areas and mining sites group)                                                                                                                                                                                                                       | Human health (direct contact, ingestion, inhalation of vapours from contaminated soils, waters and inhalation of ground gases on site) | Very low to low          | Moderate to moderate/low | Minor adverse to moderate adverse effect (significant) |
|                                                                                                                                                                                                                                                                                                                                                                                                                   | Controlled waters – groundwater                                                                                                        | Low                      | Moderate                 | Moderate adverse effect (significant)                  |

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| Name and area ref | Receptor                                      | Main baseline risk  | Main construction risk | Temporary effect                                |
|-------------------|-----------------------------------------------|---------------------|------------------------|-------------------------------------------------|
|                   | Controlled waters - surface waters            | Low                 | Moderate               | Moderate adverse (significant)                  |
|                   | Ecological designations (SSSI Alvecote Pools) | Low to moderate/low | Moderate to high       | Minor adverse to moderate adverse (significant) |

- 10.4.16 The extent to which mine water and mine gas is controlled is subject to ongoing investigation. For mining sites, potential for significant adverse effects has been identified associated with mine gas and mine water in historical workings. Any mitigation measures required will be identified, in consultation with authoritative consultees, including measures to be set out in the draft CoCP, to mitigate any significant effects.
- 10.4.17 For other sites unrelated to mining, the adoption of the draft CoCP makes it unlikely that there would be significant adverse effects, but it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. These minor adverse impacts are not regarded as significant in line with the methodology set out in the SMR.
- 10.4.18 The assessment has considered the engineering design together with the specific nature of the potential current and historical contamination sources and receptors identified. The following key issue has been identified which the draft CoCP would address.
- 10.4.19 Pooley Lane cutting, Pooley Lane embankment and Polesworth viaduct would require excavation within the area of infilled land at the former Pooley Hall Colliery which includes a historical local authority landfill that received canal dredgings. Earthworks in this area could have the potential to impact on the local water quality through ground disturbance and the mobilisation of potential contaminants to the Coventry Canal and the underlying Secondary A aquifer. In addition, excavated material arising from the cutting may require treatment prior to re-use.
- 10.4.20 Construction compounds located in this study area would include the storage of potentially hazardous substances, such as fuels and lubricating oils and may also be used for temporary storage of potentially contaminated soils. Mitigation measures set out within the draft CoCP include the management of risks from the storage of such materials.

### Permanent effects

- 10.4.21 In order to identify potential permanent effects, a screening assessment has been undertaken comparing the baseline and post-construction CSM to assess the permanent (post-construction) effects.
- 10.4.22 The magnitude of the permanent effects and their significance have been determined by assessing the change in risk between the main baseline risk and the main post-construction risk. Therefore, where there is no change between the main baseline risk and the main post-construction risk, the permanent effect significance is deemed to



be neutral even if the risk is assessed to remain as high. This would be the case where the construction of the Proposed Scheme does not alter the risks from an existing potentially contaminated site that is outside the land required for construction. As noted above, a worsening would result in adverse effects and an improvement would result in beneficial effects.

- 10.4.23 All of the sites set out in Table 22 have been assessed for the change in impact associated with the permanent post construction stage. Table 22 presents a summary of the resulting post-construction effects that have been found to be significant. All other site referenced in Table 22 were found to have non-significant effects.

Table 22: Summary of permanent (post-construction) effects

| Name and area ref                                                                                                                                                                                                        | Receptor                                                                                                | Main baseline risk range | Main post-construction risk range | Post-construction effect                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|--------------------------|-----------------------------------|----------------------------------------------|
| LA02-64, LA02-65 and LA02-112<br>Former Pooley Hall Colliery, including a local authority landfill, infilled land, current Pooley Hall garage/scrap yard and the current garage/former Pooley Hall tool machining works. | On-site users - commercial/public open space (Pooley Hall Heritage Centre) (inhalation of ground gases) | Very low to moderate     | Very low                          | Neutral to moderate beneficial (significant) |

- 10.4.24 Table 22 indicates that where remediation is carried out on sites identified within the land required for the construction of the Proposed Scheme there would be an overall moderate beneficial effect which is considered to be significant.
- 10.4.25 In relation to the potential significant effects associated with mining sites at construction stage, there will be a greater level of knowledge and understanding of the mine workings ground model and the best means to mitigate the potential effects on a permanent basis.
- 10.4.26 Additional site-specific permanent remediation measures, that could focus on source removal, pathway breakage or receptor protection, would be developed during the detailed design stage if required. These measures would ensure that risks to people and property would be controlled to an acceptable level.

### *Mining/mineral resources*

- 10.4.27 Construction of the Proposed Scheme has the potential to affect existing mineral resources, and proposed areas of mineral exploitation. This could occur by sterilisation of the resource through direct excavation during construction of the Proposed Scheme or through temporary and/or permanent severance<sup>110</sup> or isolation that may occur during the construction phase of the Proposed Scheme, possibly continuing through to its operation.
- 10.4.28 There are no MSA defined in the adopted minerals plan and all MSA discussed previously are proposed within the minerals plan under consultation and therefore not considered as part of the assessment. There are no PEDL within the study area.

<sup>110</sup> In this context, severance refers to the Proposed Scheme splitting an actual or proposed mining/mineral site into two or more areas, such that separate accesses would be required to work the whole site

- 10.4.29 Between the WCML and Bramcote Covert, the route of the Proposed Scheme would run adjacent to two open cast licensed areas with potential for future open cast mining. These sites are named Anker West and Anker East.

### Temporary effects

- 10.4.30 Temporary adverse effects may occur where construction compounds are proposed within an MSA or designated mineral site. In such cases, there would be a temporary sterilisation of the resource during construction works, but this is not considered to represent a significant effect and the resource would not be lost permanently.

#### *Coal mining – open cast*

- 10.4.31 The land required for the construction of the Proposed Scheme only marginally encroaches into the Anker East area whereas the whole Anker West area (east of the M42) would be crossed by the Proposed Scheme.
- 10.4.32 The effect of construction of the Proposed Scheme on the licensed future open cast areas would be negligible.

### Permanent effects

- 10.4.33 The majority of effects on mining and mineral sites would be permanent where overlain by the footprint of the permanent works, with a strip of mineral becoming sterilised.

#### *Coal mining – open cast*

- 10.4.34 The route of the Proposed Scheme crosses the eastern limits of the Anker West licensed future open cast area. This will result in severance of the site, and it may restrict the future exploitation potential of the resources within this part of the site which is considered to be a minor adverse non-significant effect. The assessment has considered that the draft Warwickshire Local Plan states that there are no plans to return to surface coal extraction in the county of Warwickshire, although it acknowledges that the economic viability to extract coal may change in the future. It is also possible that mineral extraction could take place prior to construction works commencing for the Proposed Scheme.
- 10.4.35 Table 23 reports the assessment of permanent effects from construction on the mining and mineral resources identified.

Table 23: Summary of effects for mining and mineral resources

| Site name                 | Status                             | Description                                       | Sensitivity/<br>value | Magnitude of<br>impact | Effect and<br>significance<br>(Y/N) |
|---------------------------|------------------------------------|---------------------------------------------------|-----------------------|------------------------|-------------------------------------|
| Anker East and Anker West | Licensed future<br>open cast areas | Potential future<br>open cast for<br>shallow coal | High                  | Minor                  | Minor adverse<br>(N)                |

- 10.4.36 There would be minor adverse effects on two licensed future open cast sites (Anker East and Anker West), which would not be significant.

### *Geo-conservation sites*

- 10.4.37 No geo-conservation areas such as SSSI or LGS are present in the study area.

### **Other mitigation measures**

- 10.4.38 At this stage, no additional measures are considered necessary to mitigate risks from land contamination during the construction stage beyond those that are set out in the draft CoCP and/or instigated as part of the site specific remediation strategies that would be developed at the detailed design stage if required. These measures would ensure that risks to people and property from contaminants in the ground would be controlled such that they would not be significant. For example, measures might include excavation and treatment of contaminated soils or controls to manage movement of landfill gas and leachate.
- 10.4.39 Mitigation of the effects on mineral resources could include extraction of the resource in landscaping areas within the Proposed Scheme adjacent to, rather than beneath the structural footprint of the Proposed Scheme, which would require good founding conditions. A plan would be discussed in advance of the construction works with the landowner, the mineral planning department, and any other relevant parties to assist in achieving an effective management of minerals within the affected location of the licensed areas.

### **Summary of likely residual effects**

- 10.4.40 For mining sites, the potential for significant adverse effects has been identified associated with mine gas and mine water in historical workings. For all other sites, based on the information currently available and with the application of the mitigation measures detailed above, no likely significant adverse residual effects are anticipated with respect to land quality. However, where remediation is undertaken there may be significant beneficial residual effects.

## **10.5 Effects arising from operation**

- 10.5.1 Users of the Proposed Scheme (i.e. rail passengers) are at all routine times within a controlled environment (i.e. within trains), and have therefore been scoped out of the assessment.

### **Avoidance and mitigation measures**

- 10.5.2 Maintenance and operation of the Proposed Scheme would be in accordance with environmental legislation and good practice. Spillage and pollution response procedures similar to those to be outlined in the draft CoCP would be established for all high risk activities and employees would be trained in responding to such incidents.

### **Assessment of impacts and effects**

- 10.5.3 The Proposed Scheme within this area would include one express feeder auto-transformer station at Birchmoor and one auto-transformer station at Austrey. An auto-transformer station and feeder stations can, in principle, be a source of contamination through accidental discharge or leaks of coolant. However, in common with other modern sub-stations, secondary containment appropriate to the level of risk would be included in the installed design.

- 10.5.4 The operation of the trains may give rise to minor contamination through leakage of hydraulic or lubricating oils. However, such leakage or spillage is expected to be very small and unlikely to result in significant contamination.

#### **Other mitigation measures**

- 10.5.5 No other mitigation measures are expected to be required beyond what has already been outlined relating to land quality in the study area.

#### **Summary of likely residual significant effects**

- 10.5.6 No significant residual effects are anticipated associated with operation of the Proposed Scheme.

#### **Monitoring**

- 10.5.7 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme. Requirements for monitoring would be determined as part of the investigation, treatment and validation of contamination on a site specific basis as part of the detailed design process. Monitoring requirements may include water quality, air quality and/or (landfill bulk and trace gases), depending on the site being considered.

# 11 Landscape and visual

## 11.1 Introduction

- 11.1.1 This section of the report presents the assessment of the likely significant landscape and visual effects identified to date within the Birchmoor to Austrey area. It summarises the baseline conditions found within and around the route of the Proposed Scheme and describes the likely impacts and significant effects during construction and operation on landscape and visual receptors.
- 11.1.2 The operational assessment section refers not just to the running of the trains, vehicles on roads and any associated lighting but also the presence of the new permanent infrastructure associated with the Proposed Scheme.
- 11.1.3 Engagement with North Warwickshire Borough Council (NWBC), Tamworth Borough Council (TBC), North West Leicestershire District Council (NWLDC), Warwickshire County Council (WaCC), Staffordshire County Council (SCC), Leicestershire County Council (LeCC), the Canal & River Trust and Natural England has commenced. The purpose of this engagement has been to discuss the assessment methodology, extent of the landscape and visual study area, and the locations of visual assessment and verifiable photomontage viewpoints. Engagement will continue as part of the development of the Proposed Scheme and to inform the formal assessment.
- 11.1.4 The Volume 2 LA02 Map Book shows the locations of key environmental features (Map Series CT-10) and the key construction (Map Series CT-05) and operational (Map Series CT-06) features of the Proposed Scheme. It also shows the locations of landscape and visual impact mitigation measures (Map Series CT-06), viewpoints that would potentially be significantly affected at the construction (Map Series LV-03) and operation (Map Series LV-04) phases and Landscape Character Areas (LCA) that would potentially be significantly affected at the construction and operation phases (Map Series LV-02).
- 11.1.5 A separate, but related, assessment of effects on the setting of heritage assets is reported in Section 9, Historic environment.

## 11.2 Scope, assumptions and limitations

- 11.2.1 The scope, key assumptions and limitations for the landscape and visual assessment are set out in full in Volume 1 (Section 8) and the Scope and Methodology Report (SMR)<sup>111</sup>.
- 11.2.2 Summer surveys for the landscape and visual assessment were undertaken from August to September 2017 and winter surveys were undertaken in November to December 2017 to inform the assessment. At this stage it has not been possible to complete surveys of all publicly accessible land in this area: therefore, for the working draft ES an assumption has been made about the level of sensitivity and magnitude of

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<sup>111</sup> Supporting document: HS2 Phase 2b Environmental Impact Assessment Scope and Methodology Report

change on a case by case basis. This will be adjusted, as appropriate, on the basis of survey results to inform the formal ES.

- 11.2.3 The extent of the study area has been informed by construction and operational phase zones of theoretical visibility (ZTV). The ZTV have been produced in line with the methodology described in the SMR and are an indication of the theoretical visibility of the Proposed Scheme. In some locations, extensive vegetation cover would mean the actual extent of visibility is substantially less than that shown in the ZTV, and professional judgement will be used to further refine the study area to focus on likely significant effects.
- 11.2.4 Tall construction plant (for example cranes and piling rigs) is excluded from the ZTV for the construction phase, as there is a great degree of variability in the extent and timeframes of the visibility of construction activity and plant. Overhead line equipment rarely gives rise to significant effects if it is the only element visible and has, therefore, been excluded from the ZTV to give a better indication of the possible spread of significant effects to aid the assessment.
- 11.2.5 Landscape and visual receptors within approximately 1.5km of the route of the Proposed Scheme have been assessed as part of the study area.
- 11.2.6 This assessment is based on preliminary design information and makes reasonable worst case assumptions on the nature of potentially significant effects where these can be substantiated. It is based on information known at present. The assessment of visual effects during construction covers the situation in winter at peak activity. The assessment of operational visual effects covers the situation in winter and summer of year 1 and summer of year 15. The assessment of landscape effects is undertaken for the construction phase and for the operational phase at both year 1 and year 15. The landscape assessment does not consider seasonal variations e.g. winter/summer, since these do not affect character. Likely significant landscape and visual effects for year 30 will be reported in the formal ES.
- 11.2.7 Professional judgements on landscape value are summarised in the baseline descriptions and judgements on landscape susceptibility and sensitivity are summarised as part of the assessment of effects on each significantly affected LCA. Full judgement on value, susceptibility and sensitivity will be provided in the formal ES.
- 11.2.8 The assessment has been carried out on the basis that design of structures would, insofar as reasonably practicable, integrate with existing skyline features and would make use of a simple, clean and coherent palette of materials to help structures fit in the landscape.

## **11.3 Environmental baseline**

### **Existing baseline**

#### *Landscape baseline*

- 11.3.1 The study area extends from Birchmoor in the south to No Man's Heath in the north of the Birchmoor to Austrey area. The study area comprises low lying, gently undulating agricultural landscape with an area of lowland river valley landscape between the

Coventry Canal and River Anker. It includes pastoral and arable farmland with hedgerows, hedgerow trees and small woodland blocks present throughout. A larger area of tree planting is located at Pooley Country Park, a restored former colliery site a third of which contains Alvecote Pools Site of Special Scientific Interest (SSSI), one of the most extensive and diverse wetland areas in the county. Pooley Country Park provides recreational routes, off road cycle routes and a public right of way (PRoW) link Polesworth with Alvecote to the north-west. Alvecote Pools SSSI is located approximately 140m north-west of the land required for the Proposed Scheme and west of the M42. The Gold Leaf sculpture is located on the mound at Pooley Country Park and acts as a landmark, visible from the majority of the surrounding area including the M42.

- 11.3.2 Settlements within the study area comprise generally of small to medium-sized nucleated villages or ribbon developments<sup>112</sup>. Tamworth is a market town and the largest settlement in proximity to the Birchmoor to Austrey area, with the suburbs of Wilnecote and Stoneydelph extending into the south-west of the study area. The influence of Tamworth on the landscape character of the study area is limited as a result of the mature tree planting located along the M42. Polesworth forms the second largest urban area in the Birchmoor to Austrey area. Polesworth and the village of Newton Regis have a number of historic assets, including Polesworth Abbey, a scheduled monument. Two conservation areas lie within the study area including; Newton Regis Conservation Area covering the majority of the village of Newton Regis and Polesworth Conservation Area located at the centre of Polesworth.
- 11.3.3 Areas of large urban development are limited to the urban edge of Tamworth which overlaps the study area at Tamworth Services and Birch Coppice Business Park to the south. This development has a limited influence on the study area as a result of the mature tree planting which is located along either side of the M42, which screen views of the structures. Large linear transport corridors are locally prominent features of the area, most notably the M42 which is present throughout the study area with varying levels of visibility and the West Coast Main Line (WCML).
- 11.3.4 The LCAs have been determined as part of an integrated process of environmental characterisation, informed by a review of historic landscape mapping and the outcome from other topics including ecological assessments. These LCAs will be refined, as appropriate, upon review of available historic landscape characterisation data and will be included in the formal ES. Use has been made of published landscape character assessments and a wide range of supporting GIS data, aerial photography and Ordnance Survey mapping, plus desk study and fieldwork. Landscape character assessments reviewed include the relevant National Landscape Character Areas<sup>113</sup> and the Landscape Character Assessment for North Warwickshire<sup>114</sup>.

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<sup>112</sup> The building of houses along a continuous linear feature such as a main road.

<sup>113</sup> Natural England (2013, 2014), *National Character Area profiles*. Available online at: <https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making/national-character-area-profiles>

<sup>114</sup> Staffordshire County Council, Development Services Department (2000), *Planning for Landscape Change*. Available online at: <https://www.staffordshire.gov.uk/environment/eLand/planners-developers/landscape/NaturalEnvironmentLandscapeCharacterTypes.aspx>

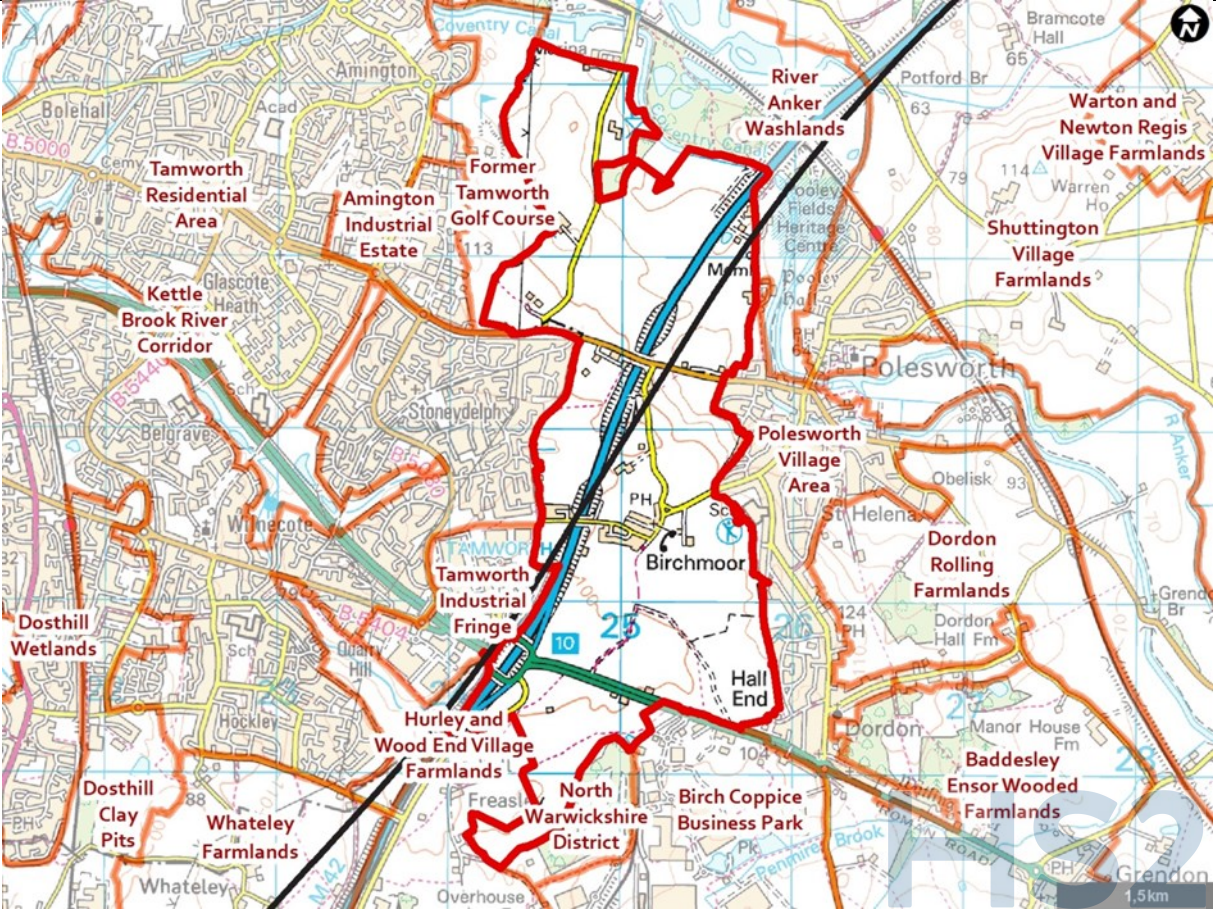


- 11.3.5 These published LCAs have been adapted for this assessment to provide LCAs of an appropriate and consistent scale. Minor amendments have been made to some published LCA boundaries to reflect existing conditions.
- 11.3.6 For the purposes of this assessment, the Birchmoor to Austrey study area has been subdivided into ten LCAs. These LCAs are draft and subject to review in consultation with local planning authorities. Full descriptions of all LCAs will be provided in Volume 5 of the formal ES. Five of the ten LCAs would not be significantly affected by the Proposed Scheme on account of indirect effects and distance. A summary of the five LCAs that would be significantly affected within the Birchmoor to Austrey area is provided in Table 24.



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Table 24: Summary of significantly affected LCAs

| <b>Birchmoor Village Farmlands</b>                                                                                                         |                                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
|                                                         |                                                                                                                                   |
| <p>Mature vegetation located on the M42 embankment</p>  | <p>Relatively flat, open arable farmland</p>  |

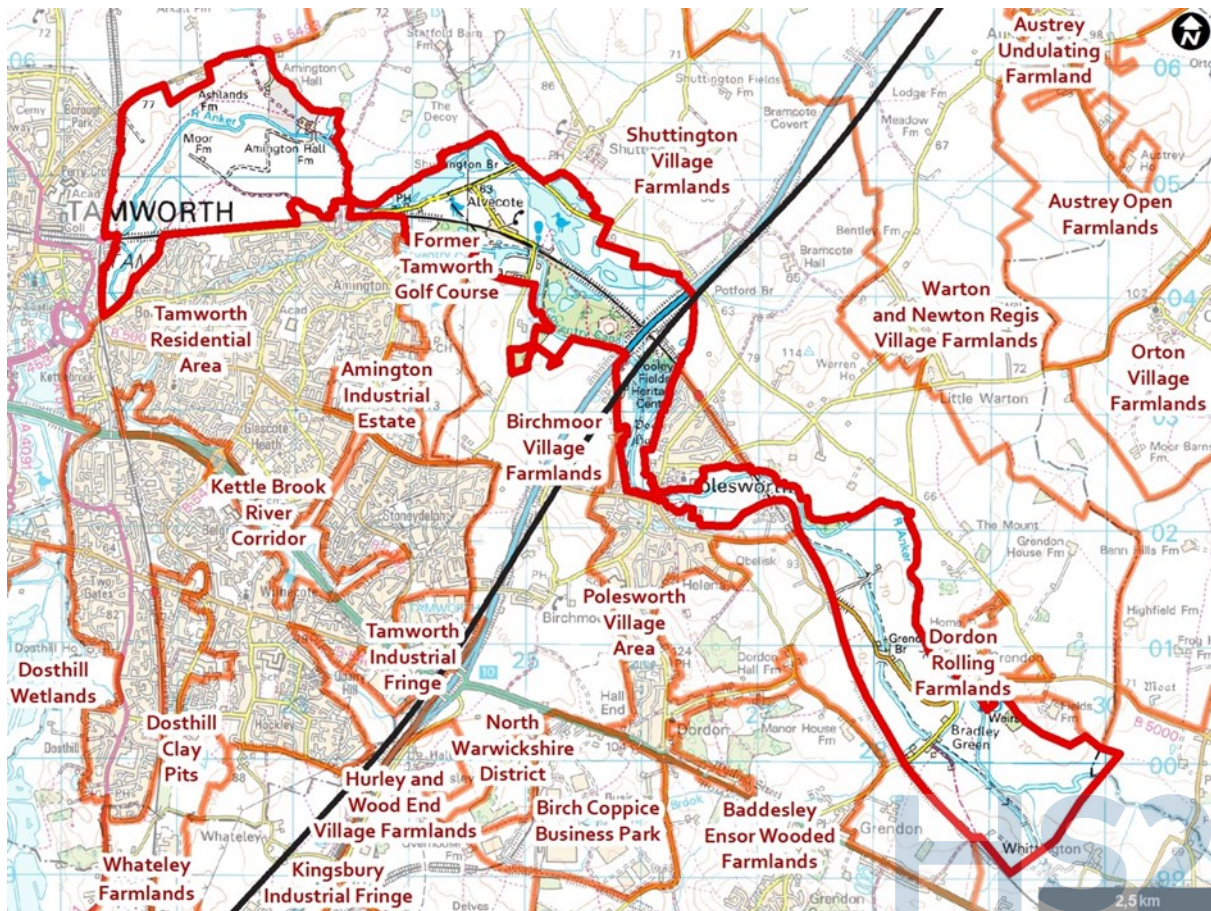
The Birchmoor Village Farmlands LCA (partly within the Lea Marston to Tamworth area (LA01)), comprises relatively flat, open, arable farmland stretching from Birchmoor and Dordon to Alvecote. The rural, relatively tranquil landscape is open and provides a buffer between the built up areas of Tamworth and Birchmoor. The M42 dissects the LCA, although its influence on the wider area is limited as a result of mature vegetation located on the embankments, which largely screens the road infrastructure. There is a consistent landscape pattern of tree cover occurring as hedgerow trees and linear woodland blocks located along the M42 and the B5000 Tamworth Road. Settlement within this LCA is sparse and limited to the village of Birchmoor and scattered farmsteads, which contributes to the level of tranquillity in the LCA.

