

# High Speed Rail (Crewe – Manchester) Environmental Statement

## Volume 2: Community Area reports

MA02: Wimboldsley to Lostock Gralam

# HS2

## **High Speed Rail (Crewe – Manchester) Environmental Statement**

**Volume 2: Community Area reports**

MA02: Wimboldsley to Lostock Gralam



## 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.

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## Preface

### The Environmental Statement

This document forms part of Volume 2 of the Environmental Statement (ES) that accompanies the deposit of the High Speed Rail (Crewe – Manchester) hybrid Bill (hereafter referred to as the Bill). This Bill would authorise:

- the Phase 2b Western Leg, which comprises the section of the proposed High Speed Two (HS2) rail network from Crewe to Manchester, with connections onto the West Coast Main Line;
- a number of works that are required beyond the route, such as to the existing conventional rail network, to enable the operation of the Western Leg; and
- provision for future Northern Powerhouse Rail services to connect with HS2.

Collectively, these are referred to in this ES as ‘the Proposed Scheme’. The ES describes the Proposed Scheme and reports its likely significant environmental effects and the measures proposed to mitigate adverse effects.

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. The Phase One hybrid Bill received Royal Assent in February 2017. The main works on Phase One commenced in April 2020.

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. The Phase 2a Bill received Royal Assent in February 2021.

### Consultation on the Environmental Statement

The public has an opportunity to comment on this ES which accompanies the deposit of the Bill. The period of public consultation on the ES extends for at least 56 days (eight weeks) after the first newspaper notices that follow deposit of Bill documents in Parliament.

### Structure of the Environmental Statement

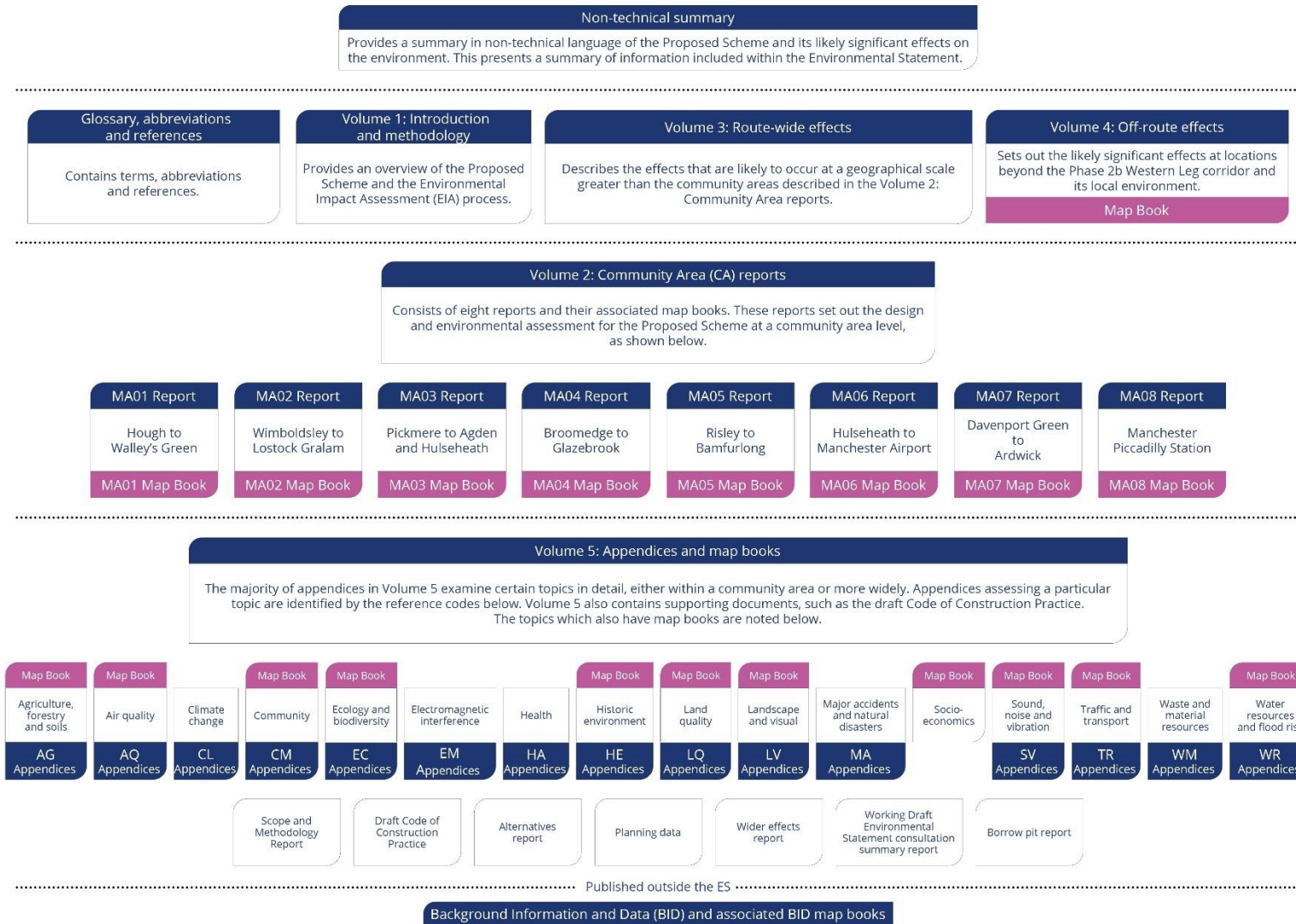
This report is part of the suite of documents that make up the ES for the Proposed Scheme. The structure of the ES is shown in Figure 1 and described in more detail in Volume 1. The ES has been prepared by persons who have sufficient expertise to ensure the completeness and technical quality of the statement.

# Environmental Statement

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**Figure 1: Structure of the 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. It will transform intercity and long distance passenger rail travel in the UK, providing the first major increase in intercity rail capacity for over a century and freeing up substantial capacity for rail travel and freight on the conventional rail network. London, Birmingham, Manchester and cities in the Midlands, the North and Scotland will be served by high speed trains running at speeds of up to 360kph (225mph) on HS2 lines and on the existing conventional rail network. As part of the Proposed Scheme, new stations will be built at Manchester Piccadilly and Manchester Airport, in addition to the new stations in London and the West Midlands included in HS2 Phase One.
- 1.1.2 The Proposed Scheme that is the subject of this ES consists of:
- the HS2 Western Leg from Crewe to Manchester, including:
    - new stations at Manchester Airport and Manchester Piccadilly;
    - a depot north of Crewe;
    - maintenance facilities north of Crewe and at Ashley; and
    - a connection onto the West Coast Main Line (WCML) near Bamfurlong;
  - the Crewe Northern Connection, connecting the route of the Proposed Scheme with the WCML and enabling future Northern Powerhouse Rail (NPR) services to connect with HS2;
  - provision for the NPR London to Liverpool, Manchester to Liverpool, and Manchester to Leeds junctions, to enable these future NPR routes to connect with HS2; and
  - a number of works at locations beyond the Western Leg route corridor, referred to as 'off-route works', which include:
    - works to enable HS2 trains to call at existing stations further north on the WCML; and
    - construction of depots to provide overnight stabling for HS2 trains serving the north of England and Scotland.
- 1.1.3 The Proposed Scheme will connect with HS2 Phase 2a at Hough, to the south of Crewe.
- 1.1.4 Construction of the Proposed Scheme is assumed to commence in 2025, with operation assumed to start in 2038.
- 1.1.5 The environmental effects of the Proposed Scheme have been assessed. The findings of the assessment are reported in the ES, of which this Volume 2 report forms a part. The ES has been deposited alongside the Bill, in accordance with the requirements of Parliamentary



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Standing Order 27A (SO27A)<sup>1</sup>. A working draft ES was consulted on during the development of the Phase 2b proposals to help inform the design and assessment of the Proposed Scheme.

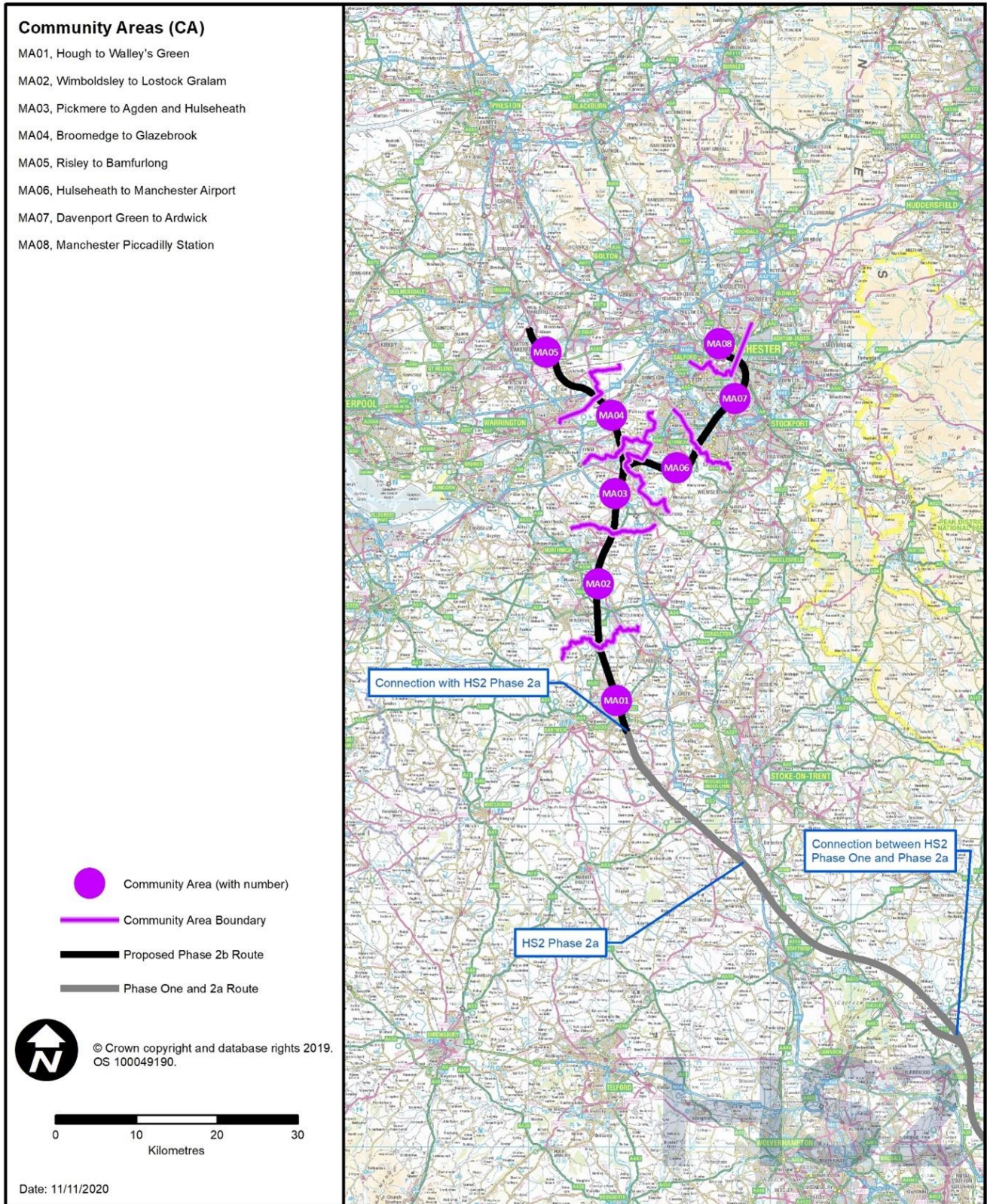
- 1.1.6 For environmental assessment and community engagement purposes, the Proposed Scheme has been divided into eight community areas (CA). These are shown in Figure 2. This CA report relates to the Wimboldsley to Lostock Gralam area (MA02).

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<sup>1</sup> House of Commons (2019), *Standing Order 27A of the Standing Orders of the House of Commons relating to private business (environmental assessment)*, House of Commons. Available online at: <https://www.parliament.uk/business/publications/commons/sessional-orders-private1/>.

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**Figure 2: The HS2 Phase 2b Western Leg route and community areas**



## 1.2 Purpose of this report

- 1.2.1 This report presents the likely significant effects of the construction and operation of the Proposed Scheme on the environment within Wimboldsley to Lostock Gralam area. The report also describes the proposed means to avoid, prevent, reduce or, if possible, offset the likely significant effects of the Proposed Scheme on the environment within the area, along with any proposed monitoring measures.

## 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 list of the local alternatives considered;
- 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 (Sections 4 to 15) comprises:

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



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- 1.3.3 Environmental effects have been assessed in accordance with the scope, methodology, assumptions and limitations set out in Volume 1 and the EIA Scope and Methodology Report (SMR)<sup>2</sup>. Volume 1 also sets out assumptions relating to the impact of Covid-19 on the environmental baseline.
- 1.3.4 The maps relevant to the Wimboldsley to Lostock Gralam area are provided in a separate corresponding document entitled Volume 2: MA02 Map Book, which should be read in conjunction with this report. The maps contain grid references that are referred to in this report to enable features to be located.
- 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: MA02 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 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, climate change, electromagnetic interference, major accidents and disasters, and waste and material resources are addressed in Volume 3 on a route-wide basis. An assessment of potential environmental effects beyond the route corridor and its associated local environment has also been undertaken and this 'off-route' assessment is reported in Volume 4.
- 1.3.7 Supporting technical information, including technical appendices and map books, relating to the assessment in this Volume 2 report is provided in Volume 5 of the ES.
- 1.3.8 In addition to the technical appendices and map books in Volume 5, certain reports and maps containing Background Information and Data (BID) have been produced, which do not form part of the ES. These documents are available on the HS2 Ltd website ([www.hs2.org.uk](http://www.hs2.org.uk)). The BID reports and maps present survey information, collated from published and unpublished sources, and other background data, and are referenced at various places within the ES.

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<sup>2</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

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

### 2.1 Overview of the area

#### General

- 2.1.1 The Proposed Scheme in the Wimboldsley to Lostock Gralam area will comprise five main components:
- the HS2 main line (referred to in this report as the route of the Proposed Scheme), which will be 14.6km in length in this area;
  - Crewe Northern Connection, which will enable future Northern Powerhouse Rail (NPR) services to connect with HS2;
  - Crewe North infrastructure maintenance base – rail (IMB-R);
  - Crewe North rolling stock depot (RSD); and
  - the reception tracks connecting the Crewe North RSD with both the West Coast Main Line (WCML) and the route of the Proposed Scheme.
- 2.1.2 The Proposed Scheme in the Wimboldsley to Lostock Gralam area will be within the local authority areas of Cheshire West and Chester Council (CWCC) and Cheshire East Council (CEC). The Proposed Scheme will pass through the parishes of Stanthorne and Wimboldsley, Winsford, Bostock, Byley, Davenham, Rudheath, Lach Dennis, Lostock Gralam and Plumley.
- 2.1.3 The boundary between the parishes of Minshull Vernon and Stanthorne and Wimboldsley forms the southern boundary of the Wimboldsley to Lostock Gralam area. Smoker Brook forms the northern extent of the area. The Hough to Walley's Green area (MA01) lies to the south and the Pickmere to Agden and Hulseheath area (MA03) lies to the north, as shown in Figure 3.

#### Settlement, land use and topography

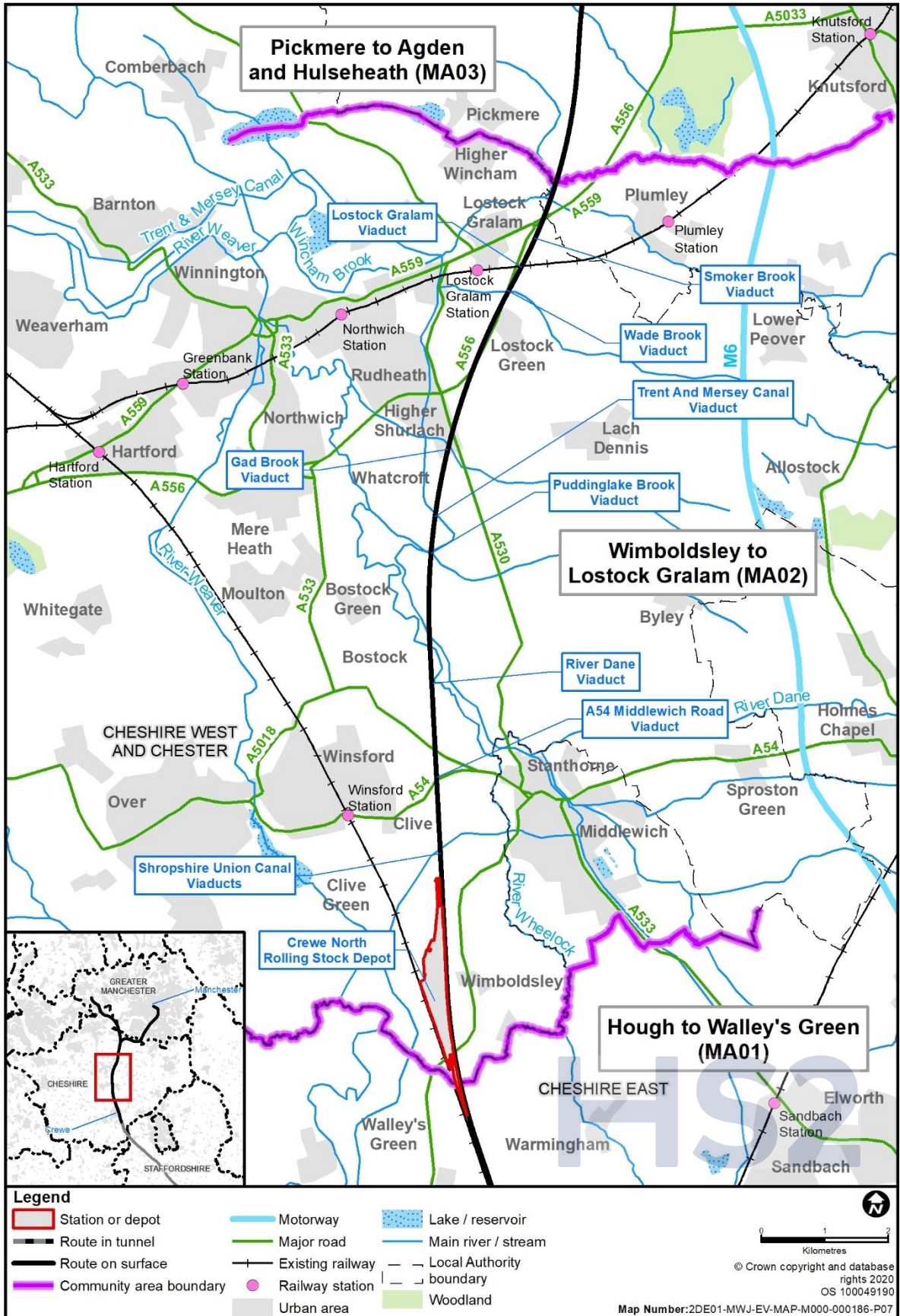
- 2.1.4 The Wimboldsley to Lostock Gralam area comprises a mix of rural and urban areas, with agriculture being the main land use. There are brinefields (areas of salt rich rocks that are used for the production of commercial salt through solution mining) in the southern and northern parts of the area.
- 2.1.5 The larger settlements of Middlewich and Winsford are located in the south of the area. Northwich, Lostock Green and Lostock Gralam are located in the north of the area. The low-lying agricultural land is interspersed with occasional woodland including ancient woodland, the smaller settlements of Wimboldsley, Stanthorne, Bostock Green and Lach Dennis and a scattering of isolated dwellings and farmsteads. Winsford Rock Salt Mine, located to the north of Winsford, is also a prominent feature of the area.

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- 2.1.6 The area is undulating. The highest area is largely flat at around 45m above Ordnance Datum (AOD) in the south of the area, between the shallow valleys of the River Weaver and the River Wheelock. North of this the land falls to a height of around 25m AOD, before undulating between around 30m to 40m AOD.

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**Figure 3: Community area context map**



## Key transport infrastructure

- 2.1.7 The M6 passes through the area, with junction 18 located 2.8km to the east of Middlewich. Other principal highways in the area include the A556 Chester Road/Shurlach Road, the A530 King Street, the A530 Nantwich Road, the A559 Manchester Road, the A54 Middlewich Road and the A533 Northwich/Bostock Road.
- 2.1.8 The WCML passes through the Wimboldsley to Lostock Gralam area, running in a south-north direction on the western side of the route of the Proposed Scheme, with a station at Winsford. The route of the Proposed Scheme will cross the Sandbach to Northwich Line at Whatcroft and the Northwich to Knutsford Railway (part of the Mid-Cheshire Line) at Lostock Gralam.
- 2.1.9 The Shropshire Union Canal (Middlewich Branch) and the Trent and Mersey Canal pass through the Wimboldsley to Lostock Gralam area and will be crossed by the Proposed Scheme near Clive Green and Bostock Hall respectively.
- 2.1.10 The Proposed Scheme will cross several public rights of way (PRoW) including local access roads and public footpaths, which provide important links between scattered dwellings and surrounding villages.

## Socio-economic profile

- 2.1.11 The professional, scientific and technical sector accounts for the largest proportion of businesses within the CWCC area (18%), followed by the retail (10%), business administration and support services (9%) and construction (9%) sectors. The professional, scientific and technical sector also accounts for the largest proportion of businesses in the CEC area (19%), followed by the construction (9%) and business administration and support services (9%) sectors<sup>3</sup>.
- 2.1.12 According to the Annual Population Survey (2020)<sup>4</sup>, the employment rate (the proportion of residents aged 16-64 in employment) within the CWCC area was 82% (156,500 people) and within the CEC area was 76% (171,300). The unemployment rate for those aged 16-64 was 3% in the CWCC area and 4% in the CEC area in 2020.
- 2.1.13 The same survey indicates that 45% of residents aged 16-64 in the CWCC area were qualified to National Vocational Qualification Level 4 (NVQ4) and above, while 7% of residents had no qualifications. In the CEC area, 42% of residents aged 16-64 were qualified to NVQ4 and above, with 5% of residents having no qualifications.

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<sup>3</sup> Office for National Statistics (2020), *UK Business Counts - Local units by industry and employment size band*. Available online at: <https://www.nomisweb.co.uk/datasets/idbrlu>.

<sup>4</sup> Office for National Statistics (2020), *Annual Population Survey, NOMIS*. Available online at: <https://www.nomisweb.co.uk/datasets/apsnew>. This number includes the jobs held by residents of CWCC and CEC irrespective of where they work.



## **Notable community facilities**

- 2.1.14 The main concentrations of community facilities are in the larger settlements of Middlewich, Winsford and Northwich. Wimboldsley, Clive and Clive Green, Stanthorne, Bostock and Bostock Green, Mere Heath, Whatcroft, Lach Dennis, Higher Shurlach and Rudheath, Lostock Green, Lostock Gralam and Plumley are smaller villages and hamlets that provide fewer local services.
- 2.1.15 Community facilities in Middlewich include several nurseries, primary schools and a secondary school, places of worship, health centres, a police station and a fire station.
- 2.1.16 Community facilities in Winsford include several nurseries, primary schools and secondary schools, including Hebden Green Community School and Specialist Arts College. There are also places of worship, health centres, a police headquarters, a fire and rescue service headquarters, a police station, ambulance station and fire station. There is additionally Meadowbank Lodge, a day activity centre for people with learning disabilities and dementia.
- 2.1.17 Community facilities in Northwich include several nurseries, primary schools and secondary schools including Greenbank School, places of worship, health centres, a magistrates' court, a fire station and a police station.
- 2.1.18 Wimboldsley and Stanthorne is a small community, with facilities including Wimboldsley Community Primary School, which also provides support to pupils with special educational needs and disabilities.
- 2.1.19 Rudheath is a village with community facilities, which include Chrysalis Day Nursery (in Higher Shurlach), Rudheath Primary Academy and The Venue, a mixed-use community facility.
- 2.1.20 Lostock Gralam is a village with community facilities, which include Lostock Green Methodist Church, Lostock Gralam Church of England Primary School and St John's Church.

## **Recreation, leisure and open space**

- 2.1.21 The Wimboldsley to Lostock Gralam area is a mix of urban and rural areas, with open space, woodland, waterways and farmland interspersed between the settlements. It features two promoted routes (routes which are promoted in their own right as a recreational resource): the Cheshire Ring Canal Walk, passing through Middlewich and Rudheath, and the Dane Valley Way, which passes through Middlewich.
- 2.1.22 Waterways include the Trent and Mersey Canal; the Shropshire Union Canal (Middlewich Branch), the River Weaver, the River Dane; and the River Wheelock.
- 2.1.23 Other notable recreation, leisure and open space facilities in the Wimboldsley to Lostock Gralam area include the Wimboldsley Wood Site of Special Scientific Interest (SSSI), north-east of Wimboldsley; Winsford Flash, which is a series of shallow lakes available to the public for fishing and sailing, south-east of Winsford; Griffith's Park, north of Rudheath; Lostock

picnic area alongside the A556 Chester Road; Long Wood and Winnington Wood east of Lostock Gralam; and the Plumley Lime Beds Nature Reserve and SSSI, south-west of Plumley.

- 2.1.24 There are sports fields, clubs and recreational grounds in many of the towns and villages in the Wimboldsley to Lostock Gralam area, which offer leisure opportunities to residents.
- 2.1.25 In the Wimboldsley to Lostock Gralam area, the National Cycle Route 5 runs between Winsford and Middlewich. National Cycle Route 551 runs from Winsford to the south-west and National Cycle Route 573 runs from Davenham eastwards towards the M6. The towpaths of the Trent and Mersey Canal and the Shropshire Union Canal (Middlewich Branch) provide off-road cycle routes.

## **Policy and planning context**

- 2.1.26 Volume 1 provides an overview of the case for HS2.

### **Planning framework**

- 2.1.27 Relevant development plan documents and other planning policies have been considered in relation to environmental topics, as part of considering the Proposed Scheme in the local context. Development plan documents and other planning policies relevant to the Wimboldsley to Lostock Gralam area are listed in Volume 5: Appendix CT-004-00000, Planning data. These have been considered and referred to where appropriate to the assessment described in Sections 4 to 15 of this Volume 2 report.

### **Committed development**

- 2.1.28 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. Section 7 of Volume 1 sets out the approach to identifying and considering committed developments in the assessment. The committed developments relevant to the assessment of the Proposed Scheme in the Wimboldsley to Lostock Gralam area listed in Volume 5: Appendix CT-004-00000, Planning data and are shown in Volume 5, Planning Data/Committed Development Map Book: maps CT13-304b to CT-13-309a.
- 2.1.29 These have been considered to determine whether they would result in a material change to the future baseline or have the potential to give rise to cumulative effects for each environmental topic. The committed developments considered in the assessment for the Wimboldsley to Lostock Gralam area are reported in the relevant topic sections of this report.

## Changes to the design since the working draft ES

2.1.30 A number of changes have been introduced to the Proposed Scheme in this area since the working draft ES was published. The key changes in this area (including approximate dimensions where appropriate) are as follows:

- introduction of four borrow pits for the extraction of acceptable engineering material for construction, described in Section 2.3:
  - MA02 Borrow Pit A, located immediately to the east of the route of the Proposed Scheme, immediately west of the A530 Nantwich Road and to the south of Wimboldsley (see Volume 2: MA02 Map Book, map CT-05-308b, G9 to J8);
  - MA02 Borrow Pit B, located immediately to the east of the route of the Proposed Scheme, west of the A530 Nantwich Road and north of Wimboldsley (see Volume 2: MA02 Map Book, map CT-05-309, D6 to H7);
  - MA02 Borrow Pit C, located immediately to the east of the route of the Proposed Scheme, west of Coalpit Lane and north of the Peover Eye (see Volume 2: MA02 Map Book, map CT-05-310, F7 to I9), and
  - MA02 Borrow Pit D, located 4.5km to the east of the route of the Proposed Scheme, north of Moss Lane and immediately west of the M6 (see Volume 2: MA02 Map Book, map CT-05-312-R5, E10 to G2 to J6).
- introduction of Crewe Northern Connection, comprising two lines, extending from the boundary of the Hough to Walley's Green area (MA01) and running parallel to the route of the Proposed Scheme to just south of River Dane viaduct in this area. Crewe Northern Connection will connect the route of the Proposed Scheme to the WCML and enable future NPR services to connect with HS2 north of Crewe and call at Crewe station (see Volume 2: MA02 Map book, map CT-06-308b, C7 to map CT-06-311, E9). The introduction of the Crewe Northern Connection required the following changes:
  - change in the horizontal alignment of the route of the Proposed Scheme east by up to 60m, to accommodate the Crewe Northern Connection and reception tracks;
  - changes to A530 Nantwich Road overbridge (see Volume 2: MA02 Map Book, map CT-06-308b, E5 to F7);
  - changes to realignment of A54 Middlewich Road (see Volume 2: MA02 Map Book, map CT-06-310, I5 to map CT-06-311, B8 to map CT-06-311-R1, A5);
  - changes to Clive Green Lane overbridge (see Volume 2: MA02 Map Book, map CT-06-310, A5 to A6);
  - additional viaduct crossing Shropshire Union Canal (see Volume 2: MA02 Map Book, map CT-06-310, D5 to E5); and
  - increase in length of Middlewich box structure (see Volume 2: MA02 Map Book, map CT-06-310, G6 to H6).
- introduction of the Crewe North Infrastructure Maintenance Base – Rail (IMB-R) as a permanent base and satellite site to the Phase 2a Stone IMB-R to support the

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maintenance of railway infrastructure, partly located in the Hough to Walley's Green area (MA01) (see Volume 2: MA02 Map Book, map CT-06-308b, A7 to F6);

- changes to the Crewe North RSD to align with the revised stabling strategy and design development (see Volume 2: MA02 Map Book, map CT-06-308b, F6 to map CT-06-310, B5);
- introduction of temporary construction sidings at the area of the Crewe North RSD, which will provide a facility to handle material during the construction of Proposed Scheme. The construction sidings will be accessed via a reception track from the WCML to the north (see Volume 2: MA02 Map Book, map CT-05-308b, F5 to map CT-05-309, D1);
- the realignment of Clive Green Lane has been moved south to avoid an area likely to have poor ground conditions. The realignment will connect to a new roundabout with the A530 Nantwich Road and Coalpit Lane. A new crossing will be provided, Shropshire Union Canal offline overbridge, adjacent to the existing Clive Green Lane canal overbridge (see Volume 2: MA02 Map Book, map CT-06-310, B1 to A8);
- changes to the A54 Middlewich Road and A533 Northwich Road junction and realignment to reduce the amount of land required for the Proposed Scheme and visual impacts on Stanthorne Hall Farm (see Volume 2: MA02 Map Book, map CT-06-311, B9). In addition the new roundabout joining the realigned sections of A54 Middlewich Road and A533 Northwich Road has moved 380m closer to the route of the Proposed Scheme, reducing severance and amount of land required for the Proposed Scheme (see Volume 2: MA02 Map Book, map CT-06-311, A8 to B8); and
- introduction of utilities works including the diversion of National Grid, Cadent Gas, Scottish Power and United Utilities assets throughout the Wimboldsley to Lostock Gralam area, as described in Section 2.2.

2.1.31 In addition, the location and layout of construction compounds, stockpiles and site haul routes have been considered as part of the development of the design. Mitigation such as noise barriers, landscape earthworks, compensatory planting and replacement ponds and wetlands have also been included throughout the Wimboldsley to Lostock Gralam area to reduce adverse effects from the Proposed Scheme.

## 2.2 Description of the Proposed Scheme

### General

2.2.1 The following section describes the main features of the Proposed Scheme in the Wimboldsley to Lostock Gralam area, including the proposed environmental mitigation measures that have been identified. 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 described 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 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 within the Wimboldsley to Lostock Gralam area has five main components (as illustrated on Figure 4):

- the route of the Proposed Scheme, 14.6km in length, continuing from the Hough to Walley's Green area (MA01) and running to the east of Crewe North RSD towards the Pickmere to Agden and Hulseheath area (MA03);
- Crewe Northern Connection: lines to connect the route of the Proposed Scheme to the WCML and enable future NPR services to connect with HS2;
- Crewe North IMB-R: a satellite maintenance facility and storage area for the Proposed Scheme, which will occupy land between the route of the Proposed Scheme and the WCML north of Walley's Green and south of the Crewe North RSD;
- Crewe North RSD, which will serve as an operational and maintenance hub for HS2 rolling stock; and
- WCML and HS2 reception tracks, which will connect the Crewe North RSD with both the WCML and the route of the Proposed Scheme.

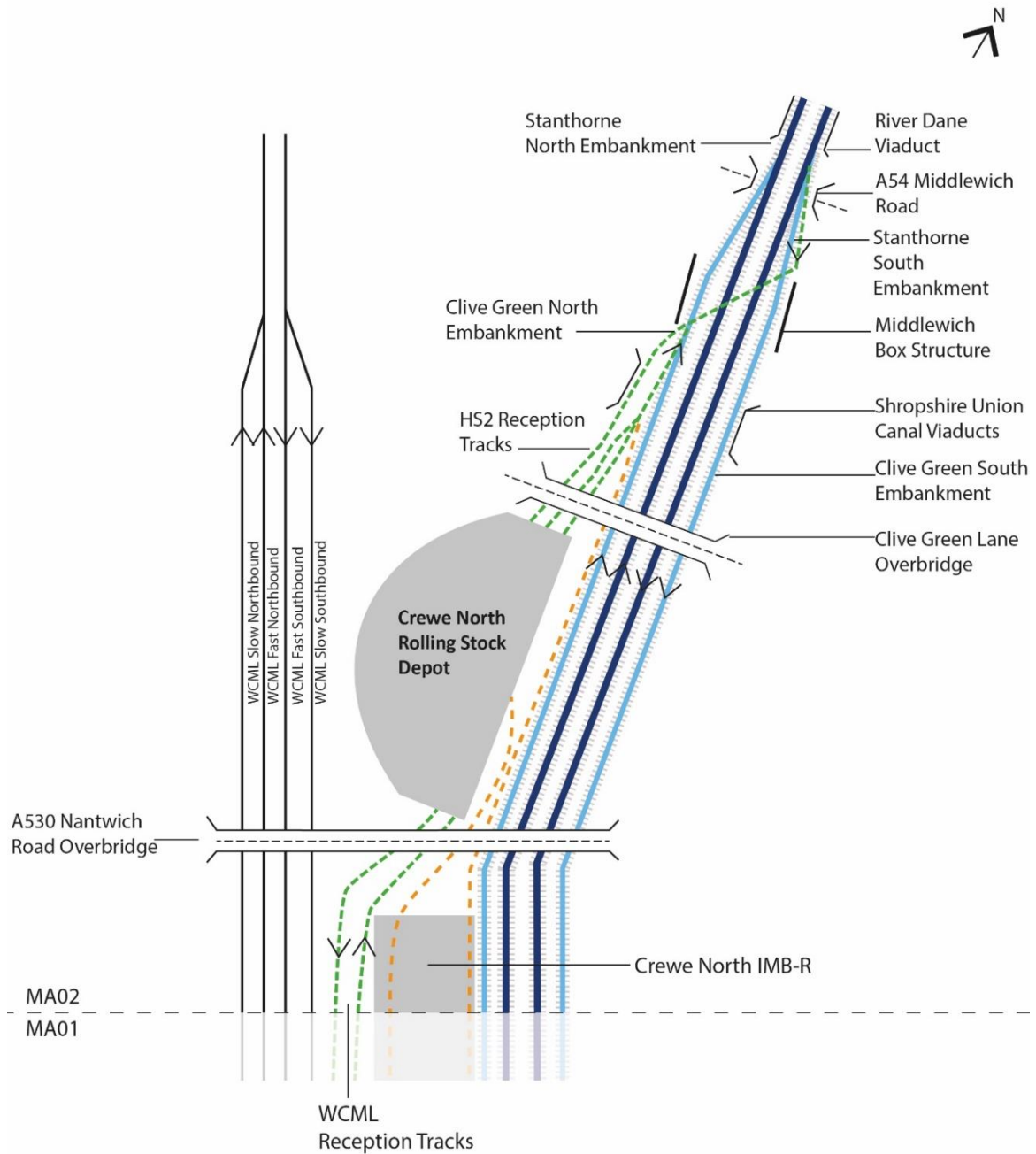
2.2.4 Each of these components and their associated key features are set out in the following sections. Where key features are associated with more than one component of the Proposed Scheme, they are described within the section they are first associated with.

2.2.5 Where reference is made to the Proposed Scheme, this includes two or more of the components listed above. The components are also described individually, where relevant.

2.2.6 In addition to the features described below, the Proposed Scheme in the area will also include maintenance access points and routes, and hedgerow planting. There will also be additional utilities works in the area, which may include works to low voltage overhead or underground lines, gas pipes, sewers and telecommunication cables.

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**Figure 4: Schematic of interaction between HS2, the WCML, Crewe Northern Connection, Crewe North IMB-R and Crewe North RSD**



Not to Scale

Legend

- Existing West Coast Mainline (WCML)
- Route of the Proposed Scheme
- Crewe Northern Connection
- - - Reception Tracks
- - - Crewe North Infrastructure Maintenance Base - Rail (IMB-R)

## The route of the Proposed Scheme

- 2.2.7 The route of the Proposed Scheme through the Wimboldsley to Lostock Gralam area will be approximately 14.6km long. The route will extend from Hough to Walley's Green area (MA01) in the south and continue north past the Crewe North RSD and on to the Pickmere to Agden and Hulseheath area (MA03).
- 2.2.8 This section of route is illustrated on maps CT-06-308b to CT-06-316a in the Volume 2: MA02 Map Book.
- 2.2.9 All dimensions in the sections below are approximate.
- 2.2.10 The route of the Proposed Scheme will consist of 3.9km of viaducts, 10.6km of embankments and a 164m long box structure in the Wimboldsley to Lostock Gralam area.
- 2.2.11 These components and their associated key features are described in four separate sections below.
- 2.2.12 In general, the Proposed Scheme is described from south to north.

### Walley's Green embankment to Shropshire Union Canal viaducts

- 2.2.13 The route of the Proposed Scheme will continue from the Hough to Walley's Green area (MA01) northwards towards Stanthorne on Walley's Green embankment, past the eastern side of the Crewe North RSD. From there it will continue northwards on Clive Green South embankment No.3.
- 2.2.14 The route of the Proposed Scheme will run parallel to and between the northbound and southbound lines of the Crewe Northern Connection. It will also run parallel to, and to the east of, the reception tracks.
- 2.2.15 This section of route is illustrated on maps CT-06-308b to CT-06-310 in the Volume 2: MA02 Map Book.
- 2.2.16 Key features of this 3.8km section will include:
- Walley's Green embankment, 2.7km in length and up to 3m in height, with associated landscape earthworks and landscape mitigation planting to the east, to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening to footpath users and residents of properties to the east. The embankment will also carry Crewe Northern Connection, which is described in the relevant section below (see Volume 2: MA02 Map Book, map CT-06-308b, C7 to map CT-06-309, H5);
  - Park Hall culvert, 320m south of Nantwich Road auto-transformer station, to convey an unnamed watercourse under Walley's Green embankment, WCML reception tracks and the Crewe North IMB-R (see Volume 2: MA02 Map Book, map CT-06-308b, C7);
  - landscape earthworks along Walley's Green embankment, as follows:



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- landscape earthworks, 300m long and 5m in height, extending from Park Hall Farm to Nantwich Road auto-transformer station with associated landscape mitigation planting on the eastern side to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening of the Crewe North RSD to Park Hall Farm, footpath users and residents of properties to the east (see Volume 2: MA02 Map Book, map CT-06-308b, C7 to E7); and
- landscape earthworks, 1.9km in length and 4m in height, and landscape mitigation planting on the eastern side of the embankment, extending from the A530 Nantwich Road to Clive Green telecommunications site to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening of the Crewe North RSD to receptors along the A530 Nantwich Road and footpath users (see Volume 2: MA02 Map Book, map CT-06-308b, F7 to map CT-06-309, J5).
- a balancing pond for railway drainage, within an area of woodland habitat creation, for replacement habitat, 150m south of the realigned A530 Nantwich Road. Access will be provided from the A530 Nantwich Road (see Volume 2: MA02 Map Book, map CT-06-308b, B6 to E4);
- realignment of a section of the A530 Nantwich Road, up to 55m south of its existing alignment on an embankment 800m long and up to 10m in height, crossing the WCML and the Proposed Scheme on A530 Nantwich Road overbridge, with negligible change in journey length. The existing A530 Nantwich Road will be closed where it crosses the Proposed Scheme. It will be retained as access to both sides of the Proposed Scheme for the Verdin Arms public house, Wimboldsley Hall and Wimboldsley Grange to the west, and Manor Cottage to the east and used as an emergency access for the Crewe North RSD (see Volume 2: MA02 Map Book, map CT-06-308b, D3 to G9);
- A530 Nantwich Road overbridge, 272m in length, up to 13m above ground level and 11m above track level (see Volume 2: MA02 Map Book, map CT-06-308b, E5 to F7);
- A530 Nantwich Road offline west culvert, and A530 Nantwich Road offline east culvert 200m north-east of Newfield Hall Farm, for realignment of Tributary of River Weaver 2. The watercourse will be realigned for 90m, south of its existing alignment, running parallel with the route of the Proposed Scheme and will cross under the A530 Nantwich Road realignment and re-join its existing alignment (see Volume 2: MA02 Map Book, map CT-06-308b, E4 to E3);
- permanent diversion and decommissioning of minor utilities to accommodate A530 Nantwich Road overbridge, including Openreach underground cables, Scottish Power Energy Networks underground cables and a United Utilities potable water main (see Volume 2: MA02 Map Book, map CT-06-308b, E5 to F7);
- diversion of an existing access for Wimboldsley Grange, located to the west of the Proposed Scheme, from the current alignment of the A530 Nantwich Road between the Verdin Arms public house and the WCML. The existing access will be closed where it crosses the Proposed Scheme, with access retained on the western side of the WCML (see Volume 2: MA02 Map Book, map CT-06-308b, E4 to G5);



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- A530 Nantwich Road auto-transformer station, 82m by 26m in area, to the east of the Proposed Scheme, including signalling equipment and a railway telecommunications mast up to 20m in height. Access will be provided from a track joining the realigned A530 Nantwich Road to the north (see Volume 2: MA02 Map Book, map CT-06-308b, E7);
- permanent diversion of minor utilities to accommodate the A530 Nantwich Road auto-transformer station, including an Openreach underground cable, Scottish Power Energy Networks underground cable and a United Utilities potable water main (see Volume 2: MA02 Map Book, map CT-06-308b, E7);
- diversion of an underground United Utilities 350mm potable water trunk main, for 4.2km in length, to be diverted along the A530 Nantwich Road and to pass under the Proposed Scheme along the realigned Clive Green Lane to accommodate the Crewe North RSD (see Volume 2: MA02 Map Book, map CT-06-308b, E7 to map CT-06-309, J7 to J2 to map CT-06-310, B1 to map CT-06-310-L1, A7);
- diversion of an existing access for Park Hall Farm, located to the east of the Proposed Scheme, to connect with the A530 Nantwich Road realignment (see Volume 2: MA02 Map Book, map CT-06-308b, E7 to G9);
- a balancing pond for highway drainage, 50m north of the A530 Nantwich Road to the west of the WCML. Access will be provided from the diverted access for Wimboldsley Grange (see Volume 2: MA02 Map Book, map CT-06-308b, F5);
- an area of landscape mitigation planting to the east of the Proposed Scheme, adjacent to the A530 Nantwich Road realignment, to provide visual screening for residents of Occlestone Green, Park Hall Farm and other properties to the east (see Volume 2: MA02 Map Book, map CT-06-308b, D7 to G9);
- four areas of woodland habitat creation, to the west of the Proposed Scheme, adjacent to the eastern side of Shropshire Union Canal (Middlewich Branch) to provide connectivity and replacement habitat (see Volume 2: Map Book, map CT-06-308b, F1 to J4);
- an area of grassland habitat creation, to the west of the Proposed Scheme, adjacent to the eastern side of Shropshire Union Canal (Middlewich Branch) to provide connectivity and replacement habitat (see Volume 2: Map Book, map CT-06-308b, F1 to J2);
- seven ecological mitigation ponds within areas of grassland habitat creation and woodland habitat creation to the west of the Proposed Scheme, north-west of Wimboldsley Hall and along the Shropshire Union Canal (Middlewich Branch) to provide replacement habitat for great crested newt (see Volume 2: MA02 Map Book, map CT-06-308b, G2 to J3);
- a balancing pond for highway drainage, 320m east of the Crewe North RSD. Access will be provided from the A530 Nantwich Road (see Volume 2: MA02 Map Book, map CT-06-308b, G9);
- diversion of a Scottish Power Energy Networks 132kV overhead line for 2.4km to the west of the WCML. The diverted power line will be carried on new overhead lines south of Wimboldsley Grange between three towers, before continuing north as underground cables, crossing the WCML north of Lea Hall before joining an existing overhead route via

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a new tower (see Volume 2: MA02 Map Book, map CT-308b, H3 to J4, map CT-06-309, A2 to D1 and map CT-06-309-L1, A10 to H9);

- a balancing pond for railway drainage, 250m west of Hopley House. Access will be provided from the A530 Nantwich Road (see Volume 2: MA02 Map Book, map CT-06-308b, H8 to I7);
- Wimboldsley culvert, 450m west of Hopley House, for surface water drainage under Walley's Green embankment and the Crewe North RSD (see Volume 2: MA02 Map Book, map CT-06-308b, I4 to I7);
- an area of woodland habitat creation to the west of the Proposed Scheme between the Shropshire Union Canal (Middlewich Branch) and WCML, to provide connectivity and replacement habitat (see Volume 2: MA02 Map Book, map CT-06-308b, J2);
- diversion of a Scottish Power 11kV overhead line for 1.1km, to pass under the Crewe North RSD stabling sidings 410m west of the A530 Nantwich Road (see Volume 2: MA02 Map Book, map CT-06-309, A5 to B4);
- two areas of grassland habitat creation to the west of the Proposed Scheme, along the eastern side of the Shropshire Union Canal (Middlewich Branch) to provide habitat connectivity (see Volume 2: MA02 Map Book, map CT-06-309-L1, A8 to F6);
- one ecological mitigation pond south of Wimboldsley Grange immediately to the east of Shropshire Union Canal (Middlewich Branch) to provide replacement habitat for great crested newt within an area of grassland habitat creation (see Volume 2: MA02 Map Book, map CT-06-309-L1, A8);
- six ecological mitigation ponds within an area of grassland habitat creation to the east of the Crewe North RSD, to provide replacement habitat for great crested newt (see Volume 2: Map Book, map CT-06-309, B6 to C8);
- diversion of an underground National Grid gas transmission 900mm high pressure gas pipeline, for 3km in length, to pass under the Proposed Scheme around the northern extent of the Crewe North RSD and under the WCML (see Volume 2: MA02 Map Book, map CT-06-309, B8 to E1 to map CT-06-309-L1, G10 to C7);
- permanent diversion of an Openreach underground cable and decommissioning of a Scottish Power underground cable to accommodate the Crewe North RSD (see Volume 2 MA02: Map Book, map CT-06-309, B5 to E3 and G5);
- closure of Footpath Wimboldsley 1/1 where it leaves the A530 Nantwich Road before crossing the Proposed Scheme. Users will be diverted along the Shropshire Union Canal (Middlewich Branch) footpath and Clive Green Lane to the A530 Nantwich Road, increasing journey length by 960m (see Volume 2: MA02 Map Book, map CT-06-309, E7 to H1 and CT-06-309-L1, G10 to I8);
- a balancing pond for railway drainage, 200m south of Clive Green telecommunications site. Access will be provided from the A530 Nantwich Road (see Volume 2: MA02 Map Book, map CT-06-309, F6 to F7);
- closure of the southern and northern Lea Hall access roads where they cross the Proposed Scheme. Users will be diverted along the Crewe North RSD access road and the

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realigned Clive Green Lane, (see Volume 2: MA02 Map Book, map CT-06-309, G3 to F7 and G4 to I7);

- Stove culvert, 140m south of the Clive Green telecommunications site, for surface water drainage under the Walley's Green embankment and Crewe North RSD (see Volume 2: MA02: Map Book, map CT-06-309, F4 to F6);
- a balancing pond for highway drainage, 150m west of the Crewe North RSD traction power substation, to the west of the Proposed Scheme. Access will be provided from the Crewe North RSD access road (see Volume 2: MA02 Map Book, map CT-06-309, F3 to F2);
- Clive Green telecommunications site, 49m by 24m in area, south-west of Lea House Farm, including a railway telecommunications mast, up to 20m in height. Access will be provided from a track running south-west from the A530 Nantwich Road (see Volume 2: MA02: Map Book, map CT-06-309, G5 to G6);
- permanent diversion and decommissioning of minor utilities to accommodate a balancing pond (highway drainage), including United Utilities potable water mains (see Volume 2: MA02 Map Book, map CT-06-309, G4 to G3);
- realignment of existing Stanthorne Park Mews access west of the Proposed Scheme, from the realigned Clive Green Lane. It will be realigned south along the Crewe North RSD access road before joining Lea Hall north access, from where it will turn north toward Stanthorne Park Mews (see Volume 2: MA02 Map Book, map CT-06-309, G3 to H4);
- Clive Green South embankment No.3, 1.1km in length and up to 7m in height. The embankment will also carry Crewe Northern Connection. The embankment will run parallel to Clive Green South embankments No.1 and No.2, which will carry the southbound and northbound HS2 reception tracks respectively, as described in the relevant section below (see Volume 2: MA02 Map Book, map CT-06-309, I5 to CT 06-310, D6);
- two areas of woodland habitat creation to the west of the Proposed Scheme and to the east of the Shropshire Union Canal (Middlewich Branch) at Rookery Wood and Wimboldsley Wood to provide connectivity and replacement habitat (see Volume 2: Map Book, map CT-06-309-L1, C6 to D6 and F6 to H7);
- realignment of a section of Clive Green Lane, up to 120m south of its current alignment on an embankment 900m long and up to 12m in height crossing the Proposed Scheme on Clive Green Lane overbridge. The realigned Clive Green Lane will connect to the A530 Nantwich Road and Coalpit Lane via a new roundabout to replace the existing junction. This will increase the length of the journey by 182m (see Volume 2: MA02 Map Book, map CT-06-309, J2 to J7 and CT-06-310, B1 to A8);
- closure of the existing Clive Green Lane where it crosses the Proposed Scheme. A section will be retained as access to Wharf Cottage with a turning head to the west of the Proposed Scheme (see Volume 2: MA02 Map Book, map CT-06-309, J7 to J2 and map CT-06-310, B3 to A8);
- Clive Green Lane overbridge, 155m in length, up to 12m above ground level and 11m above track level (see Volume 2: MA02 Map Book, map CT-06-309, J6 to J4);

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- permanent diversion and decommissioning of minor utilities to accommodate Clive Green Lane overbridge, including United Utilities potable water mains, a Scottish Power overhead cable, and Sky and Openreach underground cables (see Volume 2: MA02 Map Book, map CT-06-309, J6 to J4);
- an area of woodland habitat creation to the west of the Proposed Scheme south of Park Farm, to provide connectivity and replacement habitat (see Volume 2: MA02 Map Book, map CT-06-310, A5 to B3);
- Stanthorne culvert, 140m north of Clive Green Lane overbridge, for surface water drainage under the Proposed Scheme to drain into two balancing ponds (see Volume 2: MA02 Map Book, map CT-06-310, A5 to A6);
- an area of landscape mitigation planting to the west the Proposed Scheme along the western side of Clive Green South embankment No.1 to provide visual screening for Park Farm and users of the Shropshire Union Canal (Middlewich Branch) (see Volume 2: MA02 Map Book, map CT-06-310, A5 to D5);
- an area of woodland habitat creation to the east of the Proposed Scheme to the north of the realigned Clive Green Lane to provide connectivity and replacement habitat (see Volume 2: MA02 Map Book, map CT-06-310, A6 to B7);
- realignment of the southern section of Coalpit Lane, up to 25m west of its current alignment for 140m, to accommodate the construction of the A530 Nantwich Road/Clive Green Lane/Coalpit Lane roundabout, resulting in a negligible change in journey length;
- landscape mitigation planting to the east of the Proposed Scheme around the proposed A530 Nantwich Road/Coalpit Lane roundabout to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening for residents of Leahead Cottages, Leahead, Lea House Farm, Wallange Paddocks Farm, users of the Shropshire Union Canal (Middlewich Branch) and users of the A530 Nantwich Road and Coalpit Lane (see Volume 2: MA02 Map Book, map CT-06-310, A9 to B8);
- a balancing pond for highway drainage, within an area of woodland habitat creation, 120m west of Stanthorne Culvert. Access will be provided from the realigned Clive Green Lane (see Volume 2: MA02 Map Book, map CT-06-310, A4 to A5);
- a balancing pond for highway drainage, 380m east of Stanthorne culvert. Access will be provided via an access track from the A530 Nantwich Road (see Volume 2: MA02 Map Book, map CT-06-310, A9 to B10);
- a balancing pond for highway drainage, 150m west of Shropshire Union Canal (Middlewich Branch) overbridge and adjacent to Clive Green Lane. Access will be provided from the realigned Clive Green Lane (see Volume 2: MA02 Map Book, map CT-06-310, B1 to B2);

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- Clive Green Lane offline<sup>5</sup> culvert, 90m west of Shropshire Union Canal (Middlewich Branch), to convey Tributary of River Weaver 4 under the realigned Clive Green Lane (see Volume 2: MA02 Map Book, map CT-06-310, B2);
- Shropshire Union Canal offline overbridge, 20m in length, up to 6m above ground level and 6m above water level, to carry the realigned Clive Green Lane over Shropshire Union Canal. The existing overbridge will be retained to provide access to Wharf Cottage (see Volume 2: MA02 Map Book, map CT-06-310, B3);
- two balancing ponds for railway drainage, within an area of grassland habitat creation, 80m west of Stanthorne culvert. Access will be provided from the realigned Clive Green Lane (see Volume 2: MA02 Map Book, map CT-06-310, B3 to B4 and B4 to B5);
- diversion of a Scottish Power Energy Networks 11kV overhead power line for 608m, to pass under the route of the Proposed Scheme 205m north of Clive Green Lane (see Volume 2: MA02 Map Book, map CT-06-310, B6 to C5);
- seven ecological mitigation ponds within an area of grassland habitat creation to the east of the Proposed Scheme, 250m south of the Shropshire Union Canal (Middlewich Branch) to provide replacement pond habitat for great crested newt (see Volume 2: MA02 Map Book, map CT-06-310, B7 to C6);
- an area of woodland habitat creation to the east of the Proposed Scheme, south of the Shropshire Union Canal (Middlewich Branch), to provide replacement habitat (see Volume 2: MA02 Map Book, map CT-06-310, C6 to E9);
- two areas of grassland habitat creation to the east of the Proposed Scheme, on both sides of the (Middlewich Branch) to provide replacement habitat and connectivity (see Volume 2: MA02 Map Book, map CT-06-310, D5 to E9);
- Shropshire Union Canal viaduct No.3, 85m in length and up to 8m in height above existing ground level, to carry the route of the Proposed Scheme and Crewe Northern Connection over the Shropshire Union Canal (Middlewich Branch). The viaduct will be adjacent to Shropshire Union Canal viaducts No.1 and No.2, which will carry the southbound and northbound HS2 reception tracks respectively (see Volume 2: MA02 Map Book, map CT-06-310, D5 to E6); and
- a balancing pond for railway drainage, 40m east of the Shropshire Union Canal viaducts. Access will be provided from the retained section of existing Clive Green Lane (see Volume 2: MA02 Map Book, map CT-06-310, D6 to D7).

## **Clive Green North embankments to Stanthorne North embankments**

- 2.2.17 The route of the Proposed Scheme will continue northwards towards Whatcroft on Clive Green North embankment No.3 and over Middlewich box structure before running on

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<sup>5</sup> Offline works are works which are generally constructed along or nearby existing routes, which will remain open during construction.

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Stanthorne South embankment No.1, A54 Middlewich Road viaduct and Stanthorne North embankment.

- 2.2.18 The route of the Proposed Scheme will run parallel to, and in between, the northbound and southbound lines of the Crewe Northern Connection before converging with it on Stanthorne North embankment. Reception tracks to and from Crewe North RSD will run close to the route of the Proposed Scheme as far north as Stanthorne North embankment.
- 2.2.19 This section of route is illustrated on maps CT-06-310 to CT-06-311-R1 in the Volume 2: MA02 Map Book.
- 2.2.20 Key features of this 2.1km section will include:
- Clive Green North embankment No.3, 346m in length and up to 8m in height, with landscape earthworks and landscape mitigation planting on the eastern side to help integrate the Proposed Scheme into the surrounding landscape. The embankment will also carry Crewe Northern Connection. The embankment will run parallel to Clive Green North embankments No.1 and No.2, which will carry the southbound and northbound HS2 reception tracks respectively; and Clive Green North cutting, which will carry the southbound HS2 reception track (see Volume 2: MA02 Map Book, map CT-06-310, E6 to G6);
  - permanent diversion of Scottish Power underground cables to accommodate the Clive Green North embankment No. 3 (see Volume 2: MA02 Map Book, map CT-06-310, E6 to G6);
  - a balancing pond for railway drainage, within an area of landscape mitigation planting, 25m north of the Shropshire Union Canal (Middlewich Branch). Access will be provided from the A54 Middlewich Road (see Volume 2: MA02 Map Book, map CT-06-310, D5 to D6);
  - realignment of a section of the existing access to Yew-Tree Farm, crossing the Proposed Scheme beneath the Shropshire Union Canal viaducts (see Volume 2: MA02 Map Book, map CT-06-310, E5 to F6);
  - three areas of landscape mitigation planting to the west of the Proposed Scheme between Shropshire Union Canal (Middlewich Branch) and the A54 Middlewich Road sectioning auto-transformer station to help integrate the Proposed Scheme into the landscape (see Volume 2: MA02 Map Book, map CT-06-310, E5 to H6);
  - a noise fence barrier, 720m in length and 2m in height, located along the top of the western side of Clive Green North embankment No.2, Middlewich box structure, and Stanthorne South embankment No.1, extending from Yew-Tree Farm to 250m north of the A54 Middlewich Road sectioning auto-transformer station, to provide acoustic screening for properties in Clive (see Volume 2: MA02 Map Book, map CT-06-310, E6 to I6);
  - a noise fence barrier, 900m in length and 2m in height, located along the eastern side of Middlewich box structure and Stanthorne South embankment No.2, extending from the A54 Middlewich Road sectioning auto-transformer station to 200m north of A54



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Middlewich Road viaduct, to provide acoustic screening for properties in Stanthorne (see Volume 2: MA02 Map Book, map CT-06-310, G6 to map CT-06-311, C9);

- A54 Middlewich Road sectioning auto-transformer station, 100m by 55m in area, to the west of the Proposed Scheme, including signalling equipment and a railway telecommunications mast up to 20m in height. Access will be provided from a new track off the A54 Middlewich Road (see Volume 2: MA02 Map Book, map CT-06-310, G5 to G6);
- Clive Green North embankment retaining wall, 89m in length and up to 9m above ground level, located to the west of the route of the Proposed Scheme, 40m south of the A54 Middlewich Road sectioning auto-transformer station. The retaining wall will run parallel to Clive Green North cutting, which will carry the southbound HS2 reception track (see Volume 2: MA02 Map Book, map CT-06-310, G6);
- Middlewich box structure, 164m in length and up to 13m in height, carrying the route of the Proposed Scheme and Crewe Northern Connection over the southbound HS2 reception track (see Volume 2: MA02 Map Book, map CT-06-310, G6 to H6);
- a balancing pond for railway drainage, 90m east of the Middlewich box structure. Access will be provided from the realigned Yew-Tree Farm access (see Volume 2: MA02 Map Book, map CT-06-310, G7);
- Clive culvert, 25m north of the A54 Middlewich Road sectioning auto-transformer station, for surface water drainage under the Stanthorne South embankments (see Volume 2: MA02 Map Book, map CT-06-310, H5 to H7);
- Stanthorne South embankment retaining wall, 194m in length and up to 9m above ground level, located to the east side of the Proposed Scheme, 50m north of the A54 Middlewich Road sectioning auto-transformer station. The retaining wall will run parallel to Stanthorne South embankment No.2, which will carry the southbound HS2 reception track (see Volume 2: MA02 Map Book, map CT-06-310, H6);
- Stanthorne South embankment No.1, 343m in length and up to 10m in height, with landscape earthworks to help integrate the Proposed Scheme into the surrounding landscape. The embankment will also carry Crewe Northern Connection. The embankment will run parallel to Stanthorne South embankment No.2, which will carry the southbound HS2 reception track (see Volume 2: MA02 Map Book, map CT-06-310, H6 to J6);
- realignment of a section of the A54 Middlewich Road, 137m north of its existing alignment, meeting the diverted A533 Northwich Road at a new roundabout before crossing the Proposed Scheme beneath A54 Middlewich Road viaduct with a height clearance of 6.2m. This will increase the length of journey by 154m. Two turning heads will be provided to facilitate vehicle access on the retained section of the A54 Middlewich Road to the east of the Proposed Scheme. Access will be provided to Stanthorne Hall Farm from the realigned A54 Middlewich Road (see Volume 2: MA02 Map Book, map CT-06-310, I5 to map CT-06-311, B8 to map CT-06-311-R1, A5);
- diversion of a section of Birch Lane, up to 50m west of its existing alignment, meeting the realigned A54 Middlewich Road. This will increase the length of journey by 128m. (see Volume 2: MA02 Map Book, map CT-06-311-R1, A3 to B2);

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- permanent diversion and decommissioning of minor utilities to accommodate the realignment of the A54 Middlewich Road, including United Utilities potable water mains, Openreach underground cables, a Scottish Power Energy Networks underground cable and a Cadent gas main (see Volume 2: MA02 Map Book, map CT-06-310, I5 to J5 and map CT-06-311, A8);
- realignment of a section of Bell Lane where it is crossed by the realigned A54 Middlewich Road, up to 50m west of its existing alignment, increasing the length of the journey by 40m (see Volume 2: MA02 Map Book, map CT-06-311-R1, A3 to B2);
- diversion of a section of the A533 Northwich Road, up to 300m south of its existing alignment, meeting the realigned A54 Middlewich Road at a new roundabout. Turning heads will be provided to facilitate vehicle access on the retained section of the A533 Northwich Road either side of the Proposed Scheme. This will increase the length of the journey by 221m (see Volume 2: MA02 Map Book, map CT-06-311, B8 to E6);
- an area of woodland habitat creation to the west of the Proposed Scheme and south of the A533 Northwich Road to provide connectivity and replacement habitat (see Volume 2: Map Book, map CT-06-311 B8 to D8);
- two areas of woodland habitat creation to the east of the Proposed Scheme and south of the A533 Northwich Road, to provide connectivity and replacement habitat (see Volume 2: Map Book, map CT-06-311-R1, A1 to A4);
- A54 Middlewich Road viaduct, 66m in length and up to 9m in height (see Volume 2: Map Book, map CT-06-311, A9 to B9);
- a balancing pond for highway drainage, 250m east of A54 Middlewich Road viaduct. Access will be provided from the realigned A54 Middlewich Road (see Volume 2: MA02 Map Book, map CT-06-311-R1, B3);
- Stanthorne North embankment, 938m in length and up to 9m in height, with landscape mitigation planting on both sides to help integrate the Proposed Scheme into the surrounding landscape. There will also be three areas for the permanent storage of track sections on the embankment, adjacent to the route of the Proposed Scheme, for operational maintenance. The embankment will also carry Crewe Northern Connection and the southbound HS2 reception track (see Volume 2: MA02 Map Book, map CT-06-311, B9 to G9);
- permanent diversion and decommissioning of minor utilities to accommodate the Stanthorne North embankment, including Scottish Power and INOYVN underground cables (see Volume 2: MA02 Map Book, map CT-06-311, B9 to G9);
- an area of woodland habitat creation to the west of the Proposed Scheme adjacent to Willowbeds Local Wildlife Site (LWS) to provide connectivity and replacement habitat (see Volume 2: MA02 Map Book, map CT-06-311, C1 to D5);
- an area of woodland habitat creation to the west of the Proposed Scheme and to the east of Willowbeds LWS to provide connectivity and replacement habitat (see Volume 2: MA02 Map Book, map CT-06-311, C4 to C6);
- closure of Footpath Winsford 37/1 and Footpath Stanthorne 1/1 where they cross the Proposed Scheme. Users will be diverted along the realigned A54 Middlewich Road,



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crossing the Proposed Scheme beneath the A54 Middlewich Road viaducts. This will increase the length of journey by 223m (see Volume 2: MA02 Map Book, map CT-06-311, E9);

- two ecological mitigation ponds within an area of grassland habitat creation to the east of Stanthorne North embankment and 210m east of Bank culvert, to provide replacement habitat for great crested newt (see Volume 2: MA02 Map Book, map CT-06-311-R1, E3); and
- an area of woodland habitat creation to the east of the Proposed Scheme north of the Greenheyes Farm, to provide connectivity and replacement habitat (see Volume 2: MA02 Map Book, map CT-06-311-R1, E1 to E3).

## **River Dane viaduct to Gad Brook viaduct**

2.2.21 The route of the Proposed Scheme will continue northwards towards Rudheath on River Dane viaduct, Dane Valley embankment, Puddinglake Brook viaduct, Whatcroft South embankment, Trent and Mersey Canal viaduct, Whatcroft North embankment and Gad Brook viaduct. This section of route is illustrated on maps CT-06-311 to CT-06-313 in the Volume 2: MA02 Map Book.

2.2.22 Key features of this approximately 4.7km section will include:

- River Dane viaduct, 1.2km in length and up to 29m in height to cross the River Dane and the Trent and Mersey Canal (see Volume 2: MA02 Map Book, map CT-06-311, F9; to map CT-06-312, D7);
- realignment of an existing access for Bank Farm, crossing the route of the Proposed Scheme beneath River Dane viaduct, from the A533 Northwich Road (see Volume 2: MA02 Map Book, map CT-06-311, E8 to F10);
- permanent diversion and decommissioning of minor utilities to accommodate the realignment of an existing access for Bank Farm, including Scottish Power Energy Networks and Tata Chemicals Europe underground cables and a United Utilities potable water main (see Volume 2: MA02 Map Book, map CT-06-311, E8 to F10);
- a balancing pond for railway drainage, 100m north-east of the southern end of River Dane viaduct. Access will be provided from the A533 Northwich Road (see Volume 2: MA02 Map Book, map CT-06-311, G10);
- a replacement floodplain storage area to the east of the route of the Proposed Scheme in the River Dane valley and east of River Dane viaduct (see Volume 2: MA02 Map Book, map CT-06-311-R1, G2 to F3);
- three areas of grassland habitat creation to the east of the Proposed Scheme, adjacent to the River Dane to provide replacement habitat (see Volume 2: MA02 Map Book, map CT-06-311-R1, G3 to H3, H2 to H1 and J2 to J1);
- two areas of grassland habitat creation to the east of the Proposed Scheme, adjacent to the Trent and Mersey Canal to provide replacement habitat (see Volume 2: MA02 Map Book, map CT-06-311-R1, G4 to H4 and H3);

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- two areas of woodland habitat creation to the east of the Proposed Scheme, between the River Dane and the Trent and Mersey Canal to provide replacement habitat (see Volume 2: MA02 Map Book, map CT-06-311-R1, G4 and H4 to H3);
- two areas of woodland habitat creation to the west of the route of the Proposed Scheme north-west of Bull's Wood to provide connectivity and replacement habitat (see Volume 2: MA02 Map Book, map CT-06-311, H8 to I7 and I6 to I5);
- an area of wetland habitat creation either side of the Proposed Scheme, adjacent to the River Dane to provide replacement habitat (see Volume 2: MA02 Map Book, map CT-06-311, H9 to I9);
- an area of woodland habitat creation either side of the Proposed Scheme and beneath River Dane viaduct to provide connectivity and replacement habitat (see Volume 2: MA02 Map Book, map CT-06-311, I9);
- an area of woodland habitat creation to the west of the route of the Proposed Scheme and to the west of Hill Wood to provide connectivity and replacement habitat (see Volume 2: Map Book, map CT-06-311, J5 to J6);
- an area of wetland habitat creation beneath the Proposed Scheme, adjacent to the River Dane to provide replacement habitat (see Volume 2: MA02 Map Book, map CT-06-312, C5 to C7);
- Dane Valley embankment, 1.3km in length and up to 9m in height with landscape earthworks to the west and landscape mitigation planting on both sides to help integrate the route of the Proposed Scheme into the surrounding landscape (see Volume 2: MA02 Map Book, map CT-06-312, D7 to J7);
- Whatcroft Hall Lane telecommunications site, 49m by 24m in area, to the east of the route of the Proposed Scheme, including a railway telecommunications mast up to 15m in height, within an area of landscape mitigation planting. Access will be provided from a track running south from Whatcroft Hall Lane (see Volume 2: MA02 Map Book, map CT-06-312, D7);
- Whatcroft culvert, 500m north of the southern end of River Dane viaduct, to convey a tributary of the Trent and Mersey Canal under the Dane Valley embankment (see Volume 2: MA02 Map Book, map CT-06-312, F7);
- diversion of existing western access for Dairy Farm along the western side of the Dane Valley embankment (see Volume 2: MA02 Map Book, map CT-06-312, F6 to G6);
- diversion of existing access for Dairy Farm, crossing the route of the Proposed Scheme beneath Puddinglake Brook viaduct, from Whatcroft Hall Lane (see Volume 2: MA02 Map Book, map CT-06-312, D7 to I6);
- a balancing pond for railway drainage, 80m north of Whatcroft culvert. Access will be provided from a track running south from Whatcroft Hall Lane (see Volume 2: MA02 Map Book, map CT-06-312, F7 to G7);
- a balancing pond for railway drainage, 55m south of Puddinglake Brook. Access will be provided from a track running south from Whatcroft Hall Lane (see Volume 2: MA02 Map Book, map CT-06-312, I7 to I8);

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- Puddinglake Brook viaduct, 160m in length and up to 11m in height (see Volume 2: MA02 Map Book, map CT-06-312, J7 to map CT-06-313, B6);
- permanent diversion of minor utilities to accommodate Puddinglake Brook viaduct, including a Scottish Power underground cable, a Cadent gas main and a United Utilities potable water main (see Volume 2: MA02 Map Book, map CT-06-312, J7);
- three areas of wetland habitat either side of the of the route of the Proposed Scheme and adjacent to the Trent and Mersey Canal and Puddinglake Brook to provide replacement habitat and connectivity (see Volume 2: MA02 Map Book, map CT-06-312, I8 to J7, J8 to J7 and J7 to J6);
- a replacement floodplain storage area on the west of the route of the Proposed Scheme in the Puddinglake Brook valley, adjacent to Puddinglake Brook viaduct (see Volume 2: MA02 Map Book, map CT-06-313, A5);
- three ecological mitigation ponds within an area of grassland habitat creation to the east of the route of the Proposed Scheme 320m north-east of Byley Primary School to provide replacement habitat, (see Volume 2: Map Book, map CT-06-312-R4, G8 to H10);
- two areas of woodland habitat creation 350m north-east of Byley Primary School, to provide replacement habitat (see Volume 2: Map Book, map CT-06-312-R4, G10 and map CT-06-312-R5, H2 to H3);
- an area of woodland habitat creation to the east of the route of the Proposed Scheme adjacent to Whatcroft South embankment, to provide replacement habitat (see Volume 2: Map Book, map CT-06-313, B6);
- Whatcroft South embankment, 386m in length and up to 9m in height, with landscape mitigation planting to help integrate the Proposed Scheme into the surrounding landscape (see Volume 2: MA02 Map Book, map CT-06-313, B6 to D5);
- a balancing pond for railway drainage, 40m north-west of Puddinglake Brook viaduct. Access will be provided from Old Lane (see Volume 2: MA02 Map Book, map CT-06-313, B5);
- access diversion for Brook Farm, crossing the route of the Proposed Scheme beneath Trent and Mersey Canal viaduct, from Old Lane (see Volume 2: MA02 Map Book, map CT-06-313, C6 to D1);
- an area of wetland habitat creation to the east of the of the route of the Proposed Scheme and Trent and Mersey Canal viaduct to provide habitat connectivity (see Volume 2: MA02 Map Book, map CT-06-313, B8 to E6);
- eight ecological mitigation ponds within an area of grassland habitat creation to the east of Trent and Mersey Canal viaduct to provide replacement habitat for great crested newt (see Volume 2: MA02 Map Book, map CT-06-313, C8 to E6);
- Manor culvert, 60m south of Trent and Mersey Canal viaduct, for surface water drainage under Whatcroft South embankment (see Volume 2: MA02 Map Book, map CT-06-313, C6 to C5);

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- a balancing pond for railway drainage, 60m east of Whatcroft South embankment adjacent to Manor culvert. Access will be provided from Old Lane (see Volume 2: MA02 Map Book, map CT-06-313, C6);
- Trent and Mersey Canal viaduct, 284m in length and up to 13m in height (see Volume 2: MA02 Map Book, map CT-06-313, D5 to E5);
- an area of wetland habitat creation either side of the route of the Proposed Scheme extending beneath Trent and Mersey Canal viaduct to provide replacement habitat for wintering birds (see Volume 2: MA02 Map Book, map CT-06-313, C6 to E5);
- an area of grassland habitat creation west of the route of the Proposed Scheme, adjacent to the Trent and Mersey Canal to provide replacement habitat for wintering birds (see Volume 2: MA02 Map Book, map CT-06-313, D5 to E3);
- Whatcroft North embankment, 512m in length and up to 13m in height, with landscape mitigation planting to help integrate the Proposed Scheme into the surrounding landscape (see Volume 2: MA02 Map Book, map CT-06-313, E5 to H6);
- permanent diversion of a Scottish Power underground cable to accommodate the Whatcroft North embankment (see Volume 2: MA02 Map Book, map CT-06-313, E5 to H5);
- a balancing pond for railway drainage, 40m west of Whatcroft North embankment. Access will be provided from Davenham Road (see Volume 2: MA02 Map Book, map CT-06-313, E5);
- an area of landscape mitigation planting to the west of the route of the Proposed Scheme to help integrate the Proposed Scheme into the landscape and provide visual screening for the Oakwood Marina and users of the Trent and Mersey Canal (see Volume 2: MA02 Map Book, map CT-06-313, E5 to H4);
- an area of landscape mitigation planting to the east of the route of the Proposed Scheme to help integrate the Proposed Scheme into the landscape and provide visual screening for Pear Tree Farm cottages and users of the Trent and Mersey Canal (see Volume 2: MA02 Map Book, map CT-06-313, E6 to H6);
- diversion of five underground INOVYN potable water mains, to pass under the route of the Proposed Scheme 130m north of Davenham Road (see Volume 2: MA02 Map Book, map CT-06-313, F5 to H5);
- three ecological mitigation ponds within an area of grassland habitat creation to the west of Whatcroft North embankment to provide replacement habitat for great crested newt (see Volume 2: MA02 Map Book, map CT-06-313, G4);
- closure of the existing Higgins Lane Farm access where it crosses the route of the Proposed Scheme (see Volume 2: MA02 Map Book, map CT-06-313, G6);
- Davenham Road express feeder auto-transformer station, 105m by 55m in area, to the west of the route of the Proposed Scheme, including a railway telecommunications mast up to 20m in height. Access will be provided from Davenham Road (see Volume 2: MA02 Map Book, map CT-06-313, G5);

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- a balancing pond for railway drainage, within an area of grassland habitat creation, 37m east of Gad Brook viaduct. Access will be provided from Davenham Road (see Volume 2: MA02 Map Book, map CT-06-313, H6);
- Gad Brook viaduct, 980m in length and up to 19m in height (see Volume 2: MA02 Map Book, map CT-06-313, H5 to map CT-06-314, D5);
- permanent diversion of minor utilities to accommodate Gad Brook viaduct, including INOYVN and Scottish Power Energy Networks underground cables, a Cadent gas main and a United Utilities potable water main (see Volume 2: MA02 Map Book, map CT-06-313, H5 to J6 and map CT-06-314, A6 to D5);
- noise fence barriers along Gad Brook viaduct, as follows:
  - a noise fence barrier, 300m in length and 4m in height, located along the eastern side of the viaduct, extending from the Davenham Road express feeder auto-transformer station to the three ecological mitigation ponds to the east of Gad Brook viaduct, to provide acoustic screening for properties around Davenham Road and Pear Tree Farm Cottages (see Volume 2: MA02 Map Book, map CT-06-313, G5 to I6); and
  - a noise fence barrier, 1.4km in length (of which 510m on Gad Brook viaduct) and 4m in height, located along the western side of the viaduct extending from Marshalls' Gorse to the A556 Shurlach Road culvert on the western side of Rudheath embankment, to provide acoustic screening to properties on the eastern edge of Broken Cross (see Volume 2: MA02 Map Book, map CT-06-314, A6 to D5).
- an area of woodland habitat creation to the west of the route of the Proposed Scheme south of Marshall's Gorse to provide replacement habitat (see Volume 2: MA02 Map Book, map CT-06-313, I5 to J4);
- an area of wetland habitat creation to the east of the Proposed Scheme, adjacent to Gad Brook viaduct to provide replacement habitat (see Volume 2: MA02 Map Book, map CT-06-313, I7 to J6);
- three ecological mitigation ponds to the east of Gad Brook viaduct to provide replacement habitat for great crested newt, with surrounding terrestrial habitat (see Volume 2: MA02 Map Book, map CT-06-313, I5 to I6);
- an area of woodland habitat creation either side of the route of the Proposed Scheme east of Marshall's Gorse to provide replacement habitat (see Volume 2: MA02 Map Book, map CT-06-313, J5 to J7);
- replacement floodplain storage area to the west of the route of the Proposed Scheme in the Gad Brook valley, at Marshalls Gorse (see Volume 2: MA02 Map Book, map CT-06-313, I6 to J6);
- an area of grassland habitat creation to the east of the Proposed Scheme, east of Marshall's Gorse, to provide replacement habitat (see Volume 2: MA02 Map Book, map CT-06-314, A7 to B6);
- diversion of an underground Cadent Gas local distribution 150mm high pressure gas pipeline, for 1.1km in length, to pass under the route of the Proposed Scheme beneath

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Gad Brook viaduct and Rudheath embankment (see Volume 2: MA02 Map Book, map CT-06-314, B5 to E4);

- a balancing pond for highway drainage, within an area of woodland habitat creation, 20m east of the A530 King Street and Gadbrook Distribution Centre roundabout. Access will be provided from the diverted B5082 Penny's Lane (see Volume 2: MA02 Map Book, map CT-06-314, C5); and
- diversion of a section of the B5082 Penny's Lane, up to 420m southwest of its current alignment at existing ground level. The diverted B5082 Penny's Lane will cross the route of the Proposed Scheme beneath Gad Brook viaduct, increasing the journey length by 468m. The existing B5082 Penny's Lane will be closed where it crosses the route of the Proposed Scheme. It will be retained as access to both sides of the route. Turning heads will be provided to facilitate vehicle access on the retained section of the road on both sides of the route for access to fields on both sides and to Melvin Holme to the east (see Volume 2: MA02 Map Book, map CT-06-314, C5 to E9).

## **Rudheath embankment to Smoker Brook viaduct**

- 2.2.23 The route of the Proposed Scheme will continue northwards on Rudheath embankment, Wade Brook viaduct, Lostock Gralam South embankment, Lostock Gralam viaduct, Lostock Gralam North embankment and Smoker Brook viaduct.
- 2.2.24 This section of route is illustrated on maps CT-06-314 to CT-06-316a in the Volume 2: MA02 Map Book.
- 2.2.25 Key features of this 4km section will include:
- Rudheath embankment, 1.9km in length and up to 11m in height, with landscape mitigation planting on both sides to help integrate the Proposed Scheme into the surrounding landscape (and incorporating an area of woodland habitat creation) (see Volume 2: MA02 Map Book, map CT-06-314, D5 to map CT-06-315, D6);
  - permanent diversion and decommissioning of minor utilities to accommodate Rudheath embankment, including Scottish Power, INOYVN and Tata Chemicals Europe underground cables, Cadent and National Grid gas mains, United Utilities potable water mains and wastewater sewer (see Volume 2: MA02 Map Book, map CT-06-314, D5 to J6 and map CT-06-315, A6 to D5);
  - landscape earthworks along Rudheath embankment as follows:
    - landscape earthworks, 4m in height, and landscape mitigation planting to the eastern side of the embankment, extending from 250m north of the B5082 Penny's Lane telecommunications site to the existing Birches Lane, to help integrate the Proposed Scheme into the surrounding landscape (see Volume 2: MA02 Map Book, map CT-06-314, I6 to map CT-06-315, C6); and
    - landscape earthworks, 2m in height, and landscape mitigation planting to the eastern side of the embankment, between the existing and the realigned Birches Lane to help



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integrate the Proposed Scheme into the surrounding landscape (see Volume 2: MA02 Map Book, map CT-06-315, C6 to D6).

- noise fence barriers along Rudheath embankment as follows:
  - a noise fence barrier, 1.4km in length (of which 930m will be on Rudheath embankment) and 4m in height located along the western side of the embankment continuing from Gad Brook viaduct, to provide acoustic screening to properties on the eastern edge of Broken Cross (see Volume 2: MA02 Map Book, map CT-06-314, D5 to H5); and
  - a noise fence barrier, 1.3km in length and 4m in height, located along the eastern side of the embankment, between the B5082 Penny's Lane telecommunications site and extending on to Wade Brook viaduct, to provide acoustic screening for properties in Lostock Green (see Volume 2: MA02 Map Book, map CT-06-314, G6 to map CT-06-315, E6).
- diversion of an underground National Grid gas transmission 900mm high pressure gas pipeline, east of Rudheath for 2.7km in length, to be diverted in two sections away from the route of the Proposed Scheme. The first section, 1.1km in length, will run from north-east from A530 King Street, crossing the current alignment of B5082 Penny's Lane, before turning north past Melvin Holme. The second section, 1.6km in length, runs north-east from Lostock Green to Long Wood (see Volume 2: MA02 Map Book, map CT-06-314 B7 to G7 and map CT-06-315, C8 to J7 to map CT-06-316a, A5 to A6);
- diversion of a Scottish Power 33kV overhead power line for 2.6km, west of the route of the Proposed Scheme to be undergrounded into A530 King Street and A530 Griffiths Road, before following turning east to follow the alignment of Wade Brook (see Volume 2: MA02 Map Book, map CT-06-314, C7 to G1, map CT-06-314-L1, E10 to J7 and map CT-06-315-L1, A7 to D10 and E10 and map CT-06-315, C1 and D1 to D4);
- three ecological mitigation ponds with surrounding grassland habitat to the east of Rudheath embankment and north of the B5082 Penny's Lane diversion to provide replacement habitat for great crested newt (see Volume 2: MA02 Map Book, map CT-06-314, E6 and E7);
- closure of Footpath Rudheath 3/4, Footpath Rudheath 3/3, Footpath Lach Dennis 3X/2 and Footpath Lach Dennis 3X/1 where they cross the route of the Proposed Scheme. Users will be diverted along the proposed maintenance access for the B5082 Penny's Lane telecommunications site to Cookes Lane/A556 Shurlach Road, increasing the length of the journey by 1.7km (see Volume 2: MA02 Map Book, map CT-06-314, G5 to G6);
- realignment of a section of the A556 Shurlach Road up to 90m to the north-west of its current alignment for 2.3km, including improvement of the junction with Birches Lane/Lostock Hollow (and incorporating landscape mitigation planting), with negligible change in journey length (see Volume 2: MA02 Map Book, map CT-06-314, E3 to map CT-06-315, H5);
- four ecological mitigation ponds within an area of grassland habitat creation adjacent to the A566 Shurlach Road realignment, east of Cookes Lane to provide replacement



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habitat for great crested newt and other species (see Volume 2: MA02 Map Book, map CT-06-314, G4 to H5);

- B5082 Penny's Lane telecommunications site, 49m by 24m in area, to the east of the route of the Proposed Scheme, including a railway telecommunications mast up to 15m in height. Access will be provided from a maintenance access from the retained section of the B5082 Penny's Lane (see Volume 2: MA02 Map Book, map CT-06-314, G6 to H6);
- diversion of an underground United Utilities 300mm potable water trunk main, for 196m in length, to be diverted to pass under the route of the Proposed Scheme 20m north of the B5082 Penny's Lane (see Volume 2: MA02 Map Book, map CT-06-314, D6 to F5);
- A556 Shurlach Road culvert, 100m north of B5082 Penny's Lane telecommunications site, to convey Broken Cross Drains under Rudheath embankment and the realigned A556 Shurlach Road (see Volume 2: MA02 Map Book, map CT-06-314, H5 to H6);
- a balancing pond for railway drainage, 15m north of B5082 Penny's Lane telecommunications site. Access will be provided from the retained section of the B5082 Penny's Lane (see Volume 2: MA02 Map Book, map CT-06-314, H6);
- diversion of a Scottish Power Energy Networks 132kV overhead line for 1.6km to the east of the route of the Proposed Scheme and the A556 Shurlach Road. The diverted power line will be carried on a new overhead line for 530m near Melvin Holme and Clay Bank Farm, crossing the B5082 Penny's Lane between three towers. It will then transfer to underground cables for 1.1km, crossing the A556 Shurlach Road and the route of the Proposed Scheme west of Lostock Green. It will then join an existing overhead route via a new tower. Steel baskets attached to the rear of two of the new towers will allow the overhead line to transition to underground cables (see Volume 2: MA02 Map Book, map CT-06-314, D8 to map CT-06-315, B5);
- closure of Cookes Lane where it crosses the route of the realigned A556 Shurlach Road. Cookes Lane will be closed to the public but modified to retain access of the left-turn into the Tata waste lime beds (see Volume 2: MA02 Map Book, map CT-06-314, H5);
- diversion of an underground Cadent Gas local distribution 300mm high pressure gas pipeline, for 3.8km in length, to pass under the route of the Proposed Scheme 200m west of Melvin Holme and 170m south of Lostock Gralam North embankment (see Volume 2: MA02 Map Book, map CT-06-314 F5 to J9, map CT-06-314-R1, H1 to J4, map CT-06-315, A10 and H10 to J9, map CT-06-315-R1, A2 to J1 and map CT-06-316a, A7 to C4);
- an area of landscape mitigation planting to the west of the route of the Proposed Scheme and to the west of Cookes Lane to help integrate the Proposed Scheme into the landscape and provide visual screening for users of the A556 Shurlach Road (see Volume 2: MA02 Map Book, map CT-06-314, H5 to I5);
- a balancing pond for highway drainage, within an area of planting and grassland habitat creation, 370m north-west of B5082 Penny's Lane telecommunication site. Access will be provided from the modified section of Cookes Lane (see Volume 2: MA02 Map Book, map CT-06-314, I4 to J4);
- a balancing pond for railway drainage, partially within an area of woodland habitat creation, 340m north-west of B5082 Penny's Lane telecommunication site. Access will be

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provided from the modified section of Cookes Lane (see Volume 2: MA02 Map Book, map CT-06-314, I5 to J5);

- diversion of an underground Sabic Pipelines 8-inch high pressure ethylene pipeline, for 428m in length, to pass under the route of the Proposed Scheme between Cookes Lane and the A556 Shurlach Road (see Volume 2: MA02 Map Book, map CT-06-314, I5 to I6);
- six ecological mitigation ponds within an area of grassland habitat creation to the west of Rudheath embankment 430m north-west of B5082 Penny's Lane telecommunication site to provide replacement habitat for great crested newt (see Volume 2: MA02 Map Book, map CT-06-314, J3 to I4);
- an area of landscape mitigation planting to the west of the route of the Proposed Scheme and to the west of the realigned A556 Shurlach Road to help integrate the Proposed Scheme into the landscape and provide visual screening for users of the A556 Shurlach Road and residents on Birches Lane (see Volume 2: MA02 Map Book, map CT-06-315, A5 to C5);
- diversion of a Scottish Power 11kV overhead power line for 1.3km, to pass under the route of the Proposed Scheme and the A556 Shurlach Road realignment 95m north of Birches Lane (see Volume 2: MA02 Map Book, map CT-06-315, A6 to D3);
- an area of landscape mitigation planting to the west of the route of the Proposed Scheme between Birches Lane and Wade Brook to help integrate the Proposed Scheme into the landscape and provide visual screening for residents on Birches Lane (see Volume 2: MA02 Map Book, map CT-06-315, C5 to E5);
- an area of landscape mitigation planting to the east of the route of the Proposed Scheme along the realigned Birches Lane to help integrate the Proposed Scheme into the landscape and provide visual screening for residents of Lostock Green and receptors to the east (see Volume 2: MA02 Map Book, map CT-06-315, C6 to D6);
- diversion of a section of Birches Lane (east of the route of the Proposed Scheme), 300m north-east of the current alignment for 494m, crossing the route of the Proposed Scheme beneath Wade Brook viaduct with a height clearance of 6m. This will increase the length of the journey by 395m (see Volume 2: MA02 Map Book, map CT-06-315, C6 to E5);
- realignment of a section of Birches Lane (west of the route of the Proposed Scheme), where it meets the route of the realigned A556 Shurlach Road, resulting in a negligible change in journey length (see Volume 2: MA02 Map Book, map CT-06-315, C5 to E6);
- realignment of a section of footway that runs along the eastern side of Birches Lane (west of the route of the Proposed Scheme). It will follow the realigned Birches Lane beneath Wade Brook viaduct, then turn north to pass beneath Wade Brook offline overbridge, before turning south as a new PRoW to re-join Birches Lane to the west of the route of the Proposed Scheme and the realigned A556 Shurlach Road, increasing journey length by 881m (see Volume 2: MA02 Map Book, map CT-06-315, C5 to E6);
- permanent diversion and decommissioning of minor utilities to accommodate the diversion of a section of Birches Lane, including INOYVN and Scottish Power underground cables, a United Utilities and a INOYVN potable water main (see Volume 2: MA02 Map Book, map CT-06-315, C6 to E5);

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- Wade Brook viaduct, 285m in length and up to 20m in height (see Volume 2: MA02 Map Book, map CT-06-315, D5 to F5);
- permanent diversion of minor utilities to accommodate the Wade Brook viaduct, including INOYVN underground cable and potable water mains (see Volume 2: MA02 Map Book, map CT-06-315, E5);
- Wade Brook offline overbridge carrying a section of the realigned A556 Shurlach Road over Wade Brook, 106m in length, up to 11m above ground level (see Volume 2: MA02 Map Book, map CT-06-315, E5 to F5);
- accommodation access for Fieldhouse Farm, located to the east of the route of the Proposed Scheme, from the realigned Birches Lane (see Volume 2: MA02 Map Book, map CT-06-315, D6 to F7);
- three ecological mitigation ponds to the east of Wade Brook viaduct to provide replacement habitat for great crested newt, within an area of grassland habitat creation (see Volume 2: MA02 Map Book, map CT-06-315, E6);
- an area of wetland habitat creation either side of the route of the Proposed Scheme extending under Wade Brook viaduct to maintain habitat connectivity (see Volume 2: MA02 Map Book, map CT-06-315, E6 to D3);
- replacement floodplain storage area on the west of the route of the Proposed Scheme in the Wade Brook valley, between Lostock Green and Lostock Gralam (see Volume 2: MA02 Map Book, map CT-06-315, E4);
- a balancing pond for highway drainage, 90m west of Wade Brook viaduct. Access will be provided from Birches Lane (see Volume 2: MA02 Map Book, map CT-06-315, E5);
- two balancing ponds, one for highways drainage and one for railway drainage, east of Wade Brook viaduct. Access will be provided from the Fieldhouse Farm accommodation access from the realigned section of Birches Lane (see Volume 2: MA02 Map Book, map CT-06-315, D6 to E6 and E6);
- diversion of an underground Cadent Gas local distribution 600mm high pressure gas pipeline, for 1.6km in length, to cross the route of the Proposed Scheme near the junction between A556 Chester Road, A556 Shurlach Road and A559 Manchester Road (see Volume 2: MA02 Map Book, map CT-06-315, E7 to map CT-06-316a, A7 to B3 and C4);
- an area of landscape mitigation planting to the west of the route of the Proposed Scheme and to the west of the realigned A556 Shurlach Road between Wade Brook and the Mid-Cheshire Line (see Volume 2: MA02 Map Book, map CT-06-315, F5 to G5);
- Lostock Gralam South embankment, 353m in length and up to 14m in height, with landscape mitigation planting on both sides to help integrate the Proposed Scheme into the surrounding landscape (see Volume 2: MA02 Map Book, map CT-06-315, F5 to H6);
- permanent diversion of minor utilities to accommodate the Lostock Gralam South embankment, including INOYVN and Scottish Power Energy Networks underground cables and a INOYVN potable water main (see Volume 2: MA02 Map Book, map CT-06-315, F5 to H6);

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- a noise fence barrier, 1.2km in length and up to 5m in height, extending from Wade Brook, along the western side of Wade Brook viaduct, Lostock Gralam South embankment, Lostock Gralam viaduct, to the northern end of Lostock Gralam North embankment, to provide acoustic screening for properties in Lostock Gralam (see Volume 2: MA02 Map Book, map CT-06- 315, E5 to map CT-06- 316a, B4);
- a balancing pond for railway drainage, 80m north-east of Wade Brook viaduct. Access will be provided from the Fieldhouse Farm accommodation access from the realigned section of Birches Lane (see Volume 2: MA02 Map Book, map CT-06-315, F6);
- an area of woodland habitat creation to the west of the route of the Proposed Scheme east of the A556 Shurlach Road at Lostock Gralam, to provide connectivity and habitat replacement (see Volume 2: Map Book, map CT-06-315, H5 to map CT-06-316a, B3);
- Lostock Gralam viaduct, 62m in length and up to 9m in height (see Volume 2: MA02 Map Book, map CT-06-315, H6);
- permanent diversion of minor utilities to accommodate Lostock Gralam viaduct, including INOYVN underground cables and potable water mains (see Volume 2: MA02 Map Book, map CT-06-315, H6);
- Lostock Gralam North embankment, 655m in length and up to 14m in height, with landscape mitigation planting on both sides to help integrate the Proposed Scheme into the surrounding landscape (see Volume 2: MA02 Map Book, map CT-06-315, H6 to map CT-06-316a, B4);
- permanent diversion of Cadent Gas mains for 345m in length to accommodate the Lostock Gralam North embankment (see Volume 2: MA02 Map Book, map CT-06-315, F5 to J6 and map CT-06-316a, A3 to B4);
- an area of woodland habitat creation to the east of the route of the Proposed Scheme adjacent to the Mid-Cheshire Line, to provide connectivity and habitat replacement (see Volume 2: Map Book, map CT-06-315, H6 to J10);
- A556 Chester Road auto-transformer station, 75m by 26m in area, to the west of the Proposed Scheme, including a railway telecommunications mast up to 20m in height and signalling equipment. Access will be provided from the A556 Shurlach Road (see Volume 2: MA02 Map Book, map CT-06-315, I5 to J5);
- a balancing pond for railway drainage, 30m east of the northern end of Lostock Gralam North embankment. Access will be provided from the A556 Chester Road (see Volume 2: MA02 Map Book, map CT-06-316a, B4 to B5);
- Smoker Brook viaduct, 806m in length in this area and up to 25m in height (see Volume 2: MA02 Map Book, map CT-06-316a, B4 to F4);
- realignment of Tributary of Peover Eye for 46m and 20m and Peover Eye for 44m in an east-west direction around the piers of Smoker Brook viaduct (see Volume 2: MA02 Map Book, map CT-06-316a, C4 to D4 and D4);
- a noise fence barrier, 430m in length and 3m in height, located along the eastern side of Smoker Brook viaduct, extending from the A559 Manchester Road to Peover Eye, to

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provide acoustic screening for properties on Ascol Drive (see Volume 2: MA02 Map Book, map CT-06-316a, B4 to E4);

- diversion of seven underground CLH Pipelines 250mm fuel pipelines, for 280m in length, to cross the route of the Proposed Scheme near the junction between A556 Chester/Shurlach Road and A559 Manchester Road (see Volume 2: MA02 Map Book, map CT-06-316a, C3 to C4);
- an area of woodland habitat creation to the east of the route of the Proposed Scheme and adjacent to Plumley Lime Beds SSSI to provide connectivity and replacement habitat (see Volume 2: MA02 Map Book, map CT-06-316a, A7 to B8);
- two ecological mitigation ponds within an area of grassland habitat creation to the east of the Lostock Gralam North embankment, to provide replacement habitat for great crested newt (see Volume 2: MA02 Map Book, map CT-06-316a, B7);
- an area of woodland habitat creation to the east of the route of the Proposed Scheme south of Ascol Drive, to provide connectivity and replacement habitat (see Volume 2: MA02 Map Book, map CT-06-316a, B7 to B4);
- an area of grassland habitat creation to the west of the route of the Proposed Scheme and to the west of Smoker Brook, to provide habitat enhancement (see Volume 2: MA02 Map Book, map CT-06-316a, E3);
- two areas of wetland habitat creation to the west of the Proposed Scheme either side of Smoker Brook, to provide replacement habitat and maintain connectivity to the floodplain (see Volume 2: MA02 Map Book, map CT-06-316a, E3 to F3);
- an area of grassland habitat creation either side of the Proposed Scheme adjacent to Smoker Brook, to provide replacement habitat (see Volume 2: MA02 Map Book, map CT-06-316a, E4 to F4);
- an area of woodland habitat creation either side of the route of the Proposed Scheme along either side of the Smoker Brook, to provide habitat replacement (see Volume 2: Map Book, map CT-06-316a, E3 to G8); and
- replacement floodplain storage area to the east of the route of the Proposed Scheme adjacent to Smoker Brook west of the A556 Chester Road (see Volume 2: MA02 Map Book, map CT-06-316a, E3 to F4).

## **Crewe Northern Connection**

- 2.2.26 The Crewe Northern Connection will connect the route of the Proposed Scheme to the WCML. It will enable high speed services to call at Crewe Station, and future NPR services to connect with HS2. The Crewe Northern Connection northbound will provide connections towards Manchester and Liverpool and the Crewe Northern Connection southbound will provide connections towards Crewe and London.
- 2.2.27 The Crewe Northern Connection will continue from the northern boundary of the Hough to Walley's Green area (MA01). Its northbound and southbound lines will run parallel to, and either side of, the route of the Proposed Scheme. It will then converge with the route of the Proposed Scheme on Stanthorne North embankment, south of River Dane viaduct. The

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Crewe Northern Connection will be carried on the following features, as already described in the route of the Proposed Scheme section:

- Walley's Green embankment;
- Clive Green South embankment No.3;
- Shropshire Union Canal viaduct No.3;
- Clive Green North embankment No.3;
- Clive Green North embankment retaining wall;
- Middlewich box structure;
- Stanthorne South embankment retaining wall;
- Stanthorne South embankment No.1;
- A54 Middlewich Road viaduct; and
- Stanthorne North embankment.

## Crewe North IMB-R

- 2.2.28 The Crewe North IMB-R will be a permanent facility occupying approximately 4ha of land spanning the Hough to Walley's Green area (MA01) and the Wimboldsley to Lostock Gralam area. It will be located between the route of the Proposed Scheme and the WCML, north-east of Walley's Green. The Crewe North IMB-R is shown on Volume 2: MA02 Map Book, map CT-06-308b.
- 2.2.29 Rail access to the Crewe North IMB-R will be from the north, via the Crewe North RSD and the WCML reception tracks. Vehicular access to and from the Crewe North IMB-R will be provided through the Crewe North RSD via Clive Green Lane and is described in more detail in the Crewe North RSD section.
- 2.2.30 The Crewe North IMB-R will support railway infrastructure maintenance activities for the Proposed Scheme. The Crewe North IMB-R will not be in continuous use and will be a smaller, satellite facility to the main maintenance facilities at the Stone IMB-R (which forms part of the HS2 Phase 2a scheme<sup>6</sup>) and the Calvert infrastructure maintenance depot (IMD) (which forms part of the HS2 Phase One scheme<sup>7</sup>). Operation of the Crewe North IMB-R is described in Section 2.4.

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<sup>6</sup> High Speed Two Ltd (2018), *High Speed Rail (West Midlands - Crewe) Supplementary Environmental Statement and Additional Provision Environmental Statement, Volume 2: Community Area report, CA3: Stone and Swynnerton*. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/692596/G11\\_Volume\\_2\\_CA3\\_WEB.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/692596/G11_Volume_2_CA3_WEB.pdf).

<sup>7</sup> High Speed Two Ltd (2013), *London – West Midlands Environmental Statement, Volume 2: Community Forum Area Report*. CFA13, Calvert, Steeple Claydon, Twyford and Chetwode. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/397886/Vol\\_2\\_CFA\\_13\\_Calvert\\_Steeple\\_Claydon\\_Twyford\\_and\\_Chetwode.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/397886/Vol_2_CFA_13_Calvert_Steeple_Claydon_Twyford_and_Chetwode.pdf).