There are no recognised historic designations within this LCA. A good network of PRoW exists within the landscape, linking settlements. A number of detracting infrastructure elements such as pylons and overhead power lines are present and traverse the landscape, although they do not dominate the landscape. A mobile telephone mast located on Hermitage Lane is visible within the wider landscape. Both the M42 and the detracting infrastructure adversely influence scenic quality. Views within the LCA typically include farmland with hedged boundaries set against a backdrop of long distance horizons dominated by woodland. Glimpsed views of Tamworth and Birchmoor are available in elevated locations, where vegetation allows.

Birchmoor Village Farmland LCA is assessed as having an overall medium-low landscape value based the levels of tranquillity, moderate scenic value and presence of detractors.



River Anker Washlands



Linear trees along watercourses



Elevated view towards M42 and Pooley Country Park and woodland blocks beyond



The River Anker Washlands LCA is an attractive well wooded floodplain and riparian landscape. The landscape is divided by the M42, which crosses over the River Anker floodplain and the Coventry Canal. The WCML runs from east to west through the LCA. The area contains pastoral farmland that consists of large field sizes with a small field pattern, with evidence of ridge and furrow still evident around Grendon. There are a number of small to medium woodland blocks interspersed with the farmland in this LCA. Large blocks of woodland are present at Pooley Country Park, which acts as a recreational hub for the wider community. Tree cover within the LCA mainly consists of the regeneration woodland at Pooley Country Park and mature, linear blocks along watercourses. The Gold Leaf sculpture located on the mound, and large woodland blocks, are dominant features within the wider landscape which form landmarks. A number of large water bodies are present within the LCA, including those at Alvecote Pools SSSI. The settlement pattern is comprised of the villages of Alvecote and Bradley Green, with scattered farmsteads located throughout the LCA.

The LCA includes scheduled monuments and listed buildings, including the medieval Benedictine Priory at Alvecote and Dovecote Scheduled Monument and a Grade II\* listed building, Pooley Hall. The influence these designations have on the landscape is localised. The dominant landscape character is derived from the restored landscape of Pooley Country Park. The LCA contains a number of recreational routes that are associated with the Coventry Canal and River Anker. The LCA is an attractive riparian floodplain landscape, with pastoral farmland fringes and elevated wooded. The LCA is relatively tranquil along watercourses despite the presence of major transport routes including the WCML and the M42 at Pooley Country Park towards the centre of the LCA.

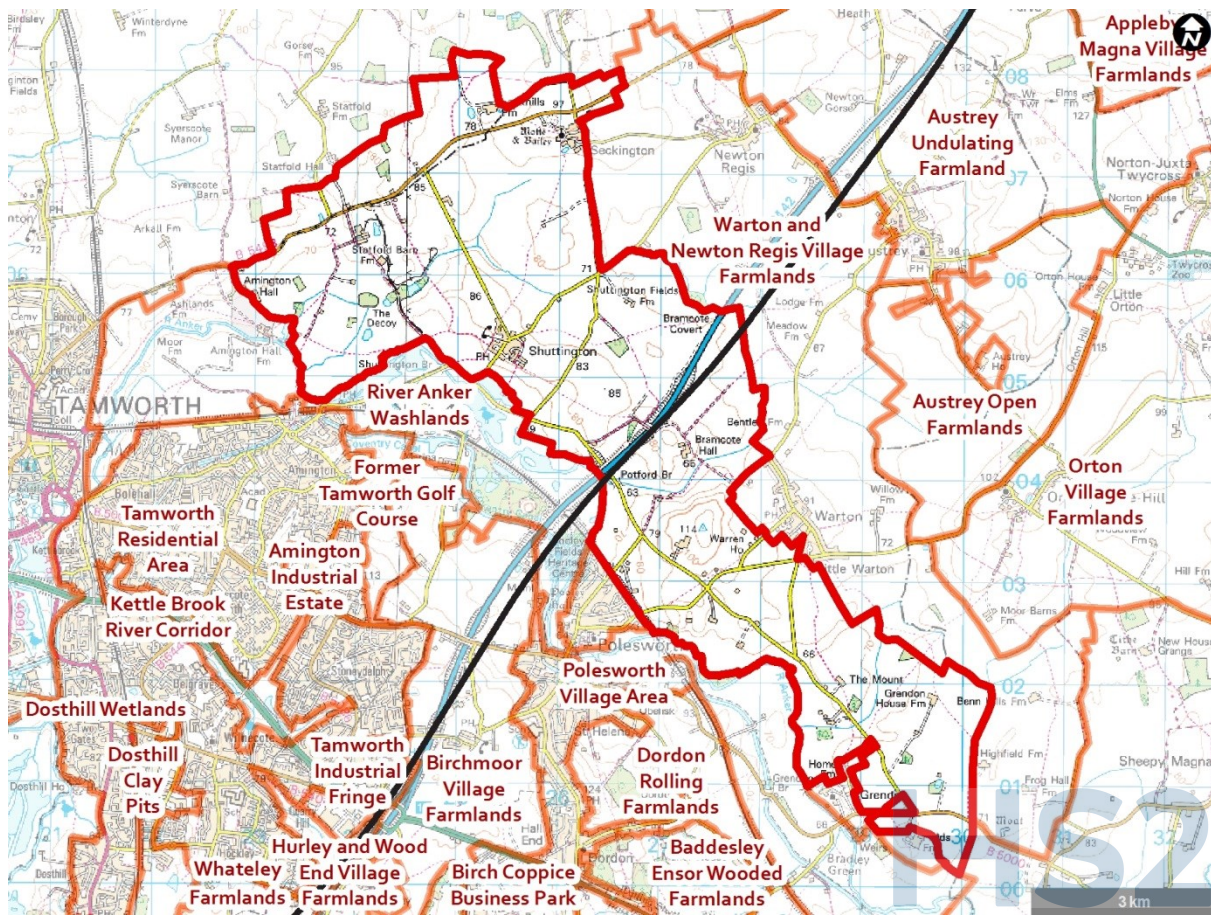


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The overall value of this LCA is medium-high derived from the strong scenic setting, the recreational value and the landscape condition.

### Shuttington Village Farmlands



Gently undulating farmland



View west over undulating farmland from Warwickshire Footpath T140, near Bramcote Hall



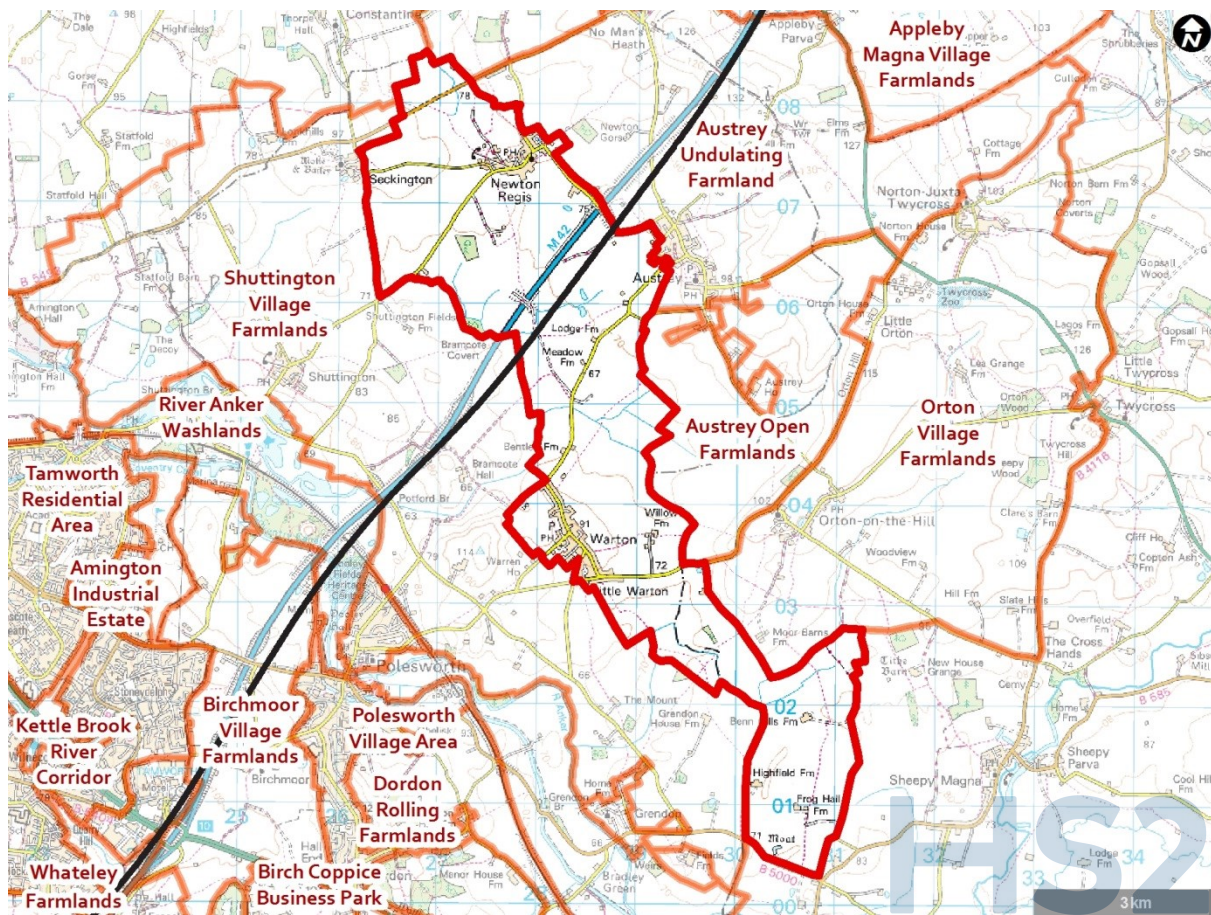
The Shuttington Village Farmlands LCA comprises flat to gently undulating arable farmland in variable condition with few elements of scenic quality as a result of the post-war agricultural intensification. Field sizes are irregular and bounded by hedgerows and hedgerow trees. Woodland cover is limited to small to medium woodland blocks. Tree cover is limited to small woodland blocks and hedgerow trees.

Settlement comprises of the villages of Shuttington and Seckington with scattered farmsteads in the surrounding area. Shuttington, a historic village that is mainly characterised by modern development. The village contains the listed Church of St. Matthew, which dates from the 12th century. Seckington is a picturesque village with a number of historic timber framed buildings that are listed and the scheduled monument of Seckington Castle, believed to have been built in the late 11th century. A number of PRoW traverse the rural landscape, linking the settlements and farmsteads. The landscape is intact in places and contains a number of modern transport infrastructure routes and utilities. These include the M42 and overhead power lines on wooden poles which traverse parts of the LCA, although they have limited influence on the wider landscape.

The overall value of this LCA is medium based on the moderate scenic value, landscape condition and presence of detractors.



Warton and Newton Regis Village Farmlands



View south-east from Warwickshire  
Footpath AE4



View west from Austrey Road corner



The Warton and Newton Regis Village Farmlands LCA comprises a relatively flat, low lying agricultural landscape, with predominantly arable land use in variable condition. Fields are predominantly medium-sized with linear hedged boundaries. Evidence of ridge and furrow is present outside the village of Warton. Tree cover is limited to hedgerow trees and small isolated woodland blocks.

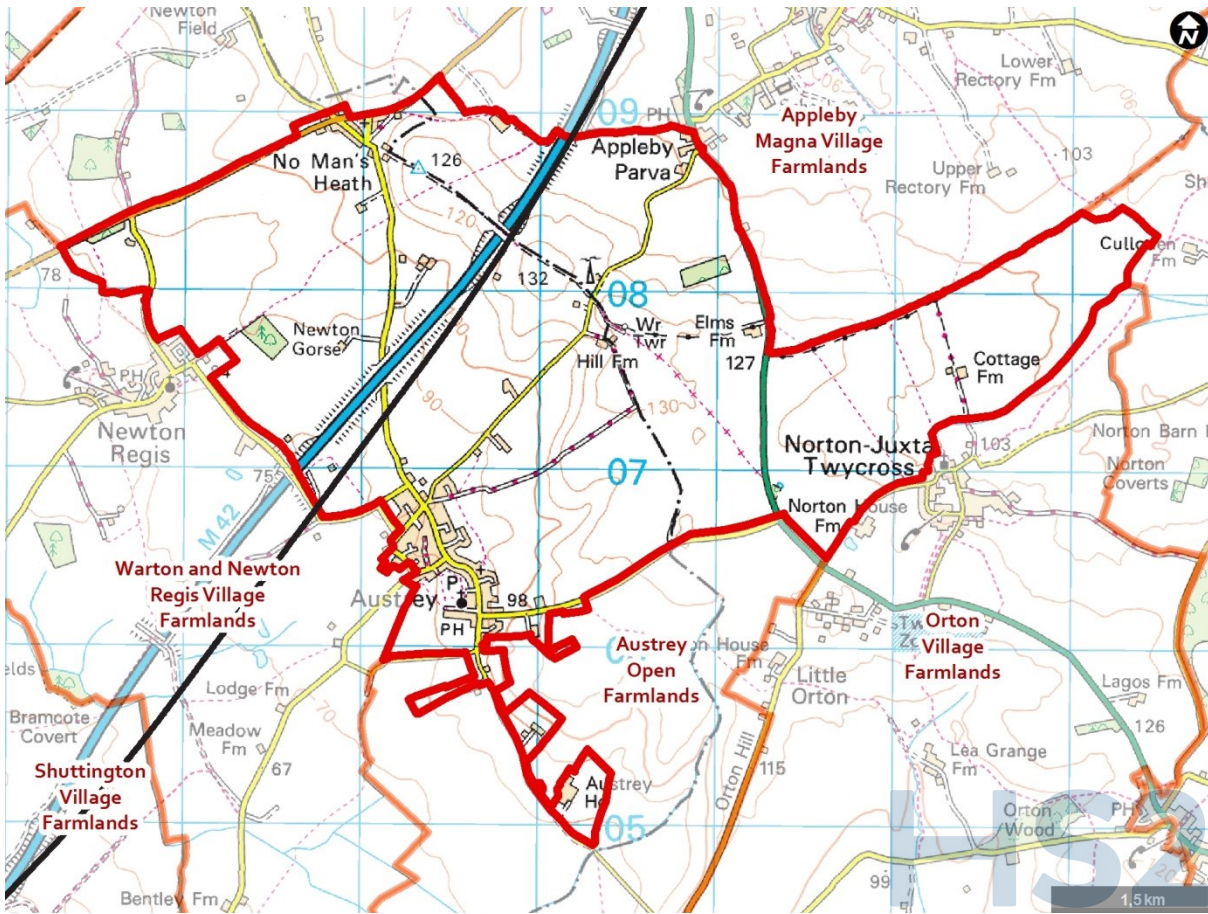
Settlement comprises the historic villages of Warton and Newton Regis with scattered farmsteads. Warton, a medieval settlement, contains mainly post-war housing. The historic village of Newton Regis is centred on the Grade II\* listed Church of St. Mary, whose spire can be seen within long distance views, forming a landmark within the surrounding landscape. A number of PRoW exist within the landscape, linking settlements to the wider landscape.

Tranquillity is influenced by the M42 which crosses the landscape. Overhead power lines on wooden poles cross the landscape, although their influence on the wider landscape is limited.

The overall value of this LCA is medium based on the poor scenic value, landscape condition and presence of infrastructure.



Austrey Undulating Farmlands



Farmland with limited trees present.



Medium field sizes with hedgerow trees



Austrey Undulating Farmlands LCA comprises an undulating arable and pastoral agricultural landscape. Field size within the LCA is overall small to medium, with boundaries generally comprising low trimmed hedgerows of varying condition. Tree cover is predominantly limited to hedgerow trees with one isolated block of woodland to the north of Newton Regis.

Settlement within this LCA comprises the nucleated villages of Austrey and No Man's Heath, with scattered farmsteads in the surrounding area. Austrey is a historic settlement that was considerably expanded and now consists of mainly post-war development. The Grade II\* listed Church of St. Nicholas is located in Austrey. No Man's Heath comprises of mainly post-war development. Long distance views of the surrounding landscape are available from elevated locations. The Grade II\* listed Church of St. Mary, located in the adjacent Warton and Newton Regis Village Farmlands LCA, is visible from areas of high ground as a landmark feature.

A number of PRoW are present within the north of the LCA, linking settlements. PRoW to the south of the LCA are limited. Tranquillity is influenced by the M42 which crosses the landscape. Overhead power lines on wooden poles cross the landscape, although their influence on the wider landscape is limited. Away from infrastructure, the landscape is relatively tranquil.

The overall value of this LCA is medium based on the medium level of tranquillity, medium conservation interest and medium scenic value.

## Visual baseline

- 11.3.7 A summary description of the distribution and types of receptors most likely to be affected is provided below. The viewpoints are numbered to identify their locations and are shown on the viewpoint location maps (see Volume 2: LA02 Map Book, Map Series LV-03 and LV-04). In each case, the middle number (xxx.xx.xxx) identifies the type of receptor that is present in this area – 1: Protected views (none within this area), 2: Residential, 3: Recreational, 4: Transport, 5: Hotels/healthcare/education and 6: Employment.
- 11.3.8 No protected views have been identified within the study area. Views from residential properties occur throughout the area, including from the settlements of Polesworth and Dordon and villages and hamlets such as Birchmoor, Warton, Shuttington, Seckington, Newton Regis, Austrey, No Man's Heath and numerous individual farmsteads.
- 11.3.9 Urban residential areas are generally dominated by built form and a range of housing styles. The predominant infrastructure to the south of the study area in the Lea Marston to Tamworth area (LA01) comprises the M42 junction 10 and A5 Watling Street, industrial development at Birch Coppice Business Park and Tamworth Services. The M42 is present throughout the study area although visibility of the road infrastructure and moving vehicles varies. The presence of these elements range from views of highway related tree and shrub planting to highway infrastructure. Views from settlement edges are typically filtered and framed by intervening hedgerows and occasional woodland blocks. Combined with low lying and gently undulating landform, this restricts open views to some degree, particularly to the north of the study area. The majority of receptors within the study area have existing views or an awareness of the M42 including traffic movement and the presence of gantries.
- 11.3.10 Views are available for recreational users from the higher ground within Pooley Country Park, the River Anker corridor and the Coventry Canal. Views from the Coventry Canal towpath are generally localised due to partial screening from vegetation and surrounding rising ground. PRow located on elevated ground, such as Warwickshire Footpath AE4, provide far reaching views, which generally contain some form of transport infrastructure. Views from PRow at lower levels are often restricted by intervening vegetation.
- 11.3.11 Users of rural roads and lanes generally experience partially restricted views due to roadside vegetation, giving only glimpses of the landscape beyond. In limited locations, long distance views from rural roads are available, such as views from Appleby Hill.

## 11.4 Temporary effects arising during construction

- 11.4.1 As is commonplace with major infrastructure works, the scale of the construction activities means that works would be visible from many locations and would have the potential to give rise to significant temporary effects that cannot practicably be mitigated. Such effects are temporary and would vary over the construction period depending on the intensity and scale of the works at the time. The assessment of landscape and visual effects has been based on the activities occurring during the peak construction phase, which is defined as the period during which the main

construction works would take place, including the presence of compounds, main earthworks and structure works.

11.4.2 The effects associated with the peak construction stage in this area are generally considered to be medium-term, based on the indicative construction programme in Section 2.3. It is currently anticipated that the peak civil engineering stage in this area would be undertaken between the start of autumn 2025 and the end of autumn 2030. Effects during other stages of works are likely to be less intensive due to less construction equipment being required at the time and a reduced intensity of construction activity.

11.4.3 Section 2.2 sets out the key permanent features of the Proposed Scheme and Section 2.3 describes the construction compounds and associated temporary works that have been considered in this assessment.

### Avoidance and mitigation measures

11.4.4 Measures that have been incorporated into Sections 12 and 14 of the draft Code of Construction Practice<sup>115</sup> (CoCP) to avoid or reduce landscape and visual effects, where reasonably practicable, during construction include the following:

- avoidance of unnecessary tree and vegetation removal, and protection of existing trees in accordance with BS 5837: Trees in relation to design, demolition and construction<sup>116</sup>;
- use of well-maintained hoardings and fencing;
- prevention of damage to the landscape features adjacent to the construction sites due to movement of construction vehicles;
- designing lighting to avoid unnecessary intrusion onto adjacent buildings and other land uses; and
- replacement of any trees intended to be retained which may die as a consequence of nearby construction works.

11.4.5 Implementation of these measures has been taken into account in the assessment of the construction effects.

### Assessment of temporary impacts and effects

11.4.6 The most apparent changes to the landscape and to the views experienced by visual receptors during construction would relate to the presence of construction plant, compounds and soils and material storage and stockpiling. Key construction activities that would give rise to the most apparent changes to landscape and visual receptors are: the excavation of cuttings, erection of viaducts, construction of embankments, the removal of existing landscape elements including trees and hedgerows, and the closure and diversion of existing public highways and PRoW. Other key changes include: the temporary realignment of the M42, the construction of overbridges and

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<sup>115</sup> Supporting document: Draft Code of Construction Practice

<sup>116</sup> BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations, 2012, British Standard.

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underbridges, an auto-transformer station, an express feeder auto-transformer station, overhead line equipment, utility diversions, the presence of transfer nodes and the demolition of buildings and structures, including the demolition of the Green Lane M42 overbridge.

*Landscape assessment*

11.4.7 Based on the current design it is anticipated that the LCAs set out in Table 25 Table 25 would be significantly affected during construction of the Proposed Scheme.

Table 25: Summary description and assessment of effects on LCAs

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| <b>Birchmoor Village Farmlands</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Medium-low susceptibility and sensitivity</b>                  |
| <p><b>Susceptibility to change:</b> the levels of tranquillity and rural qualities within the landscape have a medium-low susceptibility to change arising from the Proposed Scheme.</p> <p>The rural Birchmoor Village Farmlands LCA would be directly impacted by large scale construction works generally occurring parallel and in proximity to the M42. Construction operations would include temporary realignment of the M42, demolition of the Green Lane M42 overbridge, construction of the M42 Stoneydelph cutting, Pooley Lane cutting and Bramcote cutting, Birchmoor express feeder auto-transformer station and construction compounds, Pooley Lane overbridge and the introduction of temporary material stockpiles. The removal of extensive areas of mature trees on the M42 embankment would substantially open up views of the M42 from the wider area, resulting in a reduction in tranquillity. The removal of field pattern and hedgerows would result in a change to landscape character.</p> <p>There would therefore be an overall high magnitude of change and a moderate adverse effect.</p> | <p><b>Level of effect:</b><br/>Moderate adverse (significant)</p> |
| <b>River Anker Washlands</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Medium-high susceptibility and sensitivity</b>                 |
| <p><b>Susceptibility to change:</b> the high levels of tranquillity, rural qualities, presence of strong landmarks and limited influence of detractors within the landscape, have a medium-high susceptibility to change arising from the Proposed Scheme.</p> <p>This riparian LCA would be directly impacted by large scale construction works which would occur in the vicinity of the M42. Works would include the construction of Polesworth viaduct, and Polesworth viaduct satellite compound. There will be a loss of the Pooley Country Park facility including car parking, visitor centre and play area. The clearance of established trees located at Pooley Country Park would result in increased views of the M42, a substantial change to landscape character and reduction in tranquillity.</p> <p>There would therefore be an overall high magnitude of change and a major adverse effect.</p>                                                                                                                                                                                                         | <p><b>Level of effect:</b><br/>Major adverse (significant)</p>    |
| <b>Shuttington Village Farmlands</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Medium susceptibility and sensitivity</b>                      |
| <p><b>Susceptibility to change:</b> the medium levels of tranquillity, rural qualities, presence of landmarks and limited influence of detractors within the landscape, have a medium susceptibility to change arising from the Proposed Scheme.</p> <p>This rural LCA would be directly impacted by large scale construction in the vicinity of the M42 which would reduce the tranquillity of the rural landscape. Works would include the construction of a length of Polesworth viaduct, River Anker embankment, Bramcote cutting, New Covert embankment, New Covert cutting, Bramcote Brook embankment and Bramcote Hall Farm overbridge satellite compound. The removal of areas of trees along the M42 embankment would open up views of the M42 and the loss of field pattern would result in a change in landscape character.</p> <p>There would therefore be an overall medium magnitude of change and a moderate adverse effect.</p>                                                                                                                                                                          | <p><b>Level of effect:</b><br/>Moderate adverse (significant)</p> |



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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| <b>Warton and Newton Regis Village Farmlands</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Medium-high susceptibility and sensitivity</b>                    |
| <p><b>Susceptibility to change:</b> the medium levels of tranquillity, rural qualities, presence of strong historic landmarks and limited influence of detractors within the landscape, have a medium-high susceptibility to change arising from the Proposed Scheme.</p> <p>This rural LCA would be directly impacted by large scale construction works in the vicinity of the M42 at the centre of the LCA. The removal of areas of trees and hedgerows to construct Bramcote Brook embankment, Newton Regis cutting, Austrey auto-transformer station and Austrey main compound would open up views of the M42 with a resultant change in landscape character and levels of tranquillity.</p> <p>There would therefore be an overall medium magnitude of change and a major adverse effect.</p>                                                                                                                                                                      | <p><b>Level of effect:</b></p> <p>Major adverse (significant)</p>    |
| <b>Austrey Undulating Farmlands</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Medium susceptibility and sensitivity</b>                         |
| <p><b>Susceptibility to change:</b> the medium levels of tranquillity, rural qualities, views of strong historic landmarks and influence of detractors within the landscape, have a medium susceptibility to change arising from the Proposed Scheme.</p> <p>This rural LCA would be directly impacted by large scale construction works which would occur in the vicinity of the M42 at the centre of the LCA. Works would include the construction of Austrey embankment, Newton Lane diversion, No Man's Heath Lane viaduct, No Man's Heath Lane realignment, Pimlico embankment, Salt Street cutting and Salt Street overbridge. The removal of areas of mature tree planting on the M42 embankment would open up views of the M42 and the loss of hedgerows and field pattern would result in a change to landscape character and levels of tranquillity.</p> <p>There would therefore be an overall medium magnitude of change and a moderate adverse effect.</p> | <p><b>Level of effect:</b></p> <p>Moderate adverse (significant)</p> |

## Visual assessment

### Introduction

- 11.4.8 The following section describes the likely significant effects on visual receptors during construction. The construction assessment has been undertaken for the winter period, in line with best practice guidance, to ensure a robust assessment. However, in some cases, visibility of construction activities may be reduced during summer when vegetation, if present in a view, would be in leaf.
- 11.4.9 Where a viewpoint represents multiple types of receptor, the assessment is based on the most sensitive receptors. Effects on other receptor types with lower sensitivity would be lower than those reported.
- 11.4.10 Night-time surveys will be undertaken to inform the assessment in the formal ES. Potential visual impacts arising from additional lighting at night during construction within the area may arise from continuous working and/or overnight working. Assessment of these effects will be reported in the formal ES on completion of the night time assessment.
- 11.4.11 Table 26 describes the construction phase potentially significant visual effects based on the current design of the Proposed Scheme. Viewpoint locations are shown in Map Series LV-03 in the Volume 2: LA02 Map Book.