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- 2.2.31 The Crewe North IMB-R will extend for 1.2km in total length, adjacent to Coppenhall Moss North embankment and Walley's Green embankment, which will carry the route of the Proposed Scheme and Crewe Northern Connection. The Crewe North IMB-R will be located level with the route of the Proposed Scheme. The Crewe North IMB-R will be 60m in width at its widest point.
- 2.2.32 Key features of the Crewe North IMB-R will include:
- two maintenance sidings, each 800m in length; and
  - an area of landscape mitigation planting between the WCML and the WCML reception tracks (see Volume 2: MA02 Map Book, map CT-06-308b, D6 to F5).

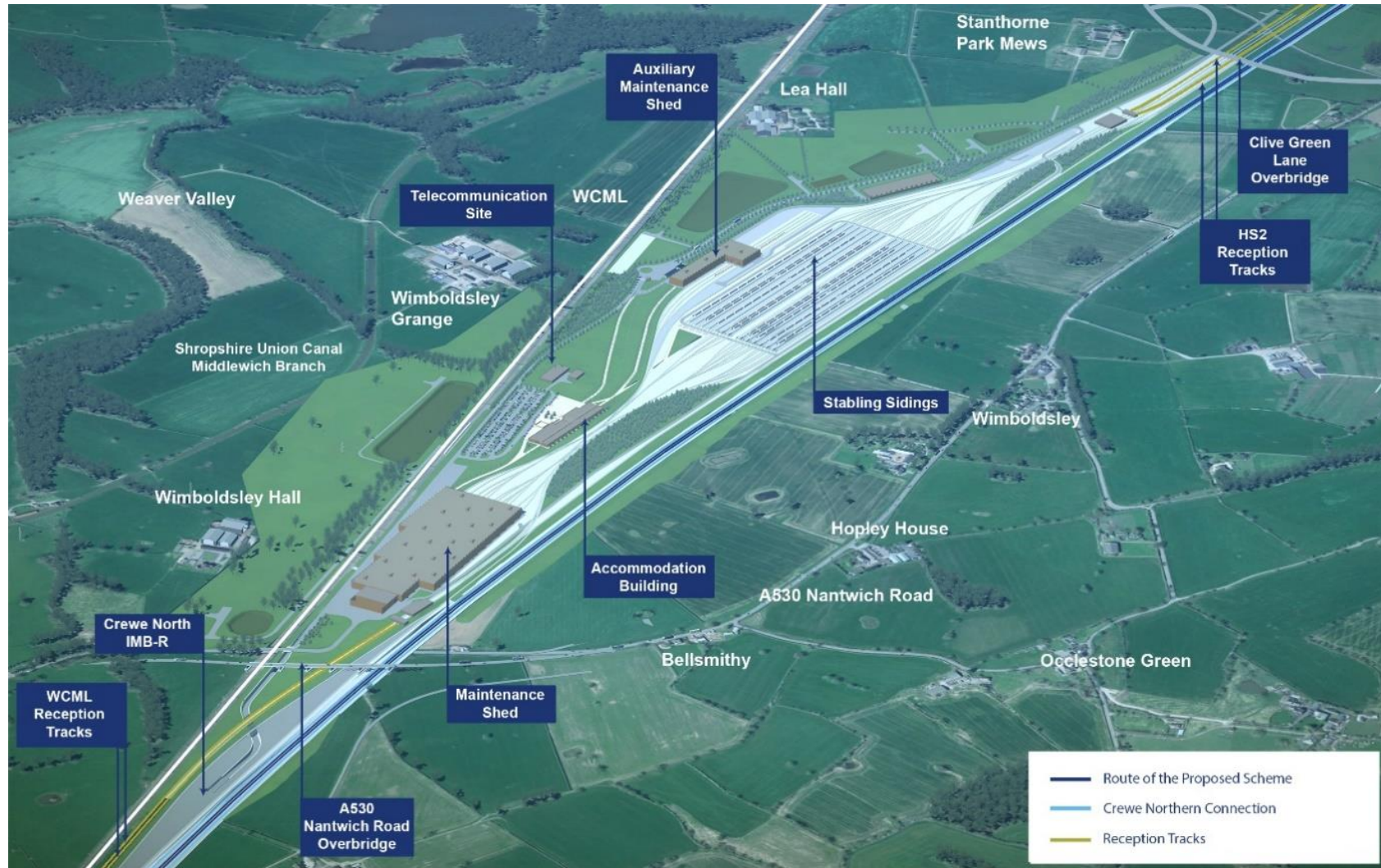
## Crewe North RSD

- 2.2.33 The Crewe North RSD will occupy approximately 65ha of land between the route of the Proposed Scheme and the WCML, north-east of Walley's Green. Rail access to the Crewe North RSD will be from reception tracks to the north connecting to the route of the Proposed Scheme, and to the south connecting to the WCML. The Crewe North RSD will also provide connection to the Crewe North IMB-R to the south. Vehicular access to and from the Crewe North RSD will be provided from the realigned Clive Green Lane.
- 2.2.34 The Crewe North RSD will serve as an operational and maintenance hub for HS2 rolling stock on the Proposed Scheme. Activities undertaken at the Crewe North RSD will include light and heavy maintenance and stabling, where servicing of HS2 rolling stock (as well as interior and exterior cleaning) will take place. The Crewe North RSD will include multiple sidings for train stabling and maintenance activities. The operation of the Crewe North RSD is described in Section 2.4.
- 2.2.35 The Crewe North RSD will be a permanent facility extending 2.8km in total length, adjacent to Walley's Green embankment, which will carry the route of the Proposed Scheme. Some areas of the Crewe North RSD will be up to 2m above existing ground level, and some areas will be up to 2m below existing ground level and slightly below the level of the route of the Proposed Scheme.
- 2.2.36 Lighting will be included along new roads, walkways and within stabling areas and will comprise columns up to 6m in height with single and double top head luminaires. Trackside lighting will also be required within the centre of the Crewe North RSD, comprising multi-head columns up to 25m in height.
- 2.2.37 Figure 5 shows a visualisation of the Crewe North RSD looking to the north-west.



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**Figure 5: Visualisation of the Crewe North RSD**



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- 2.2.38 The Crewe North RSD is shown on Volume 2: MA02 Map Book, maps CT-06-308b to CT-06-309-L1.
- 2.2.39 The Crewe North RSD will include:
- a gatehouse, which will be accessed via the Crewe North RSD access road, a new public road off the realigned Clive Green Lane which then provides access into an internal road network within the RSD at the security gatehouse. A roundabout is included adjacent to the security gatehouse for turning for public vehicles;
  - a traction power substation, 138m by 35m in area;
  - auxiliary maintenance shed with four tracks, including workshops and stores buildings, 165m by 65m in area and up to 16m in height;
  - 27 stabling sidings, up to 420m in length, where trains will be cleaned and temporarily stabled overnight. Each siding will be able to hold up to two 200m trains;
  - a 12-track maintenance shed, including workshops and stores building, for the servicing, cleaning and maintenance of trains, 350m by 140m in area and up to 18m in height;
  - a telecommunication site, 49m by 24m in area, including a railway telecommunication mast up to 20m in height;
  - a traction switching site, 25m by 15m in area;
  - two sets of carriage washers and automatic vehicle inspection equipment gantries located along the access tracks into the depot, one from the existing WCML and the other from the route of the Proposed Scheme;
  - five balancing ponds for Crewe North RSD drainage; and
  - a surface water pumping station for Crewe North RSD drainage.
- 2.2.40 An accommodation building will be provided to serve both the Crewe North RSD and Crewe North IMB-R, 80m by 25m in area and up to 8m in height, which will include office space, meeting rooms, cleaning and train crew facilities, welfare facilities and a depot control room to manage train movements within the Crewe North IMB-R and the Crewe North RSD. Car parking for approximately 450 vehicles will also be provided.
- 2.2.41 There will be a network of internal roads throughout the Crewe North RSD. These roads will also be used for vehicular access to the Crewe North IMB-R, which will require retaining walls and underbridges so it can pass beneath IMB-R sidings, WCML reception tracks and the southern depot emergency access road. There will be an emergency access road on the retained section of the A530 Nantwich Road (see Volume 2: MA02 Map Book, map CT-06-308b, F6).
- 2.2.42 The following landscape mitigation planting will be incorporated around the Crewe North RSD to help integrate the Proposed Scheme into the surrounding landscape and provide visual screening:
- along the western side of the WCML to the west of the route of the Proposed Scheme parallel to the Crewe North RSD to provide screening for residents of the Verdin Arms and Wimboldsley Hall Farm, users of the Shropshire Union Canal (Middlewich Branch)

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and footpath users (see Volume 2: MA02 Map Book, map CT-06-308b, E4 to CT-06-309, C1);

- along the western side of the route of the Proposed Scheme to provide visual screening for residents of Lea Hall and Stanthorne Park Mews and users of the Shropshire Union Canal (Middlewich Branch) (see Volume 2: MA02 Map Book, map CT-06-308b, H6 to map CT-06-309, B5);
- east of the WCML to provide visual screening for residents of Lea Hall, Wimboldsley Grange and users of the Shropshire Union Canal (Middlewich Branch) (see Volume 2: MA02 Map Book, map CT-06-308b, H5 to I5);
- along either side of the WCML to the west of the route of the Proposed Scheme parallel to the Crewe North RSD to provide visual screening for residents of Wimboldsley Grange and views further to the west (see Volume 2: MA02 Map Book, map CT-06-309, A2 to C2);
- east of Lea Hall and to the west of the Crewe North RSD access road to provide visual screening for Lea Hall Farm, residents of Wimboldsley Grange and users of the Shropshire Union Canal (Middlewich Branch) (see Volume 2: MA02 Map Book, map CT-06-309, E2 to G4);
- east of Lea Hall to provide visual screening to properties at Lea Hall and Stanthorne Park Mews, and users of the Shropshire Union Canal (Middlewich Branch) (see Volume 2: MA02 Map Book, map CT-06-309, F5 to H5); and
- west of Clive Green South embankment No.3 to provide visual screening for residents of Lea Hall and Stanthorne Park Mews, and users of the Shropshire Union Canal (Middlewich Branch) (see Volume 2: MA02 Map Book, map CT-06-309, H4 to J4).

2.2.43 To accommodate the Crewe North RSD, the following works will be undertaken:

- closure of existing Wimboldsley Grange access where it crosses the WCML (see Volume 2: MA02 Map book, map CT-06-308b, G5); and
- permanent relocation of a Vodafone, O2 and EE mobile telecommunications mast, from within the footprint of the Crewe North RSD to 50m to the south-west to the western side of the WCML (see Volume 2: MA02 Map Book, map CT-06-308b, G5).

## Reception tracks to Crewe North RSD

2.2.44 Trains will access the Crewe North RSD from both the WCML and the route of the Proposed Scheme via reception tracks. The WCML reception tracks will lie to the south of the Crewe North RSD, extending from the Hough to Walley's Green area (see Volume 2: Community Area report MA01, Hough to Walley's Green area) and connect the Crewe North RSD to the WCML. The HS2 reception tracks will lie to the north and connect the Crewe North RSD to the route of the Proposed Scheme.

2.2.45 Figure 4 shows how the reception tracks will connect the WCML, the route of the Proposed Scheme and the Crewe North RSD.

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- 2.2.46 Trains will enter the Crewe North RSD from the north via the southbound HS2 reception track. This part is described from north to south, in the direction of travel of trains accessing the Crewe North RSD.
- 2.2.47 The southbound HS2 reception track will diverge from the Crewe Northern Connection on Stanthorne North embankment then continue along A54 Middlewich Road viaduct, both of which will also carry the route of the Proposed Scheme and are described in the route of the Proposed Scheme section above. The southbound HS2 reception track will then diverge from and run on the eastern side of the route of the Proposed Scheme on the Stanthorne South embankment No.2, which will be 500m in length and up to 9m in height (see Volume 2: Map Book, map CT-06-310, J6 to H6).
- 2.2.48 The southbound HS2 reception track will pass under the route of the Proposed Scheme in the Middlewich box structure, described in the route of the Proposed Scheme section above. The southbound HS2 reception track will then run parallel to, and to the west of, the route of the Proposed Scheme (in a north to south direction) along the following features which will carry the southbound HS2 reception track only:
- Clive Green North cutting, 282m in length, up to 3m in depth, and 28m in width in this section (see Volume 2: Map Book, map CT-06-310, F5 to G6);
  - Clive Green North embankment No.1, 194m in length and up to 8m in height (see Volume 2: Map Book, map CT-06-310, E5);
  - Shropshire Union Canal viaduct No.1, 85m in length and up to 7m in height above existing ground level, to carry the southbound HS2 reception track over Shropshire Union Canal (Middlewich Branch), west of the route of the Proposed Scheme (see Volume 2: MA02 Map Book, map CT-06-310, D6); and
  - Clive Green South embankment No.1, 842m in length and up to 9m in height (see Volume 2: Map Book, map CT-06-310, A5 to D5), after which it enters the Crewe North RSD.
- 2.2.49 Trains will leave the Crewe North RSD via the northbound HS2 reception track, travelling in a south to north direction, and join the northbound Crewe Northern Connection to the west of the route of the Proposed Scheme. The northbound HS2 reception track will run along the following features to the west of and parallel to the route of the Proposed Scheme:
- Clive Green South embankment No. 2, 861m in length and up to 7m in height (see Volume 2: Map Book, map CT-06-310, A6 to D6);
  - Shropshire Union Canal viaduct No. 2, 85m in length and up to 7m in height above existing ground level, to carry the northbound HS2 reception track over the Shropshire Union Canal (Middlewich Branch), west of the route of the Proposed Scheme (see Volume 2: MA02 Map Book, map CT-06-310, D6 to E6); and
  - Clive Green North embankment No. 2, 132m in length and up to 8m in height (see Volume 2: Map Book, map CT-06-310, E6 to G6).



2.2.50 The northbound HS2 reception track will then run along Clive Green North embankment No.3 (described in the Route of the Proposed Scheme section above) on which it will merge with the Crewe Northern Connection.

## Demolitions

2.2.51 As set out in Volume 1, as the design develops, it is likely that not all the properties identified for demolition would need to be demolished, for example where not all of the land is required for permanent works.

2.2.52 The following have been identified for demolition: 24 existing residential properties, four commercial/business properties (including farm outbuildings) and three other structures. These will be needed for construction of the permanent features or, in some cases, to enable the construction works for the Proposed Scheme. Demolitions will 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 describes the key construction activities that are envisaged to be needed to build the Proposed Scheme in the Wimboldsley to Lostock Gralam area. It includes:

- an overview of the construction process;
- a description of the advance works;
- a description of the engineering works to build the Proposed Scheme;
- information on construction waste and material resources;
- a description of how the Proposed Scheme will be commissioned;
- an indicative construction programme; and
- monitoring arrangements during the construction period.

2.3.2 The construction arrangements described in this section provide the basis for the assessment presented in this ES.

2.3.3 Land used only for construction purposes will be restored as agreed with the owner of the land and the relevant planning authority once construction works on that land are complete.

2.3.4 Land will be required permanently for the key features of the Proposed Scheme described in Section 2.2.

2.3.5 During the construction phase, public roads and PRoW routes will remain open for public use wherever reasonably practicable. Where such routes cross the Proposed Scheme and require diversion, the alternative road or PRoW crossing the Proposed Scheme will be constructed prior to any closure of existing roads or PRoW, wherever reasonably practicable. Where they 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 will be identified by the nominated undertaker and provided where it is safe and reasonably practicable to do so. The routes through these areas may change over the duration of the construction period.

2.3.6 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 described in Section 6 of Volume 1 have been assumed.

## Code of Construction Practice

2.3.7 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.

2.3.8 In addition, HS2 Ltd has produced a Community Engagement Framework<sup>8</sup> which sets out how HS2 Ltd and its contractors, as well as their sub-contractors, will undertake community engagement during the construction of the HS2 project. The framework is being implemented on Phase One of HS2 and will apply to all phases of HS2.

2.3.9 The objectives of the framework include:

- to set out how HS2 Ltd and its contractors will undertake community engagement during the construction of the project;
- to provide clarity and reassurance to HS2 Ltd's stakeholders about how community engagement activity will be managed; and
- 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.

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<sup>8</sup> High Speed Two 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).

2.3.10 A draft CoCP has been prepared (see Volume 5: Appendix CT-002-00000). It will remain a draft document through the parliamentary process and the CoCP will be finalised at Royal Assent. The CoCP sets out measures to be implemented by the nominated undertaker.

## Overview of the construction process

2.3.11 Building and preparing the Proposed Scheme for operation will 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: use of borrow pits; establishment of construction compounds; site haul routes, site preparation and enabling works; main earthworks and structure works; foundations for and construction of depots/stations buildings; 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; site restoration; and removal of construction compounds;
- site finalisation works; and
- systems testing and commissioning.

2.3.12 General information about the construction process is set out in more detail in Volume 1, Section 6, and the draft CoCP (see Volume 5: Appendix CT-002-00000) 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

2.3.13 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;
- removal of vegetation, and stripping and storing of soil; and



- utility diversions and new utility connections for facilities associated with the Proposed Scheme.

## Engineering works

### Introduction

- 2.3.14 Construction of the Proposed Scheme will require the following broad types of engineering works in the Wimboldsley to Lostock Gralam area, and within land adjacent to the route:
- civil engineering works, including earthworks such as embankments and cuttings, construction of bridges and viaducts and the Crewe North RSD and works to public roads;
  - works to the conventional railway; and
  - works to install, test and commission railway systems, including track, overhead line equipment, communications and signalling equipment and traction power supply equipment associated with Crewe North RSD.
- 2.3.15 The construction of track and railway systems works will include the installation of track form, rails, infill material, minor drainage works, and installation of electrification, signalling and communication equipment.
- 2.3.16 The construction of the Proposed Scheme will be divided into sections, each of which will be managed from compounds. The compounds will act as the main interface between the construction work sites and the public highway, as well as performing other functions as described below. Compounds will either be main compounds or satellite compounds. Satellite compounds are generally smaller than main compounds. Compounds will either be used for civil engineering works, for railway installation works, or for both.

### General overview of construction compounds

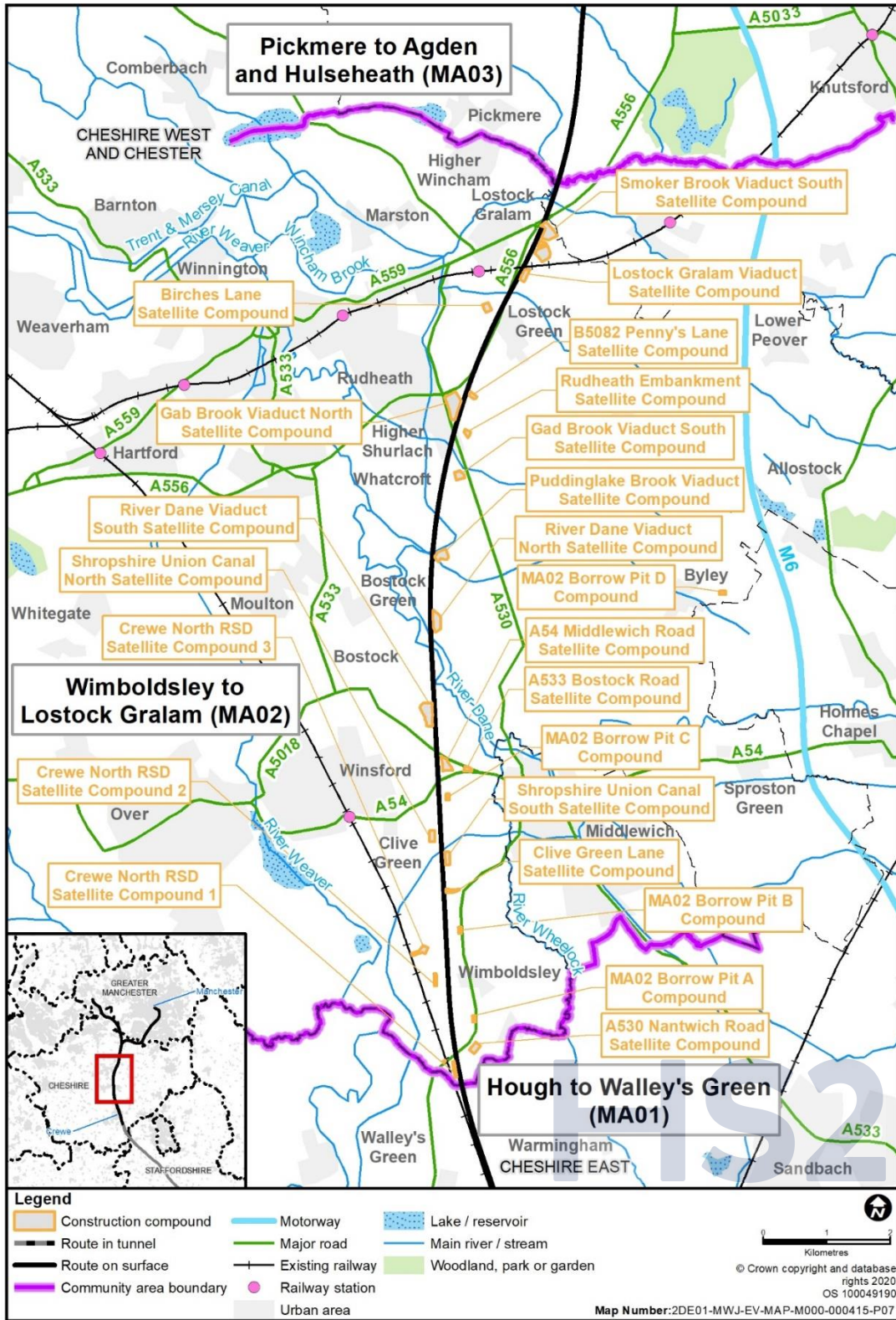
- 2.3.17 Main compounds will be used for core project management staff (i.e. engineering, planning and construction delivery) and commercial and administrative staff. These teams will directly manage some works and coordinate the works at the satellite compounds. In general, a main compound will include: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

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- 2.3.18 Satellite compounds will be used to manage specific works along a section of the route. 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.
- 2.3.19 The Crewe Tunnel north main compound, located in the Hough to Walley's Green area (MA01), will be used as the base for managing 13 civil engineering satellite compounds (including four borrow pit compounds) in the Wimboldsley to Lostock Gralam area. Five of these compounds will be used to install railway systems after the civil engineering works have been completed. There will also be one additional satellite compound to manage railway systems only that will be managed from this main compound.
- 2.3.20 In addition, the A50 main compound, located in the Pickmere to Agden and Hulseheath area (MA03), will be used as the base for managing 10 civil engineering satellite compounds in the Wimboldsley to Lostock Gralam area. Two of these compounds will be used to install railway systems after the civil engineering works have been completed.
- 2.3.21 The Crewe North RSD construction sidings will be used to remove surplus excavated material from Crewe tunnel in the Hough to Walley's Green area (MA01).
- 2.3.22 The location of construction compounds in the Wimboldsley to Lostock Gralam area is shown on Figure 6. Map Series CT-05 (in the Volume 2: MA02 Map Book) show in detail the locations of the construction compounds described below.
- 2.3.23 A number of utility diversions will be required. For the purpose of this assessment, it is assumed that utility diversions in this area will be managed from the compounds listed below.

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**Figure 6: Location of construction compounds in the Wimboldsley to Lostock Gralam area**



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- 2.3.24 Figure 7 shows the management relationship for civil engineering works compounds and Figure 8 for the railway installation works. Details of the works associated with individual compounds are provided in subsequent sections of this report.
- 2.3.25 In the Wimboldsley to Lostock Gralam area there will be worker accommodation at the Crewe North RSD satellite compound 1, the A54 Middlewich Road satellite compound and at Gad Brook Viaduct north satellite compound for the construction workforce. Details of the location and duration of worker accommodation are provided in the description of the compound.
- 2.3.26 Soil stripped as part of the works, prior to it being used when the land is reinstated, will be stored for the duration of construction. The location of topsoil storage areas will generally be adjacent to compounds and areas of construction activity. These areas are referred to as material stockpiles are shown on maps CT-05-308b to CT-05-316a, in the Volume 2: MA02 Map Book.
- 2.3.27 Some areas will include transfer nodes. Transfer nodes are additional areas of land required to unload, store and load bulk earthworks materials that are moved to and from the site on public highways. These areas will allow material to be transferred between road vehicles and site vehicles during construction to balance traffic movements on the road network. The transfer nodes within the Wimboldsley to Lostock Gralam area are shown on map CT-05-308b, map CT-05-309, map CT-05-311, map CT-05-311-R1, map CT-05-313, map CT-05-314, map CT-05-315 and map CT-05-316a in the Volume 2: MA02 Map Book.
- 2.3.28 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**

- 2.3.29 The Crewe North RSD construction sidings will connect with the existing railway network for the movement of excavated materials by rail. This will reduce the volume of construction vehicles using the public road network.
- 2.3.30 Construction vehicles, where loaded, will carry materials, plant, other equipment and the workforce. Vehicle movements will take place on public roads, within construction compounds and transfer nodes and between the compounds or transfer nodes and working areas. Where reasonably practicable, movements between the construction compounds or transfer nodes and the working areas will 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.
- 2.3.31 The construction compounds, transfer nodes and construction sidings will provide the interface between the construction works and the public road or railway network. The likely

road routes to access compounds in the Wimboldsley to Lostock Gralam area are described in subsequent sections of this report.

## Use of borrow pits

- 2.3.32 The Proposed Scheme will require material with suitable engineering properties for the construction of a high speed railway. This is described as acceptable engineering material and will be provided, in part, through excavation of cuttings and other earthworks undertaken to construct the Proposed Scheme. However, it is unlikely that excavation across the Proposed Scheme will generate sufficient volume of this material. Material would need to be imported from distant excavations in other community areas or from other sources to address this shortfall. In some locations, this would increase significant adverse transport effects on public roads during construction.
- 2.3.33 A borrow pit is an area where additional acceptable engineering material is extracted for use in the construction of the Proposed Scheme, further to material already extracted during the construction of the Proposed Scheme. In most cases the material is used for road or rail earthworks. Four borrow pits are proposed in the Wimboldsley to Lostock Gralam area, which will provide acceptable engineering material for construction and will also help reduce effects on public roads through reduced journey lengths.
- 2.3.34 Volume 5: Appendix CT-008-00000 Borrow Pit report sets out the need for and approach to identifying suitable borrow pit locations, as well as the use and restoration strategy for the proposed borrow pits. General information on borrow pits is also provided in Volume 1, Section 6.
- 2.3.35 Details of the proposed borrow pits in the Wimboldsley to Lostock Gralam area are set out in Table 1.

**Table 1: Borrow pits in the Wimboldsley to Lostock Gralam area**

Borrow pit	Location and map reference	Extracted material	Assumed working area*	Assumed thickness of recoverable material	Assumed maximum excavation depth (b.e.g.l)**	Duration	Accessed from
MA02 Borrow Pit A	Open land south of Wimboldsley; CT-05-308b, G9 to J8	Cohesive material	13.6ha	2m	5m	Two years and nine months	Clive Green Lane and A530 Middlewich Road/ Clive Green Lane and A54 Middlewich Road or Road One/ A533



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Borrow pit	Location and map reference	Extracted material	Assumed working area*	Assumed thickness of recoverable material	Assumed maximum excavation depth (b.e.g.l**)	Duration	Accessed from
MA02 Borrow Pit B	Open land north-west of Wimboldsley; CT-05-309, D6 to H7	Cohesive material	10.5ha	2m	3m	Three years and three months	Clive Green Lane and A530 Middlewich Road/Clive Green Lane and A54 Middlewich Road or Road One/ A533
MA02 Borrow Pit C	Yew-Tree Farm, Stanthorne; CT-05-310, F7 to I9	Cohesive material	11.2ha	2m	3m	Three years and nine months	A54 Middlewich Road
MA02 Borrow Pit D	Open land between Byley and M6; CT-05-312-R5, E10 to G2 to J6	Sand and gravel	48ha	3m	5m	Four years and nine months	B5081 Byley Road, B5309 Centurion Way and A54 Holmes Chapel Road

Note: \*An estimate based on the assumptions set out in Volume 5, Appendix CT-008-00000, Borrow Pit report

\*\* below existing ground level

- 2.3.36 For each borrow pit, an assumed thickness of recoverable material has been identified (including overlying soils and mineral depth), across an assumed working area based on this depth. An assumed maximum excavation depth (below existing ground level) has also been identified. The assumed and maximum depths have been derived from geotechnical desk study of mineral resources. Extraction to the maximum excavation depth, to avoid sterilisation of mineral resources for example, would mean extraction across the full assumed working area would not be required.
- 2.3.37 The assumed thickness of recoverable material and working area has been assessed.
- 2.3.38 The borrow pits will be excavated and progressively backfilled during their period of operation. Material excavated from elsewhere in the Proposed Scheme may have to arrive at the borrow pit location before it can be backfilled. In these cases, a temporary stockpile may need to be formed so that it can be backfilled as soon as possible and prepared for restoration. In addition, excavation may be phased by zones, where sufficient space has been retained adjacent to each zone for stockpiling backfill material until the zone is depleted.
- 2.3.39 During the period of operation of the borrow pits, processes such as dewatering, crushing and materials blending may be carried out on the site. For the purpose of this assessment, it



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has been assumed that borrow pit sites will be restored to existing ground level and in a condition suitable for a return to existing land use once mineral extraction has been completed. It is anticipated that borrow pits will be restored with materials generated from construction of the Proposed Scheme that do not have suitable characteristics for use as construction or engineering fill. A Borrow pit restoration strategy is included in Volume 5: Appendix CT-008-00000 Borrow Pit report.

- 2.3.40 Three borrow pits in the Wimboldsley to Lostock Gralam area (Borrow Pits A to C) will be located, adjacent to the Proposed Scheme. Material to be moved between the borrow pits and the Proposed Scheme will be transported via conveyors or site haul routes, insofar as reasonably practicable. The use of conveyors and site haul routes enables extracted acceptable engineering material to be transported to where it is needed via large capacity dump trucks, reducing the need for the long distance transport of materials by HGV on the public road network. However, material to infill the borrow pits for restoration (which will be material excavated from the Crewe tunnels, cuttings and other earthworks to construct the Proposed Scheme) will often be required to be moved greater distances on both site haul routes and the public road network.
- 2.3.41 Due to the location of acceptable engineering material of the required geology, one borrow pit in the Wimboldsley to Lostock Gralam area, MA02 Borrow Pit D, will be located approximately 4.5km to the east of the Proposed Scheme, between Byley and the M6. Material will be transported between the MA02 Borrow Pit D site and the construction areas along the B5081 Byley Road, the B5309 Centurion Way and the A54 Holmes Chapel Way.
- 2.3.42 Reducing the need for transport of material by HGV on the public road network will limit the interface with other road users (e.g. cars, cyclists and pedestrians) and avoid some of the health and safety risks which can be associated with HGV movements.

## **Construction compounds**

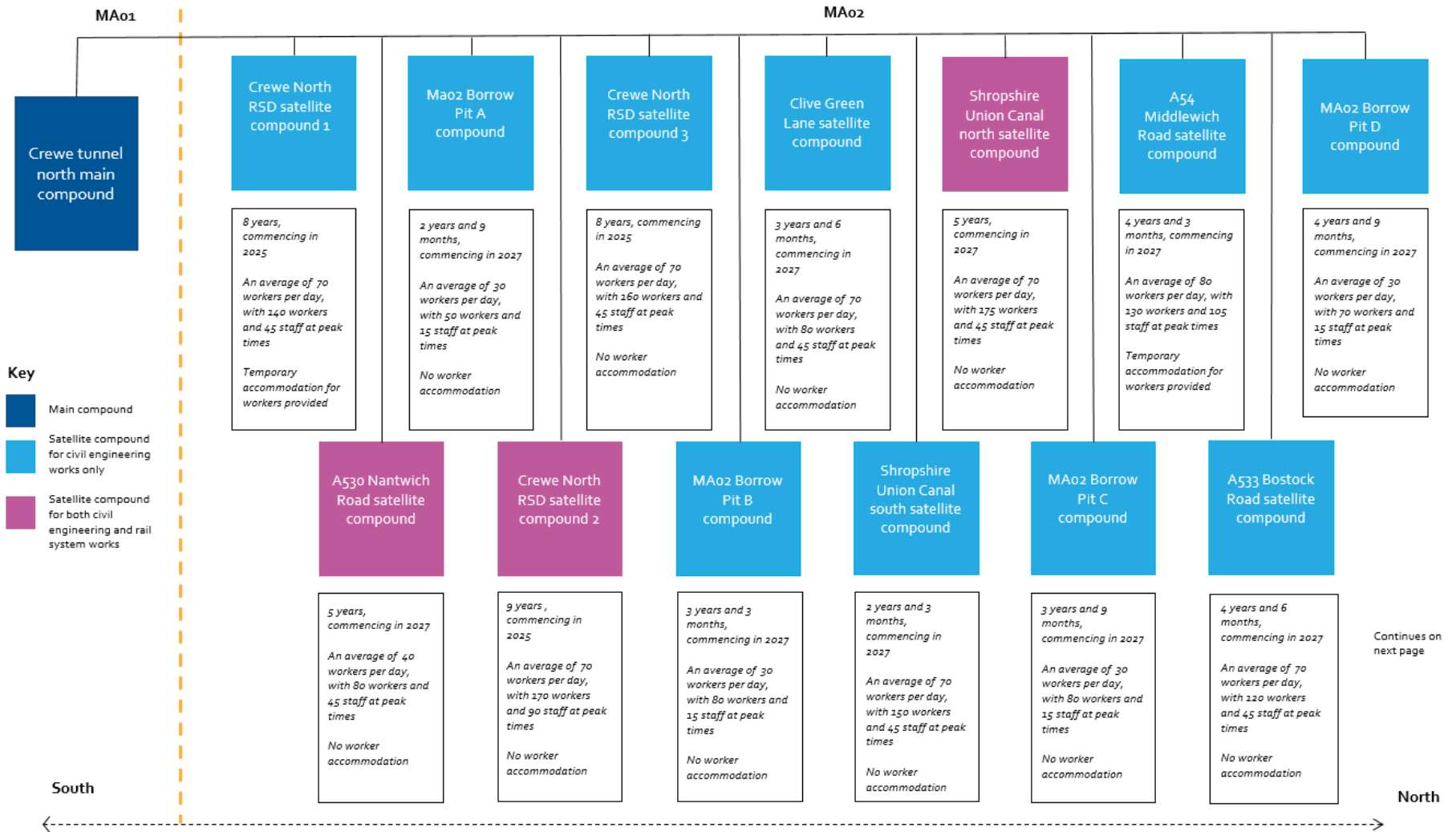
- 2.3.43 This section provides a summary of the works to be managed from the construction compounds in the Wimboldsley to Lostock Gralam area, as illustrated in Figure 7 and Figure 8. All dates and durations of activities and number of workers are indicative. All compounds will undertake initial site set-up works, and at the end of its use, finalisation works including site reinstatement, landscaping and planting (as necessary).

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**Figure 7: Construction compounds for civil engineering works**

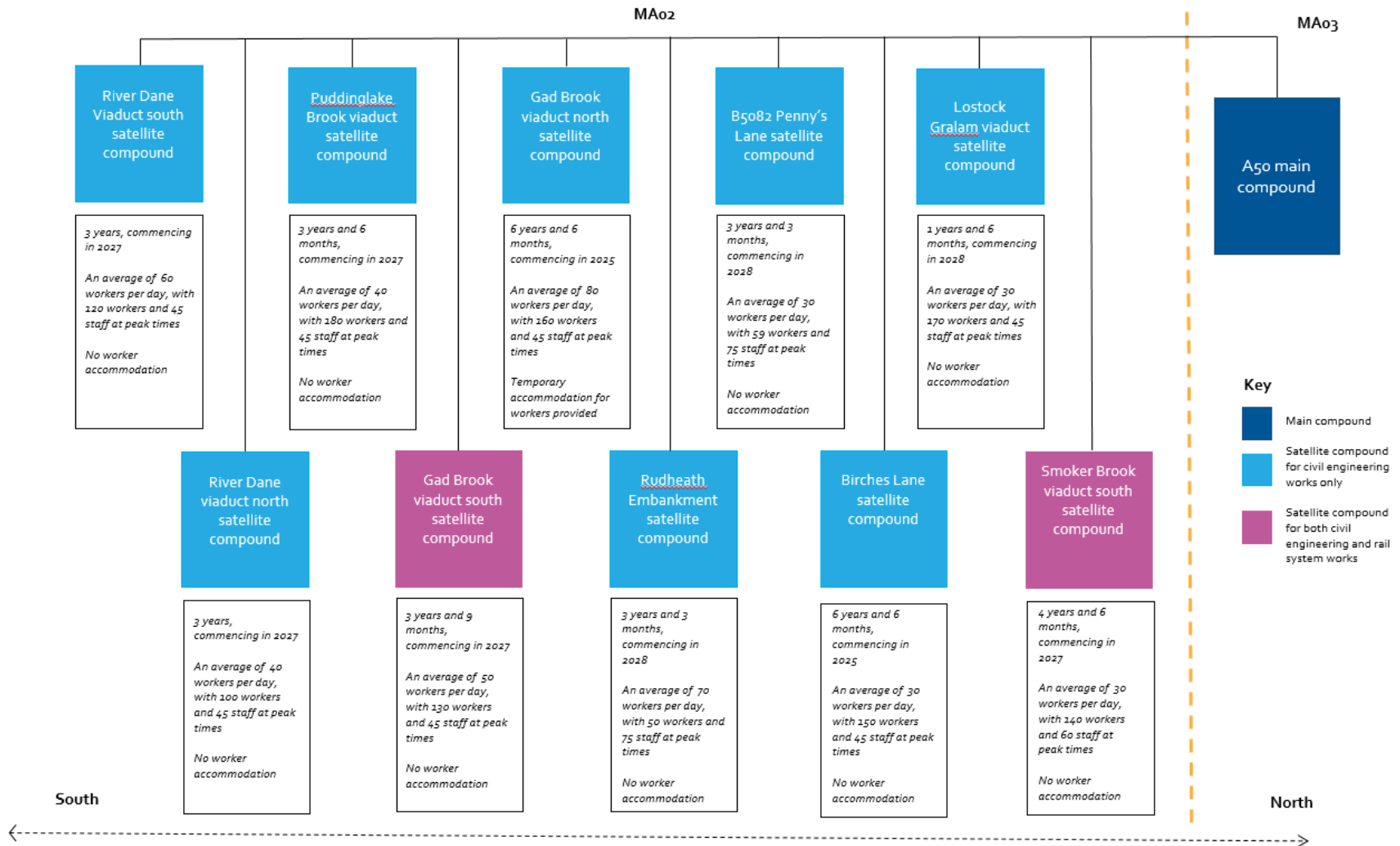


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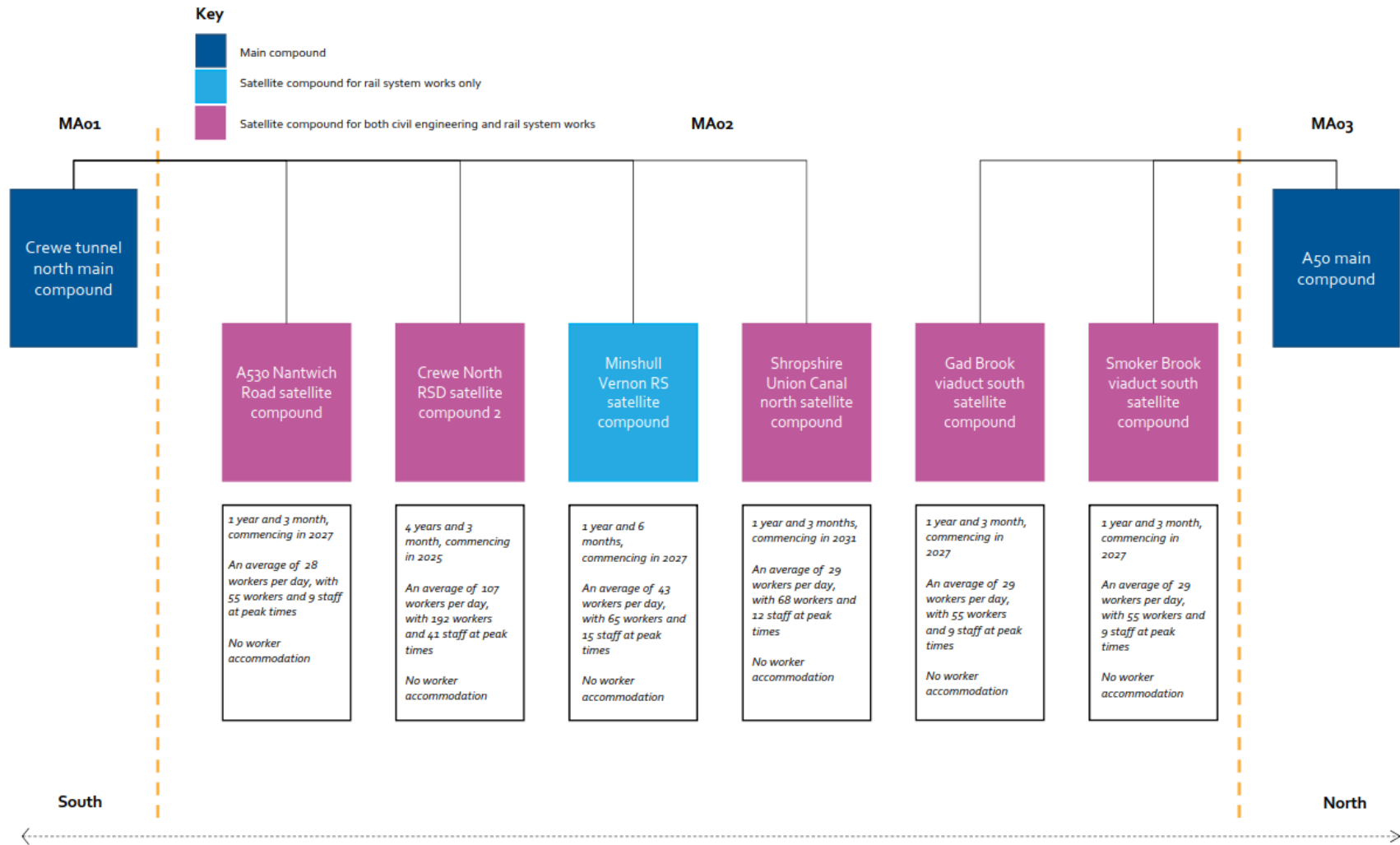
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**Figure 8: Construction compounds for railway systems works**



## **Crewe North RSD satellite compounds 1, 2 and 3**

2.3.44 Crewe North RSD satellite compounds 1, 2 and 3 (see Volume 2: MA02 Map Book, map CT-05-308b, D6 to E6, map CT-05-309, B4 to C4, map CT-05-309, E1 to F2 and CT-05-309-L1, F10 to E9) will be jointly used to manage the construction of:

- Crewe North RSD advance works, which will take one year and six months to complete;
- Crewe North RSD, which will take six years and three months to complete; and
- Crewe North IMB-R, which will take six months to complete.

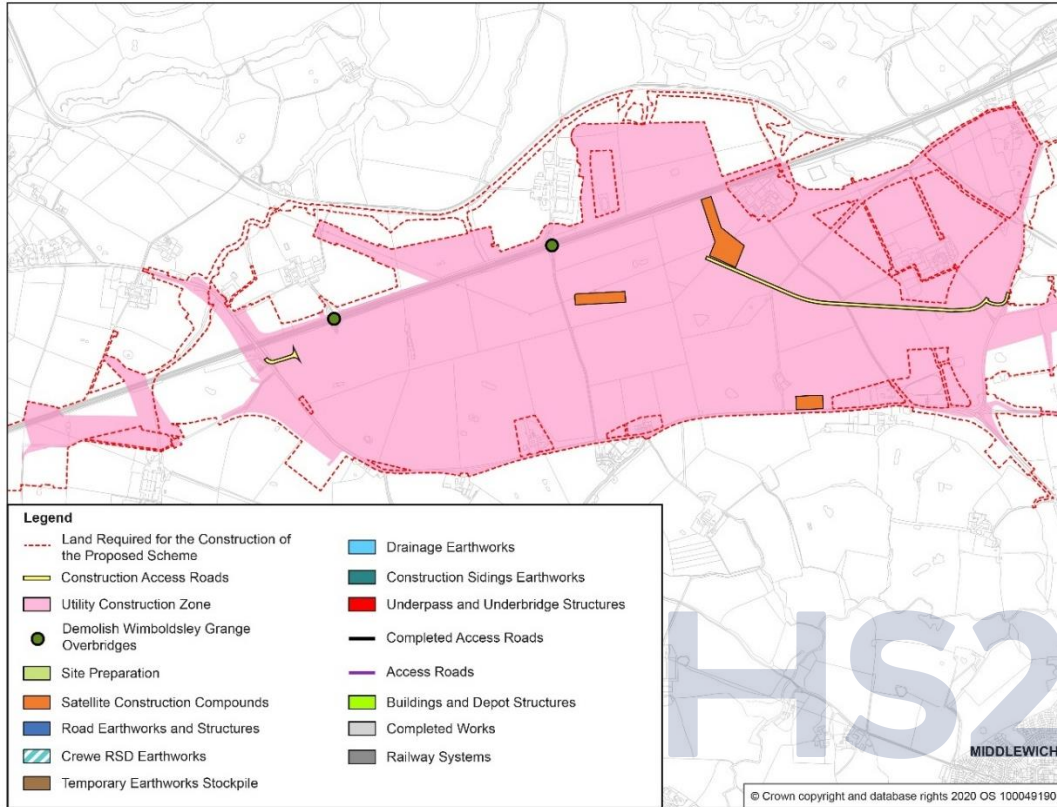
2.3.45 The works to construct the Crewe North RSD will be carried out in stages, as follows:

- Stage 1- advance works, to include site investigation, utility diversions, site access works, demolition of Wimboldsley Hall accommodation bridge and Wimboldsley Grange access, baseline monitoring of Network Rail track, habitat creation and ecological site clearance;
- Stage 2 – site preparation, to include topsoil and vegetation clearance, construction of site service road, pre-earthworks drainage and construction of long-term temporary facilities;
- Stage 3 – earthworks for the construction sidings area including stabling tracks, two head shunt tracks, an excavated material reception area and two track connections to the WCML;
- Stage 4 – earthworks for the remainder of the site, to include subsoil strip, cut/fill earthworks, creating the working platform for the main depot area, drainage, and permanent site roads;
- Stage 5 – highways works and overbridges, to include the A530 Nantwich Road realignment and Clive Green Lane realignment and their associated overbridges;
- Stage 6 – building works including services, to include maintenance shed, workshops, offices, stores, cleaners and drivers’ accommodation, ancillary maintenance building, and gatehouse;
- Stage 7 – depot structures, to include pedestrian subway under stabling sidings and track, highway retaining structures, Crewe North IMB-R hardstanding area and depot access road underbridge;
- Stage 8 – electrical works, to include GSM-R telecommunication equipment bases, traction power depot substation and traction switching site;
- Stage 9 – main site track formation and railway systems bases with phased handovers to rail systems contractor for track installation;
- Stage 10 – rail systems work, to include ballasting and track installation, substation equipment, and telecommunications; and
- Stage 11 – finishing works including black top of site roads, removal of construction sidings, site footpaths, pump house building, permanent car parking, lighting, permanent site perimeter fence, CCTV, landscaping and demobilisation of site.

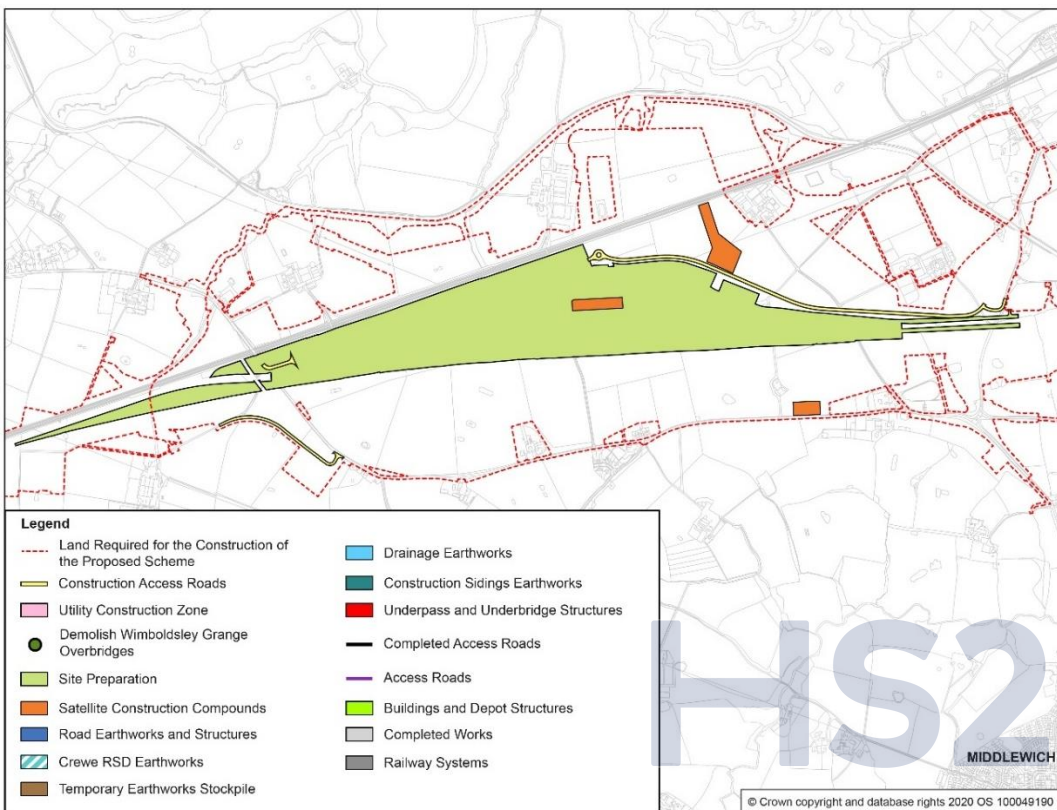
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2.3.46 The works to construct the Crewe North RSD, as outlined above, are illustrated in Figure 9 to Figure 13.

**Figure 9: Crewe North RSD: Advance works**



**Figure 10: Crewe North RSD: Site preparation**





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Figure 11: Crewe North RSD: Earthworks

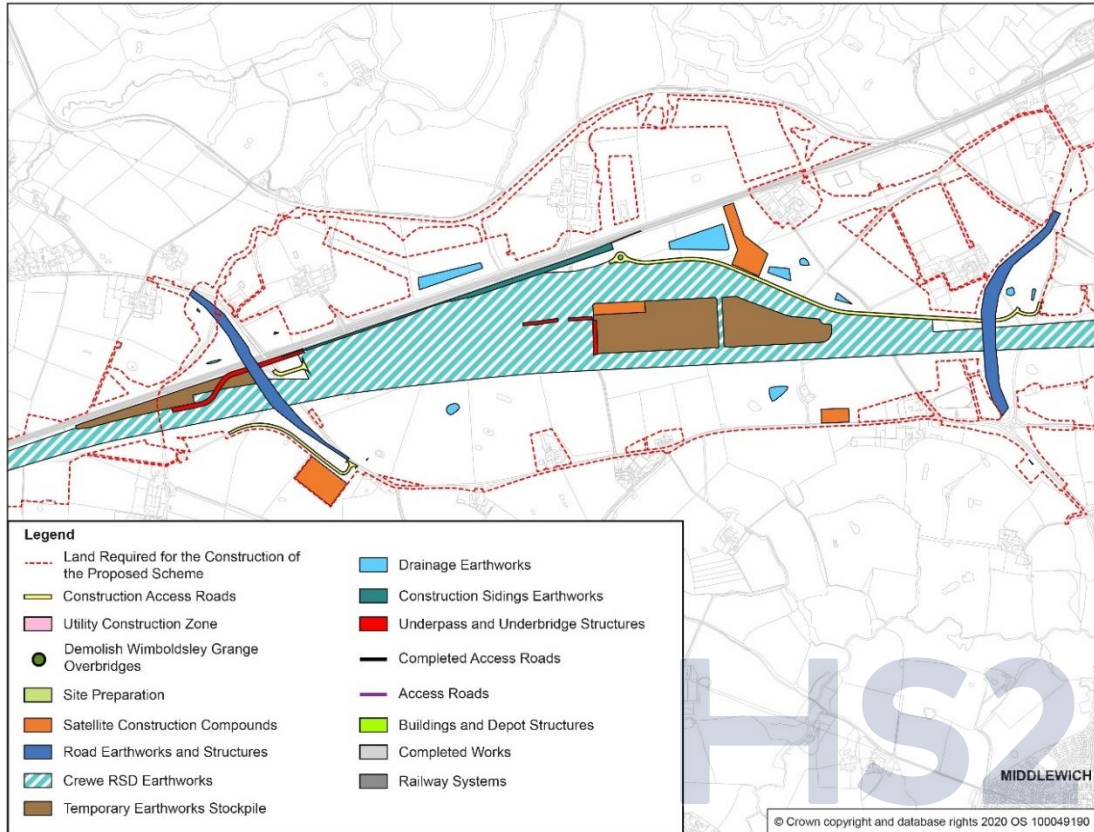


Figure 12: Crewe North RSD: Earthworks

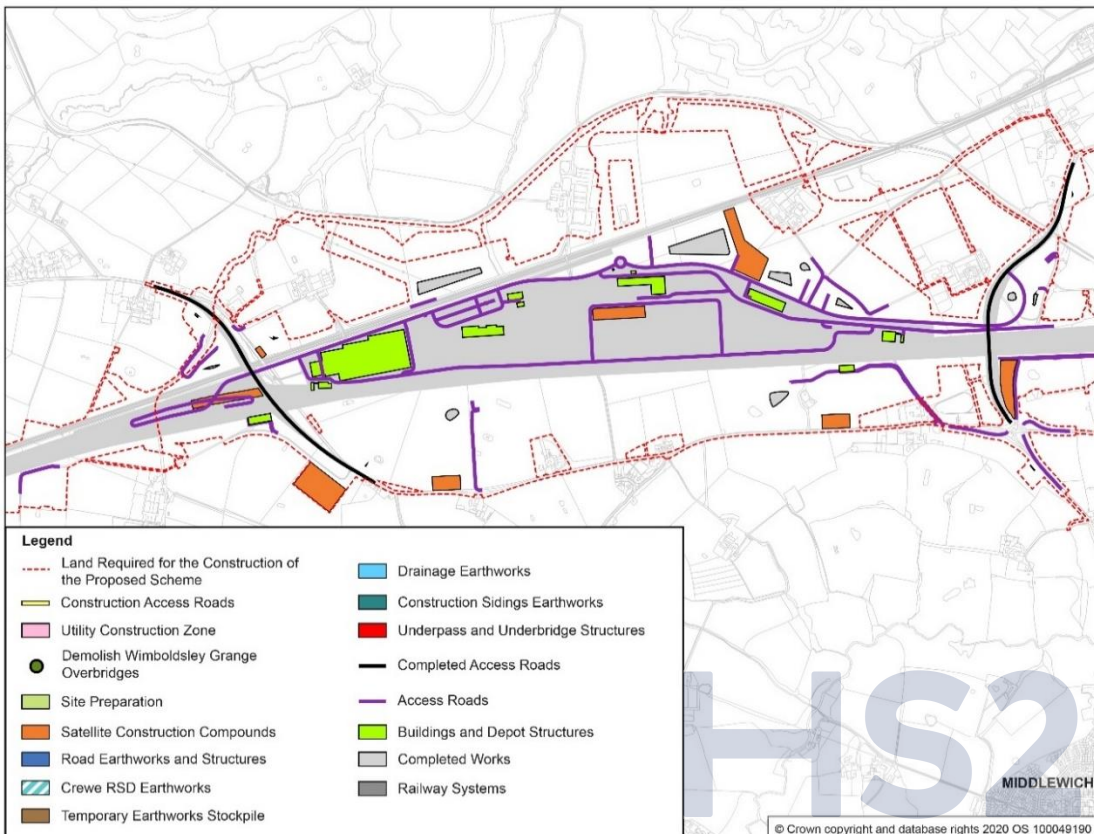
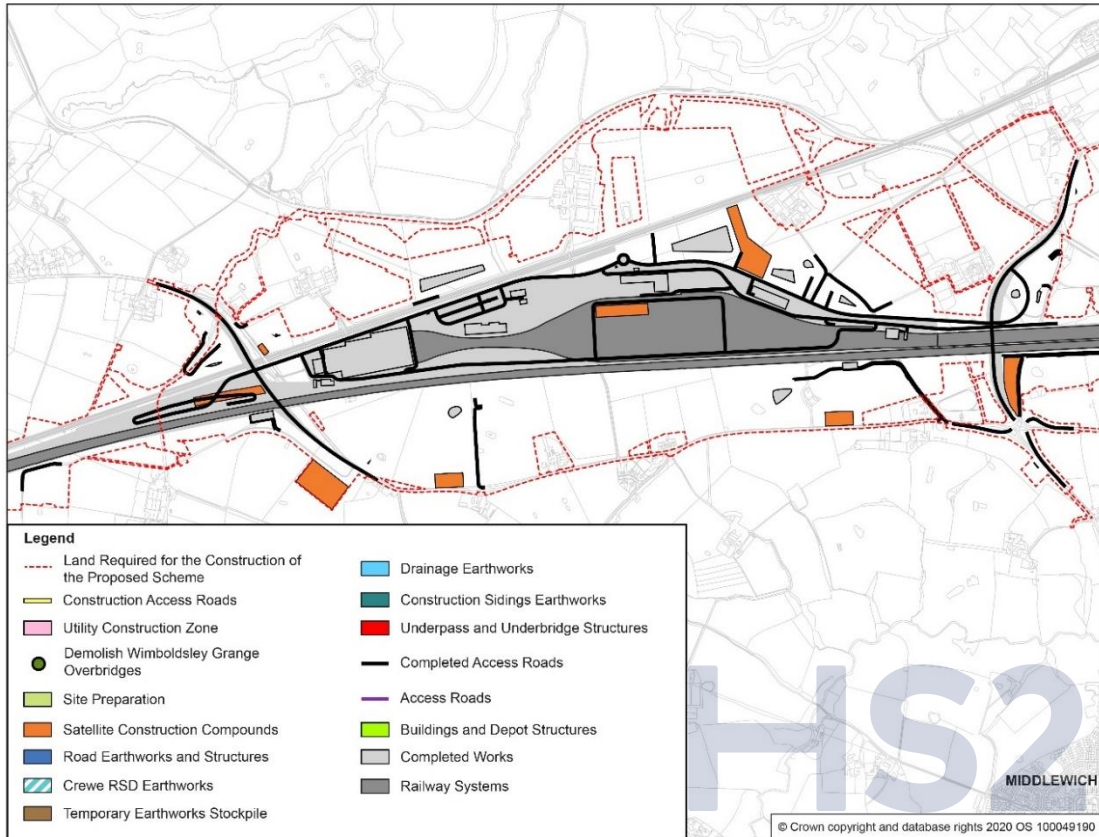


Figure 13: Crewe North RSD: Buildings and track works



## Crewe North RSD satellite compound 1

2.3.47 In addition to the works above (for the Crewe North RSD) this compound will be used to manage civil engineering works (see Volume 2: MA02 Map Book, map CT-05-308b, D6 to E6). It will:

- provide two temporary materials stockpiles immediately to the east and west of the route of the Proposed Scheme (see Volume 2: MA02 Map Book, map CT-05-308b, B7 to E7, and D6 to E6);
- provide temporary accommodation for 90 workers for three years, including welfare facilities and parking (see Volume 2: MA02 Map Book, map CT-05-308b, D6 to E6); and
- be accessed via the A530 Nantwich Road.

2.3.48 The works to be managed from this compound will require the demolition of the buildings and structures identified in Table 2.

**Table 2: Demolitions required as a result of the works to be managed from the Crewe North RSD satellite compound 1**

Type	Description	Location	Feature resulting in the demolition
Other	Bridge over WCML from Wimboldsley Grange	Wimboldsley, Middlewich	Crewe North RSD

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- 2.3.49 The compound, along with Crewe North RSD satellite compound 3, will be used to manage the construction of Walley's Green embankment, which will take three years and six months to complete.
- 2.3.50 The works to be managed from this compound will require the diversion of an existing access for Wimboldsley Grange, which will take one year to complete.
- 2.3.51 The works to be managed from this compound will involve the permanent relocation of a mobile telecommunications mast, which will take six months to complete.

### Crewe North RSD satellite compound 2

- 2.3.52 In addition to the works above (for the Crewe North RSD), this compound (shown on Volume 2: MA02 Map Book, map CT-05-309, B4 to C4) will be used to manage civil engineering works and railway systems works. It will:
- be used to manage civil engineering works for a period of two years and three months, followed by civil engineering and railways systems works for a period of six years and nine months;
  - provide three temporary materials stockpiles immediately to the east and west of the Proposed Scheme (see Volume 2: MA02 Map Book, map CT-05-309, A6 to F6, B4 to E5 and E4 to G5); and
  - be accessed via Clive Green Lane/A530 Middlewich Road or Clive Green Lane/A54 Middlewich Road/Road One/A533.
- 2.3.53 The works to be managed from this compound will require the demolition of the buildings and structures identified in Table 3.

**Table 3: Demolitions required as a result of the works to be managed from the Crewe North RSD satellite compound 2**

Type	Description	Location	Feature resulting in the demolition
Other	Bridge over WCML from Wimboldsley Hall	Wimboldsley, Middlewich	Crewe North RSD

- 2.3.54 The works to be managed from this compound will also require the following drainage works:
- Wimboldsley culvert will convey surface water under Walley's Green embankment, which will take six months to complete; and
  - Stove culvert will convey surface water under the Proposed Scheme, which will take six months to complete.
- 2.3.55 The compound will be used to manage the construction and installation of the Crewe North RSD traction power substation, located 265m north of the Crewe North RSD, which will take one year and three months to complete.

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- 2.3.56 Key railway systems installation works to be managed from this compound include:
- construction of the Crewe North RSD telecommunications site, which will take six months to complete; and
  - installation of slab and ballasted track and railway systems for the Crewe North RSD and IMB-R, which will take three years to complete.
- 2.3.57 The compound will be used to manage the installation of new railway systems for the WCML and modification of existing railway systems of the WCML to accommodate temporary construction sidings, which will take four years and three months to complete.

### Crewe North RSD satellite compound 3

- 2.3.58 In addition to the works above (for the Crewe North RSD), this compound will be used to manage civil engineering works (see Volume 2: MA02 Map Book, map CT-05-309, E1 to FE3 and CT-05-309-L1, E10 to E9). It will:
- provide one temporary material stockpile immediately to the west of the Proposed Scheme; and
  - be accessed via Clive Green Lane and A530 Nantwich Road.
- 2.3.59 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.60 The compound, along with Crewe North RSD satellite compound 1, will be used to manage the construction of Walley's Green embankment, which will take three years and six months to complete.
- 2.3.61 The compound will be used to manage the construction of the following earthworks:
- Clive Green South embankment No.1, which will take two years and nine months to complete;
  - Clive Green South embankment No.2, which will take two years and nine months to complete; and
  - Clive Green South embankment No.3, which will take two years and nine months to complete.
- 2.3.62 The works to be managed from this compound will involve the following works to utilities:
- diversion of a 132kV Scottish Power Energy Networks overhead line for 2.4km to the west of the WCML, which will take one year to complete; and
  - diversion of an underground National Grid gas transmission 900mm high pressure gas pipeline, which will take ten months to complete.

### Crewe North RSD construction sidings

- 2.3.63 The Crewe North RSD construction sidings will occupy an area between the WCML and the site of the Crewe North RSD (see Volume 2: MA02 Map Book, map CT-05-308b, F5 to map CT-05-309, DE1). The sidings will be operational for six years. The sidings will be capable of



receiving and dispatching trains to/from existing conventional lines via purpose-built sidings adjacent to the WCML. The removal of excavated materials from the construction sidings will be undertaken during day and night-time hours and at weekends, though loading will be undertaken during a standard 10 hour working day, where reasonably practicable.

2.3.64 The construction sidings will include:

- four 450m stabling tracks;
- a 400m head shunt track to the south;
- a locomotive unit head shunt track to the north;
- a 350m Crewe tunnel excavated material receptor area; and
- two track connections to the WCML.

2.3.65 Excavated material from the Crewe tunnel (in the Hough to Walley's Green area, (MA01)) will be transported along the route of the Proposed Scheme to the construction sidings by a 6km covered conveyor.

## **Minshull Vernon RS satellite compound**

2.3.66 This compound will be used to manage railway systems works (see Volume 2: MA02 Map Book, map CT-05-308b, E5). It will be accessed from the A530 Nantwich Road.

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

2.3.68 The compound will be used to manage the installation of the railway systems connection equipment to the WCML including modifications to railway systems for the temporary construction sidings, for a period of one year commencing in 2027, later followed by a period of six months commencing in 2034.

## **A530 Nantwich Road satellite compound**

2.3.69 This compound (shown on Volume 2: MA02 Map Book, map CT-05-308b, F8 to F10) will be used to manage civil engineering and railway systems works. It will:

- be used to manage civil engineering works for a period of three years and nine months, followed by civil engineering and railway systems works for a period of one year and three months;
- provide two temporary materials stockpiles immediately to the east of the Proposed Scheme (see Volume 2: MA02 Map Book, map CT-05-308b, F8 to G7 and G9 to H7); and
- be accessed via the A530 Nantwich Road.

2.3.70 The works to be managed from this compound will require the demolition of the buildings and structures identified in Table 4.

**Table 4: Demolitions as a result of the works to be managed from the A530 Nantwich Road satellite compound**

Type	Description	Location	Feature resulting in the demolition
Residential	Five properties at Railway Cottages (and three associated single-storey buildings)	Railways Cottages, Nantwich Road, Wimboldsley	Walley's Green embankment and A530 Nantwich Road overbridge

- 2.3.71 The compound will be used to manage the construction of A530 Nantwich Road overbridge, which will take three years to complete.
- 2.3.72 The works to be managed from this compound will require the following works to public and private roads:
- permanent realignment of a section of the A530 Nantwich Road, which will take three years to complete. The existing road will remain open during the realignment, with temporary traffic signals during part of the construction period;
  - temporary realignment of a section of the A530 Nantwich Road for 10 months to accommodate the construction of the A530 Nantwich Road/Clive Green Lane/Coalpit Lane roundabout, resulting in a negligible change in journey length;
  - permanent realignment of the southern section of Coalpit Lane as part of the construction of the A530 Nantwich Road/Clive Green Lane/Coalpit Lane roundabout, which will take three months to complete. The existing road will remain open during the realignment, with temporary traffic signals during part of the construction period; and
  - permanent realignment of an access for Park Hall Farm, which will take six months to complete.
- 2.3.73 Local measures will be used for a period of three years and nine months during construction to keep Footpath Wimboldsley 5/2 open, where reasonably practicable. On completion of construction of the A530 Nantwich Road realignment, Footpath Wimboldsley 5/2 will be reinstated along its existing alignment.
- 2.3.74 The works to be managed from this compound will also require the following watercourse diversion and drainage works:
- realignment of an unnamed watercourse under the Walley's Green embankment via Park Hall culvert, which will take six months to complete;
  - A530 Nantwich Road offline west culvert for realignment of Tributary of River Weaver 2 under the A530 Nantwich Road realignment, which will take six months to complete; and
  - A530 Nantwich Road offline east culvert for realignment of Tributary of River Weaver 2 under the A530 Nantwich Road realignment, which will take six months to complete.
- 2.3.75 The compound will be used to manage the construction and installation of the A530 Nantwich Road auto-transformer station, located 340m north-west of Park Hall Farm. The construction of the A530 Nantwich Road auto-transformer station will take two years to complete.



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- 2.3.76 The works to be managed from this compound involve the following works to utilities:
- permanent diversion of an underground United Utilities 350mm potable water trunk main, which will take six months to complete;
  - permanent diversion of three Openreach telecommunication cables, each of which will take three months to complete;
  - permanent diversion of three Scottish Power Energy Networks electricity cables, each of which will take three months to complete;
  - decommissioning of two Scottish Power Energy Networks electricity cables, each of which will take three months to complete; and
  - permanent diversion of two United Utilities potable water mains, one will take three months to complete and the other will take nine months to complete.

### **MA02 Borrow Pit A compound**

- 2.3.77 This compound will be used to manage the works associated with the excavation, material extraction and backfilling of MA02 Borrow Pit A, to be located east of the route of the Proposed Scheme, west of the A530 Nantwich Road and to the south of Yew-Tree Farm (see Volume 2: MA02 Map Book, map CT-05-308b, G9 to I9). A conveyor will be used to transport material to infill the borrow pit for restoration (see Volume 2: MA02 Map Book, map CT-05-308b, H5 to H8).
- 2.3.78 This compound will be accessed initially during site set up via Clive Green Lane/A530 Middlewich Road or Clive Green Lane/A54 Middlewich Road or Road One/A533. The main access will then be via site haul routes along the route of the Proposed Scheme.
- 2.3.79 This compound will be in use for two years and nine months.
- 2.3.80 No demolitions will be required as a result of the works to be managed from this compound.

### **MA02 Borrow Pit B compound**

- 2.3.81 This compound will be used to manage the works associated with the excavation, material extraction and backfilling of MA02 Borrow Pit B, to be located east of the route of the Proposed Scheme, west of the A530 Nantwich Road and north of Wimboldsley (see Volume 2: MA02 Map Book, map CT-05-309, G7).
- 2.3.82 This compound will be accessed initially during site set up via Clive Green Lane/A530 Middlewich Road or Clive Green Lane/A54 Middlewich Road or Road One/A533. The main access would be via site haul routes along the route of the Proposed Scheme.
- 2.3.83 This compound will be in use for approximately two years and nine months.
- 2.3.84 No demolitions will be required as a result of the works to be managed from this compound.

## **Clive Green Lane satellite compound**

- 2.3.85 This compound will be used to manage civil engineering works (see Volume 2: MA02 Map Book, map CT-05-309, J5 to J7). It will:
- provide one temporary materials stockpile, immediately to the east of the Proposed Scheme (see Volume 2: MA02 Map Book, map CT-05-309, H5 to I5); and be accessed via Clive Green Lane/A530 Middlewich Road or Clive Green Lane/A54 Middlewich Road or Road One/A533.
- 2.3.86 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.87 The compound will be used to manage the construction of the following bridges:
- Shropshire Union Canal offline overbridge, which will take one year and three months to complete; and
  - Clive Green Lane overbridge, which will take three years and three months to complete.
- 2.3.88 The works to be managed from this compound will require the following works to public and private roads:
- permanent realignment of an access for Stanthorne Park Mews, which will take 10 months to complete; and
  - permanent realignment of a section of Clive Green Lane. A 340m section of Clive Green Lane will be realigned, 80m north of its existing alignment, resulting in a negligible change in journey length. It will be constructed offline (i.e. generally constructed along or nearby existing routes, which will remain open during construction). A section of the existing highway will be temporarily realigned for one year and nine months. Once construction of the realigned section of road is complete, traffic management measures will be implemented for three months. During this period, works will take place to connect the realigned section of Clive Green Lane with the existing highway.
- 2.3.89 The works to be managed from this compound will require the following works to PRow:
- temporary diversion of Footpath Wimboldsley 1/1 for a period of two years and one month, users will be diverted along Footpath Winsford 3/4 and Clive Green Lane, increasing journey length by 1.5km. On completion of construction, Footpath Wimboldsley 1/1 will be permanently closed and users will be diverted; and
  - temporary diversion of Footpath Winsford 3/4 for period of two years and one month during construction. This will divert users for 625m, along Clive Green Lane. On completion of construction of the Clive Green Lane overbridge, Footpath Winsford 3/4 will be reinstated along its existing alignment via the Shropshire Union Canal offline overbridge.
- 2.3.90 The works to be managed from this compound will require the following drainage works:
- Clive Green Lane offline culvert to convey Tributary of River Weaver 4 under the realigned Clive Green Lane, which will take nine months to complete; and

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- Stanthorne culvert will convey surface water under the Proposed Scheme, which will take nine months to complete.
- 2.3.91 Key railway systems installation works to be managed from this compound include the construction of the Clive Green telecommunications site, which will take six months to complete.
- 2.3.92 The works to be managed from this compound will involve the following works to utilities:
- undergrounding of a Scottish Power Energy Networks 11kV overhead power line, which will take three months to complete;
  - permanent diversion of a Sky telecommunication cable, which will take three months to complete;
  - permanent diversion of an Openreach telecommunication cable, which will take three months to complete;
  - decommissioning of three United Utilities potable water mains, two will take three months to complete and one will take six months to complete;
  - permanent diversion of two United Utilities potable water mains, which will each take three months to complete; and
  - permanent diversion of a Scottish Power Energy Networks electricity cable, which will take three months to complete.

## Shropshire Union Canal south satellite compound

- 2.3.93 This compound will be used to manage civil engineering works (see Volume 2: MA02 Map Book, map CT-05-310, C7 to D6). It will:
- provide two temporary materials stockpiles immediately to the east and west of the Proposed Scheme (see Volume 2: MA02 Map Book, map CT-05-310, A6 to C6, and B5 to D5); and
  - be accessed initially via Clive Green Lane/A530 Middlewich Road or Clive Green Lane/A54 Middlewich Road or Road One/A533.
- 2.3.94 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.95 The works to be managed from this compound will require the temporary diversion of Footpath Winsford 3/1 and Footpath Stanthorne 3/1 for a period of two years and seven months during construction. This will divert users for 1.5km, via Clive Green Lane and Coalpit Lane, increasing journey length by 511m. On completion of construction, Footpath Winsford 3/1 and Footpath Stanthorne 3/1 will be reinstated along its existing alignment.
- 2.3.96 The compound, along with the Shropshire Union Canal north satellite compound, will be used to manage the construction of the following structures:
- Shropshire Union Canal viaduct No.1, which will take one year and nine months to complete;

- Shropshire Union Canal viaduct No.2, which will take one year and six months to complete; and
- Shropshire Union Canal viaduct No.3, which will take one year and nine months to complete.

## **Shropshire Union Canal north satellite compound**

- 2.3.97 This compound (shown on Volume 2: MA02 Book, map CT-05-310, E4 to F5) will be used to manage civil engineering and railways systems works. It will:
- be used to manage civil engineering works for a period of two years and nine months, later followed by railway systems works for a period of one year and three months commencing in 2030;
  - provide four temporary materials stockpiles immediately to the east and west of the Proposed Scheme (see Volume 2: MA02 Map Book, map CT-05-310, E5, F5, F6 to F7, and F7 to F8); and
  - be accessed initially via the A54 Middlewich Road, and thereafter from site haul routes.
- 2.3.98 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.99 The compound, along with the Shropshire Union Canal south satellite compound, will be used to manage the construction of the following structures:
- Shropshire Union Canal viaduct No.1, which will take one year and nine months to complete;
  - Shropshire Union Canal viaduct No.2, which will take one year and six months to complete; and
  - Shropshire Union Canal viaduct No.3, which will take one year and nine months to complete.
- 2.3.100 The existing access for Yew-Tree Farm will be permanently realigned, which will take one year to complete. The existing access for Yew-Tree Farm will remain open during the realignment, which will be constructed offline.
- 2.3.101 This compound, along with the A54 Middlewich Road satellite compound, will be used to manage the construction of the A54 Middlewich Road sectioning auto-transformer station. The rail systems works for the A54 Middlewich Road sectioning auto-transformer station foundations and buildings will take one year to complete.
- 2.3.102 The works to be managed from this compound will require the construction of Clive culvert, for surface water drainage under the Stanthorne South embankment, which will take six months to complete.
- 2.3.103 This compound will be used to manage the works to permanently divert a Scottish Power Energy Networks electricity cable, which will take three months to complete.

## **MA02 Borrow Pit C compound**

- 2.3.104 This compound will be used to manage the works associated with the excavation, material extraction and backfilling of MA02 Borrow Pit C to be located to the east of the route of the Proposed Scheme, west of Coalpit Lane and north of Yew-Tree Farm (see Volume 2: MA02 Map Book, map CT-05-310, H7 to I7). The compound will be accessed initially via A54 Middlewich Road, and then via site haul routes along the route of the Proposed Scheme. There will be three temporary materials stockpiles associated with the compound, to the east and west of the Proposed Scheme (see Volume 2: MA02 Map Book, map CT-05-310, H5 to I5, I7 to J7, and G7 to H7).
- 2.3.105 This compound will be in use for two years and nine months.
- 2.3.106 No demolitions will be required as a result of the works to be managed from this compound.

## **A54 Middlewich Road satellite compound**

- 2.3.107 This compound will be used to manage civil engineering works (see Volume 2: MA02 Map Book, map CT-05-311, C9, to map CT-05-311- R1, B3). It will:
- provide three temporary stockpiles to the east and west of the route of the Proposed Scheme (see Volume 2: MA02 Map Book, map CT-05-311, B8 to C9, D9, and D8 to D9);
  - be accessed via the A54 Middlewich Road and the A533 Northwich Road; and
  - provide temporary accommodation for 125 workers for three years and six months, including welfare facilities and parking (see Volume 2: MA02 Map Book, map CT-05-311, C10).
- 2.3.108 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.109 The compound will be used to manage the construction of the following structures:
- Middlewich box structure, which will take one year and nine months to complete; and
  - A54 Middlewich Road viaduct, which will take one year and six months to complete.
- 2.3.110 The compound will also be used to manage the construction of the following retaining walls:
- Clive Green North embankment retaining wall, which will take three years to complete; and
  - Stanthorne South embankment retaining wall, which will take two years and six months to complete.
- 2.3.111 The works to be managed from this compound will require the following works to public and private roads:
- permanent realignment of a section of the A54 Middlewich Road to connect with the diverted A533 Northwich Road at a new three-arm priority controlled (give-way) roundabout, which will take two years to complete. The existing route will remain open during construction;

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- temporary closure of Bell Lane during the construction of the A54 Middlewich Road for a period of four years and three months. Traffic will be diverted via the A533 Northwich Road, the existing A54 Middlewich Road and the realigned A54 Middlewich Road following its opening, increasing journey length for some users by 660m;
- local measures will be used for a period of two months during construction to keep Birch Lane open, where reasonably practicable. On completion of construction, Birch Lane will be permanently diverted to connect with the realigned A54 Middlewich Road;
- permanent diversion of a section of the A533 Northwich Road, which will take one year and 10 months to complete. The existing route will remain open during construction; and
- permanent diversion of access to Greenheyes Farm, which will take nine months to complete.

2.3.112 The works to be managed from this compound will require the temporary diversion of Footpath Winsford 37/1 and Footpath Stanthorne 1/1 for a period of 11 months during construction. This will divert users for 440m north of the realigned A54 Middlewich Road, to meet the existing A533 Northwich Road, increasing journey length by 765m. On completion of construction, Footpath Winsford 37/1 and Footpath Stanthorne 1 will be diverted along the realigned A54 Middlewich Road.

2.3.113 This compound, along with the Shropshire Union Canal north satellite compound, will be used to manage the construction of the A54 Middlewich Road sectioning auto-transformer station. The construction of the A54 Middlewich Road sectioning auto-transformer station foundations and buildings will take one year to complete.

2.3.114 The works to be managed from this compound will involve the following works to utilities:

- decommissioning of a United Utilities potable water main, which will take three months to complete;
- permanent diversion of a INOYVN electricity cable, which will take three months to complete;
- permanent diversion of three United Utilities potable water mains, two will take nine months to complete and one will take six months to complete;
- permanent diversion of a Scottish Power Energy Networks electricity cable, which will take three months to complete;
- permanent diversion of an Openreach telecommunication cable, which will take three months to complete;
- decommissioning of a United Utilities potable water main, which will take three months to complete;
- decommissioning of an Openreach telecommunication cable, which will take three months to complete;
- permanent diversion of a Cadent Gas main, which will take six months to complete;
- decommissioning of two Scottish Power Energy Networks electricity cables, each of which will take three months to complete; and



- permanent diversion of a TATA Chemicals Europe electricity cable, which will take three months to complete.

## **A533 Bostock Road satellite compound**

2.3.115 This compound will be used to manage civil engineering works (see Volume 2: MA02 Map Book, map CT-05-311- R1, B5 to B4). It will:

- provide a transfer node within the compound, accessed from the A54 Middlewich Road (as shown on Volume 2: MA02 Map Book, map CT-05-311-R1, B5 to C2); and
- be accessed via the A54 Middlewich Road and the A533 Northwich Road.

2.3.116 The works to be managed from this compound will require demolition of the buildings and structures identified in Table 5.

**Table 5: Demolitions required as a result of the works to be managed from the A54 Middlewich Road satellite compound**

Type	Description	Location	Feature resulting in the demolition
Residential	One residential property	Yew-Tree Farm, Coalpit Lane, Stanthorne	Clive Green North embankments No.2
Residential	One residential property	Stanthorne Grange, Middlewich Road, Stanthorne	Stanthorne South embankment No.2
Residential	One residential property	Greenheyes Farm, Northwich Road, Stanthorne	Stanthorne North embankment
Commercial	One commercial property comprising 18 steel-framed and two brick buildings	Greenheyes Farm, Northwich Road, Stanthorne	Stanthorne North embankment

2.3.117 The compound will be used to manage the construction of the following earthworks:

- Clive Green North embankments No.1, No.2 and No.3, which will take three years to complete;
- Stanthorne South embankments No.1 and No.2, which will take two years to complete;
- Stanthorne North embankment, which will take two years and three months to complete;
- Dane Valley embankment, which will take three years and three months to complete;
- Whatcroft South embankment, which will take one year and nine months to complete; and
- Clive Green North cutting, which will take three years to complete.

## **River Dane viaduct south satellite compound**

- 2.3.118 This compound will be used to manage civil engineering works (see Volume 2: MA02 Map Book, map CT-05-311, E8 to G7). It will:
- provide five temporary materials stockpiles immediately to the east and west of the Proposed Scheme (see Volume 2: MA02 Map Book, map CT-05-311, E9, F9 to G9, E9 to F9, G8 to G9, and I9 to G8); and
  - be accessed initially via the A533 Northwich Road, and thereafter from via site haul routes.
- 2.3.119 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.120 The works to be managed from this compound will require the construction of Bank culvert, for surface water drainage under Stanthorne North embankment, which will take nine months to complete.
- 2.3.121 The compound, along with the River Dane north satellite compound, will be used to manage the construction of River Dane viaduct, which will take two years and nine months to complete.
- 2.3.122 The existing access for Bank Farm will be permanently realigned, which will take one year and three months to complete. The existing route will remain open during construction.
- 2.3.123 This compound will be used to manage the works to permanently divert a Scottish Power Energy Networks electricity cable, which will take three months to complete.

## **River Dane viaduct north satellite compound**

- 2.3.124 This compound will be used to manage civil engineering works (see Volume 2: MA02 Map Book, map CT-05-312, D8 to F7). It will:
- provide six temporary materials stockpiles immediately to the east and west of the Proposed Scheme (see Volume 2: MA02 Map Book, map CT-05-312, D7 to F7, E6, E6 to F6, F6 to H6, G7, and H7 to I7); and
  - be accessed initially via Whatcroft Hall Lane, and thereafter via site haul routes.
- 2.3.125 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.126 The compound, along with the River Dane south satellite compound, will be used to manage the construction of River Dane viaduct, which will take two years and nine months to complete.

## **Puddinglake Brook viaduct satellite compound**

- 2.3.127 This compound will be used to manage civil engineering works (see Volume 2: MA02 Map Book, map CT-05-313, A6 to B7). It will:
- provide two temporary materials stockpiles immediately to the east and west of the Proposed Scheme (see Volume 2: MA02 Map Book, map CT-05-313, B6 to C6, and B5 to C5); and
  - be accessed via Whatcroft Hall Lane.
- 2.3.128 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.129 The compound will be used to manage the construction of Puddinglake Brook viaduct, which will take one year and six months to complete.
- 2.3.130 The compound, along with Gad Brook viaduct south satellite compound, will be used to manage the construction of Trent and Mersey viaduct, which will take one year and six months to complete.
- 2.3.131 The works to be managed from this compound will require the following works to private roads:
- Construction of the accommodation access for Dairy Farm, which will take nine months to complete;
  - diversion of Dairy Farm access west, which will take six months to complete;
  - construction of the accommodation access for Brook Farm, which will take nine months to complete; and
  - temporary realignment of Whatcroft Hall Lane, over a distance of 200m, up to 30m south of its current alignment, which will take six months to complete, with negligible change in journey length. On completion of construction, the road will be permanently reinstated along its existing alignment.
- 2.3.132 The works to be managed from this compound will require localised diversion of Footpath Davenham 6/1 for a period of two years and 11 months during construction. On completion of construction, the Footpath Davenham 6/1 will be reinstated close to its existing alignment.
- 2.3.133 The works to be managed from this compound will also require the following drainage works:
- Whatcroft culvert will convey a tributary of the Trent and Mersey Canal under Dane Valley embankment, which will take nine months to complete; and
  - Manor culvert will convey surface water under Whatcroft South embankment, which will take nine months to complete.
- 2.3.134 Key railway systems installation works to be managed from this compound includes the construction of the Whatcroft Hall Lane telecommunications site, which will take nine months to complete.

2.3.135 The works to be managed from this compound will involve the following works to utilities:

- permanent diversion of a Scottish Power Energy Networks electricity cable, which will take three months to complete;
- protective works to a Cadent Gas main; and
- protective works to a United Utilities potable water main.

## MA02 Borrow Pit D compound

2.3.136 This compound will be used to manage works associated with the excavation, material extraction and backfilling of MA02 Borrow Pit D located 4.5km east of the route of the Proposed Scheme, north of Moss Lane and immediately west of the M6 (see Volume 2: MA02 Map Book, map CT-05-312-R5, G2 to G3). The compound will be accessed via the B5081 Byley Road, B5309 Centurion Way and A54 Holmes Chapel Road.

2.3.137 This compound will be in use for four years and nine months.

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

## Gad Brook viaduct south satellite compound

2.3.139 This compound (shown on Volume 2: MA02 Map Book, map CT-05-313, G7 to H8) will be used to manage civil engineering and railway systems works. It will:

- be used to manage civil engineering works for a period of two years and six months, followed by both civil engineering and railway systems works for a period of one year and three months;
- provide seven temporary stockpiles immediately to the east and west of the route of the Proposed Scheme (see Volume 2: MA02 Map Book, map CT-05-313, E6 to F6, F6 to G6, G4 to H4, H5 to I5, H6 to I6, and J6);
- provide a transfer node to the south of the compound, accessed from Davenham Road and via site haul routes (as shown on Volume 2: MA02 Map Book, map CT-05-313, G6 to F9); and
- be accessed via Davenham Road.

2.3.140 The works to be managed from this compound will require demolition of the buildings and structures identified in Table 6.

**Table 6: Demolitions required as a result of the works to be managed from Gad Brook viaduct south satellite compound**

Type	Description	Location	Feature resulting in the demolition
Residential	One residential property	Higgins Lane Farm, Davenham Road, Rudheath	Whatcroft North embankment
Commercial	One commercial property comprising 18 steel-framed and clad barns and steel silo	Higgins Lane Farm, Davenham Road, Rudheath	Whatcroft North embankment

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- 2.3.141 The compound, along with Gad Brook viaduct north satellite compound, will be used to manage the construction of Gad Brook viaduct, which will take two years and three months to complete.
- 2.3.142 The compound, along with Puddinglake Brook viaduct satellite compound, will be used to manage the construction of Trent and Mersey Canal viaduct, which will take one year and six months to complete.
- 2.3.143 The compound will also be used to manage the construction of Whatcroft North embankment, which will take two years and three months to complete.
- 2.3.144 The works to be managed from this compound will require the temporary closure of Davenham Road where it is crossed by the route of the Proposed Scheme for one month. Users will be diverted via Davenham Road, Shipbrook Road, Church Street, London Road and the A556 Chester Road, increasing journey length for some users by 7.2km.
- 2.3.145 The works to be managed from this compound will require localised diversion of Footpath Rudheath 10/1 for a period of one year and five months during construction, with a negligible change in journey length. On completion of construction, the Footpath Rudheath 10/1 will be reinstated close to its existing alignment.
- 2.3.146 The compound, along with Gad Brook viaduct north satellite compound, will be used to manage the installation of the Davenham Road express feeder auto-transformer station. The installation of the Davenham Road auto-transformer station railways systems equipment will take one year and six months to complete.
- 2.3.147 The works to be managed from this compound will involve the following works to utilities:
- permanent diversion of five INOYVN potable water mains, which will take six months to complete;
  - permanent diversion of two Scottish Power Energy Networks electricity cables, which will each take three months to complete;
  - permanent diversion of an INOYVN electricity cable, which will take three months to complete; and
  - decommissioning of a Scottish Power Energy Networks electricity cable, which will take three months to complete.

## Gad Brook viaduct north satellite compound

- 2.3.148 This compound will be used to manage civil engineering works (see Volume 2: MA02 Map Book, map CT-05-314, C5 to E3). It will:
- provide six temporary materials stockpiles immediately to the east and west of the Proposed Scheme (see Volume 2: MA02 Map Book, map CT-05-314, D6, D5, D6 to E6, E5 and F5 to G5);
  - be accessed primarily via the A530 King Street roundabout; and

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- provide temporary accommodation for 100 workers for two years and five months, including welfare facilities and parking (see Volume 2: Map Book, map CT-05-314, C5 to E4).
- 2.3.149 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.150 The compound, along with Gad Brook viaduct south satellite compound, will be used to manage the construction of Gad Brook viaduct, which will take two years and three months to complete.
- 2.3.151 The works to be managed from this compound will require the following works to public roads:
- temporary realignment of the A556 Chester Road/Shurlach Road at its junction with the A559 Manchester Road over a distance of 240m, 22m north of its existing alignment which will be in use for two years and six months, resulting in a negligible change in journey length. The current configuration will be reinstated once construction of Wade Brook viaduct and Lostock Gralam viaduct are complete;
  - permanent diversion of the B5082 Penny's Lane, which will take two years to complete. The B0582 Penny's Lane will remain open during the diversion. On completion of construction, there will be tie-in works and traffic management including short periods of lane reductions and short duration closures at night or weekends over a period of six weeks;
  - permanent closure of the north-eastern section of Cookes Lane, where it is crossed by A556 Shurlach Road realignment, which will take three months to complete. An access road serving land to the west of the A556 Shurlach Road realignment will be provided, resulting in a negligible change in journey length; and
  - temporary diversion of a section of the A530 King Street, which will take one year and six months to complete. Users will be diverted 50m east of its existing alignment, resulting in a negligible change in journey length. On completion of construction, the A530 King Street will be reinstated on its existing alignment.
- 2.3.152 The works to be managed from this compound will require the temporary diversion of Footpath Rudheath 3/4, Footpath Rudheath 3/3, Footpath Lach Dennis 3X/2 and Footpath Lach Dennis 3X/1 to the east of the area required for the construction of the Proposed Scheme for a period of four years and two months, with an increase in journey length of 660m.
- 2.3.153 The compound will also be used to manage construction of the B5082 Penny's Lane telecommunications site, which will take nine months to complete.
- 2.3.154 The compound, along with Gad Brook viaduct south satellite compound, will be used to manage the construction of Davenham Road express feeder auto-transformer station, located 50m east of Gad Brook viaduct. The construction of the Davenham Road auto-transformer station foundations and buildings will take one year and six months to complete.



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- 2.3.155 The works to be managed from this compound will require the following works to utilities:
- permanent diversion of a Scottish Power Energy Networks 33kV overhead power line, which will take three months to complete;
  - permanent diversion of five INOYVN electricity cables, each of which will take three months to complete;
  - permanent diversion of four Scottish Power Energy Networks electricity cables, each of which will take three months to complete;
  - permanent diversion of three United Utilities potable water mains, one will take three months to complete, one will take six months to complete and one will take one year to complete;
  - permanent diversion of two TATA Chemicals Europe electricity cables, each of which will take three months to complete;
  - permanent diversion of a Cadent Gas main, which will take six months to complete;
  - decommissioning of a Cadent Gas main, which will take three months to complete;
  - permanent diversion of an INOYVN petrochemical main, which will take six months to complete;
  - decommissioning of three Scottish Power Energy Networks electricity cables, each of which will take three months to complete; and
  - permanent diversion of an INOYVN telecommunication cable, which will take three months to complete.

## Rudheath embankment satellite compound

- 2.3.156 This compound will be used to manage civil engineering works (see Volume 2: MA02 Map Book, map CT-05-314, B7 to C7). It will:
- provide a transfer node to the north of the compound, accessed from the B5082 Penny's Lane and site haul routes (as shown on Volume 2: Map Book, map CT-05-314, C7 to D8); and
  - be accessed initially via the A530 King Street, and thereafter from site haul routes.
- 2.3.157 The works to be managed from this compound will require demolition of the buildings and structures identified in Table 7.

**Table 7: Demolitions required as a result of the works to be managed from Gad Brook viaduct north satellite compound**

Type	Description	Location	Feature resulting in the demolition
Residential	One residential property	High House Farm, King Street, Rudheath	Rudheath embankment
Residential	Nine residential properties	Cookes Lane, Rudheath	Rudheath embankment

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Type	Description	Location	Feature resulting in the demolition
Commercial	One commercial property comprising two single storey brick outbuildings and three steel-framed and clad barns	High House Farm, King Street, Lach Dennis	Rudheath embankment
Commercial	One timber building used as café	Layby off the A556 Shurlach Road	Rudheath embankment
Other	One public convenience	Layby off the A556 Shurlach Road	Rudheath embankment

2.3.158 The compound, along with the B5082 Penny's Lane satellite compound and Birches Lane satellite compound will be used to manage the construction of the Rudheath embankment, which will take three years to complete.

2.3.159 The works to be managed from this compound will require the following works to utilities:

- diversion of an underground Cadent Gas local distribution 150mm high pressure gas pipeline which will take nine months to complete; and
- diversion of an underground National Grid gas transmission 900mm high pressure gas pipeline which will take two years and two months to complete.

### **B5082 Penny's Lane satellite compound**

2.3.160 This compound will be used to manage civil engineering works (see Volume 2: MA02 Map Book, map CT-05-314, E7 to F6). It will:

- provide a transfer node to the north of the compound, accessed from the B5082 Penny's Lane and site haul routes (as shown on Volume 2: MA02 Map Book, map CT-05-314, F6 to H8); and
- be accessed via B5082 Penny's Lane/A556 Shurlach Road or Crowders Lane/A530 King Street or B5082 Penny's Lane diversion to A530 King Street.

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

2.3.162 The compound, along with the Rudheath embankment satellite compound and Birches Lane satellite compound will be used to manage the construction of the Rudheath embankment, which will take three years to complete.

2.3.163 The works to be managed from this compound will require the following works to utilities:

- permanent diversion of a Scottish Power Energy Networks 132kV overhead line for 1.6km to the east of the route of the Proposed Scheme and the A556 Shurlach Road which will take one year to complete;
- permanent diversion of an underground United Utilities 300mm potable water trunk main which will take six months to complete;
- permanent diversion of an underground Cadent Gas local distribution 300mm high pressure gas pipeline which will take nine months to complete;

- permanent diversion of an underground Sabic Pipelines 8-inch high pressure ethylene pipeline which will take eight months to complete;
- permanent diversion of two Cadent Gas mains, which will each take six months to complete;
- permanent diversion of an INOYVN electricity cable, which will take three months to complete; and
- permanent diversion of a Scottish Power Energy Networks electricity cable, which will take three months to complete.

## Birches Lane satellite compound

2.3.164 This compound will be used to manage civil engineering works (see Volume 2: MA02 Map Book: map CT-05-315, C4 to D3). It will:

- provide three temporary materials stockpiles immediately to the east and west of the Proposed Scheme (see Volume 2: MA02 Map Book, map CT-05-315, A5 to C5, B5 to B4, and C5 to D5);
- provide a transfer node to the north of the compound, accessed from Lostock Hollow and via site haul routes (as shown on Volume 2: MA02 Map Book, map CT-05-315, C5 to D4); and
- be accessed via Lostock Hollow and A556 Shurlach Road.

2.3.165 The works to be managed from this compound will require demolition of the buildings and structures identified in Table 8.

**Table 8: Demolitions required as a result of the works to be managed from Birches Lane satellite compound**

Type	Description	Location	Feature resulting in demolition
Residential	Four residential properties	Birches Lane, Lostock Gralam	Rudheath embankment
Residential	One property	Birches Lane, Lostock Gralam	Rudheath embankment

2.3.166 The compound will be used to manage the construction of the following viaducts and bridges:

- Wade Brook viaduct, which will take one year and three months to complete; and
- Wade Brook offline overbridge, which will take one year and six months to complete.

2.3.167 The compound, along with the Rudheath embankment satellite compound and the B5082 Penny's Lane satellite compound will also be used to manage the construction of Rudheath embankment, which will take three years to complete.

2.3.168 The works to be managed from this compound will require the temporary realignment of the A556 Shurlach Road over a distance of 233m, 30m north of its existing alignment, which will take nine months to complete. The junction with Birches Lane will be reinstated once Wade Brook viaduct and Lostock Gralam viaduct works are complete.

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- 2.3.169 The compound will manage the construction of the A556 Shurlach Road culvert, which will take six months to complete.
- 2.3.170 The works to be managed from this compound will require the following works to utilities:
- permanent diversion of a Scottish Power Energy Network 11kV overhead powerline, which will take three months to complete;
  - permanent diversion of five INOYVN electricity cables, which will each take three months to complete;
  - permanent diversion of 12 INOYVN potable water mains, eleven of which will take three months to complete and one which will take nine months to complete;
  - permanent diversion of an INOYVN telecommunication cable, which will take three months to complete;
  - decommissioning of two United Utilities potable water mains, which will each take three months to complete;
  - permanent diversion of a United Utilities potable water main, which will take three months to complete; and
  - decommissioning of a Scottish Power Energy Networks electricity cable, which will take three months to complete.

## **Lostock Gralam viaduct satellite compound**

- 2.3.171 This compound will be used to manage civil engineering works (see Volume 2: MA02 Map Book, map CT-05-315, G6 to H6). It will:
- provide six temporary materials stockpiles immediately to the east of the Proposed Scheme (see Volume 2: MA02 Map Book, map CT-05-314, I6 to J6, I6 to J7, and map CT-05-315, C6 to D6, D6, D7 to E6, F6 to G6); and
  - be accessed via Birches Lane and the A556 Shurlach Road.
- 2.3.172 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.173 The compound will be used to manage the construction of the following viaducts:
- Wade Brook viaduct (along with Birches Lane satellite compound), which will take one year and three months to complete; and
  - Lostock Gralam viaduct (along with Smoker Brook viaduct south satellite compound), which will take one year and three months to complete.
- 2.3.174 The works to be managed from this compound will require the following works to public roads and private access:
- accommodation access for Fieldhouse Farm, which will take nine months to complete; and
  - permanent diversion of Birches Lane, which will take one year to complete. Birches Lane will remain open during construction.

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- 2.3.175 The works to be managed from this compound will require the permanent realignment of the footway north of Birches Lane, which will take nine months to complete, increasing the journey length by 581m. On completion of construction, the footway north of Birches Lane will be permanently realigned via the Birches Lane diversion under Wade Brook offline overbridge, and an unnamed access track to the west of the A556 Shurlach Road.
- 2.3.176 The works to be managed from this compound will require the following works to utilities:
- permanent diversion of 16 INOYVN potable water mains, which will each take three months to complete;
  - permanent diversion of four Scottish Power Energy Networks electricity cables, which will each take three months to complete;
  - permanent diversion of two INOYVN electricity cables, which will each take three months to complete;
  - permanent diversion of a United Utilities wastewater main, which will take three months to complete; and
  - permanent diversion of an INOYVN telecommunication cable, which will take three months to complete.

## Smoker Brook viaduct south satellite compound

- 2.3.177 This compound (shown on Volume 2: MA02 Map Book, map CT-05-316a, A4 to B6 to C4) will be used to manage civil engineering and railway systems works. It will:
- be used to manage civil engineering works for a period of three years, followed by civil engineering and/or railway systems works for a period of one year and six months;
  - provide four temporary materials stockpiles immediately to the east and west of the Proposed Scheme (see Volume 2: MA02 Map Book, map CT-05-315, H5 to I5 and H6 to I6; and MA02 Map Book, map CT-05-316a, C3 to D3 and E4 to F4);
  - provide a transfer node to the south of the compound, accessed from the A556 Shurlach Road and via site haul routes (as shown on Volume 2: Map CT-05-315, I6 to J8); and
  - be accessed via the A556 Shurlach Road.
- 2.3.178 No demolitions will be required as a result of the works to be managed from this compound.
- 2.3.179 The compound will be used to manage the construction of the following earthworks:
- Lostock Gralam South embankment, which will take two years and three months to complete; and
  - Lostock Gralam North embankment, which will take three years and three months to complete.
- 2.3.180 The compound will be used to manage the construction of the following viaducts:
- Lostock Gralam viaduct (along with Lostock Gralam viaduct satellite compound), which will take one year and three months to complete; and
  - Smoker Brook viaduct, which will take two years and three months to complete.