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Table 26: Construction phase significant visual effects

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| <p><b>View west from Warwickshire Footpath AE45 south of Cockspur Street, Birchmoor (VP 354-03-05) (Map Number LV-03-354b)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p><b>Medium-high sensitivity receptor</b></p>                    |
| <p>Recreational footpath users and occupants of residential properties would experience close-distance views of large scale construction works including the demolition of Green Lane M42 overbridge, the temporary realignment of the M42 and excavation of the M42 Stonydelph cutting. The removal of mature vegetation alongside the M42 would result in substantial changes to the extent, content and key characteristics within the view. The temporary realignment of the M42 would result in close distance views of construction works. The construction works would be visible across the majority of the view. In addition, views of large scale construction vehicles and equipment would introduce uncharacteristic movement to the views.</p> <p>There would therefore be an overall high magnitude of visual change and major adverse effect.</p>                                                                                                                           | <p><b>Level of effect:</b><br/>Major adverse (significant)</p>    |
| <p><b>View east from Green Lane, Birchmoor (VP 354-02-09) and view north-west from Green Lane, Birchmoor (VP 354-02-08) (Map Number LV-03-354b)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p><b>High sensitivity receptors</b></p>                          |
| <p>Occupants of residential properties would experience near distance views of large scale construction works including the demolition of Green Lane M42 overbridge, M42 temporary realignment satellite compound, Stonydelph satellite compound M42 Tamworth tunnel, Hermitage Lane cutting and temporary realignment of the M42. Near distance views of construction works to M42 Stonydelph cutting and M42 Tamworth tunnel south portal would be substantially altered through changes to landform and field pattern. The construction works would be visible across the majority of the view.</p> <p>The removal of mature vegetation alongside the M42 would result in substantial changes to the extent, content and key characteristics of the view. In addition, large scale construction vehicles and equipment would introduce uncharacteristic movement to the views.</p> <p>There would therefore be an overall high magnitude of visual change and major adverse effect.</p> | <p><b>Level of effect:</b><br/>Major adverse (significant)</p>    |
| <p><b>View north-west from Birchmoor Road, Birchmoor (VP 354-02-10) (Map Number LV-03-354b)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <p><b>High sensitivity receptors</b></p>                          |
| <p>Residents would experience medium to long-distance views of large scale construction works including Hermitage Lane diversion, B5000 Tamworth Road overbridge and Hermitage Lane cutting. Middle ground removal of mature vegetation, and landform changes would open up views of construction works changing field pattern and other key characteristics across the majority of the view. Large scale construction vehicles and equipment would introduce uncharacteristic movement to the views.</p> <p>There would therefore be an overall medium magnitude of visual change and moderate adverse effect.</p>                                                                                                                                                                                                                                                                                                                                                                        | <p><b>Level of effect:</b><br/>Moderate adverse (significant)</p> |
| <p><b>View west from the B5000 Tamworth Road, Birchmoor (VP 355-02-03) (Map Number LV-03-355)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p><b>High sensitivity receptors</b></p>                          |
| <p>Occupants of residential properties at this location would experience close-distance views of large scale construction works including the B5000 Tamworth Road overbridge, Pooley Lane cutting and Polesworth main compound. Views of construction works would be more visible as a result of the removal of mature vegetation in the foreground. There would be substantial changes to the content and key characteristics including landform and field pattern within the view.</p> <p>In addition, views of large scale construction vehicles and equipment would introduce uncharacteristic movement to the views.</p> <p>There would therefore be an overall high magnitude of visual change and major adverse effect.</p>                                                                                                                                                                                                                                                         | <p><b>Level of effect:</b><br/>Major adverse (significant)</p>    |
| <p><b>View west from Coventry Canal towpath (VP 355-03-11) (Map Number LV-04-355)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <p><b>Medium-High sensitivity receptors</b></p>                   |
| <p>Recreational footpath and canal users at this location would experience close-distance views of large scale construction works including Pooley Lane cutting, Pooley Lane embankment, Polesworth viaduct and Pooley Lane overbridge. Views of construction works would be more visible as a result of the removal of mature vegetation in the foreground and middle ground. The construction works would highly visible and alter the skyline of the view. There would be substantial changes to the content and addition of new components that are continuously and highly visible within the view</p>                                                                                                                                                                                                                                                                                                                                                                                | <p><b>Level of effect:</b><br/>Major adverse (significant)</p>    |

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| <p>including changes to landform and field pattern. In addition, large scale construction vehicles and equipment would introduce uncharacteristic movement to the views.</p> <p>There would therefore be an overall high magnitude of visual change and major adverse effect.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                   |
| <p><b>View west from Rowland Avenue, Polesworth (VP 355-02-10) (Map Number LV-03-355)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <p><b>High sensitivity receptors</b></p>                          |
| <p>Occupants of residential properties at this location would experience medium distance views of large scale construction works including Pooley Lane cutting, Pooley Lane embankment, Polesworth viaduct and Pooley Lane overbridge. Views of construction works would be more visible as a result of the removal of mature vegetation within Pooley Country Park in the background of the view. There would be slight changes to the content and addition of new components that are visible in the background of the view.</p> <p>In addition, large scale construction vehicles and equipment would introduce uncharacteristic movement to the views.</p> <p>There would therefore be an overall low magnitude of visual change and moderate adverse effect.</p>                                                                                                                | <p><b>Level of effect:</b><br/>Moderate adverse (significant)</p> |
| <p><b>View east from Pooley Country Park, Polesworth (VP 355-03-17) (Map Number LV-03-355)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <p><b>High sensitivity receptors</b></p>                          |
| <p>Recreational users at this location would experience medium distance elevated views of large scale construction works including Pooley Lane embankment and Polesworth viaduct. Views of construction works would be visible beyond the M42 and become more visible as a result of the large scale removal of mature vegetation in the middle ground of the view. There would be substantial changes partially filtered by intervening vegetation, to the content and addition of new components within the view including cranes and large scale machinery associated with the construction of Polesworth viaduct.</p> <p>There would therefore be an overall medium magnitude of visual change and major adverse effect.</p>                                                                                                                                                     | <p><b>Level of effect:</b><br/>Major adverse (significant)</p>    |
| <p><b>View south-west from Warwickshire Footpath AE9, Linden Lane, Polesworth (VP 355-03-16) (Map Number LV-03-355)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <p><b>Medium-High sensitivity receptors</b></p>                   |
| <p>Recreational users of Warwickshire Footpath AE9 would experience long to medium distance views of large scale construction works including Pooley Lane embankment and Polesworth viaduct. Views of construction works would be more visible as a result of the removal of mature vegetation in the middle ground of the view. There would be substantial changes to the content and addition of new components including cranes and large scale machinery associated with the construction of Polesworth viaduct that are visible in the middle ground, viewed against the elevated sections of the M42, across the full extent of the view.</p> <p>In addition, large scale construction vehicles and equipment would introduce uncharacteristic movement to the views.</p> <p>There would therefore be an overall high magnitude of visual change and major adverse effect.</p> | <p><b>Level of effect:</b><br/>Major adverse (significant)</p>    |
| <p><b>View west from Warwickshire Bridleway AE3, Warton (VP 356-03-04) (Map Number LV-03-356)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <p><b>Medium-High sensitivity receptors</b></p>                   |
| <p>Recreational bridleway users at this location would experience medium distance views of large scale construction works including Bramcote Hall Farm overbridge, Bramcote cutting, New Covert embankment, New Covert cutting, Bramcote Brook embankment and Bramcote Brook satellite compound. Views of construction works would be more visible as a result of the removal of mature vegetation in the background of the view. There would be noticeable changes to the content and addition of new components including embankments and compounds that are visible in the middle ground of the view.</p> <p>In addition, large scale construction vehicles and equipment would introduce further movement to the views.</p> <p>There would therefore be an overall high magnitude of visual change and major adverse effect.</p>                                                 | <p><b>Level of effect:</b><br/>Major adverse (significant)</p>    |
| <p><b>View west from Warwickshire Footpath AE4, Warton (VP 357-03-01) (Map Number LV-03-357)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p><b>Medium-High sensitivity receptors</b></p>                   |
| <p>Recreational footpath users at this location would experience medium-distance views of large scale construction works including New Covert cutting, Bramcote Brook embankment and Bramcote Brook satellite compound. In the middle ground of the view there would be substantial noticeable changes</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <p><b>Level of effect:</b></p>                                    |

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| <p>to the content and addition of new components including embankments and compounds that are continuously highly visible across much of the view. In addition, large scale construction vehicles, equipment and earthworks would introduce further movement to the views.</p> <p>There would therefore be an overall high magnitude of visual change and major adverse effect.</p>                                                                                                                                                                                                                                                                                                                                                                                                                          | <p>Major adverse (significant)</p>                                |
| <p><b>View west from Newton Lane, Austrey (VP 357-02-09) (Map Number LV-03-357)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p><b>High sensitivity receptors</b></p>                          |
| <p>Occupants of residential properties at this location would experience medium distance views of large scale construction works including Austrey embankment, diversion of Newton Lane, realignment of No Man's Heath Lane and No Man's Heath Lane viaduct. The removal of mature vegetation in the middle ground would result in substantial changes to the extent, content, skyline and character of views and remove distinctive local landscape features. Residential receptors at Newton Lane would experience upper storey views of these construction works.</p> <p>In addition, large scale construction vehicles, equipment and earthworks would introduce further movement to the views.</p> <p>There would therefore be an overall high magnitude of visual change and major adverse effect.</p> | <p><b>Level of effect:</b></p> <p>Major adverse (significant)</p> |

### Other mitigation measures

- 11.4.12 To further reduce the significant effects described above, consideration will be given during the detailed design stage to where planting can be established early in the construction programme to help achieve earlier landscape and visual integration. However, not all landscape and visual effects can be mitigated due to the visibility of construction activity and the sensitivity of surrounding receptors. No other mitigation measures are considered practicable during construction.

### Summary of likely residual significant effects

- 11.4.13 The temporary residual significant effects during construction remain as described above. These effects would be temporary and reversible in nature lasting only for the duration of the construction works. These residual effects would generally arise from the widespread presence of construction activity and construction plant within the landscape and viewed by surrounding residents, and users of PRow and main roads within the study area.
- 11.4.14 The significant effects that would remain after implementation of construction phase mitigation are summarised below:
- major adverse effects in relation to two LCAs;
  - moderate adverse effects in relation to three LCAs;
  - major adverse visual effects at four residential viewpoint locations;
  - major adverse visual effects at six recreational viewpoint locations; and
  - moderate adverse visual effects at two residential viewpoint locations.

## 11.5 Permanent effects arising from operation

- 11.5.1 The permanent features of the Proposed Scheme that have been taken into account in determining the effects arising during operation on landscape and visual receptors are presented in Section 2.2 of this report.

## Avoidance and mitigation measures

11.5.2 The operational assessment of impacts and effects is based on year 1 (2033) and year 15 (2048) of the Proposed Scheme, with Year 30 (2063) to be reported in the formal ES. A process of iterative design and assessment has been employed, and is ongoing, to avoid or reduce adverse effects during the operation of the Proposed Scheme. Measures that would be integrated into the design of the Proposed Scheme include:

- design of earthworks to tie the engineering earthworks for embankments (such as Bramcote Brook embankment and Austrey embankment) and cuttings into their wider landscape context and to mitigate views of structures and overhead line equipment from sensitive receptors, where reasonably practicable. Earthworks design also takes account of the relationship to surrounding land uses and management, such as agriculture;
- compensatory woodland planting in areas of loss, using the same species composition and planting types (and appropriate planting density), such as mitigation planting at the River Anker floodplain and to provide habitat connectivity, enhanced landscape/green infrastructure connectivity, as well as connectivity of historic landscape features, where reasonably practicable, and to soften embankments and viaduct abutments;
- hedgerow replacement and restoration in areas of loss to restore connectivity and landscape pattern, where reasonably practicable, and using an appropriate palette of hedgerow types and species to tie the Proposed Scheme mitigation into the wider landscape character; compensation for loss of field ponds with new wetlands, ecological ponds and biodiversity wetland features and wetland enhancement at the River Anker floodplain; and
- design of structures such as the Polesworth viaduct and No Man's Heath Lane viaduct.

## Assessment of impacts and effects

11.5.3 The likely effects on landscape and visual receptors during operation of the Proposed Scheme relate to the presence of new structures and elements in the landscape including:

- Polesworth viaduct;
- No Man's Heath Lane viaduct;
- the presence of earthworks, including River Anker embankment, Bramcote Brook embankment, Austrey embankment and Pimlico embankment;
- Pooley Lane overbridge; and
- other design features and rail infrastructure such as the auto-transformer station, express feeder auto-transformer station, presence of overhead line equipment and noise fence barriers.

*Landscape assessment*

- 11.5.4 Based on the current design, it is currently anticipated that the LCAs described in Table 27 would be significantly affected during operation of the Proposed Scheme.

Table 27: Operational phase significant landscape effects

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                   |
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| <p><b>Birchmoor Village Farmlands</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <p><b>Medium-low susceptibility and sensitivity</b></p>           |
| <p><b>Susceptibility to change:</b> The levels of tranquillity, open views, consistent landscape pattern and rural qualities within the landscape combine such that the LCA has a medium-low susceptibility to change arising from the Proposed Scheme.</p> <p><b>Year 1:</b> This LCA would be directly affected by the introduction of large scale infrastructure and landform modification alongside the M42 such as the Hermitage Lane cutting, Pooley Lane cutting, the B5000 Tamworth Road overbridge and Pooley Lane overbridge. New access tracks, the Polesworth express feeder auto-transformer station and balancing ponds would increase the presence of infrastructure features within the LCA. Proposed landscape mitigation planting, including woodland around the Birchmoor express feeder auto-transformer station and hedgerow habitat creation along the embankments of Pooley Lane overbridge would have no beneficial effects in year one as they would not be mature enough to provide any contribution to landscape character. The introduction of large scale infrastructure and landform modification alongside the M42 would alter the characteristics of the LCA, reducing levels of tranquillity.</p> <p>There would be minor changes to the PRoW network. The new embankments overbridge and cuttings would be prominent features of the landscape and would noticeably change landscape character. There would therefore be an overall medium magnitude of change and a moderate adverse effect.</p> | <p><b>Level of effect:</b><br/>Moderate adverse (significant)</p> |
| <p><b>Year 15:</b> Landscape mitigation planting and hedgerow habitat creation, would provide some integration of structures into the landscape by summer of year 15. However, the overall medium magnitude of change and moderate adverse effect would remain.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p><b>Level of effect:</b><br/>Moderate adverse (significant)</p> |
| <p><b>River Anker Washlands</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p><b>Medium-high susceptibility and sensitivity</b></p>          |
| <p><b>Susceptibility to change:</b> The high levels of tranquillity, rural qualities, high levels of tree cover at Pooley Country Park, strong landmark and limited influence of detractors within the landscape have a medium-high susceptibility to change arising from the Proposed Scheme.</p> <p><b>Year 1:</b> This LCA would be directly affected by the introduction of large scale infrastructure alongside the M42 such as the Polesworth viaduct, Pooley Lane overbridge and Pooley Lane embankment. These would cut across the existing pattern of the landscape resulting in severed agricultural land and field boundaries. Proposed mitigation, including landscape mitigation planting within Pooley Country Park would have no beneficial effects in year 1, as the mitigation planting would not be established or mature enough to provide any contribution to landscape character. The introduction of large scale infrastructure alongside the M42 would alter the characteristics of the LCA, including the removal of areas of woodland.</p> <p>There would be changes to the PRoW network and recreational area at Pooley Country Park. The new viaduct, overbridge and embankments would be prominent features that would substantially alter landscape character. There would therefore be an overall high magnitude of change and a major adverse effect.</p>                                                                                                                                            | <p><b>Level of effect:</b><br/>Major adverse (significant)</p>    |
| <p><b>Year 15:</b> Grassland habitat creation in the River Anker floodplain would be established and ecological woodland planting would be maturing by year 15. However, the overall high magnitude of change and major adverse effect would remain.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <p><b>Level of effect:</b><br/>Major adverse (significant)</p>    |
| <p><b>Shuttington Village Farmlands</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p><b>Medium susceptibility and sensitivity</b></p>               |
| <p><b>Susceptibility to change:</b> The medium levels of tranquillity, rural qualities, areas of intact landscape, presence of landmarks and limited influence of detractors within the landscape have a medium susceptibility to change arising from the Proposed Scheme.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p><b>Level of effect:</b><br/>Moderate adverse (significant)</p> |

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| <p><b>Year 1:</b> This LCA would be directly affected by the introduction of large scale features offset from the M42 such as the Polesworth viaduct, River Anker embankment, Bramcote cutting, New Covert embankment, New Covert cutting and Bramcote Brook embankment. These would cut across the existing pattern of the landscape resulting in altered local landform, severed agricultural land and field boundaries. Proposed landscape mitigation planting would have limited beneficial effects in year 1, as the mitigation planting would not be established or mature enough to provide any contribution to landscape character. The introduction of large scale infrastructure alongside the M42 would alter the characteristics of the LCA. The level of tranquillity through the central section of the LCA would be further reduced by the Proposed Scheme.</p> <p>There would be changes to the PRoW network as a result of the realignment of the Warwickshire Bridleway AE3 which would cross the route of the Proposed Scheme on the Bramcote Hall Farm overbridge. The Polesworth viaduct, River Anker embankment, Bramcote cutting, New Covert embankment and Bramcote Hall Farm overbridge would be prominent features that would noticeably alter landscape character. There would therefore be an overall medium magnitude of change and a moderate adverse effect.</p> |                                                                   |
| <p><b>Year 15:</b> Grassland habitat creation in the Bramcote Brook floodplain would be established and landscape mitigation planting would be maturing by year 15. However, the overall medium magnitude of change and moderate adverse effect would remain.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p><b>Level of effect:</b><br/>Moderate adverse (significant)</p> |
| <p><b>Warton and Newton Regis Village Farmlands</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p><b>Medium-high susceptibility and sensitivity</b></p>          |
| <p><b>Susceptibility to change:</b> the medium levels of tranquillity, rural qualities, presence of strong historic landmarks and limited influence of detractors within the landscape, have a medium-high susceptibility to change arising from the Proposed Scheme.</p> <p><b>Year 1:</b> This LCA would be directly affected by the introduction of large scale features alongside the M42 such as the Bramcote Brook embankment, Newton Regis cutting and Austrey embankment. These would cut across the existing pattern of the landscape resulting in altered local landform, severed agricultural land and field boundaries. Proposed landscape mitigation planting would have limited beneficial effects in year 1, as the mitigation planting would not be established or mature enough to provide any contribution to landscape character. The aesthetic qualities and tranquillity of the landscape would be reduced by the Proposed Scheme through the creation of large areas of islanded land that would be sandwiched between two major transport corridors, resulting in a change to landscape character through the central section of the LCA.</p> <p>The new embankments would be prominent features that would noticeably alter landscape character. There would therefore be an overall medium magnitude of change and a major adverse effect.</p>                         | <p><b>Level of effect:</b><br/>Major adverse (significant)</p>    |
| <p><b>Year 15:</b> Landscape mitigation planting would be maturing by year 15. However, the overall medium magnitude of change and major adverse effect would remain.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <p><b>Level of effect:</b><br/>Major adverse (significant)</p>    |
| <p><b>Austrey Undulating Farmlands</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p><b>Medium susceptibility and sensitivity</b></p>               |
| <p><b>Susceptibility to change:</b> the medium levels of tranquillity, rural qualities, views of strong historic landmarks and influence of detractors within the landscape, have a medium susceptibility to change arising from the Proposed Scheme.</p> <p><b>Year 1:</b> This LCA would be directly affected by the introduction of large scale features alongside the M42 such as the Austrey embankment, No Man's Heath Lane viaduct, Pimlico embankment and Salt Street cutting. These would cut across the existing pattern of the landscape resulting in altered local landform, severed agricultural land and field boundaries. Proposed landscape mitigation planting would have no beneficial effects in year 1, as the mitigation planting would not be established or mature enough to provide any contribution to landscape character. The introduction of large scale infrastructure alongside the M42 would alter the characteristics of the LCA and the scenic value.</p> <p>There would be changes to the PRoW network. The new embankments would be prominent features that would noticeably alter landscape character. There would therefore be an overall medium magnitude of change and a moderate adverse effect.</p>                                                                                                                                                    | <p><b>Level of effect:</b><br/>Moderate adverse (significant)</p> |



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| <b>Year 15:</b> Landscape mitigation planting would be maturing by year 15, although would not completely integrate the Proposed Scheme. There would therefore be an overall medium magnitude of change and moderate adverse effect would remain. | <b>Level of effect:</b><br>Moderate adverse (significant) |
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### Visual assessment

#### Introduction

- 11.5.5 The following section describes the likely significant effects on visual receptors during operation year 1 and year 15. Effects at operation year 30 will be reported in the formal ES. The assessment has been undertaken for the winter period, in line with best practice guidance, to ensure a robust assessment. However, in some cases, visibility of the operational Proposed Scheme may be reduced during summer when vegetation, if present in a view, would be in leaf.
- 11.5.6 Where a viewpoint represents multiple types of receptor, the assessment is based on the most sensitive receptors. Effects on other receptor types with a lower sensitivity would be lower than those reported.
- 11.5.7 The assessment has not identified any locations within this study area where additional lighting in operation of the Proposed Scheme would result in significant visual effects at night.
- 11.5.8 Table 28 identifies the locations where the operation of the Proposed Scheme would potentially result in significant effects. Viewpoint locations are shown in Map Series LV-04 in the Volume 2: LA02 Map Book.

Table 28: Operation phase significant visual effects

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                           |
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| <b>View west from Warwickshire Footpath AE45 south of Cockspur Street, Birchmoor (VP 354-03-05) (Map Number LV-04-354b)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Medium-high sensitivity receptor</b>                   |
| <p><b>Year 1 – winter and summer:</b></p> <p>At year 1, as a result of the removal of mature vegetation, users of the recreational Warwickshire Footpath AE45 south of Cockspur Street, Birchmoor, would gain more open views of the M42 and structures associated with Birch Coppice Business Park in the Lea Marston to Tamworth area (LA01) as a result of the legacy of mature vegetation removal. The majority of infrastructure associated with the Proposed Scheme would be located in the M42 Stoneydelph cutting, located in the middle ground of the view. Due to the depth of the cutting, which would be up to 18m below ground level, the infrastructure would not be visible from this viewpoint. The landscape mitigation planting and hedgerow habitat creation would not contribute to any visual integration or enclosure that this stage.</p> <p>There would therefore be an overall medium magnitude of visual change and a moderate adverse effect.</p> | <b>Level of effect:</b><br>Moderate adverse (significant) |
| <p><b>Year 15 – summer:</b></p> <p>As a result of maturing planting the magnitude of change would be reduced to non-significant by year 15.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Non-significant                                           |
| <b>View east from Green Lane, Birchmoor (VP 354-02-09) and view north-west from Green Lane, Birchmoor) (VP 354-02-08) (Map Number LV-04-354b)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>High sensitivity receptors</b>                         |
| <p><b>Year 1 – winter and summer:</b></p> <p>At year 1, as a result of the legacy of the removal of mature vegetation, occupants of residential properties located off Green Lane (Birchmoor) would gain open views of the M42. The majority of infrastructure associated with the Proposed Scheme would be located in the M42 Stoneydelph cutting, Hermitage Lane cutting and the M42 Tamworth tunnel south portal. Due to the depth of the cuttings,</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Level of effect:</b><br>Major adverse (significant)    |

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| <p>which would be up to 18m and 23m below ground level, the infrastructure would not be visible from this viewpoint, although the pumping station would be visible in the middle distance for receptors. The landscape mitigation planting and hedgerow habitat creation would not contribute to any visual integration or enclosure that this stage.</p> <p>There would therefore be an overall medium magnitude of visual change and a major adverse effect.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                   |
| <p><b>Year 15 – summer:</b></p> <p>By summer year 15, views of the M42 would be partially screened and filtered by landscape mitigation planting. The magnitude of change would reduce to low and there would be a moderate adverse effect.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p><b>Level of effect:</b><br/>Moderate adverse (significant)</p> |
| <p><b>View west from the B5000 Tamworth Road, Birchmoor (VP 355-02-03) (Map Number LV-04-355)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p><b>High sensitivity receptors</b></p>                          |
| <p><b>Year 1 – winter and summer:</b></p> <p>At year 1, as a result of the legacy removal of mature vegetation in the foreground, occupants of residential properties off the B5000 Tamworth Road, Birchmoor, would gain open views of the M42 that would be visible in the near to middle distance of the view. Earthworks associated with Pooley Lane overbridge would be visible in the middle distance of the view. The majority of infrastructure associated with the Proposed Scheme would be located in the Pooley Lane cutting, in the near to middle ground of the view. Due to the depth of the cutting, which would be up to 8m below ground level, the infrastructure would not be visible from this viewpoint. Any infrastructure, including the Birchmoor express feeder auto-transformer station, would be partially screened behind embankments. The landscape mitigation planting and hedgerow habitat creation would not contribute to any visual integration or enclosure at this stage.</p> <p>There would therefore be an overall medium magnitude of visual change and a moderate adverse effect.</p>                                                                                                                                                   | <p><b>Level of effect:</b><br/>Moderate adverse (significant)</p> |
| <p><b>Year 15 – summer:</b></p> <p>As a result of the maturing vegetation the magnitude of change would be reduced to non-significant by year 15.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p>Non-significant</p>                                            |
| <p><b>View west from Coventry Canal towpath (VP 355-0-11) (Map Number LV-04-355)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p><b>Medium-high sensitivity receptors</b></p>                   |
| <p><b>Year 1 – winter and summer:</b></p> <p>At year 1, recreational users of the Coventry Canal and towpath would experience substantial changes to near distance views as a result of the Proposed Scheme. Pooley Lane embankment and Polesworth viaduct would be clearly visible on the skyline including the movement of trains, as new, prominent structures up to 17m in height above ground level. Glimpsed views of the M42 would be visible beyond the Polesworth viaduct as a result of vegetation removal within Pooley Country Park. Views of the Pooley Lane overbridge which would cross approximately 5m above existing ground level would be visible on the horizon to the south. The infrastructure located in the Pooley Lane cutting, which would be up to 8m below ground level, would not be visible from this viewpoint. The balancing pond located in the middle-ground of the view would be clearly visible. The Proposed Scheme would create a substantial alteration of key characteristics of the view. The landscape mitigation planting and hedgerow habitat creation would not contribute to any visual integration or enclosure at year 1.</p> <p>There would therefore be an overall high magnitude of change and a major adverse effect.</p> | <p><b>Level of effect:</b><br/>Major adverse (significant)</p>    |
| <p><b>Year 15 – summer:</b></p> <p>By summer year 15, views of Polesworth viaduct, and the movement of trains would be partially screened and filtered by landscape mitigation planting. However the Proposed Scheme would still be seen against the skyline and would result in a substantial alteration of key characteristics of the view.</p> <p>There would therefore be an overall high magnitude of change that would remain and a major adverse effect.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <p><b>Level of effect:</b><br/>Major adverse (significant)</p>    |

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| <p><b>View east from Pooley Country Park, Polesworth (VP 355-03-17) (Map Number LV-04-355)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p><b>High sensitivity receptors</b></p>                          |
| <p><b>Year 1 – winter and summer:</b></p> <p>At year 1, as a result of the legacy removal of mature vegetation in the middle ground of the view, recreational users within the elevated areas at Pooley Country Park, Polesworth, would gain partially filtered views of the Proposed Scheme including the Pooley Lane embankment, Polesworth viaduct, movement of trains and overhead line equipment. Proposed Scheme infrastructure associated with Pooley Lane embankment and Polesworth viaduct would be highly visible in the middle ground beyond the M42, partially filtered by mature vegetation. The landscape mitigation woodland and hedgerow planting would not contribute to any visual integration or enclosure at year 1.</p> <p>There would therefore be an overall medium magnitude of visual change and a moderate adverse effect.</p>                                                                                                                                                                                                                                                                                         | <p><b>Level of effect:</b><br/>Major adverse (significant)</p>    |
| <p><b>Year 15 – summer:</b></p> <p>By summer year 15, views of Pooley Lane embankment and Polesworth viaduct would be partially screened and filtered by landscape mitigation planting. The magnitude of change would reduce to low and there would be a moderate adverse effect.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <p><b>Level of effect:</b><br/>Moderate adverse (significant)</p> |
| <p><b>View south-west from Warwickshire Footpath AE9, Linden Lane, Polesworth (VP 355-03-16) (Map Number LV-04-355)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p><b>Medium-high sensitivity receptors</b></p>                   |
| <p><b>Year 1 – winter and summer:</b></p> <p>At year 1, as a result of the legacy removal of mature vegetation in the foreground and middle ground, recreational users along Warwickshire Footpath AE9, Linden Lane would gain open views of the Proposed Scheme including the Pooley Lane embankment and Polesworth viaduct in the middle ground of the view. The Proposed Scheme infrastructure associated with Polesworth viaduct would be visible in front of the M42.</p> <p>Proposed Scheme infrastructure associated with Pooley Lane embankment and Polesworth viaduct, including the movement of trains and overhead line equipment, would be highly visible within the middle ground across much of the view, resulting in a noticeable change in the view.</p> <p>There would therefore be an overall medium magnitude of visual change and a moderate adverse effect.</p>                                                                                                                                                                                                                                                            | <p><b>Level of effect:</b><br/>Moderate adverse (significant)</p> |
| <p><b>Year 15 – summer:</b></p> <p>By summer year 15, views of Pooley Lane embankment and Polesworth viaduct would be partially screened and filtered by landscape mitigation planting. The magnitude of change would remain at medium as a result of the deterioration in the view and there would be a moderate adverse effect.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <p><b>Level of effect:</b><br/>Moderate adverse (significant)</p> |
| <p><b>View west from Warwickshire Bridleway AE3, Warton (VP 356-03-04) (Map Number LV-04-356)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <p><b>Medium-high sensitivity receptors</b></p>                   |
| <p><b>Year 1 – winter and summer:</b></p> <p>At year 1, as a result of the removal of mature vegetation in the middle ground of the view, recreational users along the Warwickshire Bridleway AE3, Warton, would gain open views of the M42. These views would be visible in the middle to far distance as a result of the scale and depth of Bramcote cutting which would be up to 8m deep. Footpath users would experience views of Bramcote Hall Farm overbridge, New Covert embankment, Bramcote Brook embankment, overhead line equipment and the movement of trains. Infrastructure associated with the Proposed Scheme would be continuously highly visible across the majority of the view, visible to the north of the Warwickshire Bridleway AE3.</p> <p>The Bramcote cutting would be in proximity to Warwickshire Bridleway AE3, resulting in the tops of overhead line equipment being visible above the earthworks. Landscape mitigation planting would not provide screening or landscape integration at this stage.</p> <p>There would therefore be an overall medium magnitude of visual change and a major adverse effect.</p> | <p><b>Level of effect:</b><br/>Major adverse (significant)</p>    |
| <p><b>Year 15 – summer:</b></p> <p>By summer year 15, views of Bramcote Hall Farm overbridge, New Covert embankment and Bramcote Brook embankment would be partially screened and filtered by landscape mitigation planting. However, due to limited mitigation planting at Bramcote Brook embankment, which is located in the</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p><b>Level of effect:</b><br/>Moderate adverse (significant)</p> |

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| <p>floodplain, the route of the Proposed Scheme would remain apparent within the view from Warwickshire Bridleway AE3, although viewed alongside the M42. The magnitude of visual change would reduce to low and result in a moderate adverse effect.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                   |
| <p><b>View west from Warwickshire Footpath AE4, Warton (VP 357-03-01) (Map Number LV-04-357)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p><b>Medium-high sensitivity receptors</b></p>                   |
| <p><b>Year 1</b> – winter and summer:</p> <p>At year 1 recreational footpath users using the Warwickshire Bridleway AE4, Polesworth, would experience large scale changes to close to medium distance views during operation of the Proposed Scheme. Views of Bramcote Brook embankment, overhead line equipment and the movement of trains would be continuous and highly visible across the majority of the view, screening views of the M42 and restricting long distance views to the east. Landscape mitigation planting would not provide any screening or landscape integration at year 1.</p> <p>There would therefore be an overall high magnitude of visual change and a major adverse effect.</p>                                      | <p><b>Level of effect:</b><br/>Major adverse (significant)</p>    |
| <p><b>Year 15</b> – summer:</p> <p>By summer year 15, views of Bramcote Brook embankment would be partially screened and filtered by landscape mitigation planting. However, due to the scale of the earthworks at Bramcote Brook embankment, the route of the Proposed Scheme would remain apparent within the view from Warwickshire Bridleway AE4, although viewed as an additional transport corridor which would largely screen views of the M42 corridor and is largely characteristic of the existing view. The magnitude of visual change would reduce to medium and result in a moderate adverse effect.</p>                                                                                                                             | <p><b>Level of effect:</b><br/>Moderate adverse (significant)</p> |
| <p><b>View west from Newton Lane, Austrey (VP 357-02-09) (Map Number LV-04-357)</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <p><b>High sensitivity receptors</b></p>                          |
| <p><b>Year 1</b> – winter and summer:</p> <p>At year 1, occupants of residential properties at this location would experience medium distance views of Austrey embankment, No Man’s Heath Lane viaduct, overhead line equipment and the movement of trains. Infrastructure associated with the Proposed Scheme would be continuous and highly visible across the majority of the view, although partially screened by localised vegetation.</p> <p>Infrastructure visible in mid-distance views to the receptor would be elevated and landscape mitigation planting would not provide any screening or landscape integration at this stage.</p> <p>There would therefore be an overall magnitude of visual change and a major adverse effect.</p> | <p><b>Level of effect:</b><br/>Major adverse (significant)</p>    |
| <p><b>Year 15</b> – summer:</p> <p>By summer year 15, views of Austrey embankment and No Man’s Heath Lane viaduct would be partially screened and filtered by landscape mitigation planting. However due to its proximity, the route of the Proposed Scheme would remain apparent within the view from Newton Lane. Landscape mitigation planting would reinforce the character of the views but as a result of the presence of No Man’s Heath Lane viaduct the magnitude of change would reduce to low and result in a moderate adverse effect.</p>                                                                                                                                                                                              | <p><b>Level of effect:</b><br/>Moderate adverse (significant)</p> |

### Other mitigation measures

- 11.5.9 The permanent effects of the Proposed Scheme on landscape and visual receptors would be reduced through integration of the measures described in this section. Effects in year 1 may also be further reduced through establishing planting early or in advance of the main construction programme. Other features such as additional earthworks, public greenspace, planting or, including use of materials, would be considered as part of the ongoing development of contextual design. These measures would potentially provide additional screening and/or greater integration of the Proposed Scheme into the landscape.

### Summary of likely residual significant effects

11.5.10 In many cases, significant effects would reduce over time as the proposed mitigation planting matures and reaches its designed intention. However, the following likely residual significant effects would remain following year 15 of operation:

- major adverse landscape effect in relation to two LCAs;
- moderate adverse landscape effect in relation to three LCAs;
- major adverse visual effects at one recreational viewpoint location;
- moderate adverse visual effects at three residential viewpoint locations; and
- moderate adverse visual effects at four recreational viewpoint locations.

### Monitoring

11.5.11 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.

11.5.12 There are no area-specific requirements for monitoring landscape and visual mitigation during the operation of the Proposed Scheme in the Birchmoor to Austrey area.

## 12 Socio-economics

### 12.1 Introduction

- 12.1.1 This section reports on the environmental baseline, likely economic and employment impacts and significant effects identified to date during construction and operation of the Proposed Scheme within the Birchmoor to Austrey area. The assessment considers existing businesses, community organisations, local employment and local economies, including planned growth and development.
- 12.1.2 Engagement with North Warwickshire Borough Council (NWBC) has been undertaken as part of the development of the Proposed Scheme. The purpose of the engagement will be to increase the understanding of socio-economic characteristics identified through a review of publicly available data. Engagement will continue as part of the development of the Proposed Scheme and to inform the formal assessment.
- 12.1.3 The socio-economic effects on employment at a route-wide level are reported in Volume 3: Route-wide effects (Section 12).
- 12.1.4 Maps showing the location of the key environmental features (Map Series CT-10) and the key construction (Map Series CT-05) and operational (Map Series CT-06) features of the Proposed Scheme can be found in the Volume 2: LA02 Map Book.

### 12.2 Scope, assumptions and limitations

- 12.2.1 The scope, assumptions and limitations for the socio-economics assessment are set out in Volume 1 (Section 8) and the Scope and Methodology Report (SMR)<sup>117</sup>.
- 12.2.2 The assessment of in-combination effects will draw upon the findings of other technical disciplines (e.g. air quality, sound, noise and vibration, landscape and visual and traffic and transport). Likely significant in-combination effects on socio-economic receptors and resources will be reported in the formal ES.

### 12.3 Environmental baseline

#### Existing baseline

##### *Study area description*

- 12.3.1 The following provides a brief overview of employment, economic structure, labour market and business premises availability within the Birchmoor to Austrey area. It lies within the administrative area of NWBC. It also falls within the Coventry and Warwickshire Local Enterprise Partnership<sup>118</sup> area and West Midlands region.

##### *Business and labour market*

- 12.3.2 Within the NWBC area there is a wide spread of business types reflecting a diverse range of commercial activities. The construction sector accounts for the largest proportion of businesses (12%), with the professional, scientific and technical sector

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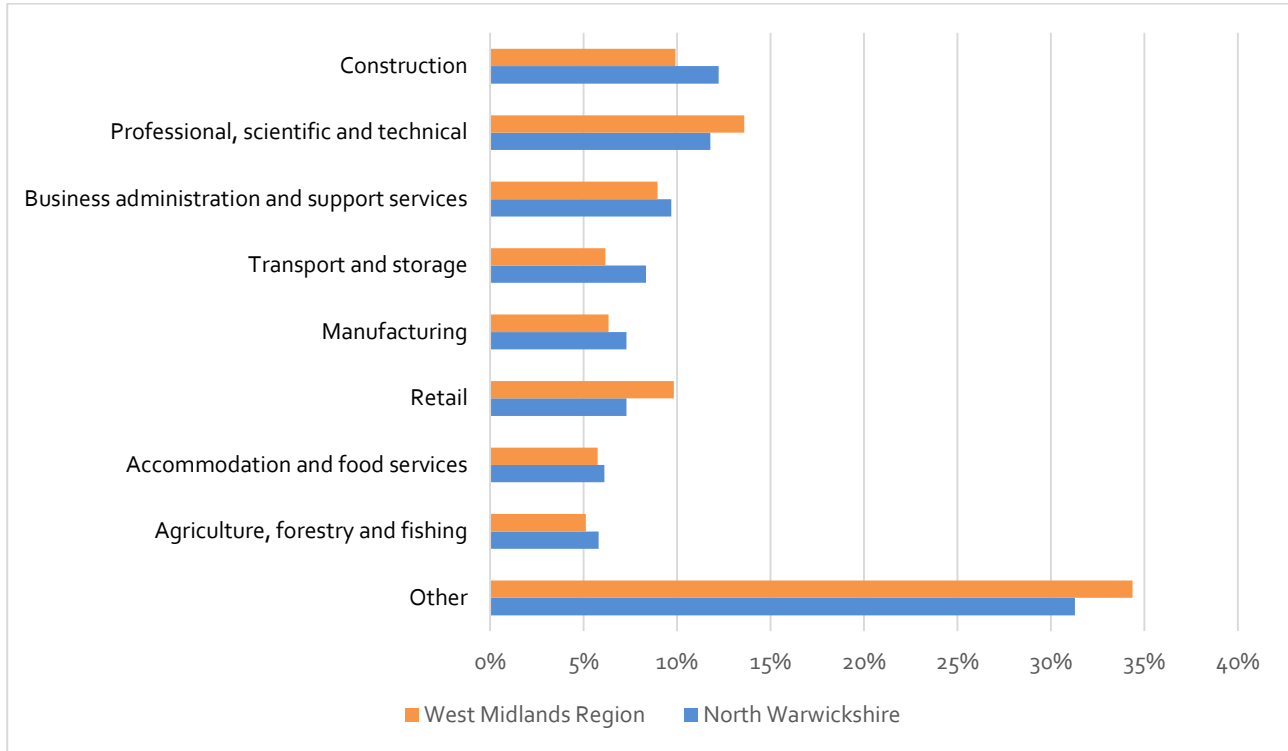
<sup>117</sup>Supporting document: HS2 Phase 2b Environmental Impact Assessment Scope and Methodology Report

<sup>118</sup> D2N2 Local Enterprise Partnership, (2014), Strategic Economic Plan March 2014.

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the second largest (12%) followed by business administration and support services (10%). This is shown in Figure 8. For comparison with the West Midlands region, the largest sectors were professional, scientific and technical (14%), followed by construction (10%) and retail (10%)<sup>119</sup>.

Figure 8: Business sector composition in NWBC area and the West Midlands<sup>120</sup>



12.3.3 In 2016<sup>121</sup>, approximately 46,000 people worked in the NWBC area. According to the Office for National Statistics (ONS) business register and employment survey 2016 the top five sectors in terms of share of employment in NWBC were: transport and storage (22%), manufacturing (15%); retail (10%); business administration and support services (9%); and accommodation and food services (8%). These compare with the top five sectors for the West Midlands region, which were: health (14%); manufacturing (12%); retail (10%); education (9%) and business administration and support services (8%). This is shown in Figure 9<sup>122</sup>.

<sup>119</sup> Office for National Statistics; UK Business count – Local Units 2016. Available online at: <https://www.nomisweb.co.uk>

<sup>120</sup> 'Other' includes: Information & communication; Manufacturing; Wholesale; Transport & storage (including postal); Motor trades; Property; Education; Financial & insurance; Public administration & defence; Mining, quarrying & utilities

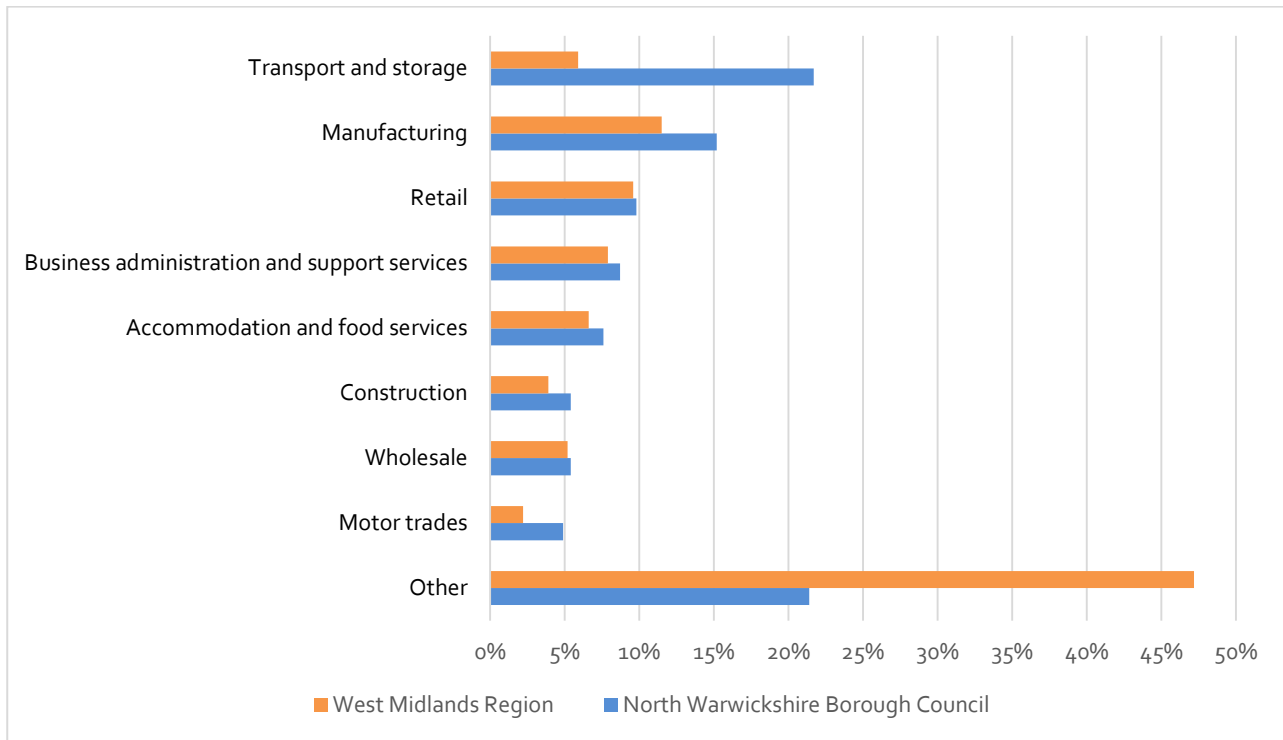
<sup>121</sup> Office for National Statistics; 2016; Business Register and Employment Survey. Available online at: <http://www.nomisweb.co.uk>. This number includes both residents and non-residents of NWBC who work within its boundaries.

<sup>122</sup> Office for National Statistics; 2016; Business Register and Employment Survey. <http://www.nomisweb.co.uk>. This number includes both residents and non-residents of NWBC who work within its boundaries.



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Figure 9: Employment by industrial sector in the NWBC area and the West Midlands



12.3.4 According to the annual population survey (2016)<sup>123</sup>, the employment rate<sup>124</sup> within the NWBC area was 83% (32,400 people), which is higher than recorded for both the West Midlands (72%) and England (74%). In 2016, unemployment<sup>125</sup> in the NWBC area was 3%, which was lower than that recorded in the West Midlands (6%) and England (5%).

12.3.5 According to the annual population survey (2016)<sup>126</sup>, 31% of NWBC residents aged 16-64 were qualified to National Vocational Qualification (NVQ) Level 4 and above, compared to 32% in the West Midlands and 38% in England, while 6% of residents had no qualifications, which was lower than that recorded both for the West Midlands (12%) and England (8%).

### *Property*

12.3.6 A review of employment land in 2013 identified a need for 3.2ha per year to 2029 for general business land in the NWBC area with a strong demand for distribution and logistics space. This figure does not include land for strategic distribution. A strategic employment site at Atherstone has been identified as providing a key opportunity for employment growth<sup>127</sup>.

<sup>123</sup> Annual Population Survey, (2016), NOMIS. Available online at: <http://www.nomisweb.co.uk>

<sup>124</sup> The proportion of working age (16-64 year olds) residents that is in employment

<sup>125</sup> Refers to people without a job who were available to start work in the two weeks following their interview and who had either looked for work in the four weeks prior to interview or were waiting to start a job they had already obtained. As the unemployed form a small percentage of the population, the APS unemployed estimates within local authorities are based on very small samples so for many areas would be unreliable. To overcome this ONS has developed a statistical model that provides better estimates of total unemployed for unitary authorities and local authority districts (unemployment estimates for counties are direct survey estimates), NOMIS

<sup>126</sup> Annual Population Survey, (2016), NOMIS. Available online at: <http://www.nomisweb.co.uk>

<sup>127</sup> North Warwickshire Site Allocations Pre Submission Plan (2014)

12.3.7 The average vacancy rate for industrial and warehousing property in the NWBC area has been assessed as 7.3% based on marketed space against known stock<sup>128</sup>.

12.3.8 Based upon the latest available data from the Estates Gazette (March 2018) there is 106,409 m<sup>2</sup> of industrial space available in the NWBC area<sup>129</sup>.

## 12.4 Effects arising during construction

### Avoidance and mitigation measures

12.4.1 The draft Code of Construction Practice (CoCP)<sup>130</sup> includes a range of provisions that would help mitigate socio-economic effects associated with construction within this area, including:

- reducing nuisance through sensitive layout of construction sites (Section 5);
- consulting businesses located close to hoardings on the design, materials used and construction of the hoarding, to reduce impacts on access to and visibility of their premises (Section 12);
- applying best practicable means during construction works to reduce noise (including vibration) at sensitive receptors (including local businesses) (Section 13);
- monitor and manage flood risk and other extreme weather events that may affect socio-economic resources during construction (Section 13);
- site specific traffic management measures including requirements relating to the movement of traffic from business and commercial operators of road vehicles, including goods vehicles (Section 14); and
- maintaining access to businesses for the duration of construction works where reasonably practicable (Section 14).

### Assessment of impacts and effects

12.4.2 The proposed construction works are assessed for socio-economic effects in relation to:

- premises demolished with their occupants and employees needing to relocate to allow for construction of the Proposed Scheme;
- in-combination effects (e.g. air quality, noise, vibration, construction traffic and visual impacts) and isolation of an area, which could affect business operations, both will be reported in the formal ES. Any resulting effects on employment are reported at a route-wide level (see Volume 3: Route-wide effects); and

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<sup>128</sup> Vacant space is based on marketed space identified from Estates Gazette data (EGi); stock data is taken from information supplied by the Valuation Office (VOA)

<sup>129</sup> Based on marketed space identified from Estates Gazette data (EGi) (March 2018). Available online at: <https://www.egi.co.uk/Property/Availability/>

<sup>130</sup> Supporting document: Draft Code of Construction Practice

- potential employment opportunities arising from construction in the local area (including in adjacent community areas).

### *Temporary effects*

#### **Construction employment**

- 12.4.3 It is currently anticipated that there would be two main construction compounds at Polesworth and Austrey and six satellite compounds in the Birchmoor to Austrey area. These sites could result in the creation of up to 3,928 person years of construction employment opportunities<sup>131</sup>, broadly equivalent to 393 full-time jobs<sup>132</sup> which, depending on skill levels required and the skills of local people, are potentially accessible to residents in the locality and to others living further afield. The impact of the direct construction employment creation has been considered as part of the route-wide assessment (see Volume 3: Route-wide effects).
- 12.4.4 Direct construction employment could lead to opportunities for local businesses to supply the project or to benefit from expenditure of construction workers. The impact of the indirect construction employment creation has been considered as part of the route-wide assessment (see Volume 3: Route-wide effects).
- 12.4.5 The resulting effects on employment are reported in aggregate at a route-wide level (see Volume 3: Route-wide effects).