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- 2.3.181 The compound will be used to manage the construction and installation of the A556 Chester Road auto-transformer station. The construction of the A556 Chester Road auto-transformer station foundations and building will take one year and three months to complete. The construction and installation of the A556 Chester Road auto-transformer station will take two year and six months to complete.
- 2.3.182 The works to be managed from this compound will require the following works to public roads:
- temporary closure of Linnards Lane during the construction of Smoker Brook viaduct, with users diverted via the A559 Manchester Road/Hall Lane and the B5391 Church Street. The diversion will be in place for one month and will increase journey length by 1.7km; and
  - temporary realignment of the A559 Manchester Road at its junction with A556 Shurlach Road/Chester Road over a distance of 335m, 25m north of its existing alignment, which will take nine months to complete. The diversion will be in place for two years and six months and will result in a negligible change in journey length.
- 2.3.183 The works to be managed from this compound will involve the following works to utilities:
- permanent diversion of an underground Cadent Gas local distribution 600mm high pressure gas pipeline which will take nine months to complete;
  - permanent diversion of seven underground CLH Pipelines 250mm fuel pipelines which will take eight months to complete; and
  - permanent diversion of two Cadent Gas mains, which will each take three months to complete.

## Construction waste and material resources

- 2.3.184 Excavated material generated across the Proposed Scheme will be reused as engineering fill material or in the environmental mitigation earthworks of the Proposed Scheme, where suitable and reasonably practicable.
- 2.3.185 Forecasts of the amount of construction, demolition and excavation waste (CDEW) that will be produced during construction of the Proposed Scheme are reported in Volume 3, Route-wide effects.
- 2.3.186 Local excess or shortfall of excavated material within the Wimboldsley to Lostock Gralam area will be managed through the mitigation earthworks design approach adopted for the Proposed Scheme, as well as the use of borrow pits, 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, Section 15.
- 2.3.187 Forecasts of the amount of waste generated at temporary worker accommodation sites will be reported in Volume 3, Section 15.



## **Commissioning of the railway**

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

## **Construction programme**

- 2.3.189 A construction programme illustrating indicative periods for each of the core construction activities described above is provided in Figure 14.



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Crewe North Rolling Stock Depot											
Wimboldsley Grange access diversion											
Walley's Green embankment											
Crewe North IMB-R											
Site reinstatement											
<b>Crewe North RSD satellite compound 2</b>											
Site preparation and setup											
Utilities											
Crewe North Rolling Stock Depot advance works											
Crewe North Rolling Stock Depot											
Wimboldsley culvert											
Stove culvert											
Crewe North Rolling Stock Depot traction substation (civil works)											
Crewe North IMB-R											
Crewe North Rolling Stock Depot telecommunications site (civil works)											
Crewe North Rolling Stock Depot telecommunications site (rail systems works)											
Rail systems installation - Rolling Stock Depot works and on network works											

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Wimboldsley to Lostock Gramam	2025 Quarters	2026 Quarters	2027 Quarters	2028 Quarters	2029 Quarters	2030 Quarters	2031 Quarters	2032 Quarters	2033 Quarters	2034 Quarters	2035 Quarters
Site reinstatement											
<b>Minshull Vernon RS satellite compound</b>											
Rail systems - On Network works											
<b>Crewe North RSD satellite compound 3</b>											
Site preparation and setup											
Crewe North Rolling Stock Depot advance works											
Crewe North Rolling Stock Depot											
Walley's Green embankment											
Clive Green South embankment No.1											
Clive Green South embankment No.2											
Clive Green South embankment No.3											
Crewe North IMB-R											
Site reinstatement											
<b>MA02 Borrow Pit A</b>											
Site preparation and setup											
Borrow Pit A excavation											
Borrow Pit A backfill											
Site reinstatement											
<b>MA02 Borrow Pit B</b>											
Site preparation and setup											
Borrow Pit B excavation											

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Wimboldsley to Lostock Gramam	2025 Quarters	2026 Quarters	2027 Quarters	2028 Quarters	2029 Quarters	2030 Quarters	2031 Quarters	2032 Quarters	2033 Quarters	2034 Quarters	2035 Quarters
Borrow Pit B backfill											
Site reinstatement											
<b>MA02 Borrow Pit C</b>											
Site preparation and setup											
Borrow Pit C excavation											
Borrow Pit C backfill											
Site reinstatement											
<b>MA02 Borrow Pit D</b>											
Site preparation and setup											
Borrow Pit D excavation											
Borrow Pit D backfill											
Site reinstatement											
<b>Clive Green Lane satellite compound</b>											
Site preparation and setup											
Clive Green Lane overbridge and realignment											
Clive Green Lane offline culvert											
Shropshire Union Canal offline overbridge											
Clive Green telecommunications site (civil works)											
Clive Green telecommunications site (rail systems works)											
Stanthorne culvert											
Site reinstatement											

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Wimboldsley to Lostock Gramam	2025 Quarters	2026 Quarters	2027 Quarters	2028 Quarters	2029 Quarters	2030 Quarters	2031 Quarters	2032 Quarters	2033 Quarters	2034 Quarters	2035 Quarters
<b>Shropshire Union Canal South satellite compound</b>											
Site preparation and setup											
Shropshire Union Canal viaduct No.1											
Shropshire Union Canal viaduct No.3											
Shropshire Union Canal viaduct No.2											
Site reinstatement											
<b>Shropshire Union Canal North satellite compound</b>											
Site preparation and setup											
Shropshire Union Canal viaduct No.3											
Shropshire Union Canal viaduct No.2											
Yew-Tree Farm access realignment											
Shropshire Union Canal viaduct No.1											
Clive culvert											
A54 Middlewich Road sectioning auto-transformer station (rail systems works)											
Rail systems installation - tunnel portal building											
Site reinstatement											
<b>A54 Middlewich Road satellite compound</b>											



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Site preparation and setup											
A54 Middlewich Road viaduct											
A54 Middlewich Road realignment											
Stanthorne South embankment retaining wall											
Clive Green North embankment retaining wall											
Greenheyes access diversion											
Middlewich box structure											
A54 Middlewich Road sectioning auto-transformer station (civil works)											
Site reinstatement											
<b>A533 Bostock Road satellite compound</b>											
Site preparation and setup											
Stanthorne North embankment											
Stanthorne South embankment No.1 and 2											
Dane Valley embankment											
Clive Green North embankment No.1, 2 and 3											
Clive Green North cutting											
Whatcroft South embankment											
Site reinstatement											
<b>River Dane Viaduct South satellite compound</b>											
Site preparation and setup											

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Wimboldsley to Lostock Gramam	2025 Quarters	2026 Quarters	2027 Quarters	2028 Quarters	2029 Quarters	2030 Quarters	2031 Quarters	2032 Quarters	2033 Quarters	2034 Quarters	2035 Quarters
Bank Farm access realignment											
River Dane viaduct											
Bank culvert											
Site reinstatement											
<b>River Dane Viaduct North satellite compound</b>											
Site preparation and setup											
River Dane viaduct											
Site reinstatement											
<b>Puddinglake Brook Viaduct satellite compound</b>											
Site preparation and setup											
Puddinglake Brook viaduct											
Dairy Farm access west diversion											
Whatcroft Hall Lane highway works											
Dairy Farm access diversion											
Trent and Mersey viaduct											
Whatcroft culvert											
Whatcroft Hall Lane telecommunications site (civil works)											
Whatcroft Hall Lane telecommunications site (rail systems works)											
Manor culvert											
Brook Farm access diversion											
Site reinstatement											

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<b>Gad Brook Viaduct South satellite compound</b>											
Site preparation and setup											
Whatcroft North embankment											
Trent and Mersey viaduct											
Gad Brook viaduct											
Davenham Road express feeder auto-transformer station (rail systems works)											
Site reinstatement											
<b>Gad Brook Viaduct North satellite compound</b>											
Site preparation and setup											
A556 Shurlach Road realignment											
Footpath Lach Dennis 3X/1 PRow diversion											
Davenham Road express feeder auto-transformer station (civil works)											
Gad Brook viaduct											
A530 King Street highway works											
B5082 Penny's Lane diversion											
B5082 Penny's Lane telecommunications site (civil works)											
B5082 Penny's Lane telecommunications site (railway systems works)											

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Wimboldsley to Lostock Gramam	2025 Quarters	2026 Quarters	2027 Quarters	2028 Quarters	2029 Quarters	2030 Quarters	2031 Quarters	2032 Quarters	2033 Quarters	2034 Quarters	2035 Quarters
Site reinstatement											
<b>Rudheath Embankment satellite compound</b>											
Site preparation and setup											
Rudheath embankment											
Site reinstatement											
<b>B5082 Penny's Lane satellite compound</b>											
Utilities											
Site preparation and setup											
Rudheath embankment											
Site reinstatement											
<b>Birches Lane satellite compound</b>											
Site preparation and setup											
A556 Shurlach Road realignment											
A556 Shurlach Road culvert											
Wade Brook offline overbridge											
Rudheath embankment											
Wade Brook viaduct											
Site reinstatement											
<b>Lostock Gramam Viaduct satellite compound</b>											
Site preparation and setup											
Lostock Gramam viaduct											
Fieldhouse Farm accommodation access											

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Wimboldsley to Lostock Gramam	2025 Quarters	2026 Quarters	2027 Quarters	2028 Quarters	2029 Quarters	2030 Quarters	2031 Quarters	2032 Quarters	2033 Quarters	2034 Quarters	2035 Quarters
New PRoW											
Wade Brook viaduct											
Birches Lane diversion											
Site reinstatement											
<b>Smoker Brook Viaduct South satellite compound</b>											
Site preparation and setup											
Smoker Brook viaduct											
A559 Manchester Road realignment											
Lostock Gramam viaduct											
Lostock Gramam South embankment											
Lostock Gramam North embankment											
A556 Chester Road auto-transformer station (civil works)											
A556 Chester Road auto-transformer station works (railway systems works)											
Site reinstatement											
<b>Track laying and testing and commissioning</b>											
Area track laying											
Testing and commissioning											

## **Monitoring during construction**

- 2.3.190 The appointed contractor will 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 will be reported to the nominated undertaker and remedial action identified.
- 2.3.191 The CoCP and the relevant LEMP will 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, will be consulted on the monitoring procedures to be implemented prior to construction commencement, as appropriate.

## **2.4 Operation of the Proposed Scheme**

### **Introduction**

- 2.4.1 This section describes the operational characteristics of the Proposed Scheme in the Wimboldsley to Lostock Gralam 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 will be up to 9 trains per hour each way passing through the Wimboldsley to Lostock Gralam area. Services are expected to operate between 05:00 and midnight from Monday to Saturday and between 08:00 and midnight on Sunday.
- 2.4.3 In this area, trains will run at speeds of up to 225mph (360kph). The trains will 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.

### **Crewe North IMB-R**

- 2.4.5 Stone IMB-R, provided as part of HS2 Phase 2a, will be the core base for railway infrastructure maintenance vehicles along the route of the Proposed Scheme. Further



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information on the Stone IMB-R can be found in HS2 Phase 2a Environmental Statement, Volume 2: Community area CA3, Stone and Swynnerton<sup>9</sup>.

- 2.4.6 Crewe North IMB-R will be a smaller satellite facility and will provide support to the core facility at Stone IMB-R, Calvert Infrastructure Maintenance Depot (IMD) (part of HS2 Phase One) and the Crewe North RSD as required. The Crewe North RSD in the Wimboldsley to Lostock Gralam area will provide the base for maintenance of HS2 trains. Crewe North IMB-R will enable temporary satellite stabling of railway maintenance vehicles to help optimise the works during periods of railway infrastructure maintenance and reduce the number of railway maintenance vehicles having to depart from and return to the Calvert IMD within the maintenance period. Further information on the Calvert IMD can be found in HS2 Phase One Environmental Statement, Volume 2: Community Forum area CF1, Calvert, Steeple Claydon, Twyford and Chetwode<sup>10</sup>.
- 2.4.7 Railway maintenance vehicles will usually be loaded or unloaded at the Calvert IMD, before the vehicles travel to Crewe North IMB-R. However, unplanned events might result in the need to occasionally load or unload vehicles directly at the Crewe North IMB-R, which will generally occur during the day, if required.
- 2.4.8 Maintenance activities, supported by the railway maintenance vehicles stabled at the Crewe North IMB-R, will generally be undertaken during the night-time. The start of a maintenance works period will be midnight and the end of the maintenance period will be 04:59 (except Sunday mornings, when it will extend to 07:59). It is anticipated that during periods of maintenance activities at Crewe North IMB-R, there will be two railway maintenance vehicle departures and two arrivals at the beginning and end of the maintenance period.
- 2.4.9 Maintenance works may be required over consecutive nights. When this is required the railway maintenance vehicles may be stabled at Crewe North IMB-R for the duration of the works in the area. This will predominantly be for several days but could include vehicle stabling for up to a period of up to several weeks. When railway maintenance vehicles are temporarily stabled at the Crewe North IMB-R, this will generally be during the day.
- 2.4.10 The sidings at Crewe North IMB-R will provide facilities to allow for vehicle preparation and inspection during the daytime. Ad-hoc minor servicing of the vehicles may be undertaken during the day, such as replacement of grinding wheels and calibration of measurement equipment to prepare the maintenance vehicles for operation.

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<sup>9</sup> High Speed Two Ltd (2017), High Speed Rail (West Midlands – Crewe), Environmental Statement, *Volume 2: Community Area report, CA3: Stone and Swynnerton*. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/627565/E15\\_CA3\\_Stone\\_and\\_Swynnerton\\_WEB\\_final.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/627565/E15_CA3_Stone_and_Swynnerton_WEB_final.pdf).

<sup>10</sup> High Speed Two Ltd (2013), *London – West Midlands Environmental Statement, Volume 2: Community Forum Area Report, CF13: Calvert, Steeple Claydon, Twyford and Chetwode*. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/397886/Vol\\_2\\_CFA\\_13\\_Calvert\\_Steeple\\_Claydon\\_Twyford\\_and\\_Chetwode.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/397886/Vol_2_CFA_13_Calvert_Steeple_Claydon_Twyford_and_Chetwode.pdf).

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- 2.4.11 Ballasted track will need to be renewed approximately every 10 to 15 years. During these periods, the sidings at Crewe North IMB-R will be used for stabling and maintenance works over a period of several months, typically for up to three or four days a week and over consecutive weekends.
- 2.4.12 Maintenance staff will be based at the Stone IMB-R or Crewe North RSD and will only work from the Crewe North IMB-R when work needs to be managed from this IMB-R. Office and welfare facilities will be provided at the Crewe North RSD.
- 2.4.13 Road vehicle access for delivery of materials and equipment to the Crewe North IMB-R will be from the M6 and Clive Green Lane. Only light supplies will be delivered to the Crewe North IMB-R by road. Heavy maintenance materials and equipment will arrive by rail via the Crewe North RSD.
- 2.4.14 Lighting will be required for all external working areas of the Crewe North IMB-R during the maintenance periods. This includes the access road, general circulation areas, walkways, and storage and loading areas. The height of lighting installations will be kept as low as reasonably practicable to facilitate maintenance and to reduce light pollution. Automatic lighting control systems complete with photocells and time clocks will be used to operate all external lighting. The lights and their support systems will also be designed to reduce the visual impact of the lighting installation. LED or low energy lamps will be used for lighting in the external areas to reduce energy consumption.

## **Crewe North RSD**

- 2.4.15 The following rolling stock servicing and maintenance activities will be carried out at Crewe North RSD:
- internal cleaning;
  - external washing;
  - emptying of train toilets;
  - periodic heavy cleaning;
  - light maintenance (inspections, minor component changes etc.);
  - heavy maintenance (major component change, overhauls, etc.); and
  - periodic wheel turning to maintain the correct safe wheel profile.
- 2.4.16 Crewe North RSD will be operational 24 hours per day, seven days a week with associated directional lighting. Lighting will be required for all external working areas of the Crewe North RSD during the maintenance periods. The areas subject to lighting will include the access road, car park, stabling sidings underpass and stabling sidings. The height of lighting installations will be kept as low as reasonably practicable to facilitate maintenance and to reduce light pollution. Automatic lighting control systems complete with photocells and time clocks will be used to operate all external lighting. The lights and their support systems will also be designed to reduce the visual impact of the lighting installation. LED or low energy lamps will be used for lighting in the external areas to reduce energy consumption.

- 2.4.17 Accommodation blocks will be provided for maintenance staff, cleaning staff and train crew. In addition to these site operatives, there will also be office-based staff supporting site and network operations. In total the Crewe North RSD will provide 540 HS2-related jobs.
- 2.4.18 Welfare areas and parking will be required at all hours, as there are anticipated to be four to five shifts per 24 hours.

## Operational waste and material resources

- 2.4.19 The assessment of the likely significant environmental effects associated with the disposal of operational waste has been undertaken for the Proposed Scheme as a whole and is reported in Volume 3, Section 15.
- 2.4.20 Forecasts of the amount of waste arising from track maintenance and ancillary infrastructure and the associated potential significant environmental effects are provided in Volume 5: Appendix WM-001-00000.

## Monitoring during operation

- 2.4.21 The nominated undertaker will be responsible for monitoring during operation of the Proposed Scheme. General monitoring measures during operation are set out in area-specific monitoring measures for each environmental topic area, which are presented in Sections 4 to 15 of this report.
- 2.4.22 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

### Introduction

- 2.5.1 The Proposed Scheme described in Section 2.2 has been selected following design development, which included consideration of environmental impacts.
- 2.5.2 The Alternatives Report (Volume 5: Appendix CT-003-00000) describes the local alternatives considered as part of the design development of the Proposed Scheme. Local alternative options for the following elements of the Proposed Scheme in the Wimboldsley to Lostock Gralam area are reported in Volume 5:
- Cheshire salt plain lowering of alignment (south);
  - Crewe north RSD;
  - Crewe north RSD connection; and
  - Lowering alignment between Lostock Green and Lostock Gralam.

## **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 stakeholder engagement and 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 Feedback from stakeholder engagement and the consultations on the working draft Environmental Statement (ES) and design refinements has been considered as part of the design and assessment of the Proposed Scheme presented in this ES.

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

- 3.2.1 This section provides a summary of consultation activities and engagement undertaken or underway in the Wimboldsley to Lostock Gralam area since the initial preferred route announcement. This summary of engagement is in addition to the route-wide engagement outlined in Volume 1, Section 3.

#### **Draft EIA Scope and Methodology Report (SMR) consultation**

- 3.2.2 The draft EIA SMR (the 2017 SMR) was formally consulted on between July and September 2017 and was issued to statutory bodies, non-government organisations and local authorities. It was made available on the [gov.uk](https://www.gov.uk) website, allowing comment by local interest groups and the public. A total of 107 responses to the 2017 SMR were received, as a result of which changes were made. A revised EIA SMR was published in October 2018 (the 2018 SMR) as part of the working draft ES (described in the following section).

3.2.3 The changes between the 2017 SMR and the publication of the 2018 SMR were set out in the EIA SMR Consultation Report<sup>11</sup>, also published in October 2018. The assessment set out in this ES follows the scope and methodology in the EIA SMR<sup>12</sup> in Volume 5 of this ES.

## Consultation on the working draft ES

- 3.2.4 As set out in Volume 1 Section 3, two parallel consultations were undertaken by HS2 Ltd in 2018: a consultation on the working draft ES and a consultation on the working draft EQIA. These consultations were relating to the full Phase 2b Scheme (including both Eastern Leg and Western Leg). As part of the process of consultation, stakeholders were invited to comment on the full Phase 2b scheme and the working draft ES and working draft EQIA Report. Documents were made available on the [gov.uk](https://www.gov.uk) website.
- 3.2.5 As part of the consultation, information events were held in communities along both the Eastern and Western legs of the full Phase 2b route. Within the Wimboldsley to Lostock Gralam area, events were held at Middlewich (November 2018) and Northwich (November 2018).
- 3.2.6 A total of 37,899 responses were received through the consultation on the working draft ES. These responses were analysed. The themes and issues relevant to the Wimboldsley to Lostock Gralam area included commentary on:
- temporary and permanent land requirements including the size and number of site compounds along the A556 Chester Road and the A530 Nantwich Road and the land required for the construction and operation of Crewe North rolling stock depot (RSD);
  - realignment of key arterial roads including: the A556 Chester Road, north of Rudheath; the A530 Nantwich Road, near Wimboldsley; the A533 Bostock Road; and the A54 Middlewich Road between Middlewich and Winsford, as well as local roads such as Clive Green Lane and the B5082 Penny's Lane;
  - the impact of the crossings of the Trent and Mersey Canal and the Shropshire Union Canal (Middlewich Branch) and potential effects on canal users;
  - geological complexities, including the crossing of Warmingham and Holford brinefields and areas associated with gas storage;
  - impacts on ancient woodland at Leonard's Wood, Smoker Wood and Winnington Wood including their loss as community and recreational resources;
  - provision of access to severed agricultural land, including access under viaducts at the River Dane and Trent and Mersey Canal crossings;

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<sup>11</sup> High Speed Two Ltd (2018), *HS2 Phase 2b: Crewe to Manchester and West Midlands to Leeds, Environmental Impact Assessment Scope and Methodology Report, Consultation Summary Report*. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/745512/HS2\\_Phase\\_2b\\_EIA\\_Scope\\_and\\_Methodology\\_Report\\_Consultation\\_Summary\\_Report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/745512/HS2_Phase_2b_EIA_Scope_and_Methodology_Report_Consultation_Summary_Report.pdf).

<sup>12</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

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- retention and/or realignment of public rights of way (PRoW), including the Dane Valley Way, the crossing of the A556 Chester Road at Lostock Green and impacts on footpaths in Stanthorne and Wimboldsley;
- potential impact of construction traffic on local highways, including: the A556 Chester Road at Rudheath; the A530 Nantwich Road, near Wimboldsley; the A533 Northwich Road and the A54 Middlewich Road between Middlewich and Winsford; and local roads such as Clive Green Lane and the B5082 Penny's Lane;
- potential impact of construction traffic on the economic viability of local businesses, notably at Gadbrook Park and Gadbrook Distribution Centre in Rudheath;
- connectivity and revitalisation of local rail services, notably the introduction of passenger services between Northwich and Sandbach;
- perceived impact of the Proposed Scheme on pupil intake at Wimboldsley Community Primary School and the proximity of the school to Crewe North RSD and associated construction; and
- potential impact of Crewe North RSD on the rural setting at Wimboldsley.

3.2.7 A working draft ES Consultation Summary Report<sup>13</sup> has been published as part of the ES detailing how consultation responses have been taken into consideration in the development of the Proposed Scheme design and its assessment.

3.2.8 Feedback from that consultation and ongoing stakeholder engagement have been considered as part of the development of the Proposed Scheme, and the assessment and identification of mitigation opportunities for the Wimboldsley to Lostock Gralam area.

## Consultation on design refinements

3.2.9 Design refinements to the Proposed Scheme in the Wimboldsley to Lostock Gralam area were consulted upon between October and November 2020. These design refinements included modifications to the design of Crewe North RSD which will provide the required stabling maintenance facilities for HS2 rolling stock and support the efficient operation of the HS2 network.

3.2.10 Documents containing information about the proposed design refinements, along with supporting information such as visualisations and construction and operational plans, were made available at on the [gov.uk](https://www.gov.uk) webpage. Information was also made available on the [hs2.org.uk](https://www.hs2.org.uk) webpage, where an interactive map and a virtual exhibition room provided alternative ways for people to access the information. Printed copies of the consultation materials were sent free of charge following requests to the HS2 Helpdesk.

3.2.11 Stakeholders were invited to comment on the proposed design refinements either by using an online response form or submitting comments by post.

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<sup>13</sup> Volume 5: Appendix CT-007-00001, Working Draft Environmental Statement: Consultation Summary Report.



3.2.12 A total of 326 responses were received through the consultation on design refinements. These responses were analysed and the themes and issues relevant to the Wimboldsley to Lostock Gralam area included:

- disruption arising from both the construction and operation of the Crewe North RSD to villages such as Wimboldsley, including local primary schools;
- job opportunities associated with the construction and operation of Crewe North RSD;
- concerns relating to potential impacts on biodiversity, including on woodland and river habitats;
- impact on views, green space and the character of the local countryside and concerns about tree planting and light pollution;
- concern regarding potential increase in noise and vibration impacts on local communities;
- potential impact of construction traffic on the local road network;
- support for the proposal because of the potential for improved connectivity to the North West and integration with Northern Powerhouse Rail (NPR); and
- concerns around flood risk and wastewater management.

3.2.13 A summary of the comments received is available at the [gov.uk](https://www.gov.uk) website.

## 3.3 Engagement and consultation with stakeholder groups

### Communities

- 3.3.1 Community stakeholders in the Wimboldsley to Lostock Gralam 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.
- 3.3.2 The purpose of this engagement has been to provide affected communities with information on the development of the Proposed Scheme and to give the opportunity to raise issues in relation to the design and assessment of the Proposed Scheme. Feedback from communities has helped inform the baseline information and evolving assessment of impacts in this ES and concurrent EQIA, as well as identify opportunities for mitigation within the design.
- 3.3.3 Programmes of public information events were held to share new information with communities and engage them on it. HS2 Ltd notified people of these by sending leaflets to addresses along the route, advertising in local media and via social media. Public information events were held in September 2017, between June and July 2018, October and December 2018 and June and July 2019. In October and November 2020, information events were held using online channels including webinars and a virtual exhibition room. Information events were held in June and July 2021 using a combination of in-person

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information events and online webinars. Members of local communities and other interested parties were invited to engage on issues pertinent to the development of the Proposed Scheme design and its assessment.

3.3.4 Engagement has been, and will continue to be, undertaken with community stakeholders, particularly those close to the Proposed Scheme. These stakeholders include educational establishments, organisations with specialist interests or those catering to the needs of vulnerable people within the community. This has informed the assessment of community and health impacts in this ES, whilst also informing the concurrent EQIA.

3.3.5 Table 9 summarises key engagement undertaken with community stakeholders to date, including the focus of the engagement and how this has informed the design and assessment of the Proposed Scheme.

**Table 9: Engagement to date with community stakeholders**

Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Acorn Hollow Care Home	Introductory meeting to describe the Proposed Scheme, and better understand the needs of the residents and the effects of construction traffic.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Age Concern	Introductory meeting to discuss the Proposed Scheme and understand any potential impacts.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required, and to inform the EQIA.
Ascol Drive	Meeting to inform the group on the Proposed Scheme and the consultation process, collate local data and understand their areas of interest and concern.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Bostock Hall Residents Group	Meeting to inform the group on the Proposed Scheme and the consultation process, collate local data and understand their areas of interest and concern.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Brightlife Cheshire	Meeting to discuss the Proposed Scheme, provide an update on consultation activities and understand their areas of concern and interest.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Cheshire Community Development Trust	Meeting to inform the group on the Proposed Scheme and the consultation process, collate local data and understand their areas of interest and concern.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.

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Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Cheshire Football Association	Introductory meeting to describe the Proposed Scheme and to understand their future development plans.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Deafness Support Network	Meeting to discuss the Proposed Scheme, provide an update on consultation activities and the programme and understand what services they provide.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required, and to inform the EQIA.
Dial West Cheshire	Meeting to discuss the Proposed Scheme, provide an update on consultation activities and understand their areas of interest and concern, primarily relating to disabled access to rail services.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required, and to inform the EQIA.
Implementation Advisory Group which included representation from MPs for Eddisbury, Tatton and Weaver Vale, Cheshire West and Chester Council, Cheshire West and Chester Council Ward Members, Parish Councils that the Proposed Scheme will pass through, Emergency Services, Gadbrook Park, Winsford Industrial Estate, Wimboldsley Community Primary School, Northwich and District Churches Together, Winsford Churches Together and Mid Cheshire Against HS2 (MCAHS2)	Series of meetings to update the group on the Proposed Scheme, the consultation process, the advance ground investigation programme, and to collate local data and understand their areas of interest and concern.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required. In response to engagement a bespoke workshop was held about the ground investigation programme for the Proposed Scheme following concerns raised by the group.
Life Church	Introductory meeting to describe the Proposed Scheme, provide an update on the consultation process and raise awareness of the Proposed Scheme in the locality.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Lostock Gralam Primary School	Meeting to discuss the Proposed Scheme, provide an update on consultation activities and understand areas of concern and interest.	Information has been used to improve understanding of baseline conditions, inform the community assessment and EQIA, and provide an opportunity to consider any mitigation that may be required
Lostock Lodge Care Home	Meeting to discuss the Proposed Scheme, provide an update on consultation activities and understand any areas of concern. This also provided an opportunity to inform the EQIA.	Information used to improve understanding of baseline conditions and provide opportunity to consider any mitigation that may be required. No specific mitigation measures were requested.

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Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Mid Cheshire Against HS2 (MCAHS2)	To inform the group on the Proposed Scheme and the consultation process, collate local data and understand their areas of interest and concern. This included concerns regarding the impact on local communities and constructability due to perceived ground instability, and the increased size of the land required for construction of the Proposed Scheme in the route-wide update.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required. There has been an ongoing exchange of information between the action group and HS2 Ltd concerning local ground conditions. The ground investigation programme for this area has been brought forward in recognition of the groups concerns.
Mid Cheshire Rail Partnership	Engagement to discuss local rail connectivity and revitalisation of local rail services, in particular the introduction of passenger services between Northwich and Sandbach.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required, and how the development of Crewe Northern Connection could facilitate greater connectivity with and expansion of local rail services.
Middlewich High School	Meeting to discuss the Proposed Scheme and provide an update on consultation activities.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required, as well as potential impacts and educational opportunities.
Petty Pool College	Meeting to discuss the Proposed Scheme, provide an update on consultation activities and understand areas of concern and interest. This includes concerns regarding the impact of construction traffic on students sensitive to change in routines.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required, and to inform the EQIA.
Rudheath Primary Academy and Nursery	Meeting to discuss the Proposed Scheme, provide an update on consultation activities and understand their areas of interest and concern. This also provided an opportunity to inform the EQIA.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
St Marys Primary School	Meeting to discuss the Proposed Scheme, provide an update on consultation activities and understand their areas of interest and concern.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.

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Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
The Joshua Tree	Meeting to discuss the Proposed Scheme, provide an update on consultation activities and understand their areas of interest and concern.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
University Academy Northwich	Meeting to discuss the Proposed Scheme, provide an update on consultation activities and understand their areas of interest and concern.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Vale Royal Disability Service	Meeting to discuss the Proposed Scheme, provide an update on consultation activities and understand their areas of interest and concern.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required, and to inform the EQIA.
Vision Support	Meeting to discuss the Proposed Scheme, provide an update on consultation activities and understand their areas of interest and concern.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Wimboldsley Community Primary School	Meetings to discuss the Proposed Scheme, the potential impacts on the school and the school's concerns.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required, including whether relocation other solutions would be appropriate.

## **MPs, local authorities and parish councils**

- 3.3.6 HS2 Ltd has offered to engage with all relevant MPs during the development of the Proposed Scheme in order to discuss key issues and concerns.
- 3.3.7 Direct engagement has also been offered to and undertaken with unitary and parish councils within the Wimboldsley to Lostock Gralam area. The purpose of this engagement was 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.
- 3.3.8 Table 10 summarises key engagement undertaken with MPs, local authorities and parish councils to date, including the focus of the engagement and how this has informed the design and assessment of the Proposed Scheme.
- 3.3.9 Key issues identified during engagement with MPs local authorities and parish councils include those summarised in Table 10.

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**Table 10: Engagement to date with MPs, local authorities and parish councils**

Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Antoinette Sandbach, former MP for Eddisbury	Engagement to discuss the Proposed Scheme, consultation strategy and seek feedback on areas of concern and interest. Key discussion points have included impacts on local communities, properties and their market values, along with concerns regarding constructability due to reported ground instability in the Wimboldsley to Lostock Gralam area.	Feedback used to improve understanding of baseline conditions, potential impacts and proposed mitigation concerns and opportunities. Feedback has informed the planning of engagement and consultation in the area. In response to on-going engagement the Implementation Advisory Group (which Antoinette Sandbach attended) has been set up and the ground investigation programme for this area was brought forward in recognition of the challenges discussed with the group.
Edward Timpson, MP for Eddisbury	Engagement to discuss the Proposed Scheme, consultation strategy and seek feedback on areas of concern and interest. Key discussion points have included impacts on local communities, Wimboldsley School, construction traffic routes and proposed changes to the local highways network including Pyms Lane.	Feedback has been used to improve understanding of key areas of local interest and provide opportunity for further discussion.
Fiona Bruce, MP for Congleton	Engagement to discuss the Proposed Scheme and seek feedback on areas of local interest, including sharing with HS2 Ltd concerns raised by a local constituent.	Feedback has been used to improve understanding of key areas of local interest and provide opportunity for further discussion.
Cheshire West and Chester Council	Series of meetings to discuss the Proposed Scheme, provide updates on consultation activities and understand potential impacts on the local community. Key discussion points included the impacts on Wimboldsley Community Primary School, ground investigations, EQIA, community groups, and voluntary organisations. A further briefing has taken place at director level regarding Crewe Northern Connection and Crewe North RSD. In addition, discussions have taken place regarding directly impacted communities, highways realignment, PRow issues and the impact of construction traffic.	Information used to improve understanding of baseline conditions as well potential impacts and mitigation opportunities. As a result of engagement with the council, early geophysical surveys and ground investigations have been completed and reviews of mitigation opportunities relating to Wimboldsley Community Primary School are progressing. Also, a robust structure for engagement and feedback to the Council has been implemented.
Cheshire East Council	Meetings to provide regular updates on the Proposed Scheme, provide updates on consultation activities and understand potential impacts on the local community.	Feedback used to improve understanding of baseline conditions, potential impacts and proposed mitigation concerns and opportunities.
Byley Parish Council	Meeting to discuss the Proposed Scheme and consultation activities, collate local information and understand areas of interest and concern.	Feedback used to improve understanding of baseline conditions, potential impacts and proposed mitigation concerns and opportunities.



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<b>Stakeholder</b>	<b>Area of focus</b>	<b>How this has informed the design and assessment of the Proposed Scheme</b>
Davenham Parish Council	Meeting to discuss the Proposed Scheme and consultation activities, collate local information and understand areas of interest and concern.	Information used to improve understanding of baseline conditions and assessment of the Proposed Scheme as well potential impacts on the local community.
Lach Dennis and Lostock Green Parish Council	An invitation to meet and discuss the Proposed Scheme has been offered. Further engagement has taken place via the Implementation Advisory Group.	Feedback used to improve understanding of baseline conditions, potential impacts, and proposed mitigation concerns and opportunities.
Lostock Gralam Parish Council	Meeting to discuss the Proposed Scheme, consultation activities and programme of events, collate local information and understand areas of interest and concern. Engagement has also taken place via the Implementation Advisory Group.	Feedback used to inform understanding of baseline conditions, potential impacts, and proposed mitigation concerns and opportunities.
Northwich Town Council	Meeting to discuss the Proposed Scheme, consultation activities and programme of events, collate local information and understand areas of interest and concern.	Feedback used to inform understanding of baseline conditions, potential impacts, and proposed mitigation concerns and opportunities.
Plumley with Toft and Bexton Parish Council	Series of meetings to discuss the Proposed Scheme and understand local concerns. Key discussion points have included construction traffic and construction routing, temporary highway diversions and the impact that construction traffic will have on the A556 Chester Road and road safety near Smoker Brook Viaduct south satellite compound.	Engagement used to gather feedback on the Proposed Scheme and consideration of mitigation proposals. The feedback received from the parish has helped to inform the construction traffic modelling in this area.

3.3.10 Local authorities and parish councils will continue to be engaged as part of the development of the Proposed Scheme with ongoing dialogue on key topics such as highways, PRoW and the draft Code of Construction Practice (CoCP)<sup>14</sup>.

## **Expert, technical and specialist groups**

3.3.11 Engagement has been undertaken with technical and specialist organisations to provide appropriate specialist input to inform the design and assessment of the Proposed Scheme. This includes engagement with statutory bodies, local authorities and utility companies operational within the Wimboldsley to Lostock Gralam area.

3.3.12 Engagement with statutory bodies, local authorities and utility companies within the Wimboldsley to Lostock Gralam area has been undertaken in order to:

- collate local baseline information;
- identify and understand issues and concerns; and

<sup>14</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

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- provide a mechanism for ongoing dialogue and discussion on the assessment and design development.

- 3.3.13 Engagement has focused on the technical areas that inform the assessment, including air quality, landscape and visual, sound, noise and vibration and traffic and transport. Briefings were offered to specialist and technical stakeholders across the Proposed Scheme during the period of consultation on the working draft ES to provide information on the evolving design and assessment of the Proposed Scheme in their respective areas.
- 3.3.14 Engagement has been offered to blue light emergency service stakeholders including fire and rescue, police force and ambulance service providers, with meetings undertaken to share information on the Proposed Scheme. This has included design review meetings to present design detail on fire engineering and safety design aspects of the Proposed Scheme.
- 3.3.15 Engagement will continue with these stakeholders as the project progresses, including consultation to support the development of local traffic management plans prior to construction starting.
- 3.3.16 Table 11 includes engagement undertaken with technical and specialist groups and how this has informed the design and assessment of the Proposed Scheme in the Wimboldsley to Lostock Gralam area.

**Table 11: Engagement to-date with expert, technical and specialist groups**

Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Statutory and national	British Geological Survey	Geological conditions	Information has been used to improve understanding of baseline geological issues route-wide and provided an opportunity to inform the assessment and consider any proposed mitigation.
Statutory and national	Canal & River Trust	Waterways	Information has been used to inform the historic environment, ecological and landscape and visual assessment and improve understanding of baseline conditions for route-wide application, including the water resources and flood risk assessment. This has included the crossing of the Shropshire Union Canal and adapting ecological mitigation based on engagement feedback.
Statutory and national	Coal Authority	Coal mining	Information has been used to improve understanding of baseline conditions for coal mining route-wide, informing the assessment and proposed mitigation.
Statutory and national	Department for Environment, Food and Rural Affairs	Agriculture and land quality issues	Informed agricultural and land quality assessment methodology, baseline conditions for route-wide application, assessment and proposed mitigation.

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Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Statutory and national	Environment Agency	Land quality, ecology and biodiversity and water and flood risk issues	Informed land quality, ecology and biodiversity, water resources, surface water flood risk and Water Framework Directive methodology. Improved understanding of baseline conditions, (including the provision of data), along the route of the Proposed Scheme and the proposed mitigation.
Statutory and national	Animal and Plant Health Agency (APHA)	Land quality issues	Information on the location of farm burial and pyre sites associated with the 1967/8 and 2001 outbreaks of foot and mouth disease as well as anthrax infected cattle burial sites has been obtained from APHA. This has been used to improve understanding of land contamination baseline conditions along the route of the Proposed Scheme and to inform the assessment and proposed mitigation.
Statutory and national	Forestry Commission	Forestry, ecology and landscape issues	Informed the ecological and landscape assessment methodology, improved understanding of baseline conditions and the assessment and proposed mitigation.
Statutory and national	Highways England	Strategic road network, traffic and transport issues	Informed the assessment of road network capacity and identification of proposed future Highways England works that informed the design.
Statutory and national	Historic England	Nationally designated heritage assets and the heritage assessment methodology	Informed methodology for assessing setting and impacts on historic landscape at national and regional level. Identification and assessment methodology of designated and non-designated heritage assets.
Statutory and national	National Farmers Union	Farming issues	Information was used to improve understanding of route-wide issues for farmers and growers.
Statutory and national	Country Land and Business Association	Farming issues	Information was used to improve understanding of route-wide issues for farmers and growers.
Statutory and national	National Trust	Owned assets and related impacts	Informed considerations around National Trust owned assets route-wide and factors to be considered in the design and assessment of the Proposed Scheme.
Statutory and national	Natural England	Ecology, agricultural land quality, surface water, groundwater and landscape and visual related issues	Provided information regarding the natural environment on a route-wide basis. Informed methodological approach and detailed local conditions and factors to be taken into consideration in the assessment.
Statutory and national	Network Rail	Rail infrastructure	Informed route-wide considerations around rail infrastructure network and factors to be considered in the design and assessment of the Proposed Scheme.
Statutory and national	Public Health England	Public health issues	Informed methodology and factors to be taken into consideration in the health assessment.

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Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Statutory and national	The Woodland Trust	Woodland and ancient woodland issues	Information has been used to improve understanding around potential ancient woodland sites and informed methodology and detailed local conditions and factors to be taken into consideration in the assessment.
Statutory sub-national	Transport for the North	Connectivity to Northern Powerhouse Rail	Discussions regarding the integration of HS2 with NPR route-wide.
Local Authority technical meetings	Cheshire East Council	Meetings to discuss the air quality and sound, noise and vibration assessment including proposed mitigation.	Information used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required, including at the proposed Crewe North RSD.
Local Authority technical meetings	Cheshire East Council	Meetings to discuss the ecology and biodiversity assessment, including the mitigation strategy.	Information used to improve understanding of baseline conditions, support the identification of sensitive ecological sites and consider appropriate mitigation and compensation for habitat loss associated with the Proposed Scheme.
Local Authority technical meetings	Cheshire East Council	Meetings with technical leads to collate data and discuss the historic environment assessment.	Information on local conditions and factors used to refine the Proposed Scheme design and assessment.
Local Authority technical meetings	Cheshire East Council	Meeting to discuss known and potential contaminated land, proposed assessment and mitigation measures for land quality.	Identified local areas of land contamination, potential impacts and proposed mitigation.
Local Authority technical meetings	Cheshire East Council	Meetings with technical leads to collate data and discuss landscape and visual impacts, viewpoint locations and site walkovers.	Informed the identification of viewpoint locations to be assessed and reported within the ES, as well as the extent of the landscape and visual study area and obtaining information to improve understanding of baseline conditions.
Local Authority technical meetings	Cheshire East Council	Meeting to collate baseline data on socio-economic characteristics.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Local Authority technical meetings	Cheshire East Council	Meetings to provide information on the Proposed Scheme and obtain relevant baseline information and discuss transport survey requirements and assessment methodology relating to traffic and transport.	Information used to improve understanding of local traffic and highways operations, future proposals and traffic flows to inform baseline conditions, design of the Proposed Scheme and assessment.

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Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Local Authority technical meetings	Cheshire East Council	Meetings with the Lead Local Flood Authorities to provide information on the Proposed Scheme and obtain relevant baseline information related to water resources and flood risk.	Information used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Local Authority technical meetings	Cheshire West and Chester Council	Meetings to discuss the air quality, sound, noise and vibration assessment including proposed mitigation.	Information on local conditions and factors used to inform the Proposed Scheme design and assessment, including concerns regarding impacts on Wimboldsley Community Primary School.
Local Authority technical meetings	Cheshire West and Chester Council	Meeting to discuss the ecology and biodiversity assessment, including the mitigation strategy.	Information used to improve understanding of baseline conditions, support the identification of sensitive ecological sites and consider appropriate mitigation and compensation for habitat loss associated with the Proposed Scheme.
Local Authority technical meetings	Cheshire West and Chester Council	Meetings with technical leads to collate data and discuss the historic environment assessment.	Informed understanding of local baseline conditions and the design and assessment of the Proposed Scheme.
Local Authority technical meetings	Cheshire West and Chester Council	Meeting to discuss known and potential contaminated land, proposed assessment and mitigation measures for land quality.	Identified local areas of land contamination, potential impacts and proposed mitigation.
Local Authority technical meetings	Cheshire West and Chester Council	Meetings with technical leads to collate data and discuss landscape and visual impacts, viewpoint locations and site walkovers.	Informed the identification of viewpoint locations to be assessed and reported within the ES, as well as the extent of the landscape and visual study area and obtaining information to improve understanding of baseline conditions.
Local Authority technical meetings	Cheshire West and Chester Council	Meeting to collate baseline data on socio-economic characteristics.	Information has been used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Local Authority technical meetings	Cheshire West and Chester Council	Meetings to provide information on the Proposed Scheme and obtain relevant baseline information and discuss transport survey requirements and assessment methodology relating to traffic and transport.	Information used to improve understanding of local traffic and highways operations, future proposals and traffic flows to inform baseline conditions, design of the Proposed Scheme and assessment.

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Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Local Authority technical meetings	Cheshire West and Chester Council	Meetings with the Lead Local Flood Authorities to provide information on the Proposed Scheme and obtain relevant baseline information related to water resources and flood risk.	Information used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Local technical specialist group	Cheshire Archaeology Planning Advisory Service	Meetings with technical leads to collate data and discuss the historic environment assessment.	Information on local conditions and factors used to refine the Proposed Scheme design and assessment.
Local technical specialist group	Cheshire Brine Compensation Board	Geological conditions.	Information has been used to improve understanding of local baseline geological issues and proposed mitigation
Local technical specialist group	Cheshire Wildlife Trust	Meeting to discuss the ecology and biodiversity assessment, including the mitigation strategy.	Information used to improve understanding of baseline conditions, support the identification of sensitive ecological sites and consider appropriate mitigation and compensation for habitat loss associated with the Proposed Scheme.
Local technical specialist group	Weaver Gowy Catchment Partnership	Meeting to collate data and discuss the flood risk, drainage and water assessment.	Information used to improve understanding of baseline conditions and provide an opportunity to consider any mitigation that may be required.
Utilities	Cadent Gas	Network provision of gas	Informed considerations relating to the utilities network and factors to be considered in the design and assessment of the Proposed Scheme. This included the diversion and abandonment of the existing high-pressure gas pipeline crossings at several locations including the A54 Middlewich Road re-alignment, B5082 Penny's Lane diversion, Birches Lane and Smoker Brook viaduct.
Utilities	CLH Pipelines	Network provision of fuel	Through engagement with CLH Pipelines, it has been established that there is a group of seven pipelines currently situated beneath the A556 Chester Road and A559 Chester Way highway junction which are impacted by the Proposed Scheme. Discussions held regarding the proposals to divert all seven pipelines at Smoker Brook viaduct as a result of the Proposed Scheme.



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Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Utilities	Inovyn	Network provision of fuel	Discussion regarding impact of the design and assessment of the Proposed Scheme on the proposed diversion of Cadent Gas high pressure gas pipeline crossing the Ineos site, and at several other locations including Lostock Gralam viaduct (various diameter water pipeline diversions and nearby ethylene pipeline). To date, the design has made assumptions as only limited information concerning the existing private assets at the Ineos site is known. Contractual agreements are now in place between HS2 Ltd and Ineos and engagement commenced in December 2020.
Utilities	Level 3	Network provision of telecommunications services	Identified telecommunication services and informed understanding of potential impacts of the Proposed Scheme and mitigation requirements, including the telecommunications asset running parallel to the existing Mid Cheshire Line and crossing the Proposed Scheme at the A556 Chester Road.
Utilities	Mainline Pipeline	Network provision of fuel	Informed considerations relating to the impacts from the Proposed Scheme on Mainline Pipeline including assets at MA02 Borrow Pit D.
Utilities	National Grid Transmission (Gas)	Network provision of gas	Informed considerations relating to the utilities network and factors to be considered in the design and assessment of the Proposed Scheme including the diversion of the 900mm diameter high pressure gas pipeline at Wimboldsley Green and Northwich, as well as any diversion of assets and mitigation required.
Utilities	Openreach	Network provision of telecommunications services	Identified telecommunication services and informed understanding of potential impacts of the Proposed Scheme and mitigation requirements. This included the telecommunications supply assets at Crewe North RSD, temporary connections to Crewe North RSD north satellite compound, Clive Green Lane satellite compound and Middlewich Road satellite compound. Discussions also held regarding the provision of permanent connections to the B5082 Penny's Lane and Birches Lane satellite compounds.
Utilities	Sabic	Network provision of fuel	Informed considerations relating to the utilities network and factors to be considered in the design and assessment of the Proposed Scheme including the diversion and possible abandonment of a section of the existing high-pressure ethylene pipeline crossing the route near Lostock Green and also in proximity to the A556 Chester Road re-alignment.

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Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Utilities	Sky Telecoms	Network provision of telecommunications services	Identified telecommunication services and informed understanding of potential impacts of the Proposed Scheme and mitigation requirements on Sky assets, including specifically the diversion at the Clive Green Lane realignment.
Utilities	SP Energy Networks	Network provision of electricity and gas	Informed understanding relating to impacts from the Proposed Scheme on SPEN assets at various locations including Crewe North RSD, A556 Chester Road auto-transformer station, Crewe North RSD traction substation and Middlewich Road satellite compound. Consideration was also given to the provision of electricity supply to Crewe North RSD north satellite compound, River Dane viaduct south satellite compound, A556 Chester Road auto-transformer station and Smoker Brook viaduct south satellite compound.
Utilities	TATA Chemicals Europe (TCE)	Network provision of fuel	TATA Chemicals Europe (TCE) operate a series of lime beds to the north of Rudheath, adjacent to the proposed diversion of the A556 Chester Road between Rudheath and Lostock Gralam. TCE operation around these lime beds includes several private utility assets that will be impacted by the Proposed Scheme.  Based on currently available information, it is assumed that three overhead lines will need to be diverted as part of the Proposed Scheme. In addition, to the lime bed operation, a high-pressure gas pipeline (operated by Eon on behalf of TCE) has also been identified which crosses the Proposed Scheme near the junction between Pickmere Lane and Flittogate Lane in the Pickmere to Agden and Hulseheath area (MA03).
Utilities	Uniper Energy	Uniper owns and operates a diverse portfolio of power and gas assets in the UK.	Informed understanding relating to impacts from the Proposed Scheme on Uniper assets at MA02 Borrow Pit D.
Utilities	United Utilities	Network provision of water and wastewater services	Informed considerations relating to the utilities network and factors to be considered in the design and assessment of the Proposed Scheme, as well as mitigation requirements. This included the provision of potable water and sewerage services at several compound locations including Crewe North RSD, Clive Green Lane, Shropshire Union Canal, Middlewich Road, River Dane viaduct south, Gad Brook viaduct north and B5082 Penny's Lane and also the private water supply to Lea Hall Farm. Discussions were also held regarding the diversion of assets at the Clive Green Lane realignment and A54 Middlewich Road realignment and mitigation works required.

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Type	Stakeholder	Area of focus	How this has informed the design and assessment of the Proposed Scheme
Utilities	Vodafone and O2 mobile masts	Provision of mobile telecommunications networks and cabling for wired/fixed telecommunications services.	Identified telecommunication services and informed understanding of potential impacts of the Proposed Scheme and mitigation requirements, specifically the mobile communications mast located at the B5082 Penny's Lane.
Utilities	Zayo	Network provision of telecommunications services	Identified telecommunication services and informed understanding of potential impacts of the Proposed Scheme and mitigation requirements including the existing underground telecom asset close to the proposed location of MA02 Borrow Pit D, at Byley.

3.3.17 HS2 Ltd has pursued engagement with all affected utility and technical stakeholders across the Proposed Scheme. Where possible HS2 Ltd has obtained information and designs from these stakeholders to inform and promote the collaborative development of the Proposed Scheme.

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

## Directly affected individuals, farmers and growers

3.3.19 This group includes those with land and property potentially affected by the Proposed Scheme, including individuals, farmers and growers within the Wimboldsley to Lostock Gralam area.

3.3.20 As part of information events held in October 2018, June 2019 between October and November 2020 and between June and July 2021 (including using online channels where necessary), targeted engagement was also offered to those stakeholders who have land or property directly affected by the construction and operation of the Proposed Scheme. These appointments provided an opportunity to meet with technical experts, to gain a better understanding of the emerging design and share their thoughts on how this might affect them. Whilst these opportunities did not replace their right to respond formally to consultation, their feedback has also been considered during design development.

3.3.21 Information events provided affected individuals, farmers and growers with the opportunity to gain an understanding of compensation and assistance available for property owners. Facilities were available at the events to have private meetings with HS2 Ltd staff.

3.3.22 In addition, engagement has been offered via letter and through known land agents to all farmers and growers directly affected by the Proposed Scheme whether permanently or temporarily. Where offers have been accepted and it has been possible, visits have been made to the land and property affected although some interviews have needed to be undertaken virtually. The purpose of this engagement has been to obtain baseline information and provide the opportunity to raise issues and discuss mitigation in relation to

the Proposed Scheme. Information gathered from farm interviews has informed the assessment presented in this ES. Key issues raised through this engagement include loss of land for landscape, ecological and other mitigation and likely long-term viability of farm holdings including holding severance and access.

- 3.3.23 Engagement with directly affected individuals and growers will continue as the project develops and opportunities for engagement with farmers and growers will continue to be offered throughout the parliamentary process.
- 3.3.24 Engagement is also continuing with key representatives of the farmers and growers industry, in particular with the National Farmers Union and Country Land and Business Association.

## **Major asset owners and businesses**

- 3.3.25 This group includes those with property potentially affected by the Proposed Scheme, including major asset holders and businesses within the Wimboldsley to Lostock Gralam area.
- 3.3.26 As part of the information events held in October 2018, June 2019 between October and November 2020 and between June and July 2021 (including using online channels where necessary), targeted engagement was also offered to those stakeholders who have land, property or business operations directly affected by the construction and operation of the Proposed Scheme. These appointments provided an opportunity for these stakeholders to meet with technical experts, to gain a better understanding of the emerging design and share their thoughts on how this might affect them. Whilst these opportunities did not replace their right to respond formally to consultation, their feedback has also been considered during design development.
- 3.3.27 Engagement has been undertaken with major asset owners and businesses within the Wimboldsley to Lostock Gralam area including Gadbrook Park, EDF Energy, Gadbrook Distribution Centre, Oakwood Marina, Winsford 1-5 Business Park, Tata, Inovyn , King Street Energy, PPAK Limited, Compass Minerals and Cheshire Land Limited. The purpose of this engagement has been to obtain baseline information and provide these stakeholders with the opportunity to raise issues and discuss mitigation in relation to the Proposed Scheme.
- 3.3.28 Key issues raised during this engagement have included:
- impacts on property and business viability;
  - accessibility as a result of changes to highways; and
  - the impacts of construction traffic associated with the Proposed Scheme, in particularly the construction and operation impacts associated with Crewe North RSD.
- 3.3.29 Engagement with these stakeholders will continue as the project 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 Wimboldsley to Lostock Gralam 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 been undertaken. 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 the farm pack for each farm holding as set out within a Phase 2b Farmers and Growers Guide<sup>15</sup>.
- 4.1.3 Details of published and publicly available information used in the assessment, and the results of surveys undertaken within this area, are contained in Volume 5: Appendix AG-001-0MA02 and shown on Map Series AG-01 (Agricultural Holdings), AG-02 (Soil Associations) and AG-04 (Agricultural Land Classification) (Volume 5: Agriculture, forestry and soils Map Book).
- 4.1.4 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 can be found in the Volume 2: MA02 Map Book. The Proposed Scheme is described in Section 2.

### 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 Section 8 of Volume 1 and the EIA Scope and Methodology Report (SMR).
- 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

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<sup>15</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>.

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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) 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 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 and fuel. The impacts on this feature are 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, include flood water attenuation, carbon storage or the support of ecological habitats. This section describes these functions and assesses the ability of the soils to fulfil their primary functions after construction of the Proposed Scheme. 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. The function of soil as a carbon store is described in Volume 3: Route-wide effects (Section 4, Climate change).
- 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 or 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 will 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. The details of land use have been obtained from face-to-face interviews wherever possible; elsewhere, information has been obtained from publicly available sources. Land use data have been collected since 2017 for the purposes of the assessment reported in this section.

## 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 Wimboldsley to Lostock Gralam 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

#### Soil parent materials

- 4.3.2 A full description of the geological characteristics of the Wimboldsley to Lostock Gralam area is provided in Volume 5: Appendix AG-001-0MA02, Section 10, Land quality and Section 15, Water resources and flood risk. This section only considers geology as a soil parent material, which is a soil-science name for a weathered rock or deposit from and within which a soil has formed<sup>16</sup>. The soil association developed in each parent material is identified below. Individual soil associations are described under 'Description and distribution of soil types'.
- 4.3.3 The majority of the Wimboldsley to Lostock Gralam area is underlain by reddish glacial till and lake deposits. Where these superficial deposits overlie Sidmouth Mudstone, it gives rise to slowly permeable and seasonally waterlogged clay soils in the Crewe association. Where glacial till overlies halite stone and mudstone in the Northwich Halite Member, there are slowly permeable and seasonally waterlogged clay loam soils in the Salop association.
- 4.3.4 River terrace deposits comprising sand and gravel are present in isolated locations along the valley of the River Dane. Where this parent material gives rise to well drained, deep sandy loam and loamy sand soils, they are placed in the Newport 1 association. Where this parent material is seasonally waterlogged by a fluctuating ground-water table, it produces soils in the Blackwood association.
- 4.3.5 Where there is alluvium, variably comprising organic rich silty clay, silt, sand and gravel, along the base of the valley of the River Dane, it produces deep, stoneless, permeable, silty soils in the Teme association. These soils are at risk of flooding.

#### Topography and drainage

- 4.3.6 Topography in this study area comprises undulating slopes characterised by shallow to moderate gradients of up to seven degrees. The area is located on the Cheshire Plain, incised by river courses and streams.

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<sup>16</sup> British Geological Survey (2011), *Soil Parent Material Model*. Available online at: [Soil Parent Material Model - British Geological Survey \(bgs.ac.uk\)](https://www.bgs.ac.uk/soil-parent-material-model/).



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- 4.3.7 In the southern part of the study area, near Wimboldsley, the land ranges in elevation from 45m to 50m above Ordnance Datum (AOD), over gentle to moderate slopes with gradients of less than seven degrees. Where the route of the Proposed Scheme crosses the A533 Northwich Road to the east of Bostock near Bull's Wood, there is a steep, north-east facing slope down to the floodplain and course of the River Dane, and to the Trent and Mersey Canal. The top of the slope descends from an elevation of 50m AOD to 25m AOD, over a seven to 11 degree gradient.
- 4.3.8 Around the eastern edge of Northwich and Rudheath, land is undulated at elevations between 29m and 33m AOD. The slopes are gentle to moderate, with gradients less than seven degrees. At Lostock Green, at 38m AOD, the land dips towards the floodplain of Wade Brook, at approximately 29m AOD. The land rises to 40m AOD to the east of Lostock Gramam, before descending to approximately 30m AOD at the confluence of Peover Eye, Smoker Brook and Wincham Brook at the far northern end of the area, at Leonard's Wood and Smoker Wood.
- 4.3.9 Flood risk is potentially limiting to agricultural land quality within the study area in the floodplains of the River Dane, Gad Brook, Puddinglake Brook, Wade Brook, Peover Eye and Smoker Brook. The land in these floodplains 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**

- 4.3.10 The broad characteristics of the soils present in the study area are described by the Soil Survey of England and Wales<sup>17</sup> and their general distribution is shown on the National Soil Map<sup>18</sup> which is replicated in Volume 5: Agriculture, forestry and soils (Map AG-02-302 Soil Associations). The soils are grouped into soil associations of a range of soil types that are spatially related. They are described in more detail in Volume 5: Appendix AG-001-0MA02.
- 4.3.11 The Wetness Class (WC) of a soil is classified according to the depth and duration of waterlogging in the soil profile. There are six categories: from WC I, which is well drained, to WC VI which is permanently wet.
- 4.3.12 The soil association data have been supplemented by detailed soil surveys on all land where access has been granted. These surveys assist with ALC and the planning of soil handling and restoration. The detailed surveys and existing survey records have identified five soil groups or soil associations within this study area.
- 4.3.13 The most prevalent group within the study area comprises clayey and fine loamy soils in the Crewe association. This association extends from the southern boundary of the area to Winsford, and in the centre of the area between Whatcroft and Rudheath. These soils, which

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<sup>17</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>18</sup> Cranfield University (2001), *The National Soil Map of England and Wales 1:250,000 scale*, National Soil Resources Institute.

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are developed in reddish, stoneless glacial till and lake deposits overlying the Sidmouth Mudstone, are seasonally waterlogged for long periods during the winter (WC IV).

- 4.3.14 The next most prevalent group comprises clay loams over clay soils of the Salop association. This association is present from Clive Green to the A533 Northwich/Bostock Road near Bostock, comprising slowly permeable and seasonally waterlogged soils, mainly WC IV, with WC III where underdrainage is possible. These slowly permeable soils are developed in reddish glacial till and lake deposits, mainly overlying halite stone and mudstone in the Northwich Halite Member.
- 4.3.15 The next most prevalent group comprises deep sandy loam and loamy sand soils of the Newport 1 association developed in glacial river sand and gravel deposits between the A533 Northwich/Bostock Road and the River Dane. The soils are generally well drained (WC I).
- 4.3.16 The next most prevalent group comprises deep, permeable sandy and sandy loam soils in the Blackwood association developed on pockets of variably stony, glacial river terrace deposits to the west of Middlewich and to the east of Lostock Green. Where undrained, the Blackwood soils are waterlogged for long periods during the winter (WC IV). The soil profiles experience fluctuating levels of groundwater. In parts where the water-table has been lowered, the soils are well drained (WC I) or only occasionally waterlogged (WC II).
- 4.3.17 The least prevalent group comprises deep, stoneless, permeable, silty soils in the Teme association (WC I to WC II). The Teme association soils are developed in alluvium (clay, silt, sand and gravel) in the floodplain of the River Dane. These soils are at risk of flooding, depending on their location and flood control measures in place.
- 4.3.18 The sensitivity of the soils disturbed during construction activity is reflected by their textural characteristics, in the light of local Field Capacity Days (FCD), as set out in the SMR. FCD is a meteorological parameter which indicates an estimated 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. In areas of the highest number of FCD, 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 reinstatement of land; whereas soils with a high sand fraction in areas with the fewest FCD and during the driest times of the year are the least susceptible.
- 4.3.19 Clayey and seasonally waterlogged soils (including soils in the Crewe, Salop, Blackwood and Teme associations) are found across approximately 706ha, or 95% of the study area. These soils are of high sensitivity due to high clay fractions where FCD are between 179 and 185 days per annum.

## Soil and land use interactions

### Agricultural land quality

- 4.3.20 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.
- 4.3.21 The main soil properties that affect the cropping potential and management requirements of land are texture, structure, depth, stoniness and chemical fertility. The climatic properties that affect the cropping potential and management requirements of land are rainfall and temperature.
- 4.3.22 Local agro-climatic data have been interpolated from the Meteorological Office's standard 5km grid point dataset<sup>19</sup> for three points within the study area and are set out in Volume 5: Appendix AG-001-0MA02. The data show climate in the area to be cool and moist. The number of FCD, when the moisture deficit is zero, ranges from 179 days to 185 days per annum. This is higher than average for lowland England (150 days) and generally constrains agricultural cultivations and soil handling for relatively long periods over winter. Moisture deficits, which give an indication of the vulnerability of soils to drought, are moderate to moderately small.
- 4.3.23 Average annual rainfall and accumulated temperature within this study area do not in themselves 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. Droughtiness is 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.
- 4.3.24 Site factors such as gradient and microrelief are not limiting to agricultural land quality within this study area. Microrelief is the complex change of slope angle and direction over short distances, or the presence of boulders or rock outcrops, which can severely limit the use of agricultural machinery.
- 4.3.25 The main physical limitations that result from interactions between soil, climate and site factors are soil wetness, soil droughtiness and a localised susceptibility to erosion. For soil wetness, each soil can be allocated a WC based on soil structure, evidence of waterlogging and the number of FCD. The topsoil texture then determines its ALC grade. Vulnerability to drought is determined by the moisture retention of different soil textures and thicknesses of each soil horizon, soil structures, stone content and moisture deficits.
- 4.3.26 The most prevalent soil association within the study area, comprising clayey and fine loamy soils in the Crewe association that are seasonally waterlogged (WC IV), are limited mainly by

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<sup>19</sup> Meteorological Office (1989), *Gridpoint Meteorological data for Agricultural Land Classification of England and Wales and other Climatological Investigations*.

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soil wetness. Soil profiles with clay and heavy clay loam topsoil are limited by soil wetness to Grade 4. Where the topsoil is medium clay loam, the soil profiles are limited to Subgrade 3b. Survey data confirms that Crewe soils between Whatcroft and Rudheath are mainly Subgrade 3b, with some Grade 4.

- 4.3.27 The next most prevalent association comprising clay loam over clay soils in the Salop association is mainly slowly permeable and seasonally waterlogged for long periods during the winter (WC IV). Soil profiles with heavy clay loam topsoil are limited by soil wetness to Grade 4. Where the topsoil is medium clay loam, the soil profiles are limited to Subgrade 3b. Where under-drained, Salop soil profiles in WC III are limited by soil wetness to Subgrade 3b where the topsoil is heavy clay loam, and to Subgrade 3a where the topsoil is medium clay loam. Survey data confirms that Salop soils to the south of Stanthorne are a mixture of Subgrade 3a and Subgrade 3b.
- 4.3.28 The next most prevalent association comprises sandy loam, well-drained (WC I) soils in the Newport 1 association, which are mostly limited by soil droughtiness. This limits the quality of agricultural land to mainly Grade 2, in the absence of any other limiting factor. Survey data confirms that a pocket of Newport 1 soils to the north Stanthorne are Grade 2.
- 4.3.29 The next most prevalent association is the Blackwood association comprising deep, permeable sandy and sandy loam soils. This group of soils is commonly seasonally waterlogged (WC IV) and limited by soil wetness to Subgrade 3b. Where the land is under-drained, and the soil profiles are in WC I or WC II, the quality of the agricultural land may be increased to Grade 2 or Subgrade 3a, depending on how droughty the soils are during the growing season.
- 4.3.30 The least prevalent group comprises deep, stoneless, permeable, silty soils in the Teme association (WC I and II). The quality of agricultural land with Teme soils is limited mainly by slight soil wetness to Grade 2 or Subgrade 3a but may be further limited by seasonal flooding to Subgrade 3b. Survey data confirms that Teme soils in the floodplain of the River Dane are a mixture of Subgrade 3a and Subgrade 3b.
- 4.3.31 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 locality, set as a 4km corridor centred on the route of the Proposed Scheme. Department for the Environment, Food and Rural Affairs (Defra) predictive mapping<sup>20</sup> shows that there is a moderate likelihood of encountering BMV agricultural land in the locality, which makes such land a resource of medium sensitivity in this study area.
- 4.3.32 The distribution of agricultural land quality in the study area is shown in Table 12, described in more detail in Volume 5: AG-001-0MA02 and shown on Map AG-04-304b to Map AG-04-309a (Volume 5: Agriculture, forestry and soils Map Book).

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<sup>20</sup> Department for Environment, Food and Rural Affairs (Defra) (2005), *Likelihood of Best and Most Versatile Agricultural Land*.

**Table 12: Distribution of grades of agricultural land in the study area**

Agricultural land quality	Area within study area (ha)	Percentage of agricultural land area within study area (%)
Grade 1	0	0
Grade 2	34.0	5.3
Subgrade 3a	209.1	32.8
<b>BMV subtotal</b>	<b>243.1</b>	<b>38.1</b>
Subgrade 3b	208.3	32.6
Grade 4	187.2	29.3
Grade 5	0	0
<b>Total agricultural land</b>	<b>638.6</b>	<b>100</b>

## Other soil interactions

- 4.3.33 Soil fulfils a number of functions and services for society, in addition to those of food and biomass production, that are central to social, economic and environmental sustainability. These are outlined in sources such as the Soil Strategy for England<sup>21</sup> and the Government's White Paper, *The Natural Choice: securing the value of nature*<sup>22</sup> and reinforced in the policies set out in the 25 year Environment Plan<sup>23</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.
- 4.3.34 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.
- 4.3.35 The floodplains of the River Dane, Gad Brook, Puddinglake Brook, Wade Brook, Peover Eye and Smoker Brook are prone to occasional flooding, as set out in Section 15, Water resources and flood risk. The soils in this area function as water stores for flood attenuation, as well as providing ecological habitat as set out in Section 7, Ecology and biodiversity.

<sup>21</sup> Department for Environment, Food and Rural Affairs (2009), *Soil Strategy for England*.

<sup>22</sup> HM Government (2011), *The Natural Choice: securing the value of nature*.

<sup>23</sup> HM Government (2018), *A Green Future: Our 25 Year Plan to Improve the Environment*. Available online at: <https://www.gov.uk/government/publications/25-year-environment-plan>.

## Land use

### Land use description

- 4.3.36 The study area is located within the Cheshire Plain, which is a dairy region. The predominant land use is pasture, with arable land more commonly associated with pockets of permeable and well drained sandy soils. The land is divided into small, irregularly shaped fields separated by hedgerows and many small woods, often planted as game cover.
- 4.3.37 The larger woods in the study area comprise Stove Room Wood to the north-west of Wimboldsley, Bull's Wood to the east of Bostock, Marshall's Gorse near Orchard Marina at Higher Shurlach, Long Wood to the east of Lostock Gralam, and Winnington Wood, Peas Wood, Smoker Wood and Leonard's Wood between Lostock Gralam and the northern boundary of the study area.
- 4.3.38 The proportion of woodland in the general locality, taken as a 4km corridor centred on the route of the Proposed Scheme within the Wimboldsley to Lostock Gralam area, is 15%, which is above the national average. As such, commercial forestry land use is assessed as a resource of low sensitivity in this study area.
- 4.3.39 Some agricultural land is subject to historical agri-environment management prescriptions that seek to retain and enhance the landscape and biodiversity qualities and features of farmland. These were associated with the Environmental Stewardship Scheme (the Entry Level Stewardship (ELS), the Organic Entry Level Stewardship (OELS) or the Higher Level Stewardship (HLS)). The Countryside Stewardship Scheme (CSS) has been main agri-environment scheme in England since 2015. The CSS incorporates elements of the Environmental Stewardship Scheme, the English Woodlands Grant Scheme and Catchment Sensitive Farming grants. Holdings that have land entered into an agri-environment scheme are identified in Table 13. These schemes are under review following the introduction of the Agriculture Act 2020<sup>24</sup>.

### Number, type and size of holdings

- 4.3.40 Table 13 sets out the main farm holdings within this study area. The details of holdings have been obtained from face-to-face interviews with farm owners and occupiers. The interviews undertaken account for holdings which collectively cover approximately 92% of the total study area. Publicly available sources have been used to obtain information about farm holdings where it has not been possible to arrange interviews.
- 4.3.41 Dairy farming predominates in the Wimboldsley to Lostock Gralam area, with many of the herds being medium to large-scale. The dairy farms are generally the largest holdings in the area at an average of 160ha. The remainder of the agricultural land in the area is mostly grazed by livestock, particularly beef cattle; the average holding size across the study area

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<sup>24</sup>*Agriculture Act 2020* (c.21). London, Her Majesty's Stationary Office. Available online at: <https://www.legislation.gov.uk/ukpga/2020/21/contents/enacted>.

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being 100ha. The boundaries of the holdings are shown on Maps AG-01-304b to AG-01-309a (Volume 5: Agriculture, forestry and soils Map Book) along with the location of the main farm buildings. Agricultural field drainage is prevalent throughout the study area.

4.3.42 Table 13 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. The holding reference provides a unique identifier and relates to Maps AG-01-309b to AG-01-312a-L1 (Volume 5: Agriculture, forestry and soils Map Book) and Volume 5: Appendix AG-001-0MA02.

**Table 13: Summary characteristics of holdings**

Holding reference/ name	Holding type	Holding size (ha)	Diversification	Agri- environment scheme	Sensitivity to change
MA02/1 Wimboldsley Hall Farm and Wimboldsley Grange Farm	Dairy	291	None	None	High
MA02/2 Lea Hall Farm	Dairy heifer rearing	453	None	Mid-tier CSS	Medium
MA02/3 Norcroft Farm*	Grassland	52	Not known	None	Medium
MA02/4 Stanthorne Park Mews*	Equestrian activities	12	Not known	None	Low
MA02/5 Park Farm	Dairy	58	Canal moorings, commercial lets	None	High
MA02/6 Yew Tree Farm (including Stanthorne Hall Farm)	Dairy	154	None	Part of the farm in mid-tier CSS	High
MA02/7 Mill Farm	Dairy	44	None	None	High
MA02/8 Bostock House Farm	Beef cattle	26	Farm shop	None	Low
MA02/9 Greenheyes Farm	Dairy	40	Events management in agricultural buildings	Mid-tier CSS	High
MA02/10 Bank Farm	Dairy heifer rearing	85	DIY livery	None	Medium
MA02/11 Croxton Hall Farm	Beef cattle	105	None	None	Medium
MA02/12 Bostock Hall Farm	Beef cattle, arable and grassland	103	Livery stables, large barn mounted solar array	HLS	Medium



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Holding reference/ name	Holding type	Holding size (ha)	Diversification	Agri- environment scheme	Sensitivity to change
MA02/13 Dairy Farm, Whatcroft	Dairy	331	None	None	High
MA02/14 Shanks Farm, Byley	Arable, beef cattle, pigs and vegetables	144	Farm shop, dog walking area	None	Medium
MA02/15 Allumbrook Farm	Dairy	120	None	ELS	Medium
MA02/16 Pear Tree Farm, Cranage	Beef cattle and sheep	75	None	None	Medium
MA02/17 Wash Lane Farm*	Arable and grassland	28	Not known	None	Medium
MA02/18 Stublach Farm*	Arable and grassland	126	Not known	None	Medium
MA02/19 Brook Farm	Dairy	50	None	None	High
MA02/20 Fir Tree Farm	Beef cattle and arable	22	None	None	Medium
MA02/21 Higgins Lane Farm	Beef cattle	22	None	None	Medium
MA02/22 Hulse Heath Farm	Dairy, arable and potatoes	200	None	Mid-tier CSS	Medium
MA02/23 Land at King Street*	Arable	17	Not known	None	Medium
MA02/24 High House Farm	Beef cattle and arable	78	Agricultural contracting	None	Medium
MA02/25 Port Ford Farm	Dairy and arable	89	None	None	Medium
MA02/26 Melvin Holme Farm	Arable	88	Agricultural contracting	Mid-tier CSS	Medium
MA02/27 Birchall Farm	Dairy	121	None	None	Medium
MA02/28 Springbank Farm*	Livestock grazing and arable	45	Farm shop	None	Medium
MA02/29 Langford Farm*	Sheep	77	Not known	None	Medium
MA02/30 Land at Hangman's Lane*	Grassland	7	Not known	None	Medium
MA02/31 Park Farm, Lostock Gralam	Arable and equestrian	93	Livery stables	None	Medium

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Holding reference/ name	Holding type	Holding size (ha)	Diversification	Agri- environment scheme	Sensitivity to change
MA02/32 Fieldhouse Farm	Arable and beef cattle with vegetable production.	150	None	None	Medium
MA02/33 Tabley Hill Dairy Farm	Dairy	198	None	None	Medium
MA02/34 Hilltop Holding	Grassland	2.6	Agricultural contracting	None	Low

*\* 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.*

## Future baseline

### Construction (2025)

- 4.3.43 Volume 5: Appendix CT-004-00000 provides details of the developments in the Wimboldsley to Lostock Gralam area that are assumed to have been implemented by 2025.
- 4.3.44 No committed developments have been identified in this study area that will materially alter the baseline conditions in 2025 for agriculture, forestry and soils.

### Operation (2038)

- 4.3.45 Volume 5: Appendix CT-004-00000 provides details of the developments in the Wimboldsley to Lostock Gralam area that are assumed to have been implemented by 2038.
- 4.3.46 No committed developments have been identified in this study area that will materially alter the baseline conditions in 2038 for agriculture, forestry and soils.

## 4.4 Effects arising during construction

### Avoidance and mitigation measures

- 4.4.1 During the development of the design, the following measures have been incorporated to avoid or mitigate adverse severance impacts on land holdings:
- reconfigured highway access to Wimboldsley Hall and Wimboldsley Grange Farm (MA02/1) (see Volume 2: MA02 Map Book, map CT-06-308b, E4 to G5);
  - reconfigured highway access to Lea Hall (MA02/2) (see Volume 2: MA02 Map Book, map CT-06-309, H4 to H6) and Stanthorne Park Mews (MA02/4) (see Volume 2: MA02 Map Book, map CT-06-309, G3 to H3);

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- provision of an agricultural access track and crossing under Shropshire Union Canal viaducts Nos. 1, 2 and 3 to mitigate severance of Yew Tree Farm (MA02/6) (see Volume 2: MA02 Map Book, map CT-06-310, E5 to F6);
  - reconfigured highway access to Greenheyes Farm (MA02/9) (see Volume 2: MA02 Map Book, map CT-06-311, C10);
  - provision of an agricultural access track and crossing under River Dane viaduct to mitigate severance of Bank Farm (MA02/10) (see Volume 2: MA02 Map Book, map CT-06-311, E8 to F10);
  - provision of agricultural access tracks and crossings under Puddinglake Brook viaduct to mitigate severance of Dairy Farm, Whatcroft (MA02/13) (see Volume 2: MA02 Map Book, map CT-06-312, F6 to G6) and Brook Farm (MA02/19) (see Volume 2: MA02 Map Book, map CT-06-313, C6 to D1); and
  - reconfigured highway access and the provision of an agricultural access track and crossing under Wade Brook viaduct and the Wade Brook offline overbridge to mitigate severance of Fieldhouse Farm (MA02/32) (see Volume 2: MA02 Map Book, map CT-06-315, D6 to F7).
- 4.4.2 The effect of severance of agricultural land for Bank Farm (MA02/10) and Bostock Hall Farm (MA02/12) is also reduced by the ability of agricultural machinery to pass under River Dane viaduct.
- 4.4.3 Other design refinements to limit the impact of the Proposed Scheme on agriculture, forestry and soil resources include:
- rationalisation of balancing ponds to seek to locate them in the least sensitive agricultural locations;
  - locally slackened slopes to improve agricultural land use or steepened slopes to limit the area of agricultural land required;
  - rationalisation of road realignments to limit the area of agricultural land required;
  - incorporation of agricultural tracks to provide access to severed land; and
  - rationalisation and relocation of mitigation planting to limit the area of agricultural land required and reduce impacts on holdings.
- 4.4.4 In addition, there is a need to avoid or reduce environmental impacts to soils during construction so that they will be in a suitable condition to support their proposed use for agricultural land, landscape planting and ecological mitigation following construction.
- 4.4.5 Compliance with the Code of Construction Practice (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<sup>25</sup> and relate to:

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<sup>25</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

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- 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 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 will include any remediation measures necessary following the completion of works (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);
  - special provisions for handling peat and peaty soils, where the disturbance of these soils cannot be avoided (Section 6);
  - 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).
- 4.4.6 Upon completion of construction, soils replaced for agricultural, forestry or landscape uses will be monitored to identify any unsatisfactory growing conditions during the five-year aftercare period.
- 4.4.7 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 Crewe, Salop, and Teme association soils) may also require particularly careful management, such as the timing of cultivation and livestock grazing during the aftercare period to meet this design objective.
- 4.4.8 Measures have been included to mitigate the impacts of borrow pits on agricultural land and soils in the Wimboldsley to Lostock Gralam area. Prior to extraction of material, soils from the area will be stripped and stored. On restoration, where land is being returned to

agricultural use, it is anticipated that landforms within the borrow pits will be created with suitable surface gradients, land drainage and groundwater levels, using materials generated elsewhere from the construction of the Proposed Scheme.

## Assessment of impacts and effects

- 4.4.9 The acquisition and use of land for the Proposed Scheme will 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.
- 4.4.10 Land used to construct the Proposed Scheme will 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;
  - highway, PROW or utility diversion/realignment;
  - returned to agricultural use (with aftercare management to ensure effective field drainage and 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

- 4.4.11 During the construction phase, the total area of agricultural land used within the Wimboldsley to Lostock Gralam area will be approximately 639ha as shown in Table 14. Of this total, it is anticipated that approximately 343ha will be restored and available for agricultural use following construction.

**Table 14: Agricultural land required for the construction of the Proposed Scheme**

Agricultural land quality	Area required (ha)	Percentage of agricultural land (%)	Area to be restored (ha)
Grade 1	0	0	0
Grade 2	34	5.3	19.5
Subgrade 3a	209.1	32.8	146.9
<b>BMV subtotal</b>	<b>243.1</b>	<b>38.1</b>	<b>166.4</b>
Subgrade 3b	208.3	32.6	100.5

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Agricultural land quality	Area required (ha)	Percentage of agricultural land (%)	Area to be restored (ha)
Grade 4	187.2	29.3	75.7
Grade 5	0	0	0
<b>Total agricultural land</b>	<b>638.6</b>	<b>100</b>	<b>342.6</b>

- 4.4.12 The disturbance during construction to approximately 243ha of BMV land is assessed as an impact of medium magnitude, comprising 38% of the agricultural land requirement. BMV land is assessed as a receptor of medium sensitivity because of its abundance in this locality. The effect of the Proposed Scheme on BMV land during the construction phase is, therefore, assessed as moderate adverse, which is significant.
- 4.4.13 Following completion of construction, temporary facilities will 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. This could improve the quality of agricultural land locally, for example where droughty soils are limited by soil depth, subject to the soil resource plans to be prepared during the detailed design stage.

### Impacts on soils

- 4.4.14 In areas of heaviest rainfall, 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 reinstatement of land; whereas soils with a high sand fraction in areas of lowest rainfall and during the driest times of the year are the least susceptible.
- 4.4.15 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>26</sup>. These principles will be followed throughout the construction period.
- 4.4.16 Implementation of the measures set out in the draft CoCP will ensure displaced soil mostly fulfils its pre-existing functions on-site, which are production of food, water stores for flood attenuation and providing ecological habitat, resulting in an impact of low magnitude on the displaced soils. The sensitivity of the majority of soil in the study area is medium, and therefore, the effect on the displaced soils will be moderate adverse, which is significant.
- 4.4.17 Clayey and seasonally waterlogged soils (including soils in the Crewe, Salop, Blackwood and Teme association) are most vulnerable to structural degradation if moved in wet conditions or by inappropriate equipment. These soils are of high sensitivity, susceptible to compaction and smearing, which could affect successful reinstatement. These soils are found in the south of the area from Wimboldsley to Clive Green, and in the centre of the area between

<sup>26</sup> Department for Environment, Food and Rural Affairs (2009), *Construction Code of Practice for the Sustainable Use of Soils on Construction Sites*.

Whatcroft and Rudheath covering a total area of approximately 318ha (50%) within the study area. This is an impact of medium magnitude. The effect will be major/moderate adverse, which is significant.

- 4.4.18 Borrow Pits A, B, C and D will be used to extract material that is acceptable for engineering purposes, from beneath the topsoil and subsoil (i.e. the whole soil profile). The borrow pits will be restored using material excavated for the Proposed Scheme that is not acceptable for use as engineering material. The existing soil survey data indicate that the entire agricultural soil profile (i.e., the topsoil and subsoil) is likely to be available for agricultural restoration. Best practice techniques for handling soil as set out in the draft CoCP, will be used to increase the likelihood of agricultural soil being able to be returned to its former agricultural use.

### **Impacts on holdings**

- 4.4.19 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 will occur simultaneously at the start of the construction period and it is the combined effect of both that will have the most impact on the holding. During the construction period, some agricultural land will be restored and the impact on individual holdings will reduce.
- 4.4.20 The effects of the Proposed Scheme on individual agricultural and related interests during the construction period are summarised in Table 15. The table shows the total area of land required from a particular holding in absolute terms and as a percentage of the total area farmed. It also shows the area of land that could be returned to the holding following the construction period. The degree of impact is based on the proportion of the holding required rather than the absolute area of land.
- 4.4.21 The effects of severance during construction are judged on the ease and availability of access to severed land. The disruptive effects, principally of construction noise and dust, are assessed according to their effects on land uses and enterprises. Impacts on residential properties on farm holdings are assessed, as required, in Section 5, Air quality; Section 6, Community; and Section 13, Sound, noise and vibration. Full details of the nature and significance of effects are set out in Volume 5: Appendix AG-001-0MA02.
- 4.4.22 Wimboldsley Hall Farm and Wimboldsley Grange Farm (MA02/1), Lea Hall Farm (MA02/2) and Dairy Farm, Whatcroft (MA02/13) all have land in both the Hough to Walley's Green area (MA01) and the Wimboldsley to Lostock Gralam area. As the main farm buildings for the holdings are in the Wimboldsley to Lostock Gralam area the impacts and effects are assessed and reported in this document.
- 4.4.23 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.



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**Table 15: Summary of temporary impacts and effects on holdings from construction**

Holding reference/ name	Sensitivity to change	Total area required from holding	Construction severance	Disruption	Scale of construction effect	Area to be restored
MA02/1 Wimboldsley Hall Farm and Wimboldsley Grange Farm	High	129.5ha (45%) High	Medium	Low	Major adverse due to the proportion of land required.	49.4ha
MA02/2 Lea Hall Farm	Medium	78.6ha (17%) Medium	Medium	Low	Moderate adverse due to the proportion of land required.	40.9ha
MA02/3 Norcroft Farm	Medium	1.2ha (2%) Negligible	Negligible	Negligible	Negligible	0.6ha
MA02/4 Stanthorne Park Mews	Low	7.8ha (65%) High	Medium	Low	Moderate adverse due to the proportion of land required.	0.6ha
MA02/5 Park Farm	High	18.6ha (32%) High	Negligible	Negligible	Major adverse due to the proportion of land required.	2.6ha
MA02/6 Yew Tree Farm (including Stanthorne Hall Farm)	High	54.7ha (35%) High	Low	Low	Major adverse due to the proportion of land required.	21.1ha
MA02/7 Mill Farm	High	0.2ha (<1%) Negligible	Negligible	Negligible	Minor adverse	0.2ha
MA02/8 Bostock House Farm	Low	3.6ha (14%) Medium	Negligible	Negligible	Minor adverse	2.6ha
MA02/9 Greenheyes Farm	High	13.3ha (33%) High	Medium	Low	Major adverse due to the proportion of land required.	9.4ha
MA02/10 Bank Farm	Medium	22.3ha (26%) High	Low	Low	Major/moderate adverse due to the proportion of land required.	10.3ha
MA02/11 Croxtton Hall Farm	Medium	2.9ha (3%) Negligible	Negligible	Negligible	Negligible	1.4ha
MA02/12 Bostock Hall Farm	Medium	10.5ha (>10%) Medium	Low	Negligible	Moderate adverse due to the proportion of land required.	6.6ha

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Holding reference/ name	Sensitivity to change	Total area required from holding	Construction severance	Disruption	Scale of construction effect	Area to be restored
MA02/13 Dairy Farm, Whatcroft	High	41.9ha (13%) Medium	Low	Low	Major/moderate adverse due to the proportion of land required.	16.9ha
MA02/14 Shanks Farm, Byley	Medium	8.6ha (6%) Low	Negligible	Low	Minor adverse	3.8ha
MA02/15 Allumbrook Farm	Medium	10.2ha (8%) Low	Negligible	Negligible	Minor adverse	10.2ha
MA02/16 Pear Tree Farm, Cranage	Medium	10.8ha (14%) Medium	Negligible	Negligible	Moderate adverse due to the proportion of land required.	10.6ha
MA02/17 Wash Lane Farm	Medium	7.1ha (25%) High	Negligible	Negligible	Major/moderate adverse due to the proportion of land required.	7.1ha
MA02/18 Stublach Farm	Medium	6.6ha (>5%) Low	Negligible	Negligible	Minor adverse	6.6ha
MA02/19 Brook Farm	High	10.7ha (21%) High	Low	Low	Major adverse due to the proportion of land required.	3.4ha
MA02/20 Fir Tree Farm	Medium	12.6ha (57%) High	Negligible	Negligible	Major/moderate adverse due to the proportion of land required.	6.7ha
MA02/21 Higgins Lane Farm	Medium	13.6ha (62%) High	Medium	Negligible	Major/moderate adverse due to the proportion of land required.	5.3ha
MA02/22 Hulse Heath Farm	Medium	6.4ha (3%) Negligible	Negligible	Negligible	Negligible	3.9ha
MA02/23 Land at King Street	Medium	7.7ha (45%) High	Negligible	Negligible	Major/moderate adverse due to the proportion of land required.	6.9ha
MA02/24 High House Farm	Medium	27.2ha (35%) High	Negligible	Negligible	Major/moderate adverse due to the proportion of land required.	19.4ha
MA02/25 Port Ford Farm	Medium	11.2ha (13%) Medium	Negligible	Negligible	Moderate adverse due to the proportion of land required.	10.3ha

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Holding reference/ name	Sensitivity to change	Total area required from holding	Construction severance	Disruption	Scale of construction effect	Area to be restored
MA02/26 Melvin Holme Farm	Medium	20.1ha (23%) High	Medium	Medium	Major/moderate adverse due to the proportion of land required.	15.6ha
MA02/27 Birchall Farm	Medium	6.5ha (>5%) Low	Medium	Negligible	Moderate adverse due to severance.	6.5ha
MA02/28 Springbank Farm	Medium	17.2ha (38%) High	Medium	Low	Major/moderate adverse due to the proportion of land required.	6.7ha
MA02/29 Langford Farm	Medium	3.1ha (4%) Negligible	Negligible	Negligible	Negligible	3.1ha
MA02/30 Land at Hangman's Lane	Medium	0.8ha (12%) Medium	Negligible	Negligible	Moderate adverse due to the proportion of land required.	0.8ha
MA02/31 Park Farm, Lostock Gralam	Medium	29.3ha (32%) High	Medium	Low	Major/moderate adverse due to the proportion of land required.	28.9ha
MA02/32 Fieldhouse Farm	Medium	76.4ha (51%) High	Medium	Low	Major/moderate adverse due to the proportion of land required.	43.3ha
MA02/33 Tabley Hill Dairy Farm	Medium	7.8ha (4%) Negligible	Negligible	Negligible	Negligible	0.3ha
MA02/34 Hilltop Holding	Low	0.6ha (22%) High	Negligible	Negligible	Moderate adverse due to the proportion of land required.	0.3ha

- 4.4.24 Overall, 34 holdings in the Wimboldsley to Lostock Gralam area will be affected during construction, of which 24 will experience moderate, moderate/major or major adverse effects, which are significant for each holding.
- 4.4.25 The temporary construction effects on five of the dairy farms in the Wimboldsley to Lostock Gralam area are assessed as major adverse due to the high proportion of land required and severance; these are Wimboldsley Hall Farm and Wimboldsley Grange Farm (MA02/1), Park Farm (MA02/5), Yew Tree Farm (including Stanthorne Hall Farm) (MA02/6), Greenheyes Farm (MA02/9) and Brook Farm (MA02/19).
- 4.4.26 Although financial compensation will be available under existing statutory arrangements to offset these impacts, it is not a consideration in the assessment of environmental effects on farm holdings.

## Permanent effects of construction

### Impacts on agricultural land

4.4.27 Following construction and restoration, the area of agricultural land that will remain permanently required will be approximately 296ha, as shown in Table 16.

**Table 16: Agricultural land required permanently**

Agricultural land quality	Total area required (ha)	Percentage of agricultural land (%)
Grade 1	0	0
Grade 2	14.4	4.9
Subgrade 3a	62.3	21.0
<b>BMV subtotal</b>	<b>76.7</b>	<b>25.9</b>
Subgrade 3b	107.8	36.4
Grade 4	111.7	37.7
Grade 5	0	0
<b>Total agricultural land</b>	<b>296.2</b>	<b>100</b>

- 4.4.28 Of this total requirement, approximately 43.5ha (14.7%) will comprise newly planted woodland on agricultural land for visual screening and habitat creation to mitigate environmental effects arising from the Proposed Scheme. The mitigation is described in Section 7, Ecology and biodiversity and Section 11, Landscape and visual.
- 4.4.29 Replacement floodplain storage will occupy a total area of 1.5ha of agricultural land (see Volume 2: MA02 Map Book, CT-06-311-R1 and CT-06-316a). Some of this land is BMV land and could be subject to downgrading in agricultural land quality. This agricultural assessment assumes that this land will return to agricultural use.
- 4.4.30 The permanent requirement for approximately 77ha of BMV land within the Wimboldsley to Lostock Gralam area is assessed as an impact of medium magnitude, comprising 26% of the overall agricultural land requirement. BMV land is assessed as a receptor of medium sensitivity because of its relative abundance in this area. The permanent effect on BMV land is, therefore, assessed as moderate adverse, which is significant.

### Impacts on holdings

- 4.4.31 The permanent effects from the construction of the Proposed Scheme on individual agricultural and related interests are summarised in Table 17. The land required column refers to the area of land required to operate the Proposed Scheme in absolute terms and as a percentage of the overall area farmed. The scale of impact is based on the likely proportion of land required from the holding. The 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 loss of or damage to farm capital, such as property, buildings and structures, and the consequential effects on land uses and enterprises. Full details of the nature and scale of effects are set out in Volume 5: Appendix AG-001-OMA02.

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4.4.32 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 17: Summary of permanent impacts and effects on holdings from construction**

Holding reference/ name	Sensitivity to change	Land required from holding	Severance	Infrastructure	Scale of effect
MA02/1 Wimboldsley Hall Farm and Wimboldsley Grange Farm	High	80.1ha (28%) High	Medium	Negligible	Major adverse due to the proportion of land required.
MA02/2 Lea Hall Farm	Medium	37.7ha (8%) Low	Medium	Negligible	Moderate adverse due to severance.
MA02/3 Norcroft Farm	Medium	0.6ha (1%) Negligible	Negligible	Negligible	Negligible
MA02/4 Stanthorne Park Mews	Low	7.2ha (60%) High	Medium	Negligible	Moderate adverse due to the proportion of land required.
MA02/5 Park Farm	High	16.0ha (28%) High	Negligible	Negligible	Major adverse due to the proportion of land required.
MA02/6 Yew Tree Farm (including Stanthorne Hall Farm)	High	33.6ha (22%) High	Low	High	Major adverse due to the proportion of land required and property demolition.
MA02/7 Mill Farm	High	0.0ha (0%) Negligible	Negligible	Negligible	Negligible
MA02/8 Bostock House Farm	Low	1.0ha (4%) Negligible	Negligible	Negligible	Negligible
MA02/9 Greenheyes Farm	High	3.9ha (10%) Low	Medium	High	Major adverse due to property demolition.
MA02/10 Bank Farm	Medium	12.0ha (14%) Medium	Low	Negligible	Moderate adverse due to the proportion of land required.
MA02/11 Croxton Hall Farm	Medium	1.5ha (1%) Negligible	Negligible	Negligible	Negligible
MA02/12 Bostock Hall Farm	Medium	3.9ha (4%) Negligible	Negligible	Negligible	Negligible
MA02/13 Dairy Farm, Whatcroft	High	25.0ha (8%) Low	Low	Negligible	Moderate adverse due to the proportion of land required and severance.
MA02/14 Shanks Farm, Byley	Medium	4.8ha (3%) Negligible	Negligible	Negligible	Negligible

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Holding reference/ name	Sensitivity to change	Land required from holding	Severance	Infrastructure	Scale of effect
MA02/15 Allumbrook Farm	Medium	0.0ha (0%) Negligible	Negligible	Negligible	Negligible
MA02/16 Pear Tree Farm, Cranage	Medium	0.2ha (<1%) Negligible	Negligible	Negligible	Negligible
MA02/17 Wash Lane Farm	Medium	0.0ha (0%) Negligible	Negligible	Negligible	Negligible
MA02/18 Stublach Farm*	Medium	0.0ha (0%) Negligible	Negligible	Negligible	Negligible
MA02/19 Brook Farm	High	7.3ha (15%) Medium	Low	Negligible	Major/moderate adverse due to the proportion of land required.
MA02/20 Fir Tree Farm	Medium	5.9ha (27%) High	Negligible	Negligible	Major/moderate adverse due to the proportion of land required.
MA02/21 Higgins Lane Farm	Medium	8.3ha (38%) High	Medium	High	Major/moderate adverse due to the proportion of land required and property demolition.
MA02/22 Hulse Heath Farm	Medium	2.5ha (1%) Negligible	Negligible	Negligible	Negligible
MA02/23 Land at King Street	Medium	0.8ha (5%) Negligible	Negligible	Negligible	Negligible
MA02/24 High House Farm	Medium	7.8ha (10%) Low	Medium	High	Major/moderate adverse due to property demolition.
MA02/25 Port Ford Farm	Medium	0.9ha (1%) Negligible	Negligible	Negligible	Negligible
MA02/26 Melvin Holme Farm	Medium	4.5ha (5%) Low	Negligible	Negligible	Minor adverse
MA02/27 Birchall Farm	Medium	0.0ha (0%) Negligible	Negligible	Negligible	Negligible
MA02/28 Springbank Farm	Medium	10.5ha (23%) High	Negligible	Negligible	Major/moderate adverse due to the proportion of land required.
MA02/29 Langford Farm	Medium	0.0ha (0%) Negligible	Negligible	Negligible	Negligible
MA02/30 Land at Hangman's Lane	Medium	0.0ha (0%) Negligible	Negligible	Negligible	Negligible
MA02/31	Medium	0.4ha (<1%) Negligible	Negligible	Negligible	Negligible

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Holding reference/ name	Sensitivity to change	Land required from holding	Severance	Infrastructure	Scale of effect
Park Farm, Lostock Gralam					
MA02/32 Fieldhouse Farm	Medium	33.1ha (22%) High	Low	Negligible	Major/moderate adverse due to the proportion of land required.
MA02/33 Tabley Hill Dairy Farm	Medium	7.5ha (4%) Negligible	Negligible	Negligible	Negligible
MA02/34 Hilltop Holding	Low	0.3ha (13%) Medium	Negligible	Negligible	Minor adverse

- 4.4.33 Overall, the construction of the Proposed Scheme will affect 27 holdings in the Wimboldsley to Lostock Gralam area permanently, with 14 holdings experiencing moderate, major/moderate or major adverse permanent effects, which are significant for each holding. A further seven holdings are only affected temporarily during construction with negligible permanent effects remaining.
- 4.4.34 Four holdings will experience major adverse permanent effects, and for two of those the high proportion of land that is required for the Proposed Scheme is the most significant impact; at Wimboldsley Hall Farm and Wimboldsley Grange Farm (MA02/1) and Park Farm (MA02/5). The other two will also be affected by property demolition: Yew Tree Farm (MA02/6) and Greenheyes Farm (MA02/9). A further two holdings are affected by property demolition at Higgins Lane Farm (MA02/21) and High House Farm (MA02/24) and for these the overall effect of the Proposed Scheme is assessed as major/moderate adverse.
- 4.4.35 Although financial compensation will be available under existing statutory arrangements, there can be no certainty that this will 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

- 4.4.36 Other mitigation will 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.
- 4.4.37 A farm pack, as set out within the Phase 2b Farmers and Growers Guide, will be provided to all farmers and landowners, setting out baseline conditions on the land holding and the assurances and obligations that HS2 Ltd will accept upon entering the land. This will 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. In instances where replacement facilities need to be provided, HS2 Ltd will identify the likely impact on existing facilities and its timing, as soon as reasonably practicable.



## Summary of likely residual significant effects

- 4.4.38 During construction, the total area of agricultural land required will be approximately 639ha, of which approximately 243ha is BMV land. This is assessed as temporary moderate adverse effect, which is significant.
- 4.4.39 Thirty-four holdings will be affected temporarily, of which 24 will experience temporary moderate, major/moderate or major adverse residual effects, which are significant for each holding.
- 4.4.40 Once construction is complete and land required temporarily has been restored, 296ha of agricultural land will continue to be required permanently, of which 77ha is BMV land. This is assessed as a permanent moderate adverse effect, which is significant.
- 4.4.41 Twenty-seven holdings will be affected permanently, of which 14 will experience moderate, moderate/major or major permanent effects following construction, which is significant for each holding.
- 4.4.42 Soil displaced from the Proposed Scheme will mostly fulfil the primary functions, which are the production of food, water stores for flood attenuation and providing ecological habitat, resulting in a moderate adverse effect, which is significant.

## Cumulative effects

- 4.4.43 There are no cumulative effects identified as arising from the construction of the Proposed Scheme as a consequence of other development projects affecting agricultural land in the locality.

## 4.5 Effects arising from operation

### Avoidance and mitigation measures

- 4.5.1 No measures are included 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 will include:
- noise emanating from moving trains; and
  - the propensity of operational land to harbour noxious weeds.
- 4.5.3 Farm livestock buildings at Yew Tree Farm (MA02/6, noise assessment reference: 610544) and Dairy Farm, Whatcroft (MA02/13, noise assessment reference: 610546) lie within approximately 100m of the route of the Proposed Scheme. Operational airborne sound

levels at these locations have been included in the assessment and the results are presented in Volume 5: Appendix SV-003-0MA02.