### *Permanent effects*

#### **Businesses**

- 12.4.6 Businesses directly affected, comprising those that lie within land required for the Proposed Scheme, are reported in groups, where possible, to form defined resources based on their location and operational characteristics. A group could contain either one or a number of businesses reflecting the fact that a building may have more than one occupier or that similar businesses and resources are clustered together.
- 12.4.7 There are locations within the Birchmoor to Austrey area where the construction of the Proposed Scheme would require the demolition of properties. Overall, 11 commercial properties in the study area would experience direct impacts as a result of the construction of the Proposed Scheme. These are as follows:
- Hermitage Business Park (four resources); and
  - Pooley Lane (seven resources).
- 12.4.8 Where the associated employment losses do not present particular relocation problems, given the commercial/office-type premises that these occupiers would require and the availability of alternative premises, these impacts are not expected to be significant.

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<sup>131</sup> Construction labour is reported in construction person years, where one construction person year represents the work done by one person in a year composed of a standard number of working days

<sup>132</sup> Based on the convention that 10 employment years is equivalent to one full time equivalent job

- 12.4.9 It is currently anticipated that no businesses would experience significant permanent direct effects as a result of construction of the Proposed Scheme in the Birchmoor to Austrey area.
- 12.4.10 Across all of the employment areas reviewed, it is currently anticipated that an estimated 100 jobs<sup>133</sup> would either be displaced or possibly lost within the Birchmoor to Austrey area. There is a reasonable probability that businesses would be able to relocate to places that would still be accessible to residents within the travel to work areas due to the general availability of vacant premises. However, there may be cases where alternative locations are problematic and the businesses may be unable to relocate on a like-for-like basis within the area. The impact on the local economy from the relocation or loss of jobs is considered to be relatively modest in the context of the total number of people employed in the NWBC area (approximately 46,000 jobs) and the scale of economic activity and opportunity in the area.
- 12.4.11 The resulting effects on employment are reported in aggregate at a route-wide level (see Volume 3: Route-wide effects).

### Other mitigation measures

- 12.4.12 Businesses displaced by the Proposed Scheme would be compensated in accordance with the Compensation Code. HS2 Ltd recognises the importance of businesses, displaced from their existing premises, being able to relocate to suitable alternative premises and at this stage it assumes that it would, therefore, adopt a policy to offer additional support over and above statutory requirements to facilitate this process as it has done on Phases One and 2a.
- 12.4.13 The construction of the Proposed Scheme offers considerable opportunities to businesses and residents along the route of the Proposed Scheme in terms of supplying goods and services and obtaining employment. HS2 Ltd at this stage assumes that it would, therefore, adopt a policy to work with its suppliers to build a skilled workforce that promotes further economic growth across the UK as it has done on Phases One and 2a.

### Summary of likely residual significant effects

- 12.4.14 Any likely residual significant socio-economic effects will be reported in the formal ES.

## 12.5 Effects arising from operation

### Avoidance and mitigation measures

- 12.5.1 No mitigation measures are proposed in relation to business resources during operation of the Proposed Scheme.

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<sup>133</sup> Employment within businesses has been estimated through a combination of sources, for example, surveys of businesses, the Experian employment dataset, employment floor space and the Homes and Communities Agency (HCA) Employment Densities Guide 3rd Edition (2015). The estimate is calculated using standard employment density ratios and estimates of floor areas and may vary significantly from actual employment at the sites.

## **Assessment of impacts and effects**

### *Resources with direct effects*

- 12.5.2 It is currently anticipated that no resources would experience significant direct socio-economic effects during the operation of the Proposed Scheme.

### *In-combination effects*

- 12.5.3 In-combination effects will be assessed and reported in the formal ES.

## **Operational employment**

- 12.5.4 Direct operational employment created by the Proposed Scheme could lead to indirect employment opportunities for local businesses in terms of potentially supplying the Proposed Scheme or benefiting from expenditure of directly employed workers on goods and services.

- 12.5.5 The impact of operational employment creation will be assessed and reported at a route-wide level in Volume 3: Route-wide effects.

## **Other mitigation measures**

- 12.5.6 No mitigation measures during operation of the Proposed Scheme are proposed in relation to business resources.

## **Summary of likely residual significant effects**

- 12.5.7 Any likely residual significant socio-economic effects will be reported in the formal ES.

## **Monitoring**

- 12.5.8 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.

- 12.5.9 There are no area-specific requirements for monitoring socio-economic effects during the operation of the Proposed Scheme in the Birchmoor to Austrey area.

## 13 Sound, noise and vibration

### 13.1 Introduction

- 13.1.1 This section reports the initial assessment of the noise and vibration likely significant effects arising from the construction and operation of the Proposed Scheme within the Birchmoor to Austrey area on:
- 'residential receptors'; people, primarily where they live, in terms of individual dwellings and on a wider community basis including any shared community open areas<sup>134</sup>; and
  - 'non-residential receptors'<sup>135</sup> such as:
    - community facilities including schools, hospitals, places of worship and 'quiet areas'<sup>136</sup>; and
    - commercial properties such as hotels.
- 13.1.2 The methodology for the assessment of likely significant noise and vibration effects was developed in alignment with Government noise policy<sup>137</sup>, planning policy, planning practice guidance on noise (PPGN)<sup>138</sup> and EIA Regulations as described in the Scope and Methodology Report<sup>139</sup> (SMR).
- 13.1.3 Engagement has been undertaken with North Warwickshire Borough Council (NWBC) and Warwickshire County Council (WaCC) with respect to the sound, noise and vibration assessment. This engagement process will continue as part of the development of the Proposed Scheme. The purpose of this engagement has been twofold. Firstly, engagement has been undertaken on a route wide basis covering matters including process, scope, method and the approach to baseline and mitigation strategy. Secondly, local engagement has been undertaken to obtain relevant information regarding residential and non-residential receptors and existing baseline sound levels, and to discuss the development of the mitigation to be included in the Proposed Scheme. Officers from local and county authorities are invited to attend and witness baseline sound measurements.
- 13.1.4 Maps of the Proposed Scheme in the Birchmoor to Austrey area showing the location of the key environmental features (Map Series CT-10), key construction features (Map Series CT-05), key operational features (Map Series CT-06) and operational sound, noise and/or vibration impacts and proposed noise mitigation (Map series SV-01), can be found in the Volume 2: LA02 Map Book. Map series SV-01 also presents key 'non-

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<sup>134</sup> 'Shared community open areas' are those that the Planning Practice Guidance identifies may partially offset a noise effect experienced by residents at their dwellings and are either a) relatively quiet nearby external amenity spaces for sole use by a limited group of residents as part of the amenity of their dwellings or b) a relatively quiet external publicly accessible amenity space (e.g. park or local green space) that is nearby.

<sup>135</sup> Non-residential receptors with multiple uses would be assessed either based on the most noise sensitive use or would be subject to multiple assessments as appropriate.

<sup>136</sup> 'quiet areas' are defined as either Quiet Areas as identified under the Environmental Noise Regulations 2007 (as amended) or are resources which are prized for providing tranquillity as noted in the NPPF and are therefore designated as such under the relevant local plan or are designated under local plans or neighbourhood development plans as local green spaces.

<sup>137</sup> Noise Policy Statement for England, (2015) Department for Environment, Food & Rural Affairs (Defra)

<sup>138</sup> Planning Practice Guidance – Noise (2014) Department for Communities and Local Government (DCLG). Available online at: <https://www.gov.uk/guidance/noise--2>

<sup>139</sup> Supporting document: HS2 Phase 2b Environmental Impact Assessment Scope and Methodology Report

residential receptors'. These receptors will be reviewed and developed further to incorporate, where appropriate, consultation feedback and ongoing stakeholder engagement.

- 13.1.5 The assessment of noise and vibration likely significant effects on agricultural, heritage and ecological receptors and the assessment of tranquillity is ongoing and will be reported in the formal ES.

## **13.2 Scope, assumptions and limitations**

- 13.2.1 The approach to assessing sound, noise and vibration and identifying envisaged mitigation is outlined in Volume 1 (Section 8 and Section 9) and the SMR.
- 13.2.2 In this assessment 'sound' is used to describe the acoustic conditions that people experience as a part of their everyday lives. Noise is taken as unwanted sound and hence adverse effects are noise effects and mitigation is, for example, by noise barriers.
- 13.2.3 Effects can either be temporary from construction or permanent from the operation of the Proposed Scheme. These effects may be direct, resulting from the construction or operation of the Proposed Scheme, and/or indirect, resulting from changes in traffic patterns on existing roads or railways that result from the construction or operation of the Proposed Scheme.
- 13.2.4 The effects of construction noise and vibration are assessed qualitatively, based on construction compound locations, construction routes, initial construction estimates and professional judgement. No quantitative assessment has been undertaken for the construction of the Proposed Scheme at this stage. The quantitative assessment will be reported in the formal ES.
- 13.2.5 The effects on operational noise and vibration are assessed quantitatively based on forecast noise emission from the Proposed Scheme combined with outline baseline information and professional judgement. As baseline information is limited at this stage the quantitative assessment including a full baseline will be reported in the formal ES.

## **13.3 Environmental baseline**

- 13.3.1 The SMR describes the three rounds of baseline data collection covering existing sources, modelling and by targeted monitoring. Baseline sound levels will be published in the formal ES.
- 13.3.2 The area is characterised by a number of towns and villages and isolated residential properties in a predominantly rural area. Birchmoor, Polesworth and Austrey are the main non-rural settings in the Birchmoor to Austrey area.
- 13.3.3 The sound environment is generally dominated by road traffic from the M42, with some contributions from other local roads at greater distances from the M42. In Polesworth, sound from other roads, including the B5000 Tamworth Road, also contribute to existing sound levels.



- 13.3.4 Sound levels close to these main transportation routes are high during the daytime and are generally lower at night. Sound levels decrease with increasing distance from the main transportation routes.
- 13.3.5 The effects of vibration at all receptors are being initially assessed using specific thresholds, below which receptors would not generally be adversely affected by vibration. Further information is provided in Volume 1 (Section 8).
- 13.3.6 The baseline assessment presented in the formal ES will consider current sound levels and how these may change in the future. This will include changes firstly due to national trends such as road traffic growth and the progressive electrification of road vehicles and secondly due to area specific changes caused either by local committed development and/or noise reduction provided in Important Areas identified in Defra's Noise Action Plans for Agglomerations<sup>140</sup>, Roads<sup>141</sup> or Railways<sup>142</sup>. HS2 Ltd will engage with the Competent Authorities responsible for the relevant Important Areas. Map Series SV-01 (Volume 2: LA02 Map Book) shows any noise Important Areas in the Birchmoor to Austrey area.

## 13.4 Effects arising during construction

### Assumptions and limitations

- 13.4.1 The construction arrangements that form the basis of the assessment are presented in Section 2.3 of this report, in Volume 1 (Section 8) and in the draft Code of Construction Practice (CoCP)<sup>143</sup>. The assessment presented herein focuses on the initial identification of communities that may be affected by construction noise. The formal ES will include the assessment of likely significant effects from construction noise and/or vibration on individual receptors and communities.
- 13.4.2 The following assumption has also been made in relation to the construction methods specific to the Birchmoor to Austrey area.
- 13.4.3 At the M42 Tamworth tunnel, tunnelling support activities, including excavated material handling, installation of the tunnel lining and fit-out, have been assumed to be undertaken during the day and in the evening for reasons of engineering practicability or to reduce the impact on existing transport.
- 13.4.4 The assessment takes account of people's sensitivity to noise during the day, evening and night. More stringent criteria are applied during evening and night-time periods, compared to the busier and more active daytime period.

### Avoidance and mitigation measures

- 13.4.5 The assessment assumes the implementation of the principles and management processes set out in the noise and vibration section of the draft CoCP (Section 13), which are:

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<sup>140</sup> Noise Action Plan: Agglomerations (large urban areas) (2014) Department for Environment, Food & Rural Affairs (Defra)

<sup>141</sup> Noise Action Plan: Roads (including major roads) (2014) Department for Environment, Food & Rural Affairs (Defra)

<sup>142</sup> Noise Action Plan: Railways (including major railways) (2014) Department for Environment, Food & Rural Affairs (Defra)

<sup>143</sup> Supporting document: Draft Code of Construction Practice

- best practicable means (BPM) as defined by the Control of Pollution Act 1974 (CoPA) and Environmental Protection Act 1990 (EPA), which will be applied during construction activities to minimise noise (including vibration) at neighbouring residential properties and other sensitive receptors<sup>144</sup>.
- as part of BPM, mitigation measures are applied in the following order:
  - noise and vibration control at source: for example, the selection of quiet and low vibration equipment, review of construction methodology to consider quieter methods, location of equipment on-site, control of working hours, the provision of acoustic enclosures and the use of less intrusive alarms, such as broadband vehicle reversing warnings;
  - screening: for example, local screening of equipment or perimeter hoarding or the use of temporary stockpiles; and
  - where, despite the implementation of BPM, the noise exposure exceeds the criteria defined in the draft CoCP, noise insulation or ultimately temporary re-housing would be offered at qualifying properties.
- lead contractors will seek to obtain prior consent from the relevant local authority under Section 61 of the CoPA for the proposed construction works. The consent application will set out BPM measures to minimise construction noise and vibration, including control of working hours, and provide a further assessment of construction noise and vibration, including confirmation of noise insulation/temporary re-housing provision.
- contractors would undertake and report such monitoring as is necessary to assure and demonstrate compliance with all noise and vibration commitments. Monitoring data would be provided regularly to, and be reviewed by, the nominated undertaker and made available to the local authorities.
- contractors would be required to comply with the terms of the draft CoCP and appropriate action would be taken by the nominated undertaker as required to ensure compliance.

13.4.6 Noise insulation or, where appropriate, temporary re-housing would avoid residents of qualifying properties being significantly affected by levels of construction noise inside their dwellings. Work is being undertaken to provide a reasonable worst case estimate of the buildings that are likely to qualify for such measures and the estimate will be reported in the formal ES.

13.4.7 Qualification for noise insulation and temporary re-housing would be confirmed as part of seeking prior consent from the local authority under Section 61 of the CoPA. Qualifying properties would be identified, as required in the draft CoCP so that noise insulation could be installed, or any temporary re-housing provided, before the start of the works predicted to exceed noise insulation or temporary re-housing criteria.

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<sup>144</sup> Including local businesses and quiet areas designated by the local authority

## Assessment of impacts and effects

- 13.4.8 Potential construction airborne noise significant effects could occur at the communities, or those parts of the communities, that are nearest to the Proposed Scheme in the following locations, as a result of the construction works illustrated on Map Series CT-05 (Volume 2: LA02 Map Book):
- Birchmoor, arising from construction activities such as tunnel construction and road realignment/diversion;
  - Polesworth, arising from construction activities such as cutting formation and road realignment/diversion; and
  - Austrey, arising from construction activities such as embankment formation, road realignment/diversion and balancing pond construction.
- 13.4.9 Map Series SV-01 (Volume 2: LA02 Map Book) shows key non-residential properties that have been identified within the study area as defined in the SMR. Of these, Polesworth (Abbey) Scout Group activity centre would be the most likely to experience significant effects (to be confirmed in the formal ES).
- 13.4.10 The avoidance and mitigation measures to be implemented would avoid or reduce airborne construction noise adverse likely significant effects. Residual temporary noise or vibration likely significant effects will be reported in the formal ES.
- 13.4.11 Construction traffic on the following local roads has the potential, on a precautionary basis, to cause adverse noise effects on the nearest parts of residential communities and nearest noise sensitive non-residential receptors:
- the B5493 between No Man's Heath and junction 11 of M42;
  - the B5000 Glascote Road/Tamworth Road east of the B5080 Pennine Way to Pooley Lane;
  - No Man's Heath Lane/Austrey Lane between Austrey and No Man's Heath;
  - Newton Lane in Austrey;
  - Hermitage Lane north of Birchmoor;
  - Pooley Lane from the B5000 Tamworth Road;
  - Austrey Road/Appleby Hill, between Austrey and the A444; and
  - Warton Lane/Bishops Cleeve/Main Road between Warton and Austrey.
- 13.4.12 The magnitude and extent of effect will depend on the level of construction traffic using the road. Residual significant temporary noise or vibration effects will be reported in the formal ES.

## Other mitigation measures

- 13.4.13 Further work is being undertaken to confirm the likely significant effects and identify any site-specific mitigation, or amendment to construction routes considered necessary in addition to the general measures set out in the draft CoCP. Any site-

specific mitigation will be presented in the formal ES and would include an estimate of the number of properties that may qualify for noise insulation or temporary re-housing under provisions set out in the draft CoCP.

### **Summary of likely residual significant effects**

- 13.4.14 Further work is being undertaken to confirm significant construction noise and vibration effects, including temporary indirect effects from construction traffic.
- 13.4.15 Non-residential receptors identified at this stage as potentially subject to construction noise or vibration effects will be further considered, where necessary, on a receptor-by-receptor basis. Likely significant effects will be reported in the formal ES.

## **13.5 Effects arising from operation**

### **Assumptions and limitations**

- 13.5.1 The assessment of the effects of noise and vibration from the operation of the Proposed Scheme is based on the envisaged design as described in Section 2.2 of this report and in Volume 1 (Sections 4 and 8) and the highest likely train flows, assuming the service pattern including Phase One and Phase Two services. The expected passenger service frequency for Phase 2b is described in Volume 1 (Section 4) and as outlined below for the Birchmoor to Austrey area.
- 13.5.2 Passenger services will start at or after 05:00 from the terminal stations. In this area, with Phase One and Phase Two in operation, after 05:00 services will progressively increase to 10 trains per hour in each direction on the main lines with an operating speed of 330kph for 90% of services and 360kph for 10% of services. This number of services is assumed to operate every hour from 07:00 to 21:00. The number of services will progressively decrease after 21:00 and the last service will arrive at terminal stations by midnight. Further information is presented in Volume 1 (Section 4).

### **Avoidance and mitigation measures**

- 13.5.3 The development of the Proposed Scheme alignment has sought to reduce noise impact insofar as reasonably practicable.
- 13.5.4 Envisaged avoidance and mitigation measures that apply route-wide are described in Volume 1 (Section 9).

### *Airborne noise*

- 13.5.5 Through the procurement process for the trains and the track, the use of proven international technology will enable the railway to be quieter than implied by current minimum European standards. Details of operational train noise will be provided in the formal ES. This will include reduction of aerodynamic noise from the pantograph that otherwise would occur above 300kph (186mph) with current pantograph designs, drawing on proven technology in use in East Asia where reasonably practicable. Overall it is assumed that proven international technology would reduce noise

emissions by approximately 3dB at 360kph (225mph) compared to the current minimum European standards<sup>145</sup>.

- 13.5.6 The Proposed Scheme would incorporate noise barriers, in the form of either landscape earthworks and/or noise fence barriers to avoid or reduce significant adverse airborne noise effects. The assessment has been based on the assumption that noise fence barriers are acoustically absorbent on the railway side and are located 5m from the outer rail. The envisaged noise barrier locations based upon the currently available information are shown on Map Series SV-01 (Volume 2: LA02 Map Book) and described in Section 2.2.
- 13.5.7 In practice, barriers may differ from this description while maintaining the required acoustic performance. For example, where noise barriers are in the form of landscape earthworks, they would need to be higher above rail level to achieve similar noise attenuation to the noise fence barrier because the crest of the earthwork would be further than 5m from the outer rail.
- 13.5.8 Noise effects would also be reduced in other locations along the route by engineering structures and landscape earthworks provided to avoid or reduce significant visual effects.
- 13.5.9 As required by statute, noise insulation measures would be offered for qualifying buildings as defined in the Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1996 and the Noise Insulation Regulations 1975 ('the NI Regulations'). Additionally, HS2 Ltd will apply more onerous criteria, to provide the same mitigation as defined in 'the NI Regulations' at residential buildings where<sup>146</sup> noise from the use of the Proposed Scheme measured outside a dwelling exceeds the Interim Target defined by the World Health Organization's (WHO) Night Noise Guidelines for Europe<sup>147</sup> or the maximum noise level criteria<sup>148</sup> defined in the SMR. Noise insulation is designed to avoid residents experiencing any residual significant effect on health and quality of life from resulting noise inside their dwelling.
- 13.5.10 Noise can be generated at exits from tunnels due to pressure waves created inside the tunnel as the train enters. This is a well understood phenomenon and is mitigated by appropriate design and construction techniques. Porous tunnel portals, tunnels and vent shafts (where required) will be designed to avoid any significant airborne noise effects caused by the trains entering the tunnel.

### *Ground-borne noise and vibration*

- 13.5.11 Significant ground-borne noise or vibration effects would be avoided or reduced through the design of the track and track-bed.

### **Assessment of impacts and effects**

- 13.5.12 Map Series SV-01 (Volume 2: LA02 Map Book) indicates the likely long-term daytime noise level (defined as the equivalent continuous sound level from 07:00 to 23:00 or

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<sup>145</sup> Technical Specification for Interoperability (TSI) Noise – EU Commission Regulation No 1304/2014

<sup>146</sup> Following Government's National Planning Practice Guidance <https://www.gov.uk/government/collections/planning-practice-guidance>

<sup>147</sup> Night time Noise Guidelines for Europe (2010) World Health Organization

<sup>148</sup> Dependent on the number of train passes

$L_{pAeq,day}$ ) from HS2 operations alone. The contours are shown in 5dB steps from 50dB to 70dB. With the train flows described in Volume 1, the night-time noise level (defined as the equivalent continuous noise level from 23:00 to 07:00 or  $L_{pAeq,night}$ ) from the Proposed Scheme would be approximately 10dB lower than the daytime sound level. The 50dB contour, therefore, indicates the distance from the Proposed Scheme at which the night time noise level would be 40dB. This contour represents where adverse noise effects may start to be observed during the day (with respect to annoyance) and night (with respect to sleep disturbance). With regard to sleep disturbance the assessment also takes account of the maximum noise levels generated by each train pass by as defined in the SMR.

- 13.5.13 The potential for noise effects that are considered significant on a community basis in areas between the 50dB and 65dB daytime noise contours, or 40dB and 55dB night-time contours, is dependent on the baseline in that area and the change in level brought about by the Proposed Scheme. Baseline information will be confirmed in the formal ES.
- 13.5.14 A summary of the likely significant effects identified on a precautionary basis is presented at the end of this section.
- 13.5.15 Likely significant airborne noise effects arising from permanent changes to existing roads will be reported in the formal ES.

### Other mitigation measures

- 13.5.16 Further work is being undertaken to confirm the extent, location and type of the noise mitigation to be included within the design of the Proposed Scheme, which will be reported in the formal ES.

### Summary of likely residual significant effects

- 13.5.17 Mitigation, including landscape earthworks and noise fence barriers, described in Volume 1 (Section 9), Section 2.2 and presented in Map Series SV-01 (Volume 2: LA02 Map Book) and Map Series CT-06 (Volume 2: LA02 Map Book), would substantially reduce the potential airborne noise effects that would otherwise arise from the Proposed Scheme. It is anticipated that the mitigation would avoid likely significant adverse effects due to airborne operational noise on the majority of receptors and communities.
- 13.5.18 Taking account of the avoidance and mitigation measures this initial assessment has identified effects on a precautionary basis with the potential to be considered significant on a community basis due to increased airborne noise levels in line with the SMR at or around:
- Polesworth: occupants of residential properties in the vicinity of Kiln Way and B5000 Tamworth Road, located closest to the Proposed Scheme, identified by LA02-Co1 on Map SV-01-353 (Volume 2: LA02 Map Book);
  - Polesworth: occupants of residential properties in the vicinity of Rowland Avenue and Pooley View, located closest to the Proposed Scheme, identified by LA02-Co2 on Map SV-01-353 (Volume 2: LA02 Map Book); and

- Austrey: occupants of residential properties in the vicinity of No Man's Heath Lane and Appleby Hill, located closest to the Proposed Scheme, identified by LA02-Co3 on Map SV-01-355a (Volume 2: LA02 Map Book).

- 13.5.19 The initial assessment indicates that, the forecast noise from long-term railway operation will not exceed the daytime threshold set by the Noise Insulation Regulations, the night-time Interim Target identified in the WHO Night Noise Guidelines for Europe 2009 or the maximum noise levels criteria set out in the SMR, at individual residential properties closest to the Proposed Scheme.
- 13.5.20 Map Series SV-01 (Volume 2: LA02 Map Book) shows key non-residential properties for the assessment of operational airborne noise impacts in the formal ES. Of these, Polesworth (Abbey) Scout Group activity centre is the most likely to experience significant effects.
- 13.5.21 Further assessment work is being undertaken to identify operational noise and vibration significant effects. This will be reported in the formal ES.
- 13.5.22 HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid these significant effects. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the potentially affected receptor, its use and the benefit of the measures.

### Monitoring

- 13.5.23 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.
- 13.5.24 Operational noise and vibration monitoring would be carried out at different times during the lifetime of the Proposed Scheme at a combination of carefully selected monitoring locations including: adjacent or attached to moving vehicles, at fixed positions or in the vicinity of individual assets; and locations within the surrounding areas and communities alongside the railway corridor.
- 13.5.25 The expected noise and vibration performance of the Proposed Scheme, operational noise and vibration measurement data, associated asset information, description of corrective actions, results of measured performance compared to expected conditions, and monitoring reports would be shared with the relevant local authorities at appropriate intervals.



## 14 Traffic and transport

### 14.1 Introduction

- 14.1.1 This section considers the likely impacts on all forms of transport and the potential likely significant effects identified to date on transport users arising from the construction and operation of the Proposed Scheme through the Birchmoor to Austrey area.
- 14.1.2 Engagement with Highways England, Warwickshire County Council (WaCC), Staffordshire County Council (SCC) and Network Rail, has been undertaken. An important focus of this engagement has been to obtain relevant baseline information and discuss transport survey requirements and assessment methodology.
- 14.1.3 Maps showing the location of the key environmental features (Map Series CT-10) and the key construction (Map Series CT-05) and key operational (Map Series CT-06) features of the Proposed Scheme can be found in the Volume 2: LA02 Map Book.

### 14.2 Scope, assumptions and limitations

- 14.2.1 The scope, key assumptions and limitations for the traffic and transport assessment are set out in Volume 1 (Section 8) and the Scope and Methodology Report (SMR)<sup>149</sup>.
- 14.2.2 The study area for traffic and transport includes Stoneydelph and the villages of Birchmoor, Polesworth, Austrey and Newton Regis.
- 14.2.3 The study area also includes all roads potentially affected by the Proposed Scheme including the strategic road, the M42 from junction 10 to the south of junction 11 at Salt Street. Local roads include: the B5080 Pennine Way; the B5000 Tamworth Road; Green Lane (Birchmoor); Hermitage Lane; Pooley Lane; Linden Lane; Austrey Road; Warton Lane; Bishops Cleeve; Main Road; Newton Lane; No Man's Heath Lane; Austrey Lane; Appleby Hill; and Salt Street.
- 14.2.4 The potential effects on traffic and transport have been assessed qualitatively, based on the Proposed Scheme design, proposed construction routes, initial estimates of construction traffic and professional judgement.
- 14.2.5 No quantitative assessment has been undertaken at this stage. A quantitative assessment will be presented in the formal ES.

### 14.3 Environmental baseline

#### Existing baseline

- 14.3.1 Existing conditions in the study area have been determined through site visits, traffic and transport surveys, liaison with Highways England, WaCC, SCC and Network Rail (including provision of information on public transport, public rights of way (PRoW) and accident data) and desktop analysis.

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<sup>149</sup> Supporting document: HS2 Phase 2b Environmental Impact Assessment Scope and Methodology Report

### *Surveys*

- 14.3.2 Traffic surveys, comprising junction turning counts and queue surveys and automatic traffic counts, were undertaken in October and November 2017. These data have been supplemented by existing traffic data from other sources, including from WaCC, SCC and Highways England. Assessment of the data indicates that the peak hours in the area are 08:00-09:00 and 17:00-18:00 which correspond to the HS2 assessment hours.
- 14.3.3 PRoW surveys were undertaken in August 2017 to establish their nature and usage by non-motorised users (pedestrians, cyclists and equestrians). The surveys included PRoW and roads that would cross the route of the Proposed Scheme, and any additional PRoW and roads that may be affected by the Proposed Scheme. The majority of the PRoW surveys were undertaken during the weekend, at times when recreational use is expected to be highest, but where routes are likely to be used for non-leisure uses such as commuting, surveys were undertaken on a weekday.

### *Strategic and local highway network*

- 14.3.4 The only strategic route that passes through the area is the M42. The strategic road network in and around the Birchmoor to Austrey area is busy at peak times and delays can be experienced.
- 14.3.5 The local roads that could be affected by the Proposed Scheme include: the B5000 Tamworth Road; the B5080 Pennine Way; the B5493 north of Austrey Lane; Green Lane (Birchmoor); Hermitage Lane; Pooley Lane; Linden Lane; Austrey Road; Warton Lane; Bishops Cleeve; Main Road; Newton Lane; No Man's Heath Lane; Austrey Lane; Appleby Hill; and Salt Street. The local road network in this area generally operates well although some localised delays can be experienced, particularly at peak times.
- 14.3.6 Relevant accident data for the road network subject to assessment have been obtained from the Department for Transport<sup>150</sup>. Data for the three-year period (January 2014 to December 2016) have been assessed and any identified clusters (i.e. where there are nine or more accidents in the three-year period) have been examined.
- 14.3.7 One accident cluster was identified within the Birchmoor to Austrey area along the M42 between junction 10 and south of Salt Street (13 accidents, including two with serious casualties).
- 14.3.8 The route of the Proposed Scheme would cross two roads with footways within the Birchmoor to Austrey area: Green Lane (Birchmoor) and the B5000 Tamworth Road. In addition, there would be seven roads crossed by the route of the Proposed Scheme without footways including: the M42; Hermitage Lane; Pooley Lane; Linden Lane; Newton Lane; No Man's Heath Lane; and Salt Street.

### *Parking and loading*

- 14.3.9 There is no parking or loading identified in the Birchmoor to Austrey area that is expected to be impacted by the Proposed Scheme. Consequently, this topic is not considered further in this assessment.

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<sup>150</sup> Department for Transport; Crashmap.co.uk. Available online at: [www.crashmap.co.uk](http://www.crashmap.co.uk). CrashMap provides accident data for the UK.

### *Public transport network*

- 14.3.10 Seven bus routes operate on six roads that are crossed by the route of the Proposed Scheme in the Birchmoor to Austrey area. There are also bus stops primarily located to serve the main built up areas. The bus routes that could be affected by the Proposed Scheme include:
- service 785 (Tamworth – Polesworth – Shuttington – Austrey) and 786 (Tamworth – Polesworth – Austrey) which route along Hermitage Lane, the B5000 Tamworth Road, Linden Lane, Austrey Road/Warton Lane/Bishops Cleeve and Newton Lane;
  - service 65 (Nuneaton – Mira – Tamworth) and 766/767 (Tamworth – Dordon – Atherstone – Nuneaton) which route along the B5000 Tamworth Road;
  - service 219 (Austrey – Warton – Polesworth – Atherstone) which routes along Austrey Road/Warton Lane/Bishops Cleeve; and
  - service 224 (No Mans Heath – Newton Regis – Seckington – Alvecote – Tamworth) which routes along the B5493.
- 14.3.11 National and local rail services are accessible via Tamworth station, 5km to the west of the Birchmoor to Austrey area. Tamworth station provides access to national services to London, Crewe and Glasgow and provides access to local services to Birmingham, Lichfield and Nuneaton.

### *Non-motorised users*

- 14.3.12 There are pedestrian footways adjacent to many of the roads in the built up areas of Stoneydelph and the villages of Birchmoor, Polesworth, Austrey and Newton Regis. Footways vary in width and condition within these areas. Where there is no formal footway provision adjacent to a road, non-motorised user numbers are generally low.
- 14.3.13 The route of the Proposed Scheme would cross the route of six PRoW within the Birchmoor to Austrey area that could be affected either temporarily or permanently due to, for example, temporary diversion of PRoW during construction and permanent diversions or upgrades, including for maintenance access to the Proposed Scheme. The PRoW surveys undertaken to inform the assessment showed that there were fewer than 10 people a day recorded during the survey day on five of the PRoW. The routes with the greatest usage recorded during the survey day were Warwickshire Footpath AE16 which was used by 13 pedestrians and no cyclists; Warwickshire Footpath AE3 which was used by five pedestrians and two cyclists; and Warwickshire Footpath AE4 which was used by three pedestrians and two equestrians.

### *Waterways and canals*

- 14.3.14 There is one navigable waterway in the Birchmoor to Austrey area. The Coventry Canal routes through Polesworth on a north-west to south-east alignment. The Coventry Canal links to Alvecote Marina approximately 2.6km north-west of Polesworth, outside of the study area.

### *Air transport*

14.3.15 There is no relevant air transport in the Birchmoor to Austrey area. Consequently, this topic is not considered further in this assessment.

## **14.4 Effects arising during construction**

### **Avoidance and mitigation measures**

14.4.1 The following measures are currently proposed to avoid or reduce effects on transport users:

- new highways (roads and PRow) would be constructed and operational prior to the permanent closure of any existing highways, insofar as reasonably practicable;
- the majority of roads crossing the route of the Proposed Scheme would be maintained or locally diverted during construction to limit the need for diversion of traffic onto alternative routes;
- traffic management measures would be implemented to limit any disruption;
- road closures would be restricted to overnight and weekends, insofar as reasonably practicable;
- temporary alternative routes for PRow would be provided during construction, insofar as reasonably practicable, where either the existing or final proposed route is not available;
- where reasonably practicable, site haul routes would be created adjacent to the route of the Proposed Scheme to transport construction materials and equipment to reduce heavy goods vehicle (HGV) movements on public roads with access taken via the main road network;
- HGV would be routed, insofar as reasonably practicable, along the strategic and/or primary road network;
- the use of the local road network would, insofar as reasonably practicable, be limited to use for site set-up, access for surveys and on-going servicing (including refuse collection and general deliveries to compounds) during construction;
- the reuse of excavated material along the route of the Proposed Scheme, insofar as reasonably practicable;
- highway measures including junction improvements, passing places and carriageway widening would be provided, as required, to manage the safe passing of construction vehicles on construction HGV routes; and
- on-site welfare facilities would be provided which would reduce daily travel by site workers.

- 14.4.2 Section 14 of the draft Code of Construction Practice<sup>151</sup> (CoCP) includes measures that aim to reduce the adverse impacts and effects on local communities and maintain public access. This includes the impacts of deliveries of construction materials and equipment.
- 14.4.3 The measures in the draft CoCP include controls on vehicle types, hours of site operation and routes for HGVs to reduce the impact of road-based construction traffic. In order to achieve this, general and site specific traffic management measures would be implemented during the construction of the Proposed Scheme on or adjacent to public roads and PRow affected by the Proposed Scheme.
- 14.4.4 The draft CoCP includes the requirement to develop local traffic management plans in consultation with the highway and traffic authorities and the emergency services. These would consider the local traffic management strategy including consideration of sensitive receptors, such that adverse impacts would be reduced insofar as reasonably practicable and any effect on safety and accidents would not be significant.
- 14.4.5 Specific measures would include core site operating hours of 08:00 to 18:00 on weekdays and 08:00 to 13:00 on Saturdays with site staff and workers generally arriving before the morning peak hour and departing after the evening peak hour.
- 14.4.6 The number of private car trips to and from the construction compounds (both workforce and visitors) would be reduced by encouraging alternative sustainable modes of transport or vehicle sharing. This would be supported by an overarching framework travel plan that would require construction workforce travel plans<sup>152</sup> to be produced that would include a range of potential measures to mitigate the impacts of traffic and transport movements associated with construction of the Proposed Scheme.
- 14.4.7 Where works potentially affect Network Rail assets, disruption to travelling passengers and freight movements would be reduced insofar as reasonably practicable. This includes measures such as:
- programming the construction works to coincide with the possessions<sup>153</sup> that are required and planned by Network Rail for the general maintenance of their railway;
  - planning the required construction works so that they can be undertaken in short overnight stages so that passenger services are not disrupted; and
  - programming longer closures at the weekend and on bank holidays to reduce insofar as reasonably practicable the number of passengers affected.

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<sup>151</sup> Supporting document: Draft Code of Construction Practice

<sup>152</sup> Construction and operational travel plans would promote the use of sustainable transport modes as appropriate to the location and types of trip. They would include measures such as: provision of information on and promotion of public transport services; provision of good cycle and pedestrian facilities; liaison with public transport operators; promotion of car sharing; and the appointment of a travel plan coordinator to ensure suitable measures are in place and are effective.

<sup>153</sup> Possession is a period of time during which one or more rail lines are blocked to trains to permit work to be carried out on or near the rail lines

## Assessment of impacts and effects

### *Temporary effects*

- 14.4.8 The traffic and transport impacts during the construction period within the Birchmoor to Austrey area are likely to include:
- construction vehicle movements to and from the various construction compounds;
  - road closures and associated realignments and diversions;
  - alternative routes for PRoW; and
  - possessions on the conventional rail network.
- 14.4.9 The construction assessment has also considered any impacts in the Birchmoor to Austrey area that arise from construction of the Proposed Scheme in the adjoining community areas.
- 14.4.10 Construction vehicle movements required to construct the Proposed Scheme would include the delivery of plant and materials, movement of excavated materials and site worker trips. Works would include utilities diversions, earthworks, underpass, viaduct, bridge and highway construction.
- 14.4.11 Construction activities would be managed from compounds. Details of the construction compounds are provided in Section 2.3. The locations of the compounds are shown in Map Series CT-05 in the Volume 2: LA02 Map Book.

### **Strategic and local highway network**

- 14.4.12 The primary HGV access routes for construction vehicles would be the strategic and/or primary road network with the use of the local road network limited, where reasonably practicable. The construction routes would also provide access to compounds. Where reasonably practicable, HGVs would use the site haul routes alongside the route of the Proposed Scheme to reduce the impact on the local road network. In this area, it is expected that the main construction routes would use:
- the M42 junction 10 and junction 11;
  - the B5493 between No Man's Heath and junction 11 of M42;
  - the B5080 Pennine Way between the B5000 and the A5;
  - the B5000 Glascote Road/Tamworth Road east of the B5080 Pennine Way to Pooley Lane;
  - No Man's Heath Lane/Austrey Lane between Austrey and No Man's Heath;
  - Newton Lane in Austrey;
  - Hermitage Lane north of Birchmoor;
  - Pooley Lane from the B5000 Tamworth Road;
  - Austrey Road in Austrey

- Appleby Hill, between Austrey and the A444; and
- Warton Lane between Warton and Austrey;
- Bishops Cleeve in Austrey; and
- Main Road in Austrey.

14.4.13 A number of these construction routes would have limited use<sup>154</sup> including Warton Lane between Warton and Austrey and Bishops Cleeve and Main Road in Austrey.

14.4.14 In addition to increases in traffic flows due to construction traffic, construction of the Proposed Scheme is expected to result in temporary highway closures and diversions or realignments as set out in Section 2.3. The works to construct both temporary and permanent highway diversions/realignments could also result in disruption to highway users. These are expected to include:

- the M42, north of junction 10 which would be temporarily realigned to accommodate the route of the Proposed Scheme, requiring temporary traffic management measures;
- Green Lane (Birchmoor), 750m north of M42 junction 10, would be closed during construction works and reinstated on its existing alignment; and
- Linden Lane, 700m north-west of the junction with Station Road.

14.4.15 Permanent changes to highways are reported under operation.

14.4.16 Changes in traffic have the potential, at some locations, to result in increased travel distance, congestion and delays and increased traffic severance for non-motorised users. The assessment of these changes will be reported in the formal ES.

14.4.17 Assessment of the traffic and transport impacts from utilities works, either separately or in combination with other works, will be reported in the formal ES.

### **Accidents and safety**

14.4.18 Changes in traffic as a result of the Proposed Scheme could result in changes in accident risk. The impacts on accident risk during construction of the Proposed Scheme will be reported in the formal ES.

### **Public transport network**

14.4.19 It is expected that construction of the Proposed Scheme would require bus route diversions, including bus routes 65, 766/767, 785 and 786 on the B5000 Tamworth Road; the 219, 785 and 786 on Austrey Road/Warton Lane/Bishops Cleeve. This could result in increased journey times and the need to relocate bus stops. Any consequent effects will be reported in the formal ES.

14.4.20 There are interfaces with the existing rail network in this area, in particular on the operation of the West Coast Main Line (WCML) and its rail freight services. Rail possessions would be required to undertake localised works, including the

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<sup>154</sup> Limited use refers to a low level of HGV use generally over a short length of time, for example for site set up or minor works



construction of Polesworth viaduct to carry a length of the route of the Proposed Scheme over the WCML in the Birchmoor to Austrey area. This could result in disruption to services, although many of the interventions would be combined to reduce the frequency of potential disruption. The effects of railway possessions will be assessed and reported in the formal ES.

### **Non-motorised users**

- 14.4.21 The construction works associated with the Proposed Scheme would require the temporary closure or diversion/realignment of PRow and roads. There would be temporary alternative routes for a number of PRow in the vicinity of the Proposed Scheme. Where necessary, PRow would be re-routed around construction compounds. It is currently expected that the Leicestershire Byway Q4a/3, known as Salt Street near Appleby Parva, would be temporarily closed.
- 14.4.22 Permanently diverted PRow are reported under operation although these PRow could also be subject to temporary closure or diversion/realignment.
- 14.4.23 The changes to PRow are likely to result in some increases in travel distance with the potential for adverse significant effects. The assessment of these will be reported in the formal ES.

### **Waterways and canals**

- 14.4.24 It is currently expected that the construction of the Proposed Scheme could have an effect upon the Coventry Canal, on both the users of the waterway and the towpath, in the Birchmoor to Austrey area where the route of the Proposed Scheme would cross the canal. The assessment of this will be reported in the formal ES.

### *Permanent effects*

- 14.4.25 Any permanent effects of construction will be considered in the assessment of operation for traffic and transport. This is because the impacts and effects of ongoing increases in travel demand and the wider impacts and effects of the operations phase need to be considered together.

### **Other mitigation measures**

- 14.4.26 The implementation of the measures in the draft CoCP, in combination with the construction workforce travel plan would help mitigate transport-related effects during construction of the Proposed Scheme.
- 14.4.27 Any further traffic and transport mitigation measures required during the construction of the Proposed Scheme will be considered based on the outcomes of the assessment. These will be reported in the formal ES.

### **Summary of likely residual significant effects**

- 14.4.28 Construction of the Proposed Scheme has the potential to lead to additional congestion and delays for road users on a number of routes including: the M42 junctions 10 and 11; the B5080 Pennine Way; the B5000 Tamworth Road; the B5493; Hermitage Lane; Pooley Lane; Austrey Road; Warton Lane; Bishops Cleeve; Main Road; Newton Lane; No Man's Heath Lane; Austrey Lane and Appleby Hill.

Increases in traffic could also result in increased traffic severance for non-motorised users of the routes and changes in traffic could result in changes in accident risk.

- 14.4.29 Construction of the Proposed Scheme is expected to result in temporary highway closures or realignments. These are expected to include the M42, Green Lane (Birchmoor) and Linden Lane.
- 14.4.30 Bus services 65, 219, 766/767, 785 and 786 would be affected by temporary diversions.
- 14.4.31 Rail possessions would be required on the WCML with potential disruption to services.
- 14.4.32 One PRoW, Leicestershire Byway Q4a/3, would be temporarily closed for the duration of the construction period.
- 14.4.33 The Coventry Canal would be affected during the construction period, affecting both users of the waterway and towpath.
- 14.4.34 The assessment of significant effects in relation to traffic and transport during construction of the Proposed Scheme will be reported in the formal ES.

## 14.5 Effects arising from operation

### Avoidance and mitigation measures

- 14.5.1 The following measures have been included as part of the design of the Proposed Scheme and would avoid or reduce impacts on transport users:
  - reinstatement of roads on or close to their existing alignments, where reasonably practicable; and
  - replacement, diversion or realignment of PRoW.

### Assessment of impacts and effects

- 14.5.2 The following section considers the impacts on traffic and transport and the likely consequential effects resulting from the operational phase of the Proposed Scheme. Operational effects arising from the Proposed Scheme in year 2033 and year 2046 will be reported in the formal ES.

#### *Key operation transport issues*

- 14.5.3 The operation of the Proposed Scheme would be unlikely to have any substantial impacts within this area due to increased traffic, as there are no stations or depots proposed within the Birchmoor to Austrey area. The maintenance of the Proposed Scheme would generate limited vehicular trips and the effect would not be significant.
- 14.5.4 The operational impacts are therefore primarily related to permanent diversion, realignment and closure of roads and the diversion or closure of PRoW.

## *Highway network*

### **Strategic and local highway network**

14.5.5 The Proposed Scheme would result in a number of permanent highway changes. These include:

- B5000 Tamworth Road (permanently realigned on a new overbridge over the route of the Proposed Scheme);
- Pooley Lane (permanently realigned on a new overbridge over the route of the Proposed Scheme);
- Newton Lane (permanently diverted to No Man's Heath Lane, located between the M42 and the route of the Proposed Scheme);
- Hermitage Lane (permanently diverted to link to the realigned B5000 Tamworth Road);
- No Man's Heath Lane (permanently realigned and would cross under the route of the Proposed Scheme); and
- Salt Street (permanently realigned on a new overbridge over the route of the Proposed Scheme).

14.5.6 The permanent highway changes are not expected to result in significant changes in travel distances. The effects of these changes including on non-motorised users will be reported in the formal ES.

### **Accidents and safety**

14.5.7 Changes in traffic could result in changes in accident risk. Operational effects arising from the Proposed Scheme will be reported in the formal ES.

### **Public transport network**

14.5.8 The permanent realignment of roads could increase travel distances for bus passengers. However, as the realignments are likely to be less than 1km in length, it is not currently expected that there would be significant effects on public transport within the Birchmoor to Austrey area.

### **Non-motorised users**

14.5.9 A number of PRoW that cross the route of the Proposed Scheme would be either permanently realigned or diverted including:

- Warwickshire Footpath AE17 located south of the B5000 Tamworth Road. The eastern section of this PRoW would be permanently closed. An alternative route would be provided via the diverted Hermitage Lane;
- Warwickshire Footpath AE16 which runs along Pooley Lane would be realigned to the south-west of its existing alignment;

- Warwickshire Bridleway AE<sub>3</sub> which runs between the access road off Austrey Road and Warwickshire Footpath T<sub>121</sub> would be realigned to the south-east of its existing alignment
- Warwickshire Footpath AE<sub>4</sub> which runs between Warton Lane and Warwickshire Footpath AE<sub>1</sub> would be realigned south of its existing alignment;
- Warwickshire Footpath T<sub>140</sub> north of Newton Lane would be realigned to the north of its existing alignment; and
- Leicestershire Byway Q<sub>4a/3</sub> which runs between Appleby Hill and Austrey Lane would be realigned to the north on a new overbridge.

14.5.10 No PRoW diversion/realignment is expected to result in additional travel distance in excess of 500m.

14.5.11 The realignment of some of the PRoW would increase journey distance and time for non-motorised users and may result in significant effects. The assessment of these changes will be reported in the formal ES.

### **Waterways and canals**

14.5.12 It is not currently expected that the operation of the Proposed Scheme would have a significant effect upon navigable waterways or canals in the Birchmoor to Austrey area.

### **Other mitigation measures**

14.5.13 HS2 Ltd is continuing to engage with local highway and transport authorities regarding the need for highway and public transport measures to mitigate the impacts of the Proposed Scheme in the area.

14.5.14 Any further traffic and transport mitigation measures required during the operation of the Proposed Scheme will be considered based on the outcomes of the assessment. These will be reported in the formal ES.

### **Summary of likely residual significant effects**

14.5.15 Operation of the Proposed Scheme would require the permanent diversion or realignment of: the B5000 Tamworth Road; Hermitage Lane; Pooley Lane; Newton Lane; No Man's Heath Lane and Salt Street although these are unlikely to result in permanent significant effects. Increases in traffic could also result in increased traffic severance for non-motorised users of the routes and changes in traffic could result in changes in accident risk.

14.5.16 Six PRoW, including Warwickshire Footpath AE<sub>17</sub>; Warwickshire Footpath AE<sub>16</sub>; Warwickshire Bridleway AE<sub>3</sub>; Warwickshire Footpath AE<sub>4</sub>; Warwickshire Footpath T<sub>140</sub> and Leicestershire Byway Q<sub>4a/3</sub> would either be permanently realigned or diverted.

14.5.17 The assessment of significant effects in relation to traffic and transport during operation of the Proposed Scheme will be reported in the formal ES.

## Monitoring

- 14.5.18 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.
- 14.5.19 There are no other area-specific monitoring requirements currently proposed for traffic and transport in the Birchmoor to Austrey area.

## 15 Water resources and flood risk

### 15.1 Introduction

- 15.1.1 This section provides a description of the current baseline for water resources and flood risk in the Birchmoor to Austrey area. The likely impacts and significant effects identified to date arising from the construction and operation of the Proposed Scheme on surface water and groundwater bodies and their associated water resources are reported. The likely impacts and significant effects of the Proposed Scheme on flood risk and land drainage are also reported.
- 15.1.2 Engagement has been undertaken with the Environment Agency, Canal and River Trust, Warwickshire County Council (WaCC), which is the Lead Local Flood Authority (LLFA), North Warwickshire Borough Council (NWBC), Tamworth Borough Council (TBC), Staffordshire County Council (SCC), Severn Trent Water Ltd (the local water and sewerage undertaker) and South Staffordshire Water PLC (the local water supply undertaker). The purpose of this engagement has been to obtain relevant baseline information and to discuss the Proposed Scheme and potential effects. Engagement with these stakeholders will continue as part of the development of the Proposed Scheme.
- 15.1.3 Maps showing the location of the key environmental features (Map Series CT-10), and the key construction (Map Series CT-05) and key operational (Map Series CT-06) features of the Proposed Scheme can be found in the Volume 2: LA02 Map Book. This map book also includes Map Series WR-01 and WR-02 showing surface water and groundwater baseline information respectively.
- 15.1.4 Volume 3: Route-wide effects, Water resources and flood risk (Section 16) covers the following at a route-wide level:
- the risk to water resources associated with accidents or spillages from trains during operation of the Proposed Scheme;
  - a summary of how the Proposed Scheme aims to demonstrate compliance with the statutory requirements of the Water Framework Directive (WFD); and
  - route-wide flood risk issues related to alignment of the Proposed Scheme with the Sequential Test and Exception Test policies in the National Planning Policy Framework (NPPF)<sup>155</sup>.

### 15.2 Scope, assumptions and limitations

- 15.2.1 The scope, assumptions and limitations for the water resources and flood risk assessment are set out in Volume 1 (Section 8) and the Scope and Methodology Report (SMR)<sup>156</sup>.
- 15.2.2 Unless indicated otherwise, the spatial scope of the assessment (the study area) is based upon the identification of surface water and groundwater features within 1km

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<sup>155</sup> National Planning Policy Framework, DCLG, 2015

<sup>156</sup> Supporting document: HS2 Phase 2b Environmental Impact Assessment Scope and Methodology Report

of the centre line of the route of the Proposed Scheme, as described in Section 2.2 of this report.