- 4.5.4 The predicted operational airborne sound levels have been considered against the specific criteria defined in the Agriculture, forestry and soils section of the SMR. Taking into consideration the noise mitigation included within the Proposed Scheme, as shown on Map Series SV-02 (Volume 5: Sound, noise and vibration Map Book), no likely significant effects from noise on livestock are identified.
- 4.5.5 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.
- 4.5.6 The presence of noxious weeds (particularly ragwort) will be controlled using an appropriate management regime that identifies and remedies areas of weed growth that might threaten adjoining agricultural interests.

## **Other mitigation measures**

- 4.5.7 No other mitigation measures have been identified.

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

- 4.5.8 No residual significant effects on agriculture, forestry and soils have been identified as a result of the operation of the Proposed Scheme.

## **Cumulative effects**

- 4.5.9 There are no cumulative effects identified as arising from the operation of the Proposed Scheme as a consequence of other development projects affecting agriculture, forestry or soil in the study area.

## **Monitoring**

- 4.5.10 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.
- 4.5.11 On the basis of there being no significant residual operational effects, there are no area-specific requirements for monitoring agriculture, forestry and soil effects during the operation of the Proposed Scheme in the Wimboldsley to Lostock Gramam 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 arising from the construction and operation of the Proposed Scheme within the Wimboldsley to Lostock Gralam area. Oxides of nitrogen (NO<sub>x</sub>) including nitrogen dioxide (NO<sub>2</sub>), fine particulate matter (particles of size less than 2.5µm and 10µm in diameter, referred to as PM<sub>2.5</sub> and PM<sub>10</sub>, respectively) 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 works, any borrow pits and the use of site haul routes. Emissions will also arise from road traffic during construction and operation of the Proposed Scheme.
- 5.1.2 Engagement with Cheshire East Council (CEC) and Cheshire West and Chester Council (CWCC) has been undertaken. The purpose of this engagement has been to obtain relevant baseline information, which includes monitoring data in this area.
- 5.1.3 Detailed reports on the air quality data and assessments for this area are contained within Volume 5: Appendix AQ-001-0MA02. Additional information on air quality monitoring and traffic data used in the assessment is set out in Background Information and Data (BID), BID AQ-002-0MA02<sup>27</sup>.
- 5.1.4 Maps showing the location of the key environmental features and the key construction and operational features of the Proposed Scheme can be found in the Volume 2: MA02 Map Book. Air quality mapping is presented in the Volume 5, Air quality Map Book, map AQ-01-302.
- 5.1.5 The Proposed Scheme is described in Section 2.

### 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), the EIA Scope and Methodology Report (SMR)<sup>28</sup> and Volume 5: Appendix AQ-001-0MA02.
- 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:
- from construction and/or mineral extraction activities;

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<sup>27</sup> High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background Information and Data, Air quality*, BID AQ-002-0MA02. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

<sup>28</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

- 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; or
- from changes to road alignment.

- 5.2.3 The assessment of construction dust emissions has been undertaken for sensitive receptors located up to 350m from dust generating activities. The assessment of mineral dust emissions has been undertaken for sensitive receptors located up to 250m from borrow pit sites. The assessment of traffic emissions has been undertaken for sensitive receptors located up to 200m from roads screened in for further assessment.
- 5.2.4 The assessment has incorporated HS2 Ltd's policies on vehicle emissions<sup>29</sup>. These include the use of Euro VI heavy goods vehicles (HGV), Euro 4 petrol and Euro 6 diesel cars and light goods vehicles (LGV) during construction of the Proposed Scheme.
- 5.2.5 The assessment of construction traffic impacts has used traffic data based on an estimate of the average daily flows in the peak year during the construction period (2025-2037). Several construction scenarios have been assessed for air quality to capture peak construction traffic activity at different times in the construction period. It has been assumed that the changes in construction traffic will occur for the whole year. In some cases, this is a conservative approach, as the duration of the peak traffic flows may well be much shorter. These scenarios have been assessed against the relevant future baseline case without the Proposed Scheme. The assessment also assumes vehicle emission rates and background pollutant concentrations from year 2025. 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 2025 represents the worst case for the construction assessment.
- 5.2.6 The predicted impacts across all assessed construction scenarios for each receptor are presented in Volume 5: Appendix AQ-001-0MA02. Predicted concentrations and significant effects are presented for the worst-case construction traffic scenario assessed.

## 5.3 Environmental baseline

### Existing baseline

#### Background air quality

- 5.3.1 The main sources of air pollution in the Wimboldsley to Lostock Gralam area are emissions from road vehicles and agricultural activities. The main roads within the area are the M6, the A530 Nantwich Road/Newton Bank/Croxton Lane/King Street (also known locally as Roman Road)/Griffiths Road, the A54 Oakmere Road/High Street/Middlewich Road/Chester Road/St Michael's Way/Kinderton Street/Holmes Chapel Road, the A533 Northwich Road/Bostock

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<sup>29</sup> High Speed Two Ltd (2022), *Phase 2b Western Leg Information Paper E14: Air quality*.

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Road/Davenham Bypass/Kingsmead/Winnington Street/Winnington Lane, the A556 Chester Road/Shurlach Road, and the A559 Chester Road/Castle Street/Watling Street/Chester Way/Manchester Road (also known locally as Roman Road)/Hall Lane/Marston Lane.

- 5.3.2 There are 13 industrial installations (regulated by the Environment Agency) with permits for emissions to air for NO<sub>x</sub> and/or PM<sub>10</sub>, namely Advanced Medical Solutions Ltd (inorganic chemicals), British Salt Ltd (combustion), Centec International Ltd (organic chemicals), ECO-Option (UK) Ltd (inorganic chemicals), Farmers Boy Ltd (animal, vegetable and food), Imerys PCC UK Ltd (inorganic chemicals), INOVYN Enterprises Ltd (waste landfilling), Lostock Sustainable Energy Plant Ltd (incineration), Northwich Power Ltd (combustion), Tall Trees Farm Ltd (intensive farming), Tata Chemicals Europe Ltd (inorganic chemicals), Thor Specialities (UK) Ltd (inorganic chemicals) and UK Power Reserve Ltd (combustion). Their details are presented in BID AQ-002-0MA02. The contribution of these industrial processes to local air quality is included within the background concentrations.
- 5.3.3 Estimates of background air quality have been taken from the Department for Environment, Food and Rural Affairs (Defra)<sup>30</sup> for the baseline year of 2018. 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 were within the air quality standards for all pollutants within the Wimboldsley to Lostock Gralam area.

## Local monitoring data

- 5.3.4 There are currently 16 local authority diffusion tube sites located within the Wimboldsley to Lostock Gralam area for monitoring NO<sub>2</sub> concentrations. These are located mainly in and around Middlewich and its air quality management area (AQMA), with two next to the M6 and one in Rudheath.
- 5.3.5 HS2 Ltd has undertaken additional monitoring for the purpose of verifying the air quality assessment at five locations in this area for 2018.
- 5.3.6 Measurements of NO<sub>2</sub> were within the air quality standard at most of the sites in 2018. Annual mean NO<sub>2</sub> concentrations were above the air quality standard in 2018 at two sites in Middlewich and one site on the A556 Chester Road near Rudheath.
- 5.3.7 Details of the location of all monitoring sites are presented in map AQ-01-302 and the monitoring data are presented in Volume 5: Appendix AQ-001-0MA02 and BID AQ-002-0MA02.

## Air quality management areas

- 5.3.8 There are two AQMA within the Wimboldsley to Lostock Gralam area: the Chester Road, Middlewich AQMA and the Lewin Street, Middlewich AQMA. The Chester Road, Middlewich AQMA covers properties to the north and south of the A54 Chester Road in Middlewich and was declared in October 2017. The Lewin Street, Middlewich AQMA covers properties

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<sup>30</sup> Department for Environment, Food and Rural Affairs (2021), *Defra Background Pollutant Concentration Maps*. Available online at: <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>.

adjacent to a stretch of the A533 Lewin Street, south of Wych-House Lane, and was declared in November 2019. Both AQMA were designated for exceedances of the annual mean NO<sub>2</sub> standard. Details of their locations are presented in map AQ-01-0MA02 and Volume 5: Appendix AQ-001-0MA02.

## Receptors

- 5.3.9 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.
- 5.3.10 Most of the receptors which may be affected by the Proposed Scheme are residential. Other receptors include Wimboldsley Community Primary School, Early Learners Nursery Middlewich, Darnhall Primary School and Community Nursery, Overhall Community Primary School, Oaklands Special Day School, Cheshire West Museum Service nursery/creche, Winsford Grange Care Home, Weaver Lodge Independent Hospital, Newton Court Care Home, Winsford High Street Community Primary School, Rudheath Primary Academy, Lostock Lodge Care Home and Wincham Community Primary School.
- 5.3.11 The air quality assessment has also included receptors in ecological sites sensitive to nitrogen deposition and dust. There are three international/national designated ecological sites of relevance to the air quality assessment identified in the Wimboldsley to Lostock Gralam area, namely Wettenhall and Darnhall Woods Site of Special Scientific Interest (SSSI), Plumley Lime Beds SSSI and Wimboldsley Wood SSSI. Other relevant local sensitive ecological sites relevant to the air quality assessment include 27 local wildlife sites (LWS) and four AW.

## Future baseline

- 5.3.12 Volume 5: Appendix CT-004-00000 provides details of the developments in the Wimboldsley to Lostock Gralam area that are assumed to be implemented by 2025. The potential cumulative impact from committed developments on air quality in conjunction with the effects from the construction and operation of the Proposed Scheme has been considered as part of this assessment. The future air quality baselines are defined as the 'without the Proposed Scheme' scenarios at each stage.

## Construction (2025)

- 5.3.13 Future background pollutant concentrations have been sourced from the Defra background maps for the first year of construction in 2025, which predict NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> levels in 2025 to be lower than in the 2018 baseline and within the relevant air quality standards.
- 5.3.14 Committed developments that have been included as future receptors in the assessment of air quality impacts during construction of the Proposed Scheme are identified in Volume 5:

AQ-001-0MA02. No additional committed developments have been identified in this study area that will materially alter the baseline conditions in 2025 for air quality.

## **Operation (2038)**

- 5.3.15 Future background pollutant concentrations have been sourced from the Defra background maps for 2030, which is the latest available year of data. These predict NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> levels in 2030 to be lower than in the 2018 baseline and within the relevant air quality standards. The 2030 background maps have been used as representative of the future baseline conditions during operation of the Proposed Scheme.
- 5.3.16 Committed developments that have been included as future receptors in the assessment of air quality impacts during operation of the Proposed Scheme are identified in Volume 5: AQ-001-0MA02. No additional committed developments have been identified in this study area that will materially alter the baseline conditions in 2038 for air quality.

## **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). The draft CoCP<sup>31</sup> 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 will be implemented. These include:
- contractors being required to manage dust, air pollution, odour and exhaust emissions during construction and mineral extraction activities;
  - 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 and mineral extraction activities; and

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<sup>31</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.



- 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.

5.4.4 Prior to commencement of activities, there will be further detailed assessment for each worksite and borrow pit to determine site specific dust mitigation.

5.4.5 The use of borrow pits is intended to reduce the need for longer distance transport and import of materials.

## Assessment of impacts and effects

### Temporary effects

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

5.4.7 The risks of demolition of existing buildings, earthworks, construction of new structures and trackout have been assessed for their effect on dust soiling, human health and ecological sites. 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. The human health effects of dust relate mainly to short-term exposure to PM<sub>10</sub>.

5.4.8 The identified risks potentially arising from construction dust within the Wimboldsley to Lostock Gralam area are shown in Table 18. The risks are dependent on the magnitude of dust generating activities and the location of sensitive receptors in relation to these activities. A range of risks is shown, as there are several construction locations in the area.

**Table 18: Summary of risks for construction dust assessment**

Activity	Dust soiling	Human health	Ecological effects
Demolition	Negligible to medium	Negligible to low	Negligible to low
Earthworks	High	Low to medium	Low to medium
Construction	High	Low to medium	Low to medium
Trackout	Medium to high	Low to medium	Low to medium

5.4.9 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. Further details of the assessment can be found in Volume 5: Appendix AQ-001-0MA02 where the scale of dust emissions and the sensitivity of the area and receptors are fully described.

## Mineral dust effects

- 5.4.10 Activities associated with the operation of borrow pits during construction of the Proposed Scheme have been assessed for their potential effects on dust soiling and human health. There will be four borrow pits in the Wimboldsley to Lostock Gralam area: MA02 Borrow Pit A; MA02 Borrow Pit B; MA02 Borrow Pit C and MA02 Borrow Pit D. These borrow pits will be excavated for cohesive materials (Borrow Pits A, B and C) and sand and gravels (Borrow Pit D), which are classified as soft rock in the assessment.
- 5.4.11 Table 19 shows the dust soiling impacts at receptors within 250m of the borrow pits prior to the implementation of the mitigation measures contained within the draft CoCP. The magnitude of dust impacts are dependent on the location and sensitivity of receptors, the frequency of wind direction and speed, and the scale of the source emissions. As there are several parameters taken into account for defining the magnitude of dust impacts, a range of impacts is shown in the table for each borrow pit. There are no sensitive ecological receptors located within 250m of any of the borrow pits.

**Table 19: Summary of dust impacts for mineral dust assessment**

Borrow pit	Magnitude of dust impacts
MA02 Borrow Pit A	Moderate to substantial adverse
MA02 Borrow Pit B	Slight to substantial adverse
MA02 Borrow Pit C	Moderate adverse
MA02 Borrow Pit D	Slight to substantial adverse

- 5.4.12 With the application of the established national best practice mitigation measures contained in the draft CoCP, no significant effects are anticipated from the activities associated with the operation of the borrow pits in this area. Human health effects from dust emissions due to borrow pit activities are not anticipated to be significant due to the low background PM<sub>10</sub> concentrations in the area. Further details of the assessment can be found in Volume 5: Appendix AQ-001-0MA02.

## Construction traffic effects

- 5.4.13 Construction activity could also affect local air quality through the additional traffic generated on the highway network and site haul routes as a result of construction vehicles and through changes to traffic patterns arising from temporary road diversions and realignments.
- 5.4.14 The assessment of construction traffic emissions has been undertaken for a 'without the Proposed Scheme' scenario and a 'with the Proposed Scheme' scenario. The traffic data for each scenario includes the additional traffic from future committed developments.
- 5.4.15 Construction traffic data in the study area have been screened to identify roads that required further assessment and to confirm the likely effect of the change in emissions from vehicles using those roads during construction of the Proposed Scheme. There were four construction traffic scenarios assessed in this area.

- 5.4.16 Receptors expected to experience the greatest change in concentrations have been included in the air quality model. No significant effects are predicted at any modelled receptors during construction of the Proposed Scheme. Concentrations of NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> are within the relevant air quality standards both with and without the Proposed Scheme.
- 5.4.17 Nitrogen deposition is predicted to increase by more than 1% of the critical load at only one ecological receptor in this area, Wettenhall and Darnhall Woods SSSI, as a result of the Proposed Scheme. The potential for this increase to result in significant ecological effects is addressed in Section 7, Ecology and biodiversity of this report.

### **Rail emissions at Crewe North RSD construction sidings**

- 5.4.18 The impact from diesel trains associated with Crewe North RSD construction sidings has been assessed and is considered to be negligible. Therefore, no significant effects are anticipated from the operation of diesel trains at this location during construction of the Proposed Scheme (see Volume 5: Appendix AQ-001-0MA02).

### **Permanent effects**

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

### **Other mitigation measures**

- 5.4.20 No other mitigation measures are considered necessary in relation to air quality during construction of the Proposed Scheme in this area.

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

- 5.4.21 The methods outlined within the draft CoCP are considered effective at reducing dust and traffic emissions, and therefore, no significant residual effects are anticipated.

### **Cumulative effects**

- 5.4.22 The data used in the air quality assessment take account of predicted changes in traffic as a result of committed developments in the area, and therefore, their impacts have been included within the assessment. It is assumed that dust emissions from construction of other developments in the area will be controlled by appropriate measures as set out within their respective environmental management controls, and therefore, no cumulative effects for air quality are anticipated.

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

### Operational traffic effects

- 5.5.4 The assessment of operational traffic emissions has been undertaken for a 'without the Proposed Scheme' scenario and a 'with the Proposed Scheme' scenario in 2038. The traffic data for each scenario include the additional traffic from future committed developments.
- 5.5.5 Traffic data in the study area have been screened to identify roads that required further assessment and to confirm the likely effect of the change in emissions from vehicles using those roads during operation of the Proposed Scheme. There were 38 roads screened in for further assessment in the Wimboldsley to Lostock Gralam area, including;
- the A54 Middlewich Road/St Michaels Way/Kinderton Street/Holmes Chapel Road/Chester Road;
  - the A530 Nantwich Road/Chester Road/King Street/Griffiths Road;
  - the A533 Bostock Road/Dane Street/London Road/Kingsmead;
  - the B5082 Holmes Chapel Road;
  - the B5082 Penny's Lane;
  - Birches Lane;
  - Clive Lane; and
  - Clive Green Lane.
- 5.5.6 No designated ecological receptors of relevance to the operational phase air quality have been identified within 200m of the screened in roads in the area. No further assessment of ecological receptors was therefore required for this area.
- 5.5.7 Receptors expected to experience the greatest change in concentrations have been included in the air quality model. One modelled residential receptor is predicted to experience significant beneficial effects for NO<sub>2</sub> concentrations in the Wimboldsley to Lostock Gralam area. This is Manor Cottage located on the A530 Nantwich Road, Occleston. No significant

effects are predicted at the remaining receptors in relation to annual mean NO<sub>2</sub> concentrations. No significant effects are predicted in relation to annual mean PM<sub>10</sub> and PM<sub>2.5</sub> concentrations.

## **Other mitigation measures**

- 5.5.8 No other mitigation measures are proposed in relation to air quality during operation of the Proposed Scheme.

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

- 5.5.9 There will be a residual significant beneficial effect at one modelled residential receptor on the A530 Nantwich Road, Occleston, in relation to annual mean NO<sub>2</sub> concentrations.

## **Cumulative effects**

- 5.5.10 The data used in the air quality assessment take account of predicted changes in traffic as a result of committed developments in the area, and therefore, their impacts have been included within the assessment.

## **Monitoring**

- 5.5.11 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.
- 5.5.12 On the basis of there being no significant residual adverse operational effects, there are no area-specific requirements for monitoring air quality effects during operation of the Proposed Scheme in the Wimboldsley to Lostock Gralam area.

## 6 Community

### 6.1 Introduction

- 6.1.1 This section of the report describes the baseline, impacts and likely significant effects on local communities resulting from the construction and operation of the Proposed Scheme in the Wimboldsley to Lostock Gralam area.
- 6.1.2 The assessment draws on information gathered from engagement with the users and operators of community resources. Local authorities, parish councils and operators of community resources that have been engaged with are identified in Section 3, Stakeholder engagement and consultation. The purpose of this engagement has been to understand how the resources are used and to obtain relevant baseline information to inform the design development and assessment of the Proposed Scheme.
- 6.1.3 Further details of the community assessments undertaken within the Wimboldsley to Lostock Gralam area are contained in Volume 5: Appendix CM-001-0MA02.
- 6.1.4 Community assessment maps are provided in the Map Series CM-01 in Volume 5, Community Map Book. 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: MA02 Map Book. The Proposed Scheme is described in Section 2.
- 6.1.5 All distances, lengths and area measurements provided in this section are approximate.

### 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 EIA Scope and Methodology Report (SMR)<sup>32</sup>.
- 6.2.2 The study area includes the land required both temporarily and permanently for the construction and operation of the Proposed Scheme. It also includes a wider area including proposed construction traffic routes within which community resources could be affected by a combination of two or more significant residual effects arising from noise, vibration, poor air quality, heavy goods vehicle (HGV)<sup>33</sup> traffic, and visual intrusion. Overall, the study area is taken as the area of land that encompasses the likely significant community effects of the Proposed Scheme.

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<sup>32</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

<sup>33</sup> HGV traffic effects are where there is a 30% or more increase in HGV traffic movements which have been identified as significant by traffic and transport. The increase in HGV traffic results in a traffic-related severance effect for non-motorised users. They contribute to in-combination effects on community resources that are located adjacent to the routes that experience the increase in HGV movements.

- 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 in Section 14, Traffic and transport. However, where PRoW and other routes are a promoted destination in their own right as a recreation resource, they have been considered within this assessment. Where impacts on public open space and recreational routes 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 will be re-instated 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. 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.
- 6.2.5 Isolation effects may arise from either physical islanding of properties or an increase in journey times and/or distance between residential areas and the community resources that residents use on a regular basis.
- 6.2.6 The assessment of in-combination effects draws upon: Section 5, Air quality; Section 11, Landscape and visual; Section 13, Sound, noise and vibration; and Section 14, Traffic and transport. Likely significant in-combination effects on community resources are reported in this section. Durations of in-combination effects on community resources have been identified where information on the duration of contributing effects is provided in the relevant source assessments.
- 6.2.7 Worker accommodation will be located at Crewe North RSD satellite compound 1, A54 Middlewich Road satellite compound and at Gad Brook viaduct north satellite compound. Construction worker impacts on community resources are considered at a route-wide level in Volume 3, Route-wide effects, Section 6.
- 6.2.8 No area-specific limitations or assumptions have been identified for this area.

## 6.3 Environmental baseline

### Existing baseline

- 6.3.1 The Wimboldsley to Lostock Gralam area covers a 14.6km section of the route of the Proposed Scheme. The route extends from Wimboldsley in the south, passing close to the settlements of Clive, Middlewich, Stanthorne, Bostock, Whatcroft, Rudheath, Lostock Green and Lostock Gralam. Cheshire West and Chester Council (CWCC) and Cheshire East Council (CEC) are the local authorities in the area. The boundary between the parishes of Minshull Vernon and Stanthorne and Wimboldsley forms the southern boundary of the Wimboldsley to Lostock Gralam area. Smoker Brook forms the northern boundary of this section.



6.3.2 The Wimboldsley to Lostock Gralam area is predominately rural in nature, characterised by small settlements, scattered farmsteads and properties, with agriculture being the main land use. The larger settlements of Rudheath and Lostock Gralam lie in the north of the area. The majority of community facilities in the Wimboldsley to Lostock Gralam area are located in Middlewich, Winsford and Northwich, which lie outside the study area.

### **Wimboldsley and surrounds**

6.3.3 Wimboldsley comprises approximately 30 residential properties. The nearest residential properties are located 250m to the east of the route of the Proposed Scheme. Wimboldsley has several community facilities including the Verdin Arms public house, Hopley House Cafe and Wimboldsley Community Primary School.

6.3.4 The Shropshire Union Canal (Middlewich Branch) extends between Wimboldsley and Clive Green. It will be crossed by the Proposed Scheme approximately 700m to the north-east of Clive Green.

### **Middlewich, Winsford and surrounds**

6.3.5 Winsford and Middlewich are located to the west and east of the route of the Proposed Scheme, respectively. They lie just outside of the study area. In between them, and within the study area, are the settlements of Clive Green, Clive, Stanthorne, Bostock, Whatcroft and Billinge Green.

6.3.6 Clive Green comprises approximately 20 dispersed residential properties and farmsteads. The closest residential property is located 200m west of the route of the Proposed Scheme. Just north of Clive Green is Clive, a settlement comprising approximately 200 residential properties, which border the southern edge of the Winsford Industrial Estate. The closest residential property is located 350m west of the route of the Proposed Scheme.

6.3.7 Stanthorne comprises approximately 70 residential properties and farmsteads, with the nearest residential properties located 70m east of the route of the Proposed Scheme. There are recreational moorings in Stanthorne located at Park Farm on the Shropshire Union Canal (Middlewich Branch), which are used by canal boats for water-based recreation in the area. Greenheyes Farm lies on the A533 Northwich Road, in Stanthorne, to the east of the route of the Proposed Scheme. Greenheyes Farm is a working dairy farm and provides free educational trips for local school groups.

6.3.8 Bostock is a settlement comprising approximately 100 residential properties. The nearest residential properties are located 700m west of the route of the Proposed Scheme, many of which are clustered within the Bostock Hall Country Estate.

6.3.9 Whatcroft comprises approximately 20 residential properties and farmsteads. The nearest residential properties are located 50m west of the route of the Proposed Scheme.

6.3.10 Community facilities in Whatcroft include Lanes End Bungalow, which is a residential care property located at the junction of Whatcroft Hall Lane and the A530 King Street. This provides specialist residential and respite care for children with mental and physical

disabilities. Riverside Organic Farm lies on Manor Lane to the east of the route of the Proposed Scheme. This holds occasional community events and runs a Farm Tots programme for parents and children, where educational sessions are held on farming, nature and wildlife.

- 6.3.11 Billinge Green comprises approximately 20 dispersed residential properties and farmsteads. The closest residential properties are located 50m west of the route of the Proposed Scheme. There are two marinas in Billinge Green: Oakwood Marina and Park Farm Marina, both of which have recreational moorings for canal boats.
- 6.3.12 There are several recreational routes and PRow in the area. Between Clive Green and Middlewich lies 2km of the Shropshire Union Canal (Middlewich Branch), running west to east across the route of the Proposed Scheme. The National Cycle Network Route 5 also follows the route of the canal. National Cycle Network Route 573 also passes through the area near Billinge Green. The Trent and Mersey Canal and towpath extends between Middlewich and Rudheath, running east to west across the route of the Proposed Scheme and passing through Billinge Green, Bostock and Whatcroft. The two canals form part of the Four Counties Ring and Cheshire Ring tourist boating circuits. The Dane Valley Way and Cheshire Ring Canal Walk (both of which run through the study area for 6km) are long-distance walking routes which follow the Trent and Mersey Canal from Middlewich.
- 6.3.13 There is one public open space on the edge of Middlewich, Croxton Park, which is within the study area.

### **Rudheath, Lostock Green, Lostock Gralam and surrounds**

- 6.3.14 This area covers the settlements of Higher Shurlach, Rudheath, Lostock Green and Lostock Gralam.
- 6.3.15 Higher Shurlach comprises approximately 25 residential properties. The nearest residential properties are located 400m west of the route of the Proposed Scheme. The Chrysalis Day Nursery is located in Higher Shurlach.
- 6.3.16 Rudheath is a settlement comprising approximately 1,900 residential properties. The nearest residential properties are located 200m west of the route of the Proposed Scheme. Rudheath has several community facilities including The Venue, a mixed-use community facility which hosts youth clubs, and the Little Owls Pre-School and Nursery. Rudheath Primary Academy and the Old Broken Cross public house are also located within the study area. Recreational facilities include a playing field on Shurlach Road and an informal open space on Britannia Drive.
- 6.3.17 Lostock Green comprises approximately 100 residential properties. The nearest residential properties are located on the route of the Proposed Scheme. Within Lostock Green there is the Broadfield Play Area and Lostock Green Methodist Church. To the south-west of the village is Lostock Green picnic area, an area of green space with a café, picnic tables and public toilets. The picnic area is accessible for pedestrians from Cookes Lane, with vehicular access from the A556 Shurlach Road.

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- 6.3.18 Lostock Gramam is a settlement comprising approximately 1,000 residential properties. The nearest properties are located 100m west of the route of the Proposed Scheme. Lostock Gramam has several community facilities, including Lostock Tiny Tots Pre-School, Lostock Belgrave Day Nursery, Lostock Gramam Church of England Primary School, St John the Evangelist Church, including its church hall and churchyard, four care homes, and Lostock Gramam Community Centre and outdoor play area. Public open spaces and recreational facilities in Lostock Gramam include Lostock Gramam football ground and play areas on Salary Row and Townshend Road.
- 6.3.19 Recreational facilities in the area include the Trent and Mersey Canal and towpath, which runs through the area to the west of the route of the Proposed Scheme. The towpath runs for 3km between Rudheath and Lostock Gramam, and Winnington and Peas Wood Local Wildlife Site (LWS), east of Lostock Gramam.

## Future baseline

### Construction (2025)

- 6.3.20 Volume 5: Appendix CT-004-0000 provides details of the developments in the Wimboldsley to Lostock Gramam area that are assumed to have been implemented by 2025. The following committed developments of relevance to the community assessment that would materially alter the future baseline during construction of the Proposed Scheme in this area, are set out in Table 20.

**Table 20: Committed developments of relevance to community during construction**

Map book reference <sup>34</sup>	Planning reference	Description	How this is considered in the assessment
MA02/277	17/01434/FUL	Location: 411 Manchester Road, Lostock Gramam, Northwich. Construction of 16 no. residential units comprising 8 no. four person two bedroom terraced dwellings, 4 no. seven person dwellings and 4 no. three person two bedroom maisonette apartments	Informing future baseline.
MA02/062	17/04252/FUL	Location: Old Hall Farm, Bostock Road, Bostock, Winsford, CW10 9JF. Conversion of agricultural building into seven residential dwellings and associated works.	Informing future baseline.
MA02/217	17/03135/OUT	Location: Land north of Middlewich Road, Clive. Outline planning application for the construction of up to 21 dwellings, provision of a vehicular access off Middlewich Road, car parking, ancillary green space, landscaping and other associated works.	Informing future baseline.
MA02/342	19/00468/FUL	Location: 162 Middlewich Road, Rudheath, Northwich, Cheshire, CW9 7DX.	Informing future baseline.

<sup>34</sup> Volume 5: Planning Data/Committed Development Map Book: Maps CT-13-304b to CT-13-309a.

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Map book reference <sup>34</sup>	Planning reference	Description	How this is considered in the assessment
		Demolition of existing detached dwelling and erection of a 2 storey (Use Class C2) 68 bed residential care home	
MA02/348	20/00923/FUL	Location: farm building, Manor Farm, Old Lane, Davenham, Northwich, CW9 7SD. Conversion of traditional agricultural buildings into six dwellings with associated parking and gardens. Conversion two steel portal framed agricultural buildings into car ports and demolition of all other redundant modern agricultural buildings.	Informing future baseline.

6.3.21 The following committed developments have been included as part of the future baseline and considered within this assessment:

- the implementation of committed development MA02/277 will result in a residential development located 300m to the west of the land required for the construction of the Proposed Scheme;
- the implementation of committed development MA02/062 will result in seven residential properties located 40m to the west of the land required for the construction of the Proposed Scheme;
- the implementation of committed development MA02/217 will result in a residential development located 600m to the west of the land required for the construction of the Proposed Scheme;
- the implementation of committed development MA02/342 will result in a residential care home located 80m to the west of the land required for the construction of the Proposed Scheme; and
- the implementation of committed development MA02/348 will result in six residential properties located immediately to the west of the land required for the construction of the Proposed Scheme.

## Operation (2038)

6.3.22 Volume 5: Appendix CT-004-00000 also provides details of the developments in the Wimboldsley to Lostock Gralam area that are assumed to have been implemented by 2038. No additional committed developments of relevance for the community assessment have been identified that would materially alter the future baseline in this area.

## 6.4 Effects arising during construction

### Avoidance and mitigation measures

6.4.1 The draft Code of Construction Practice (CoCP)<sup>35</sup> includes a range of provisions that will help mitigate community effects associated with construction of the Proposed Scheme within this area, including:

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

### Assessment of impacts and effects

#### Wimboldsley and surrounds

##### Temporary effects

##### Residential properties

6.4.2 Construction of the Proposed Scheme, including utility works and/or highways works will be required on residential land in the area. Where the scale of impact will be small, and the duration short (up to three months), these works will result in minor adverse effects, which will not be significant at a community level. A description of the affected properties is included within Volume 5: Appendix CM-001-0MA02.

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<sup>35</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

### **Community facilities**

6.4.3 No temporary construction effects on community facilities are anticipated in this area.

### **Recreational facilities**

6.4.4 No temporary construction effects on recreational facilities are anticipated in this area.

### **Public open space and recreational routes**

6.4.5 No temporary construction effects on public open space or recreational routes are anticipated in this area.

### **Permanent effects**

#### **Residential properties**

6.4.6 The construction of A530 Nantwich Road overbridge and Walley's Green embankment will require the demolition of five residential properties at Railway Cottages on the A530 Nantwich Road in Wimboldsley. These residential properties will be permanently lost. This will result in a moderate adverse effect, which is significant.

#### **Community facilities**

6.4.7 No permanent construction effects on community facilities are anticipated in this area.

#### **Recreational facilities**

6.4.8 No permanent construction effects on recreational facilities are anticipated in this area.

#### **Public open space and recreational routes**

6.4.9 No permanent construction effects on public open space or recreational routes are anticipated in this area.

## **Middlewich, Winsford and surrounds**

### **Temporary effects**

#### **Residential properties**

6.4.10 Construction of the Proposed Scheme, including utility works and/or highways works, will be required on residential land in the area. Where the scale of impact will be small, and the duration short (up to three months), these works will result in minor adverse effects, which will not be significant at a community level. A description of the affected properties is included within Volume 5: Appendix CM-001-OMA02.

6.4.11 Construction of the Clive Green south embankments will be in proximity to a group of approximately 20 residential properties in Clive Green. Clive Green Lane is a designated

route for construction traffic and is expected to experience a significant increase in HGV traffic (between the A530 Nantwich Road and Clive Back Lane). Significant noise effects from these works are likely to continue for one year and three months. Significant vibration effects will occur for approximately five months. Together these noise, vibration, visual and HGV traffic effects will result in a major adverse in-combination effect on amenity for residents at these properties, which is significant.

6.4.12 The B5309 Centurion Way in Middlewich is a designated route for construction traffic and is expected to experience a significant increase in HGV traffic movements. These significant HGV traffic effects are expected to combine with significant traffic noise effects on approximately 40 residential properties on the B5309 Centurion Way (between the B5081 Byley Lane and the B5309 King Street) during the peak months of construction. Together these noise and HGV traffic effects will result in a moderate adverse in-combination effect on amenity for residents at these properties, which is significant.

6.4.13 The B5081 Byley Road in Byley is a designated route for construction traffic and is expected to experience a significant increase in HGV traffic movements. These significant HGV traffic effects are expected to combine with significant traffic noise effects on approximately 30 residential properties on the B5081 (between Lily Lane and the B5082 Northwich Road) during the peak months of construction. Together these noise and HGV traffic effects will result in a moderate adverse in-combination effect on amenity for residents at these properties, which is significant.

### **Community facilities**

6.4.14 No temporary construction effects on community facilities are anticipated in this area.

### **Recreational facilities**

6.4.15 No temporary construction effects on recreational facilities are anticipated in this area.

### **Public open space and recreational routes**

6.4.16 No temporary construction effects on public open space or recreational routes are anticipated in this area.

### **Permanent effects**

#### **Residential properties**

6.4.17 The construction of Clive Green North embankment no. 2 will require the demolition of one residential property: Yew-Tree Farm, on Coalpit Lane in Stanthorne. This residential property will be permanently lost.

6.4.18 The construction of Stanthorne South embankment no. 2 will require the demolition of one residential property: Stanthorne Grange, on the A54 Middlewich Road in Stanthorne. This residential property will be permanently lost.



- 6.4.19 The construction of Stanthorne North embankment will require the demolition of one residential property: Greenheyes Farm, on the A533 Northwich Road in Stanthorne. This residential property will be permanently lost.

### **Community facilities**

- 6.4.20 Greenheyes Farm in Stanthorne functions as a community resource, providing a destination for educational trips free-of-charge for local school groups. It is part of the Countryside Stewardship Scheme. The visits are open to all age groups and there is partial access for disabled visitors. There is one alternative facility offering educational visits nearby, Riverside Organic Farm; however, there is a charge. Riverside Organic Farm is 4km from Greenheyes Farm and is accessible by coach for school groups. The construction of Stanthorne North embankment will result in the permanent loss of Greenheyes Farm. As there is no comparable alternative nearby, this is assessed as having a major adverse effect, which is significant.

### **Recreational facilities**

- 6.4.21 No permanent construction effects on recreational facilities are anticipated in this area.

### **Public open space and recreational routes**

- 6.4.22 No permanent construction effects on public open space or recreational routes are anticipated in this area.

## **Rudheath, Lostock Green, Lostock Gralam and surrounds**

### **Temporary effects**

#### **Residential properties**

- 6.4.23 Construction of the Proposed Scheme, including utility works and/or highways works, will be required on residential land in the area. Where the scale of impact will be small, and the duration short (up to three months), these works will result in minor adverse effects, which will not be significant at a community level. A description of the affected properties is included within Volume 5: Appendix CM-001-0MA02.

#### **Community facilities**

- 6.4.24 No temporary construction effects on community facilities are anticipated in this area.

#### **Recreational facilities**

- 6.4.25 No temporary construction effects on recreational facilities are anticipated in this area.

## **Public open space and recreational routes**

- 6.4.26 The construction of Smoker Brook viaduct will temporarily require 1.2ha of the 12.1ha of land (approximately 10%) at Winnington and Peas Wood LWS. Of the 1.2ha of land required temporarily, 0.4ha will also be required permanently. Located to the north of the A556 Shurlach Road and the A559 Manchester Road, and north-east of Lostock Gram, this is a public open space, which comprises walking routes through woodland. Construction works will sever access to the woodland from the A559 Manchester Road, which will mean that the majority of the walking track and woodland will be inaccessible. The temporary land will be required for approximately two years and three months. There are limited alternatives nearby. The temporary loss of land will result in a major adverse effect, which is significant.

## **Permanent effects**

### **Residential properties**

- 6.4.27 The construction of Whatcroft North embankment will require the demolition of one residential property: Higgins Lane Farm, on Davenham Road in Rudheath. This residential property will be permanently lost.
- 6.4.28 The construction of Rudheath embankment will require the demolition of one residential property: High House Farm, on King Street south of Rudheath. This residential property will be permanently lost.
- 6.4.29 The construction of Rudheath embankment and the A556 Shurlach Road realignment will require the demolition of nine residential properties on Cookes Lane in Rudheath. These residential properties will be permanently lost. This will result in a moderate adverse effect, which is significant.
- 6.4.30 The construction of Rudheath embankment and the A556 Shurlach Road realignment will require the demolition of five residential properties on Birches Lane in Lostock Green. These residential properties will be permanently lost. This will result in a moderate adverse effect, which is significant.

### **Community facilities**

- 6.4.31 No permanent construction effects on community facilities are anticipated in this area.

### **Recreational facilities**

- 6.4.32 No permanent construction effects on recreational facilities are anticipated in this area.

## **Public open space and recreational routes**

- 6.4.33 The realignment of the A556 Shurlach Road and construction of Rudheath embankment will permanently require all 2.2ha of land at the Lostock Green picnic area. The picnic area is a green space comprising picnic benches, a café, public toilets and green space, accessible via a layby on the A556 Shurlach Road and by foot from Cookes Lane. The picnic area is

primarily used as a stop for road users and will be permanently lost. The nearest alternative public toilet is a service station on Tabley Hill Lane 4.5 miles north of Lostock Green picnic area. The loss of this resource will result in a moderate adverse effect which is significant.

- 6.4.34 Of the 1.2ha of land required for the construction of the Proposed Scheme, the construction of Smoker Brook viaduct and the realignment of the A556 Shurlach Road will permanently require 0.4ha (3%) of the 12.1ha of land at Winnington and Peas Wood LWS. Located to the north of the A556 Shurlach Road and the A559 Manchester Road, and north-east of Lostock Gralam, this is a public open space, which comprises walking routes through woodland. The construction of Smoker Brook viaduct will permanently sever access to the woodland from the A559 Manchester Road, which will mean that the majority of the walking track and woodland will be inaccessible. The open space will be unusable for its intended purpose. There are limited alternatives nearby. The permanent loss of access is considered to be a major adverse effect, which is significant.

## Other mitigation measures

- 6.4.35 HS2 Ltd propose to re-instate the permissive path through Winnington and Peas Wood LWS during operation, re-routing the path around the Smoker Brook viaduct piers if necessary.
- 6.4.36 The owner of Greenheyes Farm will be compensated within the provisions of the Compensation Code if eligible.
- 6.4.37 The owner of the café at Lostock Green picnic area will be compensated within the provisions of the Compensation Code if eligible.

## Summary of likely residual significant effects

- 6.4.38 The construction of the Proposed Scheme will result in significant temporary residual effects on the following community resources:
- approximately 20 residential properties in Clive Green due to the combination of noise, vibration, visual and HGV traffic effects;
  - approximately 40 residential properties along the B5309 Centurion Way, Middlewich due to the combination of noise and HGV traffic effects;
  - approximately 30 residential properties along the B5081 Byley Road in Byley due to the combination of noise and HGV traffic effects; and
  - loss of land at Winnington and Peas Wood LWS.
- 6.4.39 The construction of the Proposed Scheme is likely to result in the following permanent residual significant effects:
- loss of five residential properties on the A530 Nantwich Road in Wimboldsley;
  - loss of the Greenheyes Farm community resource in Stanthorne;
  - loss of nine residential properties on Cookes Lane in Rudheath;
  - loss of five residential properties on Birches Lane in Lostock Green;

- loss of the Lostock Green picnic area in Lostock Green; and
- loss of land at Winnington and Peas Wood LWS.

## Cumulative effects

6.4.40 No temporary or permanent cumulative effects have been identified in the Wimboldsley to Lostock Gralam area.

## 6.5 Effects arising from operation

### Avoidance and mitigation measures

6.5.1 The following measures have been incorporated into the Proposed Scheme design as part of the design development process to avoid or reduce environmental impacts during operation:

- landscape mitigation planting along the route of the Proposed Scheme to provide visual screening for residents of properties in Occestone Green, Park Farm, other properties to the east and users of the Shropshire Union Canal (Middlewich Branch);
- landscape mitigation planting on land around the A530 Nantwich Road/Coalpit Lane roundabout to provide visual screening for users of the Shropshire Union Canal (Middlewich Branch) and users of the A530 Nantwich Road and Coalpit Lane;
- noise fence barriers to provide acoustic screening for residents of properties in Clive and Stanthorne;
- landscape mitigation planting running north and south of Davenham Road to provide visual screening for residents of Pear Tree Cottages, users of Oakwood and Park Farm marinas and users of the Trent and Mersey Canal;
- noise fence barriers along Gad Brook viaduct, Rudheath embankment and Wade Brook viaduct to provide acoustic screening for residents of properties around Davenham Road and in Whatcroft, Rudheath and Lostock Green;
- landscape mitigation planting along Cookes Lane, the A556 Shurlach Road and Birches Lane to provide visual screening for users of the A556 Shurlach Road and residents of properties in Lostock Green and on Birches Lane;
- a noise fence barrier to provide acoustic screening for residents of properties in Lostock Gralam and on Ascol Drive; and
- landscape mitigation planting along the route of the Proposed Scheme, within Crewe North rolling stock depot, the West Coast Main Line (WCML) and Clive Green South embankment, to provide visual screening for residents of properties on Stanthorne Park Mews, Wimboldsley Grange and users of the Shropshire Union Canal (Middlewich Branch).

## **Assessment of impacts and effects**

### **Wimboldsley and surrounds**

6.5.2 No operational effects are anticipated in this area.

### **Middlewich, Winsford and surrounds**

- 6.5.3 A group of approximately 15 residential properties in Clive Green will be adjacent to the route of the Proposed Scheme. The operation of the Proposed Scheme will result in significant noise effects on these properties during the daytime and night-time due to the running of the trains on Clive Green South embankment. These properties will experience significant adverse visual effects due to views of the Proposed Scheme, passing trains and overhead line equipment. Together these noise and visual effects will result in a major adverse in-combination effect on amenity for residents at these properties, which is significant.
- 6.5.4 A group of approximately 10 residential properties in Clive will be adjacent to the route of the Proposed Scheme. The operation of the Proposed Scheme will result in significant noise effects on these properties during the daytime and night-time due to the running of the trains on Stanthorne South embankment. These properties will experience significant adverse visual effects due to views of the Proposed Scheme, passing trains and overhead line equipment. Together these noise and visual effects will result in a major adverse in-combination effect on amenity for residents at these properties, which is significant. By year 30, visual effects will reduce to a level which is not significant. As such, there will be no significant in-combination effect for this community by year 30.
- 6.5.5 A group of approximately 25 residential properties in Stanthorne will be in proximity to the route of the Proposed Scheme. The operation of the Proposed Scheme will result in significant noise effects on these properties during the daytime and night-time due to the running of the trains through Middlewich box structure and on Stanthorne South embankment no.1. These properties will experience significant adverse visual effects due to views of the Proposed Scheme, passing trains and overhead line equipment. Together these noise and visual effects will result in a major adverse in-combination effect on amenity for residents at these properties, which is significant. By year 30, visual effects will reduce to a level which is not significant. As such, there will be no significant in-combination effect for this community by year 30.
- 6.5.6 A group of approximately 25 residential properties in Whatcroft will be in proximity to the route of the Proposed Scheme. The operation of the Proposed Scheme will result in significant noise effects on these properties during the daytime and night-time due to the running of the trains on Dane Valley embankment and Puddinglake viaduct. These properties will experience significant adverse visual effects due to views of the Proposed Scheme, passing trains and overhead line equipment. Together these noise and visual

effects will result in a major adverse in-combination effect on amenity for residents at these properties, which is significant.

- 6.5.7 A group of approximately 10 residential properties at Pear Tree Farm Cottages on Davenham Road will be in proximity to the route of the Proposed Scheme. The operation of the Proposed Scheme will result in significant noise effects on these properties during the daytime and night-time due to the running of the trains on Gad Brook viaduct. These properties will experience significant adverse visual effects due to views of the Proposed Scheme, passing trains and overhead line equipment. Together these noise and visual effects will result in a major adverse in-combination effect on amenity for residents at these properties, which is significant.

## **Rudheath, Lostock Green, Lostock Gralam and surrounds**

- 6.5.8 No operational effects are anticipated in this area.

## **Other mitigation measures**

- 6.5.9 No further mitigation is proposed.

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

- 6.5.10 The operation of the Proposed Scheme will result in residual significant effects on the following resources:
- approximately 15 residential properties at Clive Green due to the combination of noise and visual effects;
  - approximately 10 residential properties at Clive due to the combination of noise and visual effects;
  - approximately 25 residential properties at Stanthorne due to the combination of noise and visual effects;
  - approximately 25 residential properties at Whatcroft due to the combination of noise and visual effects; and
  - approximately 10 residential properties at Davenham Road due to the combination of noise and visual effects.

## **Cumulative effects**

- 6.5.11 No cumulative effects have been identified in the Wimboldsley to Lostock Gralam area.

## **Monitoring**

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

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- 6.5.13 Any area-specific operational monitoring requirements in relation to air quality effects, noise and vibration effects, traffic effects and visual effects that have contributed to the in-combination assessments, are described in the relevant sections of this Volume 2 report.



## 7 Ecology and biodiversity

### 7.1 Introduction

- 7.1.1 This section of the report describes the ecological baseline and identifies the predicted impacts and likely significant effects on habitats and species that will arise from construction and operation of the Proposed Scheme in the Wimboldsley to Lostock Gralam area. This includes effects on sites recognised or designated on the basis of their importance for nature conservation.
- 7.1.2 Engagement has been undertaken with stakeholders including Natural England, the Environment Agency, the Forestry Commission, the Woodland Trust, Cheshire Wildlife Trust, Canal & River Trust, Cheshire East Council and Cheshire West and Chester Council. The purpose of this engagement has been to obtain relevant baseline information and inform the design development and assessment of the Proposed Scheme.
- 7.1.3 Volume 5 contains supporting information to the ecological assessment reported in this section, including:
- ecological baseline data – designated sites (see Volume 5: Appendix EC-001-00001);
  - an ecological register of local level effects, which are not reported individually in Volume 2 (Volume 5: Appendix EC-015-0MA02); and
  - documents to support the Habitat Regulations Assessment Screening Report and Appropriate Assessment for the Oak Mere component of the Midland Meres and Mosses Phase 2 Ramsar site and Oak Mere Special Area of Conservation (SAC) (Volume 5: Appendix EC-016-00001).
- 7.1.4 Map Series EC-01 showing statutory and non-statutory designated sites of relevance to the assessment in the Wimboldsley to Lostock Gralam area is provided in the Volume 5: Ecology Map Book.
- 7.1.5 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: MA02 Map Book.
- 7.1.6 In addition, ecological baseline information relating to habitats and species recorded in the Wimboldsley to Lostock Gralam area is set out in Background Information and Data (BID)<sup>36</sup> (BID EC-002-00001 to BID EC-014-00001<sup>37</sup>) and accompanying Map Series EC-02 and EC-04 to EC-12 (BID Ecology Map Books).

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<sup>36</sup> High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background Information and Data*. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

<sup>37</sup> Note that BID EC-014-00000 contains data on badgers and is not published.

- 7.1.7 The Proposed Scheme is described in Section 2.
- 7.1.8 All distances, lengths 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 EIA Scope and Methodology Report (SMR)<sup>38</sup> and in the Field Survey Methods and Standards (FSMS), which is included as an annex to the SMR.
- 7.2.2 A route-wide Water Framework Directive (WFD) compliance assessment has been undertaken in conjunction with the environmental assessment (Section 15, Water resources and flood risk). Details of the assessment are set out in Volume 5: Appendix WR-001-0001, WFD compliance assessment.
- 7.2.3 Access was obtained for the majority of the land where general habitat survey (Phase 1 habitat survey) was proposed. However, access could not be gained in time for seasonally constrained surveys at land between Broken Cross and Lostock Gramam that has potential to support key ecological features. Further details are provided in Background Information and Data: BID EC-002-00001 to BID EC-014-00001.
- 7.2.4 Where data are limited, such as due to the absence of field surveys, a precautionary baseline has been built up according to the guidance reported in the SMR. This constitutes a 'reasonable worst case' basis for the subsequent assessment and development of mitigation.
- 7.2.5 BID EC-002-00001 to BID EC-014-00001 identifies these survey locations. Where the assessment has been based upon limited data, the ecological receptor is described as 'of up to' a specific value to indicate that a precautionary approach has been applied.
- 7.2.6 The precautionary approach to the assessment that has been adopted identifies the likely significant ecological effects of the Proposed Scheme. Use of the precautionary approach ensures that any limitations arising from the age of the datasets are taken into account. Unless otherwise stated, the description of effects assumes that land within Bill limits will be subject to habitat loss resulting from development of the Proposed Scheme, with the land required for construction purposes only being reinstated following completion of construction. This includes areas identified specifically for habitat creation. With respect to utility works, it is normally assumed that all habitat is lost from the land required for the Proposed Scheme. This is assumed to be temporary except for mature woodland and areas of high quality habitat.

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<sup>38</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

## 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. Further details are provided in the reports presented in Volume 5: Appendix EC-001-00001 and BID EC-002-00001 to BID EC-015-00001, and maps presented in Volume 5, Map Series EC-01 and BID Ecology Map Books: Map Series EC-02 and EC-04 to EC-12. Statutory and non-statutory designated sites are shown on Volume 5: Map EC-01-305b to EC-01-309a, more distant designated sites listed in this report are beyond the map extents. The extent of the EC-01 maps is such that some designated sites are identified on them that are not relevant to the assessment due to their distance from the Proposed Scheme. Such sites are not covered in this report.
- 7.3.2 Land required for and adjacent to the Proposed Scheme in the Wimboldsley to Lostock Gralam area consists mainly of low-lying land in mixed agricultural use (mainly dairy and pasture). Areas of woodland, including some which are ancient, grassland and ponds are widespread. The route of the Proposed Scheme will cross several watercourses, including the Shropshire Union Canal (Middlewich Branch), the River Dane, the Trent and Mersey Canal, and the Peover Eye, as well as numerous drainage ditches and smaller watercourses.

#### Designated sites

- 7.3.3 There are two statutory designated sites of international importance of relevance to the assessment in the Wimboldsley to Lostock Gralam area. They are:
- Midland Meres and Mosses Phase 2 Ramsar site, covering an area of 1,588ha, is designated for a diverse range of habitats ranging from open water to raised bog. The wide range of habitats supports nationally important flora and fauna. The closest component unit of the Ramsar site of relevance to the assessment is Oak Mere SSSI, located 9.7km west of the land required for the construction of the Proposed Scheme and adjacent to the A54 Middlewich Road and A49 Tarporley Road on which traffic will be redistributed as a result of the Proposed Scheme. Two further components of this Ramsar site, Black Firs and Cranberry Bog SSSI and Oakhanger Moss SSSI, are relevant to the Hough to Walley's Green area (MA01); and
  - Oak Mere SAC, covering an area of 68.5ha, is designated for its oligotrophic waters and transition mires, and quaking bogs. It comprises one constituent SSSI, Oak Mere SSSI, which is also part of the Midland Meres and Mosses Phase 2 Ramsar site. Oak Mere SAC is located 9.7km west of the land required for the construction of the Proposed Scheme and adjacent to the A54 Middlewich Road and A49 Tarporley Road on which traffic will be redistributed as a result of the Proposed Scheme.

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- 7.3.4 There are six nationally important Sites of Special Scientific Interest (SSSI) that are of potential relevance to the assessment in the Wimboldsley to Lostock Gralam area. For four of these sites, the land required for the construction of the Proposed Scheme in this area is within the Impact Risk Zone (IRZ) relevant to railway infrastructure as identified by Natural England. The two remaining sites are of relevance due to changes in traffic flows on nearby roads as a result of the Proposed Scheme. They are:
- Sandbach Flashes SSSI, covering an area of 152.9ha over several distinct areas, is designated for the extremely rare inland saline habitats and the unusual plants and animals associated with them. The flashes are important for notable aquatic invertebrates, as well as wildfowl and waders, supporting large numbers of wigeon, teal, lapwing, snipe and curlew. The closest component of the SSSI is located 2.4km east of the land required for the construction of the Proposed Scheme in the Wimboldsley to Lostock Gralam area. Sandbach Flashes SSSI is also relevant to the Hough to Walley's Green area (MA01), where it is located 370m east of the land required for the construction of the Proposed Scheme at its closest point;
  - Wimboldsley Wood SSSI, covering an area of 19ha, is designated for a variety of woodland types, most notably wet woodland dominated by alder and crack willow. Other important habitats include unimproved grassland, open water and the nationally rare saline spring habitat, which supports plant species uncommon in the county such as blunt-flowered rush and brookweed. The SSSI is located 25m west of land that has been identified for the purpose of habitat creation or enhancement as part of the Proposed Scheme, and 678m south of a construction traffic route on Clive Green Lane;
  - Wettenhall and Darnhall Woods SSSI, covering an area of 52.6ha, is designated for a large and diverse woodland, which contains the best example of suckering elm in Cheshire, as well as areas of unimproved grassland which contain many uncommon species. The SSSI is located 2.4km west of land that has been identified for the purpose of habitat creation or enhancement as part of the Proposed Scheme and 95m from the B5074 Swanlowe Lane on which traffic will be redistributed as a result of the Proposed Scheme. Wettenhall and Darnhall Woods SSSI is of relevance to the assessment in terms of possible impacts associated with redistribution of traffic as a result of the construction of the Proposed Scheme. However, the Proposed Scheme within the Wimboldsley to Lostock Gralam area is not within the IRZ for this SSSI;
  - Oak Mere SSSI, covering an area of 68.8ha, is designated for its mesotrophic, acidic lake. Due to the unusual water chemistry, the SSSI supports an important assemblage of aquatic plants and animals, a number of which are regionally and nationally rare. The SSSI is located 9.7km west of the land required for the construction of the Proposed Scheme and adjacent to the A54 Middlewich Road and A49 Tarporley Road on which traffic will be redistributed as a result of the Proposed Scheme. Oak Mere SSSI is of relevance to the assessment in terms of possible impacts associated with traffic redistribution as a result of the construction of the Proposed Scheme. However, the Proposed Scheme within the Wimboldsley to Lostock Gralam area is not within the IRZ for this SSSI;

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- Plumley Lime Beds SSSI, covering an area of 23.2ha, is designated for the presence of calcareous habitat of which there are few remaining natural examples in Cheshire, and for other habitats including woodland, a pool and marshland. There are a range of plant species associated with alkaline soils such as yellow-wort, common centaury and at least four species of orchid. A variety of willow hybrids and rare mosses are also present. Notable assemblages of birds including warblers and wildfowl use the habitats within the site. The extreme western extent of the SSSI (which comprises a hardstanding track only) is located partially within the land required for the construction of the Proposed Scheme; and
- Tabley Mere SSSI, covering an area of 44.4ha, is designated as it represents a very nutrient-rich mere type with a well-developed aquatic flora, as well as acidic marshy grassland and woodland. The site is important for birds, with a large heronry and numerous wildfowl. The SSSI is located 1.3km north-east of land that has been identified for the purpose of habitat creation or enhancement in the Wimboldsley to Lostock Gralam area. The SSSI is also relevant to the Pickmere to Agden and Hulseheath area (MA03) assessment, where it is located 124m east of the land required for the construction of the Proposed Scheme at its closest point and 114m west of a construction traffic route on the A556 Chester Road.

7.3.5 There are 26 Local Wildlife Sites (LWS) that are of potential relevance to the assessment in the Wimboldsley to Lostock Gralam area, each of which is of county/metropolitan value. They are:

- Shropshire Union Canal (Middlewich Branch) LWS, covering an area of 14.1ha, comprises a 7km section of the canal. The LWS is located partially within land that has been identified for the purpose of habitat creation or enhancement as part of the Proposed Scheme. The LWS will be crossed by a site haul route, which will be within the land required for the construction of the Proposed Scheme, located south of Yew-Tree Farm. The LWS is also crossed by Clive Green Lane, a construction traffic route. The LWS is located partially within the Wimboldsley to Lostock Gralam area with the remainder of the LWS in the Hough to Walley's Green area (MA01);
- Boundary Wood/Weaver Bank Wood LWS, covering an area of 7.5ha, comprises a narrow stretch of broadleaved woodland through which flows a tributary of the River Weaver. The LWS includes an area of Plantation on Ancient Woodland Site (PAWS): Weaver Bank. The LWS is located 20m west of land that has been identified for the purpose of habitat creation or enhancement, as part of the Proposed Scheme. The LWS is located partially within the Wimboldsley to Lostock Gralam area with the remainder of the LWS in the Hough to Walley's Green area (MA01);
- Rookery/Small Rookery Woods LWS, covering an area of 1.9ha, is a wooded stream valley designated for the presence of ancient semi-natural woodland. The LWS is located to the south of Wimboldsley Wood, bisected by the Shropshire Union Canal (Middlewich Branch) and is adjacent to land that has been identified for the purpose of habitat creation or enhancement, as part of the Proposed Scheme;

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- Woodland near Lea Hall, Wimboldsley LWS, covering an area of 0.7ha, is designated for the presence of ancient semi-natural woodland. The LWS is located to the east of Wimboldsley Wood and the Shropshire Union Canal (Middlewich Branch) and is adjacent to land that has been identified for the purpose of habitat creation or enhancement, as part of the Proposed Scheme;
- The Willowbeds LWS, covering an area of 9.1ha, comprises plantation woodland divided into sections by drains and ditches and is principally designated for the presence of marshy habitats and associated plant assemblage. The LWS is located to the north-west of Stanthorne Hall Farm, partially within the land identified for the purpose of habitat creation or enhancement, as part of the Proposed Scheme;
- Bostock Road Orchards LWS, covering an area of 0.3ha, is designated for the presence of traditional orchards and consists of two distinct sites at Greenheyes Farm and Bank Farm. This LWS is located partially within the land required for the construction of the Proposed Scheme and is adjacent to the A533 Northwich Road, a construction traffic route;
- Greenhays Farm Pasture LWS, covering an area of 5.8ha, is designated for the presence of neutral semi-improved and unimproved grassland, as well as a section of species rich hedgerow. The LWS is located to the north-west of Bostock House Farm and is adjacent to the land required for the construction of the Proposed Scheme;
- River Dane, Bostock LWS, covering an area of 21.2ha, comprises a section of the River Dane between Middlewich and Bostock Green, which is designated for the mosaic of habitats along the river corridor. This LWS is located partially within the land required for the construction of the Proposed Scheme to the north-east of Bank Farm, immediately east of Bull's Wood and to the east and north-east of Hill Wood;
- Dane Valley LWS, covering an area of 7ha, comprises a section of the River Dane between Byley Bridge and Ravenscroft Bridge. The LWS is designated for a meandering stretch of river and associated notable species including reed canary grass fen, river water-crowfoot, a colony of sand martin and otter. This LWS is located between two construction traffic routes: immediately adjacent to the B5081 Byley Lane and 45m north of the B5309 King Street, and is located 493m north of the land required for the construction of the Proposed Scheme;
- Veteran Ash Tree, Bank Farm, Bostock LWS, covering an area of 200m<sup>2</sup>, is designated for a large veteran ash to the east of Bank Farm located within the land required for the construction of the Proposed Scheme;
- Veteran Ash Tree, Greenhays, Bostock LWS, covering an area of 400m<sup>2</sup>, is designated for a large veteran ash tree within a species-rich hedgerow north-east of Greenheyes Farm. The LWS is located 99m south of land that has been identified for the purpose of habitat creation or enhancement, as part of the Proposed Scheme;
- Flint Mill Reedbeds LWS, covering an area of 1.5ha, is designated for reedbeds along the eastern bank of the Trent and Mersey Canal. This LWS is located 8m east of land that has been identified for the purpose of habitat creation or enhancement as part of the Proposed Scheme;



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- Bull's Wood and Meadow LWS, covering an area of 3.4ha, is designated for the presence of ancient woodland habitat, comprising 2.1ha of PAWS and 0.3ha of ancient semi-natural woodland, neutral grassland, marshy grassland and a veteran ash tree. This LWS is located partially within the land required for the construction of the Proposed Scheme;
- Trent and Mersey Canal LWS, covering an area of 2.7ha, is designated for the presence of deciduous woodland, which includes two veteran trees, an oak and an ash, and reedbeds along the eastern bank of the canal, south of Whatcroft. This LWS is located partially within the land required for the construction of the Proposed Scheme;
- Peck Mill Valley LWS, covering an area of 1.7ha, is designated for the presence of ancient semi-natural woodland and marshy grassland. The LWS is located north-west of Bostock Green, 1.1km west of the land required for the construction of the Proposed Scheme, and is bisected by the A533 Davenham Bypass, a construction traffic route;
- Puddinglake Brook Wood LWS, covering an area of 0.7ha, is designated for the presence of lowland mixed deciduous woodland, including areas of wet woodland and a large veteran crack willow. This LWS is located either side of Whatcroft Hall Lane at Bridge Farm and is partially within the land required for the construction of the Proposed Scheme;
- Whatcroft Hedge LWS, covering an area of 400m<sup>2</sup>, is designated for a species-rich hedgerow and a veteran ash tree at its eastern end. This LWS is located north of Whatcroft Hall Lane and the Trent and Mersey Canal, 7m south and east of the land required for construction of the Proposed Scheme and 10m north of a construction traffic route on Whatcroft Hall Lane;
- Whatcroft Lane Wetlands LWS, covering an area of 1.9ha, comprises two distinct areas: a pond, surrounded by reed swamp and species-rich neutral grassland, situated between the Trent and Mersey Canal and the Sandbach to Northwich Line (part of the Mid-Cheshire Line); and a large area of reedbed along the fringes of the canal. This LWS is located partially within the land required for the construction of the Proposed Scheme and 38m north of Whatcroft Hall Lane, a construction traffic route;
- Ash Trees along Trent and Mersey Canal, Billinge Green LWS, covering an area of 700m<sup>2</sup>, is designated for two large veteran ash trees on the western bank of the canal to the north-east of Brook Farm. This LWS is located partially within the land required for the construction of the Proposed Scheme;
- Billinge Green Farm Pond LWS, covering an area of 6.9ha, comprises a large pool surrounded by semi-natural woodland and scrub and includes an area of swamp. The LWS is located either side of Davenham Road and is 41m west of land required for utilities works involving diversion of five underground potable water mains, and 80m west of the land required for the construction of the Proposed Scheme;
- Pear Tree Farm LWS, covering an area of 0.1ha, is designated for traditional orchard habitat. This LWS is located near Billinge Green to the north of Davenham Road, a construction traffic route, and is partially within the land required for the construction of the Proposed Scheme;



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- Wade Brook LWS, covering an area of 5.7ha, comprises a section of Wade Brook, marshy grassland, reedbed and a small field pond. The LWS is located partially within the land required for utilities works involving modification of an overhead power line. The LWS is also situated between and immediately adjacent to two construction traffic routes, the A530 Griffiths Road and Lostock Green Road;
- Long Wood LWS, covering an area of 2.6ha, comprises a narrow semi-natural broadleaved woodland with a ditch system and several ponds. The LWS is located partially within the land required for the construction of the Proposed Scheme, between the A556 Shurlach Road, a construction traffic route, and Ascol Drive;
- Mill Wood and Mill Bottoms LWS, covering an area of 5.4ha, is designated for its complex of woodlands and other habitats along the banks of the Peover Eye. Habitats include lowland mixed deciduous woodland as well as a mix of wet woodland with drier deciduous woodland. Veteran beech, ash, oak, sycamore and crack willow are present. The LWS is located 12m to the south-east of the A556 Chester Road, a construction traffic route, and is 45m east of the land required for the construction of the Proposed Scheme;
- Winnington and Peas Wood LWS, covering an area of 12.1ha, is designated for the presence of lowland mixed deciduous woodland habitat including areas of ancient semi-natural woodland on the slopes of the Wincham/Smoker Brook and Peover Eye. This LWS is partially within the land required for the construction of the Proposed Scheme and located adjacent to the A556 Chester Road, a construction traffic route; and
- Leonard's and Smoker Wood LWS, covering an area of 10.7ha, comprises two narrow connected woodlands along the banks of two converging brooks. The woodlands include extensive areas of ancient semi-natural woodland, several specimens of veteran oak and ash. It also includes a fungal assemblage of more than 50 species, with a diverse understorey and ground flora. The LWS is located to the north of Linnards Lane and is partially within the land required for the construction of the Proposed Scheme. The LWS is also located adjacent to the A556 Chester Road, a construction traffic route. Leonard's and Smoker Wood LWS is located partially within the Wimboldsley to Lostock Gralam area, with the remainder of the LWS in the Pickmere to Agden and Hulseheath area (MA03).

7.3.6 There are 12 Ancient Woodland Inventory (AWI) sites of potential relevance to the assessment in the Wimboldsley to Lostock Gralam area each of which is of national value. They are:

- Weaver Bank AWI site (which is also part of the Boundary Wood/Weaver Bank Wood LWS), comprising 6.4ha of PAWS, is located 20m west of land that has been identified for the purpose of habitat creation or enhancement, as part of the Proposed Scheme. This AWI site is located partially within the Wimboldsley to Lostock Gralam area, with the remainder of the AWI site in the Hough to Walley's Green area (MA01);
- Rookery/Small Rookery Woods AWI site (part of which is also within the Rookery/Small Rookery Woods LWS), comprising 2.4ha of ancient semi-natural woodland, is located adjacent to land that has been identified for the purpose of habitat creation or enhancement, as part of the Proposed Scheme;

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- Wimboldsley Wood AWI site (which is also part of the Wimboldsley Wood SSSI), covering an area of 8.6ha comprising 6.6ha of ancient semi-natural woodland and 2ha of PAWS, is located 20m west of land that has been identified for the purpose of habitat creation or enhancement, as part of the Proposed Scheme;
- Brookside Woods AWI site (which is also part of Wettenhall and Darnhall Woods SSSI), comprising 22.3ha of ancient semi-natural woodland, is located 2.4km west of land that has been identified for the purpose of habitat creation or enhancement, as part of the Proposed Scheme and 95m from the B5074 Swanlowe Lane on which traffic will be redistributed as a result of the Proposed Scheme;
- Woodland near Lea Hall, Wimboldsley AWI site (which is also part of the Woodland near Lea Hall, Wimboldsley LWS), comprising 0.6ha of ancient semi-natural woodland, is located immediately adjacent to land that has been identified for the purpose of habitat creation or enhancement, as part of the Proposed Scheme;
- Stanthorne Hall Farm AWI site, covering an area of 0.6ha, is located partially within the land required for the construction of the Proposed Scheme at Stanthorne Hall Farm, north-east of Clive. It is adjacent to the A54 Middlewich Road, a construction traffic route;
- Oak Clump AWI site, covering an area of 0.8ha, is located immediately adjacent to land that has been identified for the purpose of habitat creation or enhancement as part of the Proposed Scheme east of Bostock Hall;
- Bull's Wood AWI site (which is also part of the Bull's Wood and Meadow LWS), covering an area of 2.4ha comprising 2.1ha of PAWS and 0.3ha of ancient semi-natural woodland, is located partially within the land required for the construction of the Proposed Scheme;
- Peck Mill Valley AWI site (part of which is also within the Peck Mill Valley LWS), comprises 2.8ha of ancient semi-natural woodland. The AWI site is located north-west of Bostock Green, 1.4km west of the land required for the construction of the Proposed Scheme, and is bisected by the A533 Davenham Bypass, a construction traffic route;
- Winnington Belt AWI site, comprising 1.2ha of ancient semi-natural woodland, is located immediately adjacent to the land required for the construction of the Proposed Scheme, to the south of the A556 Chester Road, a construction traffic route;
- Winnington Wood AWI site (which is also part of the Winnington and Peas Wood LWS), comprising 8.6ha of ancient semi-natural woodland, is partially within the land required for the construction of the Proposed Scheme and adjacent to the A556 Chester Road, a construction traffic route; and
- Leonard's and Smoker Wood AWI site (which is also part of the Leonard's and Smoker Wood LWS), covering an area of 8.2ha comprising 4.5ha of ancient semi-natural woodland and 3.7ha of PAWS, is partially within the land required for the construction of the Proposed Scheme and is also 75m west of the A556 Chester Road, a construction traffic route. This AWI site is located partially within the Wimboldsley to Lostock Gralam area, with the remainder of the AWI site in the Pickmere to Agden and Hulseheath area (MA03).

7.3.7 Areas of semi-natural woodland within the AWI sites are likely to qualify as lowland mixed deciduous woodland, a habitat of principal importance in Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006<sup>39</sup> and a conservation priority of the Cheshire Biodiversity Action Plan<sup>40</sup> (local BAP).

## Habitats

7.3.8 In addition to the ancient woodlands identified above, the following habitat types that occur in this area are relevant to the assessment.

## Woodland

7.3.9 There are 54 other areas of lowland deciduous woodland that qualify or are likely to qualify as lowland mixed deciduous woodland or wet woodland, which are habitats of principal importance. They are:

- an unnamed woodland north of Newfield Hall Farm, covering an area of 1ha and comprising a canopy of ash, sycamore, common lime and oak. The field layer contains dog rose, dog's mercury and Himalayan balsam, a non-native invasive species<sup>41</sup>. This woodland is located within the land required for the construction of the Proposed Scheme and adjacent to the A530 Middlewich Road, a construction traffic route. This woodland is of district/borough value and is located partially within the Wimboldsley to Lostock Gralam area, with the remainder of the woodland in the Hough to Walley's Green area (MA01);
- Stove Room Wood, east of Lea Hall, covering an area of 0.8ha. The canopy comprises mature and semi-mature sycamore, horse chestnut, ash, beech, Scot's pine, large leaved lime and hawthorn. The understorey comprises hawthorn, elder, dog rose and holly. The field layer is dominated by bramble and common nettle with ivy, cleavers and wood millet. This woodland is located within the land required for the construction of the Proposed Scheme. The woodland habitat is of district/borough value;
- an unnamed woodland east of Coalpit Lane, covering an area of 1.3ha, which is bisected by the Shropshire Union Canal (Middlewich Branch). The canopy comprises pedunculate oak, sycamore, ash and wych elm. The field layer contains dog's mercury and wood anemone, as well as frequent periwinkle and ivy. The species composition of this habitat is characteristic of National Vegetation Classification (NVC) W10c *Quercus robur-Pteridium aquilinum-Rubus fruticosus* woodland, *Hedera helix* sub-community. This woodland is located partially within the land required for the construction of the Proposed Scheme. This woodland is of district/borough value;

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<sup>39</sup> *Natural Environment and Rural Communities Act 2006 (No. 2006/2531)*, Her Majesty's Stationery Office, London. Available online at: <http://www.legislation.gov.uk/ukpga/2006/16/section/41>.

<sup>40</sup> Cheshire Wildlife Trust (2007), *Cheshire Region Biodiversity Action Plans*. Available online at: <https://www.cheshirewildlifetrust.org.uk/>.

<sup>41</sup> *The Invasive Alien Species (Enforcement and Permitting) Order 2019*, Her Majesty's Stationery Office, London. Available online at: <http://www.legislation.gov.uk/uksi/2019/527/contents/made>.

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- woodland within The Willowbeds LWS, covering an area of 9.1ha, is a plantation woodland located to the east of Winsford Industrial Estate. The canopy comprises oak, silver birch and sycamore. The field layer is dominated by perennial ryegrass. This woodland is partially within the land identified for the purpose of habitat creation or enhancement, as part of the Proposed Scheme. This woodland is of county/metropolitan value;
- an unnamed woodland north-east of Bank Farm, Bostock, covering an area of 0.8ha, is a wet woodland which forms part of the River Dane, Bostock LWS. The canopy is dominated by alder, crack willow and pedunculate oak with ash and sycamore also present. The understorey contains grey willow and elder. The field layer predominantly consists of common nettle with bluebell, wood anemone and opposite-leaved golden saxifrage also present. The species composition of this habitat is characteristic of NVC type W6a *Alnus glutinosa-Urtica dioica* woodland typical sub-community. This woodland is located partially within the land required for the construction of the Proposed Scheme and adjacent to two site haul routes. This woodland is of county/metropolitan value;
- Oak Wood, covering an area of 16ha, located south of Bostock Hall. The canopy is dominated by sycamore, with occasional to frequent pedunculate oak, beech, ash and larch. Native black poplar is also present. The understorey comprises hazel, elder, holly and rhododendron, a non-native invasive species. The ground flora comprises frequent dog's mercury, enchanter's nightshade and common nettle with ramsons, wood anemone and opposite-leaved golden-saxifrage. The species composition of this habitat is characteristic of NVC type W8e *Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland, *Geranium robertianum* sub-community. This large woodland is connected to other woodlands in the Bostock area. This woodland is located 12m west of the land required for the construction of the Proposed Scheme and adjacent to the A533 Bostock Road, a construction traffic route. This woodland is of county/metropolitan value;
- an unnamed woodland north of Bank Farm, Bostock, covering an area of 1.8ha, is bisected from north to south by an access track with broadleaved woodland on the western side of the track and coniferous woodland plantation to the east. The woodland is located adjacent to the land required for the construction of the Proposed Scheme. This woodland is of district/borough value;
- an unnamed woodland east of Bull's Wood, covering an area of 0.8ha, is located on the southern bank of the River Dane and forms part of the River Dane, Bostock LWS. The canopy comprises ash, oak, sycamore and horse chestnut. This woodland is located partially within the land required for the construction of the Proposed Scheme and adjacent to a site haul route. This woodland is of county/metropolitan value;
- Hill Wood, covering an area of 2.3ha, is located north-west of Bulls' Wood. The canopy comprises pedunculate oak, sycamore and beech. The understorey is dominated by rhododendron, a non-native invasive species, with hawthorn and elder. The field layer contains bramble, enchanter's nightshade, bluebell and wood millet. The woodland is located adjacent to the land required for the construction of the Proposed Scheme. This woodland is of district/borough value;

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- an unnamed woodland north-east of Hill Wood, covering an area of 0.7ha, is located between the River Dane and Trent and Mersey Canal and forms part of the River Dane, Bostock LWS. The canopy comprises ash, sycamore and oak with alder and crack willow along the riverbanks. The understorey contains dog rose, elder, hazel, holly and hawthorn. The field layer comprises bramble and ivy with wood avens, lesser celandine, dog's mercury and hart's-tongue fern also present, as well as deadwood supporting a number of fungi species. This woodland is located 10m east of the land required for the construction of the Proposed Scheme. This woodland is of county/metropolitan value;
- an unnamed woodland on the eastern bank of the Trent and Mersey Canal, covering an area of 3.1ha, forms part of the Trent and Mersey Canal LWS. The canopy comprises ash, sycamore and oak with alder and willow along the banks of the canal. The understorey contains elder, hazel, holly and hawthorn. The field layer comprises common mugwort, lords-and-ladies, common nettle and cleavers. This woodland is located partially within the land required for the construction of the Proposed Scheme adjacent to a site haul route. This woodland is of county/metropolitan value;
- an unnamed woodland south-east of Whatcroft Hall, covering an area of 1.2ha. The canopy comprises frequent sycamore, with occasional pedunculate oak. The understorey contains wych elm, elder and hawthorn. The field layer contains wood millet and cleavers with bramble and bluebell locally abundant. The species composition of this habitat is characteristic of NVC W8 *Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland. The woodland is located partially within the land required for the construction of the Proposed Scheme. This woodland is of district/borough value;
- woodland within Puddinglake Brook Wood LWS, covering an area of 0.7ha, is a corridor of deciduous wet woodland located along the brook either side of Whatcroft Lane. The canopy comprises alder, ash, crack willow, elm, sycamore and oak. The understorey contains blackthorn, elder, hazel and hawthorn. The field layer is dominated by common nettle and cleavers with wood avens, lesser celandine, mugwort and lords-and-ladies also present. This woodland is located partially within the land required for the construction of the Proposed Scheme. This woodland is of county/metropolitan value;
- Marshall's Gorse, covering an area of 4.9ha, is a woodland located to the west of the A530 King Street. The canopy comprises sycamore, Scot's pine and pedunculate oak. The understorey contains elder, hazel, holly and hawthorn. The field layer is dominated by bramble with frequent broad buckler-fern, bluebell and ivy. The species composition of this habitat is characteristic of NVC W10a *Quercus robur-Pteridium aquilinum-Rubus fruticosus* typical sub-community woodland. This woodland is located partially within the land required for the construction of the Proposed Scheme and adjacent to a construction traffic route on the A530 King Street. This woodland is of district/borough value;
- Square Wood, covering an area of 1.4ha, located to the north-west of Hame Farm. The canopy comprises ash, sycamore, pedunculate oak, common lime and horse chestnut. The understorey contains elder and goat willow. The field layer is dominated by common nettle with bramble, male fern and bittersweet also present. The woodland is located within the land required for utilities works associated with the construction of the

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Proposed Scheme, comprising diversion of high pressure gas mains and an underground power line. The woodland is of district/borough value;

- Long Wood, within Long Wood LWS, covering an area of 2.6ha, is located between Lostock Gralam and Plumley Lime Beds SSSI. The canopy comprises abundant pedunculate oak with sycamore and common lime and occasional sweet chestnut and alder. The understorey contains rowan, hazel and hawthorn. The field layer is dominated by bramble with bluebell, remote sedge and broad buckler fern also present. The species composition of this habitat is characteristic of NVC W10a *Quercus robur-Pteridium aquilinum-Rubus fruticosus* typical sub-community woodland. Wet woodland, characteristic of NVC W6e *Alnus glutinosa-Urtica dioica* woodland, is also present. This woodland is located partially within the land required for the construction of the Proposed Scheme and is adjacent to the A556 Shurlach Road, a construction traffic route. This woodland is of county/metropolitan value;
- woodland within Plumley Lime Beds SSSI, of which 17.4ha of the 23.2ha of the SSSI is woodland, is located between Lostock Gralam and Plumley. The canopy is dominated by birch and willow, including a number of hybrid willow species, with ash, sycamore, wild cherry and pedunculate oak also present. The understorey contains elder, goat willow, grey willow and hawthorn. The field layer is predominantly common nettle with dog's mercury, enchanter's nightshade, hart's-tongue fern, male fern and broad buckler-fern also present. The species composition of this habitat is characteristic of NVC W8 *Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland. This woodland is located adjacent to the land required for the construction of the Proposed Scheme and 176m south-east of Ascol Drive, a construction traffic route. The woodland is one of the habitats for which the SSSI is designated and is therefore of national value;
- Mill Wood and Mill Bottoms LWS, covering an area of 5.4ha, comprises areas of wet woodland along the banks of the Peover Eye as well as areas of drier deciduous woodland. The canopy comprises ash, beech, sycamore and pedunculate oak with alder and crack willow along the riverbank. The understorey contains rowan, hazel, holly, dogwood and field maple. The field layer predominantly comprises ivy and bluebell with dog's mercury, broad buckler-fern, wood anemone and wood millet also present. This woodland is located 10m to the south-east of the A556 Chester Road, a construction traffic route, and is 50m east of the land required for the construction of the Proposed Scheme. The woodland is of county/metropolitan value;
- Peas Wood, covering an area of 3.5ha, forms part of the Winnington and Peas Wood LWS. The woodland is continuous with that of Winnington Wood but is not considered to be ancient. The canopy comprises alder, beech, lime, sycamore and pedunculate oak. The understorey contains rowan, elder, hazel, holly and hawthorn. The field layer is predominantly ivy with bluebell, bracken, broad buckler-fern and bramble also locally abundant. Wood anemone, ramsons, sweet woodruff, dog's mercury, field rose, and wood millet are also present. The species composition of this habitat is characteristic of NVC W10a *Quercus robur-Pteridium aquilinum-Rubus fruticosus* typical sub-community woodland. This woodland is located partially within the land required for the



construction of the Proposed Scheme and adjacent to the A556 Chester Road, a construction traffic route. This woodland is of county/metropolitan value; and

- a further 35 woodlands (each less than 1.5ha and none within wildlife site designations) at the following locations: 10 at Wimboldsley; four east of Clive Green; one west of Middlewich; three north of Stanthorne; four at Bostock; one south of Whatcroft; one at Puddinglake Brook; an area comprising four small blocks of woodland north of the A556 Shurlach Road near Northwich and Rudheath; one at Lostock Picnic Area; two north of Lostock Green; one east of Square Wood; one between Lostock Gralam and the A556 Shurlach Road; one between the A559 Manchester Road and Wincham Brook; and one at Holford House. These woodland habitats are of up to local/parish value.

## Grassland

- 7.3.10 Unimproved neutral grassland, covering an area of 0.3ha, occurs adjacent to the Shropshire Union Canal (Middlewich Branch) LWS, north-east of Clive Green. The grassland is diverse and includes crested dog's tail, creeping bent, perennial rye grass, Yorkshire fog and timothy with self-heal, common bird's-foot trefoil, devil's bit scabious, betony and tufted vetch. This grassland is likely to qualify as lowland meadow, a habitat of principal importance. The grassland occurs within the land required for the construction of the Proposed Scheme and is of district/borough value.
- 7.3.11 Marshy grassland, covering an area of 1.5ha, occurs east of Clive, north of Yew-Tree Farm. The sward is largely dominated by soft rush. This grassland occurs within the land required for the construction of the Proposed Scheme and is of local/parish value.
- 7.3.12 Marshy grassland, covering an area of 0.2ha, occurs at Greenheyes Farm, north of the A533 Northwich Road. Desk study information indicates that this grassland principally comprises various species of rush and marsh horsetail. This grassland has been identified by Cheshire Wildlife Trust as a potential LWS. The grassland occurs partially within the land required for the construction of the Proposed Scheme and is of up to county/metropolitan value.
- 7.3.13 Marshy grassland, covering an area of 0.2ha, occurs at Bank Farm, south-east of Bull's Wood. The grassland consists entirely of soft rush with areas of seasonal standing water. This grassland occurs within the land required for the construction of the Proposed Scheme and, although this grassland has been identified by Cheshire Wildlife Trust as a potential LWS, on the basis of survey information, it is of district/borough value.
- 7.3.14 Semi-improved neutral grassland, covering an area of 1.5ha, occurs west of the River Dane within Bull's Wood and Meadows LWS. The LWS is located between Bostock Hall and the River Dane, partially within the land required for the construction of the Proposed Scheme. This grassland is of county/metropolitan value.
- 7.3.15 Semi-improved neutral grassland and marshy grassland, covering an area of 36.5ha, occurs at the waste lime beds west of Cooke's Lane, north-east of Broken Cross. Most of the grassland is semi-improved neutral grassland, which is dominated by red fescue with occasional common bent, cock's-foot and Yorkshire fog. Infrequent species include autumn



hawkbit, black medick, crested dog's-tail, sheep's fescue and field woodrush. The marshy grassland areas are localised and smaller in extent. They contain abundant creeping bent with frequent soft rush and marsh orchids, occasional hard rush, jointed rush, gipsywort and sea club-rush, and infrequent marsh arrowgrass and cuckoo flower. The grassland is located partially within the land required for the construction of the Proposed Scheme and is of county/metropolitan value.

- 7.3.16 Semi-improved neutral grassland, covering an area of 0.3ha, occurs at the roadside verge of the A556 Chester Road near Holford Farm. Desk study information indicates that this grassland is moderately species-rich. This grassland is located adjacent to the land required for the construction of the Proposed Scheme and is of up to district/borough value.
- 7.3.17 Species-poor semi-improved grassland covers an area of 91.4ha throughout the Wimboldsley to Lostock Gralam area within the land required for the construction of the Proposed Scheme. Areas of species-poor semi-improved grassland are of local/parish value.

## Hedgerows

- 7.3.18 Whatcroft Hedge LWS is designated for its species-rich hedgerow on the northern bank of the Trent and Mersey Canal, north of Whatcroft Lane. This LWS is located 10m south and east of the land required for the construction of the Proposed Scheme. River Dane, Bostock LWS is also designated, amongst other reasons, for its species-rich hedgerows and is partially within the land required for the construction of the Proposed Scheme. These LWS are of county/metropolitan value.
- 7.3.19 In total, there is 88.9km of hedgerow within the land required for the construction of the Proposed Scheme in the Wimboldsley to Lostock Gralam area. Hedgerow with at least 80% cover of native woody species is a habitat of principal importance.
- 7.3.20 Of the 88.9km of hedgerow a total of 37.9km of hedgerows have not been subject to survey. To accord with Phase 1 habitat descriptions these hedgerows are mapped as native species-rich on map series EC-02 and they are included as native species-rich in the list below. Based on survey data, and on a precautionary basis, the hedgerow is assumed to consist of:
- 47.7km of native species-poor; and
  - 41.2km of native species-rich, of which 5.4km are also classified as 'Important' according to the 'Wildlife and Landscape' criteria described in The Hedgerows Regulations 1997<sup>42</sup>.
- 7.3.21 As part of the precautionary assessment, it is assumed that further important hedgerows will be found within land that was not surveyed, but which will be required for the Proposed Scheme. The hedgerows within the area also function as wildlife corridors. The hedgerow network as a whole is of county/metropolitan value.

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<sup>42</sup> *The Hedgerow Regulations 1997 (No. 1997/1160)*, Her Majesty's Stationery Office, London. Available online at: <https://www.legislation.gov.uk/uksi/1997/1160/made>.

## **Watercourses**

- 7.3.22 The Shropshire Union Canal (Middlewich Branch), the River Wheelock, the River Dane, the Trent and Mersey Canal, Puddinglake Brook, Wade Brook, Peover Eye and Smoker Brook will be crossed by the route of the Proposed Scheme. Each of these watercourses may qualify as habitats of principal importance and local BAP habitats. These watercourses and adjacent habitats are intrinsically important and provide corridors for wildlife dispersal. As such they are of up to county/metropolitan value.
- 7.3.23 Several smaller watercourses, including Gad Brook, the Dingle and a tributary of the Peover Eye, and tributaries associated with the watercourses will also be crossed by the route of the Proposed Scheme. These smaller watercourses are of up to district/borough value. The unnamed tributaries of these smaller watercourses are of up to local/parish value.

## **Water bodies**

- 7.3.24 There are 70 ponds located within, or partly within, the land required for the construction of the Proposed Scheme, and a further 232 ponds within 250m of the land required for the construction of the Proposed Scheme. On a precautionary basis it is assumed that all ponds could support habitats of principal importance or local BAP habitats and are of district/borough value unless surveys have shown that they are of local/parish value only.

## **Ancient and veteran trees**

- 7.3.25 Ancient and veteran trees with potential relevance to the assessment in the Wimboldsley to Lostock Gralam area have been considered. An ancient tree is one that has passed maturity and is old, or aged, in comparison with other trees of the same species. Veteran trees are younger than ancient trees, but have features found on ancient trees such as decay in the trunk, branches and/or roots. The Ancient Tree Inventory includes some ancient and veteran trees.
- 7.3.26 There are six LWS designated, at least in part, for the presence of veteran trees that are within or partially within the land required for the construction of the Proposed Scheme. The veteran trees within each of these sites are considered to be of national value. These are:
- Veteran Ash Tree, Bank Farm, Bostock LWS, located within the land required for the construction of the Proposed Scheme;
  - River Dane, Bostock LWS, which has several specimens of veteran oak, ash and sycamore, located partially within the land required for the construction of the Proposed Scheme;
  - Trent and Mersey Canal LWS, which has several specimens of veteran oak and ash, located partially within the land required for the construction of the Proposed Scheme;
  - Ash Trees along Trent and Mersey Canal, Billinge Green LWS, located partially within the land required for the construction of the Proposed Scheme;
  - Puddinglake Brook Wood LWS, which has a large veteran crack willow, located partially within the land required for the construction of the Proposed Scheme; and

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- Leonard's and Smoker Wood LWS, which has several specimens of veteran oak and ash, located partially within the land required for the construction of the Proposed Scheme.
- 7.3.27 There is one tree recorded on the Ancient Tree Inventory immediately adjacent to the land required for the construction of the Proposed Scheme. This is a veteran oak tree (Tree 137258)<sup>43</sup> which is located between Wimboldsley Hall and the Shropshire Union Canal (Middlewich Branch). This tree is of national value.
- 7.3.28 On the basis of surveys undertaken, there is one additional tree within the land required for the construction of the Proposed Scheme that is considered to be of a sufficient age and/or supports features to indicate it is of veteran status. This is a veteran horse chestnut within farmland to the west of the A530 Nantwich Road, south of Clive Green Lane, and is of national value.
- 7.3.29 The Phase 1 survey identified additional veteran trees within the canopy of Long Wood LWS. Each of these trees is considered to be of national value and on a precautionary basis, they are assumed to be within the land required for the construction of the Proposed Scheme.
- 7.3.30 Field surveys also identified a veteran alder and four birch trees of sufficient size and age status to be considered ancient, located within Winnington and Peas Wood LWS adjacent to land required for the construction of the Proposed Scheme. These trees are of national value.

### **Traditional orchards**

- 7.3.31 Traditional orchards with potential relevance to the assessment in the Wimboldsley to Lostock Gralam area have been considered.
- 7.3.32 Bostock Road Orchards LWS and Pear Tree Farm LWS are designated for their traditional orchards. Both of these LWS are located partially within the land required for the construction of the Proposed Scheme and each are of county/metropolitan value.
- 7.3.33 Desk study information indicates the presence of a further four orchards that qualify or are likely to qualify as traditional orchard, a habitat of principal importance. Each of these orchards is considered to be of up to district/borough value. They are:
- west of Wimboldsley Hall, covering an area of 0.2ha, located adjacent to land that has been identified for the purpose of habitat creation or enhancement, as part of the Proposed Scheme. This orchard is located partially within the Wimboldsley to Lostock Gralam area, with the remainder in the Hough to Walley's Green area (MA01);
  - at Lea House Farm, covering an area of 0.1ha, located adjacent to the land required for the construction of the Proposed Scheme to the north-east of Wimboldsley;
  - at Manor Farm, covering an area of 0.1ha, located 5m north of the A54 Holmes Chapel Road, a construction traffic route to the east of Middlewich; and

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<sup>43</sup> Woodland Trust, *Ancient Tree Inventory*. Available online at: <https://ati.woodlandtrust.org.uk>.

- Birch View Orchard at Lostock House, covering an area of 0.2ha, located adjacent to the land required for the construction of the Proposed Scheme to the south-east of Lostock Green.

## **Reedbed**

- 7.3.34 An area of reedbed, covering 0.4ha, occurs on the northern bank of the Trent and Mersey Canal within Whatcroft Lane Wetlands LWS. This habitat is likely to qualify as a habitat of principal importance and a conservation priority of the local BAP. This LWS is located south of Higgins Lane Farm partially within the land required for the construction of the Proposed Scheme and is of county/metropolitan value.

## **Open mosaic habitat**

- 7.3.35 An area of open mosaic habitat on previously developed land, covering 6.1ha, occurs within a former industrial site adjacent to Square Wood, north of Hame Farm. The habitat comprises a mosaic of woodland, scrub, semi-improved neutral grassland, marshy grassland, tall ruderal and bare soil. This habitat is likely to qualify as a habitat of principal importance. This area of open mosaic habitat on previously developed land is located partially within the land required for the construction of the Proposed Scheme and is of up to county/metropolitan value.

## **Protected and/or notable species**

- 7.3.36 A summary of the likely value of protected and/or notable species of relevance to the assessment is provided in Table 21.

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**Table 21: Protected and/or notable species within the Wimboldsley to Lostock Gralam area**

Resource/feature	Value	Receptor	Baseline and rationale for valuation
Bats	Regional	Bat assemblage between Wimboldsley and Stanthorne	<ul style="list-style-type: none"> <li>Field surveys confirmed the presence of common pipistrelle, soprano pipistrelle, brown long-eared bat, noctule, Leisler's bat, serotine and <i>Myotis</i> species within this assemblage:</li> <li>occasional roosts of common pipistrelle, soprano pipistrelle, Pipistrellus species, brown long-eared bat, <i>Myotis</i> species, and an unconfirmed species were recorded; and</li> <li>the River Weaver and the Shropshire Union Canal (Middlewich Branch) provide commuting corridors between woodlands to the east and west of the route of the Proposed Scheme.</li> <li>The assemblage is considered to be of regional value on the basis that high numbers of foraging and commuting <i>Myotis</i> species were recorded, which are considered to be 'rarer' bats in England.</li> </ul>
Bats	Regional	Bat assemblage between Stanthorne and Rudheath	<p>Field surveys confirmed the presence of common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, brown long-eared bat, noctule, Leisler's bat, serotine and <i>Myotis</i> species within this assemblage:</p> <ul style="list-style-type: none"> <li>occasional roosts of common pipistrelle, soprano pipistrelle, <i>Pipistrellus</i> species, brown long-eared bat, Brandt's bat and <i>Myotis</i> species were recorded;</li> <li>a brown long-eared bat feeding perch was recorded at the A533 Northwich Road, Stanthorne between 30m north of land required for construction of the Proposed Scheme;</li> <li>a soprano pipistrelle possible maternity roost, was recorded at Davenham Road, Northwich, within the land required for the construction of the Proposed Scheme;</li> <li>a common pipistrelle possible maternity roost was identified at Whatcroft Lane, Middlewich, 180m west of the land required for the construction of the Proposed Scheme; and</li> <li>the Trent and Mersey Canal is considered an important commuting and foraging corridor. The canal, as well as the River Dane, provides connectivity between large woodland areas that are used for foraging by the bats in the assemblage.</li> </ul> <p>The assemblage is considered to be of regional value on the basis that high numbers of foraging and commuting noctule and <i>Myotis</i> species were recorded, which are considered to be 'rarer' bats in England<sup>44</sup>, although noctule are considered to be more common in Cheshire. Maternity roosts, including those of the most common species, are relatively uncommon and are important in maintaining bat populations.</p>

<sup>44</sup> Wray, S. Wells, D. Long, E. & Mitchell-Jones, T. (2010), *Valuing Bats in Ecological Impact Assessment*, In-Practice, 23-25, Chartered Institute of Ecology and Environmental Management, Winchester.

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Resource/feature	Value	Receptor	Baseline and rationale for valuation
Bats	Regional	Bat assemblage between Broken Cross and Lostock Gralam	<p>Field surveys confirmed the presence of common pipistrelle, soprano pipistrelle, noctule, brown long-eared bat and <i>Myotis</i> species within this assemblage:</p> <ul style="list-style-type: none"> <li>• an occasional roost of common pipistrelle was recorded; and</li> <li>• Wade Brook provides a sparsely wooded commuting corridor from east to west.</li> </ul> <p>The assemblage is considered to be of regional value on the basis that moderate to high levels of foraging and commuting <i>Myotis</i> species were recorded.</p>
Bats	Regional	Bat assemblage east and north-east of Lostock Gralam	<p>Field surveys confirmed the presence of common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, brown long-eared bat, noctule, Leisler's bat, serotine and <i>Myotis</i> species within this assemblage:</p> <ul style="list-style-type: none"> <li>• occasional roosts of soprano pipistrelle were recorded at Linnards Lane, Northwich, located between 15m and 20m north of the land required for the construction of the Proposed Scheme; and</li> <li>• Peover Eye is considered to provide a key commuting corridor.</li> </ul> <p>The assemblage is considered to be of regional value on the basis that high numbers of foraging and commuting <i>Myotis</i> species were recorded, which are considered to be 'rarer' bats in England.</p>
Mosses and liverworts	Regional	Freiberg's screw-moss at the Shropshire Union Canal (Middlewich Branch) and the Trent and Mersey Canal	<p>Freiberg's screw-moss has been identified from desk study records along the Shropshire Union Canal (Middlewich Branch) with a record along the western bank of the canal, west of Wimboldsley Hall, located 5m west of land required for the purpose of habitat creation or enhancement, as part of the Proposed Scheme. This species has also been identified from desk study records along the Trent and Mersey Canal between Bostock and Rudheath with one record within the land required for the construction of the Proposed Scheme, north-east of Hill Wood.</p> <p>The walls of the Trent and Mersey Canal, Shropshire Union Canal (Middlewich Branch) and other canals in north-west of England are a stronghold for Freiberg's screw-moss, which is one of the largest populations in Britain. The distribution of this population reflects the availability of sandstone substrate that provides optimal growing conditions.</p> <p>Freiberg's screw-moss is a rare moss globally and is a species of principal importance.</p>
Amphibians	County/metropolitan	A population (GCNP 1.2.2) of great crested newt in a single pond, to the north of Walley's Green and south-west of Wimboldsley	<p>A medium population of great crested newt was identified within a single pond through field surveys. The pond is located within the land required for the construction of the Proposed Scheme.</p>

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Resource/feature	Value	Receptor	Baseline and rationale for valuation
Amphibians	County/ metropolitan	A meta-population (a group of at least four spatially separated populations which interact, GCNMP 1.2.18 <sup>45</sup> ) of great crested newt in a network of 25 ponds to the north of Middlewich	A medium meta-population of great crested newt was identified across 25 ponds. Field surveys recorded small populations from three ponds and a medium population from one pond. Great crested newt DNA was recorded from within three ponds. The ponds are located within and up to 737m from the land required for the construction of the Proposed Scheme.
Amphibians	County/ metropolitan	A meta-population (GCNMP 1.2.19) of great crested newt in a network of 23 ponds to the north of Middlewich	A medium meta-population of great crested newt was identified across 23 ponds, which includes populations identified through desk study records at two ponds. Field surveys recorded small populations from two ponds and medium populations from two ponds. Great crested newt DNA was recorded from within two ponds. The ponds are located within and up to 962m from the land required for the construction of the Proposed Scheme.
Amphibians	County/ metropolitan	A meta-population (GCNMP 1.2.25) of great crested newt in a network of seven ponds to the south-east of Rudheath	A medium meta-population of great crested newt was identified across seven ponds. Field surveys recorded medium populations in two ponds. The ponds are located within and up to 98m from the land required for the construction of the Proposed Scheme.
Amphibians	County/ metropolitan	A meta-population (GCNMP 1.2.36) of great crested newt in a network of 132 ponds to the west of Knutsford	An assumed large meta-population of great crested newt was identified across 132 ponds, which includes populations identified through desk study data at three ponds. Field surveys recorded small populations from 12 ponds, and medium populations from five ponds. Great crested newt DNA was recorded from two ponds. The ponds are located within and up to 1.1km from the land required for the construction of the Proposed Scheme. This metapopulation extends into the Pickmere to Agden and Hulseheath area (MA03). The population size class of this meta-population is assumed to be large as it is associated with a network of over 100 ponds.

<sup>45</sup> Each great crested newt meta-population (GCNMP) has been given an identifying number. Meta-populations are described in BID EC-007-00001 Ecological baseline data - amphibian and pond and canal surveys.