- 15.2.3 This assessment is based on desk study information, including information provided to date by consultees and stakeholders, as well as surveys of accessible water features.
- 15.2.4 Where surveys have not been undertaken due to land access constraints, a precautionary approach has been adopted in the assessments of receptor value and impact magnitude.
- 15.2.5 Hydraulic analysis is currently being undertaken of watercourses and key structures within flood risk areas. This includes modelling of the River Anker and its tributary, Bramcote Brook.
- 15.2.6 Groundwater levels have been inferred from the available Environment Agency groundwater level monitoring boreholes, historic borehole logs and topographic data, as well as from spring and watercourse locations.
- 15.2.7 Impacts on biological receptors such as aquatic fauna and flora are assessed in Section 7, Ecology and biodiversity.
- 15.2.8 The assessments in this working draft ES are based on professional judgement using the information that is currently available. A precautionary approach has been adopted with regard to assessing the potential for adverse impacts to occur. The surveys, analysis and modelling work currently in progress, and the results of the consultation process, will be used to refine the assessments reported in the formal ES.

## 15.3 Environmental baseline

### Existing baseline - Water resources and WFD

#### *Surface water*

- 15.3.1 All surface water bodies in the study area fall within the Tame, Anker and Mease management catchment of the Humber river basin district (RBD).
- 15.3.2 The river basin management plan<sup>157</sup> identifies the chemical<sup>158</sup> and ecological<sup>159</sup> status of surface water bodies, and the quantitative<sup>160</sup> and chemical<sup>161</sup> status of groundwater bodies within this RBD.
- 15.3.3 To be compliant with WFD legislation, the Proposed Scheme should not cause deterioration of a water body from its current status; nor prevent future attainment of

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<sup>157</sup> Environment Agency (2015), Water for life and livelihoods Part 1: Humber river basin district: River basin management plan

<sup>158</sup> The chemical status of surface waters reflects concentrations of priority and hazardous substances present

<sup>159</sup> The ecological status of surface waters is determined based on the following elements:

- Biological elements – communities of plants and animals (for example, fish and rooted plants), assessed in the ecology and biodiversity section;
- Physico-chemical elements – reflects concentrations of pollutants such as metal or organic compounds, such as copper or zinc; and
- Hydromorphological elements – reflects water flow, sediment composition and movement, continuity (in rivers) and the structure of physical habitats

<sup>160</sup> The quantitative status of groundwaters reflects the presence or absence of saline or other intrusions, interactions with surface water, issues related to groundwater dependent terrestrial ecosystems (GWDTE) and overall water balance

<sup>161</sup> The chemical status of a groundwater body reflects effects on drinking water protected areas, its general quality, the importance of water quality within the water body for GWDTEs and surface water interactions and whether there are intrusions of poor quality groundwater present



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good status where this has not already been achieved. The Proposed Scheme should also avoid adverse impacts on protected or priority species and habitats.

- 15.3.4 Specialist field surveys are being undertaken, where access is available. Receptor values will be adjusted to reflect the outputs from these surveys, in close consultation with the Environment Agency. In the absence of field surveys, surface water bodies, other than minor ponds and ditches, have been identified within this assessment as being of either high or very high value on a precautionary basis.
- 15.3.5 Summary information relating to the surface water bodies potentially affected by the Proposed Scheme within the study area is provided in Table 29. The receptor value attributed to each individual water body is based on the methodologies set out in the SMR.

Table 29: Surface water body receptors

| Water body name and location <sup>162</sup>       | Designation          | Q95 value (m <sup>3</sup> /s) <sup>163</sup> | Receptor value | Parent WFD water body name and identification number <sup>164</sup> | Current WFD status/Objective <sup>165</sup> |
|---------------------------------------------------|----------------------|----------------------------------------------|----------------|---------------------------------------------------------------------|---------------------------------------------|
| Kettle Brook<br>WR-01-351b-I6                     | Ordinary watercourse | 0.008                                        | Moderate       | Anker from River Sence to River Tame<br>GB104028046460              | Poor/Good by 2027                           |
| Coventry Canal<br>WR-01-351b-E5                   | Inland waterway      | n/a                                          | Very high      | Coventry and Ashby Canals<br>GB70410212                             | Good/Good by 2015                           |
| River Anker<br>WR-01-351b-F5                      | Main river           | 3                                            | Very high      | Anker from River Sence to River Tame<br>GB104028046460              | Poor/Good by 2027                           |
| Bramcote Brook<br>WR-01-351b-F5 and WR-01-351b-H6 | Main river           | 0.05                                         | High           |                                                                     |                                             |
| Tributary of Bramcote Brook (1)<br>WR-01-352a-I6  | Minor ditch          | n/a                                          | Moderate       |                                                                     |                                             |
| Tributary of Bramcote Brook (2)<br>WR-01-352a-I6  | Minor ditch          | n/a                                          | Moderate       |                                                                     |                                             |

### Abstractions and permitted discharges (surface water)

- 15.3.6 There is one licensed surface water abstraction in the study area, which is not located within the land required for the construction and operation of the Proposed Scheme. This is considered a high-value receptor.

<sup>162</sup> The feature locations are indicated by the grid coordinates on the relevant Volume 2: LA02 Map Book figure (in this case WR-01)

<sup>163</sup> This is the flow within the watercourse that is exceeded for 95% of the time

<sup>164</sup> The Environment Agency has attributed each surface water and groundwater body a unique water body identification (ID) number

<sup>165</sup> Status and objectives are based on those set out in the 2015 River basin management plan

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- 15.3.7 Records of private unlicensed surface water abstractions, which comprise those for quantities less than 20m<sup>3</sup> per day, have been obtained from the local authorities. These data indicate that there are no registered private unlicensed surface water abstractions within the study area. As there is no obligation to register private water supplies, unregistered private surface water supplies may be present. Private water supplies would be assessed as high value receptors unless details obtained from the owner indicate otherwise.
- 15.3.8 There are seven<sup>166</sup> consented discharges to surface waters within the study area, two of which are located within the land required for the Proposed Scheme. These have been assessed as being receptors of low value.

### Groundwater

- 15.3.9 The geology of the study area is described in Section 10, Land quality, and the superficial and bedrock hydrogeology is summarised in Table 30. Unless stated otherwise, the geological groups listed would all be crossed by the Proposed Scheme. Table 30 also identifies the receptor values attributed to each groundwater receptor based on the methodologies set out in the SMR.

Table 30: Summary of geology and hydrogeology in the study area

| Geology <sup>167</sup>      | Distribution                                                                      | Formation description                               | Aquifer classification | WFD body (ID) and current overall status <sup>168</sup> | WFD status objective <sup>169</sup>    | Receptor value |
|-----------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------|------------------------|---------------------------------------------------------|----------------------------------------|----------------|
| <b>Superficial deposits</b> |                                                                                   |                                                     |                        |                                                         |                                        |                |
| Peat                        | Located near to Bentley Farm                                                      | Organic, partially decomposed vegetation.           | Unproductive           | Not assessed by the Environment Agency                  | Not assessed by the Environment Agency | Low            |
| Alluvium                    | Along the River Anker and associated tributaries, and Bramcote Brook near Austrey | Clay, silt, sand and gravel                         | Secondary A            | Not assessed by the Environment Agency                  | Not assessed by the Environment Agency | Moderate       |
| River terrace deposits      | Along the River Anker and floodplain at Pooley Country Park                       | Sands and gravels, locally with silt, clay or peat. | Secondary A            | Not assessed by the Environment Agency                  | Not assessed by the Environment Agency | Moderate       |

<sup>166</sup> Note that the number of consents listed in Section 10, Land quality may be different to that stated here. This is because the Water resources and flood risk study area comprises all land within 1km of the centreline of the Proposed Scheme, whereas the Land quality study area comprises land within 250m from the boundary of the Proposed Scheme. The default study areas may be extended where potential for wider pathways exist.

<sup>167</sup> In recent years the British Geological Survey has revised the nomenclature used to describe the geological materials present in Great Britain, with the publication of a series of lithostratigraphic framework reports. Some of these reports cover an entire geological period e.g. The Carboniferous and others cover a single group e.g. the Triassic Mercia Mudstone. The nomenclature used in these reports supersede the nomenclature introduced in the 1980s. While some traditional names have been retained by this process, many new names have also been generated, and many geological maps have not yet been updated. Some stratigraphic units have been renamed twice in the last 35 years. To reflect this, the previous name used for geological units (if different) is shown in brackets.

<sup>168</sup> As stated in the 2015 River basin management plan

<sup>169</sup> As stated in the 2015 River basin management plan

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| Geology <sup>167</sup>                                | Distribution                                                                                                                | Formation description                                                       | Aquifer classification                                | WFD body (ID) and current overall status <sup>168</sup>           | WFD status objective <sup>169</sup>    | Receptor value |
|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------------|----------------------------------------|----------------|
| Glaciofluvial deposits                                | Present near to Bramcote Hall and to the south of Salt Street, in the north of the study area                               | Sand and gravel                                                             | Secondary A                                           | Not assessed by the Environment Agency                            | Not assessed by the Environment Agency | Moderate       |
| Glacial till                                          | Present to the west of the M42 in the south of the study area, between Polesworth and Linden Lane and around Bramcote Hall  | Variable pebbly and silty clay                                              | Secondary (undifferentiated) (Thrussington Member)    | Not assessed by the Environment Agency                            | Not assessed by the Environment Agency | Moderate       |
| <b>Bedrock</b>                                        |                                                                                                                             |                                                                             |                                                       |                                                                   |                                        |                |
| Mercia Mudstone Group – Sidmouth Mudstone Formation   | Outcrops at the northern limits of the study area around Appleby Hill, No Man's Heath and Salt Street                       | Mudstone, and siltstone with beds of dolomitic siltstone and sandstone      | Secondary B (younger mudstone and siltstone)          | Tame Anker Mease – Secondary Combined<br>(GB40402G990800)<br>Good | Good by 2015                           | Moderate       |
|                                                       |                                                                                                                             |                                                                             | Secondary (undifferentiated) (older mudstone)         |                                                                   |                                        | Moderate       |
| Mercia Mudstone Group – Tarporley Siltstone Formation | Present around Bramcote Hall and Shuttington extending no the north of Austrey.                                             | Siltstone, Mudstone and Sandstone                                           | Secondary A (sandstone)                               | Tame Anker Mease-Sandstone Burton<br>(GB40401G301200)<br>Poor     | Good by 2027                           | Moderate       |
|                                                       |                                                                                                                             |                                                                             | Secondary (undifferentiated) (siltstone and mudstone) |                                                                   |                                        | Moderate       |
| Sherwood Sandstone Group – Hopwas Breccia Formation   | Two localised outcrops to the south of Bramcote Hall                                                                        | Breccia with limestone clasts, interbedded with sandstone and mudstone beds | Principal                                             | Tame Anker Mease – Secondary Combined<br>(GB40402G990800)<br>Good | Good by 2015                           | Moderate       |
| Warwickshire Group Halesowen Formation                | Present in the south of the study area up to the area between Tamworth and Polesworth, extending south around Bramcote Hall | Sandstone, mudstone and siltstone with thin coals and limestone beds        | Secondary A                                           | Tame Anker Mease – Secondary Combined<br>(GB40402G990800)<br>Good | Good by 2015                           | Moderate       |

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| Geology <sup>167</sup>                                               | Distribution                                                                                                | Formation description                              | Aquifer classification | WFD body (ID) and current overall status <sup>168</sup>                   | WFD status objective <sup>169</sup> | Receptor value |
|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------|------------------------|---------------------------------------------------------------------------|-------------------------------------|----------------|
| Pennine Coal Measures Group - Pennine Middle Coal Measures Formation | Present from the area between Tamworth and Polesworth up to the north-east of Potford Bridge on Linden Lane | Mudstone, siltstone and sandstone, with coal seams | Secondary A            | Tame Anker Mease – Secondary Combined<br><br>(GB40402G990800)<br><br>Good | Good by 2015                        | Moderate       |

### Superficial deposit aquifers

15.3.10 The basis of the receptor values attributed to the superficial deposit aquifers present within the study area, as shown in Table 30, is outlined briefly as follows:

- alluvium, river terrace deposits and glaciofluvial deposits may be capable of supporting water supplies at a local rather than regional scale and may also form an important source of baseflow to rivers. They have therefore been classified moderate value receptors; and
- glacial till deposits (Thrussington Member) may supply base flow to watercourses or store and yield limited amounts of groundwater and so has been classified as moderate value receptor.

### Bedrock aquifers

15.3.11 The basis of the receptor values attributed to the bedrock aquifers present within the study area, as shown in Table 30 is outlined briefly as follows:

- the Sherwood Sandstone Group (locally comprising the Hopwas Breccia Formation) has been classified as a Principal aquifer by the Environment Agency. It outcrops close to the Bramcote cutting. This aquifer may also provide an important component of base flow to rivers. It has therefore been assessed as a high value receptor;
- the Warwickshire Group (locally comprising the Halesowen Formation) is regarded by the Environment Agency as a Secondary A aquifer. The permeable sandstones and limestones can yield limited quantities of groundwater. It has therefore been assessed as a moderate value receptor. The formation outcrops from Birchmoor to Hermitage Lane; and
- the Mercia Mudstone Group in the study area are variably classified by the Environment Agency as Secondary A aquifers (the Pennine Middle Coal Measures, and the sandstone layers of the Tarporley Siltstone); Secondary B aquifers (the Sidmouth Mudstone – younger mudstone and siltstone); and Secondary (undifferentiated) aquifers (Tarporley Siltstone – siltstone and mudstone, and Sidmouth Mudstone – older mudstones). Secondary A aquifers are permeable layers that can yield limited quantities of groundwater. Secondary B aquifers are predominantly lower permeability layers that may store and yield limited amounts of groundwater. Secondary undifferentiated

aquifers are designated where there are variable characteristics between rock types and it has not been possible to categorise the aquifer as a Secondary A or Secondary B aquifer. All secondary aquifers are assessed as moderate value receptors.

### **WFD status of groundwater bodies**

- 15.3.12 A summary of locations, current overall WFD status, and future overall status objectives associated with the designated bedrock groundwater bodies within the study area is provided in Table 30. The value attributed to each of these receptors is also indicated.
- 15.3.13 The superficial deposits in the study area are not formally designated as WFD groundwater bodies but may be hydraulically connected to the WFD bedrock aquifers.

### **Abstraction and permitted discharges (groundwater)**

- 15.3.14 There are no groundwater abstractions licensed for public water supply within the study area. However, the Proposed Scheme would intersect a total catchment (zone 3), groundwater source protection zone (SPZ) associated with the abstraction of potable water supply by South Staffordshire Water PLC at Green Lane pumping station, located 2.5km north of Salt Street.
- 15.3.15 There is one private groundwater abstraction licence registered in the study area, as shown on Map-WR-02-310, located within 1km of the land required for construction of the Proposed Scheme, north-east of Austrey. This licence permits non-industrial lake and pond through flow use.
- 15.3.16 Records of private unlicensed groundwater abstractions, which comprise those for quantities less than 20m<sup>3</sup> per day, have been requested from the local authorities. Responses are being sought. As there is no obligation to register private water supplies, unregistered private groundwater supplies may also be present. Private water supplies have been assessed as high value receptors unless details obtained from the owner indicate otherwise.
- 15.3.17 There are four<sup>170</sup> consented discharges to groundwater within the study area. These discharges have been assessed as low value receptors.

### *Groundwater – surface water interactions*

- 15.3.18 Desk-based assessment using Ordnance Survey maps and detailed river network data provided by the Environment Agency identified 12 features within the study area that had potential to be springs. Access was not possible to inspect any of these features at this stage.
- 15.3.19 The 12 potential spring features that have yet to be inspected are assumed to be high value receptors on a precautionary basis. Two of these features are within the land required for the Proposed Scheme, one to the north-west of Austrey Meadows close

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<sup>170</sup> The number of consents listed here is different to the number listed in Section 10, Land quality. This is because the Water resources and flood risk default study area comprises all land within 1km of the centreline of the Proposed Scheme; the Land quality default study area extends 250m from the land required for the construction of the Proposed Scheme. These default study areas are extended, where the potential for wider pathways exists

to the M42 and one to the north-west of Austrey by the stable facilities off Newton Lane.

- 15.3.20 There are nine ponds within the land required for the Proposed Scheme. The nature and relative value of these features, the magnitude of the impacts that the Proposed Scheme would have on them, and the mitigation proposed, are outlined in Section 7, Ecology and biodiversity.

#### *Water dependent habitats*

- 15.3.21 The following nature conservation sites within the study area are potentially groundwater dependent:
- Alvecote Pools Site of Special Scientific Interest (SSSI) is located approximately 80m north-west of the Proposed Scheme at the Polesworth viaduct. The SSSI includes fen, bog and red beds that are likely to be dependent on groundwater; and
  - Abbey Green Local Nature Reserve (LNR), which includes the Polesworth Abbey Green Local Wildlife Site (LWS), and Polesworth Abbey Marsh LWS, is located approximately 560m southeast of the Proposed Scheme at Polesworth. This LWS includes a swamp, and marshland and are likely to be groundwater dependent.
- 15.3.22 Further details of the ecology of these sites, including the reporting on the effects and associated other mitigation, are provided in Section 7, Ecology and biodiversity.
- 15.3.23 No designated nature conservation sites within the study area which are dependent on surface water flows have the potential to be affected by the Proposed Scheme.

#### **Existing baseline - flood risk and land drainage**

- 15.3.24 The Environment Agency's Flood map for planning (rivers and sea)<sup>171</sup> has been used to scope the baseline flood risk for flooding from main rivers and ordinary watercourses. These plans define Flood Zone 2 (land assessed as having between a 1 in 100 (1%) and 1 in 1,000 (0.1%) annual probability of river flooding) and Flood Zone 3 (land assessed as having a 1 in 100 (1%) or greater annual probability of river flooding).
- 15.3.25 The updated Flood map for surface water<sup>172</sup> has been used to scope surface water flood risks. Infrastructure failure flood risks have been scoped using the Environment Agency risks of flooding from reservoirs national dataset<sup>173</sup>. The British Geological Survey national dataset, Areas susceptible to groundwater flooding<sup>174</sup>, has been used to assess the future risk of groundwater flooding.

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<sup>171</sup> Environment Agency; Flood Map for Planning; <https://flood-map-for-planning.service.gov.uk/>

<sup>172</sup> Environment Agency; Long term flood risk assessment for locations in England <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>

<sup>173</sup> Environment Agency; Long term flood risk assessment for locations in England <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>

<sup>174</sup> British Geological Society; BGS groundwater flooding; <http://www.bgs.ac.uk/products/hydrogeology/groundwaterFlooding.html>

15.3.26 The following reports were used to help determine the baseline flood risk within the study area:

- Warwickshire Preliminary Flood Risk Assessment (PFRA) (2011)<sup>175</sup>;
- NWBC Strategic Flood Risk Assessment (SFRA) (2013)<sup>176</sup>;
- WaCC Local Flood Risk Management Strategy (LFRMS) (2016)<sup>177</sup>;
- WaCC Surface Water Management Plan (2015)<sup>178</sup>;
- TBC SFRA (2014)<sup>179</sup>;
- Staffordshire PFRA (2010)<sup>180</sup>;
- Shropshire and Staffordshire LFRMS (2015)<sup>181</sup>; and
- South Staffordshire Surface Water Management Plan (2010)<sup>182</sup>.

### River flooding

15.3.27 The study area includes substantial areas of floodplain (Flood Zone 2 and 3) associated with the River Anker at Pooley Country Park and Bramcote Brook, a tributary of the River Anker, north of Warton. Table 31 shows all relevant watercourses within the study area with receptors that would potentially be affected by any changes in flood magnitude. The value of these receptors, based on the definitions in Table 57 of the SMR, is also indicated.

Table 31: River flood risk sources and receptors

| Source      | Location description and figure/coordinate <sup>183</sup>                                                          | Receptor potentially affected | Receptor value/sensitivity to flooding |
|-------------|--------------------------------------------------------------------------------------------------------------------|-------------------------------|----------------------------------------|
| River Anker | Rowland Avenue, Pooley View, Rickyard Close, B5000<br>Tamworth Road, Polesworth<br>WR-01-351b-D5 and WR-01-351b-D6 | Residential properties        | High                                   |
|             | Pooley playing fields                                                                                              | Sports field                  | Low                                    |

<sup>175</sup> Royal Haskoning (2011). *Warwickshire Preliminary Flood Risk Assessment*. Available online at:

<http://webarchive.nationalarchives.gov.uk/20140328165716/http://cdn.environment-agency.gov.uk/flho1211bvt-e-e.pdf>

<sup>176</sup> URS (2013). *Stratford-upon-Avon DC, Warwickshire CC, North Warwickshire BC & Rugby BC Level 1 Strategic Flood Risk Assessment*.

Available online at: <https://www.northwarks.gov.uk/downloads/file/3195/north-warwickshire-level-1-strategic-flood-risk-assessment>

<sup>177</sup> Warwickshire County Council (2016). *Local Flood Risk Management Strategy*. Available online at:

<https://apps.warwickshire.gov.uk/api/documents/WCCC-1039-29>

<sup>178</sup> AECOM (2015) *Warwickshire County Council Surface Water Management Plan Methodology Report*. Available online at:

<https://apps.warwickshire.gov.uk/api/documents/WCCC-1039-45>

<sup>179</sup> Halcrow Group Limited (2009) *Tamworth Borough Council Strategic Flood Risk Assessment for Local Development Framework, Level 1*.

Available online at: [http://www.tamworth.gov.uk/sites/default/files/planning\\_docs/G-Natural\\_Environment\\_Climate\\_Change\\_A/G13\\_SFRA\\_Level\\_1\\_Report\\_2009.pdf](http://www.tamworth.gov.uk/sites/default/files/planning_docs/G-Natural_Environment_Climate_Change_A/G13_SFRA_Level_1_Report_2009.pdf)

<sup>180</sup> Royal Haskoning (2011) *Staffordshire Preliminary Flood Risk Assessment*. Available online at:

<http://webarchive.nationalarchives.gov.uk/20140328163835/http://cdn.environment-agency.gov.uk/flho1211bvro-e-e.pdf>

<sup>181</sup> Shropshire Council and Staffordshire County Council (2015) *Shropshire and Staffordshire Local Flood Risk Management Strategy, Part 1*.

Available online at: <https://www.staffordshire.gov.uk/environment/Flood-Risk-Management/lfrmspart1.pdf>

<sup>182</sup> Royal Haskoning (2010) *South Staffordshire Surface Water Management Plan, Phase 1*. Available online at:

[https://www.sstaffs.gov.uk/doc/171944/name/SWMP\\_FINAL1.pdf](https://www.sstaffs.gov.uk/doc/171944/name/SWMP_FINAL1.pdf)

<sup>183</sup> This is the location at which the source intersects the Proposed Scheme, as indicated by the grid coordinates on the relevant Volume 2: LA02 Map Book figure (in this case WR-01)



High Speed Rail (Crewe to Manchester and West Midlands to Leeds)  
Working Draft Environmental Statement Volume 2: LA02

| Source         | Location description and figure/coordinate <sup>183</sup>                                                        | Receptor potentially affected                  | Receptor value/sensitivity to flooding |
|----------------|------------------------------------------------------------------------------------------------------------------|------------------------------------------------|----------------------------------------|
|                | WR-01-351b-E5 and WR-01-351b-F5                                                                                  |                                                |                                        |
|                | Pooley Country Park<br>WR-01-351b-F5                                                                             | Amenity open space and recreational facility   | Low                                    |
|                |                                                                                                                  | Access road to recreational facility           | Moderate                               |
|                | Abbey Green Park<br>WR-01-351b-E6                                                                                | Recreational facilities and amenity open space | Low                                    |
| Bramcote Brook | Bramcote House<br>WR-01-351b-F6                                                                                  | Residential property                           | High                                   |
|                | Agricultural land<br>WR-01-351b-F6, WR-01-351b-G6, WR-01-351b-G7, WR-01-351b-H5, WR-01-351b-H6 and WR-01-351b-H7 | Agricultural land                              | Moderate                               |
|                | Gas valve compound<br>WR-01-351b-H7                                                                              | Gas infrastructure                             | Very high                              |
|                | Warton Lane<br>WR-01-351b-H7                                                                                     | Road infrastructure                            | Moderate                               |

## Surface water flooding

15.3.28 There are numerous areas that are susceptible to surface water flooding within the study area. The key sources and receptors with potential to be affected are shown in Table 32<sup>184</sup>. The value of these receptors, based on Table 57 of the SMR, is also indicated.

Table 32: Surface water flood risk sources and receptors

| Source                                                              | Location description and figure/coordinate (NGR) <sup>185</sup> | Receptor potentially affected | Receptor value |
|---------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------|----------------|
| Surface water ponding and flow by the realigned B5000 Tamworth Road | Hermitage Lane and B5000 Tamworth Road<br>WR-01-351b-D5         | Hermitage Lane                | Moderate       |
|                                                                     |                                                                 | Commercial property           | Moderate       |
|                                                                     |                                                                 | Agricultural land             | Moderate       |
|                                                                     |                                                                 | Kiln Way                      | Moderate       |
| Surface water flow along River Anker valley                         | Pooley Country Park<br>WR-01-351b-F5                            | Playing fields                | Low            |
|                                                                     |                                                                 | Amenity open space            | Low            |

<sup>184</sup> The receptor value has been assumed based on the Risk of Flooding from Surface Water dataset. Where the risk of flooding is high (1 in 30 year event) the receptor value is very high, where the risk of flooding is medium (1 in 30 to 1 in 100 year event) the receptor value is high and where the risk of flooding is low (1 in 100 to 1 in 1,000-year event) the receptor value is moderate

<sup>185</sup> This is the location at which the source intersects the Proposed Scheme, as indicated by the grid coordinates on the relevant Volume 2: LA02 Map Book figure (in this case WR-01)

High Speed Rail (Crewe to Manchester and West Midlands to Leeds)  
Working Draft Environmental Statement Volume 2: LA02

| Source                                                             | Location description and figure/coordinate (NGR) <sup>185</sup> | Receptor potentially affected | Receptor value |
|--------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------|----------------|
| Surface water flow along Bramcote Brook floodplain and tributaries | North-east of Polesworth<br>WR-01-351b-F6                       | Linden Lane                   | Moderate       |
|                                                                    |                                                                 | Agricultural land             | Moderate       |
|                                                                    | Austrey Meadows<br>WR-01-351b-H7                                | Agricultural land             | Moderate       |
|                                                                    |                                                                 | Warton Lane                   | Moderate       |
| Surface water flow from the north of Austrey                       | Lodge Farm<br>WR-01-352a-C5                                     | Residential property          | High           |
|                                                                    |                                                                 | Agricultural land             | Moderate       |
|                                                                    | Newton Lane realignment<br>WR-01-352a-C5 and WR-01-352a-C6      | Newton Lane                   | Moderate       |

### Artificial water bodies

15.3.29 Flooding from artificial water bodies may occur due to failure of an impounding structure, such as a dam or canal embankment. Artificial water bodies with potential implications for flood risk within the study area include the Coventry Canal and Merevale Lake. Merevale Lake, located approximately 7km south-east of the Proposed Scheme, has a mapped inundation flow path crossing the Proposed Scheme near Polesworth. However, as this is a large raised reservoir, subject to the requirements of reservoir safety legislation<sup>186</sup>, the inundation risk posed by this reservoir is considered negligible. The risk of flooding from Coventry Canal is considered negligible as there are no historic flood incidents along the Coventry Canal identified in the NWBC SFRA. In addition, the Canal & River Trust manage and maintain the Coventry Canal, undertaking regular inspections and maintenance where required.