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Resource/feature	Value	Receptor	Baseline and rationale for valuation
Amphibians	Up to county/metropolitan	A meta-population (, GCNMP 1.2.1) of great crested newt in a network of six ponds to the south-east of Winsford and south-west of Middlewich	An assumed medium population of great crested newt was identified across six ponds. Field surveys recorded a small population in one pond, and great crested newt DNA was recorded in three ponds. The ponds are all located within the land required for the construction of the Proposed Scheme. Great crested newt is an Annex 2 species, a species of principal importance and a conservation priority of the local BAP.
Amphibians	Up to county/metropolitan	A population (GCNP 1.2.3) of great crested newt in a network of three ponds to the west of Wimboldsley	An assumed medium population of great crested newt was identified across three ponds. Field surveys recorded a small population in one pond, which also returned positive results for great crested newt DNA. The ponds are located within and up 19m from the land required for the construction of the Proposed Scheme.
Amphibians	Up to county/metropolitan	A population (GCNP 1.2.7) of great crested newt in a network of two ponds to the south-west of Middlewich and south-east of Winsford	An assumed medium population of great crested newt was identified from two ponds, one of which returned positive results for great crested newt DNA. The ponds are located within and up to 6m from the land required for the construction of the Proposed Scheme.
Amphibians	Up to county/metropolitan	A meta-population (GCNMP 1.2.12) of great crested newt in a network of 20 ponds to the north of Clive Green	An assumed medium meta-population of great crested newt was identified across 20 ponds, which includes populations identified through desk study records at four ponds. Field surveys recorded a small population from one pond. The ponds are located immediately adjacent to and up to 656m from the land required for the construction of the Proposed Scheme.
Amphibians	Up to county/metropolitan	A meta-population (GCNMP 1.2.16) of great crested newt in a network of 174 ponds to the north-west of Middlewich and south-east of Northwich	An assumed large meta-population of great crested newt was identified across 174 ponds, which includes a population identified through desk study records at a single pond. The ponds are located within and up to 1.8km from the land required for the construction of the Proposed Scheme. The population size class of this meta-population is assumed large as it is associated with a network of over 100 ponds.
Amphibians	Up to county/metropolitan	A meta-population (GCNMP 1.2.17) of great crested newt in a network of five ponds to the north-east of Winsford and south-east of Moulton	An assumed medium meta-population of great crested newt was identified across five ponds. Field surveys recorded small populations from two ponds. The ponds are located between 22m and 312m from the land required for the construction of the Proposed Scheme.

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Resource/feature	Value	Receptor	Baseline and rationale for valuation
Amphibians	Up to county/metropolitan	A meta-population (GCNMP 1.2.21) of great crested newt in a network of 54 ponds to the north-east of Middlewich	An assumed medium meta-population of great crested newt was identified across 54 ponds, which includes populations identified through desk study records at one pond. The ponds are located between 198m and 986m from the land required for the construction of the Proposed Scheme.
Amphibians	Up to county/metropolitan	A population (GCNP 1.2.24) of great crested newt in a single pond to the south-east of Rudheath	An assumed medium population of great crested newt was identified across a single pond, which includes populations identified through eDNA surveys. The pond is located 15m from the land required for the construction of the Proposed Scheme.
Amphibians	Up to county/metropolitan	A meta-population (GCNMP 1.2.26) of great crested newt in a network of 147 ponds to the east of Northwich	An assumed large meta-population of great crested newts was identified across 147 ponds, which includes populations identified through desk study data at two ponds. The ponds are located within and up to 1.9km from the land required for the construction of the Proposed Scheme. The population size class of this meta-population is assumed large as it is associated with a network of over 100 ponds.
Amphibians	Up to county/metropolitan	A population (GCNP 1.2.30) of great crested newt in a network of two ponds to the east of Northwich and south of Lostock Gralam	An assumed medium population of great crested newt was identified across two ponds, which includes a population identified through desk study data at one pond. The ponds are located between 6m and 119m from the land required for the construction of the Proposed Scheme.
Amphibians	Up to county/metropolitan	A meta-population (GCNMP 1.2.32) of great crested newt in a network of 34 ponds to the east of Lostock Gralam	An assumed medium meta-population of great crested newt was identified across 34 ponds. Field surveys recorded small populations in two ponds, and great crested newt DNA was recorded within one pond. The ponds are located within and up to 1km from the land required for the construction of the Proposed Scheme.
Amphibians	Up to county/metropolitan	Populations of great crested newt within un-surveyed ponds	Ponds that have not been surveyed are assumed to support breeding populations of great crested newt of medium size class.
Amphibians	District/borough	A population (GCNP 1.2.4) of great crested newt in a single pond to the west of Wimboldsley	A small population of great crested newt was identified within a single pond through field surveys. The pond is located within the land required for the construction of the Proposed Scheme.

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Resource/feature	Value	Receptor	Baseline and rationale for valuation
Amphibians	District/ borough	A population (GCNP 1.2.5) of great crested newt in a single pond to the north of Wimboldsley	A small population of great crested newt was identified within a single pond through field surveys. The pond is located within the land required for the construction of the Proposed Scheme.
Amphibians	District/ borough	A population (GCNP 1.2.8) of great crested newt in a single pond to the south-west of Middlewich and south-east of Winsford	A small population of great crested newt was identified within a single pond through field surveys. The pond is located 29m from the land required for the construction of the Proposed Scheme.
Amphibians	Local/parish	Populations of other amphibian species comprising palmate newt, smooth newt, common toad and common frog	These common amphibian species have been identified within ponds throughout the Wimboldsley to Lostock Gralam area during surveys and are assumed to be present within the ponds that have not yet been surveyed. Woodland, rough grassland and hedgerow habitats are likely to be utilised by these species during their terrestrial phase for foraging, dispersal and shelter. Each of these species is common and widespread throughout the UK. Common toad is a species of principal importance.
Birds	County/ metropolitan	Breeding bird assemblage associated with habitats between Wimboldsley and Stanthorne	Field surveys recorded a total of 52 bird species, of which 27 are notable, within and adjacent to the land required for the construction of the Proposed Scheme. Breeding territories of 39 species were recorded of which eight are notable with four Red List species and four species of principal importance and/or conservation priorities of the local BAP.  Snipe, a scarce species in Cheshire, which desk study records show to be regularly breeding within habitats between Wimboldsley and Stanthorne, was recorded within this assemblage. The presence of regular breeding snipe and 15 other notable breeding species means that the assemblage is of county/ metropolitan value.
Birds	Up to county/ metropolitan	Potential breeding and wintering barn owl near Wimboldsley	A probable barn owl nest site and confirmed roost site was recorded from surveys near Lea Hall, within the land required for the construction of the Proposed Scheme. A confirmed roost was also identified near Norcroft Farm, located 325m east of the land required for the construction of the Proposed Scheme. Three desk study records of breeding barn owl have also been recorded in this area. Barn owl is a Schedule 1 and local BAP priority species.
Birds	Up to county/ metropolitan	Potential breeding and wintering barn owl north-west of Middlewich	Four confirmed roost sites, all of which are suitable for nesting, were identified from surveys, within and up to 820m from the land required for the construction of the Proposed Scheme. Seven desk study records of breeding barn owl have also been recorded in this area.

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Resource/feature	Value	Receptor	Baseline and rationale for valuation
Birds	Up to county/metropolitan	Potential breeding and wintering barn owl east of Higher Shurlach	A confirmed roost site, and probable nest site was recorded from surveys within the land required for the construction of the Proposed Scheme. Three buildings were also noted as providing potential roost sites. There are two desk study records of breeding barn owl within this area.
Birds	County/metropolitan	Wintering bird assemblage associated with habitats between Broken Cross and Fieldhouse Farm	Field surveys recorded a total of 52 bird species, 29 of which are notable, within and adjacent to the land required for the construction of the Proposed Scheme. This included 12 Red List species and 10 species of principal importance and/or conservation priorities of the local BAP. Snipe, a scarce species in Cheshire, was recorded within this assemblage and the habitats between Broken Cross and Lostock Gramam are suitable to support this species on a regular basis. The likely presence of regular over-wintering snipe, and 27 other notable species, means that the assemblage is of county/metropolitan value.
Birds	District/borough	Breeding bird assemblage associated with habitats between Wimboldsley Hall and Wimboldsley Grange	Field surveys recorded a total of 43 bird species, 18 of which are notable, within and adjacent to the land required for the construction of the Proposed Scheme. Breeding territories of 34 species were recorded, of which 10 are notable, with six Red List species and seven species of principal importance and/or conservation priorities of the local BAP. Corn bunting, a rare species in Cheshire, is present within this assemblage. Corn bunting occurred infrequently and in low numbers and there were no other desk study records of this species in the area. It is considered unlikely that corn bunting is breeding regularly and the habitats within the land required for the construction of the Proposed Scheme are unlikely to be significant for the local population of this species. Habitats present within the land required for the construction of the Proposed Scheme are typical of the area and are widespread.
Birds	District/borough	Breeding hobby between Wimboldsley Hall and Wimboldsley Grange	A pair of breeding hobby were confirmed from field surveys recorded 190m west of the land required for the construction of the Proposed Scheme. Hobby is a Schedule 1 species and is a scarce migrant breeder <sup>46</sup> , but is not listed as a bird of conservation concern or on the Cheshire LWS selection criteria <sup>47</sup> . Due to their mobility, the presence of a single occupied territory is not considered to be of greater than district/borough value.

<sup>46</sup> Royal Society for the Protection of Birds (RSPB) (2016), *Cheshire and Wirral Bird Report 2016*. Available online at: <https://ww2.rspb.org.uk/groups/images/05032019163802.pdf>.

<sup>47</sup> Cheshire Wildlife Trust (2014), *Cheshire Local Wildlife Site selection criteria*. Available online at: <https://www.cheshirewildlifetrust.org.uk/sites/default/files/2018-06/Cheshire%20LWS%20selection%20criteria.pdf>.

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Resource/feature	Value	Receptor	Baseline and rationale for valuation
Birds	District/ borough	Breeding hobby between Wimboldsley and Stanthorne	A pair of breeding hobby were confirmed from field surveys, recorded 490m east of the land required for the construction of the Proposed Scheme.
Birds	District/ borough	Breeding bird assemblage associated with habitats between Bostock House Farm and Pear Tree Farm Cottages	Field surveys recorded a total of 63 birds, 27 of which are notable, within and adjacent to the land required for the construction of the Proposed Scheme. Breeding territories of 52 species were recorded of which nine are notable with two Red List species and five species of principal importance and/or conservation priorities of the local BAP.  This diverse assemblage includes bullfinch, house sparrow and reed bunting, notable breeding species in Cheshire. Habitats present within the land required for the construction of the Proposed Scheme are typical of the area and are widespread.
Birds	District/ borough	Breeding bird assemblage associated with habitats between Marshall's Gorse and High House	Field surveys recorded a total of 42 bird species, 18 of which are notable, within and adjacent to the land required for the construction of the Proposed Scheme. Breeding territories of 36 species were recorded, of which 11 are notable with five Red List species and seven species of principal importance and/or conservation priorities of the local BAP.  Snipe, a scarce species in Cheshire, is present within this assemblage. Snipe occurred in low numbers, habitats present are sub-optimal and there were no other desk study records of this species in the area. It is considered unlikely that snipe is breeding regularly and the habitats within the land required for the construction of the Proposed Scheme are unlikely to be significant for the local population of this species. Habitats present within the land required for the construction of the Proposed Scheme are typical of the area and are widespread.
Birds	District/ borough	Breeding bird assemblage associated with habitats between Fieldhouse Farm and Pickmere	Field surveys recorded a total of 44 bird species, 20 of which are notable, within the land required for the construction of the Proposed Scheme. Breeding territories of 35 species were recorded of which nine are notable with five Red List species and seven species of principal importance and/or conservation priorities of the local BAP.  Common redstart, a scarce species in Cheshire, is present within this assemblage. Redstart occurred infrequently and in low numbers and there were no other desk study records of this species in the area. It is considered unlikely that redstart is breeding regularly and the habitats within the land required for the construction of the Proposed Scheme are unlikely to be significant for the local population of this species. Habitats present within the land required for the construction of the Proposed Scheme are typical of the area and are widespread.

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Resource/feature	Value	Receptor	Baseline and rationale for valuation
Birds	District/ borough	Wintering bird assemblage associated with habitats between Fieldhouse Farm and Pickmere	Field surveys recorded a total of 41 bird species, 17 of which are notable, within the land required for the construction of the Proposed Scheme. This included nine Red List species and nine species of principal importance and/or conservation priorities of the local BAP.  Willow tit, a rare species in Cheshire, is present within this assemblage. A single willow tit was recorded during surveys and there were no desk study records of this species in the area. It is considered unlikely that willow tit is present regularly and the habitats within the land required for the construction of the Proposed Scheme are unlikely to be significant for the local population of this species. Habitats present within the land required for the construction of the Proposed Scheme are typical of the area and are widespread.
Birds	Local/parish	Wintering bird assemblage associated with habitats between Park Hall Farm and River Wheelock	Field surveys recorded a total of 39 bird species, 14 of which are notable, within and adjacent to the land required for the construction of the Proposed Scheme. This included five Red List species and five species of principal importance and/or conservation priorities of the local BAP. The species recorded are considered to be common and widespread and characteristic of farmland habitats. No large or important populations were recorded.
Birds	Local/parish	Wintering bird assemblage associated with habitats between Wimboldsley Hall and Wimboldsley Grange	Field surveys recorded a total of 27 bird species, 13 of which are notable, within and adjacent to the land required for the construction of the Proposed Scheme. This included four Red List species and four species of principal importance and/or conservation priorities of the local BAP. The species recorded are considered to be common and widespread and characteristic of farmland habitats. No large or important populations were recorded.
Birds	Local/parish	Wintering bird assemblage associated with habitats between Wimboldsley and Stanthorne	Field surveys recorded a total of 33 bird species, 12 of which are notable, within and adjacent to the land required for the construction of the Proposed Scheme. This included six Red List species and four species of principal importance and/or conservation priorities of the local BAP. The species recorded are considered to be common and widespread and characteristic of farmland habitats. No large or important populations were recorded.
Birds	Local/parish	Wintering bird assemblage associated with habitats between Greenheyes Farm and Davenham Road	Field surveys recorded a total of 40 bird species, 15 of which are notable. This included six Red List species and six species of principal importance and/or conservation priorities of the local BAP. The species recorded are considered to be common and widespread and characteristic of farmland habitats. No large or important populations were recorded.

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Resource/feature	Value	Receptor	Baseline and rationale for valuation
Birds	Local/parish	Breeding bird assemblage associated with habitats between Winsford Industrial Estate and Bostock Hall	Field surveys recorded a total of 54 bird species, 24 of which are notable. Breeding territories of 45 species were recorded, of which six are notable with three Red List species and three species of principal importance and/or conservation priorities of the local BAP. The species recorded are considered to be common and widespread and characteristic of farmland habitats. No large or important populations were recorded.
Birds	Local/parish	Wintering bird assemblage associated with habitats between Davenham Road and Cooke's Lane	Field surveys recorded a total of 37 bird species, 16 of which are notable. This included nine red list species and nine species of principal importance and/or conservation priorities of the local BAP. The species recorded are considered to be common and widespread and characteristic of farmland habitats. No large or important populations were recorded.
Birds	Local/parish	Breeding bird assemblage associated with habitats between Broken Cross and Fieldhouse Farm	Field surveys recorded a total of 58 bird species, 32 of which are notable. Breeding territories of 21 species were recorded, of which five are notable with two Red List species and four species of principal importance and/or conservation priorities of the local BAP. The species recorded are considered to be common and widespread and characteristic of farmland habitats. No large or important populations were recorded.
Birds	Local/parish	Breeding kingfisher on the River Dane and Trent and Mersey Canal	A confirmed nest site was identified from field surveys near Bull's Wood, within the land required for the construction of the Proposed Scheme. There are also desk study records of kingfisher present on the Trent and Mersey Canal between Middlewich and Davenham.
Birds	Up to local/parish	Potential breeding kingfisher along the Shropshire Union Canal (Middlewich Branch)	Possible nest sites were identified during field surveys near Wimboldsley Wood, immediately adjacent to the land required for the construction of the Proposed Scheme, and near Yew-Tree Farm, 65m east of the land required for the construction of the Proposed Scheme.
White-clawed crayfish	County/metropolitan	White-clawed crayfish population within the Peover Eye	White-clawed crayfish were recorded in this watercourse during field surveys within the land required for the construction of the Proposed Scheme. White-clawed crayfish is a species of principal importance and is a conservation priority of the local BAP.
Vascular plants	County/metropolitan	Black poplar at Leonard's and Smoker Wood LWS	This species was recorded from field surveys within the land required for the construction of the Proposed Scheme within Leonard's and Smoker Wood LWS. Black poplar is a conservation priority of the local BAP.
Vascular plants	Up to district/borough	Alternate-leaved golden-saxifrage at Greenhays Farm Pasture LWS	This species has been identified from desk study data located within Greenhays Farm Pasture LWS and it is assumed that this species is present within the land adjacent to that required for the construction of the Proposed Scheme. Alternate-leaved golden-saxifrage is listed as locally scarce in Cheshire.



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Resource/feature	Value	Receptor	Baseline and rationale for valuation
Vascular plants	Up to district/ borough	Greater knapweed at Greenhays Farm Pasture LWS	This species has been identified from desk study data located within Greenhays Farm Pasture LWS and it is assumed that this species is present within the land adjacent to that required for the construction of the Proposed Scheme. Greater knapweed is listed as locally scarce in Cheshire.
Vascular plants	Up to district/ borough	Water-purslane at The Willowbeds LWS	This species has been identified from desk study data located within The Willowbeds LWS and it is assumed that this species is present within land that has been identified for the purpose of habitat creation or enhancement, as part of the Proposed Scheme. Water-purslane is listed as locally scarce in Cheshire.
Vascular plants	District/ borough	Small-leaved lime at Long Wood LWS and Winnington and Peas Wood LWS	This species has been identified from field surveys at Long Wood LWS and Winnington and Peas Wood LWS, both located partially within the land required for the construction of the Proposed Scheme. Small-leaved lime is listed as locally scarce in Cheshire.
Fish	Up to county/ metropolitan	Fish assemblage in the River Wheelock	The presence of 13 species of fish have been identified, from desk study data, in a section of this river within and in the vicinity of the land required for the construction of the Proposed Scheme. Notable species included bullhead, barbel and European eel. Bullhead is an Annex 2 species. European eel is a species of principal importance. They are widespread in suitable habitat in England.
Fish	Up to county/ metropolitan	Fish assemblage in the River Dane	The presence of 12 species of fish have been identified, from desk study data, in sections of this river within and in the vicinity of the land required for the construction of the Proposed Scheme. Notable species include bullhead and European eel. It is assumed that these species could be present in the River Dane and tributaries in the vicinity of the land required for the construction of the Proposed Scheme.
Fish	Up to county/ metropolitan	Fish assemblage in the Peover Eye	The presence of 17 species of fish have been identified, from desk study data, in sections of this river within and in the vicinity of the land required for the construction of the Proposed Scheme. Notable species include brown/sea trout, European eel and lamprey. Bullhead was also identified during macro-invertebrate and crayfish surveys at Peover Eye. Lamprey is an Annex 2 species and brown/sea trout is a species of principal importance, but rivers in Cheshire are frequently stocked with this species.
Fish	Up to county/ metropolitan	Fish assemblage in Smoker Brook	The presence of 14 species of fish have been identified, from desk study data, in sections of this watercourse, within and in the vicinity of the land required for the construction of the Proposed Scheme. These include two notable species: brown/sea trout and European eel. It is assumed that these species could be present in Smoker Brook and tributaries. Bullhead was also identified during macro-invertebrate and crayfish surveys at Smoker Brook.

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Resource/feature	Value	Receptor	Baseline and rationale for valuation
Fish	Up to local/parish	Fish assemblages in Puddinglake Brook and Wade Brook	Puddinglake Brook and Wade Brook are smaller watercourses with modified channel sections. These watercourses have the potential to support fish assemblages, but the habitats present are considered unlikely to support notable species.
Terrestrial invertebrates	Up to county/metropolitan	Potential notable terrestrial invertebrate assemblage using open mosaic habitat east of Square Wood, near Lostock Gralam	Habitat with the potential to support a notable assemblage of terrestrial invertebrates has been identified in an area of open mosaic habitat, east of Square Wood, near Lostock Gralam. The open mosaic habitat on previously developed land comprises a mosaic of woodland, scrub, semi-improved neutral grassland, marshy grassland, tall ruderal and bare soil. These habitats are within and adjacent to the land required for the construction of the Proposed Scheme.
Terrestrial invertebrates	District/borough	Invertebrate assemblage associated with habitats by the Trent and Mersey Canal north of Whatcroft Hall	Field surveys recorded 108 species from woodland on the northern bank of the Trent and Mersey Canal located north of Whatcroft. Alder leaf beetle <sup>48</sup> was recorded during the surveys. All other species recorded are common and widespread and typical of the habitat types present. These habitats are adjacent to the land required for the construction of the Proposed Scheme.
Terrestrial invertebrates	District/borough	Invertebrate assemblage at Winnington Wood and Peas Wood	Field surveys recorded 180 species at Winnington Wood and 40 species at Peas Wood. These woodlands are located to the north-east of Lostock Gralam and are partially within the land required for the construction of the Proposed Scheme. Alder leaf beetle was identified from field surveys at both Winnington Wood and Peas Wood. All the other species recorded are common and widespread, and typical of the habitat types present.
Terrestrial invertebrates	Local/Parish	Invertebrate assemblage at Oak Wood	Forty species were recorded during field surveys at Oak Wood, all of which were common and widespread and typical of the habitat types present. Oak Wood is an area of deciduous woodland to the south of Bostock Hall located immediately adjacent to the land required for the construction of the Proposed Scheme.
Terrestrial invertebrates	Local/Parish	Invertebrate assemblage associated with habitats by the Trent and Mersey Canal north-east of Bostock Hall	Field surveys undertaken of woodland to the north-east of Bostock Hall recorded 67 species on the western bank and 53 species on the eastern bank of the Trent and Mersey Canal. <i>Rhinocyllus conicusa</i> , a nationally notable species of weevil, was recorded from deciduous woodland on the eastern bank of the Trent and Mersey Canal. All other species recorded were common and widespread and typical of the habitat types present. These habitats are adjacent to the land required for the construction of the Proposed Scheme.

<sup>48</sup> The status of alder leaf beetle is unreliable as it awaits formal review. However, National Biodiversity Network (NBN) data shows that the species has expanded significantly over the last 15 years and its distribution no longer qualifies it as nationally rare. Available online at: <https://nbnatlas.org/>.

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Resource/ feature	Value	Receptor	Baseline and rationale for valuation
Otter	District/ borough	Otter population using Puddinglake Brook	<p>Two active holts and two potential holts, as well as other signs of otter, were recorded along this watercourse. One of the active holts is located within the land required for the construction of the Proposed Scheme to the north of Bridge Farm and the other is located 245m south-east of the land required for the construction of the Proposed Scheme.</p> <p>Given the availability of suitable habitat, in addition to otters using this watercourse, it is assumed that otters are also using the nearby Trent and Mersey Canal and River Dane and adjacent water bodies for foraging and dispersal.</p> <p>Otter is an Annex 2 species, a species of principal importance and a conservation priority of the local BAP. This is consistent with the results of the Fifth National Otter Survey<sup>49</sup>, which states that otter is widely distributed within the Weaver/Dane catchments but at a low population level.</p>
Otter	District/ borough	Otter population using Gad Brook	<p>Six potential holts, as well as other signs of otter, were recorded along this watercourse. One of the potential holts is located within the land required for the construction of the Proposed Scheme at Marshall's Gorse. The remaining five potential holts were all within 110m of the land required for the construction of the Proposed Scheme.</p> <p>Given the availability of suitable habitat, in addition to otters using this watercourse, it is assumed that otters are also using the nearby Trent and Mersey Canal and adjacent water bodies for foraging and dispersal. This is consistent with the results of the Fifth National Otter Survey, which states that otter is widely distributed to the south of Warrington and Manchester but at a low population level.</p>
Otter	District/ borough	Otter population using the Peover Eye and its tributaries	<p>An active holt and two potential holts were recorded within the land required for the construction of the Proposed Scheme, within Winnington Wood near Holford Bridge. A further potential holt as well as other signs of otter, was recorded 187m east of the land required for the construction of the Proposed Scheme. Evidence of otter activity was concentrated within Winnington Wood and Peas Wood along an unnamed tributary of the Peover Eye.</p> <p>Given the availability of suitable habitat, in addition to otters using this watercourse, it is assumed that otters are also using the interconnected Smoker Brook and Wincham Brook as well as adjacent water bodies for foraging and dispersal. This is consistent with the results of the Fifth National Otter Survey, which states that otter is widely distributed to the south of Warrington and Manchester but at a low population level.</p>

<sup>49</sup> Environment Agency (2010), *Fifth otter survey of England 2009 – 2010*.

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Resource/feature	Value	Receptor	Baseline and rationale for valuation
Otter	District/borough	Otter population using Smoker Brook	An active holt, as well as other signs of otter, was recorded 10m south-east of land that has been identified for the purpose of habitat creation or enhancement, as part of the Proposed Scheme. Given the availability of suitable habitat, in addition to otters using this watercourse, it is assumed that otters are also using the interconnected Trent and Mersey Canal, Wincham Brook and Peover Eye as well as adjacent water bodies for foraging and dispersal. This is consistent with the results of the Fifth National Otter Survey, which states that otter is widely distributed to the south of Warrington and Manchester but at a low population level.
Aquatic macro-invertebrates	District/borough	Aquatic macro-invertebrate assemblage in the River Dane	A moderate diversity of macro-invertebrate taxa was identified from surveys at two locations on this river near Bostock, where it is partially within the land required for the construction of the Proposed Scheme. The Community Conservation Index (CCI) score indicated that the assemblage was of 'moderate to high' conservation value.
Aquatic macro-invertebrates	District/borough	Aquatic macro-invertebrate assemblage in the Peover Eye and tributary of the Peover Eye	A moderate diversity of macro-invertebrate taxa was identified from surveys on the tributary of the Peover Eye. The CCI score indicated that the assemblage was of 'moderate' conservation value. A moderate to high diversity of macro-invertebrate taxa was identified from surveys on the Peover Eye. The CCI score indicated that the assemblage was of 'fairly high' conservation value. Both watercourses are partially within the land required for the construction of the Proposed Scheme.
Aquatic macro-invertebrates	District/borough	Aquatic macro-invertebrate assemblage in Smoker Brook	A moderate to high diversity of macro-invertebrate taxa was identified from surveys on this watercourse. The CCI score indicated that the assemblage was of 'moderate' conservation value. Smoker Brook is partially within the land required for the construction of the Proposed Scheme.
Aquatic macro-invertebrates	Local/parish	Aquatic macro-invertebrate assemblages at Puddinglake Brook, Gad Brook, tributary of Gad Brook, Broken Cross Drains and Wade Brook	A low diversity of macro-invertebrate taxa was recorded from surveys, with a CCI score indicating that the assemblages of Puddinglake Brook, Gad Brook, a tributary of Gad Brook and Broken Cross Drains are of 'low' conservation value. Each of these watercourses are partially within the land required for the construction of the Proposed Scheme. Desk study information indicates that an assemblage at Wade Brook also has a CCI score that it is of 'low' conservation value. Wade Brook is partially within the land required for the construction of the Proposed Scheme.
Badger	Local/parish	At least seven social groups at undisclosed locations	A common and widespread species recorded during the survey period. Three badger main setts have been recorded during field surveys within the land required for the construction of the Proposed Scheme. A further four main setts have been recorded between 70m and 80m from the land required for the construction of the Proposed Scheme.

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Resource/ feature	Value	Receptor	Baseline and rationale for valuation
Reptiles	Up to local/ parish	Potential small populations of common reptiles in the Wimboldsley to Lostock Gralam area	<p>No reptiles were found during field surveys at three sites where surveys were completed, or at 10 sites where surveys were partially completed. The presence of reptiles is assumed on a precautionary basis at two sites where less than half of the survey visits were completed. These sites are located at Lostock Gralam and are within the land required for the construction of the Proposed Scheme.</p> <p>Suitable habitat that was not surveyed was generally constrained to field margins, edges of woodland and scrub habitat or isolated small patches of overgrown grassland. These habitats are within a generally intensively farmed landscape, offering limited opportunities for reptiles. Therefore, it is assumed that any reptiles located within the land required for the construction of the Proposed Scheme are present in low numbers.</p> <p>Grass snake, slow worm and common lizard are all species of principal importance. Slow worm is also a conservation priority of the local BAP.</p>

## Future baseline

### Construction (2025)

- 7.3.37 Volume 5: Appendix CT-004-00000 provides details of the developments in the Wimboldsley to Lostock Gralam area that are assumed to have been implemented by 2025.
- 7.3.38 No committed developments have been identified in this study area that will materially alter the baseline conditions in 2025 for ecology and biodiversity.

### Operation (2038)

- 7.3.39 Volume 5: Appendix CT-004-00000 provides details of the developments in the Wimboldsley to Lostock Gralam area that are assumed to have been implemented by 2038. The following committed developments of relevance to ecology and biodiversity during operation in this area are set out in Table 22.

**Table 22: Committed developments relevant to ecology and biodiversity during operation**

Map book reference <sup>50</sup>	Planning reference	Description	How this is considered in the assessment
MA02/272	18/5833C	Location: Land at Pochin Way, Middlewich. Proposed two-way single carriageway road scheme to bypass Middlewich and referred to as the 'Middlewich Eastern Bypass', together with associated highway and landscaping works.	Informing future baseline. Considered in cumulative effects.

- 7.3.40 Implementation of committed development MA02/272 is anticipated to result in a negative impact on barn owl as a result of collision risk during operation. This may result in the loss of pairs of potential breeding and wintering barn owl located near to Wimboldsley and to the north-west of Middlewich.

## 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, additional to the landscape planting as shown on the Map Series CT-06 along the route of the Proposed Scheme, which will be largely a mixture of woodland/scrub and grassland. These measures contribute towards limiting effects on habitats and species:
- the design of the drainage associated with Crewe North rolling stock depot (RSD) and Walley's Green embankment will avoid impacts on the rare saline spring habitat at Wimboldsley Wood SSSI;

<sup>50</sup> Volume 5: Planning Data/Committed Development Map Book: Maps CT-13-304b to CT-13-309a.

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- Shropshire Union Canal viaducts Nos 1, 2 and 3, River Dane viaduct, Puddinglake Brook viaduct, Trent and Mersey Canal viaduct, Gad Brook viaduct, Wade Brook viaduct and Smoker Brook viaduct will avoid direct effects on the Shropshire Union Canal (Middlewich Branch), the River Dane, Puddinglake Brook, the Trent and Mersey Canal, Gad Brook, a tributary of Gad Brook, Wade Brook, the Peover Eye, a tributary of the Peover Eye and Smoker Brook and allow free passage for wildlife beneath them;
- limiting the extent of the land required for the construction of the Proposed Scheme adjacent to River Dane viaduct will reduce impacts on the ancient woodland habitat at Bull's Wood;
- River Dane viaduct will reduce direct impacts on Bull's Wood and Meadow LWS and River Dane, Bostock LWS;
- Puddinglake Brook viaduct will reduce impacts on Puddinglake Brook Wood LWS;
- Trent and Mersey Canal viaduct will reduce impacts on Whatcroft Lane Wetlands LWS;
- the design of Gad Brook viaduct, south of Rudheath, will avoid diversion of the Gad Brook;
- Gad Brook viaduct will reduce impacts to the deciduous woodland habitat at Marshall's Gorse;
- locating utility diversions between Lostock Gralam and Plumley to avoid direct loss of habitat from Plumley Lime Beds SSSI, ancient woodland habitat at Winnington Belt and woodland habitat at Mill Wood and Mill Bottoms LWS; and
- limiting the extent of the land required for the construction of the Proposed Scheme adjacent to Smoker Brook viaduct will reduce impacts to Winnington and Peas Wood LWS. This includes ancient woodland at Winnington Wood and non-ancient woodland at Peas Wood and will reduce impacts to Leonard's and Smoker Wood LWS and its ancient woodland habitat.

7.4.2 The assessment assumes implementation of the measures set out within the draft Code of Construction Practice<sup>51</sup> (CoCP), which includes sensitive construction practices and habitat management plans.

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;

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<sup>51</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.



- 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 Effects arising during construction that are significant at the district/borough level or above are described below. Effects on ecological features of significance at the local/parish level are listed in Volume 5: Appendix EC-015-0MA02.

### Designated sites

- 7.4.5 Midland Meres and Mosses Phase 2 Ramsar site will not be affected by the construction of the Proposed Scheme in the Wimboldsley to Lostock Gralam area. The closest component of the Ramsar site, Oak Mere SSSI, is located 9.7km west of the land required for the construction of the Proposed Scheme and adjacent to the A54 Middlewich Road and the A49 Tarporley Road on which traffic will be redistributed as a result of the Proposed Scheme. The potential impacts of nitrogen deposition caused by changes in traffic flows during construction of the Proposed Scheme close to Oak Mere SSSI and one further constituent SSSI<sup>52</sup> of the Ramsar site has been assessed. This demonstrated that there will be no adverse effects on the integrity of the Ramsar site due to changes in air quality at either Oak Mere, as the modest exceedance in nitrogen deposition will be restricted to woodland and grassland adjacent to the road and no qualifying features will be affected, or at the other constituent SSSI. Overall, therefore, adverse effects on the integrity of the Ramsar site can be ruled out both alone or in-combination with other plans or projects.
- 7.4.6 Oak Mere SAC, designated for its diverse range of habitats, the sole component of which is also Oak Mere SSSI, will not be adversely affected by changes in air quality as a result of the Proposed Scheme, as detailed above in respect to Midland Meres and Mosses Phase 2 Ramsar site.
- 7.4.7 Sandbach Flashes SSSI is located 370m east of the land required for the construction of the Proposed Scheme in the Hough to Walley's Green area (MA01). The closest point of construction in the Wimboldsley to Lostock Gralam area will be MA02 Borrow Pits A to D and Crewe North RSD, located 2.4km west of the SSSI. The potential for impacts and the effects of the Proposed Scheme is reported in Volume 2, Community Area report: Hough to Walley's

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<sup>52</sup> Oakhanger Moss SSSI, reported in Volume 2, Community Area report: Hough to Walley's Green (MA01), Section 7.

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Green (MA01). It concludes that Sandbach Flashes SSSI will not be affected by construction of the Proposed Scheme.

- 7.4.8 Wettenhall and Darnhall Woods SSSI (which also includes Brookside Woods AWI site) is located 2.4km west of land identified for the purpose of habitat creation or enhancement and 95m from the B5074 Swanlowe Lane on which traffic will be redistributed as a result of the Proposed Scheme. Air quality modelling demonstrated a small exceedance in nitrogen deposition at the edge of the woodland, though this is not expected to result in an adverse effect on the structure and function of the SSSI. Wettenhall and Darnhall Woods SSSI (and Brookside Woods AWI site) will therefore not be affected by the construction of the Proposed Scheme.
- 7.4.9 Wimboldsley Wood SSSI is located 25m west of land identified for the purpose of habitat creation or enhancement, as part of the Proposed Scheme on the opposite side of the Shropshire Union Canal (Middlewich Branch). As reported in Section 15, Water resources and flood risk, construction of Crewe North RSD may result in a reduction in groundwater recharge to the glacial till. This has the potential to result in changes to groundwater flow beneath parts of the SSSI. On a precautionary basis, this is assessed a minor hydrological impact. Wimboldsley Wood SSSI is notified in part for its woodland habitats, including areas of wet woodland which may potentially be affected by changes in groundwater flows. Based on Phase 1 habitat survey information, including historic information supplied by Natural England, areas of wet woodland are located within the west of the site and are associated with alluvium rather than glacial till. Any reduction in ground water recharge as a result of the construction of Crewe North RSD will not affect the alluvium where the areas of wet woodland are located. Wimboldsley Wood SSSI also contains a rare saline spring, though this will also not be affected by the construction of Crewe North RSD or any other element of the Proposed Scheme. The effects from potential waterborne pollution through surface water runoff will be reduced through implementation of the measures in the draft CoCP. These include adopting the good working practices for pollution prevention as well as implementation of site-specific control measures to avoid the spread of invasive species which are known to be present within Wimboldsley Wood. Therefore, there will be no significant effect on the designated features of this SSSI.
- 7.4.10 Oak Mere SSSI, a component part of the Midland Meres and Mosses Phase 2 Ramsar site and Oak Mere SAC, is designated for the same reasons as these sites. Consequently, in line with the documents to inform the Appropriate Assessment, additional nitrogen deposition caused by increases in traffic flows will not have any adverse effect on qualifying features. Therefore, adverse effects on the structure and function of the SSSI can be ruled out.
- 7.4.11 Plumley Lime Beds SSSI will not be affected by construction of the Proposed Scheme. The closest point of construction will be immediately adjacent to the western boundary of the SSSI, south of Ascol Drive. This area is principally required for habitat creation. Works associated with the diversion of high pressure gas pipelines will also occur to the west of the SSSI, located 5m from the SSSI at the closest point of works. These works will be of short duration and will not result in any loss of habitat from the SSSI. The potential for effects from airborne and waterborne pollution will be reduced through implementation of the

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measures in the draft CoCP. There will also be a requirement for the use of a short section of an existing access track, within and around the western periphery of the SSSI, to provide access to the habitat creation area. Measures set out in the draft CoCP pertaining to the protection of retained habitat will ensure there is no loss of habitats within the SSSI as a result of the use of the short section of existing track. Therefore, there will be no significant effect on the designated features of this SSSI.

- 7.4.12 Tabley Mere SSSI will not be affected by construction of the Proposed Scheme. The closest point of construction will be the junction modifications for the construction traffic route, located at the A556 Chester Road and Flittogate Lane, 114m west of the SSSI in the Pickmere to Agden and Hulseheath area (MA03). The closest point of construction in the Wimboldsley to Lostock Gralam area will be an area of woodland habitat creation adjacent to Smoker Wood, located 1.3km south-west of the SSSI. The potential for impacts and the effects of the Proposed Scheme is reported in Volume 2, Community Area report: Pickmere to Agden and Hulseheath (MA03), which concludes that Tabley Mere SSSI will not be affected by construction of the Proposed Scheme.
- 7.4.13 The Willowbeds LWS will not be affected by the construction of the Proposed Scheme. There will be the requirement to use a short section of access track, within the centre of the LWS, in order to provide access to the habitat creation area to the west of the LWS. Measures set out in the draft CoCP pertaining to the protection of retained habitat will ensure there is no loss of habitats within the LWS as a result. There will therefore be no significant effect on The Willowbeds LWS.
- 7.4.14 Construction of Stanthorne North embankment will result in the permanent loss of 0.2ha (67%) of Bostock Road Orchards LWS. This loss will result in a permanent adverse effect on the structure and function of the site that will be significant at the county/metropolitan level.
- 7.4.15 Construction of Stanthorne North embankment and River Dane viaduct will result in the permanent loss of 2ha (10%) of the River Dane, Bostock LWS. Habitat loss from this LWS will result in a permanent adverse effect on the structure and function of the site that will be significant at the county/metropolitan level.
- 7.4.16 Construction of Stanthorne North embankment will result in the permanent loss of 200m<sup>2</sup> (100%) of Veteran Ash Tree, Bank Farm, Bostock LWS. This loss will result in a permanent adverse effect on the structure and function of the site that will be significant at the county/metropolitan level.
- 7.4.17 Construction of River Dane viaduct will result in the permanent loss of 390m<sup>2</sup> of ancient woodland habitat from Bull's Wood and Meadow LWS and Bull's Wood AWI site, which represents a loss of 1% and 2% of these sites respectively. A temporary site haul route will also result in the permanent loss of 60m<sup>2</sup> (0.2%) of grassland habitat from Bull's Wood and Meadow LWS. Habitat loss from Bull's Wood and Meadow LWS will result in a permanent adverse effect on the structure and function of the site that will be significant at the county/metropolitan level, and the loss of irreplaceable ancient woodland habitat from Bull's Wood AWI site will result in a permanent adverse effect that will be significant at the national level.

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- 7.4.18 Construction of River Dane viaduct and Dane Valley embankment will result in the permanent loss of 0.5ha (19%) of Trent and Mersey Canal LWS. Habitat loss from this LWS will result in a permanent adverse effect on the structure and function of the site that will be significant at the county/metropolitan level.
- 7.4.19 Construction of Puddinglake Brook viaduct will result in the permanent loss of 0.6ha (85%) of Puddinglake Brook Wood LWS. Habitat loss from this LWS will result in a permanent adverse effect on the structure and function of the site that will be significant at the county/metropolitan level.
- 7.4.20 Construction of Trent and Mersey Canal viaduct will result in the permanent loss of 1.1ha (58%) of Whatcroft Lane Wetlands LWS. Habitat loss from this LWS will result in a permanent adverse effect on the structure and function of the site that will be significant at the county/metropolitan level.
- 7.4.21 Ash Trees along Trent and Mersey Canal LWS is designated for two large veteran ash trees on the western bank of the canal south of Billinge Green. A site haul route associated with the construction of Trent and Mersey Canal viaduct will be located between the two veteran ash trees and will, on a precautionary basis, result in the permanent loss of one of these. The other veteran ash tree will be on the edge of an area of wetland habitat to be created between the canal and the Sandbach to Northwich line and will therefore be retained. The loss of one of the veteran ash trees will result in a permanent adverse effect on the structure and function of the site that will be significant at the county/metropolitan level.
- 7.4.22 Construction of Gad Brook viaduct will result in the permanent loss of 800m<sup>2</sup> (66%) of Pear Tree Farm LWS. Habitat loss from this LWS will result in a permanent adverse effect on the structure and function of the site that will be significant at the county/metropolitan level.
- 7.4.23 The diversion of a 33kV overhead power line south of Lostock Gralam will result in the permanent loss of 0.17ha (3%) of Wade Brook LWS. Habitat loss from this LWS will result in a permanent adverse effect on the structure and function of the site that will be significant at the county/metropolitan level.
- 7.4.24 Construction of Lostock Gralam North embankment will result in the permanent loss of 0.5ha (20%) of Long Wood LWS. The diversion of three high pressure gas pipelines between Lostock Gralam and Plumley Lime Beds SSSI will result in the permanent loss of a further 1.9ha (73%) of the LWS. Habitat loss from this LWS will result in a permanent adverse effect on the structure and function of the site that will be significant at the county/metropolitan level.
- 7.4.25 Construction of Smoker Brook viaduct will result in the permanent loss of 1.2ha (10%) of woodland habitat at Winnington and Peas Wood LWS. Of this, 0.6ha (50%) is ancient woodland habitat from Winnington Wood AWI site (which is 7% of the total ancient woodland habitat at this AWI site). Habitat loss from the LWS will result in a permanent adverse effect on the structure and function of the site that will be significant at the county/metropolitan level. The loss of irreplaceable ancient woodland from Winnington

Wood AWI site will result in a permanent adverse effect that will be significant at the national level.

- 7.4.26 Construction of Smoker Brook viaduct, and the construction of Pickmere embankment within the Pickmere to Agden and Hulseheath area (MA03), will result in the permanent loss of 0.3ha (3%) of Leonard's and Smoker Wood LWS (which is 4% of the ancient woodland habitat from Leonard's and Smoker Wood AWI site). Loss from the Wimboldsley to Lostock Gralam area accounts for just under 0.3ha with the remainder from the Pickmere to Agden and Hulseheath area (MA03). The ancient woodland habitat lost comprises 0.3ha of ancient semi-natural woodland and less than 0.1ha of PAWS. Habitat loss from the LWS will result in a permanent adverse effect on the structure and function of the site that will be significant at the county/metropolitan level. The loss of irreplaceable ancient woodland habitat from the AWI site will result in a permanent adverse effect that will be significant at the national level.
- 7.4.27 Construction of the A54 Middlewich Road realignment, which is associated with the construction of Stanthorne South embankment No.1 will result in the permanent loss of 0.3ha (55%) of ancient woodland habitat at Stanthorne Hall Farm AWI site. The loss of irreplaceable ancient woodland will result in a permanent adverse effect on this habitat that is significant at up to national level.

## Habitats

### Woodland

- 7.4.28 As well as the effects on ancient woodland described in the designated sites section, there are a number of other woodlands that will be affected by the construction of the Proposed Scheme.
- 7.4.29 Realignment of the A530 Middlewich/Nantwich Road associated with construction of Walley's Green embankment and the A530 Nantwich Road overbridge will result in the permanent loss of 0.5ha (50%) of semi-natural broadleaved woodland north of Newfield Hall Farm. Loss from the Wimboldsley to Lostock Gralam area accounts for 0.2ha of the loss with the remainder of the loss of 0.3ha from the Hough to Walley's Green area (MA01). The loss of this woodland will have a permanent adverse effect that is significant at up to district/borough level.
- 7.4.30 Construction of Crewe North RSD will result in the permanent loss of 0.8ha (100%) of Stove Room Wood. The loss of this woodland will have a permanent adverse effect that is significant at the district/borough level.
- 7.4.31 The provision of two new drainage ditches will result in the permanent loss of 550m<sup>2</sup> (4%) of deciduous woodland habitat from both the southern and northern edges of an unnamed woodland east of Coalpit Lane, which is located either side of the Shropshire Union Canal (Middlewich Branch). The loss of this woodland will have a permanent adverse effect that is significant at the district/borough level.

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- 7.4.32 Construction of Stanthorne North embankment will result in the permanent loss of 0.5ha (62.5%) of wet woodland habitat from an unnamed woodland north-east of Bank Farm, which forms part of the River Dane, Bostock LWS. The loss of this woodland will have a permanent adverse effect that is significant at the county/metropolitan level.
- 7.4.33 Construction of River Dane viaduct will result in the loss of 0.2ha (25%) of deciduous woodland habitat from an unnamed woodland east of Bull's Wood on the southern bank of the River Dane, which forms part of the River Dane, Bostock LWS. The loss of this woodland will have a permanent adverse effect that is significant at the county/metropolitan level.
- 7.4.34 Construction of River Dane viaduct and Dane Valley embankment will result in the permanent loss of 0.3ha (10%) of deciduous woodland habitat from an unnamed woodland on the eastern bank of the Trent and Mersey Canal, north-east of Hill Wood, which forms part of the Trent and Mersey Canal LWS. The loss of this woodland will have a permanent adverse effect that is significant at the county/metropolitan level.
- 7.4.35 Construction of Puddinglake Brook viaduct will result in the permanent loss of 0.7ha (100%) of deciduous wet woodland habitat within Puddinglake Brook Wood LWS. The loss of this woodland will have a permanent adverse effect that is significant at the county/metropolitan level.
- 7.4.36 Construction of Gad Brook viaduct and works associated with the realignment of a gas pipeline and high voltage power line, will result in the permanent loss of 2.2ha (45%) of deciduous woodland habitat at Marshall's Gorse. The loss of this woodland will have a permanent adverse effect that is significant at the district/borough level.
- 7.4.37 Work associated with the diversion of three high pressure gas pipelines and the underground diversion of an existing 11kV power line between Lostock Gralam and Plumley Lime Beds SSSI will result in the permanent loss of 1.1ha (79%) of Square Wood. The loss of this woodland will have a permanent adverse effect that is significant at the district/borough level.
- 7.4.38 Construction of Lostock Gralam North embankment and Smoker Brook viaduct will result in the permanent loss of 1.0ha (38%) of deciduous woodland within Long Wood LWS. The diversion of three high pressure gas pipelines between Lostock Gralam and Plumley Lime Beds SSSI and temporary works associated with Lostock Gralam North embankment will result in the permanent loss of a further 1.3ha (50%) of the woodland. The loss of this woodland will have a permanent adverse effect that is significant at the county/metropolitan level.
- 7.4.39 Construction of Smoker Brook viaduct and the temporary diversion of the A556 Chester Road and the A559 Manchester Road will result in the permanent loss of 0.6ha (5%) of deciduous woodland habitat at Peas Wood, which is part of Winnington and Peas Wood LWS. The loss of this woodland will have a permanent adverse effect that is significant at the county/metropolitan level.



## Grassland

- 7.4.40 Construction of Shropshire Union Canal viaducts No.1, 2 and 3, and associated temporary works including a site haul route and security fencing, will result in the permanent loss of 0.3ha (100%) of unimproved neutral grassland adjacent to the Shropshire Union Canal (Middlewich Branch) LWS, north-east of Clive Green. The loss of this lowland meadow habitat will result in a permanent adverse effect that is significant at the district/borough level.
- 7.4.41 Temporary works associated with construction of Stanthorne North embankment will result in the permanent loss of 0.1ha (50%) of marshy grassland habitat at Greenheyes Farm, north of the A533 Northwich Road. The loss of this marshy grassland habitat will result in a permanent adverse effect that is significant at up to county/metropolitan level.
- 7.4.42 Construction of River Dane viaduct will result in the loss of 0.3ha (100%) of marshy grassland habitat at Bank Farm, south-east of Bull's Wood. The loss of this marshy grassland habitat will result in a permanent adverse effect that is significant at the district/borough level.
- 7.4.43 Temporary works associated with the construction of River Dane viaduct, comprising a site haul route and security fencing, will result in the permanent loss of 90m<sup>2</sup> (0.6%) of lowland meadow habitat within Bull's Wood and Meadows LWS. The loss of this lowland meadow habitat will result in a permanent adverse effect that is significant at the district/borough level.
- 7.4.44 Works associated with realignment of overhead power lines will result in the permanent loss of 0.9ha (2.5%) of semi-improved neutral grassland at the edge of the waste lime beds, to the west of Cooke's Lane. The loss of this grassland will result in a permanent adverse effect that is significant at the county/metropolitan level.

## Hedgerows

- 7.4.45 On a precautionary basis, it is assumed that all hedgerows (88.9km) within the land required for the construction of the Proposed Scheme in the Wimboldsley to Lostock Gralam area will be permanently lost and the remaining hedgerow network will be fragmented. This includes the native species rich hedgerows at River Dane, Bostock LWS. This total, however, includes some hedges that are likely to be retained, such as those located within land required for overhead line diversions/realignments and those located within land required for habitat creation. The combined loss and severance of hedgerows within the land required for the construction of the Proposed Scheme will have a permanent adverse effect that is significant at county/metropolitan level.

## Watercourses

- 7.4.46 The Proposed Scheme will cross the following watercourses on viaducts:
- the Shropshire Union Canal (Middlewich Branch) will be crossed by Shropshire Union Canal viaducts No. 1, 2 and 3, and will also be crossed by Shropshire Union Canal offline overbridge, which will carry the realigned Clive Green Lane;



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- the River Dane will be crossed by River Dane viaduct;
- the Trent and Mersey Canal will be crossed to the east of Bostock by River Dane viaduct, to the north of Whatcroft by Puddinglake Brook viaduct and to the south of Billinge Green by Trent and Mersey Canal viaduct;
- Puddinglake Brook will be crossed by Puddinglake Brook viaduct;
- Gad Brook and a tributary of Gad Brook will be crossed by Gad Brook viaduct;
- Wade Brook will be crossed by Wade Brook viaduct; and
- the Peover Eye, a tributary of the Peover Eye and Smoker Brook will be crossed by Smoker Brook viaduct.

7.4.47 Piling for the construction of viaduct piers of Trent and Mersey Canal viaduct, which will marginally encroach upon the Trent and Mersey Canal south of Higgins Lane Farm at Billinge Green, could adversely temporarily affect the water quality of the canal. However, these effects will be controlled through the implementation of measures described in the draft CoCP and are unlikely to have a significant effect on the conservation status of the Trent and Mersey Canal and the majority of the watercourse will remain unaffected.

7.4.48 Other watercourses within the Wimboldsley to Lostock Gralam area will not be directly affected, and indirect adverse effects will not be significant as they will be controlled through the implementation of measures that are described in the draft CoCP. However, a series of smaller watercourses will also be permanently realigned or culverted, reducing the connectivity of the habitat corridors associated with watercourses. The habitat loss and reduction in connectivity will result in a permanent adverse effect that is significant at up to district/borough level.

### **Water bodies**

7.4.49 On a precautionary basis it is assumed that 63 of the 70 ponds located within the land required for the construction of the Proposed Scheme in the Wimboldsley to Lostock Gralam area will be permanently lost. This total, however, includes some ponds that are likely to be retained, such as those located within the land required for overhead line diversions/realignments. It is assumed that seven ponds within land required for habitat creation will be retained. Where survey has not been possible, a precautionary approach to the assessment has been applied. The loss of ponds within the land required for the construction of the Proposed Scheme will lead to a permanent adverse effect on the conservation status of water bodies that will be significant, in each case, at up to district/borough level.

### **Ancient and veteran trees**

7.4.50 There are no ancient trees affected by the construction of the Proposed Scheme within the Wimboldsley to Lostock Gralam area. It is assumed that all but one of the veteran trees recorded within the land required for the construction of the Proposed Scheme in the Wimboldsley to Lostock Gralam area will be permanently lost. The loss of veteran trees is significant at the national level. Where reasonably practicable, measures will be taken to

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protect veteran trees that are assumed to be lost. On a precautionary basis, veteran trees are assumed to be lost as a result of:

- works associated with the construction of Walley's Green embankment, which will result in the loss of a veteran horse chestnut west of the A530 Nantwich Road, south of Clive Green Lane;
- works associated with the construction of Stanthorne North embankment, which will result in the loss of a veteran ash at Bank Farm, the reason for designation of Veteran Ash Tree, Bank Farm, Bostock LWS;
- works associated with the construction of River Dane viaduct, which will result in the loss of an unknown number of veteran oak, ash and sycamore within River Dane, Bostock LWS, and veteran oak and ash within Trent and Mersey Canal LWS;
- works associated with the construction of Trent and Mersey Canal viaduct, which will result in the loss of one of the veteran ash trees along the canal, the reason for the designation of Ash Trees along Trent and Mersey Canal, Billinge Green LWS;
- works associated with the construction of Puddinglake Brook viaduct, which will result in the loss of a veteran crack willow within Puddinglake Brook Wood LWS; and
- works associated with the construction of Lostock Gralam North embankment and Smoker Brook viaduct, which will result in the loss of an unknown number of veteran trees within Long Wood LWS and Leonard's and Smoker Brook LWS.

7.4.51 Ash Trees along Trent and Mersey Canal, Billinge Green LWS contains another veteran ash tree, which is within the land required for grassland habitat creation and therefore retention of the tree is assumed.

### **Traditional orchards**

7.4.52 Construction of Stanthorne North embankment will result in the permanent loss of 0.2ha (100%) of traditional orchard habitat at Greenheyes Farm. The loss of this habitat, which forms part of Bostock Road Orchards LWS, will result in a permanent adverse effect that will be significant at the county/metropolitan level.

7.4.53 Construction of Gad Brook viaduct will result in the permanent loss of 813m<sup>2</sup> (68%) of traditional orchard habitat at Pear Tree Farm LWS. This loss will result in an adverse effect on this habitat that will be significant at the county/metropolitan level.

### **Reedbed**

7.4.54 Construction of Trent and Mersey Canal viaduct will result in the permanent loss of 0.3ha (76%) of reedbed habitat at Whatcroft Lane Wetlands LWS. This reedbed habitat is one of the reasons for designation of Whatcroft Lane Wetlands LWS and, therefore, its loss will result in a permanent adverse effect that will be significant at the county/metropolitan level.

## **Open mosaic habitat**

- 7.4.55 Work associated with the diversion of three high pressure gas pipelines between Lostock Gralam and Plumley Lime Beds SSSI will, on a precautionary basis, result in the loss of 1.5ha (30%) of an area of open mosaic habitat on previously developed land adjacent to Square Wood, north of Hame Farm. The loss of this habitat will result in an adverse effect that will be significant at up to county/metropolitan level.

## **Species**

### **Bats**

- 7.4.56 The removal or disturbance of habitat features that are utilised by bats during breeding, hibernation or migrating between roosts is considered to have the potential to result in adverse effects on the bat populations or assemblages during construction. However, the point at which such impacts are considered likely to result in significant adverse effects on the conservation status of a population will differ depending on the status of the species concerned.
- 7.4.57 The impact of disturbance on bat populations will generally be localised and limited to the period of construction. Bats utilising retained habitats may be subject to irregular and localised disturbance from lighting and noise during the construction period where works in autumn, winter and spring may be carried out for short periods after dusk or prior to dawn. These impacts will only temporarily deter bats from using foraging and commuting habitats and the implementation of measures that are described in the draft CoCP will reduce potential disturbance effects to a level that is not significant.
- 7.4.58 The route of the Proposed Scheme will cross the A556 Chester Road and the A559 Manchester Road near Lostock Gralam, both of which are dual carriageways that are likely to have regular and heavy traffic flows. Consequently, the presence of these roads is likely to have an existing effect on the activity of the bats in this area, influencing their flight lines and limiting crossing points between habitats either side of the roads.
- 7.4.59 Construction of the Proposed Scheme will affect the bat assemblage between Wimboldsley and Stanthorne. Specifically, construction of Stanthorne South embankment and its associated retaining wall will result in the loss of a non-breeding soprano pipistrelle roost and a non-breeding brown-long eared roost in a building at Stanthorne Grange within the land required for the construction of the Proposed Scheme. Construction of Walley's Green embankment and Crewe North RSD will result in the loss of Stove Room Wood and the loss and fragmentation of hedgerows in the Wimboldsley area that provide connectivity to large areas of woodland and major waterways including the Shropshire Union Canal (Middlewich Branch) and the River Weaver, which are located to the west of the Proposed Scheme. The direct loss of these roosts and the loss and fragmentation of foraging and commuting habitat will result in a permanent adverse effect on the assemblage of bats between Wimboldsley and Stanthorne which will be significant at the regional level.

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- 7.4.60 Construction of the Proposed Scheme will affect the bat assemblage between Stanthorne and Rudheath. Specifically, construction of Stanthorne North embankment will result in the loss of non-breeding roosts of soprano pipistrelle and brown long-eared bat at A533 Northwich Road. Construction of Whatcroft North embankment will result in the loss of a soprano pipistrelle possible maternity roost at Davenham Road, Northwich. As maternity roosts are important to the continued breeding success of bat populations, the loss of a maternity roost will result in a permanent adverse effect on the soprano pipistrelle population in the assemblage. A number of other non-breeding roosts at Davenham Road, Northwich will also be lost, including three additional soprano pipistrelle roosts and two *Myotis* species roosts. *Myotis* bats are considered to be rarer in the UK and, although they are not maternity roosts, the loss of two *Myotis* roosts will result in a permanent adverse effect on the populations of *Myotis* bats in the assemblage. Construction between A54 Middlewich Road realignment and Gad Brook viaduct and the resultant partial loss of woodland, river and hedgerow foraging habitats between Bostock and Rudheath has the potential to cause temporary disturbance to the bat assemblage in the area. The direct loss of these roosts and the loss and fragmentation of foraging and commuting habitat will result in a permanent adverse effect on the assemblage of bats between Stanthorne and Rudheath which will be significant at the regional level.
- 7.4.61 The large areas of woodland to the east and north-east of Lostock Gralam and the wooded river corridors of the Peover Eye, Smoker Brook and their tributaries provide foraging habitat and commuting routes for the bat assemblage located to the north and north-east of Lostock Gralam. Construction of Smoker Brook viaduct will result in the partial loss of woodland from Winnington Wood, Peas Wood and Leonard's and Smoker Wood. Construction of the viaduct will also result in the partial loss of Long Wood, while the works associated with the construction of Lostock Gralam North embankment and diversion of three high pressure gas pipelines will result in further loss of Long Wood. Although no roosts have been recorded within the land required for the construction of the Proposed Scheme in this area, it is assumed on a precautionary basis, that construction of Smoker Brook viaduct will result in the loss of roosts within these woodlands. The loss of these roosts and the loss and fragmentation of foraging and commuting habitat will result in a permanent adverse effect on the assemblage of bats east and north-east of Lostock Gralam, which will be significant at the regional level.
- 7.4.62 Loss of other suitable habitats within the land required for the construction of the Proposed Scheme may require some bats to travel further and expend more energy during day to day foraging and movement throughout their home range for the duration of construction. However, such effects alone are for all species considered unlikely to result in sufficient disturbance of the populations or assemblages concerned to result in an adverse effect on their conservation status.

### **Mosses and liverworts**

- 7.4.63 Freiberg's screw-moss has been recorded within the land required for the construction of the Proposed Scheme on the northern bank of the Trent and Mersey Canal, north-east of Hill

Wood. Construction of River Dane viaduct and Dane Valley embankment will, on a precautionary basis, result in the loss of Freiberg's screw-moss in this location which will have a permanent adverse effect on this population that will be significant at the regional level. The risk of pollution or dust deposition on this species elsewhere along the Trent and Mersey Canal will be avoided by the implementation of measures in the draft CoCP. This species is known to occur in both open and shaded habitats and it is not considered that the viaduct would adversely affect habitat suitability or, given the scattered distribution of records, affect other significant parts of the population.

## Amphibians

7.4.64 There are five populations and 11 meta-populations of great crested newt, each of which are either moderate, or assumed to be moderate in size, within the Wimboldsley to Lostock Gralam area where habitat loss resulting from the construction of the Proposed Scheme will result in significant adverse effects at up to the county/metropolitan level in each case. These are as follows:

- a meta-population (GCNMP 1.2.1) within a network of six ponds to the south-east of Winsford and south-west of Middlewich;
- a population (GCNP 1.2.2) within a single pond to the north of Walley's Green and south-west of Wimboldsley;
- a population (GCNP 1.2.3) in a network of three ponds to the west of Wimboldsley;
- a population (GCNP 1.2.7) within a network of two ponds to the south-west of Middlewich and south-east of Winsford;
- a meta-population (GCNMP 1.2.12) of great crested newt in a network of 20 ponds to the north of Clive Green;
- a meta-population (GCNMP 1.2.16) of great crested newt in a network of 174 ponds to the north-west of Middlewich and south-east of Northwich;
- a meta-population (GCNMP 1.2.17) of great crested newt in a network of five ponds to the north-east of Winsford and south-east of Moulton;
- a meta-population (GCNMP 1.2.18) of great crested newt in a network of 25 ponds to the north of Middlewich;
- a meta-population (GCNMP 1.2.19) of great crested newt in a network of 23 ponds to the north of Middlewich;
- a meta-population (GCNMP 1.2.21) within a network of 54 ponds to the north-east of Middlewich;
- a population (GCNP 1.2.24) of great crested newt in a single pond to the south-east of Rudheath;
- a meta-population (GCNMP 1.2.25) within a network of seven ponds to the south-east of Rudheath;
- a meta-population (GCNMP 1.2.26) within a network of 147 ponds to the east of Northwich;

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- a population (GCNP 1.2.30) within a network of two ponds to the east of Northwich and south of Lostock Gralam;
- a meta-population (GCNMP 1.2.32) within a network of 34 ponds to the east of Lostock Gralam; and
- a meta-population (GCNMP 1.2.36) within a network of 132 ponds to the west of Knutsford.

7.4.65 There are a further three small populations of great crested newt within the Wimboldsley to Lostock Gralam area where habitat loss resulting from the construction of the Proposed Scheme will result in significant adverse effects at the district/borough level. These are:

- a population (GCNP 1.2.4) within a single pond to the west of Wimboldsley;
- a population (GCNP 1.2.5) within a single pond to the north of Wimboldsley; and
- a population (GCNP 1.2.8) of great crested newt in a single pond to the south-west of Middlewich and south-east of Winsford.

7.4.66 Of the 70 waterbodies providing potential breeding sites within the land required for construction of the Proposed Scheme that require survey within the Wimboldsley to Lostock Gralam area, 16 have been confirmed as supporting great crested newt, four have been assessed as being unsuitable for this species, and 19 have been found not to support the species. The remaining 31 have not been surveyed due to access constraints and are assumed to support populations of great crested newts and the loss of the waterbodies supporting these populations could result in a permanent adverse effect on amphibian populations that will be, in each case, significant at up to county/metropolitan level.

## **Birds**

7.4.67 The construction of the Proposed Scheme in the Wimboldsley to Lostock Gralam area will affect at least three potential breeding pairs of barn owl. They are:

- a pair identified in the Wimboldsley area, where construction of Walley's Green embankment and associated infrastructure and Crewe North RSD will result in the permanent loss of barn owl foraging habitat, including semi-improved and improved grassland and associated field margins, as well as the loss of a possible nest site in a tree near Wimboldsley, which will be significant at county/metropolitan level;
- a pair identified north-west of Middlewich, where construction of Stanthorne North embankment and River Dane viaduct will result in the permanent loss of foraging habitat for barn owl, including arable fields, marshy grassland, semi-improved and improved fields and associated field margins adjacent to the River Dane and the Trent and Mersey Canal, which will be significant at county/metropolitan level; and
- a pair identified east of Rudheath, where construction of Rudheath embankment will result in the permanent loss of barn owl foraging habitat, including arable fields, semi-improved and improved grassland and associated field margins, as well as the loss of confirmed roost sites and possible nest sites in trees and buildings east of Rudheath, which will be significant at county/metropolitan level.

## Vascular plants

- 7.4.68 Construction of Lostock Gralam North embankment, the diversion of three high pressure gas pipelines between Lostock Gralam and Plumley Lime Beds SSSI, the construction of Smoker Brook viaduct, and the temporary diversion of the A556 Chester Road and the A559 Manchester Road will likely result in the loss of small-leaved lime. This species is, on a precautionary basis, assumed to be present within Long Wood LWS and Winnington and Peas Wood LWS, as identified from desk study data. The loss, or a reduction in number, of this species from both sites will result in a permanent adverse effect which will be significant at up to the district/borough level.
- 7.4.69 Construction of Smoker Brook viaduct, and Pickmere embankment within the Pickmere to Agden and Hulseheath area (MA03) will, on a precautionary basis, result in the permanent loss of black poplar within Leonard's and Smoker Wood. The loss, or a reduction in number of this species, of this species will result in an adverse effect which will be significant at district/borough level.

## Terrestrial invertebrates

- 7.4.70 The open mosaic habitat on previously developed land adjacent to Square Wood, which comprises a mosaic of woodland, scrub, semi-improved neutral grassland, marshy grassland, tall ruderal and bare soil, has been assumed to support a notable terrestrial invertebrate assemblage. Work associated with the diversion of three high pressure gas pipelines and the underground diversion of an existing 11kV power line between Lostock Gralam and Plumley Lime Beds SSSI will result in the loss of 1.5ha of an area of open mosaic habitat on previously developed land. The loss of these habitats will, it is assumed on a precautionary basis, result in an adverse effect on the assemblage that is significant at up to county/metropolitan level.

## Otter

- 7.4.71 Construction of Puddinglake Brook viaduct will result in the loss of an active holt and two potential holts, north of Bridge Farm, Whatcroft. Construction of Gad Brook viaduct will result in the loss of a potential holt on the eastern edge of Marshall's Gorse, south of Rudheath. Construction of Smoker Brook viaduct will result in the loss of one active holt and two potential holts on Peover Eye, west of Holford Bridge. The construction of Puddinglake Brook viaduct will take one year and six months, and the construction of Gad Brook viaduct and Smoker Brook viaducts will each take two years and three months. During this time, the potential effects of disturbance will be reduced to a level that is not significant and the risk of waterborne pollution will be avoided by the implementation of measures in the draft CoCP. It is not expected that there will be any fragmentation of otter movement routes, as the majority of both Puddinglake Brook and Gad Brook, as well as their tributaries and the majority of the nearby Trent and Mersey Canal will remain unaffected by the Proposed Scheme. The loss of a holt, however, will result in a permanent adverse effect on the



conservation status of each of these otter populations which will be significant at the district/borough level in each case.

## Other mitigation measures

7.4.72 This section describes other mitigation measures designed to reduce or compensate for significant ecological effects. These include habitat creation and habitat enhancement.

### Habitats

#### Woodland

- 7.4.73 The Proposed Scheme will result in the combined loss of 1.3ha of ancient woodland, which is irreplaceable, from Stanthorne Hall Farm AWI site, Bull's Wood AWI site, Winnington Wood AWI site and Leonard's and Smoker Woods AWI site each of which is significant at the national level.
- 7.4.74 In addition, the Proposed Scheme will result in the combined loss of 4.4ha of lowland mixed deciduous woodland at River Dane, Bostock LWS; Trent and Mersey Canal LWS; Puddinglake Brook Wood LWS; Long Wood LWS and Winnington and Peas Wood LWS, each of which is significant at the county/metropolitan level. There is further loss of a combined 4.4ha of lowland mixed deciduous woodland at north of Newfield Hall Farm; Stove Room Wood; east of Coalpit Lane; Marshall's Gorse and Square Wood, each of which is significant at the district/borough level.
- 7.4.75 There is further loss and fragmentation from 19 small woodlands across the Wimboldsley to Lostock Gralam area, including loss of 0.6ha of lowland mixed deciduous woodland and 3.4ha of other woodland habitat, as reported within the register of local/parish effects (Volume 5: Appendix EC-015-0MA02). The combined loss and fragmentation of habitat from these woodlands is significant at the district/borough level.
- 7.4.76 In accordance with the Ecological Principles of Mitigation in the SMR, a route-wide, integrated strategic approach has been developed to compensate for the loss of woodland. The woodland habitat creation in this area is to compensate for the loss of woodland habitat in the local area as well as to ensure that the populations of protected and notable species including bats are maintained. With these objectives in mind, where reasonably practicable, the locations of woodland habitat creation have been selected so as to increase the size of existing higher quality habitat and to increase connectivity.
- 7.4.77 The loss of ancient woodland will be partly compensated through a range of measures, including planting of native broadleaved woodland as follows:
- 4ha in total at two locations either side of the Proposed Scheme south of the A533 Northwich Road, which will partially compensate for the loss of 0.3ha of ancient woodland habitat at Stanthorne Hall Farm and 1ha of smaller blocks of woodland in this area. Mitigation planting in this location will also enhance connectivity with other

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woodland habitat within the wider area and be of benefit to the bat assemblage associated with the habitats between Stanthorne and Bostock;

- 0.4ha at two locations either side of the Proposed Scheme, to the north and immediately adjacent to Bull's Wood and Meadow LWS which will partially compensate for the loss of 430m<sup>2</sup> of ancient woodland habitat from Bull's Wood AWI site and provide connectivity between fragmented woodland in this location;
- 5.3ha between Winnington and Peas Wood LWS and Leonard's and Smoker Wood LWS, which will enhance ecological connectivity between woodland at these LWS and help maintain the integrity of these woodland sites. In particular, this will partially compensate for the loss of 1.2ha of woodland from Winnington and Peas Wood LWS, which includes the loss of 0.6ha of ancient woodland from Winnington Wood AWI site and 0.6ha of woodland from Peas Wood; and
- 2.1ha immediately to the south of Leonard's and Smoker Wood LWS, which will partially compensate for the loss of 0.3ha of ancient woodland habitat from Leonard's and Smoker Wood LWS and AWI site.

7.4.78 Woodland planting to partly compensate for the loss of ancient woodland will include further measures such as translocation of ancient woodland soil with its associated seed bank where appropriate. Other measures such as planting native trees and shrubs of local provenance and translocation of coppice stools and dead wood will be undertaken in accordance with the Ecological Principles of Mitigation within the SMR.

7.4.79 Within the Wimboldsley to Lostock Gralam area, a further 36.1ha of woodland habitat creation will be undertaken to compensate primarily for adverse effects upon non-ancient woodland at locations including the following:

- 2.8ha in total at two locations to the north of Newfield Hall Farm to compensate for the loss of 0.5ha at the unnamed woodland north of Newfield Hall Farm and to enhance ecological connectivity with other areas of existing woodland in this area. Of this, 1.5ha will be located within the Wimboldsley to Lostock Gralam area and the remaining 1.3ha is within the Hough to Walley's Green area (MA01);
- 0.8ha in total at four locations to the south of Wimboldsley Grange, within and adjacent to the Shropshire Union Canal (Middlewich Branch) LWS, which will compensate for woodland habitat lost in the vicinity and will enhance ecological connectivity along the canal and with planting around the Crewe North RSD;
- 0.9ha adjacent to Rookery/Small Rookery Woods AWI site and 2.3ha adjacent to Woodland near Lea Hall, Wimboldsley AWI site, to compensate for woodland habitat loss within the vicinity, enhance ecological connectivity along the Shropshire Union Canal (Middlewich Branch) and help maintain the integrity of these existing ancient woodlands;
- 7.3ha in total at five locations east of Clive Green to the south and east of Park Farm, which will enhance ecological connectivity along the Shropshire Union Canal (Middlewich Branch) and east to west, along the realigned Clive Green Lane. In particular, this will compensate for the loss of 0.8ha of woodland at Stove Room Wood, 550m<sup>2</sup> of woodland

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east of Coalpit Lane and a total of 0.4ha of several smaller blocks of woodland in this area;

- 3.6ha in total at two locations within and immediately adjacent to The Willowbeds LWS, which will compensate for the loss of 0.8ha of woodland habitat from the River Dane, Bostock LWS and will enhance ecological connectivity between woodlands in the Bostock area;
- 0.5ha in total at two locations, one to the north-east of Bank Farm, Bostock and the other along the western bank of the Trent and Mersey Canal, which will partly compensate for the loss of woodland habitat from the Trent and Mersey Canal LWS and will enhance ecological connectivity to existing bankside woodland along the Trent and Mersey Canal;
- 2ha in total at four locations between the River Dane and Bostock Hall, which will enhance ecological connectivity between the complex of existing woodlands in this area including Bull's Wood, Oak Clump and Hill Wood. In particular, this will compensate for the loss of woodland habitat from the Trent and Mersey Canal LWS and other small areas of woodland within the area;
- 0.4ha north of Whatcroft Hall Lane to compensate for the loss of 0.3ha of woodland from Puddinglake Brook Wood LWS;
- 8.9ha in total at three locations, to the south and to the east of Marshalls' Gorse, south of Penny's Lane and to the west of Cooke's Lane. These areas will compensate for the loss of 2.2ha of woodland from Marshall's Gorse and 1.3ha of other smaller areas of woodland loss in the vicinity of Rudheath; and
- 7.9ha in total at five locations between the A556 Shurlach Road east of Lostock Gralam and Plumley Lime Beds SSSI. Planting in these locations will help maintain the integrity and enhance ecological connectivity between the complex of existing woodlands in this area including Winnington Belt AWI site, woodland at Plumley Lime Beds SSSI and Long Wood LWS. In particular, this will compensate for the loss of 1.1ha of woodland from Square Wood and 2.4ha of woodland from Long Wood LWS.

7.4.80 The target habitat type for woodland planting is lowland mixed deciduous woodland habitat of principal importance. The new areas of woodland habitat will connect and help maintain the integrity of remaining areas of woodland. A temporary adverse effect is expected until these areas have become established, after which these measures will reduce the overall effect on woodland to a level that is not significant.

7.4.81 Landscape mitigation planting will provide some additional benefits to wildlife and will help to connect areas of higher quality habitat.

## **Grassland**

7.4.82 In accordance with the Ecological Principles of Mitigation in the SMR a route-wide, integrated strategic approach has been developed to compensate for loss of grassland. The species-rich grassland creation in this area is required to compensate for the loss of grassland habitat in the local area as well as to ensure that the populations of protected and notable species including great crested newts, bats and barn owls are maintained. With these

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objectives in mind, where reasonably practicable, the locations of grassland creation have been located so as to increase the size of existing higher quality habitat and to increase connectivity.

- 7.4.83 A total of 1.1ha of species-rich grassland will be created to the north-east of Bank Farm and along the banks of the River Dane and the Trent and Mersey Canal to compensate for the loss of 90m<sup>2</sup> of grassland habitat from Bull's Wood and Meadow LWS.
- 7.4.84 A combined total of 2.6ha of species-rich neutral grassland will be created to the east and west of Cooke's Lane, immediately adjacent to the waste lime beds north-east of Broken Cross. This will compensate for the loss of 0.9ha of semi-improved neutral grassland habitat from the waste lime beds. Following establishment, the adverse effect on semi-improved neutral grassland will be reduced to a level that is not significant.
- 7.4.85 On the River Dane floodplain and adjacent to the Trent and Mersey Canal, a combined total of 4.1ha of marshy grassland habitat will be created. This will compensate for the loss of 1.5ha of marshy grassland to the east of Clive, north of Yew-Tree Farm, 0.1ha of marshy grassland at Greenheyes Farm and 0.3ha of marshy grassland at Bank Farm, south-east of Bull's Wood. Following establishment and restoration, the adverse effect on marshy grassland will be reduced to a level that is not significant.
- 7.4.86 A total of 2.8ha of grassland habitat will be created within and adjacent to the Shropshire Union Canal (Middlewich Branch) LWS in order to mitigate for the loss and fragmentation of habitats, and the associated impacts on connectivity, as a result of the construction of Crewe North RSD.
- 7.4.87 Details of approaches to grassland habitat creation are provided in the Ecological Principles of Mitigation in the SMR. Due to the extent of habitat creation and measures to ensure the establishment there will be no significant effect on the conservation status of lowland meadow.

## **Hedgerows**

- 7.4.88 New hedgerows will be planted as replacement for those lost as a result of the Proposed Scheme. Where practicable the hedgerows within the River Dane, Bostock LWS will be translocated to the nearest suitable habitat creation areas. A total of 32km of new hedgerows will be planted and the species composition will be characteristic of the surrounding area. This represents a net reduction in hedgerow of 56.9km after mitigation, which is a residual adverse effect that is significant at the county/metropolitan level.

## **Watercourses**

- 7.4.89 Where smaller watercourses are realigned, the channel will be naturalised, where reasonably practicable, with a profile to promote the establishment of marginal vegetation and pools. Once the vegetation has developed, the adverse effect on these watercourses will be reduced to a level that is not significant.

## **Water bodies**

- 7.4.90 At least one pond will be created for every pond lost within the land required for the construction of the Proposed Scheme. New ponds will be established in accordance with the Ecological Principles of Mitigation in the SMR. Once established, it is anticipated that any adverse effect on pond habitats will be reduced to a level that is not significant.

## **Ancient and veteran trees**

- 7.4.91 Where reasonably practicable, measures will be taken to protect veteran trees that are assumed to be lost. Where loss is unavoidable, the trees will be soft-felled and sections placed within retained habitats to provide a continued deadwood resource. Veteran trees are irreplaceable and the loss of each of these trees represents a residual adverse effect that is significant at the national level.

## **Traditional orchard**

- 7.4.92 Where reasonably practicable, measures will be taken to protect as much of the orchard habitat as possible at Greenheyes Farm, which forms part of Bostock Road Orchards LWS, and the orchard habitat at Pear Tree Farm LWS. Where loss is unavoidable, the trees within the orchard will be soft-felled and sections placed within retained habitats to provide a continued deadwood resource. The loss of these orchard habitats represents a residual adverse effect that is significant at the county/metropolitan level.

## **Reedbed**

- 7.4.93 To address the loss of 0.3ha of reedbed habitat at Whatcroft Lane Wetlands LWS, replacement reedbed habitat will be created within 1.4ha of wetland habitat creation areas immediately to the east of the LWS along the Trent and Mersey Canal and to the south and south-west of the LWS on the opposite bank of the Trent and Mersey Canal between the canal and the Northwich to Knutsford Railway (part of the Mid-Cheshire Line). Once established, it is anticipated that any adverse effect on reedbed habitat will be reduced to a level that is not significant.

## **Open mosaic habitat**

- 7.4.94 Where reasonably practicable, measures will be taken to protect as much of the open mosaic habitat as possible during modification of three high pressure gas pipelines adjacent to Square Wood, north of Hame Farm. Following restoration of existing habitats after completion of utilities diversions, the adverse effect on open mosaic habitat will be reduced to a level that is not significant.

## Species

### Bats

- 7.4.95 To replace roosts that will be lost to construction, artificial roosts will be provided across the Proposed Scheme in accordance with the Ecological Principles of Mitigation within the SMR. The habitat creation measures detailed above in response to habitat loss, including creation of grasslands, hedgerows, new ponds and semi-natural woodlands will compensate for those bat foraging habitats lost within the land required for the construction of the Proposed Scheme as detailed below.
- 7.4.96 The loss of woodland from Stove Room Wood, and associated effects on the bat assemblage between Wimboldsley and Stanthorne, will be addressed by the provision of suitable replacement habitat. This will comprise new woodland planting either side of Clive Green Lane and adjacent to Small Rookery Wood and Wimboldsley Wood, improving connectivity between woodlands and bolstering the existing woodland habitat. The loss of hedgerows between Wimboldsley and Stanthorne and the associated fragmentation effects will be addressed through the provision of suitable replacement habitat. This will include grassland creation along the Shropshire Union Canal (Middlewich Branch) and new hedgerows and scrub planting at the margins of Crewe North RSD and along Walley's Green embankment, improving connectivity between habitats. Following the implementation of these measures, the effects on the bat assemblage between Wimboldsley and Stanthorne will be reduced to a level that is not significant.
- 7.4.97 The loss of a soprano pipistrelle maternity roost and two *Myotis* bat roosts from buildings at Davenham Road, Northwich, which are all component species of the bat assemblage between Stanthorne and Rudheath, will be addressed through the provision of suitable replacement roosts within the habitat creation area to the west of Higgins Lane Farm. The loss and fragmentation of foraging and commuting habitats used by the bat assemblage between Stanthorne and Rudheath will be addressed by the provision of suitable replacement planting. This will comprise new woodland planting adjacent to The Willowbeds LWS, west of the A533 Northwich Road, and to the south-east of Bostock Hall. This will bolster and improve connectivity between existing woodlands in the area. New grassland will be created to the south of the River Dane, Bostock LWS and alongside the Trent and Mersey Canal LWS. Hedgerow planting will provide connectivity between areas of new planting, and existing foraging and commuting habitats between Stanthorne and Rudheath. Following implementation of these measures, the effects on the bat assemblage between Stanthorne and Rudheath will be reduced to a level that is not significant.
- 7.4.98 The potential loss of roosts and the fragmentation of woodland habitat used by the bat assemblage to the east and north-east of Lostock Gralam will be addressed by provision of suitable replacement roosts within nearby retained woodland habitat. Following the implementation of these measures, the effects of the potential loss of roosts on the bat assemblage will be reduced to a level that is not significant. The partial loss of woodland from Long Wood, Winnington Wood, Peas Wood and Leonard's and Smoker Woods and the

fragmentation effects will be addressed through the provision of suitable replacement habitat. This will comprise extensive woodland planting between Plumley Lime Beds SSSI and Leonard's and Smoker Woods improving connectivity between these woodlands. Following the implementation of these measures, the effects on the bat assemblage to the east and north-east of Lostock Gralam will be reduced to a level that is not significant.

## **Mosses and liverworts**

- 7.4.99 Where reasonably practicable, measures will be taken to retain and protect Freiberg's screw-moss present along the Trent and Mersey Canal, north-east of Hill Wood, within the land required for the required for the construction of the Proposed Scheme. Where adverse effects on this species are unavoidable, stone substrate from this section of the canal will be translocated to another section of the canal in a habitat creation area adjacent to Whatcroft Lane Wetlands LWS. Records of Freiberg's screw-moss already occur in this habitat creation area, indicating that this location provides suitable growing conditions, and therefore, is suitable as a receptor site for its translocation. The new habitat creation area will be managed to ensure that suitable conditions for Freiberg's screw-moss are maintained. Once established, it is anticipated that any adverse effect on the population of Freiberg's screw-moss along the Trent and Mersey Canal will be reduced to a level that is not significant.

## **Amphibians**

- 7.4.100 Ponds, species-rich grassland and broadleaved woodland included as part of the Proposed Scheme will be designed to compensate for the loss of breeding sites, foraging habitat and places of shelter used by great crested newts and other amphibians. Compensation will be provided within ecological habitat creation areas along the Shropshire Union Canal (Middlewich Branch), north of Clive Green Lane, west of Whatcroft Hall Lane, north of Davenham Road, south of the B5082 Penny's Lane and west of Cooke's Lane. Ponds, grassland and woodland will be established in accordance with the Ecological Principles of Mitigation within the SMR. Following implementation, the adverse effects on amphibian populations in the Wimboldsley to Lostock Gralam area will be reduced to a level that is not significant. HS2 Ltd will continue to survey ponds for great crested newt populations, and where it is confirmed that populations are absent then pond and terrestrial habitat provision will be re-assessed.

## **Birds**

- 7.4.101 Habitat creation measures to address the adverse effects on barn owl in the Wimboldsley to Lostock Gralam area will include: the provision of woodland and grassland habitat creation along the Shropshire Union Canal (Middlewich Branch); woodland, grassland and wetland creation and hedgerow planting along the River Dane and the Trent and Mersey Canal; wetland habitat creation along Puddinglake Brook; grassland and wetland creation and hedgerow planting adjacent to Whatcroft Lane Wetlands LWS; woodland, grassland and wetland habitat creation adjacent to Marshall's Gorse; and woodland and grassland creation with hedgerow planting south of Penny's Lane, east of Rudheath. These habitat creation



measures will provide foraging and nesting opportunities for barn owl populations in the Wimboldsley to Lostock Gralam area. Once the habitats have become established, the adverse effect on barn owl populations resulting from the loss of foraging habitat and potential nesting sites in the Wimboldsley to Lostock Gralam area will be reduced to a level that is not significant.

## **Vascular plants**

- 7.4.102 To address the adverse effects on locally scarce vascular plants and those listed on the local BAP, where appropriate, translocation will be undertaken of small-leaved lime and black poplar. New areas of habitat planting will also include these species where conditions are suitable, and management of the habitats will be appropriate for these species. Following the implementation of these measures, the adverse effects on the populations of these species will be reduced to a level that is not significant.

## **Terrestrial invertebrates**

- 7.4.103 To address the adverse effects on the assumed notable terrestrial invertebrate assemblage adjacent to Square Wood, measures will be taken to protect as much of the open mosaic habitat as possible, where reasonably practicable. Where loss is unavoidable, this will be addressed through the provision of a combination of new habitats, including woodland, grassland, ponds and open areas, to the west of Plumley Lime Beds SSSI. Following establishment of new habitats and restoration of existing habitats following completion of utilities diversions, the adverse effect on the assumed notable terrestrial invertebrate assemblage will be reduced to a level that is not significant.

## **Otter**

- 7.4.104 To address the adverse effect on the otter populations along Puddinglake Brook, Gad Brook and Peover Eye, replacement holts will be created within the wetland habitat creation areas adjacent to these brooks to replace those that will be lost. These will be created in accordance with the Ecological Principles of Mitigation within the SMR. The provision of these replacement holts will be sufficient to maintain the favourable conservation status of otter along Puddinglake Brook, Gad Brook and Peover Eye and will reduce the adverse effects on these otter populations to a level that is not significant.

## **Badger**

- 7.4.105 Although there will be no significant effects on badger populations in this area, mitigation measures to address the potential disturbance of badgers will be provided in accordance with the Ecological Principles of Mitigation within the SMR and the implementation of measures in the draft CoCP. This will include the provision of badger proof fencing and replacement setts where necessary.

## Summary of likely residual significant effects

- 7.4.106 This section describes likely significant residual ecological effects during construction, taking account of the mitigation and compensation proposed.
- 7.4.107 Ancient woodland is irreplaceable and the loss of 1.3ha of this habitat will result in a permanent adverse residual effect upon ancient woodland at each location where this habitat is lost that is significant at the national level.
- 7.4.108 On a precautionary basis, it is assumed that there will be a net loss in hedgerow of 56.9km, which will result in a permanent adverse residual effect that is significant at the county/metropolitan level. In addition to the mitigation described, opportunities will be sought for additional retention and replacement of hedgerow within the land required for temporary works.
- 7.4.109 The assumed loss of veteran trees will result in a permanent adverse residual effect that is significant at the national level in each case.
- 7.4.110 The loss of orchard habitat will result in a permanent adverse residual effect at each location where this habitat is lost that is significant at the county/metropolitan value.

## Cumulative effects

- 7.4.111 No cumulative effects on ecological receptors have been identified in the Wimboldsley to Lostock Gralam area.

## 7.5 Effects arising during operation

### Avoidance and mitigation measures

- 7.5.1 Within this section of the Proposed Scheme the following elements of the design will avoid or reduce impacts on features of ecological value during operation:
- Shropshire Union Canal viaducts No.'s 1, 2 and 3, A54 Middlewich Road viaduct, River Dane viaduct, Puddinglake Brook viaduct, Trent and Mersey Canal viaduct, Gad Brook viaduct, Wade Brook viaduct, Lostock Gralam viaduct and Smoker Brook viaduct will provide ecological connectivity under the route of the Proposed Scheme to adjacent habitats. Ecological connectivity beneath the route of the Proposed Scheme will be maintained for a combined length of 4.2km of viaducts in the Wimboldsley to Lostock Gralam area. This will reduce habitat fragmentation and barrier effects, allowing free passage of wildlife at these locations; and
  - where the Proposed Scheme will cross a watercourse, a culvert or dry tunnel will be provided to allow passage for mammals such as otter and water vole.

## Assessment of impacts and effects

- 7.5.2 Significant effects arising during operation at the district/borough level or above are described below. Significant effects on ecological features at the local/parish level are listed in Volume 5: Appendix EC-015-0MA02.

### Species

#### Bats

- 7.5.3 The operation of the Proposed Scheme has the potential to result in a variety of impacts on bat populations including those as a result of collision with passing trains, turbulence and noise. The point at which such impacts are considered to result in a significant adverse effect on the conservation status of the population concerned will differ between species. As a consequence, the following assessment of operational impacts takes into account the differing character and nature of the bat populations and/or assemblages concerned in determining the likely effects of the Proposed Scheme on each of these receptors.
- 7.5.4 Due to the large areas over which bats forage it is likely that any loss of, or displacement from, suitable foraging habitat in the vicinity of the Proposed Scheme will in itself amount to only a small proportion of the wider available resource. However, the impact of any such disturbance or displacement could be greatly increased if bats are hampered in moving between breeding sites, hibernation sites and other roosts which they commonly utilise.
- 7.5.5 Noise, vibration and lighting associated with passing trains have the potential to disturb bat species foraging and commuting within habitats close to the Proposed Scheme. Understanding of the impact of noise on bats caused by passing trains is limited. Research suggests that gleaned bats, such as brown long-eared, will have reduced foraging success within areas where there is persistent noise from busy roads<sup>53</sup>. However, noise generated from passing trains will be regular but temporary and as such will differ from that resulting from a busy road.
- 7.5.6 Operation of the Crewe North RSD will require the use of artificial lighting for up to 24 hours a day. Provision of artificial lighting may result in light spill onto adjacent habitats between Wimboldsley and Stanthorne. This has the potential to affect the bat assemblage present in this area through a reduction in the availability of suitable foraging habitat and creating barriers to movement along commuting routes. However, where reasonably practicable, lighting type, column height and location will be selected to reduce light spill and glare. A control management system will be used to dim and control each light and accessories such as baffles, hoods and louvres will be used where required to direct light and reduce light spill. Accordingly, following incorporation of these measures into the lighting design, the

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<sup>53</sup> Schaub, A., Ostwald, J. & Simeers, B.M. (2008), *Foraging bats avoid noise*, Journal of Experimental Biology, 211, 3174-3180.

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adverse effects on the bat assemblage between Wimboldsley and Stanthorne will be reduced to a level that is not significant.

- 7.5.7 Where the route of the Proposed Scheme bisects, or is located in proximity to existing features known to be utilised regularly by foraging or commuting bats, there is an increased risk that bats could be killed or injured as a result of collisions with passing trains or associated turbulence. The significance of any such effect will be dependent on both the flight height range of the species and the vertical alignment of the Proposed Scheme (i.e. whether the route of the Proposed Scheme is in cutting, at ground level or on embankment) at the point the impact occurs.
- 7.5.8 Woodland and grassland habitat creation along the Shropshire Union Canal (Middlewich Branch) will connect to larger areas of woodland either side of the Proposed Scheme, encouraging bats to utilise the foraging habitats in this location. Bats in the assemblage associated with habitats between Wimboldsley and Stanthorne flying towards the Proposed Scheme will be encouraged, by this planting, to cross beneath the route of the Proposed Scheme at Shropshire Union Canal viaduct.
- 7.5.9 Grassland planting to the east of Bank Farm will be provided as an alternative foraging resource by the bat assemblage between Bostock and Rudheath. This planting will connect to woodland, wetland and grassland planting along the River Dane, Trent and Mersey Canal, Puddinglake Brook and Gad Brook. Bats flying towards the Proposed Scheme will be encouraged, by this planting, to cross beneath the route of the Proposed Scheme at River Dane viaduct, Puddinglake Brook viaduct, Trent and Mersey Canal viaduct and Gad Brook viaduct.
- 7.5.10 Wetland habitat creation along Wade Brook will connect foraging habitats in this area. Bats in the assemblage associated with habitats between Broken Cross and Lostock Gralam flying towards the Proposed Scheme will be encouraged, by this planting, to cross beneath the route of the Proposed Scheme at Wade Brook viaduct.
- 7.5.11 Woodland planting between Plumley Lime Beds SSSI and Leonard's and Smoker Woods will connect foraging habitats in this area. Bats in the assemblage associated with habitats to the east and north-east of Lostock Gralam flying towards the Proposed Scheme will be encouraged, by this planting, to cross beneath the route of the Proposed Scheme at Smoker Brook viaduct.
- 7.5.12 Although it is possible that there may be infrequent incidental mortality of individual bats, due to the avoidance measures described above and the availability of alternative foraging and commuting habitat on either side of the Proposed Scheme, this is unlikely to result in a significant adverse effect on the conservation status of the bat assemblages present in the Wimboldsley to Lostock Gralam area.

## **Birds**

- 7.5.13 The majority of bird species that are known to be present in the area are not considered to be particularly vulnerable to collision with trains. However, barn owls hunt low over the

rough grassland habitats that are associated with embankments and are slow moving and are, therefore, likely to be subject to collision with high speed trains. Three pairs of barn owls potentially breeding in the vicinity of the Proposed Scheme will be affected at: Wimboldsley; north-west of Middlewich; and east of Higher Shurlach. In each of these locations, the route of the Proposed Scheme passes through networks of improved grassland and arable habitat likely to be used for hunting by these pairs of barn owl. Research undertaken by the British Trust for Ornithology on behalf of HS2 Ltd. suggests that there may be effects on barn owls up to 3km away<sup>54</sup>. This means that more barn owls are likely to be affected than those in the vicinity of the Proposed Scheme identified above. This will result in a permanent residual adverse effect that will be significant at the county/metropolitan level.

## Other mitigation measures

- 7.5.14 A Barn Owl Mitigation Plan will be prepared to identify the measures that can be implemented to help offset the effects on barn owls. As the availability of nesting sites is a limiting factor for this species the provision of additional nest boxes would be likely to increase numbers of barn owls within the wider landscape and thus offset the adverse effect.

## Summary of likely residual significant effects

- 7.5.15 The mitigation, compensation and enhancement measures described above are likely to reduce the residual ecological effects during operation to a level that is not significant, except for barn owl. Train strike is likely to result in the loss of barn owls that nest within 3km of the route of the Proposed Scheme resulting in a residual significant effect at the county/metropolitan level. However, if the proposed mitigation measures for barn owl are implemented through liaison with landowners and other relevant stakeholders, the residual effect on barn owl would be reduced to a level that is not significant.

## Cumulative effects

- 7.5.16 The operation of committed development MA02/272, expected from 2021 onwards, is anticipated to result in a negative impact on barn owl due to the risk of traffic collision. Measures to mitigate this impact, comprising new hedgerow and tree planting which aims to prevent low-level flight, are anticipated to take five years to establish, with no residual impact anticipated after 15 years. During this time, the committed development may result in loss of potential breeding and wintering barn owl at Wimboldsley and north-west of Middlewich. Operation of the Proposed Scheme, expected from 2038, is also anticipated to result in a negative impact on barn owl in these locations due to the risk of train collision. Although not concurrent, the consecutive nature of these impacts is likely to result in an increase in mortality of barn owl over time, leading to an overall reduction in breeding

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<sup>54</sup> Pringle, H., Siriwardena, G. and Toms, M. (2016), *Informing best practice for mitigation and enhancement measures for Barn Owls*. British Trust for Ornithology, Thetford.

success for these pairs until mitigation for both schemes is established. The cumulative effect of the Proposed Scheme and committed development MA02/272 will therefore result in an adverse effect on barn owl at Wimboldsley and north-west of Middlewich which is significant at the county/metropolitan level.

- 7.5.17 No cumulative effects on ecology receptors have been identified from other committed developments in the Wimboldsley to Lostock Gralam area.

## **Monitoring**

- 7.5.18 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.
- 7.5.19 There are no area-specific requirements for monitoring ecology and biodiversity effects or mitigation during the operation of the Proposed Scheme in the Wimboldsley to Lostock Gralam area.

## 8 Health

### 8.1 Introduction

- 8.1.1 This section identifies the communities within the Wimboldsley to Lostock Gralam area that will be subject to impacts associated with the Proposed Scheme and describes how these impacts are likely to affect 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, including Public Health England and local Directors of Public Health, has been undertaken to inform the health assessment process. Consultation with communities, local authorities and parish councils has been ongoing throughout the route design and assessment process, as described in Volume 1, Section 3. This has contributed to the measures identified to avoid and mitigate adverse health effects.
- 8.1.3 The assessment also draws on health-related information and views expressed in consultation responses from the owners and/or operators of Greenheyes Farm.
- 8.1.4 This section deals specifically with impacts at a local level within the Wimboldsley to Lostock Gralam area. Health effects assessed across the Proposed Scheme as a whole are reported in Volume 3, Route-wide effects, Section 8.
- 8.1.5 Further details of the health assessment, including the criteria used to assess effects on population health as described in the EIA Scope and Methodology Report (SMR)<sup>55</sup>, are contained in Volume 5: Appendix HA-001-0MA02 Health assessment matrix.
- 8.1.6 Maps showing the location of the key environmental features (Map Series CT-10), construction features (Map Series CT-05), and key operational features (Map Series CT-06) of the Proposed Scheme can be found in the Volume 2: MA02 Map Book. The Proposed Scheme is described in Section 2.

### 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 SMR.
- 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

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<sup>55</sup> High Speed Two Ltd (2018), *HS2 Phase 2b: Crewe to Manchester and West Midlands to Leeds, Environmental Impact Assessment Scope and Methodology Report, Consultation Summary Report*. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/745512/HS2\\_Phase\\_2b\\_EIA\\_Scope\\_and\\_Methodology\\_Report\\_Consultation\\_Summary\\_Report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/745512/HS2_Phase_2b_EIA_Scope_and_Methodology_Report_Consultation_Summary_Report.pdf).



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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 impacts of the Proposed Scheme on a range of environmental and socio-economic 'health determinants' could result in adverse or beneficial effects on health and wellbeing. This process of assessing these effects is documented in the health assessment matrices in Volume 5: Appendix HA-001-0MA02. Based on this a professional judgement has been made to identify those effects on population health and wellbeing that are sufficiently important to report within the health assessment sections found in this report and Volume 3, Route-wide effects.
- 8.2.4 The health determinants of relevance within the Wimboldsley to Lostock Gralam area during construction (temporary and permanent impacts) are:
- neighbourhood quality;
  - access to green space, recreation and physical activity;
  - education; and
  - social capital.
- 8.2.5 One health determinant, neighbourhood quality, has been identified as being relevant within the Wimboldsley to Lostock Gralam area during operation (permanent).
- 8.2.6 Additionally, health effects that are relevant along the route of the Proposed Scheme as a whole are reported in Volume 3, Route-wide effects, Section 8.
- 8.2.7 The geographic extent of the health assessment covers those areas where impacts on health determinants are predicted to occur. Health effects arising from impacts on a particular resource may affect communities across a wide area. These effects are described in the report section corresponding to the location of the resource itself. Health effects arising from reduced access to resources, for example as a result of traffic delays, are described in the report section corresponding to the community whose access is restricted.
- 8.2.8 The health assessment methodology is based on a review of published evidence showing how impacts on health determinants are linked to health effects in a large population. The health assessment is based on a review of evidence linking changes in health determinants to potential health outcomes. This information is presented in Volume 5: Appendix HA-002-00000. The strength of evidence varies; 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.
- 8.2.9 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'.

## 8.3 Environmental baseline

### Existing baseline

#### Description of communities in the Wimboldsley to Lostock Gralam area

8.3.1 The Wimboldsley to Lostock Gralam area covers a 14.6km section of the route of the Proposed Scheme. The route extends from Wimboldsley in the south, passing close to the settlements of Clive, Middlewich, Stanthorne, Bostock, Whatcroft, Rudheath, Lostock Green and Lostock Gralam. The Wimboldsley to Lostock Gralam area is predominately rural in nature, characterised by villages and hamlets, scattered farmsteads and isolated dwellings, with agriculture being the main land use. The communities in proximity to the Proposed Scheme are described below. A more detailed description of community facilities is provided in Section 6, Community.

#### Wimboldsley and surrounds

- 8.3.2 Wimboldsley is a village comprising approximately 30 residential properties. The nearest residential properties are located 250m east of the route of the Proposed Scheme. Community resources in the village include the Verdin Arms public house and Wimboldsley Community Primary School. The school serves pupils aged four to 11 years from the surrounding area.
- 8.3.3 The Shropshire Union Canal (Middlewich Branch) is located to the west of the village and offers walking paths along the canal. The Wimboldsley Wood Site of Special Scientific Interest (SSSI) is also located north-west of Wimboldsley.

#### Middlewich, Winsford and surrounds

- 8.3.4 The towns of Winsford and Middlewich are west and east of the route of the Proposed Scheme, respectively. They lie just outside of the study area. In between them, and within the study area, are the smaller settlements of Clive Green, Clive, Stanthorne, Bostock, Whatcroft and Billinge Green.
- 8.3.5 Clive Green comprises approximately 20 dispersed residential properties and farmsteads. The closest residential property is located 200m west of the route of the Proposed Scheme. Just north of Clive Green is Clive, a settlement comprising approximately 200 residential

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properties, which border the southern edge of the Winsford Industrial Estate. The closest residential property is located 350m west of the route of the Proposed Scheme.

- 8.3.6 Stanthorne comprises approximately 70 residential properties and farmsteads, with the nearest residential properties located 70m east of the route of the Proposed Scheme. There are recreational moorings at Park Farm on the Shropshire Union Canal (Middlewich Branch) in Stanthorne, which are used by canal boats for water-based recreation in the area. Greenheyes Farm lies on the A533 Northwich Road, in Stanthorne, to the east of the route of the Proposed Scheme. Greenheyes Farm is a working dairy farm and provides free educational trips for local school groups.
- 8.3.7 Bostock and Whatcroft are settlements that lie to the west of the route of the Proposed Scheme. Bostock comprises approximately 100 residential properties. The nearest residential properties are located 700m west of the route of the Proposed Scheme. Whatcroft comprises approximately 20 residential properties and farmsteads. The nearest residential properties are located 50m west of the route of the Proposed Scheme.
- 8.3.8 Billinge Green comprises approximately 20 dispersed residential properties and farmsteads. The closest residential properties are located 50m west of the route of the Proposed Scheme. There are two marinas in Billinge Green: Oakwood Marina and Park Farm Marina, both of which have recreational moorings for canal boats.
- 8.3.9 There are several recreational routes and public rights of way (PRoW) in the study area. Between Clive Green and Middlewich lies 2km of the Shropshire Union Canal (Middlewich Branch), running west to east across the route of the Proposed Scheme. The National Cycle Network Route 5 also follows the route of the canal. The Trent and Mersey Canal and towpath extends between Middlewich and Rudheath, running east to west across the route of the Proposed Scheme and passing through Billinge Green, Bostock and Whatcroft. The canals form part of the Four Counties Ring and Cheshire Ring tourist boating circuits. The Dane Valley Way and Cheshire Ring Canal Walk (both of which run through the study area for 6km) are long-distance walking routes which follow the Trent and Mersey Canal from Middlewich.

### **Rudheath, Lostock Green, Lostock Gralam and surrounds**

- 8.3.10 This area covers the village of Higher Shurlach and the settlements of Rudheath, Lostock Green and Lostock Gralam.
- 8.3.11 Rudheath is a settlement comprising approximately 1,900 residential properties. The nearest residential properties are located 200m west of the route of the Proposed Scheme. Rudheath has several community facilities including The Venue, a mixed-use community facility in Rudheath, which hosts youth clubs and the Little Owls Pre-School and Nursery. The village of Higher Shurlach is located at the southern edge of Rudheath. The Chrysalis Day Nursery is located in this village.
- 8.3.12 Lostock Gralam is a village of approximately 1,000 residential properties. The nearest residential properties are located 100m west of the route of the Proposed Scheme. Lostock

Gralam has a range of community resources, including Lostock Gralam Church of England Primary School and St John the Evangelist Church. To the south, Lostock Green has approximately 100 residential properties, separated from Lostock Gralam by the A556 Shurlach Road and the Northwich to Knutsford Line. The nearest residential properties are located on the route of the Proposed Scheme.

- 8.3.13 The area has several recreational facilities including: Griffith's Park, north of Rudheath; the Lostock picnic area alongside the A556 Shurlach Road, south-west of Lostock Green; and Long Wood and Winnington and Peas Wood Local Wildlife Site (LWS), east of Lostock Gralam. The Plumley Lime Beds Nature Reserve and SSSI also lies east of Lostock Gralam.

## **Demographic and health profile of the Wimboldsley to Lostock Gralam area**

- 8.3.14 A review of publicly available health and demographic information has been undertaken to inform the health assessment. The information gathered describes the populations that could be affected by the Proposed Scheme in terms of their key characteristics such as size, distribution, age structure, socio-economic status and health. It enables consideration of the nature of the populations affected and their sensitivity to potential health effects, as well as indicating the prevalence of specific vulnerable groups.
- 8.3.15 The communities affected by the Proposed Scheme in the Wimboldsley to Lostock Gralam area have a relatively low population density compared to the national average.
- 8.3.16 Public health indicators have been benchmarked by Public Health England<sup>56</sup> to show how a local authority compares to England for each specific indicator. The benchmark is presented on a three-point scale: worse than, similar to and better than the English average. The data provided by Public Health England show that this population has a similar health status compared with the English average.
- 8.3.17 The English Indices of Deprivation<sup>57</sup> rank neighbourhoods from most to least deprived, according to a range of criteria and an overall (combined) ranking. The neighbourhoods in the Wimboldsley to Lostock Gralam area are generally less deprived than the national average, falling mainly within the 10% to 50% least deprived bands.
- 8.3.18 This area as a whole is considered to be slightly more resilient than the national average with regard to changes in the relevant health determinants. However, there are some vulnerabilities in terms of the health status of the population.
- 8.3.19 The available data provide detail down to local authority and ward level and enable a profile to be made of the population within the Wimboldsley to Lostock Gralam area. The description of the whole population, and the populations within wards, does not preclude

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<sup>56</sup> Public Health England (2019), *Local Authority Health Profiles*. Available online at: <https://fingertips.phe.org.uk/profile/health-profiles>.

<sup>57</sup> Ministry of Housing, Communities and Local Government (2019), *English indices of deprivation 2019*. Available online at: <https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019>.

the possibility that there will be individuals or groups of people who do not conform to the overall profile.

## Future baseline

### Construction (2025)

8.3.20 Volume 5: Appendix CT-004-00000 provides details of the developments in the Wimboldsley to Lostock Gralam area that are assumed to have been implemented by 2025. The following committed developments of relevance to the health assessment that would materially alter the future baseline during construction of the Proposed Scheme in this area, are set out in Table 23.

**Table 23: Committed developments of relevance to health during construction**

Map book reference <sup>58</sup>	Planning reference	Description	How this is considered in the assessment
MA02/277	17/01434/FUL	Location: 411 Manchester Road, Lostock Gralam, Northwich. Construction of 16 no. residential units comprising 8 no. four person two bedroom terraced dwellings, 4 no. seven person dwellings and 4 no. three person two bedroom maisonette apartments	Informing future baseline.
MA02/062	17/04252/FUL	Location: Old Hall Farm, Bostock Road, Bostock, Winsford, CW10 9JF. Conversion of agricultural building into seven residential dwellings and associated works.	Informing future baseline.
MA02/217	17/03135/OUT	Location: land north of Middlewich Road, Clive. Outline planning application for the construction of up to 21 dwellings, provision of a vehicular access off Middlewich Road, car parking, ancillary green space, landscaping and other associated works.	Informing future baseline.
MA02/342	19/00468/FUL	Location: 162 Middlewich Road, Rudheath, Northwich, Cheshire, CW9 7DX. Demolition of existing detached dwelling and erection of a 2 storey (Use Class C2) 68 bed residential care home	Informing future baseline.
MA02/348	20/00923/FUL	Location: farm building, Manor Farm, Old Lane, Davenham, Northwich, CW9 7SD. Conversion of traditional agricultural buildings into six dwellings with associated parking and gardens. Conversion two steel portal framed agricultural buildings into car ports and demolition of all other redundant modern agricultural buildings.	Informing future baseline.

<sup>58</sup> Volume 5: Planning Data/Committed Development Map Book: Maps CT13-304b to CT-13-309a.

- 8.3.21 The following committed developments have been included as part of the future baseline and considered within this assessment:
- the implementation of committed development MA02/277 will result in a residential development located 300m to the west of the land required for the construction of the Proposed Scheme;
  - the implementation of committed development MA02/062 will result in seven residential properties located 40m to the west of the land required for the construction of the Proposed Scheme;
  - the implementation of committed development MA02/217 will result in a residential development located 600m to the west of the land required for the construction of the Proposed Scheme;
  - the implementation of committed development MA02/342 will result in a residential care home located 80m to the west of the land required for the construction of the Proposed Scheme; and
  - the implementation of committed development MA02/348 will result in six residential properties located immediately to the west of the land required for the construction of the Proposed Scheme.

## **Operation (2038)**

- 8.3.1 Volume 5: Appendix CT-004-00000 also provides details of the developments in the Wimboldsley to Lostock Gralam area that are assumed to have been implemented by 2038. No additional committed developments of relevance for the health assessment have been identified that would materially alter the future baseline in this area.

## **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. Insofar as reasonably practicable, mitigation measures have been incorporated into the design of the Proposed Scheme with the aim of avoiding or reducing adverse effects on people. The locations of construction compounds and site haul routes have been selected to reduce the number of people exposed to construction impacts insofar as reasonably practicable. The mitigation measures incorporated into the design of the Proposed Scheme in the Wimboldsley to Lostock Gralam area are described in Section 2.
- 8.4.2 Contractors will be required to comply with the environmental management regime for the Proposed Scheme, set out in the draft Code of Construction Practice (CoCP)<sup>59</sup>, which provides a general basis for route-wide construction environmental management.

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<sup>59</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

Contractors will also be required to comply with the measures set out in Local Environmental Management Plans (LEMP), which will apply the environmental management strategies at a local level.

- 8.4.3 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.
- 8.4.4 The CoCP will require contractors to produce and implement a community engagement framework, 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. Contractors will 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, while taking into account the specific needs of protected groups (as defined in the Equality Act 2010).
- 8.4.5 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**

- 8.4.6 Impacts on health determinants resulting from the construction of the Proposed Scheme are presented in the health assessment matrix in Volume 5: Appendix HA-001-OMA02. The health assessment criteria are described within the SMR. Within the assessment matrix, the assessment criteria are applied to determine which impacts are likely to lead to health and wellbeing effects at the population level. These effects are reported in the assessment sections below.

## **Neighbourhood quality**

- 8.4.7 The neighbourhood quality assessment identifies changes in the character and amenity of neighbourhoods along the route of the Proposed Scheme. It includes public realm such as streets, footpaths, public squares, parks and playing fields. It does not include residential or other private property. The assessment identifies combinations of impacts on two or more of the following environmental factors within the public realm: traffic, noise and vibration, landscape and visual impacts. When these factors are altered people's levels of satisfaction with their living environment may change, which in turn may affect their mental wellbeing. This may include reduced feelings of attachment to, and pride in, their neighbourhood and reduced enjoyment of outside space.



- 8.4.8 A review of published research evidence linking neighbourhood quality with health and wellbeing can be found in Volume 5: Appendix HA-002-00000. The evidence linking the various aspects of neighbourhood quality with health outcomes ranges from moderate to strong.
- 8.4.9 The neighbourhood quality assessment uses information from other topics but does not apply the same assessment thresholds, as it is focused on neighbourhoods rather than individual receptors. The construction of the Proposed Scheme will affect neighbourhood quality through impacts such as noise, visual impacts and additional traffic, including heavy goods vehicles (HGVs)<sup>60</sup>. These impacts are described in Section 11, Landscape and visual, Section 13, Sound, noise and vibration and Section 14, Traffic and transport.
- 8.4.10 Construction of Clive Green south embankments no. 1, 2, and 3 will be visible for the community of Clive Green. Construction noise will be noticeable and is expected to last for approximately one year and three months. Clive Green Lane is a designated route for construction traffic and is expected to experience a significant increase in HGV traffic movements (between the A530 Nantwich Road and Clive Back Lane). People in this community is likely to experience these features of the Proposed Scheme as changing the quality of their neighbourhood and to regard that change as adverse.
- 8.4.11 The B5309 Centurion Way in Middlewich is a designated route for construction traffic and is expected to experience a significant increase in HGV traffic movements. Significant HGV traffic effects are expected to combine with significant traffic noise effects on residential properties on the B5309 Centurion Way (between the B5081 Byley Lane and the B5309 King Street) during the peak months of construction. People in this community are likely to experience these effects as changing the quality of their neighbourhood and to regard that change as adverse, in diminishing the amenity of the settlement.
- 8.4.12 The B5081 Byley Road in Byley is a designated route for construction traffic and is expected to experience a significant increase in HGV traffic movements. Significant HGV traffic effects are expected to combine with significant traffic noise effects on residential properties on the B5081 Byley Road (between Lily Lane and the B5082 Northwich Road) during the peak months of construction. People in this community are likely to experience these effects as changing the quality of their neighbourhood and to regard that change as adverse, in diminishing the amenity of the settlement.

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

- 8.4.13 There is moderate evidence to show that access to green space contributes to good mental health, including reduced stress and improved cognitive function and resilience. There is also moderate evidence that environmental factors such as access to high quality green

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<sup>60</sup> HGV traffic effects are where there is a 30% or more increase in HGV traffic movements which have been identified as significant by traffic and transport. The increase in HGV traffic results in a traffic-related severance effect for non-motorised users. They contribute to neighbourhood quality effects on health resources that are located adjacent to the routes that experience the increase in HGV movements.

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space, safety and amenity can influence participation in physical activity. Physical activity is strongly linked to health outcomes. A review of published research evidence linking access to green space, recreation and physical activity with health and wellbeing can be found in Volume 5: Appendix HA-002-00000.

- 8.4.14 The route of the Proposed Scheme will intersect some PRoW in the Wimboldsley to Lostock Gralam area. Effects relating to the severance and diversion of PRoW (public footpaths and bridleways) are described in Section 14, Traffic and transport. Surveys of the user numbers and condition of PRoW have been undertaken and are reported in Background Information and Data<sup>61</sup> (see BID TR-004-00001: Transport Assessment policy and data report). Where PRoW and other routes are a 'promoted' destination in their own right as a recreational resource, they are also assessed within the Section 6, Community. Effects on views from PRoW are assessed in Section 11, Landscape and visual effects. PRoW are not identified as sensitive receptors in the assessment of sound, noise and vibration (Section 13) as they are, by their nature, transitory in their use, with users not staying in any one location for any length of time. However, during construction, the amenity and recreational value of some PRoW will be temporarily reduced due to their proximity to construction activities, as well as other aspects such as changes in the length and appearance, and the addition of features such as underpasses. This may result in some people using alternative routes or, where a suitable alternative is not available, being deterred from using PRoW, leading to adverse effects on wellbeing for some individuals. However, the impacts on PRoW are not considered to reduce access to green space and levels of physical activity to a level that would lead to adverse health effects on the population in the Wimboldsley to Lostock Gralam area.
- 8.4.15 Construction traffic, including HGVs, will be present on local roads within the Wimboldsley to Lostock Gralam area as described in Section 14, Traffic and transport. The presence of HGVs is likely to deter some non-motorised users (pedestrians, cyclists and equestrians) from using the affected routes, due to concerns about safety and amenity. In the case of recreational users, it is considered that alternative routes will be available. However, for those using these routes for active travel to work or to access shops and services, there is the possibility that people will choose instead to travel by car, temporarily reducing levels of physical activity and associated health and wellbeing benefits. Given the location of construction traffic routes and the number of HGV movements, it is considered that any reduction in physical activity would be small, and would not lead to adverse health effects on the population in the Wimboldsley to Lostock Gralam area.
- 8.4.16 The construction of Smoker Brook viaduct will temporarily require 1.2ha (10%) and permanently require 0.4ha (3%) of the 12.1ha of land at Winnington and Peas Wood LWS. The wood is located to the north of the A556 Shurlach Road and the A559 Manchester Road, and north-east of Lostock Gralam. It is a public open space, which comprises walking routes through woodland. The construction of Smoker Brook viaduct will permanently sever access

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<sup>61</sup> High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background Information and Data*. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

to the woodland from the A559 Manchester Road, meaning that the majority of the walking track and woodland will be inaccessible. The open space will be unusable for its intended purpose. There are limited alternatives nearby. Therefore, the reduction in opportunities for physical activity and access to green space is considered to result in an adverse health effect.

## Education

- 8.4.17 There is moderate evidence linking low levels of education with poor mental and physical health. The majority of evidence linking education with health outcomes looks at educational attainment in the context of broader socio-demographic status. Educational attainment influences socio-economic factors such as earnings and home ownership, as well as self-esteem and lifestyle choices. A review of published research evidence linking education with health and wellbeing can be found in Volume 5: Appendix HA-002-00000.
- 8.4.18 Health and wellbeing effects resulting from impacts on educational facilities are reported in this section. Health and wellbeing effects associated with construction skills and training are assessed in Volume 3: Route-wide effects, Section 8. Significant effects on education facilities resulting from noise are reported in Section 13, Sound, noise and vibration.
- 8.4.19 The construction of Stanthorne North embankment will result in the demolition of Greenheyes Farm, a residential and working dairy farm on the A533 Northwich Road in Stanthorne. The farm provides educational trips for local groups and is part of the Countryside Stewardship Scheme, meaning that they do not charge for farm visits. The visits are open to all age groups and there is partial access for disabled visitors. The loss of the facilities provided by the farm will result in a reduction in the beneficial wellbeing effects associated with educational activities, and therefore, is considered to result in an adverse health effect.

## Social capital

- 8.4.20 The term 'social capital' refers to 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. The Office for National Statistics<sup>62</sup> 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."
- 8.4.21 There is moderate evidence for a link between social capital and mental and physical health outcomes. A change in social capital has the potential to influence the mental health effects that are gained through social contact and support, social participation, reciprocity and trust.

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<sup>62</sup> Office for National Statistics (2014), *Measuring social capital*. Available online at: [https://webarchive.nationalarchives.gov.uk/20160107115718/http://www.ons.gov.uk/ons/dcp171766\\_371693.pdf](https://webarchive.nationalarchives.gov.uk/20160107115718/http://www.ons.gov.uk/ons/dcp171766_371693.pdf).

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Adverse effects on health from changes in social capital could be experienced as a reduction in mental wellbeing or as physiological effects on the body's hormonal and immune systems, with increased susceptibility to mental and physical illness. A review of published research evidence linking social capital with health and wellbeing can be found in Volume 5: Appendix HA-002-00000.

- 8.4.22 The settlements along the route of the Proposed Scheme support small, well-established communities. The assessment has identified potential wellbeing effects within these communities associated with the temporary construction workforce, which will be substantial relative to the size of these communities. Temporary worker accommodation will be provided at three satellite compounds:
- Crewe North RSD satellite compound 1 will provide temporary accommodation for up to 90 workers for up to three years;
  - A54 Middlewich Road satellite compound will provide temporary accommodation for up to 125 workers for up to three years and six months; and
  - Gad Brook viaduct north satellite compound will provide temporary accommodation for up to 100 workers for up to two years and five months.
- 8.4.23 During the day, the workforce will be present on construction sites and compounds throughout the area, including work sites and satellite compounds in the vicinity of the settlements of Wimboldsley, Clive Green, Stanthorne, Bostock Green, Whatcroft, Rudheath, Lostock Green and Lostock Gralam. The daily average number of workers at each site will typically be around 30 to 110, and the duration of the works at each site will range from up to one year and three months to up to nine years. The presence of construction workers is likely to be noticeable, with construction vehicles using assigned local roads to access compounds, and workers using facilities in local settlements.
- 8.4.24 The introduction of a temporary construction workforce into established communities has the potential to negatively alter people's perceptions of, and interactions with, 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.
- 8.4.25 The draft CoCP includes a commitment to produce and implement a community engagement framework and provide appropriately experienced community relations personnel to implement the framework and provide a first point of contact. HS2 Ltd will engage with local authorities and community representatives to identify measures aimed at fostering and maintaining good relationships between the workforce and local communities. Any measures identified will be included within the community engagement framework as appropriate.
- 8.4.26 Loss of residential properties can cause changes to the social environment within the remaining community. This could involve the direct loss of contacts in the local area and/or a noticeable reduction in the number of people using local facilities. 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. This has been 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 from residential demolitions identified in Section 6, Community, will result in adverse effects on social capital.

- 8.4.27 The Proposed Scheme will result in the demolition of five properties in the village of Wimboldsley. This represents a relatively sizeable proportion of the local community. The erosion of social networks resulting from these demolitions will have the potential to reduce social capital, reducing the beneficial health effects that are gained through social contact and support.

## **Other mitigation measures**

- 8.4.28 HS2 Ltd will engage with local authorities and community representatives to identify measures aimed at fostering and maintaining good relationships between the workforce and local communities. Any measures identified will be included within the community engagement framework as appropriate.
- 8.4.29 HS2 Ltd propose to re-instate the permissive path through Winnington and Peas Wood LWS during operation, re-routing the path around the Smoker Brook viaduct piers if necessary.
- 8.4.30 No other mitigation measures are proposed in the Wimboldsley to Lostock Gralam area.

## **Cumulative effects**

- 8.4.31 The assessment has considered whether the cumulative effects of the Proposed Scheme and other committed developments are likely to give rise to additional health effects. No cumulative health effects have been identified.
- 8.4.32 Cumulative effects may also occur where a number of individual health effects come together within a location, such that a considerable proportion of the population is likely to experience more than one type of health effect. This will place increased stress on those individuals affected and may exacerbate health outcomes associated with the individual effects.
- 8.4.33 In Wimboldsley, the construction of the Proposed Scheme will affect neighbourhood quality and social capital. It is expected that the majority of the population at Wimboldsley will experience impacts on two or more health determinants during the construction of the Proposed Scheme, and this may therefore result in a cumulative effect on health.

## **8.5 Effects arising from operation**

### **Avoidance and mitigation measures**

- 8.5.1 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

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economic issues. Insofar as reasonably practicable, mitigation measures have been incorporated into the design of the Proposed Scheme with the aim of avoiding or reducing adverse effects on people. The mitigation measures incorporated into the design of the Proposed Scheme in the Wimboldsley to Lostock Gralam area are described in Section 2 and include:

- landscape mitigation planting along the route of the Proposed Scheme to provide visual screening for residents of properties in Occlestone Green, Park Farm, other properties to the east and users of the Shropshire Union Canal (Middlewich Branch);
- landscape mitigation around the A530 Nantwich Road/Coalpit Lane roundabout to provide visual screening for users of the A530 Nantwich Road and Coalpit Lane;
- noise fence barriers to provide acoustic screening for residents of properties in Clive and Stanthorne;
- noise fence barriers along Gad Brook viaduct, Rudheath embankment and Wade Brook viaduct to provide acoustic screening for residents of properties around Davenham Road and in Whatcroft, Rudheath and Lostock Green;
- landscape mitigation planting along Cookes Lane, the A556 Shurlach Road and Birches Lane to provide visual screening for the A556 Shurlach Road and residents of properties in Lostock Green and on Birches Lane;
- a noise fence barrier to provide acoustic screening for residents of properties in Lostock Gralam and on Ascol Drive; and
- landscape mitigation planting along the route of the Proposed Scheme, within Crewe North rolling stock depot, the West Coast Main Line (WCML) and Clive Green South embankment, to provide visual screening for residents of properties in Stanthorne Park Mews, Wimboldsley Grange and users of the Shropshire Union Canal (Middlewich Branch).

## **Assessment of impacts and effects**

- 8.5.2 Impacts on health determinants resulting from the operation of the Proposed Scheme are presented in the health assessment matrix in Volume 5: Appendix HA-001-0MA02. The health assessment criteria are detailed within the SMR. Within the assessment matrix, the assessment criteria are applied to determine which impacts are likely to lead to health and wellbeing effects at population level. These effects are reported in the assessment sections below.

### **Neighbourhood quality**

- 8.5.3 Noise and visual impacts from passing trains will result in permanent operational impacts on neighbourhood quality in the communities in proximity to the Proposed Scheme, including Clive Green, Clive, Stanthorne, Whatcroft and on parts of Davenham Road. These operational impacts will be experienced alongside permanent construction impacts, including the presence of railway infrastructure within the local landscape.



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- 8.5.4 Trains running on Clive Green South embankment no.3 will be visible from street level in some parts of Clive Green. Noise from passing trains will also be noticeable in these locations during the daytime and night-time. Residents living in Clive Green are likely to experience these features of the Proposed Scheme as changing the quality of their neighbourhood and to regard that change as adverse.
- 8.5.5 Overhead line equipment and trains running on Stanthorne South embankment no.1 will be visible from streets in Clive. Noise from passing trains will also be noticeable in these locations during the daytime and night-time. Residents living in Clive are likely to experience these features of the Proposed Scheme as changing the quality of their neighbourhood and to regard that change as adverse.
- 8.5.6 Overhead line equipment and trains running on Stanthorne South embankment no. 1 will be visible from streets in Stanthorne. Noise from passing trains and trains passing through Middlewich box structure will be noticeable in this area. Residents living in Stanthorne are likely to experience these features of the Proposed Scheme as changing the quality of their neighbourhood and to regard that change as adverse.
- 8.5.7 Overhead line equipment and trains running on Dane Valley embankment and Puddinglake Brook viaduct will be visible from street level in Whatcroft. Noise from passing trains will also be noticeable in Whatcroft. Residents living in Whatcroft are likely to experience these features of the Proposed Scheme as changing the quality of their neighbourhood and to regard that change as adverse.
- 8.5.8 The trains running on Gad Brook viaduct will be visible from Pear Tree Farm Cottages, Davenham Road. Noise from passing trains will also be noticeable. Residents living in Pear Tree Farm Cottages are likely to experience these features of the Proposed Scheme as changing the quality of their neighbourhood and to regard that change as adverse.
- 8.5.9 It is considered likely that the effects on wellbeing will lessen over time, as mitigation planting becomes established and as communities become accustomed to the presence of the Proposed Scheme.

## **Other mitigation measures**

- 8.5.10 Avoidance and mitigation measures are described above. No other mitigation measures have been identified.

## **Cumulative effects**

- 8.5.11 No cumulative effects have been identified.

## **Monitoring**

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



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- 8.5.13 Proposals for monitoring of precursors to health effects, such as air quality and noise, are reported in Sections 5 and 13.
- 8.5.14 Any area-specific operational monitoring requirements in relation to air quality effects, noise and vibration effects, traffic effects and visual effects that have contributed to the health assessment are described in the relevant sections of this Volume 2 report.

## 9 Historic environment

### 9.1 Introduction

- 9.1.1 This section of the report provides a description of baseline conditions for heritage assets and the identified impacts and likely significant effects resulting from the construction and operation of the Proposed Scheme within the Wimboldsley to Lostock Gralam area. Consideration is given to the extent and value of heritage assets including archaeological and palaeoenvironmental remains, historic buildings, the built environment and historic landscape.
- 9.1.2 Engagement has been undertaken with Historic England, Cheshire East Council, Cheshire West and Chester Council, Cheshire Archaeological Planning Advisory Service, and the Canal & River Trust. 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.
- 9.1.3 Appendices and Background Information and Data (BID<sup>63</sup>) reports accompany this section of the report. These are:
- Volume 5: Appendix HE-002-0MA04 – Summary gazetteer, impact assessment table and archaeological character areas;
  - Volume 5: Appendix HE-003-0MA04 – Historic landscape character areas;
  - Volume 5, Map Book HE-01 and HE-02 – Heritage assets within the study area and Map Book HE-03 - Archaeological sub-zones;
  - BID HE-001-0MA02 – Historic environment baseline report (including a detailed gazetteer of heritage assets);
  - BID HE-004-0MA02 – Historic environment field survey report (geophysical survey), and Map Book HE-004; and
  - BID HE-005-0MA02 – Historic environment remote sensing survey report (aerial photograph and LiDAR<sup>64</sup> assessment), and Map Book HE-005.
- 9.1.4 Heritage assets have been given a Unique gazetteer identifier (UID), for example MA02\_0001. These have been allocated to all heritage assets within the gazetteer and are referenced throughout the ES, BID reports and in map books.
- 9.1.5 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

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<sup>63</sup> High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background Information and Data*. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

<sup>64</sup> LiDAR (meaning ‘light detection and ranging’) is a surveying method that measures distance to a target by illuminating the target with pulsed laser light and measuring the reflected pulses with a sensor, this can be used to identify archaeological earthwork evidence.

Proposed Scheme can be found in the Volume 2: MA02 Map Book. The Proposed Scheme is described in Section 2.

## 9.2 Scope, assumptions and limitations

- 9.2.1 The general scope, assumptions and limitations for the historic environment assessment are set out in full in Volume 1, Section 8 and the EIA Scope and Methodology Report (SMR)<sup>65</sup>, including the method for determining the value of a heritage asset and magnitude of impact.
- 9.2.2 The assessment focuses on the extent to which the Proposed Scheme will affect designated and non-designated heritage assets. The Proposed Scheme could impact heritage assets through the alteration, demolition or removal of the asset, or as a result of changes within the asset's setting, where setting contributes to the value of the asset.
- 9.2.3 The study area for the assessment of effects on designated and non-designated heritage assets is the land required for the construction of the Proposed Scheme plus 500m on each side in rural areas. This is referred to in the remainder of this section as the 500m study area.
- 9.2.4 Designated heritage assets within a study area of up to 2km from the land required for the construction and operation of the Proposed Scheme have been considered in relation to potential effects arising from changes within an asset's setting. This is referred to in the remainder of this section as the 2km study area.
- 9.2.5 The historic environment methodology includes the consideration of the relevant interactions with other topics, including ecology and biodiversity, landscape and visual, socio-economics, sound noise and vibration, water resources and flood risk, and in-combination climate change impacts. These interactions have been included in the assessment of baseline conditions, impacts and effects.
- 9.2.6 Where noise is considered, this is within the context of the way in which sound and noise currently contribute 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 For the purpose of this assessment, it is generally assumed that heritage assets within the land required for the construction of the Proposed Scheme will be removed. Exceptions to this are: linear heritage assets (canals and railways); the Verdin Arms (MA02\_0003); Middlewich Branch Canal Bridge Number 19 at 680 624 (MA02\_0007); and Middlewich Branch Canal Bridge Number 20 at SJ 679 630 (MA02\_0010); which although partially located within the land required for the construction of the Proposed Scheme will not be removed.

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<sup>65</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

## 9.3 Environmental baseline

### Existing baseline

9.3.1 A full list of data sources used in establishing baseline conditions is provided in BID HE-001-0MA02. In addition to the desk-based assessment, the following surveys have been undertaken in the Wimboldsley to Lostock Gralam area:

- walkover and site reconnaissance from areas of public access or in locations where site access was granted. This was carried out in order to understand the character of the historic landscape; review the nature, condition and setting of known heritage assets; and identify previously unknown assets;
- desk-top analysis of remote sensing data, including LiDAR and aerial photographs (BID HE-005-0MA02); and
- a programme of non-invasive geophysical survey in areas identified as suitable for this survey method and where access was granted (BID HE-004-0MA02).

### Designated assets

9.3.2 Designated heritage assets within the 2km study area are described in Volume 5: Appendix HE-002-0MA02. The following designated heritage assets are located partially or wholly within the land required for the construction of the Proposed Scheme:

- Grade II listed Middlewich Branch Canal Bridge Number 19 at 680 624 (MA02\_0007), of moderate heritage value;
- Grade II listed Middlewich Branch Canal Bridge Number 20 at SJ 679 630 (MA02\_0010), of moderate heritage value;
- Grade II listed Milepost, Bostock Road (East) (MA02\_0083), of moderate heritage value;
- Bostock Conservation Area (MA02\_0113), of moderate heritage value;
- Trent and Mersey Canal Conservation Area – Middlewich to Preston Brook (MA02\_0114), of moderate heritage value; and
- Trent and Mersey Canal Conservation Area – Middlewich to Kent Green (MA02\_0314), of moderate heritage value.

9.3.3 The assets summarised below are located outside of the land required for the construction of the Proposed Scheme but are partially or wholly within the 2km study area. Only assets where a significant effect is predicted, as described in Section 9.4 and 9.5, are named below:

- ten scheduled monuments comprising a Roman fort, five medieval moated sites, two post-medieval industrial sites, two salt-working sites and the World War II defences of the former airfield at RAF Cranage (MA02\_0218), all of high heritage value;
- a Grade I listed church of high heritage value;

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- thirteen Grade II\* listed buildings comprising eight country houses including Lea Hall (MA02\_0020) and Whatcroft Hall (MA02\_0124), a barn, a townhouse, two churches and a farmhouse, all of high heritage value;
- one hundred and thirty Grade II listed buildings including: domestic buildings, farmhouses such as Park Farmhouse (MA02\_0033), Bank Farmhouse (MA02\_0093) and Bridge Cottage and Canal Cottage (MA02\_0125); agricultural buildings; commercial buildings; war memorials; a church; a lych gate; a mortuary chapel; three tombs; two sundials; gateways; a boat house; a fountain; a walled garden; two ornamental bridges over moats; smithies; mills; salt works buildings; a water tower; a well; a school; and a bridge and weir on the River Wheelock; canal infrastructure including locks, bridges, mileposts and buildings associated with the Shropshire Union Canal, Middlewich Branch and the Trent and Mersey Canal Conservation Area; a signpost, a bridge and mileposts on the road system, all of moderate heritage value; and
- five conservation areas, all of moderate heritage value.

## Non-designated assets

- 9.3.4 The non-designated heritage assets summarised below lie wholly or partially within the land required for the construction of the Proposed Scheme. Only assets where a significant effect is predicted, as described in Section 9.4 and 9.5, are named below.
- 9.3.5 One non-designated area of archaeological potential, an asset of moderate heritage value, lies partially within land required for the construction of the Proposed Scheme. There are no non-designated assets of high heritage value within the land required for the construction of the Proposed Scheme.
- 9.3.6 There are 40 assets of low heritage value within the land required for the construction of the Proposed Scheme. These date from the Roman, medieval, post-medieval and modern periods and relate to domestic, agricultural, industrial and transportation activity in the area. The assets include: 1-4 Railway Cottages (MA02\_0004); Trackway to Wimboldsley Grange (MA02\_0011); Enclosure in Wimboldsley Parish (MA02\_0016); Yew Tree Farmhouse, off Coal Pit Lane (MA02\_0047); Greenheys Farm (MA02\_0089); Higgins Lane Farm (MA02\_0141); Brick-making site by King Street (MA02\_0158); Structure in Rudheath (MA02\_0159); Parish Boundary in Rudheath (MA02\_0160); High House Farm (MA02\_0161); Possible Roman roadside settlement, Rudheath (MA02\_0162); 5, 7, 9, 11 Birches Lane (MA02\_0179); 3 Birches Lane (MA02\_0180); RAF Cranage Airfield (MA02\_0214); Boundary Bank south of Bostock Hall (MA02\_0267); Row of pits at Park Hall Farm (MA02\_0269); Former parish boundary at Winnington Belt (MA02\_0320); Possible Former Pond near King Street (MA02\_0321); Site of Roman Salt Works Near Bostock (MA02\_0322); Irregularly shaped archaeological features at Park Farm (MA02\_0328); an Archaeological feature at Whatcroft Hall (MA02\_0329); and a Pair of archaeological features at King Street (MA02\_0330).
- 9.3.7 The non-designated heritage assets summarised below lie wholly or partially within the 500m study area.

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- 9.3.8 There are two assets of high heritage value within the 500m study area, comprising a cemetery in Middlewich and a Former command centre (MA02\_0325). There is one asset of moderate heritage value within the 500m study area: Dairy House Farm (now Stanthorne Park Mews) (MA02\_0028).
- 9.3.9 There are 88 assets of low heritage value within the 500m study area. These assets include: the remains of structures associated with RAF Cranage; several post-medieval and modern farms, farm buildings, stables and cottages; places of worship; a public house, a war memorial, a railway embankment and a telephone kiosk; as well as archaeological remains including Roman transport routes, medieval ring ditches and shrunken villages and sites relating to the salt and dairy industries.

## **Historic environment overview**

- 9.3.10 The bedrock geology of the Wimboldsley to Lostock Gralam area is largely formed of mudstone and siltstone with some halite-bearing units (salt) and sandstone. This bedrock is overlain by glacial till and isolated glaciofluvial deposits comprising sand and gravel. Alluvial deposits are located along the course of the small river and stream valleys, including River Weaver, River Wheelock, River Dane, Gad Brook, Wade Brook, Peover Eye and Smoker Brook. River terrace deposits of gravel survive along the River Dane Valley. There are limited peat deposits, in particular around Holford Moss.
- 9.3.11 Evidence for Palaeolithic activity in north-west England is scarce. During the last glaciation much of the region was on the edge of, or under, glacial ice. However, a period of dramatic climatic warming led to a rise in sea levels and a new environment where open landscapes were replaced by woodland. These changes stimulated the development of Mesolithic hunter-gatherer societies and the later subsequent emergence of the early agricultural societies of the Neolithic.
- 9.3.12 Evidence from these periods is usually characterised by discoveries of stone or flint tools that indicate hunting, fishing or agricultural activity. There is no recorded archaeological evidence from the Palaeolithic, Mesolithic or Neolithic period in the study area. However, sites of temporary camps used for hunting and gathering of resources in the Mesolithic and Neolithic period have been identified in Cheshire. There remains the potential for similar sites at topographical locations on higher ground around former wetlands at Holford Moss and in river terrace deposits such as those located on the River Dane.
- 9.3.13 The Bronze Age which followed is nationally defined by the introduction of bronze metalwork, changes in pottery style and the increase of single burials. Knowledge of the period is generally gained from physical evidence of land division, settlement and funerary practices. Individual burials became more common in funerary monuments known as round barrows. The Kinderton Hall Ring Ditch (MA02\_0306) has been interpreted as the remains of a ploughed out former round barrow. Archaeological evidence from this period includes metal artefacts discovered accidentally or during metal-detecting. These include a bronze axe from south of the A533 Northwich Road in Stanthorne and a bronze palstave, a type of hafted axe, from east of the A530 King Street in Rudheath. Bronze artefacts tend to be high

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status objects believed to be indicative of a more hierarchical society and their deposition is believed to be for ritual reasons as opposed to by chance. Evidence for agricultural practices and settlement is unknown in the study area during the Bronze Age.

- 9.3.14 The Iron Age is characterised nationally by the introduction of iron metalwork including swords, horse equipment and decorative items. The climate also became cooler and wetter, leading to intensification of agricultural practices and the use of marginal land that resulted in clearance of woodland. Nationally, this led to a better supply of food and in turn a large-scale population increase, which resulted in further evolution of the hierarchical changes which began in the Bronze Age. By the end of the first millennium BC the study area had become the territory of the Cornovii tribe. Defended sites known as hillforts, seen elsewhere during the period, are absent from the lowland plains of Cheshire. Instead Iron Age sites appear to be represented by single banked or ditched enclosures. Two unnamed sites in Wimboldsley (MA02\_0009, MA02\_0014) are unexcavated but may represent enclosed settlements. An excavated example at Poulton in Cheshire, revealed a large farmstead of roundhouses enclosed by a ditch. The first evidence for salt production in mid-Cheshire is identified as dating from the Iron Age at sites in the Wheelock, Weaver and Dane valleys. Pottery used in salt production has been widely identified at sites across Cheshire and beyond. Later Roman salt-working sites are likely to have been first utilised in the Iron Age. Plausible evidence of this has been identified within the Middlewich area of archaeological potential (MA02\_0292).
- 9.3.15 Although Britain came under Roman control after AD 43, it was not until AD 70 that the Romans began to occupy the area north of the Midlands that is nowadays Cheshire. The area became the focus of industrial production that supported the Roman fortress of Deva Victrix established at Chester in AD 74 – 75. Sites were located along the lines of the river valleys which had incised through the superficial geology exposing halite (salt) layers and brine springs. Settlements were established at Middlewich (Salinae) and Northwich (Condate). A network of Roman roads connected the settlements at Middlewich and Northwich to Chester, Manchester and Nantwich. These settlements and the surrounding area were the sites of salt-making. A Possible Roman industrial site (MA02\_0082), which may have included salt-working, has been indicated at Bostock by the discovery of lead salt pans by metal-detecting. Nearby, a remote sensing survey has identified an additional possible Roman Salt Works (MA02\_0322). There is little evidence for rural settlement except for roadside sites indicated by chance and metal-detecting finds, such as the one indicated by Roman artefacts outside Rudheath (MA02\_0162). It is likely that the occupation of enclosed settlements or farmsteads in the rural landscape continued from the Iron Age into the Roman period.
- 9.3.16 In the early medieval period, archaeological evidence becomes increasingly scarce and knowledge of the period is largely dependent on documentary sources. After the withdrawal of Roman rule in the 5th century the region of Cheshire was influenced by kingdoms in more powerful neighbouring regions, including Mercia, Northumbria, and the Hiberno-Norse from Ireland. Cheshire eventually became part of unified England by the early 10th century. It was during this period that the pattern of towns and villages in the study area was established.



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Settlements and farmsteads tended to be located on higher ground above the rivers Dane and Weaver which utilised the fertile alluvial soils in the valleys. The plains of Stublach and Lostock were less densely settled as heathland and woodland were common on the poorer quality glacial tills.

- 9.3.17 The pattern of towns and villages established in the early medieval period continued after the Norman conquest. The Domesday Survey of 1086 suggests that Northwich and Middlewich had become the main towns. Both include the Old English -wich place name element associated with Anglo-Saxon artisanal or trade towns. By at least the 11th century the 'wich' towns had become associated with the salt trade. The manors mentioned in the Domesday Survey include smaller settlements of hamlets and farmsteads such as Wimboldsley, Clive Green, Davenham, Bostock, and Lach Dennis. The earliest parishes were centred on these settlements and churches in Middlewich, Northwich and the village of Davenham have surviving medieval elements.
- 9.3.18 The Norman conquest introduced a new ruling elite of lords. The manorial system was the organising principle of the study area at this time, where legal and economic power was vested in the lord of the manor. The manorial centre was normally a hall, which from the 12th century was often surrounded by a moat. The archaeological remains survive as moated sites such as the scheduled sites at Bostock Hall (MA02\_0094) and Holford Hall (MA02\_0188). The former medieval landscape is reflected in the pattern of fields and hedgerows around Stanthorne and the Dane Valley. Lost elements, including boundaries, ditches and routeways can be identified by archaeological remains. These include an enclosure at Wimboldsley (MA02\_0016) and a trackway that leads to Wimboldsley Grange (MA02\_0011). During the medieval period, subsistence farming was common practice in mid-Cheshire, relying on barley, oats and rye and grazing of livestock. Town fields, small strip fields used by villagers around Lach Dennis and Lostock Green, suggest that a version of the open field system of collective farming was practised in the study area. Towards the end of the medieval period there was a reduction in population due to the Black Death, or Bubonic Plague, in the 14th century. This may have resulted in shrunken villages at Croxton (MA02\_0086) and Whatcroft Hall (MA02\_0123). The extent of the parishes relating to these villages was marked with banks and ditches, such as the boundary at Winnington Belt (MA02\_0320) and the parish boundary in Rudheath (MA02\_0160).
- 9.3.19 By the post-medieval period the mixed farming economy changed to pasture-based agriculture, focused on dairy farming. Poorer quality heathland on the plains around Wimboldsley, Stublach and Lostock was improved and brought into agricultural use. This corresponded with the legal enclosure of common land. In turn, agricultural pasture was improved by the application of lime and loam in a process known as marling that resulted in the distinctive marl pits located throughout the Cheshire landscape. Associated with this agricultural change were farmhouses. The earliest examples were timber-framed, and some were potentially enclosed in later brick buildings, such as the example at Twelve Acres Farmhouse (known as Wimboldsley Grange) (MA02\_0013). Fewer timber-framed agricultural buildings survive, with a rare example being the Grade II\* listed 17th century barn at Twelve Acres (MA02\_0012). By the 19th century a pattern of dairy farms had emerged that consisted

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of a farmhouse and barns for fattening cattle. The Grade II listed Park Farmhouse (MA02\_0033), the Grade II listed Bridge Cottage and Canal Cottage (MA02\_0125) and the non-designated Yew Tree Farmhouse, off Coal Pit Lane (MA02\_0047) are examples of these farmhouses. Other farms were developed by the Bostock Estate, including three farms on the Bostock Road: Greenheys Farm (MA02\_0089), the Grade II listed Bank Farmhouse (MA02\_0093) and Grade II listed Old Hall Farmhouse (MA02\_0095). The Verdin family also developed farms for their estate, including Dairy House Farm (now Stanthorne Mews) (MA02\_0028). As further land was enclosed from the marginal land near Rudheath, isolated farmsteads were built on the Stublach Plain, such as Higgins Lane Farm (MA02\_0141) and High House Farm (MA02\_0161). Other buildings associated with this agricultural economy were also constructed, such as the Structure in Rudheath (MA02\_0159).

- 9.3.20 From the 17th century high status housing continued in moated sites such as the timber-framed farmhouse at Grade II\* listed Holford Hall (MA02\_0189). However, towards the end of the century a new upper and middle-class gentry emerged, with wealth created from agriculture, the salt industry and trade. They created large rural estates, new halls and country houses within the study area. These include the Grade II\* listed Lea Hall (MA02\_0020), its associated gatepiers (MA02\_0019), and the Grade II listed Stanthorne Lodge (MA02\_0078). By the 19th century country houses including the Grade II listed Stanthorne Hall (MA02\_0076) and the Grade II\* listed Whatcroft Hall (MA02\_0124) were surrounded by designed landscapes of lodges, parkland and woodland. The estate of the Grade II\* listed Bostock Hall (MA02\_0104) is the best example in the study area. It is surrounded by a designed country park, estate buildings and an estate village that is now within Bostock Conservation Area (MA02\_0113). Its surroundings also include a boundary bank to the south (MA02\_0267). In contrast, lower status housing in rural Cheshire comprised brick-built cottages such as 1-4 Railway Cottages (MA02\_0004), 3 Birches Lane (MA02\_0180) and 5-11 Birches Lane, (MA02\_0179).
- 9.3.21 The growth of salt mining, extraction and production led to the urban expansion of Middlewich, Northwich and Winsford from the 17th century. New infrastructure was built to link these towns. Roads were turnpiked from the 18th and 19th century. Little evidence for turnpiked roads survives except for mileposts such as the Grade II listed Milepost on Bostock Road (East) (MA02\_0083). The Trent and Mersey Canal, now a conservation area in two parts (MA02\_0114; MA02\_0314), was built in 1766-1777. The Shropshire Union Canal, Middlewich Branch (MA02\_0037) was completed in 1827-1835. The railway followed with the Grand Junction Railway (MA02\_0238) built in 1837 and the Cheshire Midland Railway (MA02\_0183) was extended to Northwich in 1863. Excessive brine pumping and the collapse of salt mines in Northwich, Middlewich and Winsford during the 19th century led to large-scale subsidence. Water filled the depressions left by subsidence forming distinctive water bodies such as Whatcroft Flash adjacent to the Trent and Mersey Canal. Brick production sites also formed part of the post-medieval industry of the study area, including a site identified adjacent to King Street (MA02\_0158), utilising the alluvial clay in the superficial geology. A geophysical survey has identified archaeological features which may represent pits filled with burnt clay, also adjacent to King Street and likely related to this site (MA02\_0330).

9.3.22 From the 19th century Northwich became an important centre for chemical manufacturing. It helped develop trinitrotoluene (TNT) for explosives during the First World War at the scheduled monument of the Former Soda Ash and Calcium Nitrate Works (MA02\_0185) at Plumley Lime Beds. During the Second World War, RAF Cranage Airfield (MA02\_0214) was used for air training. It is surrounded by the scheduled remains of the World War II defences of the former airfield at RAF Cranage (MA02\_0218), which include the surviving remains of the battle headquarters, sleeping shelter and four pill boxes. Also surviving at the airfield are other remains relating to its Second World War use, including the upstanding remains of a possible former command centre and blast wall (MA02\_0325). The salt industry declined in the mid-20th century. The towns of central Cheshire, including Winsford, Middlewich and Northwich, became centres for distribution, light manufacturing and residential commuters. The A556 Chester Road was completed south of Northwich by the 1970s. This resulted in the outer suburbs of Northwich, including Rudheath and Lostock Gralam, expanding to the south and west towards the new road.

## **Future baseline**

### **Construction (2025)**

9.3.23 Volume 5: Appendix CT-004-00000 provides details of the developments in the Wimboldsley to Lostock Gralam area that are assumed to have been implemented by 2025. No committed developments have been identified in this study area that will materially alter the baseline conditions in 2025 for historic environment.

### **Operation (2038)**

9.3.24 Volume 5: Appendix CT-004-00000 also provides details of the developments in the Wimboldsley to Lostock Gralam area that are assumed to have been implemented by 2038. No committed developments have been identified in this study area that will materially alter the baseline conditions in 2038 for historic environment.

## **9.4 Effects arising during construction**

### **Avoidance and mitigation measures**

9.4.1 The design of the Proposed Scheme has sought to avoid adverse effects on heritage assets within the land required for construction insofar as reasonably practicable.

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- 9.4.2 Section 8 of the draft Code of Construction Practice (CoCP<sup>66</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 The following design measures have also been included to reduce impacts on heritage assets in the Wimboldsley to Lostock Gralam area:
- landscape and hedgerow planting will increasingly reduce the effect of changes to setting as it matures at Lea Hall (MA02\_0020), Park Farmhouse (MA02\_0033) and Whatcroft Hall (MA02\_0124);
  - landscape earthworks will reduce the effect of changes to setting at Lea Hall and Whatcroft Hall; and
  - the design of Trent and Mersey Canal viaduct will help preserve any key views as noted in the Trent and Mersey Canal Conservation Area Appraisal<sup>67</sup>, across the Whatcroft Flash in the Trent and Mersey Canal Conservation Area – Middlewich to Preston Brook (MA02\_0114).

## Assessment of impacts and effects

- 9.4.4 Impacts on all heritage assets described above have been assessed and are set out in the Impact Assessment Table (Volume 5: Appendix HE-002-0MA02). Only impacts on heritage assets resulting in significant effects are described in the assessment set out below. Effects on Historic Landscape Character Areas are set out in Volume 5: Appendix HE-003-0MA02, and again only the significant effects are described below.

## Temporary effects

- 9.4.5 The temporary construction works, such as excavations and earthworks for construction compounds, storage areas, and diversions of existing roads and services, have the potential to affect heritage assets during the construction period. Heritage assets could be affected as a result of changes within the assets' settings, where setting contributes to the value of the

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<sup>66</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

<sup>67</sup> High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background Information and Data, Historic Environment, MA02 Wimboldsley to Lostock Gralam*. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

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asset. The duration of the activities giving rise to the temporary effect described below are set out in the indicative construction programme in Section 2.3.

- 9.4.6 The following significant effects are expected to occur as a result of temporary impacts on designated or non-designated heritage assets due to changes that affect the contribution made by setting to the asset's value.
- 9.4.7 Lea Hall (MA02\_0020) is a Grade II\* listed building of high heritage value. It is located 55m from the land required for the construction of the Proposed Scheme, which surrounds it on all sides. It is a 17th century hall that derives its heritage value from its architectural and historic interest as an example of a high status, classically influenced country house. It has group heritage value with the Grade II listed gatepiers (MA02\_0019) located in the garden. These represent the location of the former entrance to the hall, but the driveway no longer exists, so their historic context has been removed. The setting of the hall is its gardens along with the former gate piers, the farm buildings and the surrounding fields, including those it faces to the east. New residential buildings have been built south of the asset and hedgerows around the asset were removed in the 20th century. The gardens and surrounding agricultural land have a quiet rural character, which is intermittently interrupted by the noise of trains that run on the West Coast Mainline (WCML) to the west of the asset. Despite these changes, the setting is consistent with its history as a former hall and estate associated with dairy farming and contributes positively to its heritage value. The construction of Crewe North rolling stock depot (RSD) and associated structures and utilities works will occur within this setting. The Crewe North RSD satellite compound will be located 205m south-east of the asset. The Proposed Scheme will introduce the noise and presence of construction machinery into the fields surrounding Lea Hall, altering its setting. This will adversely impact the heritage value of the asset as it will reduce the ability to appreciate the country house within the farmland of its former rural estate. This will constitute a medium impact and result in a major adverse significant effect.
- 9.4.8 Dairy House Farm, now known as Stanthorne Park Mews (MA02\_0028), is a non-designated asset of moderate heritage value. It is located 10m from land required for the construction of the Proposed Scheme. The asset consists of the red brick farmhouse and former courtyard of barns. It derives its heritage value as an example of architectural and agricultural design known as a 'model farm'. The setting of the asset includes fields of pasture south of Clive Green Lane with a formal avenue lined by trees forming its entrance driveway. Its setting contributes positively to the heritage value of the asset as it explains the relationship between the farmhouse and farm buildings, and the surrounding farmland. The Proposed Scheme will introduce the presence and noise of construction machinery into this setting during the construction of Clive Green South embankment, Crewe North RSD access to the east, and the realignment of Clive Green Lane 40m to the north-east. This will alter the setting of the farmhouse and reduce the ability to understand the rural context of the historic dairy farm as set within fields used for the pasture of cattle. This will adversely impact its heritage value. This will constitute a medium impact and result in a moderate adverse significant effect.

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- 9.4.9 Park Farmhouse (MA02\_0033) is a Grade II listed building of moderate heritage value. It is located approximately 15m north-east of land required for the construction of the Proposed Scheme. It is a late 17th century farmhouse which derives its heritage value from its history and as an example of the architectural development of brick-built farmhouses in Cheshire. The setting of the farmhouse is a working farmyard of 19th and 20th century agricultural barns located to the north. The setting also includes adjacent flat fields of pasture surrounded by hedgerows. The setting contributes positively to its heritage value as it is in keeping with the historical agricultural context of the farm. Construction noise and the presence of construction machinery associated with Clive Green South embankments No. 1, 2 and 3 will be introduced into the setting of the asset. This will adversely impact the heritage value of the asset as it will reduce the ability to appreciate the context of farmland within which the farmhouse was built. However, its relationship with the farmyard and fields to the west will remain unaltered. This will constitute a medium impact and result in a moderate adverse significant effect.
- 9.4.10 Bank Farmhouse (MA02\_0093) is a Grade II listed building of moderate heritage value. It is located 15m north-east of the land required for the construction of the Proposed Scheme. It is a 19th century farmhouse deriving its heritage value from its architecture and its history as a farm associated with Bostock Hall. It is set within its farmyard, north of the busy A533 Northwich Road. It maintains a relationship with the surrounding farmland north and south of the road, formerly also belonging to James France of the Bostock Estate in the 19th century. Despite the busy road, this setting makes a positive contribution to its heritage value, as it aids in understanding the asset as a former estate farm. The Proposed Scheme will introduce the presence of construction machinery into this setting, associated with the Stanthorne North embankment to the east and the realignment of the A533 Northwich Road to the south. The River Dane viaduct south satellite compound will also be located 200m north of the asset. This will adversely impact the heritage value of the asset by reducing the ability to appreciate the relationship between the farmhouse and farmland of fields used for the pasture of cattle within which it was built. This will constitute a medium impact and result in a moderate adverse significant effect.
- 9.4.11 Trent and Mersey Canal Conservation Area – Middlewich to Preston Brook (MA02\_0114) is of moderate heritage value. The asset is partially located within the land required for the Construction of the Proposed Scheme, which crosses the canal at three locations. Approximately 2.2km of the 23.5km conservation area will be affected by construction of the Proposed Scheme. This stretch of the canal served local farms between Middlewich and Northwich and retains a rural character. The conservation area comprises the land immediately surrounding the canal corridor and associated structures. The 18th century canal derives its heritage value from its historic and archaeological interest as one of the first canals on Britain's canal network. Key views noted in the conservation area appraisal are along the canal corridor itself, across the Whatcroft Flash formed by salt extraction subsidence, and west towards parkland around Bostock Hall and the spire of Davenham Church. The conservation area includes an existing railway embankment and viaduct crossing the canal by the London and North Western Railway, Middlewich Branch (MA02\_0239) at Whatcroft. The setting of this part of the conservation area is the flat fields,



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hedgerows and woodland alongside the canal corridor. This setting is characteristically quiet, with the noises of birdsong and wind in the trees audible over intermittent noise from distant rail and road traffic and farm machinery. The setting makes a positive contribution to the heritage value of the conservation area as it reflects the evolution of the canal as it passes through the historic landscape of rural farms and farmland, despite the introduction of later rail infrastructure. In particular, the setting in this area allows understanding of the historic relationship between this rural stretch of canal and the surrounding farming community. The Proposed Scheme will introduce the noise and presence of machinery associated with the construction of River Dane, Puddinglake Brook and Trent and Mersey Canal viaducts into the conservation area and its setting. This will adversely impact the heritage value of the conservation area as it will reduce the ability to understand the quiet, rural character and farmland setting of this stretch of the Trent and Mersey Canal. It will also alter key views along the canal corridor. This will constitute a medium impact and result in a moderate adverse significant effect.

- 9.4.12 Bridge Cottage and Canal Cottage (MA02\_0125) are a Grade II listed asset of moderate heritage value. The cottages are located 5m north and west of the land required for the construction of the Proposed Scheme. The two cottages are the remains of a former 19th century farmhouse that has been converted into two dwellings. They derive their heritage value from their architectural and historic interest as an example of a dairy farm. The setting of the cottages is within the farmyard of former 19th century barns of the farm and surrounded by farmland. The cottages are located off the quiet Whatcroft Hall Lane, which leads to a rural wharf on the Trent and Mersey Canal, located 120m to the north. The former farmhouse's quiet, agricultural setting contributes positively to its heritage value. It explains the relationship between the former farmhouse, the barns of the dairy farm, the surrounding fields and the lane leading to the canal wharf. The Proposed Scheme will introduce the noise and presence of construction machinery into the setting of the cottage associated with the construction of Dane Valley embankment, Puddinglake Brook viaduct, Puddinglake Brook viaduct satellite compound and utilities diversions. This will adversely impact the heritage value of the asset as it will reduce the ability to understand the former farmhouse's relationship with the surrounding quiet agricultural land. This will constitute a medium impact and result in a moderate adverse significant effect.
- 9.4.13 The World War II defences of the former airfield of RAF Cranage (MA02\_0218) is a scheduled monument of high value. The scheduled monument comprises six separate scheduled areas; the remains of a battle headquarters, an anti-aircraft gunpost, an aircrew sleeping shelter and four pillboxes. These are located around MA02 Borrow Pit D, with the closest at a distance of 50m from land required for the construction of the Proposed Scheme. The scheduled monument has heritage value derived from archaeological and historic interest, as an example of military airfield defences. The separate scheduled areas are set around the edge of the former airfield of RAF Cranage (MA02\_0214), an area of characteristically flat agricultural land within which some of the layout of the former airfield is partly legible. Intervisibility between the elements has been affected by the introduction of hedgerows and woodland. The setting also includes the industrial areas and the village of Byley in the west, and the M6 in the east. The extent of the former airfield provides the historic context to the



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upstanding remains of the defences as part of a single Second World War site. The setting therefore contributes positively to the heritage value of the scheduled monument. The use of MA02 Borrow Pit D will be partially within this setting. This will reduce the ability to appreciate the scheduled areas as related to one another and their relationship with the flat agricultural land chosen for the airfield, adversely impacting the heritage value of the asset. This will constitute a medium impact and result in a major adverse significant effect.

- 9.4.14 The former RAF Cranage Airfield (MA02\_0214) is a non-designated asset of low value which is partly within the land required for the excavation of MA02 Borrow Pit D. The asset comprises the extent of the former airfield. Its present character is an area of flat agricultural land within which some of the layout of RAF Cranage persists in the field pattern. However, the introduction of the M6 in the east, a gas storage facility and industrial estate in the west and the introduction of new field boundaries has reduced the legibility of the historic airfield. The asset derives heritage value from its historic interest associated with its role as a training airfield in the Defence of Britain campaign and its subsequent use as a flying school. The former airfield also has the potential for unknown archaeological remains. It has group value with the upstanding scheduled monument (MA02\_0218) and possible former Command Post (MA02\_0335); and with known archaeological features which help explain its former function, including aircraft taxiways (MA02\_0273), waterworks (MA02\_0275), an extractive pit (MA02\_0323) and a dispersal pen (MA02\_0327). The excavation of MA02 Borrow Pit D will modify the characteristically flat topography of the former airfield and reduce the legibility of its layout. This will alter its character, which will reduce the ability to recognise it as an historic airfield and therefore adversely impact its heritage value. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.15 The former command centre of RAF Cranage (MA02\_0325) is a non-designated asset of high value, located 55m south of MA02 Borrow Pit D. The asset comprises upstanding remains of a square building and a W-shaped blast wall covering the eastern elevation. It derives heritage value from its historic and archaeological interest as an example of military airfield defences. The asset's setting includes the former airfield of RAF Cranage (MA02\_0214), an area of characteristically flat agricultural land within which some of the layout of the former airfield is partly legible. Its setting also includes the nearest elements of the scheduled World War II defences of the former airfield of RAF Cranage (MA02\_0218), namely the southern and western pillboxes. It has group value with the scheduled monument. Intervisibility between the asset and the upstanding remains of the scheduled monument is reduced by field boundaries. The setting also includes an industrial estate to the south, on the edge of Byley. The extent of the former airfield provides the historic context to the upstanding remains of the defences as part of a single Second World War site. The setting therefore contributes positively to the heritage value of the asset. The use of MA02 Borrow Pit D will be partially within this setting. This will reduce the ability to appreciate the relationship between the asset, scheduled monument and with the flat agricultural land chosen for the airfield and adversely impact its heritage value. This will constitute a medium impact and result in a major adverse significant effect.

## Permanent effects

- 9.4.16 Permanent construction phase 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 that affect the contribution made by setting to the asset's value.
- 9.4.17 The following significant effects will occur as a result of permanent physical impacts on heritage assets within the land required for the construction of the Proposed Scheme.
- 9.4.18 Numbers 1-4 Railway Cottages (MA02\_0004) are a non-designated asset of low heritage value, located within land required for the construction of the Proposed Scheme. The asset derives its heritage value from its historical and architectural interest as an example of early 20th century cottages likely built for railway workers. The cottages will be demolished to allow the construction of A530 Nantwich Road overbridge and Walley's Green embankment. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.19 Trackway to Wimboldsley Grange (MA02\_0011) is a non-designated asset of low heritage value, located mostly within land required for the construction of the Proposed Scheme. The asset derives its heritage value from its archaeological interest as an example of a former route through the rural landscape that is likely to be medieval in origin. The trackway provided a route between settlements at Wimboldsley Grange and Occlestone Green and survives as a cropmark. The asset will be removed by the construction of new utility diversions, MA02 Borrow Pit A and the Crewe North RSD. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.20 Enclosure in Wimboldsley Parish (MA02\_0016) is a non-designated asset of low heritage value, located within the land required for the construction of the Proposed Scheme. The asset derives its heritage value from its archaeological interest as an example of a former agricultural or settlement enclosure that is likely to be medieval in origin. It survives as a soil mark visible on aerial photographs. The majority of the asset will be removed by the construction of the Crewe North RSD. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.21 Yew Tree Farmhouse, off Coal Pit Lane (MA02\_0047) is a non-designated asset of low heritage value, within the land required for the construction of the Proposed Scheme. The asset derives its heritage value from its historic and archaeological interest as an example of a post-medieval farmhouse. The asset consists of the farmhouse only, which will be demolished to allow construction of Clive Green North embankment No. 2. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.22 Milepost, Bostock Road (East) (MA02\_0083) is a Grade II listed asset of moderate heritage value, located within the land required for the Proposed Scheme. The asset derives its heritage value from its historical and architectural interest as an example of a roadside milepost associated with the turnpiking of roads from the 19th century. It will be removed

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during realignment of the A533 Northwich Road and A54 Middlewich Road. This will constitute a high impact and result in a major adverse significant effect.

- 9.4.23 Greenheys Farm (MA02\_0089) is a non-designated asset of low heritage value, located within the land required for the construction of the Proposed Scheme. The asset derives its heritage value from its 19th century rural farm architecture and its history as a farm associated with Bostock Hall. The asset includes the farmhouse and two farm buildings. The farmhouse and two farm buildings will be demolished to allow construction of Stanthorne North embankment. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.24 Trent and Mersey Canal Conservation Area – Middlewich to Preston Brook (MA02\_0114), as described above, is of moderate heritage value. The River Dane viaduct, Puddinglake Brook viaduct and the Trent and Mersey Canal viaduct will be introduced into the conservation area and its setting. The River Dane viaduct will interrupt views along the canal and across the Dane Valley towards Bostock and Davenham. The Puddinglake Brook viaduct will interrupt views along the canal corridor and dominate this section of the canal. The Trent and Mersey Canal viaduct will interrupt views across the Whatcroft Flash and notably change a distinct open area of the canal by introducing the viaduct. The introduction of modern infrastructure will adversely impact the heritage value of the conservation area. Despite the presence of an existing rail viaduct this will further change the rural character and setting of this stretch of the canal in the conservation area. The canal evolved along a sinuous course, following the natural contours of the Dane Valley and the development of the distinctive flashes caused by subsidence. Where views are interrupted it will be more difficult to understand this design evolution. This will constitute a medium impact and result in a moderate adverse significant effect.
- 9.4.25 Higgins Lane Farm (MA02\_0141) is a non-designated asset of low heritage value, located within the land required for the construction of the Proposed Scheme. The asset derives its heritage value from its historic and architectural interest as a group of 19th century red brick farm buildings that demonstrate the development of the farm complex in rural Cheshire. The farmhouse and three brick barns will be demolished to allow the construction of Whatcroft North embankment. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.26 Brick-making site by King Street (MA02\_0158) is a non-designated asset of low heritage value, located within the land required for the construction of the Proposed Scheme. The asset derives its heritage value from its archaeological interest as an example of a post-medieval brick-making site. It has potential to inform on the rural production of bricks for domestic and farm buildings. The full extent of the asset is unknown, but it will likely be entirely removed by the construction of the Proposed Scheme. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.27 Structure in Rudheath (MA02\_0159) is a non-designated asset of low heritage value, located within the land required for the construction of the Proposed Scheme. The age and date of the structure is not known, but it may represent the remains of a post-medieval farm

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building. The asset derives its heritage value from its archaeological interest as an example of a possible post-medieval farm building. The archaeological remains will be removed during the diversion of utilities and realignment of the B5082 Penny's Lane. This will constitute a high impact and result in a moderate adverse significant effect.

- 9.4.28 Parish boundary in Rudheath (MA02\_0160) is a non-designated asset of low heritage value, located within the land required for the construction of the Proposed Scheme. The asset derives its heritage value from its archaeological interest as an example of the possible medieval parish boundary. The boundary is marked on the Rudheath tithe map and may be medieval or post-medieval in date. It survives as buried archaeological remains and as a visible ditch alongside the existing hedgerow. The asset will be removed to allow the construction of the Proposed Scheme. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.29 High House Farm (MA02\_0161) is a non-designated asset of low heritage value, located within the land required for construction of the Proposed Scheme. The asset derives its heritage value from its historic and architectural interest as an example of post-medieval farmhouses with associated barns. It derives additional historical interest from a likely association with the post-medieval expansion of the dairy industry in mid-Cheshire. The asset includes the farmhouse and two brick barns. The asset will be demolished to allow construction of Rudheath embankment. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.30 Roman roadside settlement, Rudheath (MA02\_0162), is a non-designated asset of low heritage value, located within the land required for the construction of the Proposed Scheme. The possible settlement was identified by the recovery of roman finds during metal detecting in a field adjacent to King Street, a Roman Road. These included 3rd and 4th century coins, coins of Constantine I from 333AD and 1st and 2nd century jewellery. The asset derives its heritage value from its archaeological interest as an example of a potential area of Roman roadside settlement. The asset will be removed to allow for the construction of the Proposed Scheme, including B5082 Penny's Lane satellite compound. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.31 Numbers 5, 7, 9, 11 Birches Lane (MA02\_0179), located in Lostock Green, are non-designated assets of low heritage value, located within the land required for the construction of the Proposed Scheme. The asset derives its heritage value from historical and archaeological interest as good examples of former farmworkers cottages. The asset will be demolished to allow construction of Rudheath embankment. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.32 Number 3 Birches Lane (MA02\_0180), located in Lostock Green, is a non-designated asset of low heritage value, located within the land required for the construction of the Proposed Scheme. The asset derives its heritage value from its historical and archaeological interest as it may contain evidence of a former farm worker's cottage. The asset will be demolished as a result of the construction of Rudheath embankment. This will constitute a high impact and result in a moderate adverse significant effect.

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- 9.4.33 RAF Cranage Airfield (MA02\_0214), as described under temporary effects above, is a non-designated asset of low value which is partly within the land required for the excavation of MA02 Borrow Pit D. Its value is partly derived from the potential for unknown archaeological remains and its association with known archaeological features which help explain its former function. The excavation of MA02 Borrow Pit D will remove any associated archaeological remains within the area of the borrow pit. This will impact the archaeological interest of the asset and therefore its heritage value. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.34 Boundary Bank south of Bostock Hall (MA02\_0267) is a non-designated asset of low heritage value, located within the land required for the construction of the Proposed Scheme. The asset was identified in remote sensing surveys. It derives its heritage value from its archaeological interest as an example of a medieval boundary associated with the parish of Bostock or Stanthorne. The asset will be removed to allow for the construction of Stanthorne North embankment and realignment of an existing access track for Bank Farm. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.35 Row of pits at Park Hall Farm (MA02\_0269) is a non-designated asset of low heritage value, located within the land required for the Proposed Scheme. The asset derives heritage value from its archaeological interest, as the pits are aligned along a former medieval field boundary. The asset will be removed to allow for construction of the Walley's Green embankment. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.36 Former parish boundary at Winnington Belt (MA02\_0320) is a non-designated asset of low heritage value, located within the land required for the Proposed Scheme. The asset derives its heritage value from its archaeological interest as a possible medieval parish boundary between Lostock Gramam and Plumley. It is depicted on the respective tithe maps and was recorded during a geophysical survey. The asset will be removed by the construction of the Proposed Scheme. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.37 Possible Former Pond near King Street (MA02\_0321) is a non-designated asset of low heritage value, located within the land required for the Proposed Scheme. It comprises an irregular square feature identified through geophysical survey at the known location of a former plantation, orchard and ponds. The asset derives value from its archaeological interest relating to past arboricultural practices. The asset will be removed during construction of the Proposed Scheme. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.38 The site of a Roman Salt Works near Bostock (MA02\_0322) is a non-designated asset of low heritage value, located within the land required for the Proposed Scheme. It comprises a largely rectangular cropmark near Bostock, towards the River Dane. The asset derives its heritage value from its archaeological interest as the possible remains of a Roman salt working site. The asset will be removed during construction of the Proposed Scheme. This will constitute a high impact and result in a moderate adverse significant effect.

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- 9.4.39 Irregularly shaped archaeological features at Park Farm (MA02\_0328) is a non-designated asset of low heritage value, located within the land required for the Proposed Scheme. The asset has heritage value as a series of five irregular features identified during geophysical survey that are of potential archaeological interest. The five separate features are of similar nature and likely related. The asset will be removed during construction of the Proposed Scheme. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.40 Archaeological feature at Whatcroft Hall (MA02\_0329) is a non-designated asset of low heritage value, located within the land required for the Proposed Scheme. The asset derives its heritage value from its archaeological interest as a probable ditch with possible association to a human settlement or agricultural activity. The asset will be removed during construction of the Proposed Scheme. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.41 Pair of archaeological features at King Street (MA02\_0330) is a non-designated asset of low heritage value, located within the land required for the Proposed Scheme. They are a pair of small anomalies representing pits or patches of burnt soil which were identified through geophysical survey. Their lack of regular shape argues against a kiln interpretation. However, they may represent clamps, irregularly shaped structures used for the burning of bricks. The asset will be removed during construction of the Proposed Scheme. This will constitute a high impact and result in a moderate adverse significant effect.
- 9.4.42 The following significant effects will occur as a result of permanent impacts on designated or non-designated heritage assets due to changes to their settings.
- 9.4.43 Lea Hall (MA02\_0020), as described above, is a Grade II\* listed building of high heritage value. The country house is located approximately 190m to the north-west of infrastructure associated with the Crewe North RSD. New infrastructure will be introduced into the rural farmland setting of the asset's former estate. This includes the infrastructure associated with Crewe North RSD, Crewe North RSD access and Crewe North RSD traction substation. This will adversely impact the heritage value of the asset as it will reduce the ability to understand it is an important country house surrounded by its estate of agricultural fields. This will constitute a low impact and result in a moderate adverse significant effect.
- 9.4.44 Dairy House Farm (now Stanthorne Park Mews) (MA02\_0028), is a non-designated asset of moderate heritage value. It is located 40m south from the route of the realigned Clive Green Lane and associated earthworks. The route of the Proposed Scheme will run on Clive Green South embankment, located east of Crewe North RSD access road, which is 170m west of the asset. The Proposed Scheme will introduce new infrastructure into the flat agricultural setting of the farmhouse. This will reduce the ability to understand the relationship between the former dairy farm and its surrounding fields, which would have been used for the pasture of cattle. It will also remove the existing driveway that forms the formal entrance to the farm and is an important element of its setting. This will constitute a medium impact and result in a moderate adverse significant effect.



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- 9.4.45 Park Farmhouse, Clive Green Lane (MA02\_0033), as described under temporary effects above, is a Grade II listed building of moderate heritage value. The construction of the Proposed Scheme will introduce Clive Green South embankments Nos. 1, 2 and 3 into the setting of the asset, 80m to its east. This new infrastructure will remove fields of pasture and hedgerows to the south-east and east and change the setting of the asset. This will affect the legibility of the agricultural setting of the asset within the Wimboldsley Plain, creating severance between the farmhouse and fields to the east. This will adversely impact the heritage value of the asset. This will constitute a medium impact and result in a moderate adverse significant effect.
- 9.4.46 Bank Farmhouse (MA02\_0093), as described under temporary effects above, is a Grade II listed building of moderate heritage value. The Proposed Scheme will run on Stanthorne North embankment and River Dane viaduct 180m east of the asset. The A533 Northwich Road will be realigned to form the A54 Middlewich Road diversion located 10m south-west of the asset. The introduction of this new infrastructure will remove farmland. This will sever the farmhouse's relationship to this land and alter its rural setting to the south and east. The realignment of the A533 Northwich Road to the south will also alter the southwards views from the farmhouse. These changes to its setting will adversely impact its heritage value as it will reduce the ability to appreciate the farmhouse within the agricultural farmland in which it was built. This will constitute a medium impact and result in a moderate adverse significant effect.
- 9.4.47 Whatcroft Hall (MA02\_0124) is a Grade II\* listed building of high heritage value. It is located 350m west of the route of Proposed Scheme. The 18th century mansion derives its heritage value from its historic and architectural interest as an example of high status rural domestic architecture. The setting of the asset is parkland surrounding the hall, working farm buildings to the east and farmland including woodland and hedgerows to the south. Key views are to the south-east across the moated site of an earlier hall and parkland towards farmland of its former estate. These views demonstrate the chronological development and history of the hall and its estate. Although views of the farmland are partly screened and filtered by vegetation and modern farm buildings, they contribute positively to the heritage value of the asset. The Dane Valley embankment will be constructed in farmland south and east of the asset. This will alter the setting of the hall and detract from key views to the south that explain the relationship between the hall, its former moated site and the farmland of the estate. This will adversely impact the heritage value of the asset as it will reduce the ability to recognise the chronological development of the surrounding landscape. This will constitute a low impact and result in a moderate adverse significant effect.
- 9.4.48 Bridge Cottage and Canal Cottage (MA02\_0125), as described under temporary effects above, is a Grade II listed building of moderate heritage value. The cottages are located off the quiet Whatcroft Hall Lane, which leads to a rural wharf on the Trent and Mersey Canal, located 120m to the north. The canal allowed cheese and milk to be transported to towns and cities. The former farmhouse's quiet, agricultural setting contributes positively to its heritage value. It explains the relationship between the former farmhouse, the barns of the dairy farm, the surrounding fields and the lane leading to the canal wharf. The heritage value



of the asset will be impacted by the introduction of Dane Valley embankment and Puddinglake Brook viaduct approximately 35m to the east of the asset at its closest point. This will adversely impact the heritage value of the asset as it will change its rural farmland setting. This will reduce the ability to understand the relationship between the former farmhouse, the barns of the dairy farm, the surrounding fields and the canal which allowed cheese and milk to be transported to towns and cities. This will constitute a medium impact and result in a moderate adverse significant effect.

## Other mitigation measures

- 9.4.49 Potential opportunities for further mitigation measures will continue to be considered through detailed design to reduce further the significant effects described above where practicable. These may include the identification of:
- suitable locations for advance planting, to reduce the effects of changes within the assets' setting where setting contributes to the heritage value of the asset; and
  - locations where the physical impacts on below ground heritage assets can be reduced through the design of earthworks.
- 9.4.50 The Grade II listed Milepost, Bostock Road (East) (MA02\_0083) will be removed during construction but will be safely stored for the duration of construction activities and will be returned, insofar as it is reasonably practicable, to its original location, or an alternative location agreed with the relevant stakeholders, before the Proposed Scheme is in operation.

## Summary of likely residual significant effects

- 9.4.51 The temporary effects of construction activity on the setting of heritage assets have been considered. However, as these effects result from temporary construction activities they are restricted to the duration of those activities and are reversible.
- 9.4.52 Specific mitigation measures have been incorporated as set out above and taken into account during assessment. Therefore, the residual effects are the same as those reported under permanent construction phase effects.
- 9.4.53 A major adverse effect is predicted in relation to the removal of the Grade II listed Milepost, Bostock Road (East) (MA02\_0083). However, replacing the milepost as set out above will reduce the effect to a level that is not significant.
- 9.4.54 MA02 Borrow Pit D will be reinstated following excavation, reverting changes to the setting of the World War II defences of the former airfield of RAF Cranage (MA02\_0218), the setting of the possible former Command Post (MA02\_0325) and the layout of RAF Cranage (MA02\_0214) insofar as it is reasonably practicable.

## Cumulative effects

- 9.4.55 No cumulative effects on heritage assets during construction have been identified in the Wimboldsley to Lostock Gralam area.

## 9.5 Effects arising from operation

### Avoidance and mitigation measures

- 9.5.1 Some of the design measures, as shown on the Map Series CT-06 within the Volume 2: MA02 Map Book, could reduce the operational impacts and effects on heritage assets:
- landscape mitigation planting could increasingly reduce the effect of changes within the assets' setting within the study area as it matures at Lea Hall (MA02\_0020) and Whatcroft Hall (MA02\_0124); and
  - landscape earthworks have been included within the Proposed Scheme that could reduce potential impacts on some heritage assets at Lea Hall and Whatcroft Hall.

### Assessment of impacts and effects

- 9.5.2 The assessment considers the Proposed Scheme once operational; all effects are permanent.
- 9.5.3 During the operation of the Proposed Scheme no further ground works are anticipated. 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 arising from changes in their settings due to the presence of the Proposed Scheme are reported as permanent construction effects. These effects are not repeated but will continue throughout the operation of the Proposed Scheme.
- 9.5.5 An additional significant effect is predicted at Bridge Cottage and Canal Cottage (MA02\_0125), a Grade II listed building of moderate heritage value, as described above. The intermittent noise and presence of passing of trains on the nearby Puddinglake Brook viaduct will alter the rural agricultural setting of the former farmhouse. This will impact the heritage value of the asset as it will reduce how the asset can be understood as a former farmhouse within rural agricultural fields on the quiet Whatcroft Hall Lane. This will result in a medium impact and a moderate adverse effect.

### Other mitigation measures

- 9.5.6 The Proposed Scheme includes a number of design measures to address potential impacts and significant effects. No additional operational mitigation measures beyond those included within the Proposed Scheme design have been identified. Potential opportunities

for further mitigation such as additional planting and noise fencing will be considered as part of the detailed design process.

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

- 9.5.7 No mitigation beyond that described above has been identified. As a result it is currently anticipated that residual effects will be the same as those reported in the assessment of effects during operation.

## **Cumulative effects**

- 9.5.8 No cumulative effects on heritage assets during operation have been identified in the Wimboldsley to Lostock Gralam area.

## **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.

## 10 Land quality

### 10.1 Introduction

- 10.1.1 This section of the report presents the baseline conditions along the route of the Proposed Scheme in the Wimboldsley to Lostock Gralam area in relation to land quality and reports the likely impacts and significant effects 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, mining and mineral exploitation or mineral resources point of view including geological Sites of Special Scientific Interest (SSSI) and Local Geological Sites (LGS), areas of historical and current brine extraction, 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 Cheshire East Council (CEC), Cheshire West and Chester Council (CWCC), the Environment Agency, the Animal and Plant Health Agency (APHA) and local geological interest groups. 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.
- 10.1.3 Details of baseline information, conceptual site models (CSM) and risk assessments are outlined in Volume 5: Appendix LQ-001-0MA02. Baseline data relevant to land quality are presented on Maps LQ-01-304b to LQ-01-309a (in the Volume 5: Land quality Map Book).
- 10.1.4 Maps showing the location of the key environmental features (Map Series CT-10), 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: MA02 Map Book.
- 10.1.5 Land contamination issues are closely linked with those involving water resources and waste. Issues regarding water 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).
- 10.1.6 The Proposed Scheme is described in Section 2.
- 10.1.7 All distances, lengths and area measurements in this section are approximate.

### 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 EIA Scope and Methodology Report (SMR)<sup>68</sup>.
- 10.2.2 In accordance with the SMR, a risk-based approach was undertaken to identify contamination that may have an impact in relation to construction of the Proposed Scheme.

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<sup>68</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

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To support this, a desk-based assessment has been undertaken for the study area, defined as the land required for the construction of the Proposed Scheme plus a 250m buffer. In the case of groundwater abstractions, this buffer is increased to 1km. The land quality study area also includes a 250m buffer around MA02 Borrow Pit D and a 1km buffer for groundwater abstractions.

- 10.2.3 For major above ground utilities, a pre-screening exercise has been completed to determine where these may break ground, or otherwise interact with land quality. In such cases, these are considered in the land quality assessment.
- 10.2.4 The majority of new and diverted minor utilities will be laid in the boundaries of existing highways within normal road construction layers and soils below. These have been considered in the context of the CSM approach. The lack of contact with nearby potentially contaminated sites, the usual approach to ensuring services are protected from contamination by design and choice of materials and the absence of sensitive receptors within the roadways, reduces the risk of an impact occurring. The potential impacts 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.
- 10.2.5 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.
- 10.2.6 The location of the Proposed Scheme was viewed from points of public access initially. In addition, and where permission could be obtained, visits to some key sites have been undertaken to verify desktop information. The details of site visits are provided in Background Information and Data (BID) LQ-002-0MA02<sup>69</sup>.
- 10.2.7 A CSM approach has been used to provide an understanding of the sources and 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.
- 10.2.8 The minerals assessment is based upon the mineral resources<sup>70</sup> identified in published mineral plans, and existing planning or licensed areas. Any inference of minerals provided by

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<sup>69</sup> High Speed Two Ltd (2022), High Speed Rail (Crewe - Manchester), *Background and Information Data, Land quality baseline data, BID LQ-002-0MA02*. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

<sup>70</sup> Defined in the SMR as 'mineral body including aggregates, salt, coal and other hydrocarbons, Petroleum Extraction and Development Licence (PEDLs), Shale Prospective Area (SPA)'.

geological maps/reports is excluded (except where these are covered by a published mineral plan).

- 10.2.9 The geoconservation assessment is based upon local authority and publicly available local 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 British Geological Survey (BGS), Coal Authority, CEC, CWCC, Oil and Gas Authority (OGA), Network Rail, Public Health England, the Environment Agency, Natural England and the APHA records, as well as online sources such as local geological trusts (including Cheshire Regionally Important Geological Sites (RIGS) Group). Further details are given in Volume 5: Appendix LQ-001-0MA02 and BID LQ-002-0MA02 and presented on Maps LQ-01-1-304b to LQ-01-309a (Volume 5: Land quality Map Book).

### Geology

- 10.3.2 This section describes the underlying ground conditions within the Wimboldsley to Lostock Gralam area. Recent changes in lithostratigraphic classifications by the BGS have been incorporated where appropriate.
- 10.3.3 Table 24 provides a summary of the geology (made ground, superficial and bedrock units) in the study area.

**Table 24: Summary of the geology underlying the land quality study area**

Category	Geology	Distribution	Formation description	Aquifer classification
Made ground	Made ground	Made ground is not shown in the study area on the BGS artificial ground mapping. However, although not recorded, localised deposits of made ground may be present across the previously developed land in the study area.	Artificial ground comprising variable deposits of reworked natural and man-made materials	Not designated
Superficial	Alluvium	Identified on BGS mapping <sup>71</sup> along the base of the valleys of the: River Dane; River Weaver; River Wheelock; River Croco, Wade Brook; Gad Brook; and Peover Eye and Smoker Brook which become Wincham Brook.	Organic rich clay, silt, sand and gravel	Secondary A
Superficial	River terrace deposits	Isolated locations along the valley of the River Dane and Wade Brook.	Sand and gravel	Secondary A

<sup>71</sup> British Geological Survey (2019), *BGS Geology 50k (DiGMapGN-50) WMS, superficial deposits and bedrock geology*. Available online at: [https://www.bgs.ac.uk/products/digitalmaps/digmapgb\\_50.html](https://www.bgs.ac.uk/products/digitalmaps/digmapgb_50.html).

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Category	Geology	Distribution	Formation description	Aquifer classification
Superficial	Glaciofluvial deposits	Isolated areas to the west and north-west of Stanthorne, north of Whatcroft and along the valley of Wade Brook and River Dane. Deposits in the area around Smoker Brook and Peover Eye.	Sand and gravel	Secondary A
Superficial	Glaciofluvial sheet deposits	An isolated area in the west of Middlewich and to the east of Byley.	Sand and gravel	Secondary A
Superficial	Glacial till	Located across the majority of the study area where other superficial deposits are not described.	Sandy silty clay with gravel	Secondary (Undifferentiated)
Bedrock	Mercia Mudstone Group - Sidmouth Mudstone Formation	The Sidmouth Mudstone Formation is located from the southern end of the study area to the north-west of Wimboldsley, and from the south-east of Rudheath to the east of Lostock Gralam. The Sidmouth Mudstone Formation also underlies the study area to the east of Byley.	Mudstone, siltstone and sandstone	Secondary B
Bedrock	Mercia Mudstone Group – Wilkesley Halite Member	In the easternmost extent of the study area around Middlewich. Exploited for salt mining/brine extraction.	Halite with mudstone	Unproductive strata
Bedrock	Mercia Mudstone Group - Northwich Halite Member	From the north-west of Wimboldsley to the south-east of Rudheath, and from the east of Lostock Gralam to the northern extent of the study area. Exploited for salt mining/brine extraction.	Halite stone and mudstone	Unproductive strata

- 10.3.4 Bedrock faults are recorded underlying the route of the Proposed Scheme in five locations: 300m north of the A533 Northwich Road; adjacent to both the north and south of the Winsford Rock Salt Mine waste disposal facility (to the south of Whatcroft); 200m to the south of Gad Brook; and at the Middlewich Cricket Ground.
- 10.3.5 Areas of potential collapse breccia may be present in the bedrock strata (Sidmouth Mudstone Formation and Northwich Halite Member) from 1km north of Walley's Green to Gad Brook, and from Wade Brook to the northern extent of the study area.
- 10.3.6 Farm burial or pyre sites associated with the 1967/8 and 2001 outbreaks of foot and mouth disease (FMD) are known to be present within the Wimboldsley to Lostock Gralam area. The 2001 to 2002 FMD outbreak risk assessment map<sup>72</sup> identifies the study area to lie within an FMD impacted county. Older unrecorded sites may also be present from the 1967/8 outbreak. Similarly, anthrax infected cattle burial sites may be present, generally relating to burials over 50 to 100 years ago. However, no records have been found of such burials. In all

<sup>72</sup> Animal and Plant Health Agency (2001), *Foot and Mouth Disease 2001 County Status Map 01.10.2001*.



cases, the records do not provide an exact location for the burial or pyre sites and other, unrecorded sites may be present.

## Radon

10.3.7 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>73</sup>.

10.3.8 The study area lies within a lower probability radon area, where less than 1% of homes are estimated to be at or above the action level of 200 becquerels per cubic metre of air (Bq/m<sup>3</sup>) for residential properties.

## Groundwater

10.3.9 Four aquifer designations have been identified within the study area, as defined by the Environment Agency. These are as follows:

- the river terrace deposits, alluvium, glaciofluvial deposits and the glaciofluvial sheet deposits are designated as Secondary A aquifers;
- the Sidmouth Mudstone Formation is designated as a Secondary B aquifer;
- the glacial till is designated as a Secondary (Undifferentiated) aquifer; and
- the Northwich Halite Member and Wilkesley Halite Member are designated as Unproductive Strata.

10.3.10 Table 25 sets out the groundwater abstractions and designations in the land quality study area of 1km from the land required for construction of the Proposed Scheme in the Wimboldsley to Lostock Gralam area.

**Table 25: Groundwater designations and abstractions in the land quality study area**

Feature	Details
Source Protection Zones (SPZ) associated with licensed public water supplies	None
Private licensed groundwater abstractions	None
Registered unlicensed private groundwater abstractions	At Mellor Knowl Farm to the west of Middlewich
Registered unlicensed private groundwater abstractions	At Lagoon at Rudheath Woods, Cranage
Registered unlicensed private groundwater abstractions	At Bank Farm, Stanthorne

<sup>73</sup> British Geological Survey (2020), *Radon Potential Dataset*. Available online at: <http://www.bgs.ac.uk/radon/hpa-bgs.html>. This dataset underpins Public Health England (2007), *Indicative Atlas of Radon in England and Wales*. Available online at: [www.ukradon.org/information/ukmaps](http://www.ukradon.org/information/ukmaps).

10.3.11 Further information on the groundwater in the Wimboldsley to Lostock Gralam area is provided in Section 15, Water resources and flood risk.

## Surface water

10.3.12 The route of the Proposed Scheme will cross a number of canals and main rivers, as described in Section 15, Water resources and flood risk. The main rivers and watercourses, including unnamed streams, tributaries, drains, ponds and culverts located within the study area are described in Volume 5: Appendix WR-003-0MA02.

10.3.13 There are no surface water abstractions or designations in the land quality study area of 250m from the land required for construction of the Proposed Scheme.

10.3.14 Further information on surface water in the Wimboldsley to Lostock Gralam area is provided in Section 15, Water resources and flood risk.

## Current and historical land use

10.3.15 Current potentially contaminative land uses within the study area include three landfill sites (including deep underground storage facilities), and 61 industrial and commercial sites.

10.3.16 Historical land uses identified within the study area with the potential to have caused contamination include eight landfill sites (including deep underground storage facilities), 10 shallow mining sites and 175 industrial and commercial sites. Infilled pits and ponds may have been filled with a variety of waste materials but have not been licensed.

10.3.17 Table 26 to Table 28 summarise the key current and historical contaminative land uses in the Wimboldsley to Lostock Gralam area. These are categorised into:

- landfill sites;
- mining and mineral sites; and
- industrial, commercial and other sites identified with a high risk of potential contamination.

**Table 26: Current and historical landfill sites located within the study area**

Name and area reference	Location	Description
Winsford Rock Salt Mine waste disposal facility, Middlewich (MA02-124)	The waste disposal facility is located within the land required for the operation of the Proposed Scheme, approximately 650m south of Whatcroft.	Active Environment Agency authorised 'landfill' licence reference EPR/AP3238GH. Site for the underground storage of hazardous waste. The annual waste input limit is listed as 99,000 tonnes per year. Operated by Veolia Limited.  This is a deep underground storage facility utilising salt caverns at between approximately 130m and 220m below ground level.
Holford Brinefield, Lostock Gralam (MA02-181)	The site is located within the land required for the operation of the	Active Environment Agency authorised disposal site reference EPR/XP3934SL. The

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Name and area reference	Location	Description
	Proposed Scheme on both sides of the A556 Chester Road at Lostock Green.	specified activity under the permit is the landfill for non-hazardous waste and landfill restoration. The annual waste input limit is listed as 220,000 tonnes per year. Operated by Inovyn Enterprises Limited. The only permitted waste streams are salt and brine wastes which are stored in caverns following brine washing. The depth to the top of the caverns at Holford varies with the geology but are typically 200m to 350m below ground level around Lostock Gralam.
Lostock Lime Beds and works tip, Lostock, Northwich (MA02-183)	Located adjacent to land required for the construction of the Proposed Scheme, to the north-east of Rudheath.	Environment Agency historical landfill site reference EAHLD17938. Waste deposited from 1952 to 1994, including inert, industrial, special wastes and liquid sludge.
Local authority recorded landfill, The Dingle, Wimboldsley (MA02-30)	Located 125m from land required for the construction of the Proposed Scheme, to the west of Wimboldsley Grange.	Historical Vale Royal Borough Council (now part of CWCC) local authority recorded landfill, reference 4/458. No information provided on dates of operation or wastes deposited.

**Table 27: Current and historical mining and mineral sites located within the study area**

Name and area reference	Location	Description
Sand pits (MA02-115, MA02-122)	To the north-east of Winsford Industrial Estate, located 35m and 30m from land required for the construction of the Proposed Scheme.	Historical sand pits, extracting from the glaciofluvial sheet deposits between 1875 and 1970. Between 0.5ha and 1.2ha in area.
Localised shallow mineral extraction (MA02-119)	To the north of Bank Farm near Winsford within land required for the construction of the Proposed Scheme.	Localised excavations from the glaciofluvial deposits and glacial till recorded on historical mapping from 1967. Approximately 0.15ha in area.
Winsford Rock Salt Mine, Middlewich (MA02-124)	Located at depth below the land required for the Proposed Scheme, approximately 650m south of Whatcroft.	Current rock salt mine, originally active 1844-1892, reopened 1928-present. Mine covers approximately 5km (east to west) by 3km (north to south) and is approximately 150m below ground level.
Brick works (MA02-145)	Located to the west of the Trent and Mersey Canal where it is crossed by Davenham Road.	Historical brick works suspected to be infilled. Marked on mapping between 1898 and 1909. Covers an area of approximately 1.2ha.
Holford Brinefield, Lostock Gralam (MA02-181)	The brinefield is located at depth below the land required for the construction of the Proposed Scheme, on both sides of the A556 Chester Road at Lostock Green.	Historical brinefield covering approximately 3.7km (east to west) by 3km (north to south). Salt extraction since the 19th century was initially via 'wild brine pumping'. Controlled solution mining has taken place since the 20th century.

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**Table 28: Current and historical industrial, commercial and other sites identified with a high risk of potential contamination located within the study area**

Name and area reference	Location	Description
Chemical works (MA02-200)	South-east of Lostock Gralam, 25m south of land required for the construction of the Proposed Scheme.	Historical chemical works, present on mapping between 1969 and 1974.
Ammonia soda works (MA02-211)	East of Lostock Gralam, 70m south-east of land required for construction of the Proposed Scheme.	Historical ammonia soda works for the production of ammonia nitrate for use in munitions, present on mapping between 1910 and 1911. Associated warehousing, tip and rail infrastructure were also present.
Recycling centre (MA02-107)	North-west of Middlewich, 350m north-east of land required for construction of the Proposed Scheme.	Active local authority recycling centre situated on historical recorded landfill site.
Former RAF Cranage (MA02-342)	East of Byley, underlying land required for the construction of the Proposed Scheme.	Historical Royal Air Force (RAF) Cranage, World War II airfield. Used as aircraft storage facility, flying training school, and United States Army Air Force Base. Active between 1940 and 1957.

10.3.18 Contaminants commonly associated with sites in Table 26, Table 27 and Table 28 could include metals, semi-metals, asbestos, organic and inorganic compounds. In addition, infilled pits and landfills could give rise to landfill gases, such as methane or carbon dioxide, and leachate.

## Other regulatory data

10.3.19 The regulatory data reviewed includes pollution incidents (major, significant and minor categories), radioactive and hazardous substances consents, ecological sites and environmental permits (previously landfill, integrated pollution control and integrated pollution prevention and control licences).

10.3.20 In the Wimboldsley to Lostock Gralam area this includes:

- one Control of Major Accident Hazards (COMAH) site;
- one major and five significant pollution incidents;
- forty five discharge consents to surface water, the majority of which relate to sewage or trade discharge;
- six petrol stations and numerous local authority pollution prevention and control permits;
- fifteen recorded sites with integrated pollution prevention and control permits ('Environmental Permits');
- two nationally significant ecological designations, as defined in the land quality section of the SMR. These are Wimboldsley Wood SSSI and Plumley Lime Beds SSSI; and
- thirty Local Wildlife Sites (LWS), including 15 located within, or partially within, the land required for the construction of the Proposed Scheme.

- 10.3.21 Further details of relevant regulatory data in the Wimboldsley to Lostock Gralam area is provided in Section 5 of BID LQ-002-0MA02.
- 10.3.22 Further information on ecological designations in the Wimboldsley to Lostock Gralam area is provided in Section 7, Ecology and biodiversity.

## Mineral resources

- 10.3.23 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 include sand, gravel, salt, 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 OGA via the issue of Petroleum Exploration and Development Licences (PEDL).

## Minerals plans

- 10.3.24 Cheshire County Council was responsible for the overall mineral and waste local plans for the study area. The Cheshire Replacement Minerals Local Plan<sup>74</sup> was adopted in June 1999 and sets out the policies aimed at controlling mineral related developments within the Cheshire East and Cheshire West and Chester Boroughs up to the year 2006. No further revisions of the plan were published by Cheshire County Council prior to its dissolution in 2009. No replacement plans have been published by CEC to date, although it is noted that the Minerals and Waste Development Plan Document of the new Cheshire East Local Plan is currently in preparation.
- 10.3.25 The Cheshire Mineral Resource Information map<sup>75</sup> presents the extent of all mineral extraction planning permissions and brinefields.
- 10.3.26 The CWCC local plan<sup>76</sup> was adopted in 2015. Policy ENV 9 of this plan sets out the minerals supply and minerals safeguarding within the borough. The CWCC planning policy mapping<sup>77</sup> identifies the location of the minerals sites and areas of minerals safeguarding within the borough.
- 10.3.27 The locations of specific mineral and mining resources within the study are described below.

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<sup>74</sup> Cheshire County Council (1999), *The Cheshire Replacement Minerals Local Plan*.

<sup>75</sup> Norton, G.E. et al. (2006), *Mineral Resources Information for National, Regional and Local Planning: Cheshire (comprising Cheshire and the Boroughs of Halton and Warrington)*, British Geological Survey Commissioned Report CR/05/090N.

<sup>76</sup> Cheshire West and Chester Council (2013), *Local Plan (Part One) Strategic Policies. Consultation on safeguarding of minerals and minerals infrastructure – Outcomes report*. Available online at: [https://consult.cheshirewestandchester.gov.uk/portal/cwc\\_ldf/cwc\\_lp/localplanexamination/examination?pointId=1387277962807](https://consult.cheshirewestandchester.gov.uk/portal/cwc_ldf/cwc_lp/localplanexamination/examination?pointId=1387277962807).

<sup>77</sup> Cheshire West and Chester Council, *Planning Policy Mapping*. Available online at: <https://maps.cheshirewestandchester.gov.uk/cwac/localplan>.

## **Sand and gravel deposits**

- 10.3.28 There are a limited number of recorded quarries within the study area associated with the quarrying of glaciofluvial sheet deposits for sand, and glacial till for clay.
- 10.3.29 There are 29 mineral safeguarding areas (MSA) within the Wimboldsley to Lostock Gralam area comprising superficial sand and gravel. These vary in size from less than 0.5ha to over 50ha and coincide with the mapped river terrace deposits, glaciofluvial deposits, glaciofluvial sheet deposits and alluvium.
- 10.3.30 Eight MSA will be crossed by the route of the Proposed Scheme in the following locations:
- west of Yew-Tree Farm;
  - two MSA located north of the A553 Bostock Road;
  - the River Dane north of Middlewich;
  - Puddinglake Brook in Whatcroft;
  - Gad Brook south of Rudheath;
  - Wade Brook to the south of Lostock Gralam; and
  - Wincham Brook/Smokers Brook/Peover Eye to the north of Lostock Gralam.
- 10.3.31 A further four MSA are located within land required for the construction of the Proposed Scheme at the following locations:
- north of the Shropshire Union Canal (Middlewich Branch);
  - two MSA north of Peover Eye; and
  - to the east of Byley south of the B5081 Byley Lane.

## **Salt**

- 10.3.32 The Cheshire Mineral Resource Information map<sup>75</sup> presents the extent of all mineral extraction planning permissions and brinefields. The Northwich Halite Member is used for salt extraction in the study area.
- 10.3.33 There are two main salt extraction areas Winsford Rock Salt Mine towards the south of the study area and Holford Brinefield further north. Both have a long history of salt mining and brine extraction as further detailed in Volume 5: Appendix LQ-001-0MA02 and BID<sup>69</sup>.
- 10.3.34 Caverns created by salt mining have also been utilised for waste disposal and storage (as described in Table 26).
- 10.3.35 The route of the Proposed Scheme will cross the Winsford Rock Salt Mine underground extraction permissions, to the north-east of Winsford. Salt is extracted in Winsford Rock Salt mine through deep salt mining, via 'room and pillar' method in 8m high galleries at depths of between 130m and 220m below ground level.
- 10.3.36 The route of the Proposed Scheme is also located above the currently active Holford Brinefield, to the south of Lostock Gralam. Holford Brinefield comprises a field of approximately 200 caverns. Caverns are washed through solution mining of the Northwich

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Halite Member. These typically range from 100m to 150m in diameter, 100m to 200m in height with cavern crown (top) depths of some 200m to 350m below ground level, depending on the geology.