### Groundwater flooding

15.3.30 Information related to historical incidents of groundwater flooding in the Birchmoor to Austrey area is provided within the NWBC and TBC SFRA. The NWBC SFRA states that there is no history of groundwater flooding within NWBC. The SFRA states due to the presence of mudstone across the area, the risk of groundwater flooding should be relatively low. The TBC SFRA states that apart from the valleys of the Tame and Trent, there are no other known problems with flooding from groundwater in the borough of Tamworth.

15.3.31 The BGS Groundwater flooding susceptibility dataset indicates that there is some potential for groundwater flooding to occur in the River Anker floodplain and at the northern extent of the Birchmoor to Austrey area. This susceptibility to groundwater flooding is likely to be associated with the permeable superficial river terrace deposits and alluvium deposits which form Secondary A aquifers.

<sup>186</sup> Department for Environment Food and Rural Affairs and the Environment Agency; Reservoirs: owner and operator requirements; <https://www.gov.uk/guidance/reservoirs-owner-and-operator-requirements>

## Land drainage

- 15.3.32 Existing topography, soils and land drainage systems within the study area are described in Section 4, Agriculture, forestry and soils. The rivers and watercourses within the area are connected to an extensive network of existing open drains. Subsurface drainage systems are also likely to be present in fields used for agriculture. The land drainage function of these systems, which is important for crop productivity, is potentially sensitive to increases in water levels within the receiving watercourses.

## 15.4 Effects arising during construction

### Avoidance and mitigation measures

- 15.4.1 The principal strategy adopted to limit the temporary and permanent effects of the Proposed Scheme is through avoidance of sensitive receptors wherever reasonably practicable. Where receptors could not be avoided, mitigation measures have been incorporated where appropriate and reasonably practicable, to limit the potential effects. Section 16 of the draft CoCP<sup>187</sup> includes a range of mitigation measures that aim to reduce construction impacts as far as is reasonably practicable. The avoidance and mitigation measures that are of particular relevance to water resources and flood risk during construction are described in the following sections of this report.

#### *Water resources and WFD*

- 15.4.2 The avoidance of sensitive receptors has reduced the risks associated with the Proposed Scheme not complying with the requirements of the WFD. Examples of this strategy include:
- avoidance of channels and floodplain areas, where reasonably practicable - the route of the Proposed Scheme will avoid passing along river or stream valleys, such as that of the River Anker and its associated floodplain. Instead it would mostly pass over this larger watercourse and associated floodplain on viaducts spanning the floodplain, with piers set back from the channel;
  - avoidance, where reasonably practicable, of water dependent habitats, including natural springs that can play a key role in the hydrology and hydrogeology of such ecosystems; and
  - avoidance, where reasonably practicable, of major public water supplies and smaller licensed and unlicensed abstractions of surface water and groundwater.
- 15.4.3 The presence of any unregistered private water supplies, their function and the means of protecting or if necessary replacing them would be discussed with any landowners potentially affected by the Proposed Scheme.
- 15.4.4 The temporary works shown on Map Series CT-05 in the Volume 2: LA02 Map Book have been informed by a detailed consideration of the water resources constraints and have sought to avoid sensitive features wherever reasonably practicable.

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<sup>187</sup> Supporting document: Draft Code of Construction Practice

- 15.4.5 A watercourse realignment is proposed at Bramcote Brook. The aim will be to design this with equivalent hydraulic capacity to the existing channels. The Proposed Scheme would also aim to ensure that field subsurface drainage systems can be adapted to discharge into the new channel. Where such watercourses are natural channels, the design principle will be to incorporate appropriate features to retain and, where reasonably practicable, enhance their hydromorphological condition<sup>188</sup>.
- 15.4.6 Watercourse diversions, which would result in changes in flow regime within discrete sections of channel, have been avoided wherever possible. There are two diversions proposed within this study area. The watercourse diversions along Tributary of Bramcote Brook (1) and Tributary of Bramcote Brook (2) are a result of the proposed embankment across the Bramcote Brook floodplain and the watercourses would be diverted north and south of the embankment, respectively. The diversions would result in new discharge points into Bramcote Brook following changes to the channels length and direction.
- 15.4.7 For watercourses that are not in their natural condition, the design aim for realignments and diversions will be to incorporate measures, where reasonably practicable, to improve their hydromorphological condition, provided this is compatible with their flood risk and land drainage functions.
- 15.4.8 The design of infrastructure required within or in proximity to an existing channel (including bridge abutments, intermediate piers and outfalls) will aim to reduce impacts on the natural hydromorphology of watercourse channels, as far as is reasonably practicable.
- 15.4.9 The draft CoCP includes requirements to protect water bodies and their associated water resources from the potential impacts of pollution from construction site runoff, including where appropriate:
- provision of maps showing sensitive areas and buffer zones where no pollutants are to be stored or used; and
  - preparation of method statements for silt management, site drainage at compounds and satellite compounds, for the storage and control of oils and chemicals and the prevention of accidental spillages, in consultation with the Environment Agency, and if appropriate, the LLFA and other relevant authorities as part of the approvals process. These method statements will cover, where applicable:
    - the avoidance of discharges of site runoff to ditches, watercourses, drains, sewers or soakaways without the prior approval of the appropriate authority;
    - measures to prevent silt-laden runoff and other pollutants entering the water environment; and
    - restrictions or controls on excavation within watercourses to limit effects on water quality, sedimentation, fisheries and aquatic ecology.

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<sup>188</sup> Hydromorphological condition: reflects the extent to which water flow, sediment composition and movement, continuity (in rivers) and the structure of physical habitats departs from that expected of a natural river or stream system

- 15.4.10 Method statements will be required for all watercourse crossings and channel realignments required for site haul routes. The method statements will describe how potential changes to flood risk, water quality and channel hydromorphology will be managed during the establishment, use and decommissioning of all site haul routes.
- 15.4.11 Permanent culverts are proposed on the smaller watercourse crossings within this study area including those on Bramcote Brook and its tributaries (Tributary of Bramcote Brook (1) and Tributary of Bramcote Brook (2)). Culverts are also proposed at the following locations to maintain existing and proposed land drainage networks associated with the Proposed Scheme: B5000 Tamworth Road realignment, Pooley Lane overbridge, a drop inlet culvert beneath New Covert embankment, Newton Lane diversion (south and north), Austrey embankment and No Man's Heath Lane (east and west). The detailed design of these culverts will be developed in general accordance with Construction Industry Research and Information Association (CIRIA) and Environment Agency guidance and in consultation with Environment Agency specialists. The design has sought to mitigate the impact on the hydromorphology of the affected watercourses, as follows:
- drop inlet culverts have been avoided wherever reasonably practicable and are proposed on minor headwater channels or ditches only;
  - culvert lengths have been reduced as far as is reasonably practicable; and
  - invert levels would be set below the firm bed of the watercourse to allow a natural substrate to develop along the bed of the culvert.
- 15.4.12 The wider issues associated with these culverts, and how their detailed design will aim to ensure no deterioration in the status of any of the relevant water bodies WFD quality elements, will be considered within the WFD compliance assessment.
- 15.4.13 Existing groundwater abstraction boreholes or monitoring points would be protected from physical damage, insofar as reasonably practicable, including appropriate decommissioning of abandoned boreholes in order to prevent pollution pathways. If boreholes are to be decommissioned and replaced with alternatives, the contractors would follow the latest good practices. This principle would also be applicable to springs potentially affected by the Proposed Scheme, although additional measures may be required to mitigate temporary construction impacts on springs that are to be relocated. Wherever reasonably practicable, the design will aim to recreate affected spring features nearby.
- 15.4.14 Measures would be introduced, as required, to mitigate the temporary and permanent effects on groundwater flows and water quality during excavation and construction of foundations, tunnels and cuttings as far as is reasonably practicable. The types of measure likely to be adopted could include:
- installation of cut-off<sup>ff189</sup> structures around excavations;

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<sup>189</sup> Impermeable barrier preventing water flow

- ensuring cut-off structures are driven to sufficient depths to meet an underlying strata or zone of lower permeability;
- promoting groundwater recharge, such as discharging pumped water to recharge trenches around excavations to maintain baseline groundwater and surface water conditions; and
- incorporating passive bypasses within the design, which could comprise a 'blanket' of permeable material, such as gravel, placed around temporary structures allowing groundwater to bypass the below-ground works, without a rise in groundwater levels on the upstream side.

15.4.15 The exact requirements would be refined and method of mitigation would be designed following ground investigation at foundations, tunnels or cutting locations.

### *Flood risk and land drainage*

15.4.16 The design of the Proposed Scheme will aim to mitigate permanent impacts on flood risk and land drainage as follows:

- the floodplain avoidance strategy will ensure that the impacts on flood flows within rivers and streams, and their floodplains, would be limited to those associated with the intermediate pier structures on the Polesworth viaduct, which would be located in the River Anker floodplain and the presence of the Bramcote Brook embankment in the Bramcote Brook floodplain. The Proposed Scheme includes replacement floodplain storage areas to replace losses associated with the piers and highway realignment and the embankment located within the Bramcote Brook floodplain;
- the temporary works shown on Map Series CT-05 in the Volume 2: LA02 Map Book have been informed by a detailed consideration of the flood risk constraints and have sought to avoid flood zones wherever reasonably practicable;
- provision has been made to pass surface water runoff and land drainage flows beneath sections of raised embankment that would cross surface water flow paths where reasonably practicable. This would be achieved using perimeter drainage and culverts, with their inverts set below the likely level of any upstream field subsurface drainage systems;
- in locations where the route of the Proposed Scheme would cross watercourses, the design aim is for structures to accommodate flood flows up to and including the 1 in 100 (1%) annual probability flood with an allowance for climate change based on latest guidance issued by the Environment Agency<sup>190</sup>;
- runoff from the footprint of the infrastructure could occur more rapidly post-construction due to steeper slope angles and the permeability of the newly-created surfaces. The design of drainage systems aims to ensure that there

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<sup>190</sup> Environment Agency (2016), *Adapting to Climate Change. Advice for Flood and Coastal Erosion Risk Management Authorities*

would be no significant increases in flood risk downstream, during storms up to and including the 1 in 100 (1%) annual probability design event, with an allowance for climate change based on the latest guidance issued by the Environment Agency;

- balancing ponds for new sections of highway and railway drainage have been sized on a precautionary basis, pending more detailed information about the permeability and runoff characteristics of existing and proposed ground surfaces;
- where the Proposed Scheme would pass in cutting, drainage measures would be provided with the aim of preventing flow into the cutting and diverting this water into its natural catchment. Where reasonably practicable, runoff from the cuttings would also be drained to the catchment to which this water would naturally drain, avoiding transfer of water from one water body to another, which could increase flood risk or impact on land drainage systems; and
- measures would be introduced to reduce any potentially significant effects on groundwater flood risk as far as is reasonably practicable, including the incorporation of passive hydraulic bypasses at cuttings and other below ground structures. These could for example comprise a 'blanket' of permeable material such as gravel.

15.4.17 The nominated undertaker will, insofar as reasonably practicable, ensure that flood risk is managed throughout the construction period and will consider flooding issues when planning sites and storing materials. If necessary, temporary provision would be made to reduce the potential for impacts on existing land drainage systems during construction. Some of the specific measures referred to in the draft CoCP, include:

- preparation of flood risk assessments and method statements for temporary works, including main construction and satellite compound drainage, watercourse crossings and realignments and temporary realignments in consultation with the Environment Agency, and where applicable, the LLFA and other relevant regulators;
- location of storage, machinery, equipment and temporary buildings outside flood risk areas where reasonably practicable;
- construction of outfalls during periods of low flow to reduce the risk of scour and erosion;
- design of temporary watercourse realignments with equivalent hydraulic capacity to the existing channels, ensuring that field subsurface drainage systems can be adapted to discharge into the new channel; and
- having regard to the requirement for construction activities to avoid any increases in flood risk to vulnerable receptors.

15.4.18 In accordance with Section 16 of the draft CoCP, monitoring would also be undertaken in consultation with the Environment Agency and, where applicable, the LLFA, to ensure that temporary structures are installed, maintained and removed in



accordance with the relevant environmental approvals and that impact on existing land drainage systems are managed appropriately.

### **Assessment of impacts and effects**

- 15.4.19 This section describes the significant effects following the implementation of the avoidance and mitigation measures. The majority of the potential temporary impacts on the water environment during construction would be avoided or mitigated by the working methods outlined in the draft CoCP. The mitigation embedded into the design has focused on reducing permanent impacts resulting from the presence of the Proposed Scheme to as low a level as is reasonably practicable.

#### *Temporary effects – Water resources and WFD*

##### **Surface water**

- 15.4.20 Potential temporary impacts on surface water quality, due to site runoff and increased pollution risk, are a key concern during construction and have the potential to affect abstractions and the water environment more generally. However, the practices outlined in the draft CoCP are considered adequate to mitigate any impacts, such that there are unlikely to be any significant effects.

##### **Groundwater**

###### *Aquifers*

- 15.4.21 The proposed cuttings and tunnels in the study area would intersect the Warwickshire Group Halesowen Formation, Pennine Middle Coal Measures and the Tarporley Siltstone Secondary A aquifers, the Sidmouth Mudstone Secondary B aquifer and the Tarporley Siltstone Formation Secondary (undifferentiated) aquifer. Whilst there are likely to be minor localised impacts, the implementation of the measures outlined in the draft CoCP is likely to mean that any impacts on the overall status of these aquifers would not be significant.
- 15.4.22 Where the cuttings could affect local receptors, such as groundwater abstractions or springs, this is reported in the sections below.

###### *Abstractions*

- 15.4.23 There is one licensed private groundwater abstraction, for amenity use of through flow in the lake and pond, within 1km of the land required for the construction of the Proposed Scheme, approximately 120m east of Austrey. There are no expected impacts to this abstraction as it is not in the zone of influence of any cuttings.

##### **Groundwater - surface water interactions**

- 15.4.24 There remains the potential for base flows to a drain of the Kettle Brook north of the M42 Tamworth tunnel to be impacted whilst groundwater levels are lowered during construction. Kettle Brook is located in the Lea Marston to Tamworth area (LA01). The assessment of this receptor is therefore covered in Volume 2: Community area LA01: Lea Marston to Tamworth.

### **Water dependent habitats**

- 15.4.25 Alvecote Pools SSSI is located 180m from Polesworth viaduct. Construction of the pier footings may have temporary localised impacts on groundwater levels in the vicinity of the piers, but this is anticipated to result in a negligible impact on groundwater levels at the SSSI.
- 15.4.26 Abbey Green LNR is located 560m upstream of the Polesworth viaduct on the River Anker. It is considered that there will be no effect on groundwater flows or levels at the LNR as a result of construction of the viaduct piers.
- 15.4.27 Further details of the effects and associated other mitigation, are provided in Section 7, Ecology and biodiversity.

### *Temporary effects - Flood risk and land drainage*

- 15.4.28 Construction of Polesworth viaduct would require temporary working within flood zones. This would include the construction traffic route that would span the Coventry Canal, the River Anker and Bramcote Brook during construction of the Polesworth viaduct. Construction sequencing and temporary works design will be carefully considered and assessed in terms of potential impacts on flood risk. Method statements detailing how these works will be undertaken would be produced by the nominated undertaker in consultation with the Environment Agency and the LLFA. It is not anticipated that these temporary activities would result in significant effects related to flood risk and land drainage.
- 15.4.29 Construction of the Bramcote Brook embankment and the associated flood mitigation measures would require temporary working within flood zones. This would include the construction traffic route that would span t Bramcote Brook, tributary of Bramcote Brook (1) and tributary of Bramcote Brook (2) during the construction of the Bramcote Brook embankment. Construction sequencing and temporary works design will be carefully considered and assessed in terms of potential impacts on flood risk. Method statements detailing how these works will be undertaken would be produced by the nominated undertaker in consultation with the Environment Agency and the LLFA. It is not anticipated that these temporary activities would result in significant effects related to flood risk and land drainage.

### *Permanent effects – Water resources and WFD*

- 15.4.30 Permanent effects are those initially caused by activity to construct the Proposed Scheme but which would also remain after the Proposed Scheme has been constructed and is present in the area.

### **Surface water**

- 15.4.31 The construction of the embankment across the Bramcote Brook floodplain would require realignment of the existing Bramcote Brook channel in two locations and diversion of tributary of Bramcote Brook (1) and tributary of Bramcote Brook (2) to minimise the watercourse crossings and need for culverts beneath Bramcote Brook embankment. The realignment and diversions would have the potential to cause minor localised impact on the hydromorphology of the watercourses as proposed amendments to channel length and direction would potentially have an impact on the

sediment regime. Bramcote Brook is a high value receptor and this impact would result in a moderate adverse effect, which would be significant. The tributary of Bramcote Brook (1) and tributary of Bramcote Brook (2) are moderate value receptors and the impact would result in a minor adverse effect, which would not be significant.

- 15.4.32 In addition, the Bramcote Brook embankment would require the installation of a new culvert for the realigned Bramcote Brook. This has the potential to cause a minor localised impact on the hydromorphology of Bramcote Brook which is a high value receptor. This would potentially result in a moderate adverse effect, which would be significant.

## **Groundwater**

### *Aquifers*

- 15.4.33 It is currently anticipated that implementation of the avoidance and mitigation measures would ensure that there are no permanent significant effects related to the impact of the proposed cuttings on water levels and quality in the aquifers intercepted by the Proposed Scheme. Where the impacts of the cuttings on the aquifers could affect additional local receptors that rely on the groundwater resource, for example springs and abstractions, the impacts on these have been assessed below.

### *Abstractions*

- 15.4.34 The assessment has not identified any permanent significant effects on licensed groundwater abstractions.

## **Groundwater - surface water interactions**

- 15.4.35 The potential spring features north-west of Austrey Meadows at the Bramcote Brook embankment and north-west of Austrey at the Austrey embankment would be permanently lost. These features are assumed to be high value receptors on a precautionary basis. The loss of these features would therefore potentially result in a permanent moderate adverse effect related to flows from this spring, which would be significant.

## **Water dependent habitats**

- 15.4.36 Permanent impacts on groundwater flow are not anticipated at Alvecote Pools SSSI and Abbey Green LNR as a result of the Proposed Scheme. The closest point of the Proposed Scheme is Polesworth viaduct and the presence of piers would be unlikely to permanently alter groundwater flow or levels at these sites.

### *Permanent effects - Flood risk and land drainage*

- 15.4.37 Hydraulic modelling of the River Anker and Bramcote Brook is in progress. It is currently anticipated that the Proposed Scheme would result in a negligible impact on flood levels due to the provision of replacement floodplain storage. This would have negligible effect on the following receptors: amenity open space, sports fields and associated recreational facilities classed as low value receptor, agricultural farmland and minor roads classed as moderate value receptors and residential property, gas infrastructure and the M42 classed as very high value receptors. This would result in a negligible effect to all receptors, which is not significant.

- 15.4.38 Surface water flow paths would be intersected by the Austrey embankment and, as a result, alternative flow paths could be created. This has been assessed as having a moderate impact on agricultural land as a result of changed flood levels and extent. Agricultural land is a moderate value receptor resulting in a moderate adverse effect, which would be significant. This would also have a moderate impact on the M42 as a result of changed flood levels and extent. The M42 is a very high value receptor which would result in a major adverse effect, which would be significant.
- 15.4.39 Surface water flow paths would be intersected by Bramcote Brook embankment, displacing surface waters within the agricultural land. This has been assessed as having a moderate impact on agricultural land as a result of changed flood levels and extent. Agricultural land is a moderate value receptor resulting in a moderate adverse effect, which would be significant. This would also have a moderate impact on the M42 as a result of changed flood levels and extent. The M42 is a very high value receptor which would result in a major adverse effect, which would be significant.

### **Other mitigation measures**

- 15.4.40 Additional mitigation measures to further reduce the temporary and permanent impacts of construction stage activities, where there is potential for the Proposed Scheme to result in significant effects are described in the sections below.

#### *Surface water*

- 15.4.41 Additionally, the embedded mitigation proposed in the design of Bramcote Brook culvert will be developed further in consultation with the Environment Agency and relevant LLFA.
- 15.4.42 The positioning of piers for the Polesworth viaduct would be carefully managed to avoid, where possible, the watercourse banks. Where necessary, scour protection mitigation would be developed to manage erosion. Hydromorphological mitigation will be considered up and downstream of the pier locations to enable erosion patterns to re-stabilise as a result of any scour protection.

#### *Groundwater – surface water interactions*

- 15.4.43 A survey of the potential spring features north-west of Austrey Meadows at the Bramcote Brook embankment and north-west of Austrey at the Austrey embankment will be undertaken to determine their value and to identify whether further mitigation is required. If they are confirmed as springs, measures would be implemented to re-establish these springs nearby in a manner that ensures any adverse impacts are mitigated.

#### *Flood risk and land drainage*

- 15.4.44 The embedded mitigation proposed for land drainage at the embankments, including perimeter drainage and culvert size will be developed further in consultation with the LLFA to ensure changes in surface water flood flow paths, levels and extent are reduced insofar as reasonably practicable.

## Summary of likely residual significant effects

- 15.4.45 In the absence of the other mitigation measures set out above, the Proposed Scheme would potentially result in residual significant effects as follows:
- a major adverse effect related to the Austrey embankment altering surface water flow paths surrounding the M42, which would be significant;
  - a major adverse effect related to the Bramcote Brook embankment altering surface water flow paths surrounding the M42, which would be significant;
  - a moderate adverse effect related to the Austrey embankment altering surface water flow paths on the agricultural land, which would be significant;
  - a moderate adverse effect related to the Bramcote Brook embankment altering surface water flow paths on the agricultural land, which would be significant;
  - a moderate adverse effect related to the realignment of Bramcote Brook, which would be significant;
  - a moderate adverse effect related to the installation of the Bramcote Brook culvert beneath Bramcote Brook embankment, which would be significant; and
  - a moderate adverse effect related to the loss of the potential spring features north-west of Austrey Meadows north-west of Austrey, which would be significant.
- 15.4.46 It is currently anticipated that it should be possible to develop the means of mitigating these impacts, to ensure that there are no residual significant effects arising from construction of the Proposed Scheme.

## 15.5 Effects arising from operation

### Avoidance and mitigation measures

- 15.5.1 The principal issue of concern during operation of the Proposed Scheme is the potential for accidental spillages to occur that could result in the release of contaminants into the water environment. This issue has been assessed on a route-wide basis in Volume 3: Route-wide effects (Section 16), where the mitigation measures associated with this risk are described. A draft operation and maintenance plan for water resources and flood risk will be provided in the formal ES.
- 15.5.2 The design takes into account the policies in the NPPF and will aim to ensure that the Proposed Scheme is safe from flooding without increasing flood risk elsewhere. Evidence of application of the Sequential Test and Exception Tests in the NPPF is provided on a route-wide basis in Volume 3: Route-wide effects.
- 15.5.3 Sustainable drainage systems will be used where reasonably practicable. These will help to remove any suspended material within runoff from the Proposed Scheme through filtration, vegetative adsorption or settlement. The drainage systems proposed will aim to ensure that the quantity and quality of water draining from the

Proposed Scheme during its operational phase would have a negligible impact on the water environment.

- 15.5.4 A summary of the route-wide WFD compliance assessment process is provided in Volume 3: Route-wide effects. This describes the ongoing assessment process and how measures will be embedded into the design that are specifically designed to ensure that the Proposed Scheme complies with the requirements of the WFD, where reasonably practicable. It is currently anticipated that the Proposed Scheme will be compliant with WFD legislation.

### **Assessment of impacts and effects**

- 15.5.5 There are considered to be no significant adverse effects related to water resources and flood risk arising from operation of the Proposed Scheme.

### **Other mitigation measures**

- 15.5.6 There are considered to be no further measures required to mitigate adverse effects on surface water resources, groundwater resources or flood risk.

### **Summary of likely residual significant effects**

- 15.5.7 The assessment indicated that there would be no residual significant effects on surface water, groundwater or flood risk during operation of the Proposed Scheme.

### **Monitoring**

- 15.5.8 Volume 1, Section 9 sets out the general approach to monitoring of water resources and flood risk during operation of the Proposed Scheme.
- 15.5.9 There are no area-specific requirements for monitoring water resources and flood risk during operation of the Proposed Scheme.

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# HS2

[www.hs2.org.uk](http://www.hs2.org.uk)

**High Speed Two (HS2) Limited**

Two Snowhill,

Snow Hill Queensway,

Birmingham B4 6GA

Freephone: 08081 434 434

Minicom: 08081 456 472

Email: [HS2enquiries@hs2.org.uk](mailto:HS2enquiries@hs2.org.uk)