- 10.3.37 Holford Brinefield has planning permission (Application 4/32984, dated 21 May 1998) for solution mining as well as the disposal of waste from the former Cheshire County Council.
- 10.3.38 The permission is granted under both the Town and Country Planning Act 1990 and the Environment Act 1995<sup>78</sup>. The permission covers the extent of the existing actively worked Holford Brinefield and two planned extensions (as detailed in paragraph 10.3.47).
- 10.3.39 The following additional, non-consented, salt related minerals planning information is recorded in the study area in the Cheshire Replacement Minerals Local Plan and the CWCC Local Plan:
- a preferred extension to the Warmingham Brinefield underlying the land required for the operation of the Proposed Scheme to the west of Warmingham. Warmingham Brinefield itself is located in the adjacent Hough to Walley's Green area (MA01);
  - preferred areas to the south of Winsford Rock Salt Mine to the north-east of Winsford, underlying the land required for the operation of the Proposed Scheme; and
  - preferred areas for controlled brine extraction, namely Holford Brinefield C and D, are present in the east of the study area, underlying the land required for the construction of the Proposed Scheme to the east of Middlewich, and in the area to the east of Byley.

## Coal

- 10.3.40 Deep coal (located at more than 1.2km depth) is recorded as a resource in the study area. However, available records from the Coal Authority show that the route of the Proposed Scheme will not be located in areas of recorded current or historical underground coal mining activities. As a low value resource, without a specific designation (e.g. MSA), coal is not considered further as part of the assessment.
- 10.3.41 The study area is not located within a Coal Mining Reporting Area or Development High Risk Area.

## Petroleum Exploration and Development Licences/Hydrocarbons

- 10.3.42 The OGA indicates that the route of the Proposed Scheme will pass through three PEDL areas: PEDL 292, PEDL 294 and PEDL 296. The PEDL areas are associated with extraction wells for conventional oil and gas. One of the conventional oil and gas extraction wells associated with PEDL 292 is located in the land required for the construction of the Proposed Scheme to the east of Winsford Industrial Estate. This well comprises an

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<sup>78</sup> The Environment Act 1995 (Section 96) placed a duty on all Mineral Planning Authorities (MPAs) to review and update planning permissions for mineral sites which were granted planning permission under the Town and Country Planning Acts between 1948 and 1983; and to then undertake a periodic review every 15 years thereafter. This process is known as the Review of Old Mineral Permissions (ROMPs).



abandoned exploration well in an area identified for woodland habitat creation. The study area is also within a shale prospective area (SPA).

## Geoconservation resources

- 10.3.43 No geological SSSI have been identified within the study area.
- 10.3.44 Engagement with Cheshire RIGS Group was undertaken in 2018 and data provided by the group has identified one Regionally Important Geodiversity site in the study area, referred to as Billinge Flashes. Billinge Flashes is located in the central part of the study area, 500m east of Shipbrookhill and in proximity to several farms. It comprises a number of lakes that are thought to have formed from the subsidence of a buried glacial valley resulting from rock dissolution beneath porous sands, gravels and clays, and former historical uncontrolled brine pumping in the area. Billinge Flashes will be crossed by the route of the Proposed Scheme.

## Receptors

- 10.3.45 The sensitive receptors that have been identified within the study area are summarised in Table 29. A definition of receptor sensitivity is given in the SMR.

**Table 29: Summary of sensitive receptors**

Issue	Receptor type	Receptor description	Receptor sensitivity
Land contamination	People	Residents of existing properties, and users of nurseries, schools, study centres, play areas, parks and public open space	High
Land contamination	People	Employees and visitors at commercial areas, retail parks and areas, hotels properties	Moderate
Land contamination	People	Workers at and visitors to industrial premises	Low
Land contamination	Groundwater	Secondary A aquifers (river terrace deposits, alluvium, glaciofluvial deposits and glaciofluvial sheet deposits)	Moderate
Land contamination	Groundwater	Secondary (Undifferentiated) aquifer (glacial till), Secondary B aquifer (Mercia Mudstone Group)	Low
Land contamination	Surface waters	Trent and Mersey Canal (Water Framework Directive)	Moderate
Land contamination	Surface waters	Shropshire Union Canal, River Wheelock and tributaries, River Croco, River Dane and tributaries, Puddinglake Brook, Wade Brook, Peover Eye and tributary, Smoker Brook, the Dingle, Gad Brook and tributaries and River Weaver and tributaries	Low
Land contamination	Built environment	Underground structures and buried services	Low
Land contamination	Ecological designations	SSSI (Plumley Lime Beds and Wimboldsley Wood)	High

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Issue	Receptor type	Receptor description	Receptor sensitivity
Land contamination	Ecological designations	LWS (15 within or partially within land required for the construction of the Proposed Scheme, and 14 within the wider study area)	Moderate
Impacts on mineral and petroleum (gas) sites (severance and sterilisation)	Mineral sites	Actively worked brine extraction site/rock salt mines (Winsford Rock Salt Mine and Holford Brinefield)	Very High
Impacts on mineral and petroleum (gas) sites (severance and sterilisation)	Mineral sites	Consented future brine extraction (areas of preferred extension to Holford Brinefield and a preferred to extension to Warmingham Brinefield)	Very High
Impacts on mineral and petroleum (gas) sites (severance and sterilisation)	Mineral sites	Preferred areas for salt resources (at Winsford Rock Salt Mine and Holford Brinefield), PEDLs (PEDL 292, PEDL 294 and PEDL 296)	High
Impacts on mineral and petroleum (gas) sites (severance and sterilisation)	Mineral sites	Sand and gravel MSA, SPA.	Medium
Impacts on protected geological sites	Geodiversity sites	Billinge Flashes	Medium

## Future baseline

- 10.3.46 Volume 5: Appendix CT-004-00000 provides details of the developments in the Wimboldsley to Lostock Gralam area.
- 10.3.47 In addition to the committed developments outlined in Volume 5: Appendix CT-004-00000, the route of the Proposed Scheme will cross Holford Brinefield, to the south of Lostock Gralam. Holford Brinefield has extant permission (Application 4/32984, dated 21 May 1998) for solution mining and disposal of waste from Cheshire County Council. The permission covers the area of the existing Holford Brinefield and two planned extensions:
- Springbank Farm located to the west of the existing Holford Brinefield caverns underlying the route of the Proposed Scheme. This comprises 12 new caverns partially underlying the land required for the operation of the Proposed Scheme; and
  - King Street Energy extension located to the south of the existing Holford Brinefield. This comprises 10 new caverns primarily for gas storage and an associated pipeline and is located partially in land required for the construction of the Proposed Scheme.
- 10.3.48 The permission states that the extraction of brine at Holford Brinefield and disposal of waste shall cease by no later than 22 February 2042. Other than this date, no information relating to planned date of minerals extraction at the above extensions is known.
- 10.3.49 On this basis the extensions are considered not to have been completed by construction or operation of the Proposed Scheme.

## Construction (2025)

- 10.3.50 Volume 5: Appendix CT-004-00000 provides details of the developments in the Wimboldsley to Lostock Gralam area that are assumed to have been implemented by 2025. No committed developments have been identified in this study area that will materially alter the baseline conditions in 2025 for land quality.

## Operation (2038)

- 10.3.51 Volume 5: Appendix CT-004-00000 provides details of the developments in the Wimboldsley to Lostock Gralam area that are assumed to have been implemented by 2038. There are no additional committed developments of relevance to land quality during operation of the Proposed Scheme.

## 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 Code of Construction Practice (CoCP)<sup>79</sup>. The draft CoCP sets out the measures and standards of work that will 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 will 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 (Sections 5, 11 and 16);
  - the management of human exposure for both construction workers and people living and working nearby (Sections 5, 7, 11, 13 and 14);
  - 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 (Sections 11 and 15);
  - a post-remediation permit to work system (Section 11);
  - storage requirements for hazardous substances such as oil (Sections 5, 11 and 16);
  - traffic management to ensure that there is a network of designated site haul routes to reduce compaction/degradation of soils (Sections 5, 6 and 14);

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<sup>79</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

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- methods to monitor and manage flood risk and other extreme weather events which may affect land quality during construction (Sections 5 and 16);
- methods to manage discovery of unknown animal burial pits (Section 6); and
- the excavation and restoration of borrow pits (Sections 7, 8, 15 and 16).

- 10.4.3 The draft CoCP will require further detailed investigations, which may include both desk-based and site-based work, to confirm the full extent of areas of contamination. Such works will be required prior to and during construction. It also requires a risk assessment to be undertaken to determine what, if any, site specific remediation measures are required. The identified measures will allow the Proposed Scheme to be constructed safely and to prevent harmful future migration of contaminants. The investigation and assessment of potentially contaminated sites will be undertaken in accordance with Environment Agency's Land Contamination Risk Management (LCRM) framework<sup>80</sup>, based on CLR11<sup>81</sup> and British Standards BS10175<sup>82</sup> and BS8576<sup>83</sup>.
- 10.4.4 A remedial options appraisal will be undertaken to define the most appropriate remediation techniques. Where appropriate, this appraisal will 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>84</sup>. The preferred option will then be developed into a remediation strategy.
- 10.4.5 Contaminated soils excavated within the site, where reasonably practicable, will 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 will be taken to a soil treatment facility, another construction site (for treatment and reuse) or to an appropriately permitted landfill.

## Assessment of impacts and effects

- 10.4.6 Construction of the Proposed Scheme in this area will require earthworks, utility diversions, deep foundations and borrow pits, and other activities, including the construction of the various viaducts, embankments and road infrastructure works. These aspects of the Proposed Scheme, along with other construction features, are shown on the CT-05 Map Series in the Volume 2: MA02 Map Book.

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<sup>80</sup> Environment Agency (2020), *Land Contamination Risk Management (LCRM)*. Available online at: <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>.

<sup>81</sup> Environment Agency (2004), *CLR11 Model Procedures for the Management of Land Contamination*. Available online at: <http://webarchive.nationalarchives.gov.uk/20140328084622/http://cdn.environment-agency.gov.uk/scho0804bibr-e-e.pdf>.

<sup>82</sup> British Standards Institution (2011), *BS10175+A2:2017 Investigation of Potentially Contaminated Sites*.

<sup>83</sup> British Standards Institution (2013), *BS8576:2013 Guidance on Investigations for Ground Gas*.

<sup>84</sup> Sustainable Remediation Forum UK (2010), *A Framework for Assessing the Sustainability of Soil and Groundwater Remediation*.

## 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 in relation to the Proposed Scheme. This includes areas with extensive historical salt mining activities. 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. All sites assessed are shown on Maps LQ-01-304b to LQ-01-309a (Volume 5: Land quality Map Book) and those considered as potentially posing a risk in relation to the Proposed Scheme are labelled with a reference number (site ID). In this report the site ID are presented as MA02-46 and on the related maps as 02-46.
- 10.4.8 In the Wimboldsley to Lostock Gralam area, 20 sites remain following initial screening to go through to detailed risk assessment and require CSM. The majority of the sites that have undergone the more detailed risk assessments are historical or current landfills, industrial, mining and commercial sites.
- 10.4.9 CSM 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 within the land required for the construction of the Proposed Scheme;
  - the vertical profile of the Proposed Scheme in the vicinity of the site;
  - 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.
- 10.4.10 Clusters of potentially contaminated sites of a similar nature have been grouped and assessed together, where appropriate.
- 10.4.11 A simple summary of the baseline CSM is provided in Table 30. A more detailed assessment of baseline risk is provided in Volume 5: Appendix LQ-001-0MA02. The 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. For clarity, 'on-site' means within the land required for the construction of the Proposed Scheme and 'off-site' refers to land beyond this boundary, but within the study area.
- 10.4.12 Not all sites detailed in Table 26 to Table 28 have been carried through to the detailed assessment stage. These include; The Dingle (MA02-30), former mineral sites (MA02-122 and MA02-145), and a recycling centre (MA02-107), all due to the distance of the sites from the

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land required for the construction of the Proposed Scheme and the types of construction activities proposed in these areas.

**Table 30: Summary of baseline CSM for sites which may pose a contaminative risk in relation to the Proposed Scheme**

Category	Site group/ID	Human health risk	Groundwater risk	Surface water risk	Ecosystem risk	Buildings risk
On-site	Railway land MA02-46	Low to moderate/low	Low	Very low to low	Very low to low	Very low to low
On-site	Farms MA02-82, MA02-141	Low to moderate/low	Low to moderate/low	Moderate/low	Very low	Low
On-site	Authorised disposal/deep storage facilities – Winsford Rock Salt Mine MA02-124, and Holford Brinefield MA02-181	Low to moderate/low	Very low	N/A	N/A	N/A
On-site	Historical dredging silt lagoon MA02-232	Low to moderate/low	Low	Low	Very low	Very low to low
On-site	Historical localised shallow mineral extraction MA02-119	Low	Low to moderate/low	N/A	Very low	N/A
On-site	Cemetery MA02-186	Low	Low	N/A	N/A	Low
On-site	Former chemical works MA02-200	Low	Moderate/low	Moderate/low	Very low to low	Low
On-site	Electrical substation – large MA02-193	Low	Low to moderate/low	Low	Very low	Low
On-site	Former RAF airfield MA02-342	Low to moderate/low	Moderate/low to moderate	Moderate/low	N/A	Low
Off-site	Historical landfill (Lostock Lime Beds and works tip) MA02-183	Low to moderate	Low to moderate/low	Low to moderate/low	Very low	Very low to moderate/low

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Category	Site group/ID	Human health risk	Groundwater risk	Surface water risk	Ecosystem risk	Buildings risk
Off-site	Farms MA02-134, MA02-241	Low to moderate/low	Low to moderate/low	Moderate/low	Very low	Low
Off-site	Historical infilled land MA02-215	Low to moderate/low	Low to moderate/low	Very low	Very low to low	Low
Off-site	Former ammonia soda and bleach works MA02-211, MA02-262	Low	Moderate/low to moderate	Moderate/low	Very low to low	Low
Off-site	Industrial estate MA02-102	Low to moderate/low	Low to moderate/low	N/A	Very low	Low to moderate/low
Off-site	Former railway land MA02-210	Low to moderate/low	Low	Low	Very low to low	Very low to low
Off-site	Power station MA02-298	Low to moderate/low	Low	Moderate/low	N/A	Low

*N/A means receptor/pathway not present*

## Temporary effects

- 10.4.13 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.
- 10.4.14 Where there is no change between the main baseline risk and the main construction risk, the temporary effect significance is deemed to be neutral even if the risk is deemed to be high. For example, this will be the case where the construction of the Proposed Scheme does not alter the risks from an existing potentially contaminated site that is off-site (i.e. outside the area required for construction).
- 10.4.15 A worsening risk at the construction stage compared to baseline will result in a negative effect, and conversely, an improvement will result in a positive effect. The assessment assumes that contamination will be controlled through the general measures in the draft CoCP.
- 10.4.16 All of the sites set out in Table 30 have been assessed for the change in impact associated with the construction stage of the work and were found to have no significant effects.
- 10.4.17 In the event that unexpected contamination is encountered during the construction of the Proposed Scheme in this area, this will be remediated as described in the draft CoCP resulting in an overall beneficial effect.



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- 10.4.18 The application of the measures set out in the draft CoCP makes it unlikely that there will be significant adverse effects, but it is considered that there may still be some temporary minor adverse effects during the construction period from ground disturbance in these areas. These temporary minor adverse impacts at the construction stage are not regarded as significant in line with the methodology set out in the SMR.
- 10.4.19 Construction compounds located in this study area could 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. Control and mitigation measures are contained within the draft CoCP include measures to manage the risks associated with the storage of such materials resulting in no significant effects.

### Permanent effects

- 10.4.20 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.
- 10.4.21 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 will be the case where the construction of the Proposed Scheme will not alter the risks from an existing potentially contaminated site that is outside the land required for the construction of the Proposed Scheme. As noted above, a worsening will result in negative effects and an improvement will result in positive effects.
- 10.4.22 All of the sites set out in Table 30 have been assessed for the change in impact associated with the permanent post construction stage. Table 31 presents the summary of the resulting significant post-construction effects. All other sites referenced in Table 30 were found to have non-significant effects.

**Table 31: Summary of permanent (post-construction) effects**

Site group/ID	Receptor	Main baseline risk range	Main post-construction risk range	Post-construction effect
Former RAF airfield MA02-342	Controlled waters – groundwater	Moderate/low to moderate	Very low	Moderate beneficial (significant)

- 10.4.23 Table 31 indicates that where remediation is carried out (in accordance with the draft CoCP) on the former RAF airfield site identified within the land required for the construction of the Proposed Scheme, there will be moderate beneficial effects, which are considered significant.
- 10.4.24 Additional site-specific permanent remediation measures, which will focus on source removal, pathway breakage or receptor protection, will be developed during the detailed design stage if required. These measures will make sure risks to human health and property

from gas and vapours in the ground, the principal risk in this area, will be controlled to an acceptable level.

## **Mineral resources**

- 10.4.25 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 or isolation that may occur during the construction phase of the Proposed Scheme, possibly continuing through to its operation.
- 10.4.26 The route of the Proposed Scheme will cross: a preferred extension to the Warmingham Brinefield; a preferred area associated with salt extraction south of Winsford Rock Salt Mine; the existing Holford Brinefield and its consented extensions and preferred areas; and eight MSA for sand and gravel.
- 10.4.27 Holford Brinefield preferred area D falls partially within the land required for the construction of the Proposed Scheme. The land is required for temporary works in existing highways only and is therefore not considered further.
- 10.4.28 Section 2.3 of this report and the Volume 5: Borrow Pit Report (Appendix CT-0008-00000) sets out the details of the proposed borrow pits. MA02 Borrow Pit D overlies a sand and gravel MSA and preferred area associated with salt resources at Holford Brinefield. MA02 Borrow pits A, B and C are also within the preferred area for Winsford Rock Salt Mine.
- 10.4.29 The route of the Proposed Scheme will pass through three PEDL areas: PEDL 292, PEDL 294 and PEDL 296. The study area is also within a SPA.

## **Temporary effects**

- 10.4.30 The following section outlines the potential temporary effects arising during the construction of the Proposed Scheme.
- 10.4.31 Temporary adverse effects may occur where construction compounds or borrow pits are proposed within the MSA or preferred areas. In such cases, there will be a temporary sterilisation of the resource during construction works, but this is not considered to represent a significant effect and the resource will not be lost permanently.

## **Sand, gravel and clay**

- 10.4.32 Puddinglake Brook viaduct satellite compound, Shropshire Union Canal north satellite compound and River Dane viaduct south satellite compound will lie partially within an MSA for sand and gravel. The effect of construction of the Proposed Scheme on the identified sand and gravel deposits will be negligible.

## Salt deposits

- 10.4.33 All four of the proposed borrow pits in the Wimboldsley to Lostock Gralam area fall within or partially within preferred areas for salt resources.
- 10.4.34 Preferred areas of salt resources at Winsford Rock Salt Mine and preferred extension to Holford Brinefield also cover the majority of compounds within the Wimboldsley to Lostock Gralam area. Holford Brinefield preferred area C also underlies MA02 Borrow Pit D. As such, there will be a temporary sterilisation of these resources during construction works at each construction compound and MA02 Borrow Pit D, but this is not considered to represent a significant effect because the resource will not be lost permanently.

## Petroleum Exploration and Development Licences/Hydrocarbons

- 10.4.35 The land required for the construction of the Proposed Scheme is located in three PEDL areas and a SPA.
- 10.4.36 There is a former exploration well targeting oil and gas located 150m to the north-east of Winsford Industrial Estate. It is located within an area of land identified for woodland habitat creation in The Willowbeds LWS.
- 10.4.37 The effect of construction of the Proposed Scheme on the identified PEDLs and SPA will be negligible as it is unlikely that construction of the Proposed Scheme would place a constraint on future exploitation of potential sources of shale gas or other forms of hydrocarbon resource.

## Summary of temporary effects

- 10.4.38 Table 32 sets out a summary of the temporary effects identified for mineral resources.

**Table 32: Summary of temporary effects for mineral resources**

Site name	Status	Description	Sensitivity/ value	Magnitude of impact	Effect and significance (Y/N)
Sand and gravel MSA, Crewe	MSA	MSA for sand and gravel extraction, defined by CWCC	Medium	Minor	Negligible (N)
Preferred area for salt resources at Holford Brinefield C and Winsford Rock Salt Mine	Preferred area	Preferred area of salt, as defined by CWCC	High	Minor	Minor adverse (N)
PEDL 292, PEDL 294, PEDL 296	PEDL	Petroleum exploration and development licence areas.	High	Negligible	Negligible (N)
Shale gas	SPA	SPA for Shale gas	Medium	Negligible	Negligible (N)

- 10.4.39 There will be negligible or minor temporary adverse effects on the mineral resources, which are not significant.

## **Permanent effects**

- 10.4.40 The following section outlines the potential permanent effects resulting from the construction of the Proposed Scheme.
- 10.4.41 It should be noted that extraction from below the structural footprint of the Proposed Scheme will not occur, as the permanent railway will require good founding conditions.
- 10.4.42 A plan will be discussed in advance of the construction works with the landowner, local authority, and any other relevant parties to assist in achieving effective management of minerals within the area.

## **Sand, gravel and clay**

- 10.4.43 The effect of construction of the Proposed Scheme on the identified sand and gravel deposits will be permanent where the MSA are located beneath the land required for operation of the Proposed Scheme, with these minerals becoming sterilised. However, as a proportion of the total sand and gravel MSA in the CWCC area, these areas are small (less than 5%), and the impact on the MSA is considered to be minor. The resource is of medium sensitivity and a minor impact, resulting in a negligible effect which is not significant.
- 10.4.44 The excavation of granular material (glaciofluvial sheet deposits) at MA02 Borrow Pit D will result in the material being utilised for its intended use under its existing mineral designation (i.e. as a source of construction materials within the county). The extraction of these resources is assessed to be negligible impact on a medium value receptor, resulting in a negligible effect, which is not significant.

## **Salt deposits**

- 10.4.45 The Winsford Rock Salt Mine and Holford Brinefield are very high value receptors. The Proposed Scheme will be designed to allow the continued safe extraction and use of the existing mine and brinefield. Given this, the impact will be negligible resulting in a negligible effect, which is not significant.
- 10.4.46 The consented Springbank Farm extension to Holford Brinefield sits partially under the route of the Proposed Scheme. The route of the Proposed Scheme could potentially impact on the viability of five of the proposed 12 caverns. This could represent a moderate impact (as a result of a major loss of this resource) which is of very high value giving a moderate adverse effect, which is significant.
- 10.4.47 The consented King Street Energy extension to Holford Brinefield sits partially under the land required for the construction of the Proposed Scheme. Once built the route of the Proposed Scheme will not impact on the proposed cavern locations. This will result in a negligible impact on a very high value resource, resulting in a negligible effect, which is not significant.
- 10.4.48 The land required for the operation of the Proposed Scheme will potentially sterilise a narrow strip of areas of preferred extension to the Warmingham Brinefield (less than 3%).

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This will result in a minor impact on a high value resource, resulting in a minor adverse effect, which is not significant.

- 10.4.49 The land required for the operation of the Proposed Scheme will potentially sterilise a strip of the preferred area at Winsford Rock Salt Mine (less than 10%). This will be a minor impact on a high value resource resulting in a minor adverse effect, which is not significant.

### **Petroleum Exploration and Development Licences/Hydrocarbons**

- 10.4.50 The effect of construction of the Proposed Scheme on the identified PEDLs and SPA will be negligible. The PEDLs and SPA identify deep areas of hydrocarbon resource, specifically, potential sources of shale gas. Operation of the Proposed Scheme is unlikely to place a constraint on future exploitation of potential sources of shale gas.

### **Summary of permanent effects**

- 10.4.51 Table 33 sets out a summary of the permanent effects identified for mineral resources.

**Table 33: Summary of permanent effects for mineral resources**

<b>Mineral resource</b>	<b>Status</b>	<b>Description</b>	<b>Sensitivity/ value</b>	<b>Magnitude of impact</b>	<b>Effect and significance (Y/N)</b>
Sand and gravel MSA	MSA	MSA for sand and gravel extraction, defined by CWCC	Medium	Negligible to minor	Negligible (N)
Winsford Rock Salt Mine, Winsford	Strategic mineral resource currently being worked	Active rock salt mine. Planning consent expires in 2021	Very high	Negligible	Negligible (N)
Holford Brinefield	Strategic mineral resource currently being worked	Consented brine extraction, defined by CWCC	Very high	Negligible	Negligible (N)
Springbank Farm extension to Holford Brinefield	Strategic mineral resource consented for extraction	Consented brine extraction, defined by CWCC	Very high	Moderate	Moderate adverse (Y)
King Street Energy extension to Holford Brinefield	Strategic mineral resource consented for extraction	Consented brine extraction, defined by CWCC	Very high	Negligible	Negligible (N)
Warmingham Brinefield (in Hough to Walley's Green) preferred extension	Mineral site	Preferred extension to the controlled brinefield at Warmingham, defined by Cheshire County Council	High	Minor	Minor adverse (N)
Preferred areas at Winsford Rock Salt Mine	Preferred area	Preferred area of salt resource, as defined by CWCC	High	Minor	Minor adverse (N)

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Mineral resource	Status	Description	Sensitivity/ value	Magnitude of impact	Effect and significance (Y/N)
PEDL 292, PEDL 294, PEDL 296	PEDL	Petroleum exploration and development licence areas	High	Negligible	Negligible (N)
Shale gas	SPA	SPA for Shale gas	Medium	Negligible	Negligible (N)

10.4.52 In general, there will be negligible to minor adverse effects on the mining and mineral resources, which are not significant. However, there will be a moderate adverse effect on the Springbank Farm extension to Holford Brinefield.

### Geoconservation sites

10.4.53 Billinge Flashes, which is described by Cheshire RIGS as a Regionally Important Geodiversity Site, comprises a series of water filled depressions associated with the underlying soluble salt deposits and is located within land required for the construction of the Proposed Scheme. This has been classified as a site of medium sensitivity. The route of the Proposed Scheme first crosses the Billinge Flashes on the Trent and Mersey Canal viaduct, before becoming Whatcroft North embankment.

10.4.54 The proposed embankment is likely to have a minor impact on the setting and accessibility of the site. Therefore, the Proposed Scheme is anticipated to have a negligible effect on the site, which is not significant.

### Other mitigation measures

10.4.55 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 will be developed at the detailed design stage. These measures will ensure that risks to people, property and environmental receptors from contaminants in the ground will be controlled such that they will not be significant. For example, measures might include excavation and treatment of contaminated soils or controls to manage movement of ground gas and leachate.

10.4.56 Mitigation of the effects on mineral resources could include extraction of the resource within the land required for the construction of the Proposed Scheme adjacent to, rather than beneath the structural footprint of the Proposed Scheme. A plan will be discussed in advance of the construction works with the landowner, the mineral planning departments at CEC and CWCC, and any other relevant parties to assist in achieving an effective management of minerals within the affected location of the MSA.

10.4.57 Mitigation of the effects on salt and brine mineral resources will need to be agreed between HS2 and the mineral resource owner/operator.

## Summary of likely residual significant effects

- 10.4.58 Based on the information currently available and with the application of the mitigation measures detailed above, significant residual effects are anticipated with respect to sterilisation of the salt resources associated with the Springbank Farm extension to Holford Brinefield.
- 10.4.59 On the basis of the application of measures set out in the CoCP, there will be a significant beneficial effect associated with the former RAF airfield site. For all other sites, no likely significant residual effects are anticipated with respect to land quality.
- 10.4.60 Where remediation at contaminated land sites is undertaken there may be significant beneficial residual effects.

## Cumulative effects

- 10.4.61 Volume 5: Appendix CT-004-00000 sets out the committed developments that have been considered in the assessment of cumulative effects.
- 10.4.62 Based upon the review of committed development sites, it is assessed that there will be no significant cumulative effects arising from the construction of the Proposed Scheme with respect to land quality.

## 10.5 Effects arising from operation

- 10.5.1 Users of the Proposed Scheme (i.e. rail passengers) will be 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 will be in accordance with environmental legislation and good practice. Spillage and pollution response procedures similar to those to be outlined in the draft CoCP will be established for all high risk activities and employees will be trained in responding to such incidents.

## Assessment of impacts and effects

- 10.5.3 The Proposed Scheme within this area will include Crewe North rolling stock depot (RSD), A530 Nantwich Road auto-transformer station, Crewe North RSD traction power substation, A54 Middlewich Road sectioning auto-transformer station, Davenham Road express feeder auto-transformer station and A556 Chester Road auto-transformer station. Fuel and oil storage tanks, auto-transformer stations, feeder stations and substations can, in principle, be a source of contamination through accidental discharge or leaks of coolant. However, in



common with other modern infrastructure development, secondary containment appropriate to the level of risk will 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 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.

## **Cumulative effects**

- 10.5.7 There are anticipated to be no significant cumulative residual effects from operation of the Proposed Scheme.

## **Monitoring**

- 10.5.8 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme. Requirements for monitoring will 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 within the Wimboldsley to Lostock Gralam 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 the Canal & River Trust, Cheshire West and Chester Council (CWCC), Cheshire East Council (CEC) and Natural England has been undertaken. The purpose of this engagement has been to discuss the assessment methodology, the extent of the landscape and visual study area, the extent of the landscape character boundaries and the locations of visual assessment and verifiable photomontage viewpoints.
- 11.1.4 Further details on the landscape and visual assessment, including engagement, baseline information and assessment findings, are presented in the Volume 5: Landscape and visual Map Book and Volume 5: Appendix LV-001-0MA02, which comprises the following:
- Part 1: Engagement with technical stakeholders;
  - Part 2: Landscape character assessment;
  - Part 3: Visual assessment;
  - Part 4: Assessment matrices; and
  - Part 5: References.
- 11.1.5 The Proposed Scheme is described in Section 2. The Volume 2: MA02 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 will be significantly affected at the construction (Map Series LV-03) and operation (Map Series LV-04) phases and landscape character areas (LCA) that will be significantly affected at the construction and operation phases (Map Series LV-02).
- 11.1.6 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 EIA Scope and Methodology Report (SMR)<sup>85</sup>.
- 11.2.2 Surveys were undertaken during the following periods to inform the landscape and visual assessment:
- summer surveys from July to September in 2017, 2018 and 2020; and
  - winter surveys in February and March 2018, and February and March 2019.
- 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 means that the actual extent of visibility will be substantially less than that shown in the ZTV, and professional judgement has been 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. However, overhead line equipment as well as tall construction plant are taken into account in the assessment of effects on LCA and visual receptors.
- 11.2.5 Landscape and visual receptors within approximately 1.5km of the centre line of the route of the Proposed Scheme have been assessed as part of the study area. Landscape and visual receptors within 1.5km of MA02 Borrow Pit D, located approximately 4.5km to the east of the route of the Proposed Scheme at Byley are also assessed as part of the study area. Where important receptors fall just beyond the ZTV, professional judgement has been used in recording and assessing these. Long distance views of up to 2km have been considered at settlement edges, such as at Middlewich and Bostock Green.
- 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. 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 and year 30. The assessment of landscape effects is undertaken for the construction phase and for the operational phase at year 1, year 15 and year 30. The landscape assessment does not consider seasonal variations e.g. winter/summer, since these do not affect character.

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<sup>85</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

- 11.2.7 Professional judgements on landscape value are provided in the baseline descriptions and judgements on susceptibility of the landscape to the Proposed Scheme and overall landscape sensitivity are provided as part of the assessment of effects on each significantly affected LCA.
- 11.2.8 The assessment has been carried out on the basis that design of structures will, insofar as reasonably practicable, integrate with existing skyline features and will make use of a simple, clean and coherent palette of materials to help structures fit in the landscape.
- 11.2.9 It has been assumed that all vegetation within the land required for construction of the Proposed Scheme will be removed during construction unless stated otherwise. This excludes areas included only for the purpose of mitigation planting. Removed vegetation will be reinstated insofar as is reasonably practicable and would provide screening and integration benefits by year 15.
- 11.2.10 It has also been assumed that with respect to utilities and utility decommissioning, it is likely that the majority of existing vegetation can be retained. Vegetation will be removed along new utility lines, based on easement guidance from specific utility companies. All vegetation removed during utilities construction work will be reinstated insofar as is reasonably practicable. The assessment has been based on the assumption that any reinstatement planting will provide integration benefits by year 15. Works associated with underground utilities within highways will follow the principles set out in the draft Code of Construction Practice (CoCP)<sup>86</sup> and existing street trees and property boundary vegetation will be retained insofar as is reasonably practicable.

## 11.3 Environmental baseline

### Existing baseline

#### Landscape baseline

- 11.3.1 The study area extends from Wimboldsley in the south to Lostock Gralam and Smoker Brook in the north. It is a lowland landscape of gently undulating or, in places, flat farmland set amongst the towns of Middlewich, Winsford and Northwich.
- 11.3.2 Typical of much of Cheshire, this area forms part of a wider lowland plain, broadly separated by sandstone ridges and locally cut by shallow river valleys that converge north and west towards Northwich and the Mersey Estuary. The rivers Weaver and Wheelock flow northwards across the landscape, with the recessed valley form of the River Weaver and its widely meandering, wooded stream courses being prominent to the west. Ancient woodland is recorded in the valley fringes of the rivers Weaver and Dane.

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<sup>86</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

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- 11.3.3 The landscape character of the plain owes much to its glacial origins, with an underlying geology rich in rock salt covered by a thick layer of glacial till and clay soils. Increases in wealth from the 12th century onwards were based on pastoral agriculture including dairy farming, accompanied by the growth of the salt industry in market towns including Nantwich and Middlewich. Medieval and post-medieval industrial activity from salt extraction led to further urban expansion of these centres. The construction of the Trent and Mersey Canal and Shropshire Union Canal in the late 18th century for the transport of pottery, coal and salt played a significant part in this industrial transformation. The canal network today is a valuable recreational resource and an important heritage legacy; the whole of the Trent and Mersey Canal corridor is a designated conservation area.
- 11.3.4 The relatively flat agricultural landscape of the plain incorporates a pattern of fields that vary in regularity and size, with generally well-maintained hedgerows. The pattern of managed hedgerows and mature individual trees gives the appearance of a well-wooded landscape, despite woodland being relatively scarce. Beyond the main urban centres there is a dispersed settlement pattern of hamlets and scattered, often distinctive individual residential properties. Large farmsteads are locally prominent as are large landed estates, notably at Bostock Hall, Whatcroft and Wimboldsley.
- 11.3.5 The landscape is punctuated by ponds and meres. Subsidence from salt extraction is evident from the presence of other open water bodies or flashes, such as at Billinge Green near Northwich and along the line of the Trent and Mersey Canal.
- 11.3.6 The West Coast Main Line (WCML) with its locally prominent overhead line equipment crosses the landscape between Crewe, Middlewich and Northwich. Primary roads, including the A530 Nantwich Road, A556 Chester Road/Shurlach Road and A54 Middlewich Road are heavily trafficked, in contrast to the surrounding network of rural lanes and paths. The landscape maintains a largely tranquil and rural quality, with skylines formed mainly by hedgerows and mature trees. Distant skylines of the Peak District and Peckforton Hills are occasionally evident to the east and west. Settlements are generally well screened by trees and woodland within the landscape.
- 11.3.7 The LCA have been determined as part of an integrated process of environmental characterisation, informed by a review of historic mapping, historic landscape characterisation datasets and the outcome from other topics including ecological assessments. 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

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National Landscape Character Areas<sup>87</sup> and the Landscape Character Assessments for Cheshire West and Chester<sup>88</sup> and Cheshire East<sup>89</sup>.

- 11.3.8 These published LCA have been adapted for this assessment to provide LCA of an appropriate, consistent scale. Minor amendments have been made to some published LCA boundaries to reflect existing conditions, as verified on-site, or to draw out specific aspects susceptible to change from the Proposed Scheme.
- 11.3.9 For the purposes of this assessment, the study area for the Wimboldsley to Lostock Gralam area has been subdivided into 14 LCA. Full descriptions of these LCA are provided in Volume 5: Appendix LV-001-0MA02.
- 11.3.10 Nine of the 14 LCA will not be significantly affected by the Proposed Scheme on account of their distance from it or their limited sensitivity to this type of development.
- 11.3.11 A summary of the five LCA that will be significantly affected within the Wimboldsley to Lostock Gralam area is shown in Figure 15 to Figure 19 and described below.
- 11.3.12 In addition to the 14 LCA in this area, Wimboldsley Plain LCA will be significantly affected by the Proposed Scheme. Part of this LCA is within the Wimboldsley to Lostock Gralam area; however, as it is located for the most part within the Hough to Walley's Green (MA01), it is reported in Volume 2, Community Area report: Hough to Walley's Green area (MA01).

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<sup>87</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>88</sup> Cheshire West and Chester Council (2016), *Local Landscape Character Assessment – Landscape Strategy*. Available online at: <https://www.cheshirewestandchester.gov.uk/residents/planning-and-building-control/total-environment/landscape-character-assessment.aspx>.

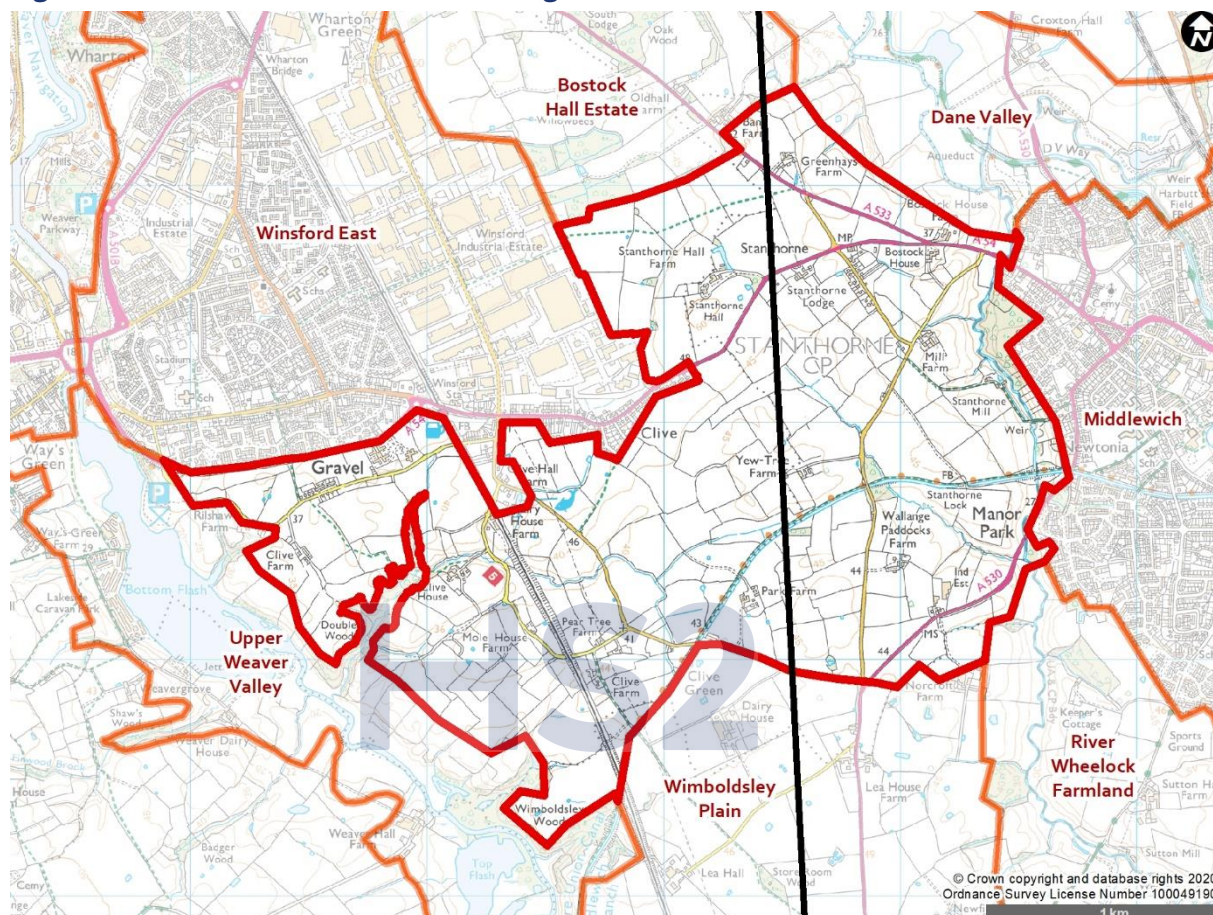
<sup>90</sup> Cheshire East Council (2018), *Landscape Character Assessment*. Available online at: [https://www.cheshireeast.gov.uk/environment/heritage\\_natural\\_environment/landscape/landscape\\_character\\_assessment.aspx](https://www.cheshireeast.gov.uk/environment/heritage_natural_environment/landscape/landscape_character_assessment.aspx).



## Significantly affected landscape character areas

### Winsford and Middlewich Fringe Farmland

Figure 15: Winsford and Middlewich Fringe Farmland



- 11.3.13 Winsford and Middlewich Fringe Farmland LCA is a gently undulating agricultural landscape between the shallow valleys of the rivers Weaver and Wheelock, separating the urban fringes of Winsford to the west and Middlewich to the east.
- 11.3.14 The area is characterised by an ancient pattern of small to medium-sized irregular fields, most of which are bordered by well-managed hedges incorporating mature trees. There are also frequent individual mature field trees. The landform is gently undulating between converging local watercourses. Along these watercourses, mature vegetation contributes to a sense of enclosure and forms visual buffers to the nearby residential and industrial edges of Middlewich and Winsford.
- 11.3.15 Beyond the towns, the settlement pattern is one of dispersed large individual farmsteads and houses including the locally prominent Stanthorne Hall. Despite the proximity of Winsford and Middlewich the landscape retains a largely rural character, although the eastern boundary of Winsford Industrial Estate is a noticeable detractor. The WCML severs the landscape between Clive Green and Winsford, while the A530 Nantwich Road, A533 Northwich Road/Bostock Road and A54 Middlewich Road radiate across the landscape from

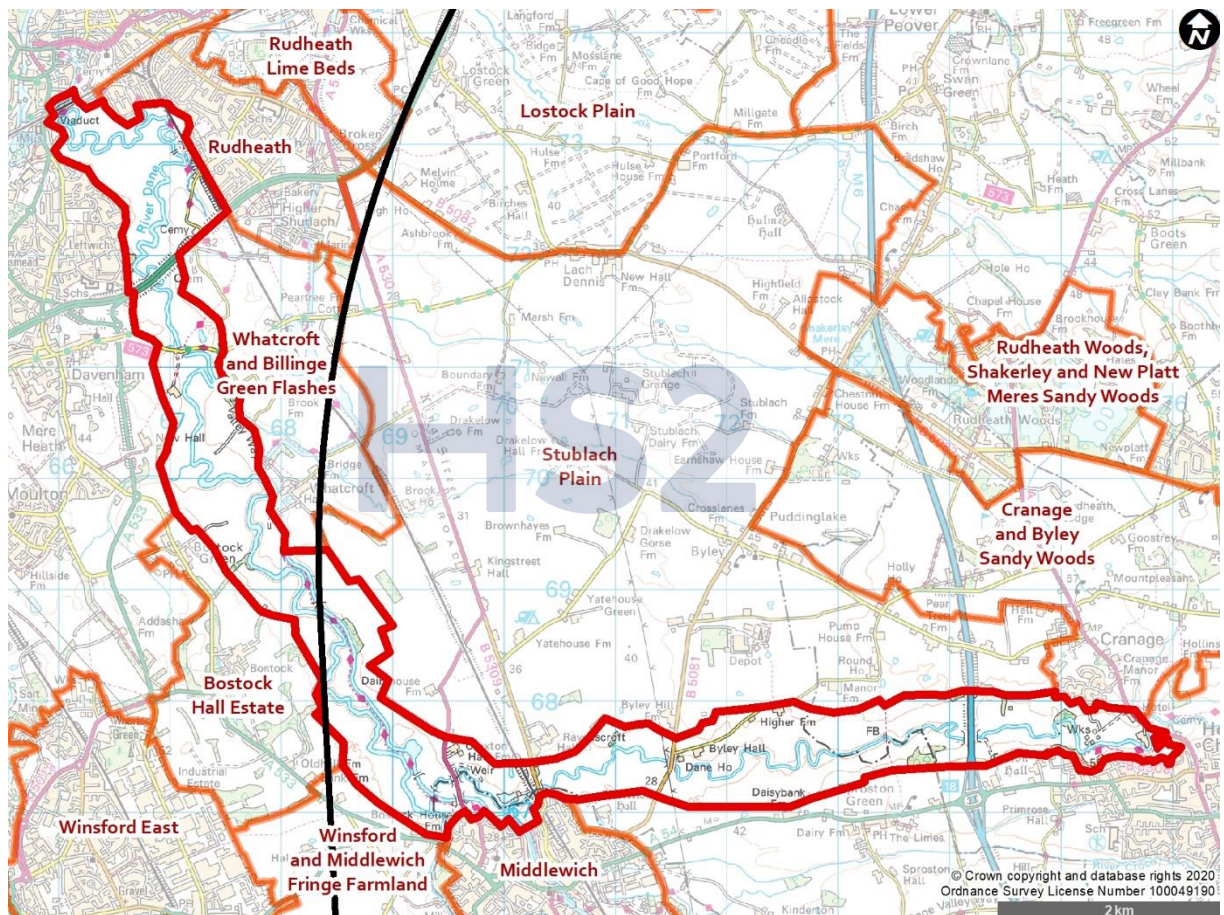


Middlewich. The Shropshire Union Canal (Middlewich Branch) is a key feature of the LCA, affording a sense of historic continuity and incorporating several Grade II listed structures, including the aqueduct over the River Wheelock and Stanthorne Lock.

- 11.3.16 Winsford and Middlewich Fringe Farmland LCA is assessed as having an overall **medium** landscape value based on its rural character and historic field pattern and the presence of the canal with its associated history and modern-day recreational function.

## Dane Valley

**Figure 16: Dane Valley**



- 11.3.17 The Dane Valley LCA is a quiet, rural valley following the course of the meandering River Dane to the west of Holmes Chapel. The River Dane is joined by the River Wheelock at Middlewich and flows northwards to Northwich in parallel with the Trent and Mersey Canal.
- 11.3.18 The narrow floodplain contains the widely meandering river with its low, steep-sided and tree-lined banks next to open arable fields. The valley is flanked to the west by the estate woodlands (some ancient) of Bostock Hall and Davenham Hall and along its eastern fringe by the well-vegetated canal corridor. Bostock (comprising Bostock Hall estate and the village of Bostock Green) and the Trent and Mersey Canal are designated conservation areas.

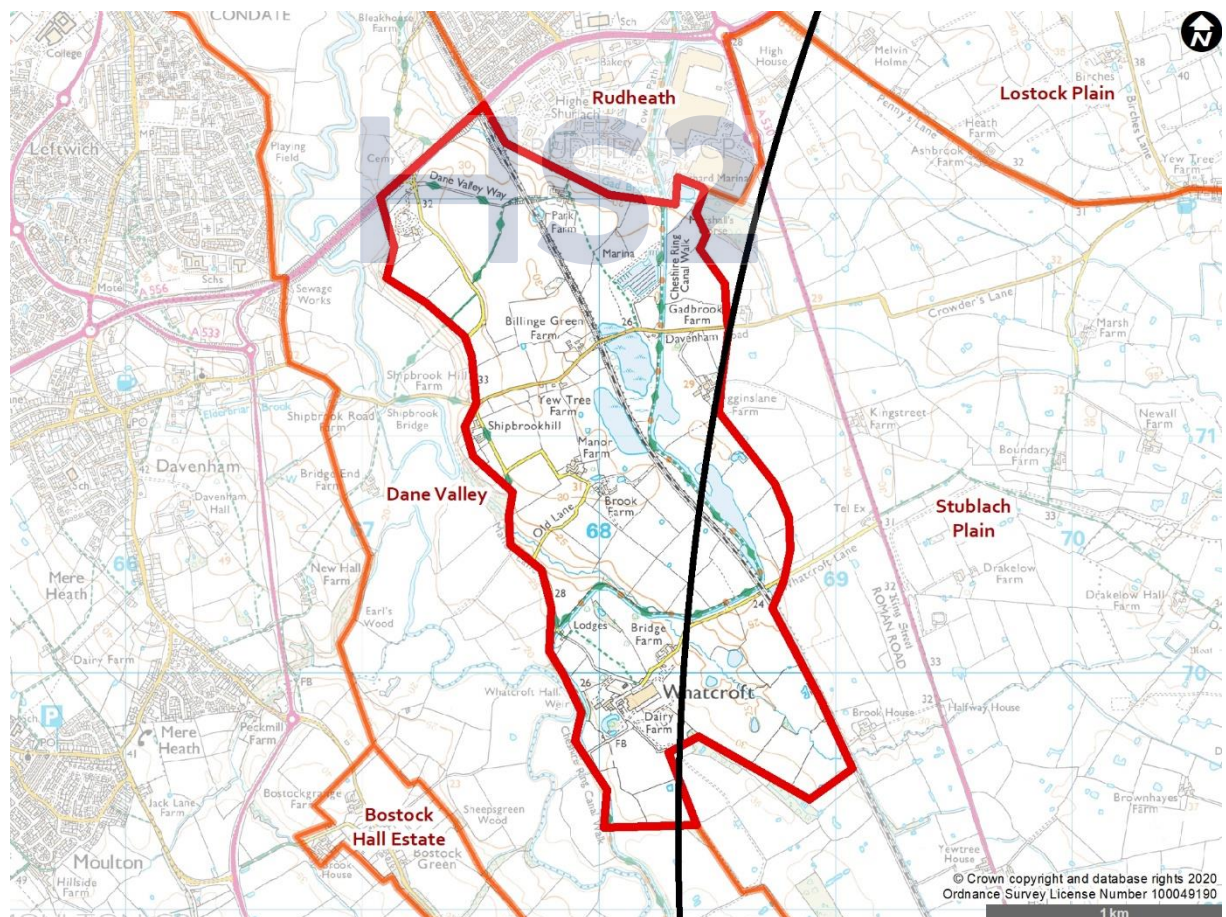


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- 11.3.19 There are few prominent developments within the valley, with only isolated farmsteads and dwellings along its fringes. Bostock Hall and nearby Bostock Green on the western flank of the valley are largely screened by estate woodland and other vegetation. To the east several large farms and landed properties, including the Grade II\* listed Whatcroft Hall, punctuate the skyline but do not dominate. St Wilfrid's Parish Church at Davenham provides a distant focal point to the north, along the line of the valley. The Dane Valley Way (a long-distance footpath) forms part of the Cheshire Ring Canal Walk in this area and provides a valuable recreational resource. There are several valley crossing points including railway viaducts at Northwich and Middlewich, the M6 west of Holmes Chapel, the A556 Shurlach Road south of Northwich and the A530 Nantwich Road at Middlewich.
- 11.3.20 Dane Valley LCA is assessed as having an overall **medium-high** landscape value based on its tranquil and rural character which is largely uninfluenced by built development.

### Whatcroft and Billinge Green Flashes

**Figure 17: Whatcroft and Billinge Green Flashes**



- 11.3.21 The Whatcroft and Billinge Green Flashes LCA is an undulating rural landscape bordering the River Dane valley, divided by the Trent and Mersey Canal and the Sandbach to Northwich Line.

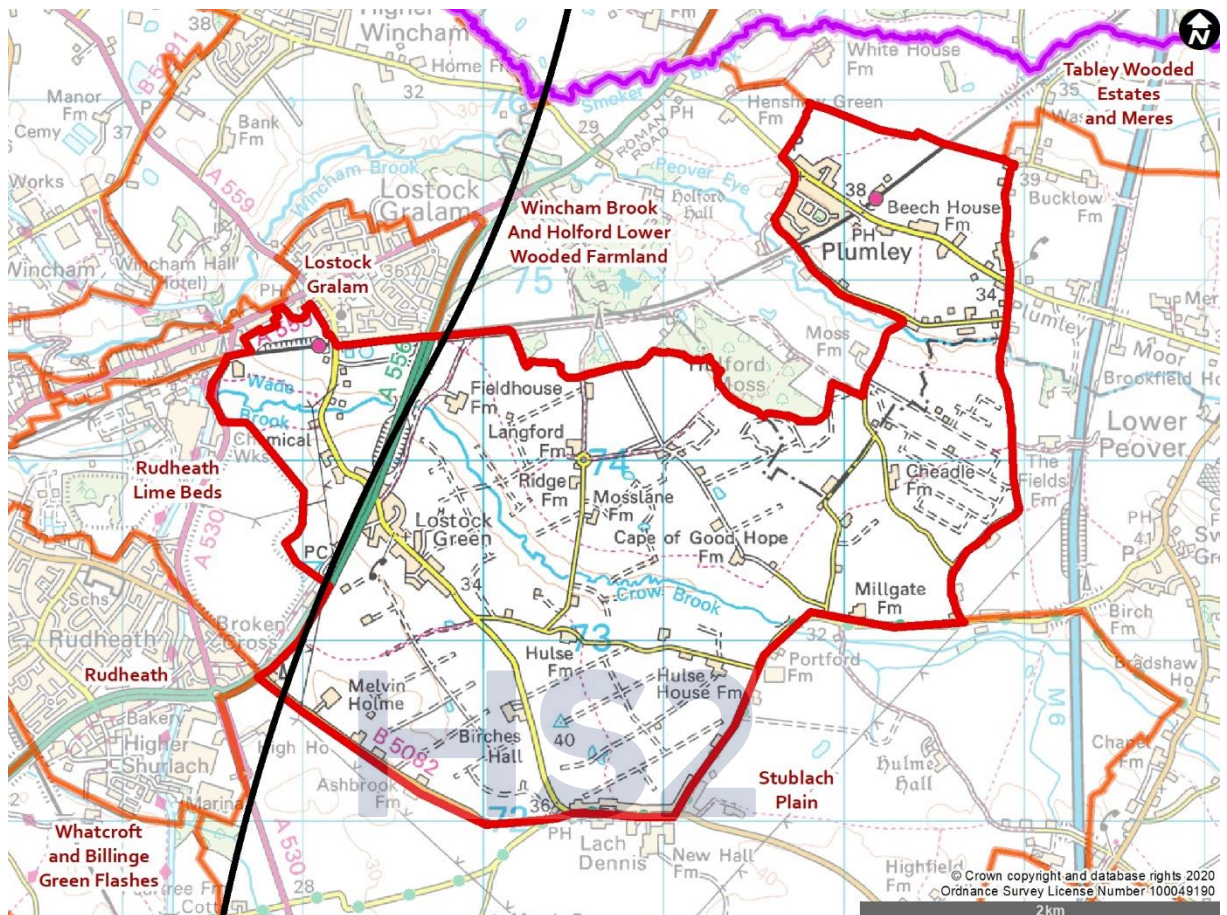
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- 11.3.22 The Trent and Mersey Canal diverts from the River Dane at Whatcroft Hall, through a stretch of farmland adjoining Puddinglake Brook. The Hall, its lodges and the nearby Dairy Farm and Brook Farm form a prominent group of buildings on the fringes of the Dane valley, complementary in character with other large houses and isolated farmsteads in this open agricultural landscape. The canal takes a sinuous route, circumnavigating these buildings and several flashes (created by subsidence following salt extraction) near Billinge Green. The landscape here has a scenic composition, with the waterbodies set within a gently undulating terrain of medium-sized fields bordered by managed hedges with mature trees.
- 11.3.23 In addition to a scattering of large farmsteads, the small hamlets of Billinge Green and Shipbrook are clusters of mainly vernacular dwellings set within a network of rural lanes. Water related recreational activity is popular, as evidenced by the Cheshire Ring Canal Walk (long distance footpath), a new mooring basin at Park Farm Marina and canalside mooring facilities at Oakwood Marina near Higgins Lane Farm. The elevated, freight only Sandbach to Northwich Line bisects the area, forming local divisions between the canal corridor and the well vegetated flashes.
- 11.3.24 Whatcroft and Billinge Green Flashes LCA is assessed as having an overall **medium-high** landscape value based on the tranquil, recreational, historic and scenic attributes of the canal and its connecting water bodies.



## Lostock Plain

**Figure 18: Lostock Plain**



- 11.3.25 The Lostock Plain LCA is an area of predominantly flat agricultural land which was formerly heath and is now characterised in part by the extraction of brine. It is bordered by the industrial and residential fringes of Northwich to the west, the Stublach Plain LCA to the south and the wooded area of Marthall to its north.
- 11.3.26 The field pattern comprises a network of small and irregular medieval fields surrounding the compact linear villages of Lostock Green and Lach Dennis, with a pattern of larger sized and more regular enclosure beyond. Agricultural use is predominantly pasture, with a large distribution of field ponds where marl was previously extracted for improvement of the land. Crow Brook and Wade Brook flow east-west across the area, interrupting an otherwise level terrain. A network of drainage ditches trace field boundaries that are lined by largely intact and mature hedgerows. Woodland cover is sparse comprising isolated small copses and hedgerow trees. Individual farmsteads, typically of red brickwork construction, punctuate the landscape of the open plain. There is a network of local footpaths, mainly following farm tracks and field boundaries.
- 11.3.27 Lostock Plain LCA is a major brine extraction area which is also utilised for underground gas storage. These activities create an above ground, visible infrastructure of wellheads, fenced

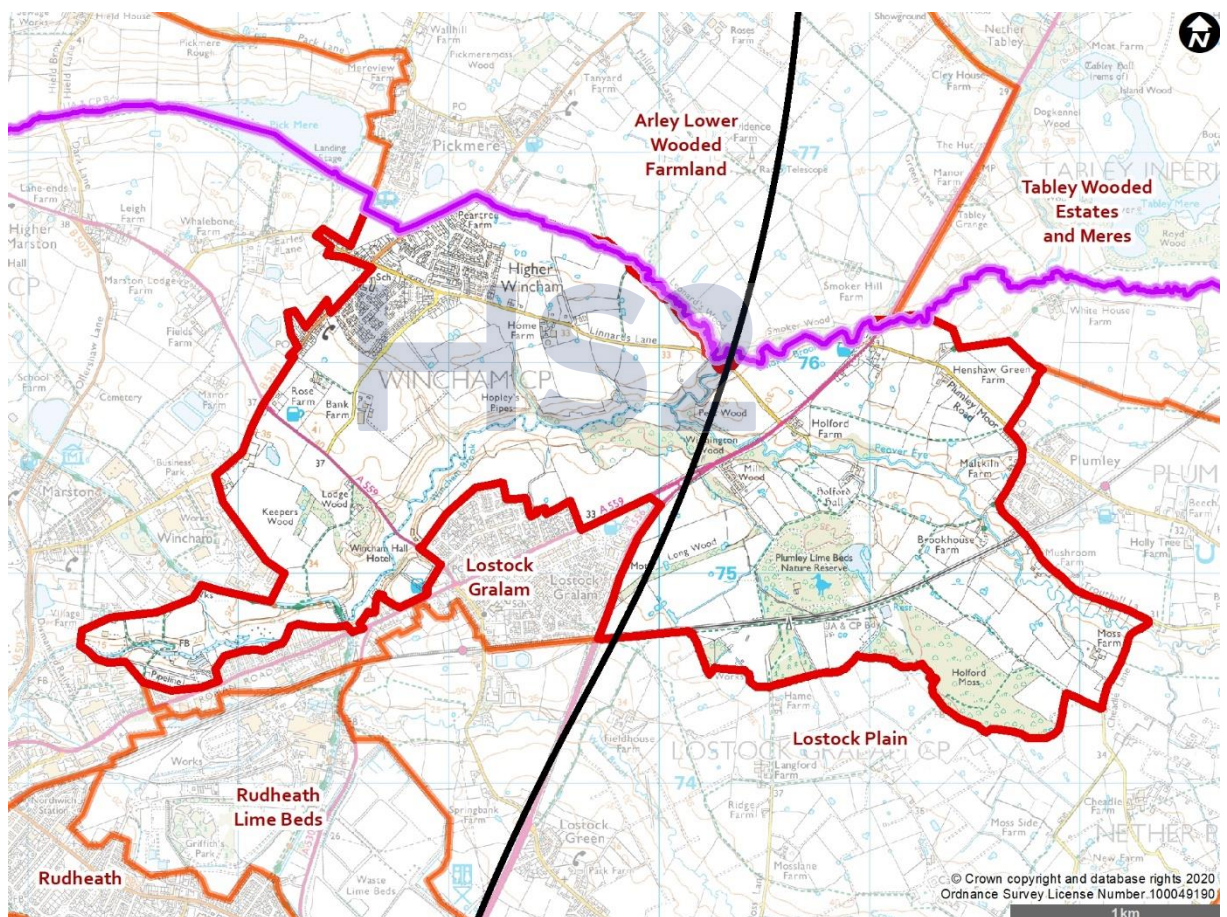


compounds and connecting tracks, evident throughout the landscape. The busy A556 Shurlach Road passes east of Northwich, its mature flanking vegetation creating a buffer to the town's industrial and residential fringe. Overhead power lines are evident to the west of Lostock Green and in the open landscape to the south.

- 11.3.28 Lostock Plain LCA is assessed as having an overall **medium-low** landscape value based on the interruption of an otherwise rural landscape by numerous discrete but widespread industrial installations, the presence of overhead power lines, the A556 Shurlach Road and the perception of the industrial skyline and residential fringes of Northwich.

## Wincham Brook and Holford Lower Wooded Farmland

**Figure 19: Wincham Brook and Holford Lower Wooded Farmland**



- 11.3.29 The Wincham Brook and Holford Lower Wooded Farmland LCA is an area of arable and pastoral land to the north-east of Northwich, characterised by a network of heavily wooded, incised watercourses and areas of woodland on former mossland.
- 11.3.30 The field pattern within the LCA varies from irregular small to medium-sized (of medieval origin) to larger, more regular enclosure. Most fields are bordered by mature hedgerows, frequently with ponds originating from marl pits. The meandering stream courses of Smoker Brook and Peover Eye flow east to west, converging to form Wincham Brook. Distinctive belts of woodland flank these incised watercourses at Winnington Wood, Smoker Wood and

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Leonard's Wood, parts of which are ancient and semi-natural woodland. To the south-east, Plumley Lime Beds Site of Special Scientific Interest (SSSI) and Holford Moss incorporate large tracts of woodland with intervening grassland and wetland habitats. A network of local footpaths runs close to these woodlands and to the moated site of Holford Hall, linking the village of Plumley with Lostock Gramam.

- 11.3.31 Higher Wincham is located in the north-western part of the LCA and comprises predominantly 20th century housing, whilst the residential and industrial fringes of Lostock Gramam and Wincham edge the valley of Wincham Brook. The valley is crossed by the Trent and Mersey Canal, the canal being an important recreation corridor and historic asset linking local settlements.
- 11.3.32 Beyond Higher Wincham, settlement is limited to dispersed farmsteads and clusters of properties alongside local roads. The highly trafficked A556 Chester Road/Shurlach Road and the Mid-Cheshire Line cross the landscape to the east of Lostock Gramam, both of which are detracting elements in the landscape. However, the density of roadside vegetation and surrounding woodland limits the influence of this linear infrastructure.
- 11.3.33 Wincham Brook and Holford Lower Wooded Farmland LCA is assessed as having an overall **medium** landscape value based on the intimate quality of its many woodlands and small watercourses, although this is slightly offset by localised disturbance from transport corridors.

## Visual baseline

- 11.3.34 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: MA02 Map Book, Map Series LV-03 and LV04). 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<sup>90</sup>, 4: Transport, 5: Hotels/healthcare/schools and 6: Employment.
- 11.3.35 Views are experienced by residents from the residential fringes of the larger settlement areas of Winsford, Middlewich, Rudheath and Lostock Gramam, as well as those living in smaller settlements including Wimboldsley, Clive Green, Stanthorne, Bostock Green, Whatcroft, Lostock Green and Higher Wincham. Views are also experienced from individual properties, large farmsteads and houses set within landed estates throughout the Cheshire Plain around Wimboldsley, Stanthorne, Bostock Hall and Whatcroft. There are views from individual and clustered properties along the A530 Nantwich Road, the A530 King Street, the A54 Middlewich Road, the A533 Northwich Road/Bostock Road and the A556 Chester Road/Shurlach Road; and at properties along rural lanes.

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<sup>90</sup> Reference to specific civil parish numbers for footpaths is provided where available otherwise the adjacent road name is used as a reference to the footpath.

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- 11.3.36 The views experienced from most residential properties are of the flat or gently undulating, open agricultural landscape of the Cheshire Plain. Views tend to be into the near or middle distance, limited by the surrounding terrain, field pattern and presence of hedgerows and trees. Views are longer where the field pattern is of a larger scale, notably in the agricultural landscape north of Crewe and towards Wimboldsley. The hill crests of the Peak District to the east and the sandstone ridgeline of the Peckforton Hills to the west are occasionally visible on the distant horizon.
- 11.3.37 For users of the canals and towpaths of the Shropshire Union Canal (Middlewich Branch) and the Trent and Mersey Canal (comprising the Cheshire Ring Canal Walk and Dane Valley Way), views are typically limited by canalside vegetation and local terrain. However, there are occasional open views, particularly along the Dane valley between Middlewich and Northwich.
- 11.3.38 Users of National Cycle Route 5 (between Winsford and Middlewich and along the towpath of the Shropshire Union Canal (Middlewich Branch)) have views across open farmland. There are also open views from National Cycle Route 573 (between Davenham and Lach Dennis) where it crosses the Dane valley across the undulating open farmland to the east of Northwich.
- 11.3.39 Most views from the Public Rights of Way (PRoW) network are of the mainly flat, agricultural landscape of the Cheshire Plain, filtered by mature hedgerows and occasional stretches of riverside and plantation woodland.
- 11.3.40 Views experienced by road users on primary routes are mainly contained by high hedges and roadside planting. However, where these are unimpeded across the Cheshire Plain farmland the distant outlines of the Peak District hills to the east and the Peckforton Hills to the west can be seen.

## **Future baseline**

### **Construction (2025)**

- 11.3.41 Volume 5: Appendix CT-004-00000 provides details of the developments in the Wimboldsley to Lostock Gralam area that are assumed to have been implemented by 2025. The following committed developments of relevance to landscape and visual amenity during construction in this area are set out in Table 34.



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**Table 34: Committed developments of relevance to landscape and visual during construction**

Map book reference <sup>91</sup>	Planning reference/ Allocation reference	Description	How this is considered in the assessment
MA02/252	17/3605W	Location: land at Rudheath Lodge, New Platt Lane, Cranage and Allostock, Cheshire, CW4 8HJ.  Silica sand extraction and associated development, mineral extraction by dredging, progressive restoration, mineral processing and dispatch.	Potential for cumulative effects.

11.3.42 Committed development MA02/252 has been included as part of the future baseline and considered within this assessment as it will result in the loss of pasture and arable fields bordered with hedgerows and occasional trees and introduce new areas of mineral extraction activities within 800m to the east of the land required for construction of the Proposed Scheme. The mineral extraction will be concurrent with material excavation at MA02 Borrow Pit D for the Proposed Scheme. This committed development is identified as having the potential to result in cumulative effects with the construction of the Proposed Scheme.

## Operation (2038)

11.3.43 Volume 5: Appendix CT-004-00000 provides details of the additional developments in the Wimboldsley to Lostock Gralam area that are assumed to have been implemented by 2038. No committed developments of relevance to landscape and visual have been identified that would materially alter the future baseline in this area.

## 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 will be visible from many locations and will have the potential to give rise to significant temporary effects that cannot practicably be mitigated. Such effects will 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 will 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. 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.

<sup>91</sup> Volume 5: Planning Data/Committed Development Map Book: Maps CT-13-304b to CT-13-309a.

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 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>92</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 should they 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 will relate to the presence of construction plant, compounds and soils and material storage and stockpiling. Key construction activities that will give rise to the most apparent changes to landscape and visual receptors are: the construction of Crewe North rolling stock depot (RSD) and Crewe North IMB-R, auto-transformer stations, embankments, viaducts, overbridges, retaining walls, the demolition of buildings, removal of vegetation, use of borrow pits and the realignment or closure of existing public highways and PRoW.

11.4.7 Non-significant effects are reported in Volume 5: Appendix LV-001-0MA02.

## Landscape assessment

11.4.8 The LCA set out in Table 35 will be significantly affected during construction of the Proposed Scheme.

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<sup>92</sup> British Standards Institution (2012), *BS5837:2012 Trees in relation to design, demolition and construction – Recommendations*.

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**Table 35: Summary description and assessment of effects on LCA**

Location	
<p><b>Winsford and Middlewich Fringe Farmland</b></p> <p>The Winsford and Middlewich Fringe Farmland LCA of <b>medium</b> value will be directly impacted by construction of the Proposed Scheme, including the realignment of the A54 Middlewich Road and the excavation of MA02 Borrow Pit C. It will be indirectly affected by construction of the realigned Clive Green Lane at the southern extent of the LCA. The construction of these elements, together with Stanthorne South embankments No.1 and No.2, will remove field boundary vegetation and disrupt the local field pattern and road network, the latter including Clive Green Lane, the A54 Middlewich Road and A533 Northwich Road/Bostock Road. Where the Shropshire Union Canal (Middlewich Branch) is crossed by the Proposed Scheme construction activity will affect its landscape setting.</p> <p>The combination of the above will result in a substantial change to the key characteristics of the LCA. Due to its moderate scenic value, sense of historic continuity and the influence of transport infrastructure, the landscape has a <b>medium</b> susceptibility to change arising from the Proposed Scheme. The presence of five satellite compounds, temporary material stockpiles, plant noise and construction traffic along the A54 Middlewich Road and A533 Northwich Road/Bostock Road will result in a <b>high</b> magnitude of change to the landscape.</p> <p>The <b>high</b> magnitude of change for the Winsford and Middlewich Fringe Farmland and its <b>medium</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p><b>Dane Valley</b></p> <p>The Dane Valley LCA of <b>medium-high</b> value will be directly impacted by construction of River Dane viaduct. Construction activity will occur within a tranquil and secluded section of the Dane valley, an otherwise attractive riverine landscape unaffected by prominent built development. Construction works for the viaduct will be close to the River Dane and above and next to the historic Trent and Mersey Canal with its high recreational value. Localised changes to landform will result from large-scale earthworks and temporary material stockpiles.</p> <p>Due to its relative tranquillity, sense of historical continuity and recreational use, the landscape has a <b>medium-high</b> susceptibility to change arising from the Proposed Scheme. The presence of plant noise, crane movements, and lighting will adversely affect the tranquillity of this rural and secluded river valley which will result in a <b>high</b> magnitude of change to the landscape.</p> <p>The <b>high</b> magnitude of change for the Dane Valley and its <b>medium-high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p><b>Whatcroft and Billinge Green Flashes</b></p> <p>The Whatcroft and Billinge Green Flashes LCA of <b>medium-high</b> value will be directly impacted by construction activity, principally to create three viaducts. Work will be undertaken to span the Trent and Mersey Canal in two locations, Puddinglake Brook viaduct and Trent and Mersey Canal viaduct, whilst Gad Brook viaduct on the northern fringe of the LCA will be constructed over Davenham Road. The construction of these structures, together with Whatcroft South and Whatcroft North embankments will remove vegetation, disrupt the existing field pattern and isolate several land parcels.</p> <p>Due to its relative intimacy, sense of tranquillity and recreational use, the landscape has a <b>medium-high</b> susceptibility to change arising from the Proposed Scheme. The presence of construction activities, two satellite construction compounds and the use of Whatcroft Hall Lane as a construction traffic route will result in a <b>high</b> magnitude of change to the landscape.</p> <p>The <b>high</b> magnitude of change for the Whatcroft and Billinge Green Flashes and its <b>medium-high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p><b>Lostock Plain</b></p> <p>The Lostock Plain LCA of <b>medium-low</b> value will be directly impacted by construction works to realign the A556 Shurlach Road and along the Proposed Scheme between Rudheath and Lostock Gralam, where structures including Gad Brook viaduct across the A530 King Street, Wade Brook</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

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Location	
<p>viaduct across the Gad Brook and Lostock Gralam viaduct across the Mid-Cheshire Line will be built.</p> <p>The construction of these elements, along with Rudheath embankment and Lostock Gralam South embankment will encroach upon adjacent agricultural land but have minimal influence on the existing field pattern already modified close to the A556 Shurlach Road. Where utilities diversions cross field boundaries and watercourses there will be losses of vegetation. There will also be a loss of mature trees adjacent to the A556 Shurlach Road. These activities will impact upon the urban fringe character relationship between the town of Northwich and the tranquil rural landscape of the Lostock Plain at the north-western margin of the LCA.</p> <p>Due to the visual containment provided by frequent boundary hedges and other field vegetation along with the presence of detracting industrial features, the landscape has a <b>medium-low</b> susceptibility to change arising from the Proposed Scheme. The loss of vegetation and the presence of plant noise, utilities diversions, three satellite construction compounds, temporary material stockpiles and construction traffic along the A556 Shurlach Road, B5082 Penny's Lane and Birches Lane will result in a <b>medium</b> magnitude of change to the landscape.</p> <p>The <b>medium</b> magnitude of change for the Lostock Plain and its <b>medium-low</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	
<p><b>Wincham Brook and Holford Lower Wooded Farmland</b></p> <p>The Wincham Brook and Holford Lower Wooded Farmland LCA of <b>medium</b> value will be directly impacted by construction of Smoker Brook viaduct over the A556 Shurlach Road and Lostock Gralam North embankment. There will be a loss of mature tree cover at Long Wood, Winnington Wood, Leonard's Wood and Smoker Wood, the majority being designated ancient woodland. Construction activity, utilities diversions, the presence of two satellite construction compounds, temporary material stockpiles and construction traffic along the A556 Shurlach Road and A559 Manchester Road will be concentrated close to the fringe of Lostock Gralam and the adjacent valley woodlands.</p> <p>Due to the prevalence and the visual containment of long-established woodland and the presence of some detracting features, the landscape has a <b>medium</b> susceptibility to change arising from the Proposed Scheme. The removal of mature vegetation including woodland and introduction of construction works will result in a <b>medium</b> magnitude of change to the landscape.</p> <p>The <b>medium</b> magnitude of change for the Wincham Brook and Holford Lower Wooded Farmland and its <b>medium</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>

## Visual assessment

### Introduction

- 11.4.9 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, will be in leaf. Where visual receptors are predicted to experience significant effects at night-time arising from additional lighting, these are also presented in this section.
- 11.4.10 Where a viewpoint represents multiple types of receptor, the assessment is based on the most sensitive receptor. Effects on other receptor types with lower sensitivity will be lower than those reported.

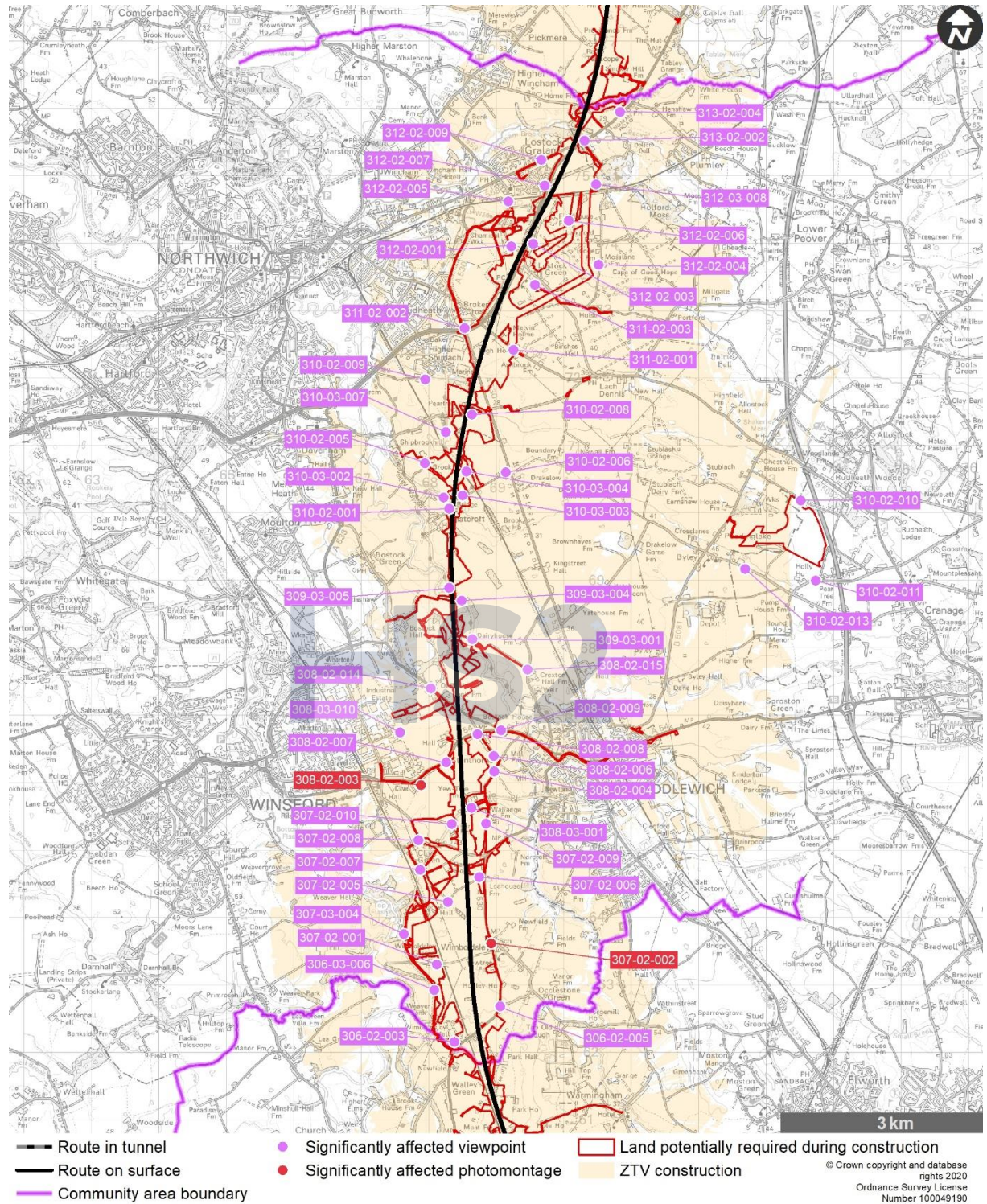
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- 11.4.11 The visual assessment has identified locations where continuous night working and/or overnight working during construction will result in significant effects on visual receptors (summarised in Table 36 and described in detail in Volume 5: Appendix LV-001-0MA02 Part 3).
- 11.4.12 Table 36 describes the construction phase potentially significant visual effects. Viewpoint locations are shown in Map Series LV-03 in the Volume 2: MA02 Map Book.



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**Table 36: Construction phase significant visual effects**



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View east from Footpath Wimboldsley 5/2, Verdin Arms public house, Walley's Green (High sensitivity receptors) (VP 306-02-003)	
<p>Residents of Wimboldsley Hall, Verdin Arms public house and PRoW users of <b>high</b> susceptibility, and visitors to the Verdin Arms public house of lower susceptibility, all with <b>medium</b> value views, will experience a substantial change to the composition of near and middle-distance views. There will be large-scale construction works across the WCML including the construction works for Crewe North RSD, A530 Nantwich Road satellite compound and Crewe RSD satellite compound 1 and Minshull Vernon RS satellite compound, along with the A530 Nantwich Road realignment and overbridge. The removal of existing vegetation along the WCML and A530 Nantwich Road together with the height of A530 Nantwich Road overbridge and Crewe North RSD will emphasise the construction of the Proposed Scheme from Wimboldsley Hall and the Verdin Arms public house. The construction works will be prominent across the majority of the view in the near and middle-distance.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<p>Night-time effects: The presence of night-time lighting associated with A530 Nantwich Road satellite compound, Crewe North RSD satellite compound 1 and Minshull Vernon RS satellite compound, with construction works associated with WCML possessions and Crewe North RSD, including workers accommodation, will introduce additional light sources and sky glow in the middle-distance and far distance beyond the WCML. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view, although there will be a substantial increase in the prominence of artificial lighting. At night, there will be a <b>high</b> magnitude of visual change and <b>major</b> adverse effect.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
View west from Bellsmithy, A530 Nantwich Road (High sensitivity receptors) (VP 306-02-005)	
<p>Residents of properties at Hopley House, Bellsmithy, Yewtree Farm, and Manor Cottage and users of Footpath Wimboldsley 3/1 and Bridleway Wimboldsley 2/1 of <b>high</b> susceptibility, and road users of lower susceptibility, all with views of <b>medium</b> value will experience a substantial change to the composition of near and middle-distance views. This will include the construction works for Crewe North RSD, Walley's Green embankment and A530 Nantwich Road satellite compound. The large-scale construction works will require the removal of established hedgerows which incorporate mature trees and pockets of woodland. This vegetation removal will be apparent and represent a substantial change to the agricultural character of the view notably in the open and direct views from properties to the east of the A530 Nantwich Road. Intervening vegetation associated with the properties at Yewtree Farm (comprising Yew Tree Court and The Dairy House) will provide some filtering of views. However, the proximity of the borrow pit areas including MA02 Borrow Pit A satellite compound will be visible. The construction works will be visible across the majority of the view. The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<p>Night-time effects: The presence of night-time lighting associated with Crewe North RSD satellite compounds 1 and 2, A530 Nantwich Road satellite compound and MA02 Borrow Pit A satellite compound will introduce additional light sources in the near distance and generate far distance skyglow. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view, although there will be a substantial increase in the prominence of artificial lighting. At night, there will be a <b>high</b> magnitude of visual change and <b>major</b> adverse effect.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>



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View east from the Shropshire Union Canal (Middlewich Branch), south of Wimboldsley Grange (High sensitivity receptors) (VP 306-03-006)	
<p>Users of Footpath Wimboldsley 5/1 and 9/1 and canal users of <b>high</b> susceptibility and with <b>medium-high</b> value views will experience a noticeable change to the composition of middle-distance and far distance views. There will be large-scale construction works across and beyond the WCML including views towards the construction of Crewe North RSD (including A530 Nantwich Road satellite compound and Crewe North RSD satellite compounds 1 and 2) along with the A530 Nantwich Road realignment and overbridge to the south, and utility diversions. The construction works will be prominent in the middle-distance and this will be partially enabled by the removal of field boundary hedges and accompanying mature trees. Vegetation along The Dingle watercourse will filter views to construction to the north beyond Wimboldsley Grange. Construction activity will be noticeable against the skyline and across the majority of the view, beyond the WCML. The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

View east from Wimboldsley Grange (High sensitivity receptor) (VP 307-02-001)	
<p>Residents of <b>high</b> susceptibility and with views of <b>medium</b> value will experience a substantial change to the composition of near and middle-distance views. There will be large-scale construction works, including views across the WCML towards the construction works for Crewe North RSD, Crewe North RSD satellite compounds 2 and 3 along with the A530 Nantwich Road realignment and overbridge to the south. The construction works will be prominent in the near distance, immediately beyond and adjacent to the WCML and highly visible across much of the view. The construction area for utility works extends to the south, north and west of Wimboldsley Grange, which will bring such activity close to the property. The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Night-time effects:  The presence of night-time lighting associated with Crewe North RSD satellite compounds 2 and 3 will introduce additional light sources in the near and middle-distance. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. However, there will be a substantial increase in the prominence of artificial lighting. At night, there will be a <b>high</b> magnitude of visual change and <b>major</b> adverse effect.</p>	<p>Level of effect:  Major adverse (significant)</p>

View west from Wimboldsley, A530 Nantwich Road (High sensitivity receptor) (VP 307-02-002)	
<p>Residents of <b>high</b> susceptibility, staff and pupils at Wimboldsley Community Primary School and road users along the A530 Nantwich Road of lower susceptibility, all with views of <b>medium</b> value will experience a substantial change to the composition of near and middle-distance views. There will be large-scale construction works including views towards the construction of Crewe North RSD, Walley's Green embankment and MA02 Borrow Pits A and B to the south and north. The removal of established hedgerows with mature trees and pockets of woodland will result in the construction works being visible in proximity to Wimboldsley, in particular in open and direct views from residents of properties on the western side of the A530 Nantwich Road, substantially changing the agricultural character of the view. Utilities diversions to the west will bring construction activity close to the properties. Users of Wimboldsley Community Primary School will be largely screened by existing roadside and boundary hedges, although construction activity</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

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View west from Wimboldsley, A530 Nantwich Road (High sensitivity receptor) (VP 307-02-002)	
<p>will be perceptible where construction plant is viewed above this vegetation. Intervening garden vegetation partly filters views west from properties to the east of A530 Nantwich Road. The construction works will be visible across the majority of the view. The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p> <p>A photomontage illustrating this scenario is included Volume 5: Appendix LV-001-0MA02, Part 3.</p>	
<p>Night-time effects:</p> <p>The presence of night-time lighting associated with Crewe North RSD and Crewe North RSD satellite compounds 2 and 3 will generate additional light sources and middle-distance skyglow. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. However, there will be a substantial increase in the prominence of artificial lighting. At night, there will be a high magnitude of visual change and <b>major</b> adverse effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

View east from the Shropshire Union Canal (Middlewich Branch), Rookery Wood (High sensitivity receptors) (VP 307-03-004)	
<p>Users of Footpath Wimboldsley 9/1 and canal users of <b>high</b> susceptibility and with <b>medium-high</b> value views will experience a noticeable change to the composition of middle-distance views. There will be large-scale construction works, with open views beyond the WCML towards the construction of Crewe North RSD (including Crewe North RSD satellite compound 3). The construction works will be prominent in the middle-distance and highly visible across much of the view. Such visibility of construction will be partially enabled by the removal of vegetation, including Stove Room Wood. Construction activity will be noticeable against the skyline and across the majority of the view, beyond the WCML. The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

View south-east from Footpath Wimboldsley 1/1, east of Lea Hall (High sensitivity receptor) (VP 307-02-005)	
<p>Residents of Lea Hall, The Huntsman's Lodge, The Gate House and Lea Hall Farm House, and users of Footpath Wimboldsley 1/1 of <b>high</b> susceptibility and with views of medium value will experience a substantial change to the composition of near-distance views to large-scale construction works, including the construction of the Crewe North RSD, Walley's Green embankment and Clive Green Lane overbridge to the north. The removal of established hedgerows with mature trees, including Stove Room Wood and adjacent copses to the east and south, and the presence of large-scale construction activity in proximity to residents will represent a substantial change to key characteristics of the view. Utilities diversions will extend to the west of the viewpoint, which will bring construction activity close but will not result in additional hedgerow or tree loss. The construction works will be visible across the majority of the view. Footpath Wimboldsley 1/1 will be temporarily diverted during construction. The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Night-time effects:</p> <p>The presence of night-time lighting associated with Crewe North RSD and Crewe North RSD satellite compounds 2 and 3 and construction activity in relation to Clive Green Lane overbridge</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

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View south-east from Footpath Wimboldsley 1/1, east of Lea Hall (High sensitivity receptor) (VP 307-02-005)	
to the north will introduce additional near distance light sources and skyglow. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. However, there will be a substantial increase in the prominence of artificial lighting. At night, there will be a <b>high</b> magnitude of visual change and <b>major</b> adverse effect.	

View west from Leahead, A530 Nantwich Road (High sensitivity receptors) (VP 307-02-006)	
Residents of Lea House Farm, Leahead and Leahead Cottages of <b>high</b> susceptibility and road users of lower susceptibility, all with views of <b>medium</b> value, will experience a substantial change to the composition of near-distance views. There will be large-scale construction works including activities associated with MA02 Borrow Pit B, Clive Green Lane realignment and Clive Green Lane satellite compound. Views will be either open or partially screened by existing buildings and established garden vegetation. Construction of Crewe North RSD, Walley's Green embankment and Clive Green Lane satellite compound will be visible in the middle-distance, although partially filtered by intervening vegetation and buildings. The A530 Nantwich Road and Clive Green Lane will be used by construction traffic and the removal of roadside vegetation will expose views of this. Utilities diversions will extend into the near distance and result in minor additional hedgerow loss. The works will be visible across the majority of the view. The combination of the above will result in a <b>high</b> magnitude of visual change. The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.	Level of effect: <b>Major</b> adverse (significant)
Night-time effects: The presence of night-time lighting associated with Crewe North RSD, Crewe North RSD satellite compound 3 and Clive Green Lane satellite compound will generate additional middle-distance skyglow. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. There will be a noticeable increase in the prominence of artificial lighting. At night, there will be a <b>medium</b> magnitude of visual change and <b>moderate</b> adverse effects.	Level of effect: <b>Moderate</b> adverse (significant)

View east from the Shropshire Union Canal (Middlewich Branch), Clive Green (High sensitivity receptors) (VP 307-02-007)	
Residents of Stanthorne Park Mews and Clive Green, users of Footpaths Winsford 49/1, Wimboldsley 1/2, 9/1, 9/3 and NCN Route 5 and canal users, of <b>high</b> susceptibility and with views of <b>medium-high</b> value will experience a substantial change to the composition of near-distance views. This will include large-scale construction works including activities associated with the construction of Clive Green Lane realignment and Clive Green Lane overbridge, the construction of access roads and tracks serving Crewe North RSD, and Clive Green embankment. Construction site elements including Crewe North RSD satellite compound 1, Clive Green Lane satellite compound, MA02 Borrow Pit B satellite compound and the use of Clive Green Lane for construction traffic, evident across most of the view. Sequential views experienced by users of the Shropshire Union Canal (Middlewich Branch) will be changed by the construction of Clive Green Lane realignment across the line of the canal. The construction area for utility works will extend to the south of Stanthorne Park Mews, which will bring construction activity close to the properties. The construction works will be visible across the majority of the view and in proximity to the receptors. The combination of the above will result in a <b>high</b> magnitude of visual change. The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.	Level of effect: <b>Major</b> adverse (significant)
Night-time effects:	Level of effect:

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View east from the Shropshire Union Canal (Middlewich Branch), Clive Green (High sensitivity receptors) (VP 307-02-007)	
The presence of night-time lighting associated with Clive Green Lane satellite compound, Crewe North RSD north satellite compound 3 and construction activity in relation to Crewe North RSD will create areas of localised lighting and skyglow set in the context of a predominantly rural and unlit area. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. There will be a noticeable increase in the prominence of artificial lighting. At night, there will be a <b>medium</b> magnitude of visual change and <b>moderate</b> adverse effect.	<b>Moderate</b> adverse (significant)

View east from Clive Green Lane, Clive Green (High sensitivity receptors) (VP 307-02-008)	
Residents of properties along Clive Green Lane of <b>high</b> susceptibility and road users of lower susceptibility, all with views of <b>medium</b> value will experience a noticeable change to the composition of near and middle-distance views towards the construction works for the emerging Clive Green Lane realignment, which will include the construction of the Shropshire Union Canal offline overbridge. Construction work relating to the Proposed Scheme, including Crewe North RSD, will be seen in the far distance, heavily filtered by intervening vegetation. Views of construction activity beyond the eastern side of the canal, including the emerging structures of Clive Green Lane realignment will be noticeable from Wharf Cottage and the adjacent property. Construction traffic using Clive Green Lane as a construction traffic route will be evident across most of the view. The combination of the above will result in a <b>medium</b> magnitude of visual change. The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)
Night-time effects: The presence of night-time lighting associated with Crewe North RSD, Crewe North RSD satellite compound 3, Shropshire Union Canal north and south satellite compounds, Clive Green Lane satellite compound and construction activity related to Shropshire Union Canal viaducts Nos. 1 to 3 will create localised areas of lighting in the far distance of a predominantly rural and unlit area. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. There will be a noticeable increase in the prominence of artificial lighting. At night, there will be a <b>medium</b> magnitude of visual change and <b>moderate</b> adverse effect.	Level of effect: <b>Moderate</b> adverse (significant)

View west from Coalpit Lane, Wallange Paddocks Farm (High sensitivity receptors) (VP 307-02-009)	
Residents of Wallange Paddocks Farm and residential properties on the A530 Nantwich Road of <b>high</b> susceptibility and road users of lower susceptibility, all with views of <b>medium</b> value, will experience a substantial change to the composition of middle-distance views towards the construction works, partially enabled by the removal of existing hedgerow and trees. Shropshire Union Canal south satellite compound will be in the direct line of view, with Clive Green South embankment and Shropshire Union Canal viaducts Nos. 1 to 3 beyond. To the south, construction of the emerging Clive Green Lane realignment will be prominent in a relatively open agricultural landscape. The construction works will be visible across the majority of the view. The combination of the above will result in a <b>high</b> magnitude of visual change. The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.	Level of effect: <b>Major</b> adverse (significant)
Night-time effects: The presence of night-time lighting associated with Shropshire Union Canal north and south satellite compounds and Clive Green Lane satellite compound immediately to the west, Crewe North RSD in the distance to the south and construction activity related to Shropshire Union	Level of effect: <b>Moderate</b> adverse (significant)

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View west from Coalpit Lane, Wallage Paddocks Farm (High sensitivity receptors) (VP 307-02-009)	
Canal viaducts Nos. 1 to 3 will create areas of localised lighting in the near distance and far distance of the view in a predominantly rural and unlit area. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. There will be a noticeable increase in the prominence of artificial lighting. At night, there will be a <b>medium</b> magnitude of visual change and <b>moderate</b> adverse effects.	

View east from the Shropshire Union Canal (Middlewich Branch), Park Farm (High sensitivity receptors) (VP 307-02-010)	
Residents of Park Farm, users of Footpath Winsford 3/1 and NCN Route 5, and canal users of <b>high</b> susceptibility and with views of <b>medium-high</b> value will experience a substantial change to the composition of near distance views. This will include the construction works for Crewe North RSD reception tracks, Stanthorne south embankment, Clive Green north and south embankments Nos. 1 to 3 and the Shropshire Union Canal viaducts Nos. 1 to 3. Construction elements including Shropshire Union Canal north and south satellite compounds and site haul routes will be evident in the near distance and across most of the view. More distant views towards Clive Green Lane realignment will be noticeable to the south. Sequential and longer views experienced by users of the Shropshire Union Canal (Middlewich Branch) will be substantially changed, in particular by the construction of Shropshire Union Canal viaducts Nos. 1 to 3 and the approach embankments. The construction works will be visible across the majority of the view. The combination of the above will result in a <b>high</b> magnitude of visual change. The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.	Level of effect: <b>Major</b> adverse (significant)
Night-time effects: The presence of night-time lighting associated with the Shropshire Union Canal north and south satellite compounds, Clive Green Lane satellite compound and Crewe North RSD in the distance to the south and construction activity in relation to Shropshire Union Canal viaducts Nos. 1 to 3 will create areas of localised lighting in the near distance and far distance in a predominantly rural and unlit area. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. There will be a noticeable increase in the prominence of artificial lighting in the view. At night there will be a <b>medium</b> magnitude of visual change and a <b>moderate</b> adverse effect.	Level of effect: <b>Moderate</b> adverse (significant)

View south-west from the Shropshire Union Canal (Middlewich Branch), Yew Tree Farm (High sensitivity receptors) (VP 308-03-001)	
Users of Footpath Winsford 3/1 and NCN Route 5, and canal users of <b>high</b> susceptibility and with views of <b>medium-high</b> value will experience a substantial change to the composition of near distance views including construction works for Crewe North RSD reception tracks, the formation of Stanthorne south embankment, Clive Green north and south embankments Nos. 1-3 and the Shropshire Union Canal viaducts Nos. 1 to 3. Construction elements including Shropshire Union Canal north and south satellite compounds, temporary material stockpiles, MA02 Borrow Pit C excavation and site haul routes will be evident in the near distance and across most of the view. Sequential and longer views by users of the Shropshire Union Canal (Middlewich Branch) will be substantially changed, in particular by the construction of the Shropshire Union Canal viaducts Nos. 1 to 3 and the approach embankments. The construction works will be visible across the majority of the view. Construction activity will therefore result in a <b>high</b> magnitude of visual change. The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.	Level of effect: <b>Major adverse</b> (significant)

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<p><b>View south-east from Footpath Winsford 48/1, Clive (High sensitivity receptors) (VP 308-02-003)</b></p>	
<p>Residents of properties on the A54 Middlewich Road, Seaton Street, Hewitt Drive and Beckett Avenue and footpath users of <b>high</b> susceptibility and with views of <b>medium</b> value, will experience a noticeable change to the composition of middle-distance, oblique and filtered views across undulating farmland towards the construction works. The construction of Crewe North RSD reception tracks, Middlewich box structure and Shropshire Union Canal north satellite compound will be visible on the skyline but filtered by intervening hedgerows and trees. The emerging Stanthorne South embankment will be visible to the north and the emerging Shropshire Union Canal viaducts Nos. 1 to 3 and Clive Green north and south embankments Nos. 1 to 3 seen in the far distance, to the south. The A54 Middlewich Road will be used as a construction traffic route to the north and west. The presence of the construction activity will be a noticeable change, although partially obscured by intervening vegetation. The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p> <p>A photomontage illustrating this scenario is included Volume 5: Appendix LV-001-0MA02, Part 3.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>
<p><b>View north-west from Coalpit Lane, Stanthorne (High sensitivity receptors) (VP 308-02-004) and view west from Birch Lane, Stanthorne (High sensitivity receptors) (VP 308-02-006)</b></p>	
<p>Residents of Birch Lane, The Cottage and Millview Cottage of <b>high</b> susceptibility and road users of lower susceptibility, all with views of <b>medium</b> value, will experience a substantial change to the composition of near and middle-distance views. MA02 Borrow Pit C and its associated compound will be visible in the near distance. The removal of hedgerow and scattered trees will emphasise the visibility of the emerging Middlewich box structure, Clive Green North embankments Nos. 2 and 3 and Stanthorne South embankments Nos. 1 and 2. The demolition of Stanthorne Grange and removal of associated mature tree cover will be evident in the far distance.</p> <p>Large-scale construction works will be visible across the majority of the view from residential properties. Receptors will have open and direct views of the MA02 Borrow Pit C activity in the near distance representing a substantial change in the view. The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p><b>View south-east from the A54 Middlewich Road, Stanthorne Hall (High sensitivity receptors) (VP 308-02-007)</b></p>	
<p>Residents of Stanthorne Hall and Stanthorne Hall Farm of <b>high</b> susceptibility and road users of lower susceptibility, both with views of <b>medium</b> value, will experience a noticeable change to the composition of oblique and direct, but filtered views of the construction work for A54 Middlewich Road realignment and Stanthorne South embankment No.1. The demolition of Stanthorne Grange and the loss of the associated established trees adjacent to the A54 Middlewich Road and access road to the properties will be noticeable in the views from Stanthorne Hall, although dwellings associated with Stanthorne Hall Farm are relatively well screened by existing trees. The construction activity associated with Crewe North RSD reception tracks, Middlewich box structure and Stanthorne South embankment No.1 will be in the middle distance and far distance of heavily filtered views. Tall plant and cranes in the construction compounds, including Shropshire Union Canal north satellite compound, MA02 Borrow Pit C compound and A54 Middlewich Road</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>



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View south-east from the A54 Middlewich Road, Stanthorne Hall (High sensitivity receptors) (VP 308-02-007)	
<p>satellite compound, will be visible above the trees. The A533 Northwich Road diversion may be visible to the north and east, but partially screened by existing farm buildings and trees. The presence of the construction works will result in a noticeable change to part of the view, but partly filtered by intervening vegetation. The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	

View north-west from the A54 Middlewich Road and Birch Lane junction (High sensitivity receptors) (VP 308-02-008)	
<p>Residents of the A54 Middlewich Road, Birch Lane and Stanthorne Lodge of <b>high</b> susceptibility and road users of lower susceptibility, all with views of <b>medium</b> value will experience a substantial change to the composition of near and middle-distance views. There will be filtered views of the construction works adjacent to Stanthorne Lodge to the west associated with Stanthorne South embankment No. 2 and landscape earthworks, and to the north of A54 Middlewich Road satellite compound. The demolition of Stanthorne Grange and the loss of established trees adjacent to the A54 Middlewich Road will emphasise the proximity of the construction works to the properties. The construction of A54 Middlewich Road viaduct, the A54 Middlewich Road realignment and satellite compound and the A533 Northwich Road diversion will be prominent elements in the near distance from properties facing the A54 Middlewich Road. Construction traffic using the A54 Middlewich Road will be noticeable in the view. The scale and proximity of the construction activities and the emerging structures will substantially foreshorten views and change the skyline. The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<p>Night-time effects: The presence of night-time lighting associated with A54 Middlewich Road satellite compound, including workers accommodation, and A533 Bostock Road satellite compound will create areas of localised lighting in the middle-distance and far distance of views from properties fronting the A54 Middlewich Road and on Birch Lane, although views from Stanthorne Lodge are partially filtered by mature garden boundary vegetation. The controls on light spill set out in the draft CoCP will limit the change these new light sources introduce to the wider view. There will be a noticeable increase in the prominence of artificial lighting. At night, there will be a <b>medium</b> magnitude of visual change and moderate adverse effects.</p>	<p>Level of effect: <b>Moderate</b> adverse (significant)</p>

View west from the A533 Northwich Road and the A54 Middlewich Road junction (High sensitivity receptors) (VP 308-02-009)	
<p>Residents of Bostock House Farm and Bostock House of <b>high</b> susceptibility and road users of lower susceptibility, all with views of <b>medium</b> value, will experience a noticeable change to the composition of open or partially screened near and middle-distance views primarily of the construction of the A54 Middlewich Road realignment and A533 Northwich Road diversion. Construction of the Crewe North RSD reception tracks, Stanthorne North and South embankments and A54 Middlewich Road viaduct will be visible as far distance skyline components with views partially filtered by intervening existing hedgerow and garden vegetation. The A533 Bostock Road satellite compound and temporary material stockpiles will be visible in the middle distance. The A54 Middlewich Road satellite compound will be visible in the far distance of the view, partially screened by the rising landform. Construction traffic will be present</p>	<p>Level of effect: <b>Moderate</b> adverse (significant)</p>

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<b>View west from the A533 Northwich Road and the A54 Middlewich Road junction (High sensitivity receptors) (VP 308-02-009)</b>	
<p>along the A54 Middlewich Road. The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	
<b>View east from Footpath Winsford 37/1, Winsford Industrial Estate (Medium-high sensitivity receptors) (VP 308-03-010)</b>	
<p>Footpath users of <b>medium-high</b> susceptibility and workers of lower susceptibility, with views of <b>medium</b> value will experience a noticeable change to the composition of middle and far-distance views, extending east beyond the residential extents of Clive and Stanthorne Hall. The Willowbeds woodland screens views to the north, while construction activity associated with Stanthorne South and North embankments, Crewe North RSD reception tracks, A54 Middlewich Road viaduct and the A54 Middlewich Road realignment will be in the far distance of the view. The A54 Middlewich Road satellite compound between the existing A54 Middlewich Road and A533 Northwich Road will be more visible in sequential views from the footpaths closer to Stanthorne Hall Farm, along with several temporary material stockpiles.</p> <p>Construction activities will be visible on the skyline, partially screened by intervening vegetation. Although distant, the construction activities will be evident across much of the view. The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>medium-high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>  adverse  (significant)</p>
<b>View south-east from Oldhall Farm, A533 Northwich Road (High sensitivity receptors) (VP 308-02-014)</b>	
<p>Residents of Old Hall Farm, Bank Farm and Heyscroft of <b>high</b> susceptibility and road users of lower susceptibility, all with views of <b>medium</b> value, will experience a substantial change to the composition of open, filtered or partially screened near distance views to the construction works for the A533 Northwich Road diversion, with construction of the A54 Middlewich Road realignment, Stanthorne North and South embankments, and A54 Middlewich Road viaduct seen in the middle distance. River Dane viaduct south satellite compound will be evident to the north and east of the properties. Although Bull's Wood and Oak Wood to the north will provide some screening of views, the loss of smaller groups of trees and the demolition of Greenheyes Farm will open up views east towards the construction activities. The scale and proximity of the construction activities will be apparent in the near and middle distance representing a substantial change to the view. The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b>  adverse  (significant)</p>
<b>View west from Croxton Hall Farm, A530 Croxton Lane (High sensitivity receptors) (VP 308-02-015)</b>	
<p>Residents of <b>high</b> susceptibility and road users of lower susceptibility, both with views of <b>medium</b> value will experience a noticeable change to the composition of middle and far-distance views. There will be visibility of construction of Stanthorne North embankment, while the construction of River Dane viaduct will be visible across the majority of views in the middle to far distance. The removal of sections of field boundary and watercourse vegetation east and west of the Proposed Scheme will be noticeable. The upper elements of equipment and activities within</p>	<p>Level of effect:  <b>Moderate</b>  adverse  (significant)</p>

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View west from Croxton Hall Farm, A530 Croxton Lane (High sensitivity receptors) (VP 308-02-015)	
<p>River Dane viaduct satellite compound will be visible against the western slopes of the valley, seen beyond the emerging River Dane viaduct. Residents on the A530 Croxton Lane will have wide and uninterrupted views of construction activities, seen against rising ground across the majority of the view in the distance to the west. The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	

View north-west from the Trent and Mersey Canal, Dane Valley (High sensitivity receptors) (VP 309-03-001 and VP 309-03-004) and view south-east from the Trent and Mersey Canal, Dane Valley (High sensitivity receptors) (VP 309-03-005)	
<p>Users of Footpaths Byley 3/1 and Davenham 6/1 and the canal of <b>high</b> susceptibility and with views of <b>medium-high</b> value will experience a substantial change to the composition of near-distance views to large-scale construction works, including activities associated with River Dane viaduct and Dane Valley embankment. The removal of canalside vegetation for Dane Valley embankment will expose River Dane viaduct north satellite compound and a temporary materials stockpile in the middle-distance to the east of the valley margin. The large-scale construction activities will be visible across the majority of the view. The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

View south-east from Bridge Farm, Whatcroft Hall Lane (High sensitivity receptors) (VP 310-02-001)	
<p>Residents of Bridge Farm, Whatcroft Hall and Dairy Farm, and users of Footpath Davenham 20/2 of <b>high</b> susceptibility and with views of <b>medium</b> value, will experience a substantial change to the composition of near and middle-distance views to construction activities for Dane Valley embankment on the southern approach to Puddinglake Brook viaduct, along with works for Dairy Farm access realignment. Residents at Bridge Farm will have views of works within Puddinglake Brook viaduct satellite compound in the middle distance and at River Dane viaduct north satellite compound in the far distance. Temporary materials stockpiles will also be visible in the middle-distance and far distance. Views experienced by residents at Whatcroft Hall and Dairy Farm will be largely screened by farm buildings and intervening mature vegetation. Utilities diversions will extend to the south of the properties, which will bring construction activity close to the properties but not result in additional hedgerow or tree loss. The construction activities will be visible across the majority of the view. The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Night-time effects:</p> <p>The presence of night-time lighting for Puddinglake Brook viaduct satellite compound, River Dane viaduct north satellite compound and viaduct construction activity in the far distance to the south will create areas of localised lighting in a predominantly rural and unlit area. The controls on light spill set out in the draft CoCP will reduce light spill and glare. Residents at Bridge Farm will have close views of Puddinglake Brook viaduct satellite compound. Residents of Whatcroft Hall and Dairy Farm will be partially screened by existing vegetation and farm outbuildings but skyglow in the far distance will result in a substantial change in the prominence of artificial lighting in the view. At night, there will be a <b>high</b> magnitude of visual change and a <b>major</b> adverse effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

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View south-east from the Trent and Mersey Canal, Puddinglake Brook (High sensitivity receptors) (VP 310-03-002) and view west from the Trent and Mersey Canal, alongside Whatcroft Hall Lane (High sensitivity receptor) (VP 310-03-003)	
<p>Users of Footpath Davenham 6X/2 and the canal of <b>high</b> susceptibility and with views of <b>medium-high</b> value will experience a substantial change to the composition of near distance views of construction activity associated with Puddinglake Brook viaduct, Dane Valley embankment to the south and Whatcroft South embankment to the north of the canal. The removal of established vegetation along Puddinglake Brook will expose views towards Puddinglake Brook viaduct satellite compound. The construction of Whatcroft South embankment and Brook Farm access diversion will also be visible in the near distance to sequential views from the west. Footpath and canal users will experience a substantial change to views due to the closeness of large-scale construction works. The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

View north-west from the Trent and Mersey Canal, north of Whatcroft (High sensitivity receptors) (VP 310-03-004)	
<p>Users of Footpath Rudheath 10/1 and the canal of <b>high</b> susceptibility and with views of <b>medium-high</b> value will experience a substantial change to the composition of middle-distance views of the construction of Trent and Mersey Canal viaduct, with the construction of Whatcroft North embankment further towards the site of Higgins Lane Farm. Works associated with Gad Brook viaduct south satellite compound will be partially visible, located beyond and to the east of the site of Higgins Lane Farm. Construction of Whatcroft South embankment will be largely screened by the Mid-Cheshire Line and dense boundary vegetation alongside the canal towpath. Construction activities including vehicle and crane movements will be evident and there will be a substantial change to the skyline partly due to the loss of Higgins Lane Farm. The construction works will be visible across the majority of the view. The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

View south-east from Brook Farm, Old Lane (High sensitivity receptors) (VP 310-02-005)	
<p>Residents of Manor Farm, Brook Farm and Brook Farm Cottage of <b>high</b> susceptibility and with views of <b>medium</b> value will experience a substantial change to the composition of open or partially screened visibility of construction of Brook Farm access diversion in the near and middle distance and of Whatcroft South embankment, Trent and Mersey viaduct and the southern extent of Whatcroft North embankment in the middle distance. The removal of field boundary hedgerows to construct the access diversion will allow more open views towards construction activity. The taller elements of construction equipment in Puddinglake Brook viaduct satellite compound will be partially visible in the far distance. The construction works will be visible in proximity to the receptors and large-scale elements will be introduced into the middle distance. Views will be partially filtered by existing vegetation and farm buildings at Manor Farm and Brook Farm, but views to the east and north will be more open from the adjacent cottages, resulting in a substantial change in the view. The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

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View south-west from Croft Lodge Kennels, Whatcroft Hall Lane (High sensitivity receptors) (VP 310-02-006)	
<p>Residents of properties on the A530 King Street and Whatcroft Hall Lane and users of Restricted Byway Lach Dennis 8/1 of <b>high</b> susceptibility and with views of <b>medium</b> value, will experience a noticeable change to the composition of middle and far-distance views. There will be partial visibility of construction work in the far distance for Whatcroft South embankment. Puddinglake Brook viaduct and Dane Valley embankment, along with Puddinglake Brook viaduct satellite compound, visible across the breadth of the far distance. Views of construction will be filtered by intervening mature field boundary vegetation and woodland bordering the Sandbach to Northwich Line. The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

View south-east from the Trent and Mersey Canal, Oakwood Marina (High sensitivity receptors) (VP 310-03-007)	
<p>Users of the canal, Footpath Rudheath 10/1 and mooring facilities of <b>high</b> susceptibility and with views of <b>medium-high</b> value will experience a substantial change to the composition of near and middle-distance views of the construction of Whatcroft North embankment and Trent and Mersey viaduct and to the east of the canal and the marina. In the far distance, the demolition of Higgins Lane Farm and removal of some areas of mature hedgerow and field trees will be evident. Also in the far distance, taller elements of construction equipment within Gad Brook viaduct south satellite compound will be visible, seen against the skyline beyond Higgins Lane Farm. Construction of Whatcroft South embankment will be screened by the Sandbach to Northwich Line and dense boundary vegetation west of the canal towpath. The construction works and emerging structures will be visible in the middle distance across the majority of the view resulting in a substantial change to the view. The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

View west from Pear Tree Farm Cottages, Davenham Road (High sensitivity receptors) (VP 310-02-008)	
<p>Residents of <b>high</b> susceptibility and road users of lower susceptibility, all with views of <b>medium</b> value will experience a substantial change to the composition of near-distance views of the construction and emerging structures of Whatcroft North embankment, Gad Brook viaduct and Davenham Road express feeder auto-transformer station. Near distance garden, roadside and field boundary hedges and hedgerow and field trees will be removed to facilitate construction activities. Gad Brook viaduct south satellite compound, located immediately south of Davenham Road, will be visible in the near distance. Views of construction works will be in the near distance to the south, west and north. The large-scale and proximity of construction works will obscure existing views to the west, forming a substantial change to the skyline. The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Night-time effects:  The presence of night-time lighting for Gad Brook viaduct south satellite compound and viaduct construction activity in the near distance to the north will introduce lighting elements in a predominantly unlit area. The controls on light spill set out in the draft CoCP will reduce light spill</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

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<b>View west from Pear Tree Farm Cottages, Davenham Road (High sensitivity receptors) (VP 310-02-008)</b>	
and glare. However, there will be a substantial increase in the extent and prominence of artificial lighting. At night, there will be a <b>high</b> magnitude of visual change and a <b>major</b> adverse effect.	
<b>View east from Footpath Rudheath 5/2, Park Farm, Rudheath (High sensitivity receptors) (VP 310-02-009)</b>	
Residents and footpath users of <b>high</b> susceptibility and with views of <b>medium</b> value, will experience a noticeable change to the composition of middle-distance views. In the far-distance of the view the taller elements of construction of Gad Brook viaduct, Whatcroft North embankment and Davenham Road express feeder auto-transformer station, to the east of the Trent and Mersey Canal will be visible. Taller construction equipment at Gad Brook viaduct south satellite compound, east of the Proposed Scheme, will also be visible on the skyline. However, visibility of these construction components will be filtered by intervening tall field boundary and canal-side vegetation. The combination of the above will result in a <b>medium</b> magnitude of visual change.  The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)
<b>View south-west from King's Lane Farm, King's Lane (High sensitivity receptors) (VP 310-02-010)</b>	
Residents of <b>high</b> susceptibility and road users of lower susceptibility, both with views of <b>medium</b> value, will experience a substantial change to the composition of near distance, partially filtered views towards MA02 Borrow Pit D. There will be near-distance views of construction activity where the borrow pit works extend towards the edge of the field unit immediately to the south of Kings Lane. Vegetation removal to facilitate the works will be limited to a linear wooded strip in the centre of the site. The remaining area is characterised by open agricultural fields with limited vegetation along field boundaries. The presence of construction activity, vehicles and machinery will represent a substantial change in proximity to the receptor, out of character within the open agricultural setting. The combination of the above will result in a <b>high</b> magnitude of visual change.  The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.	Level of effect: <b>Major</b> adverse (significant)
<b>View north-west from Byway Cranage 7/1, A54 Middlewich Road (High sensitivity receptors) (VP 310-02-011)</b>	
Residents of Holly House Farm and properties off the A54 Middlewich Road and footpath users of <b>high</b> susceptibility, and road users of lower susceptibility, all experiencing views of <b>medium</b> value, will experience a noticeable change to the composition of middle-distance, partially filtered views towards the construction activity associated with MA02 Borrow Pit D. Vegetation removal to facilitate the works will be limited to a linear wooded strip in the centre of the site. The remaining area is characterised by open agricultural fields with limited vegetation along field boundaries. The presence of construction activity, vehicles and machinery will represent a noticeable change in the middle distance but partially filtered by existing vegetation.  Construction activity will therefore result in a <b>medium</b> magnitude of visual change.  The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse effect.	Level of effect: <b>Moderate</b> adverse (significant)



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View north-east from Moss Lane (High sensitivity receptors) (VP 310-02-013)	
<p>Residents of Moss Lane of <b>high</b> susceptibility, staff and pupils at Byley Primary School, visitors to Lowes Farm Shop and road users of lower susceptibility, all with views of <b>medium</b> value, will experience a noticeable change to the composition of heavily filtered middle-distance views towards the MA02 Borrow Pit D compound across the agricultural landscape to the north. Vegetation removal to facilitate the works will be limited to a linear wooded strip in the centre of the site. The existing mature woodland belt to the south of the works will be retained and will provide partial screening and filtering of the borrow pit works as perceived in these views. Introduction of new landform and earthworks may also be visible particularly in early stages of the construction period. Construction activity will therefore result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

View west from the B5082 Penny's Lane, Lach Dennis (High sensitivity receptors) (VP 311-02-001)	
<p>Residents and users of Footpath Lach Dennis 2/1, 3X/1 and Rudheath 3/4 of <b>high</b> susceptibility and road users of lower susceptibility, both with views of <b>medium</b> value, will experience a substantial change to the composition of near and middle-distance views. There will be open or partially screened visibility of the construction of Gad Brook viaduct and Rudheath embankment in the middle and far distance to the north. The B5802 Penny's Lane diversion, and notably B5082 Penny's Lane satellite compound for receptors at Melvin Holme, will be visible in the near distance, with works for Rudheath embankment satellite compound being visible in the middle distance. Taller elements of construction equipment and operations within Rudheath embankment satellite compound will be visible in the far distance. The removal of mature hedgerows and trees in the near, middle and far distance will substantially alter views. Utilities diversions extending to the west of the properties will result in additional hedgerow clearance including trees. The construction works will be visible across the majority of the view. Footpath Lach Dennis 3X/1 will be diverted. Footpath Rudheath 3/4 will be closed. The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Night-time effects:  The presence of night-time lighting for B5082 Penny's Lane satellite compound, Gad Brook viaduct north satellite compound (including workers accommodation), Rudheath embankment satellite compound and construction activity in relation to Gad Brook viaduct in the near distance and middle-distance to the north-west will introduce lighting elements against a backdrop of the already lit urban sections of the A556 Shurlach Road and the A530 King Street. The presence of night-time lighting for the B5082 Penny's Lane satellite compound will introduce noticeable lighting elements in the near distance for residents of Melvin Holme, although views will be partially filtered by vegetation. The controls on light spill set out in the draft CoCP will reduce light spill and glare. There will be a slight increase in the extent and brightness of artificial lighting in the view. At night there will be a <b>medium</b> magnitude of visual change, resulting in a <b>moderate</b> adverse effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

View south-east from Broken Cross, the A556 Shurlach Road and the A530 King Street junction (High sensitivity receptors) (VP 311-02-002)	
<p>Residents of <b>high</b> susceptibility and road users of lower susceptibility, both with views of <b>medium</b> value, will experience a substantial change to the composition of near and middle-distance views. There will be open visibility across the A556 Shurlach Road towards the construction works, with Rudheath embankment satellite compound prominent in the middle-</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

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<p><b>View south-east from Broken Cross, the A556 Shurlach Road and the A530 King Street junction (High sensitivity receptors) (VP 311-02-002)</b></p>	
<p>distance. The removal of roadside boundary vegetation will open up views towards the realignment of the A556 Shurlach Road in the near distance. The loss of field boundary vegetation and demolition of High House Farm will be noticeable. Construction of Rudheath embankment and the northern extent of Gad Brook viaduct will be visible against the skyline. Tall construction equipment at Rudheath embankment will also be evident in the far distance as will the diversion of the B5082 Penny's Lane to join the A530 King Street. Utilities diversions extending to the east and north of the properties will result in additional hedgerow and associated tree clearance in the far distance. The construction activity will be visible across the majority of the view resulting in a substantial change in proximity to residential receptors. The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	
<p><b>View west from Birch Grove, Lostock Green (High sensitivity receptors) (VP 311-02-003)</b></p>	
<p>Residents along the south-western fringe of Lostock Green of <b>high</b> susceptibility and with views of <b>medium</b> value will experience a substantial change to the composition of near and middle-distance views. There will be open visibility of construction works for the A556 Shurlach Road realignment and the Proposed Scheme. The removal of existing field and roadside boundary vegetation along the A556 Shurlach Road will be noticeable in the near distance and middle-distance, opening up views towards the construction activity. A section of overhead power line over the A556 Shurlach Road will be diverted. There will be a substantial change in the middle-distance during construction works, which will be visible across the majority of the view. The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p><b>View north-east from Springbank Farm, Birches Lane (High sensitivity receptors) (VP 312-02-001)</b></p>	
<p>Residents of <b>high</b> susceptibility and with views of <b>medium</b> value will experience a substantial change in the composition of middle-distance views. There will be direct views to Birches Lane satellite compound in the near distance and oblique views of the realignment of the A556 Shurlach Road and construction of Rudheath embankment in the middle-distance and far distance. Five properties on Birches Lane to west of the junction with the A556 Shurlach Road will be demolished, along with the removal of roadside and field boundary vegetation on Birches Lane and the A556 Shurlach Road.</p> <p>The large scale and proximity of the construction works, including construction traffic on Birches Lane, in combination with the removal of mature vegetation will substantially alter the view for residents. The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Night-time effects:</p> <p>The presence of night-time lighting for Birches Lane satellite compound in the near distance, Lostock Gralam viaduct satellite compound and construction activity for Wade Brook and Lostock Gralam viaducts in the middle and far distance of the view will introduce new lighting elements. The controls on light spill set out in the draft CoCP will reduce light spill and glare. There will be a noticeable increase in the extent and brightness of artificial lighting in proximity to the properties. At night, there will be a <b>medium</b> magnitude of visual change and <b>moderate</b> adverse effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

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<p><b>View west from Restricted Byway Lostock Gralam 1/1, Lostock Green (High sensitivity receptors) (VP 312-02-003)</b></p>	
<p>Residents of Lostock Green and footpath users of <b>high</b> susceptibility and with views of <b>medium</b> value will experience a substantial change to the composition of near distance views towards construction works for Wade Brook viaduct, Rudheath embankment, Lostock Gralam South embankment, Birches Lane diversion and the A556 Shurlach Road realignment. Views will be partially screened by garden boundary vegetation and roadside planting along the existing A556 Shurlach Road. Users of the restricted byway will have direct views of construction activity between Lostock Green and the Mid-Cheshire Line, partially enabled by the removal of mature vegetation along the existing A556 Shurlach Road. Lostock Gralam viaduct satellite compound will be adjacent to the byway, with material stockpiles visible in fields next to the realigned Birches Lane and along the byway. The presence of large-scale construction works in proximity to the receptors will result in a substantial change in the view. The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p><b>View west from Mosslane Farm, Moss Lane (High sensitivity receptors) (VP 312-02-004)</b></p>	
<p>Residents of Mosslane Farm, Langford Farm and adjacent properties and users of Footpaths Lostock Gralam 4/1 and 10/1 of <b>high</b> susceptibility and with <b>medium</b> value views, will experience a noticeable change to the composition of middle and far-distance views. There will be views of the construction of the A556 Shurlach Road realignment, Rudheath embankment and Wade Brook viaduct in the far distance, following the removal of mature field boundary vegetation. The construction of the Birches Lane diversion and temporary material stockpiles immediately east of the Proposed Scheme will be visible, with taller elements of construction and equipment seen against the skyline. Although these changes will be seen in the far distance, the large-scale construction activity will make them visible across the full extent of the view. Utilities diversions will also take place across the middle-distance. The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>
<p><b>View south-east from Lostock Gralam Station entrance, Lostock Hollow (Medium sensitivity receptors) (VP 312-02-005)</b></p>	
<p>Residents of Rosetree Meadow, Paulden Road and Harris Road of high susceptibility and rail users of the Mid-Cheshire Line of lower susceptibility, all with views of medium-low value, will experience a noticeable change to the composition of near and middle distance views of large-scale construction activities including the A556 Shurlach Road realignment, Wade Brook viaduct and Lostock Gralam South embankment. Taller elements of construction equipment and operations within Birches Lane satellite compound will be visible above intervening existing trees to the south. The removal of vegetation along the A556 Shurlach Road will open up oblique views east towards Lostock Gralam viaduct satellite compound. All traffic movement on the A556 Shurlach Road throughout the construction period will be visible in the far distance together with construction traffic along Lostock Hollow.</p> <p>There will be a noticeable change to the skyline during construction, with the works visible across the majority of the view. The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and medium sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

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<p><b>View north-west from Footpath Lostock Gralam 4/2, east of Fieldhouse Farm (High sensitivity receptors) (VP 312-02-006)</b></p>	
<p>Residents of Fieldhouse Farm and nearby properties and users of Footpath Lostock Gralam 4/2 of <b>high</b> susceptibility and with views of <b>medium</b> value, will experience a substantial change to the composition of near and middle-distance views. This will include construction works for the emerging Lostock Gralam North and South embankments, Rudheath embankment, Wade Brook viaduct and Lostock Gralam viaduct, the A556 Shurlach Road realignment and the realigned Birches Lane. Lostock Gralam viaduct satellite compound will be located in proximity to Fieldhouse Farm, with Smoker Brook viaduct south satellite compound to the north-west in the middle distance. There will be widespread removal of established vegetation bordering the existing A556 Shurlach Road, at Long Wood and across intervening field boundaries. The construction works will be visible across the majority of the view. The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Night-time effects:  The presence of night-time lighting for Lostock Gralam viaduct satellite compound in the near distance and construction activity in relation to Wade Brook viaduct and Lostock Gralam viaduct in the middle-distance to the west will introduce additional light sources in the view seen in the context of the far distance skyglow associated with Lostock Gralam and existing lighting along the A556 Shurlach Road. The controls on light spill set out in the draft CoCP will reduce light spill and glare. There will be a noticeable increase in the prominence of artificial lighting. At night, there will be a <b>medium</b> magnitude of visual change and <b>moderate</b> adverse effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>
<p><b>View east from Broseley Way, Lostock Gralam (High sensitivity receptors) (VP 312-02-007)</b></p>	
<p>Residents of <b>high</b> susceptibility, and guests and visitors to the Travelodge Northwich and The Watermead public house of lower susceptibility, all with views of <b>medium</b> value, will experience a noticeable change in the composition of near and middle-distance views. Large scale construction works associated with Lostock Gralam embankment and Smoker Brook viaduct. Smoker Brook viaduct south satellite compound will be visible immediately east of the A556 Shurlach Road, partially filtered by existing timber boundary fencing and vegetation providing a visual screen. The removal of mature tree cover from the western edge of Long Wood will be a noticeable change to the wooded backdrop to the view in the near and middle distance. Residents of Salary Row, Broseley Way and Lostock Lodge Care Home will have partially filtered views across the existing A556 Shurlach Road towards the construction of Lostock Gralam North embankment. The combination of the above will result in a <b>medium</b> magnitude of visual change. The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>
<p><b>View west from Footpath Lostock Gralam 8/2, Plumley Lime Beds Nature Reserve (High sensitivity receptors) (VP 312-03-008)</b></p>	
<p>Footpath users of <b>high</b> susceptibility and with views of <b>medium</b> value will experience a substantial change to the composition of near and middle-distance views, including visibility of utilities diversions including associated vegetation clearance at Long Wood and Square Wood and along nearby field boundaries. Footpath users will have filtered views towards construction activity for Lostock Gralam viaduct, including Lostock Gralam North and South embankments. Construction activity for Smoker Brook viaduct and A556 Shurlach Road auto-transformer station will also be visible above intervening field vegetation. Lostock Gralam viaduct satellite compound</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

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<b>View west from Footpath Lostock Gralam 8/2, Plumley Lime Beds Nature Reserve (High sensitivity receptors) (VP 312-03-008)</b>	
and Smoker Brook viaduct south satellite compound will be visible across a large proportion of the view. The combination of the above will result in a <b>high</b> magnitude of visual change. The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.	
<b>View east from the A559 Manchester Road, Lostock Gralam (Medium sensitivity receptors) (VP 312-02-009)</b>	
Residents of Wilson Crescent and properties bordering the A559 Manchester Road of <b>high</b> susceptibility and road users of lower susceptibility, both with views of <b>medium-low</b> value, will experience a noticeable change to the composition of middle-distance views for residents and near distance views for road users of the construction of Lostock Gralam embankment and Smoker Brook viaduct. Smoker Brook viaduct south satellite compound will be partially visible immediately east of the A556 Shurlach Road. Views east from residential properties along Wilson Crescent towards the emerging Smoker Brook viaduct, a temporary material stockpile area and highway works will be partly filtered by garden vegetation and trees within the Cheshire Business Park area. Construction of the Proposed Scheme will introduce new elements that will be noticeable across the majority of the view. The combination of the above will result in a <b>medium</b> magnitude of visual change. The <b>medium</b> magnitude of visual change and <b>medium</b> sensitivity will result in a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)
<b>View west from the A556 Chester Road, Cranage Villas (High sensitivity receptors) (VP 313-02-002)</b>	
Residents of Cranage Villas and Ascol Drive of <b>high</b> susceptibility and road users of lower susceptibility, both with views of <b>medium</b> value, will experience a noticeable change to the composition of middle-distance views. Residents of Cranage Villas will see some removal of woodland along the northern margin of the A556 Chester Road, opposite the properties. They will have oblique and narrow views along the line of the A556 Chester Road towards construction of Smoker Brook viaduct where it crosses the A556 Chester Road, including temporary material stockpiles. Construction works for the continuation of Smoker Brook viaduct through Winnington Wood, crossing the Peover Eye to the north, will be heavily screened by existing woodland. Views from properties on Ascol Drive of Smoker Brook viaduct south satellite compound, along with construction of Smoker Brook viaduct and Lostock Gralam North embankment, will be heavily filtered by the mature tree cover of Winnington Belt. Construction activity will be visible across part of the view. The combination of the above will result in a <b>medium</b> magnitude of visual change. The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)
<b>View west from the A556 Chester Road, Holford Cottages (High sensitivity receptors) (VP 313-02-004)</b>	
Residents of <b>high</b> susceptibility and road users of lower susceptibility, both with views of <b>medium</b> value, will experience a noticeable change to the composition of oblique middle-distance views of construction works for Smoker Brook viaduct across open fields to the west of the A556 Chester Road/Shurlach Road. The emerging viaduct will be visible between Winnington Wood, Peas Wood and Smoker Wood. To the north, construction works for Pickmere embankment (located in the Pickmere to Agden and Hulseheath area (MA03) and the activity in and around Smoker Brook viaduct south satellite compound will be screened by existing mature woodland. The presence of	Level of effect: <b>Moderate</b> adverse (significant)

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<b>View west from the A556 Chester Road, Holford Cottages (High sensitivity receptors) (VP 313-02-004)</b>	
<p>construction activity associated with Smoker Brook viaduct south satellite compound will be screened by existing woodland. Construction activity associated with Smoker Brook viaduct will be a noticeable change in the middle distance against a wooded backdrop and within the context of associated construction traffic on the A556 Chester Road in the near distance. The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	
<p>Night-time effects:</p> <p>The presence of night-time lighting for Smoker Brook viaduct north and south satellite compounds will be limited to increased skyglow as they will be largely screened by woodland along Smoker Brook and Peover Eye. The additional lighting required for Smoker Brook viaduct will create an area of localised lighting in a predominantly rural setting with a dark wooded backdrop. The controls in the draft CoCP will reduce light spill and glare and overall there will be a noticeable change in the existing view. At night, there will be a <b>medium</b> magnitude of visual change and <b>moderate</b> adverse effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>

## Other mitigation measures

- 11.4.13 No other mitigation measures are considered reasonably practicable during construction. Not all landscape and visual effects can be mitigated due to the visibility of construction activity and the sensitivity of surrounding receptors.
- 11.4.14 However, consideration will be given during the detailed design stage to where mitigation planting can be established early in the construction programme to help achieve landscape integration or visual screening at an earlier time.

## Summary of likely residual significant effects

- 11.4.15 The temporary residual significant effects during construction remain as described above. These effects will be temporary and reversible in nature lasting only for the duration of the construction works. These residual effects will 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.
- 11.4.16 The significant effects that will remain after implementation of construction phase mitigation are summarised below:
- major adverse effects in relation to three LCA;
  - moderate adverse effects in relation to two LCA;
  - major adverse visual effects at 23 representative residential viewpoint locations;
  - moderate adverse visual effects at 15 representative residential viewpoint locations;
  - major adverse night-time visual effects at seven representative residential viewpoint locations;
  - moderate adverse night-time visual effects at 10 representative residential viewpoint locations;



- major adverse visual effects at nine recreational viewpoint locations; and
- moderate adverse visual effects at three recreational viewpoint locations.

## Cumulative effects

### Cumulative landscape effects

- 11.4.17 Committed development MA02/252 has been included within the cumulative assessment, as the mineral extraction will be concurrent with the extraction of material associated with MA02 Borrow Pit D. It will result in the loss of pasture and arable fields bordered with hedgerows and occasional trees and introduce new areas of mineral extraction activities within 800m to the east of the land required for construction of the Proposed Scheme. However, due to their locations, the Proposed Scheme and extraction operations as part of committed development MA02/252 will be perceived separately, and as such no significant cumulative effect is anticipated.

### Cumulative visual effects

- 11.4.18 No significant cumulative temporary effects during construction are anticipated.

## 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 (2038), year 15 (2053) and year 30 (2068) of the Proposed Scheme. 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 will be integrated into the design of the Proposed Scheme include:
- design of earthworks to tie the embankments (such as at Crewe North RSD, Stanthorne South embankment and the realignment of A54 Middlewich Road) into their wider landscape context and to mitigate views of structures and overhead line equipment from sensitive receptors, where reasonably practicable. Earthworks design has taken account of the relationship to surrounding land uses and management, such as agriculture;
  - areas of compensatory woodland habitat creation near areas of loss, using the same species composition and planting types (and appropriate planting density), such as at Long Wood near Lostock Gralam and Stove Room Wood near Wimboldsley. This will also 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; and
- compensation for loss of field ponds with new wetlands, ecological ponds and biodiversity wetland features (such as at Whatcroft Flash and Wade Brook).

## 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:

- Crewe North RSD, including the A530 Nantwich Road and Clive Green Lane realignments;
- Crewe North RSD reception tracks, Shropshire Union Canal viaducts No.'s. 1, 2 and 3 and Middlewich box structure;
- A54 Middlewich Road realignment and A533 Northwich Road diversion;
- River Dane viaduct;
- viaduct crossings between Whatcroft and Northwich (comprising Puddinglake Brook viaduct, Trent and Mersey viaduct and Gad Brook viaduct);
- A556 Shurlach Road realignment, Wade Brook viaduct, the B5082 Penny's Lane diversion and Birches Lane diversion;
- Smoker Brook viaduct;
- earthworks including Walley's Green embankment, Clive Green South and North embankments, Stanthorne South and North embankments, Whatcroft South and North embankments, Rudheath embankment, Lostock Gralam South and North embankments; and
- other design elements and rail infrastructure such as auto-transformer stations, telecommunications sites and accommodation access diversions.

11.5.4 Non-significant effects are reported in Volume 5: Appendix LV-001-0MA02.

## Landscape assessment

11.5.5 The LCA described in Table 37 will be significantly affected during operation of the Proposed Scheme.

**Table 37: Operational phase significant landscape effects**

Location	
<b>Winsford and Middlewich Fringe Farmland</b>	
Year 1: This LCA will be directly affected by the introduction of large-scale infrastructure and the realignments of Clive Green Lane, the A54 Middlewich Road and the A533 Northwich Road. Noise	Level of effect: <b>Moderate</b>

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Location	
<p>and movement of trains on embankments and the prominence of the Shropshire Union Canal viaducts Nos. 1-3 will reduce the tranquil quality of the LCA, notably along the Shropshire Union Canal (Middlewich Branch). Landscape earthworks on either side of Stanthorne South embankments No. 1 and No. 2, between the Shropshire Union Canal (Middlewich Branch) and the realigned A54 Middlewich Road will, however, partially screen train movements. There will be changes to the landscape setting of nearby buildings, notably the Grade II listed properties of Park Farm, Stanthorne Hall and Stanthorne Lodge. Middlewich Road sectioning auto-transformer station will be an uncharacteristic feature in the landscape. The Proposed Scheme will form a low skyline component, with its earthworks and structures bisecting the LCA and permanently changing the landscape pattern in a similar manner to the WCML, although connectivity will be retained via the realigned A54 Middlewich Road and the Shropshire Union Canal (Middlewich Branch) corridor. Landscape mitigation planting will not be sufficiently established to integrate the Proposed Scheme into the landscape.</p> <p>Due to its moderate scenic value, sense of historic continuity and the influence of transport infrastructure, the landscape has a <b>medium</b> susceptibility to change arising from the Proposed Scheme.</p> <p>The introduction of the Proposed Scheme and Crewe North RSD reception tracks together with the realignment of existing roads will result in a <b>high</b> magnitude of change to the landscape. The <b>high</b> magnitude of change for the Winsford and Middlewich Fringe Farmland and its <b>medium</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	adverse (significant)
<p>Year 15:</p> <p>Extensive mitigation planting along landscape earthworks on either side Stanthorne South embankments No. 1 and No. 2, around Clive Green Lane North and South embankments No.s 1-3 and alongside the Proposed Scheme will be sufficiently established to provide local screening of the Proposed Scheme and increased integration with surrounding vegetation. The establishment of mitigation planting will serve to better integrate the realigned Clive Green Lane, the A54 Middlewich Road and A533 Northwich Road into the landscape. Landscape character will, however, remain noticeably changed due to the large scale of the Proposed Scheme, the severance of the rural landscape pattern between Winsford and Middlewich, and the presence of the Shropshire Union Canal viaducts Nos. 1-3 over the Shropshire Union Canal (Middlewich Branch). The magnitude of change will reduce to <b>medium</b>, resulting in a <b>moderate</b> adverse effect.</p>	Level of effect: <b>Moderate</b> adverse (significant)
<p>Year 30:</p> <p>The mature mitigation planting along landscape earthworks either side of Stanthorne South embankments No. 1 and No. 2, the realigned Clive Green Lane and around Middlewich Road sectioning auto-transformer station will further reduce the prominence of the Proposed Scheme between Winsford and Middlewich. The Shropshire Union Canal viaducts Nos. 1 to 3 will remain evident at the crossing of the Shropshire Union Canal (Middlewich Branch). The level of effects will remain <b>moderate</b> adverse.</p>	Level of effect: <b>Moderate</b> adverse (significant)
<b>Dane Valley</b>	
<p>Year 1:</p> <p>This LCA will be directly affected by the introduction of large-scale infrastructure, with River Dane viaduct prominent in the valley. As a bridging structure, at ground level there will be limited disruption of landscape features, including landscape pattern. However, the presence of the viaduct and elevated train movements will reduce the sense of tranquillity, seclusion and scenic quality of the valley. The viaduct will be a visually prominent, elevated structure crossing the largely intact agricultural landscape interrupting the unrestricted long-distance views along this part of the Dane valley. Where the Proposed Scheme crosses the Trent and Mersey Canal, the River Dane viaduct will adversely affect the landscape setting of this historic asset and alter the sequential experience of the river valley landscape for its recreational users. Landscape mitigation planting will not be sufficiently established to integrate the Proposed Scheme into the landscape</p>	Level of effect: <b>Major</b> adverse (significant)

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Location	
<p>Due to its relative tranquillity, sense of historical continuity and recreational use, the landscape has a <b>medium-high</b> susceptibility to change arising from the Proposed Scheme.</p> <p>The introduction of large-scale infrastructure will result in a <b>high</b> magnitude of change to the landscape.</p> <p>The <b>high</b> magnitude of change for the Dane Valley and its <b>medium-high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	
<p>Year 15:</p> <p>Mitigation planting at the viaduct approaches will be sufficiently established to provide some screening of the connecting abutments on either side of the valley. Growth of mitigation planting along Dane Valley embankment will help the process of integration with existing mature woodland along the canal to the eastern side of the floodplain. River Dane viaduct will however remain a prominent and elevated element crossing the river valley. The <b>major</b> adverse effect will remain.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<p>Year 30:</p> <p>The maturing of mitigation planting at Stanthorne North embankment and Dane Valley embankment will help to integrate and frame River Dane viaduct. This will reduce the visibility of these approach structures and link with adjoining well-established woodland. River Dane viaduct will, however, remain a prominent and elevated element crossing the river valley. The <b>major</b> adverse effect will remain.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<b>Whatcroft and Billinge Green Flashes</b>	
<p>Year 1:</p> <p>This LCA will be directly affected by the introduction of large-scale infrastructure. Noise and movement of trains on Puddinglake Brook viaduct, Whatcroft South embankment, Trent and Mersey viaduct, Whatcroft North embankment and Gad Brook viaduct will change the sense of tranquillity associated with the LCA and the landscape setting of historic assets. There will be changes to the landscape settings of nearby buildings and historic assets, notably the listed properties of Whatcroft Hall (Grade II* listed), Brook Farm (Grade II listed) and to Pear Tree Farm Cottages whilst the absence of Higgins Lane Farm, removed during construction will be a further change in landscape pattern. Davenham Road express feeder auto-transformer station will be an uncharacteristic feature in the landscape.</p> <p>The new earthworks and structures will be permanent changes in landscape pattern and will result in the isolation of two parcels of land along the Trent and Mersey Canal, by Dane Valley embankment and Whatcroft South embankment. Train movement across Puddinglake Brook viaduct and Trent and Mersey viaduct will impact upon the tranquil character and aesthetic qualities of the Trent and Mersey Canal, although the structures will maintain an open aspect along the canal corridor. Landscape mitigation planting will not be sufficiently established to integrate the Proposed Scheme into the landscape.</p> <p>Due to its relative intimacy, sense of tranquillity and recreational use, the landscape has a <b>medium-high</b> susceptibility to change arising from the Proposed Scheme.</p> <p>The introduction of large-scale infrastructure will result in a <b>high</b> magnitude of change to the landscape.</p> <p>The <b>high</b> magnitude of change for the Whatcroft and Billinge Green Flashes and its <b>medium-high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<p>Year 15:</p> <p>Mitigation planting along the embankment approaches to each of the viaducts will be sufficiently established to provide some local screening of the Proposed Scheme, with increased levels of connectivity to existing vegetation. Landscape character will however remain noticeably changed, due to the scale of the Proposed Scheme including the embankment landform and Trent and Mersey viaduct across the canal and in proximity to historic assets. The magnitude of change will reduce to <b>medium</b>, resulting in a <b>moderate</b> adverse effect.</p>	<p>Level of effect: <b>Moderate</b> adverse (significant)</p>

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Location	
<p>Year 30:</p> <p>Mature mitigation planting along Whatcroft South embankment, Whatcroft North embankment and around Davenham Road express feeder auto-transformer station will further reduce the visibility of the Proposed Scheme and frame the sequence of viaducts, although the presence of the viaduct structures crossing the canal corridor will remain evident. Effects will remain <b>moderate</b> adverse.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<b>Wincham Brook and Holford Lower Wooded Farmland</b>	
<p>Year 1:</p> <p>This LCA will be directly affected by the introduction of large-scale infrastructure across formerly wooded areas. At Year 1 the immaturity of the mitigation planting will not integrate the approach embankment to Smoker Brook viaduct, whilst areas of former woodland will be locally evident. Train movements running across Smoker Brook viaduct and Lostock Gralam North embankment will be experienced in combination with the existing A556 Chester Road/Shurlach Road and junction with the A559 Manchester Road. Although relatively long in span, Smoker Brook viaduct will be partially absorbed within the landscape by the surrounding mature woodland. The new earthworks and structures will not significantly alter the landscape pattern of the LCA, and the permeability of the viaduct will reduce any perceived sense of landscape severance. Landscape mitigation planting will, however, not be sufficiently established to integrate the Proposed Scheme into the landscape.</p> <p>Due to the prevalence of long-established woodland and the presence of some detracting features, the landscape has a <b>medium</b> susceptibility to change arising from the Proposed Scheme.</p> <p>The introduction of large-scale infrastructure and reduction of areas of mature woodland will result in a <b>medium</b> magnitude of change to the landscape.</p> <p>The <b>medium</b> magnitude of change for the Wincham Brook and Holford Lower Wooded Farmland and its <b>medium</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<p>Year 15 and year 30:</p> <p>Effects will reduce to non-significant for year 15 and remain so for year 30 due to the growth and maturity of the landscape mitigation planting, which will help integrate the Proposed Scheme into its landscape setting (reported in detail in Volume 5).</p>	<p>Level of effect:            Non-significant</p>

## Visual assessment

### Introduction

- 11.5.6 The following section describes the likely significant effects on visual receptors during operation in the winter and summer of year 1 and in the summer of both year 15 and year 30. The year 1 assessment includes the winter period, in line with best practice guidance, to ensure a robust assessment. In some cases, visibility of the operational Proposed Scheme may be reduced during summer when vegetation, if present in a view, will be in leaf. Where visual receptors are predicted to experience significant effects at night-time arising from additional lighting, these are also presented in this section.
- 11.5.7 Where a viewpoint represents multiple types of receptor, the assessment is based on the most sensitive receptor. Effects on other receptor types with a lower sensitivity will be lower than those reported.

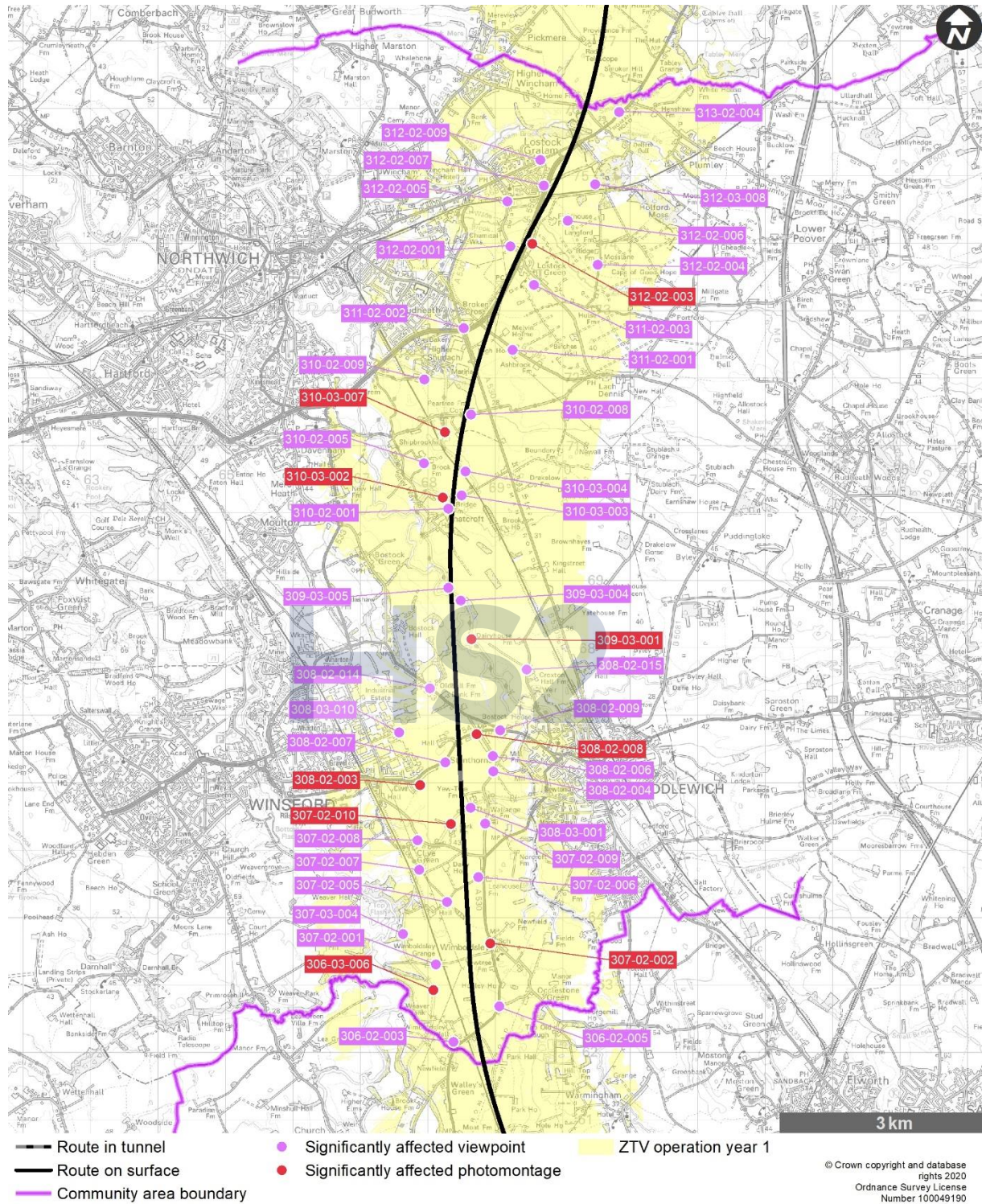
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- 11.5.8 The visual assessment has identified locations where additional lighting during operation will result in significant effects on visual receptors (summarised in Table 38 and described in detail in Volume 5: Appendix LV-001-0MA02, Part 3).
- 11.5.9 Table 38 identifies the locations where the operation of the Proposed Scheme will potentially result in significant effects. Viewpoint locations are shown in Map Series LV-04 in the Volume 2: MA02 Map Book.



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**Table 38: Operation phase significant visual effects**



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View east from Footpath Wimboldsley 5/2, Verdin Arms public house, Walley's Green (High sensitivity receptors) (VP 306-02-003)	
<p>Year 1 – winter and summer:</p> <p>Residents of Wimboldsley Hall, Verdin Arms public house and PRoW users of <b>high</b> susceptibility, and visitors to the Verdin Arms public house of lower susceptibility, all with <b>medium</b> value views, will experience a substantial change to the composition of near and middle-distance views. There will be open visibility across the WCML towards Crewe North RSD. Crewe North RSD maintenance shed and A530 Nantwich Road overbridge will be visible in the near and middle distance. These prominent elements, in combination with the absence of existing vegetation along the WCML and the A530 Nantwich Road removed during construction will represent a substantial change. The Proposed Scheme will be highly visible across the majority of the view and out of character with the open agricultural setting. At year 1 the immaturity of landscape mitigation planting will not integrate the Proposed Scheme. The combination of the above will result in a <b>high</b> magnitude of visual change. The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>Due to the growth of mitigation planting adjacent to the WCML and along the embankments of the A530 Nantwich Road realignment, Crewe North RSD will be partially screened. However, the roofline of the maintenance shed will still be apparent above the tree canopies. The A530 Nantwich overbridge will be more integrated into the wider landscape but still visible on the skyline. The Proposed Scheme will be visible across the majority of the view and out of character with the open agricultural setting. Mitigation planting will provide some visual screening, but the new elements will still be apparent on the skyline. The established mitigation planting will help integrate the Proposed Scheme. However, there will still be a substantial alteration to the view and the magnitude of visual change will remain as <b>high</b> and effects will continue to be <b>major</b> adverse significant effect.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>The maturing tree and hedgerow mitigation planting will provide denser screening in summer months alongside the Proposed Scheme. Train movements and views of Crewe North RSD maintenance shed will be partially screened, although the roofline of the maintenance shed will be apparent above the tree canopies. The A530 Nantwich overbridge will be more integrated into the wider landscape and the magnitude of visual change will therefore reduce to <b>medium</b>. The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect: <b>Moderate</b> adverse (significant)</p>
<p>Night-time effects:</p> <p>Year 1:</p> <p>At night, the lighting associated with Crewe North RSD to the east will generate light spill in the middle-distance beyond the WCML, above and through intervening field vegetation in a predominantly rural and unlit area. The lights and their support systems will be designed to reduce the visual impact of the lighting installation. However, there will be a noticeable increase in the prominence of artificial lighting and at night this will result in a <b>medium</b> magnitude of visual change. The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect: <b>Moderate</b> adverse (significant)</p>
<p>Year 15:</p> <p>At night, the lighting associated with Crewe North RSD in the middle-distance will be partially screened by mitigation planting establishing west of the WCML. However, awareness of the lighting and night-time glow will remain noticeable in an otherwise predominantly rural and unlit area. At night there will remain a <b>medium</b> magnitude of visual change.</p>	<p>Level of effect: <b>Moderate</b> adverse (significant)</p>



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<b>View east from Footpath Wimboldsley 5/2, Verdin Arms public house, Walley's Green (High sensitivity receptors) (VP 306-02-003)</b>	
<p>Year 30:</p> <p>At night, the lighting associated with Crewe North RSD in the middle-distance will be further screened by mature mitigation planting west of the WCML. However, awareness of the lighting and night-time glow will remain noticeable in an otherwise predominantly rural and unlit area. At night there will remain a <b>medium</b> magnitude of visual change.</p>	<p>Level of effect: <b>Moderate</b> adverse (significant)</p>
<b>View west from Bellsmithy, A530 Nantwich Road (High sensitivity receptors) (VP 306-02-005)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of properties at Hopley House, Bellsmithy, Yewtree Farm, and Manor Cottage and users of Footpath Wimboldsley 3/1 and Bridleway Wimboldsley 2/1 of <b>high</b> susceptibility, and road users of lower susceptibility, all with views of <b>medium</b> value, will experience a substantial change to the composition of near and middle-distance views. There will be open and direct views towards Crewe North RSD and Walley's Green embankment and its associated landscape earthworks. Crewe North RSD maintenance shed and A530 Nantwich Road overbridge will be visible in the middle distance as new skyline structures. Intervening vegetation associated with the properties at Yew-Tree Farm (comprising Yew Tree Court and The Dairy House) will provide some filtering of views. Other properties front directly onto the A530 Nantwich Road, with open views towards Crewe North RSD. The proximity of A530 Nantwich Road overbridge will represent a substantial change in the views from Manor Cottage. The removal of established hedgerows with mature trees during construction will open up views to the west. The Proposed Scheme will be highly visible across the majority of the view representing a substantial change to the agricultural character and skyline. At year 1, the immaturity of landscape mitigation planting will not integrate the Proposed Scheme.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>Due to the growth of mitigation planting on landscape earthworks adjacent to Walley's Green embankment, views of Crewe North RSD will be partially screened, although the roofline of the maintenance shed will be apparent above the tree canopies. The A530 Nantwich Road overbridge will be more integrated into the wider landscape but still visible in the middle distance as a new skyline element. The Proposed Scheme will be visible across the majority of the view and out of character with the open agricultural setting. Mitigation planting and earthworks will provide some visual screening and will help integrate the Proposed Scheme into the wider landscape, but new structures will still be apparent on the skyline. However, there will still be a noticeable alteration to the view and the magnitude of visual change will reduce to <b>medium</b>.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect: <b>Moderate</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>The mature mitigation planting will provide denser screening in summer months including tree and hedgerow planting alongside the Proposed Scheme. Crewe North RSD maintenance shed will be partially screened although the roofline of the maintenance shed will be apparent above the tree canopies. The A530 Nantwich Road overbridge will be more integrated into the wider landscape, however the magnitude of visual change will remain <b>medium</b>.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect: <b>Moderate</b> adverse (significant)</p>
<p>Night-time effects:</p> <p>Year 1:</p>	<p>Level of effect: <b>Moderate</b></p>

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<b>View west from Bellsmithy, A530 Nantwich Road (High sensitivity receptors) (VP 306-02-005)</b>	
<p>At night, operational lighting associated with Crewe North RSD will introduce lighting elements in the middle-distance in a predominantly rural and unlit area. The lights and their support systems will be designed to reduce the visual impact of the lighting installation. However, there will be a noticeable increase in the prominence of artificial lighting and at night there will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	adverse (significant)
<p>Year 15:</p> <p>At night, the operational lighting associated with Crewe North RSD will remain noticeable in the middle-distance in a predominantly rural and unlit area, although maturing landscape mitigation planting will provide screening. However, the prominence of artificial lighting will remain and at night there will remain a <b>medium</b> magnitude of visual change.</p>	Level of effect: <b>Moderate</b> adverse (significant)
<p>Year 30:</p> <p>At night, the operational lighting associated with Crewe North RSD will remain noticeable in the middle-distance in a predominantly rural and unlit area, although mature landscape mitigation planting will provide an additional screen. However the prominence of artificial lighting will remain and at night there will <b>remain</b> a medium magnitude of visual change.</p>	Level of effect: <b>Moderate</b> adverse (significant)

<b>View east from the Shropshire Union Canal (Middlewich Branch), south of Wimboldsley Grange (High sensitivity receptors) (VP 306-03-006)</b>	
<p>Year 1 – winter and summer:</p> <p>Users of Footpath Wimboldsley 5/1 and 9/1 and canal users of <b>high</b> susceptibility and with <b>medium-high</b> value views will experience a noticeable change to the composition of middle-distance and far distance views. There will be open views towards Crewe North RSD, beyond overhead line equipment associated with the WCML. Recreational receptors will have wide reaching, middle-distance views of the maintenance shed and A530 Nantwich Road overbridge across the open eastern bank of the canal. Buildings associated with Wimboldsley Grange and mature riparian vegetation alongside The Dingle stream course will provide partial screening to the north. The diverted power line and tower will be more prominent in the near distance of the view. The introduction of Crewe North RSD and A530 Nantwich Road overbridge, in combination with the absence of mature trees removed during construction, will be a noticeable change to the characteristics of the view and the skyline profile beyond the existing WCML.</p> <p>The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p> <p>A photomontage illustrating this scenario is included Volume 5: Appendix LV-001-0MA02, Part 3.</p>	Level of effect: <b>Moderate</b> adverse (significant)
<p>Year 15 and year 30:</p> <p>Effects will reduce to non-significant due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5).</p> <p>A photomontage illustrating the year 15 scenario is included Volume 5: Appendix LV-001-0MA02, Part 3.</p>	Level of effect: Non-significant

<b>View east from Wimboldsley Grange (High sensitivity receptor) (VP 307-02-001)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of <b>high</b> susceptibility and with views of <b>medium</b> value will experience a substantial change to the composition of near and middle-distance views. There will be open views across the WCML towards Crewe North RSD, across the middle-distance of the view. Crewe North RSD</p>	Level of effect: <b>Major</b> adverse (significant)

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<b>View east from Wimboldsley Grange (High sensitivity receptor) (VP 307-02-001)</b>	
<p>telecommunications site and the auxiliary maintenance shed will be prominent elements, with the array of lighting columns for the stabling sidings visible beyond. The loss of existing vegetation removed during construction, including clearance to accommodate utility diversions, will allow open views towards the main maintenance shed to the south and A530 Nantwich Road overbridge, which will form new far distance elements and represent a substantial change to views. At year 1, the immaturity of landscape mitigation planting will not integrate the Proposed Scheme.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	
<p>Year 15 – summer:</p> <p>The growth of mitigation planting adjacent to the WCML and Crewe North RSD traction substation in the direct line of views from the property will provide some screening of Crewe North RSD and associated infrastructure. Taller elements such as the mast at Crewe North RSD telecommunications site, overhead line equipment and lighting columns will be perceived above the tree canopies in the middle-distance. The main maintenance shed and A530 Nantwich Road overbridge will remain as visible far distance elements to the south. The establishing mitigation planting will provide some integration of the Proposed Scheme, however there will remain a substantial alteration to the view. The magnitude of visual change will remain as <b>high</b>.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>The maturity of the mitigation planting at year 30 will provide denser screening in summer months including tree and hedgerow planting adjacent to the WCML and Crewe North RSD traction substation. The magnitude of visual change will therefore reduce to <b>medium</b>.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>
<p>Night-time effects:</p> <p>Year 1:</p> <p>At night, the lighting associated with Crewe North RSD will introduce lighting elements across the extents of the depot area in the middle-distance and far distance, above and through existing intervening field vegetation in a predominantly rural and unlit area. This will include lighting of the stabling sidings, road lighting and security lighting. The lights and their support systems will be designed to reduce the visual impact of the lighting installation. However, there will be a substantial increase in the prominence of artificial lighting and night-time sky glow. At night there will be a high magnitude of visual change.</p> <p>The high magnitude of visual change and high sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Year 15:</p> <p>The lighting and night-time sky glow associated with Crewe North RSD will be noticeable in the middle-distance and far distance of view, although road lighting will be partially screened in the near distance by establishing woodland planting alongside the WCML. The prominence of artificial lighting and localised sky-glow will be noticeable in a predominantly rural and unlit area. At night there will be a <b>medium</b> magnitude of visual change.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>
<p>Year 30:</p> <p>At night, the localised sky-glow from lighting associated with Crewe North RSD will continue to be noticeable in the middle and far distance of view, in an otherwise predominantly rural and unlit area. The maturing of woodland planting will provide a further screen to roadside lighting within Crewe North RSD. At night there will remain a <b>medium</b> magnitude of visual change.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

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View west from Wimboldsley, A530 Nantwich Road (High sensitivity receptor) (VP 307-02-002)	
<p>Year 1 – winter and summer:</p> <p>Residents of <b>high</b> susceptibility, staff and pupils at Wimboldsley Community Primary School and road users along the A530 Nantwich Road of lower susceptibility, all with views of <b>medium</b> value, will experience a substantial change to the composition of middle-distance views. This will include infrastructure elements including overhead line equipment, buildings and passing trains within Crewe North RSD. The presence of Crewe North RSD and Proposed Scheme will foreshorten views notably for residents of properties to the west of the A530 Nantwich Road at Wimboldsley, where the Proposed Scheme will form the skyline across the majority of the view. Users of Wimboldsley Community Primary School will be largely screened by existing roadside and boundary hedges. Intervening garden vegetation will partly filter views west from properties to the east of the A530 Nantwich Road, but the Proposed Scheme will form the new skyline. Footpath Wimboldsley 1/1 will be closed as a result of the Proposed Scheme. Landscape earthworks in the middle-distance will screen train movements along the Proposed Scheme, Crewe North RSD reception tracks and stabling sidings, although overhead line equipment will be a visible component. The roof lines of buildings within Crewe North RSD, including the auxiliary maintenance shed, the depot accommodation building and traction substation, along with high mast lighting, will be visible in the far distance, on the skyline. The removal of mature hedge and field trees during construction over a large area will open up views towards the Proposed Scheme. At year 1, the immaturity of landscape mitigation planting will not integrate the Proposed Scheme.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p> <p>A photomontage illustrating this scenario is included Volume 5: Appendix LV-001-0MA02, Part 3.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>The establishment of landscape mitigation planting will screen overhead line equipment. Mitigation planting will have re-established some of the intervening field pattern between Wimboldsley and the Proposed Scheme. High mast lighting will, however, remain as visible elements on the skyline, while the rooflines of some of the main RSD buildings will remain evident just above the tree canopy. The magnitude of visual change will reduce to <b>medium</b>.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p> <p>A photomontage illustrating this scenario is included Volume 5, Appendix LV-001-0MA02, Part 3.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>The maturing of the mitigation planting at year 30 will provide denser screening in summer months and will form an effective screen for overhead line equipment and for the majority of built structures within Crewe North RSD. High mast lighting will, however, remain visible above the tree canopy, with the presence of Crewe North RSD evident across the majority of views. The magnitude of visual change will therefore remain <b>medium</b>.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>
<p>Night-time effects</p> <p>Year 1:</p> <p>At night, the lighting associated with Crewe North RSD to the west will introduce lighting elements in the middle-distance, visible above and through existing intervening field vegetation, in a predominantly rural and unlit area. High mast lighting across Crewe RSD and lighting for the stabling sidings will be visible above landscape earthworks, however landscape mitigation planting will not have established by year 1. The lights and their support systems will be designed</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>



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<b>View west from Wimboldsley, A530 Nantwich Road (High sensitivity receptor) (VP 307-02-002)</b>	
to reduce the visual impact of the lighting installation. There will be a substantial increase in the prominence of artificial lighting and at night there will be a high magnitude of visual change. The high magnitude of visual change and high sensitivity will result in a major adverse significant effect.	
Year 15: The lighting associated with Crewe North RSD to the west will introduce lighting elements in the middle-distance, visible above and through existing intervening field vegetation and establishing mitigation planting, in a predominantly rural and unlit area. There will remain a substantial increase in the prominence of artificial lighting due to the visibility of high mast lighting columns within Crewe North RSD. At night there will remain a <b>high</b> magnitude of visual change and a major adverse significant effect.	Level of effect: <b>Major</b> adverse (significant)
Year 30: The high mast lighting associated with Crewe North RSD will still represent a noticeable change to the presence of artificial lighting in a predominantly rural and unlit area. The maturing of mitigation planting will help limit the visibility of light sources across the stabling sidings, but skyglow will still be apparent. The magnitude of visual change will reduce to <b>medium</b> , with a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)

<b>View east from the Shropshire Union Canal (Middlewich Branch), Rookery Wood (High sensitivity receptors) (VP 307-03-004)</b>	
Year 1 – winter and summer: Users of Footpath Wimboldsley 9/1 and canal users of <b>high</b> susceptibility and with <b>medium-high</b> value views will experience a noticeable change to the composition of middle-distance views. This will include infrastructure elements including overhead line equipment, train movements and buildings within Crewe North RSD (including the auxiliary maintenance shed and traction substation). In addition, the removal of existing mature vegetation during construction will enable views of the Proposed Scheme in the middle-distance beyond the WCML. Recreational receptors will have predominantly direct views of the Proposed Scheme across the open eastern bank of the canal. Buildings associated with Lea Hall will provide partial screening to the north-east. Overhead line equipment within the middle-distance will be seen in the context of the existing similar component of the WCML. However, the introduction of Crewe North RSD and the loss of areas of woodland, including Stove Room Wood, during construction will be a noticeable change to the characteristics of the view and the skyline profile. At year 1, the immaturity of landscape mitigation planting will not integrate the Proposed Scheme. The combination of the above will result in a <b>medium</b> magnitude of visual change. The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)
Year 15 and year 30: Effects will reduce to non-significant due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5).	Level of effect: Non-significant

<b>View south-east from Footpath Wimboldsley 1/1, east of Lea Hall (High sensitivity receptor) (VP 307-02-005)</b>	
Year 1 – winter and summer: Residents of Lea Hall, The Huntsman’s Lodge, The Gate House and Lea Hall Farm House of <b>high</b> susceptibility and with views of <b>medium</b> value will experience a substantial change to the composition of near and middle-distance views of infrastructure elements including Crewe North	Level of effect: <b>Major</b> adverse (significant)

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<b>View south-east from Footpath Wimboldsley 1/1, east of Lea Hall (High sensitivity receptor) (VP 307-02-005)</b>	
<p>RSD traction substation, the route of the Proposed Scheme and Crewe North RSD, notably the reception tracks and stabling sidings, the auxiliary maintenance shed, vehicular access routes and attenuation ponds. Clive Green Lane overbridge will be visible to the north in the far distance.</p> <p>Although the WCML can be seen, the presence of Crewe North RSD will represent a substantial visual change for residents of properties at Lea Hall, across the majority of the view. There will be open views towards overhead line equipment and lighting columns within Crewe North RSD, primarily associated with the reception tracks and stabling sidings, while the built structures of the substation and the auxiliary maintenance shed will form uncharacteristic skyline elements. The loss of mature vegetation at Stove Room Wood and nearby woodland copses during construction will contribute to openness of the view and change the skyline. At year 1, the immaturity of landscape mitigation planting will not integrate the Proposed Scheme. Footpath Wimboldsley 1/1 will be closed as a result of the Proposed Scheme.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	
<p>Year 15 – summer:</p> <p>The establishment of landscape mitigation planting, surrounding the attenuation pond areas and alongside the vehicular access and reception tracks within Crewe North RSD, will provide a continuous screen to train movements and overhead line equipment, including part of the WCML. The appearance of Crewe North RSD traction substation and auxiliary maintenance shed will be softened by extensive planting but will remain visible as skyline structures. Crewe North RSD will remain noticeable across the majority of the view, although the growth of mitigation planting will filter views. The magnitude of visual change will therefore reduce to <b>medium</b>.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<p>Year 30 – summer:</p> <p>The maturing of the mitigation planting at year 30 will provide denser screening in summer months and will form an effective screen for overhead line equipment and for the majority of built structures within Crewe North RSD, although the traction substation and the auxiliary maintenance shed will remain visible as skyline elements. Crewe North RSD will remain noticeable across the majority of the view, although the maturity of mitigation planting will have created a framework of woodland cover comparable to that removed during construction. The magnitude of visual change will therefore remain <b>medium</b>.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<p>Night-time effects</p> <p>Year 1:</p> <p>At night, the lighting associated with Crewe North RSD and addition of lighting to the junction of Clive Green Lane will introduce lighting elements in the near distance and middle-distance above intervening hedgerows in a predominantly rural and unlit area. The lights and their support systems will be designed to reduce the visual impact of the lighting installation. However, there will be a substantial increase in the prominence of artificial lighting. At night there will be a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse            (significant)</p>
<p>Year 15:</p> <p>At night, the lighting associated with Crewe North RSD and addition of lighting to the junction of Clive Green Lane will remain in the middle-distance above intervening hedgerows in a predominantly rural and unlit area. The maturing landscape mitigation planting will limit visibility</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>

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<b>View south-east from Footpath Wimboldsley 1/1, east of Lea Hall (High sensitivity receptor) (VP 307-02-005)</b>	
of artificial lighting in the near distance. There will be a decrease in the prominence of artificial lighting and at night there will be a <b>medium</b> magnitude of visual change.	
Year 30: At night, the lighting associated with Crewe North RSD and addition of lighting to the junction of Clive Green Lane will remain in the middle-distance above intervening hedgerows in a predominantly rural and unlit area. Mature mitigation planting will limit the visibility of artificial lighting in the near distance. The magnitude of visual change will remain <b>medium</b> .	Level of effect: <b>Moderate</b> adverse (significant)
<b>View west from Leahead, A530 Nantwich Road (High sensitivity receptors) (VP 307-02-006)</b>	
Year 1 – winter and summer: Residents of Lea House Farm, Leahead and Leahead Cottages of <b>high</b> susceptibility and road users of lower susceptibility, all with views of <b>medium</b> value, will experience a substantial change to the composition of near-distance views. Infrastructure elements will be visible including the route of the Proposed Scheme and Crewe North RSD reception tracks, the realigned Clive Green Lane and built structures to the northernmost edge of Crewe North RSD. Views from residential properties alongside the A530 Nantwich Road will vary from unrestricted to heavily filtered by intervening vegetation and roadside hedges. Where visibility is unrestricted, the Proposed Scheme will represent a substantial change across the majority of views. The realigned Clive Green Lane will be highly visible to the north as a skyline structure. Train movements, overhead line equipment and other structures including the carriage washer north building and telecommunications site will be visible in the middle-distance. The absence of mature vegetation removed during construction, including Stove Room Wood and nearby woodland copses will represent a change of skyline within the view. At year 1, the immaturity of landscape mitigation planting will not integrate the Proposed Scheme. The combination of the above will result in a <b>high</b> magnitude of visual change. The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.	Level of effect: <b>Major</b> adverse (significant)
Year 15 – summer: The establishment of landscape mitigation planting will provide a screen to train movements, although overhead line equipment and buildings within Crewe North RSD will in part remain visible above the tree canopy. The appearance of Clive Green Lane overbridge will be softened by the establishment of mitigation planting along the approach embankments, such that the bridge becomes more integrated, although the bridge itself will remain a visible feature. The presence of the Proposed Scheme will remain noticeable across the majority of the view but filtered by intervening vegetation. The magnitude of visual change will reduce to <b>medium</b> . The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)
Year 30 – summer: The maturing of the mitigation planting at year 30 will provide denser screening of overhead line equipment in summer months. The magnitude of visual change will remain <b>medium</b> due to the proximity of the Proposed Scheme. The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)
Night-time effects Year 1 - At night, the lighting associated with Crewe North RSD to the south and at the junction of Clive Green Lane and the A530 Nantwich Road will introduce lighting elements in the middle-distance above intervening vegetation, in a predominantly rural and unlit area. The lights and their support systems will be designed to reduce the visual impact of the lighting installation.	Level of effect: <b>Moderate</b> adverse (significant)

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<b>View west from Leahead, A530 Nantwich Road (High sensitivity receptors) (VP 307-02-006)</b>	
<p>However, there will be a noticeable increase in the prominence of artificial lighting and at night there will be a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p> <p>Year 15 and 30 - The magnitude of visual change will be reduced to non-significant as a result of maturing planting (reported in Volume 5).</p>	

<b>View east from the Shropshire Union Canal (Middlewich Branch), Clive Green (High sensitivity receptors) (VP 307-02-007)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of Stanthorne Park Mews and Clive Green, users of Footpaths Winsford 49/1, Wimboldsley 1/2, 9/1, 9/3 and NCN Route 5 and canal users, of <b>high</b> susceptibility with views of <b>medium-high</b> value will experience a substantial change to the composition of near-distance views. This will include the route of the Proposed Scheme and Crewe North RSD reception tracks, Clive Green Lane realignment and the northern extents of Crewe North RSD, notably the stabling sidings, buildings and vehicular access routes. Views east from residential properties at Stanthorne Park Mews will substantially alter. The realigned Clive Green Lane will occupy the near distance, while train movements and overhead line equipment will be visible in the middle-distance, although screened to the north by the earthworks of the realigned Clive Green Lane. Crewe North RSD, its reception tracks, buildings and vehicular accesses will form a far distance across the majority of views south. Recreational users of the Shropshire Union Canal (Middlewich Branch) will have wide-reaching, unobstructed views towards the Proposed Scheme in the middle-distance and far distance, between Clive Green Lane realignment to the north and Crewe North RSD to the south. The skyline will be interrupted by Clive Green Lane overbridge and, at greater distance, the larger buildings situated within the RSD. Sequential views along the canal will be increasingly influenced by Clive Green Lane realignment and in particular the new highway crossing of the canal. At year 1, the immaturity of landscape mitigation planting will not integrate the Proposed Scheme.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>The establishment of landscape mitigation planting alongside the Proposed Scheme will provide a visual screen to train movements, although overhead line equipment will in part remain visible above the tree canopy. The appearance of Clive Green Lane overbridge and Shropshire Union Canal offline overbridge will be softened by the establishment of mitigation planting along the approach embankments such that the structures appear more integrated, although the bridge structures themselves will remain prominent elements. The proximity of the realigned Clive Green Lane in relation to Stanthorne Park Mews will still represent a substantial alteration of views east from these residential properties. To south, the far distance of Crewe North RSD will be softened by extensive mitigation planting, although the roof line of buildings within the RSD will remain visible. The magnitude of visual change will remain <b>high</b>.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

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<b>View east from the Shropshire Union Canal (Middlewich Branch), Clive Green (High sensitivity receptors) (VP 307-02-007)</b>	
<p>Year 30 – summer:</p> <p>The maturing of the mitigation planting at year 30 will provide denser screening in summer months for overhead line equipment and for the majority of built structures, although Clive Green Lane overbridge will remain visible as a skyline feature. The magnitude of change will reduce to <b>medium</b>.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>
<p>Night-time effects:</p> <p>Year 1 - At night, the lighting associated with Crewe North RSD will introduce lighting elements in the far distance above and through existing intervening field vegetation in a predominantly rural and unlit area. The lights and their support systems will be designed to reduce the visual impact of the lighting installation. However, there will be a noticeable increase in the prominence of artificial lighting and at night there will be a <b>medium</b> magnitude of change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p> <p>Year 15 and 30 - The magnitude of visual change will be reduced to non-significant as a result of maturing planting (reported in Volume 5).</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>

<b>View east from Clive Green Lane, Clive Green (High sensitivity receptors) (VP 307-02-008)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of properties along Clive Green Lane of <b>high</b> susceptibility and road users of lower susceptibility, all with views of <b>medium</b> value will experience a noticeable change to the composition of near and middle-distance views. This will include the realigned Clive Green Lane for residents on the western side of the Shropshire Union Canal (Middlewich Branch). The Proposed Scheme will be intermittently visible through a small proportion of the view and in the far distance with overhead line equipment and train movements evident. The realigned Clive Green Lane will not substantially change the character of the view, although vegetation loss and the proximity of the road embankment will be noticeable for occupiers of properties facing the road. Wharf Cottage to the eastern side of the canal will have open views south towards the realigned Clive Green Lane, with Clive Green Lane situated on embankment and across the majority of the near distance. The Proposed Scheme will form a far distance component, partially screened by existing vegetation on Clive Green Lane. At Year 1, the immaturity of landscape mitigation planting will not integrate the Proposed Scheme.</p> <p>The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>
<p>Year 15 and year 30: Effects will reduce to non-significant due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5).</p>	<p>Level of effect:</p> <p>Non-significant</p>

<b>View west from Coalpit Lane, Wallage Paddocks Farm (High sensitivity receptors) (VP 307-02-009)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of Wallage Paddocks Farm and residential properties on the A530 Nantwich Road of <b>high</b> susceptibility and road users of lower susceptibility, all with views of <b>medium</b> value, will experience a noticeable change to the composition of middle-distance views towards the Proposed Scheme and Crewe North RSD reception tracks, where overhead line equipment and train movements will be a visible component of the skyline between Park Farm and</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>

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<b>View west from Coalpit Lane, Wallage Paddocks Farm (High sensitivity receptors) (VP 307-02-009)</b>	
<p>the Shropshire Union Canal (Middlewich Branch). Residents of properties will have open views towards Shropshire Union Canal viaducts Nos. 1 to 3, crossing the canal near the Yew-Tree Farm outbuildings to the north. The embankments and overbridge structure for the realigned Clive Green Lane to the south will be noticeable as a distant element, viewed obliquely from properties. Loss of mature vegetation as a component of the skyline will be noticeable, while mitigation planting, due to its immaturity, will not provide any screening or integration of the Proposed Scheme by year 1.</p> <p>The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	
<p>Year 15 – summer:</p> <p>The establishment of large areas of mitigation woodland planting fronting the Proposed Scheme, Crewe North RSD reception tracks and alongside the Shropshire Union Canal (Middlewich Branch) will provide a dense visual screen for train movements across the majority of the view, although overhead line equipment will still be evident above the tree canopy. Planting on either side of Shropshire Union Canal viaducts Nos. 1 to 3 will serve to integrate and reduce the prominence of these structures. Similarly, mitigation planting along the approach embankments to Clive Green Lane overbridge will soften its appearance. The magnitude of visual change will remain <b>medium</b>.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect: <b>Moderate</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>The magnitude of visual change will reduce to non-significant as a result of maturing planting (reported in Volume 5).</p>	<p>Level of effect: Non-significant</p>

<b>View east from the Shropshire Union Canal (Middlewich Branch), Park Farm (High sensitivity receptors) (VP 307-02-010)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of Park Farm, users of Footpath Winsford 3/1 and NCN Route 5, and canal users of <b>high</b> susceptibility and with views of <b>medium-high</b> value will experience a substantial change to the composition of near distance views. This will comprise infrastructure elements including overhead line equipment and train movements on Clive Green South and North embankments Nos. 1 to 3 and over Shropshire Union Canal viaducts Nos. 1 to 3. These will be substantial new elements within the near distance, seen crossing the width of the view, altering the skyline and obscuring the current far distance. A balancing pond and access track will be in the near distance, immediately west of the Shropshire Union Canal viaducts Nos. 1 to 3. The absence of canalside boundary vegetation removed during construction, along with an isolated group of mature trees in the middle-distance will be evident. The combined presence of three closely aligned viaduct structures crossing the Shropshire Union Canal (Middlewich Branch) will represent a substantial change for canal users. Due to its immaturity, mitigation planting will not provide any screening or integration at year 1.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p> <p>A photomontage illustrating this scenario is included Volume 5: Appendix LV-001-0MA02, Part 3.</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>The growth of mitigation planting on Clive Green South and North embankments Nos. 1-3 will be sufficiently established to locally integrate the earthworks, screening the lower elements of overhead line equipment and train movements, and softening the appearance and prominence</p>	<p>Level of effect: <b>Major</b> adverse (significant)</p>



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<b>View east from the Shropshire Union Canal (Middlewich Branch), Park Farm (High sensitivity receptors) (VP 307-02-010)</b>	
<p>of Shropshire Union Canal viaducts Nos. 1 to 3. However, the Proposed Scheme will remain a prominent linear feature spanning the canal and there will still be a substantial alteration to the view. The magnitude of visual change will therefore remain <b>high</b>.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	
<p>Year 30 – summer:</p> <p>The maturing of the mitigation planting will provide denser screening in summer months including tree and hedgerow planting along Clive Green South and North embankments Nos. 1 to 3. Train movements and overhead line equipment will be largely screened, although these will remain visible crossing Shropshire Union Canal viaducts Nos. 1 to 3. The viaducts will remain prominent elements out of character with the canal in terms of alignment and scale. The magnitude of visual change will therefore remain <b>high</b>.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

<b>View south-west from the Shropshire Union Canal (Middlewich Branch), Yew-Tree Farm (High sensitivity receptors) (VP 308-03-001)</b>	
<p>Year 1 – winter and summer:</p> <p>Users of Footpath Winsford 3/1 and NCN Route 5, and canal users of <b>high</b> susceptibility and with views of <b>medium-high</b> value will experience a substantial change to the composition of near distance views. This will comprise infrastructure elements including Clive Green North and South embankments and the Shropshire Union Canal viaducts Nos. 1 to 3 together with overhead line equipment and train movements. The Proposed Scheme will be a substantial new linear element, spanning the canal corridor's rural setting. An access track from Clive Green Lane will be visible immediately east of Clive Green South embankments providing access to a balancing pond south of the canal. Due to its immaturity, mitigation planting will not provide any screening or integration at year 1.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>Mitigation planting and habitat creation east of the Clive Green North and South embankments and to the south of the canal will be sufficiently established to locally integrate the lower elements of the earthworks, overhead line equipment and train movements and also soften the appearance of the canal viaduct abutments. However, the viaducts will remain a prominent feature when seen from the canal and from the towpath and a substantial alteration to the view. The magnitude of visual change will therefore remain <b>high</b>.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>The maturing of the mitigation planting at year 30 will provide denser screening in summer months including tree and hedgerow planting and habitat creation alongside the Proposed Scheme and the Shropshire Union Canal (Middlewich Branch). Train movements over the viaducts will be noticeable in a small part of the view and be partially screened by the mature embankment planting. The magnitude of visual change will therefore reduce to <b>medium</b>.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

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<b>View south-east from Footpath Winsford 48/1, Clive (High sensitivity receptors) (VP 308-02-003)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of properties on the A54 Middlewich Road, Seaton Street, Hewitt Drive and Beckett Avenue and footpath users of <b>high</b> susceptibility and with views of <b>medium</b> value, will experience a noticeable change to the composition of middle-distance and oblique views of the landscape earthworks on Stanthorne South embankment No. 1. The A54 Middlewich Road sectioning auto-transformer station and Middlewich box structure will be visible to the east. Overhead line equipment, noise fence barriers and train movements will be visible, notably crossing the Shropshire Union Canal viaducts Nos. 1 to 3 and Middlewich box structure, but views will be partly filtered by intervening vegetation. Crewe North RSD reception tracks and Shropshire Union Canal viaducts Nos. 1 to 3 will be visible in direct views forming the skyline in the far distance. Views will, however, be partially filtered by existing hedgerow trees and garden vegetation where present. At year 1, the immaturity of landscape mitigation planting will not integrate the Proposed Scheme.</p> <p>The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p> <p>A photomontage illustrating this scenario is included Volume 5, Appendix LV-001-0MA02, Part 3.</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>
<p>Year 15 and year 30:</p> <p>Effects will reduce to non-significant due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5).</p>	<p>Level of effect:</p> <p>Non-significant</p>

<b>View north-west from Coalpit Lane, Stanthorne (High sensitivity receptors) (VP 308-02-004) and view west from Birch Lane, Stanthorne (High sensitivity receptors) (VP 308-02-006)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of Birch Lane, The Cottage and Millview Cottage of <b>high</b> susceptibility and road users of lower susceptibility, all with views of <b>medium</b> value, will experience a substantial change to the composition of near and middle-distance views. Infrastructure elements will be visible including overhead line equipment, noise fence barriers, train movements, Middlewich box structure and the connecting Clive Green North embankment No. 3 and Stanthorne South embankment No. 2 with landscape earthworks which will form the skyline. The absence of mature trees removed during construction will be evident in the far distance, beyond Stanthorne Lodge. A slight rise in landform will partially screen infrastructure elements for residential receptors situated closer to the junction of Birch Lane/Coalpit Lane, although views will be more open for properties situated towards the junction with the A54 Middlewich Road. The Proposed Scheme on the skyline will obscure more distant features and result in a substantial change to existing views over a relatively open agricultural landscape. The lack of intervening vegetation and the removal of hedgerow and scattered trees during construction will emphasize the visibility of the Proposed Scheme. The presence of large-scale earthworks and structures within the middle distance will represent a substantial change in the view. At year 1, the immaturity of landscape mitigation planting will not integrate the Proposed Scheme.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>Due to the growth of mitigation planting on the landscape earthworks associated with Stanthorne South embankment No. 2, views of Middlewich Box Structure and the connecting Clive Green North embankment No. 3 and Stanthorne South embankment No. 2 and noise fence barriers will be filtered and more integrated into the wider landscape. Overhead line equipment</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>

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<b>View north-west from Coalpit Lane, Stanthorne (High sensitivity receptors) (VP 308-02-004) and view west from Birch Lane, Stanthorne (High sensitivity receptors) (VP 308-02-006)</b>	
and train movements will be partially screened by landscape earthworks and mitigation planting. The magnitude of visual change will therefore reduce to <b>medium</b> . The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.	
Year 30 – summer: The magnitude of visual change will reduce to non-significant as a result of maturing planting (reported in detail in Volume 5).	Level of effect: Non-significant

<b>View south-east from the A54 Middlewich Road, Stanthorne Hall (High sensitivity receptors) (VP 308-02-007)</b>	
Year 1 – winter and summer: Residents of Stanthorne Hall and Stanthorne Hall Farm of <b>high</b> susceptibility and road users of lower susceptibility, both with views of <b>medium</b> value, will experience a noticeable change to the composition of oblique and direct, but filtered views of the realigned A54 Middlewich Road and the landscape earthworks associated with Stanthorne South embankment No. 1 in the near to middle distance. Overhead line equipment, train movements and noise fence barriers will be visible further south at Middlewich box structure. The A54 Middlewich Road sectioning auto-transformer station will also be visible further south, although filtered by intervening vegetation. The absence of established trees adjacent to Stanthorne Hall Farm, removed during construction, in combination with the A54 Middlewich Road realignment will be a noticeable change in the view. The realigned A54 Middlewich Road will be positioned closer to the property than at present, with large-scale earthworks forming the skyline in the middle distance. Views will however, be partially screened by existing farm buildings and trees. At year 1, the immaturity of landscape mitigation planting will not integrate the Proposed Scheme. The combination of the above will result in a <b>medium</b> magnitude of visual change. The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)
Year 15 – summer: Hedge and tree mitigation planting alongside the A54 Middlewich Road realignment will have integrated the highway and will provide some screening to traffic movement. The growth of the mitigation planting including areas adjacent to and on Stanthorne South embankment No. 1, will partially filter views of the A54 Middlewich Road sectioning auto-transformer station and the Proposed Scheme, providing greater integration into the wider landscape. Overhead line equipment, train movements and noise fence barriers will be discernible above the woodland but filtered by the mitigation planting. The magnitude of visual change will remain <b>medium</b> . The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)
Year 30 – summer: The magnitude of visual change will reduce to non-significant as a result of maturing planting (reported in detail in Volume 5).	Level of effect: Non-significant

<b>View north-west from the A54 Middlewich Road and Birch Lane junction (High sensitivity receptors) (VP 308-02-008)</b>	
Year 1 – winter and summer: Residents of the A54 Middlewich Road, Birch Lane and Stanthorne Lodge of <b>high</b> susceptibility and road users of lower susceptibility, all with views of <b>medium</b> value, will experience a substantial change to the composition of near and middle-distance views of infrastructure	Level of effect: <b>Major</b> adverse (significant)

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<b>View north-west from the A54 Middlewich Road and Birch Lane junction (High sensitivity receptors) (VP 308-02-008)</b>	
<p>elements including Stanthorne South embankment No. 2 and A54 Middlewich Road viaduct, overhead line equipment, train movements and the realigned A54 Middlewich Road. The Proposed Scheme will be visible across the middle-distance extending northwards to the far distance on Stanthorne North embankment from A54 Middlewich Road viaduct. Overhead line equipment and train movements will be noticeable, seen against the skyline. Due to its immaturity, mitigation planting will not provide any screening or integration at year 1 and the presence of large-scale elements in proximity to the receptors will represent a substantial change in the view.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p> <p>A photomontage illustrating this scenario is included Volume 5, Appendix LV-001-0MA02, Part 3.</p>	
<p>Year 15 – summer:</p> <p>The establishment of mitigation hedgerow and woodland planting along the A54 Middlewich Road realignment and to the east of Stanthorne South embankment No. 2 will screen the lower levels of the earthworks, overhead line equipment and train movements. Views will however be foreshortened and enclosed, with large scale elements including A54 Middlewich Road viaduct largely screened by vegetation from the viewpoint. The magnitude of visual change will therefore reduce to <b>medium</b>.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p> <p>A photomontage illustrating this scenario is included Volume 5, Appendix LV-001-0MA02, Part 3.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<p>Year 30 – summer:</p> <p>The mature mitigation planting, including trees and hedgerows along the A54 Middlewich Road realignment and east of Stanthorne South embankment No. 2, will provide denser screening in summer months, largely obscuring overhead line equipment and train movements. Views will remain foreshortened and enclosed, with a restricted view of trains and rail infrastructure crossing the A54 Middlewich Road viaduct, framed by mature vegetation adjacent to the abutments. The magnitude of visual change will remain <b>medium</b>.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<b>View west from the A533 Northwich Road and the A54 Middlewich Road junction (High sensitivity receptors) (VP 308-02-009)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of Bostock House Farm and Bostock House of <b>high</b> susceptibility and road users of lower susceptibility, all with views of <b>medium</b> value, will experience a noticeable change to the composition of near and middle-distance views of infrastructure elements, including the realignment of the A54 Middlewich Road and associated loss of boundary hedge vegetation during construction, in proximity to Bostock House and Bostock House Farm. The Proposed Scheme will be a low and continuous skyline component to the west, on higher ground. Visible infrastructure elements will include train movements and overhead line equipment on the Proposed Scheme on embankment and A54 Middlewich Road viaduct. Views from both properties will be largely screened by mature vegetation and outbuildings from the ground floor. The immaturity of mitigation planting will not provide any screening or integration of the Proposed Scheme at year 1.</p> <p>The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>

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View west from the A533 Northwich Road and the A54 Middlewich Road junction (High sensitivity receptors) (VP 308-02-009)	
Year 15 and year 30: Effects will reduce to non-significant due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5).	Level of effect: Non-significant

View east from Footpath Winsford 37/1, Winsford Industrial Estate (Medium-high sensitivity receptors) (VP 308-03-010)	
Year 1 – winter and summer: Footpath users of <b>medium-high</b> susceptibility and workers of lower susceptibility with views of <b>medium</b> value will experience a noticeable change to the composition of middle and far-distance views. The Proposed Scheme will be visible on embankment in the far distance forming a continuous low skyline profile. Landscape earthworks adjacent to Stanthorne South embankment No. 1 will partially screen overhead line equipment and passing trains. The woodland planting between the realigned A54 Middlewich Road and the Proposed Scheme will not provide any screening by year 1 and overhead line equipment and passing trains will be more visible northwards beyond A54 Middlewich Road viaduct before being screened from view altogether by mature plantations bordering The Willowbeds. The loss of mature woodland during construction close to Stanthorne Hall will be noticeable on the skyline beyond the property. The realigned A54 Middlewich Road and vehicular traffic will be evident across the line of view, running beyond Stanthorne Hall and immediately to the west of the Proposed Scheme. The A54 Middlewich Road viaduct will appear as one structure, noticeable to the north of Stanthorne Hall Farm. Due to its immaturity, mitigation planting will not integrate the Proposed Scheme by year 1. The combination of the above will result in a <b>medium</b> magnitude of visual change. The <b>medium</b> magnitude of visual change and <b>medium-high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)
Year 15 – summer: The establishment of landscape mitigation adjacent to the Stanthorne South embankment No. 1 and Stanthorne North embankment will help to integrate the Proposed Scheme and provide additional screening of overhead line equipment and train movements, although the A54 Middlewich Road viaduct will remain visible. Hedgerows to be established alongside the A54 Middlewich Road realignment will provide a partial screen to traffic movement and will help integrate the realigned section with the existing A54 Middlewich Road and A533 Northwich Road. However, the appearance of the Proposed Scheme as a continuous skyline feature across much of the view will remain evident. The magnitude of visual change will, therefore, remain <b>medium</b> . The <b>medium</b> magnitude of visual change and medium-high sensitivity will result in a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)
Year 30 – summer: The magnitude of visual change will reduce to non-significant as a result of maturing planting (reported in detail in Volume 5).	Level of effect: Non-significant

View south-east from Oldhall Farm, A533 Northwich Road (High sensitivity receptors) (VP 308-02-014)	
Year 1 – winter and summer: Residents of Old Hall Farm, Bank Farm and Heyscroft of <b>high</b> susceptibility and road users of lower susceptibility, all with views of <b>medium</b> value, will experience a substantial change to the composition of near distance views of the diverted A533 Northwich Road with views extending to the new roundabout with the realigned A54 Middlewich Road. Views from the existing A533 Northwich Road will be direct towards Stanthorne North embankment and Stanthorne South	Level of effect: <b>Major</b> adverse (significant)

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<b>View south-east from Oldhall Farm, A533 Northwich Road (High sensitivity receptors) (VP 308-02-014)</b>	
<p>embankment No. 1, overhead line equipment and train movements. Although existing woodland, Bull's Wood and Oak Wood to the north, will provide some screening of views, the loss of smaller groups of trees and the demolition of Greenheyes Farm will be evident in views east towards the Proposed Scheme. The proximity of the Proposed Scheme will be apparent in the near and middle distance from Bank Farm and Heyescroft properties, partially screened by boundary vegetation but representing a substantial change to the view. Due to its immaturity, mitigation planting will not provide any screening or integration at year 1.</p> <p>The combination of the above will result in a high magnitude of visual change.</p> <p>The high magnitude of visual change and <b>high</b> sensitivity will result in a major adverse significant effect.</p>	
<p>Year 15:</p> <p>The establishment of landscape mitigation planting along and to the east of A533 Northwich Road diversion and along Stanthorne North embankment and Stanthorne South embankment No. 1 will add screening in the middle-distance, to supplement that of mature field boundary hedgerows and woodlands. Mitigation planting will successfully screen the embankment and the lower elements of overhead electrical equipment and train movements, although there will be foreshortening and enclosure of views for residents of Heyescroft. The magnitude of visual change will reduce to <b>medium</b>, resulting in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<p>Year 30:</p> <p>The maturity of the mitigation planting will provide denser screening in summer months including tree and hedgerow planting along and to the east of the A533 Northwich Road diversion. Train movements across Stanthorne North embankment and Stanthorne South embankment No. 1 will be screened by the mature roadside and embankment planting although there will remain a foreshortening and enclosure of views for residents of Heyescroft. The magnitude of visual change will therefore remain <b>medium</b>, with a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<b>View west from Croxton Hall Farm, A530 Croxton Lane (High sensitivity receptors) (VP 308-02-015)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of <b>high</b> susceptibility and road users of lower susceptibility, both with views of <b>medium</b> value, will experience a noticeable change to the composition of middle and far-distance views of infrastructure elements including River Dane viaduct. The absence of existing mature vegetation east and west of the River Dane will allow views of the viaduct and overhead line equipment and train movements to be seen against the lower slopes of rising terrain to the west. The Proposed Scheme, elevated here on embankment and viaduct, will be a noticeable linear element crossing the width of the view in the far-distance. Mitigation planting due to its immaturity will not provide any screening or integration at year 1.</p> <p>The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<p>Year 15 and year 30:</p> <p>Effects will reduce to non-significant due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5).</p>	<p>Level of effect:            Non-significant</p>



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Views north-west from the Trent and Mersey Canal, Dane Valley (High sensitivity receptors) (VP 309-03-001 and VP 309-03-004) and view south-east from the Trent and Mersey Canal, Dane Valley (High sensitivity receptors) (VP 309-03-005)	
<p>Year 1 – winter and summer:</p> <p>Users of Footpaths Byley 3/1 and Davenham 6/1 and the Trent and Mersey Canal of <b>high</b> susceptibility and with views of <b>medium-high</b> value will experience a substantial change to the composition of near-distance views. River Dane viaduct will be visible as a substantial new linear feature crossing the river valley. Sequential views of the viaduct from the canal towpath will vary, the structure being visible against a backdrop of mature woodland along the valley margin but visible above the skyline in the north. The viaduct will be highly visible across the whole of the view, with overhead line equipment and train movements. The absence of mature field boundary, woodland and waterside vegetation removed during construction will be evident in the middle-distance. Due to its immaturity, mitigation planting will not provide any screening or integration at year 1.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>The growth of mitigation planting, together with the continued growth of retained mature woodland along the River Dane will help integrate River Dane viaduct into the local landscape, as it crosses the river. However, there will still be a substantial alteration to the view, with the viaduct remaining a continuous and prominent feature across the width of the view. Overhead line equipment and train movements will be visible. The magnitude of visual change will therefore remain <b>high</b>.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p> <p>A photomontage illustrating this scenario is included Volume 5, Appendix LV-001-0MA02, Part 3.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>The maturing of the mitigation planting will provide denser screening in summer months to a limited section of the view of River Dane viaduct where it will cross the river, helping to integrate the lower elements of this part of the structure into the riverside setting. However, the viaduct will remain a prominent, linear feature crossing a rural landscape, with train movements visible. The magnitude of visual change will therefore remain <b>high</b>.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

View south-east from Bridge Farm, Whatcroft Hall Lane (High sensitivity receptors) (VP 310-02-001)	
<p>Year 1 – winter and summer:</p> <p>Residents of Bridge Farm, Whatcroft Hall and Dairy Farm, and users of Footpath Davenham 20/2 of <b>high</b> susceptibility and with views of <b>medium</b> value will experience a substantial change to the composition of near and middle-distance views. Infrastructure elements including Dane Valley embankment and Puddinglake Brook viaduct will be visible. Residents at Bridge Farm will have near distance views, while views experienced by residents at Whatcroft Hall and Dairy Farm will be largely screened by farm buildings and intervening mature vegetation. The viaduct and earthworks will substantially alter the character of the view and the skyline, while overhead line equipment and train movements on will be highly visible. Dairy Farm access realignment will be visible in the near distance, both east and west of the Proposed Scheme. The absence of existing tree cover along Puddinglake Brook, removed during construction, will be evident near the properties at Bridge Farm, enabling views of Puddinglake Brook viaduct. Due to its immaturity,</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

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View south-east from Bridge Farm, Whatcroft Hall Lane (High sensitivity receptors) (VP 310-02-001)	
<p>mitigation planting west of Dane Valley embankment will not provide any screening or integration at year 1.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	
<p>Year 15 – summer:</p> <p>Due to the growth of mitigation planting on the landscape earthworks to the west of Dane Valley embankment and along Puddinglake Brook, views of overhead line equipment and train movements will be partially screened although taller infrastructure elements will remain visible. Puddinglake Brook viaduct will remain a continuous and highly visible feature in proximity to the receptor, representing a substantial change in the view. The magnitude of visual change will therefore remain <b>high</b>.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>The maturing of mitigation planting on the landscape earthworks west of Dane Valley embankment and along Puddinglake Brook will provide denser screening of the Proposed Scheme including overhead line equipment and train movements. Framed views of Puddinglake Brook viaduct, in proximity to properties at Bridge Farm, will still be possible although the maturing vegetation along the embankment will help to integrate the Proposed Scheme into the wider landscape. A high magnitude of visual change will remain due to the presence of the viaduct in proximity to the residential properties.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
View south-east from the Trent and Mersey Canal, Puddinglake Brook (high sensitivity receptors) (VP 310-03-002) and view west from the Trent and Mersey Canal, alongside Whatcroft Hall Lane (high sensitivity receptor) (VP 310-03-003)	
<p>Year 1 – winter and summer:</p> <p>Users of Footpath Davenham 6X/2 and the canal of <b>high</b> susceptibility and with views of <b>medium-high</b> value will experience a substantial change to the composition of near distance views. Infrastructure elements including Puddinglake Brook viaduct and its approach embankments to the north and south, overhead line equipment and train movements will be visible. These substantial new linear structures will be highly visible in the near distance, changing the rural character of this section of canal. The open form of the viaduct will allow a sense of landscape and visual connectivity beneath the structure to be retained, although it will be prominent against the skyline and restrict wider views beyond. Due to its immaturity, landscape mitigation planting will not provide any screening or integration at year 1 to the viaduct's embankments.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p> <p>A photomontage from VP 310-03-002 illustrating this scenario is included Volume 5: Appendix LV-001-0MA02, Part 3.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>The establishing mitigation planting on Dane Valley embankment and Whatcroft South embankment will be sufficiently established to soften the earthworks and integrate these elements into the local landscape setting, partially screening the visibility of train movements and the lower elements of overhead line equipment. However, Puddinglake Brook viaduct will remain</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

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View south-east from the Trent and Mersey Canal, Puddinglake Brook (high sensitivity receptors) (VP 310-03-002) and view west from the Trent and Mersey Canal, alongside Whatcroft Hall Lane (high sensitivity receptor) (VP 310-03-003)	
<p>a highly visible linear element spanning the Trent and Mersey Canal and towpath and will be a substantial alteration to the view. The magnitude of visual change will therefore remain <b>high</b>. The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p> <p>A photomontage from VP 310-03-002 illustrating this scenario is included Volume 5: Appendix LV-001-0MA02, Part 3.</p>	
<p>Year 30 – summer:</p> <p>The mature mitigation planting will provide denser screening of overhead line equipment and train movements along the approach embankments to Puddinglake Brook viaduct. The mature vegetation will frame views of the viaduct and together with the wetland habitat created below will assist in integrating the structure as a component of the canal and local landscape. However, where views remain open to the viaduct, train movements and overhead line equipment will remain prominent. The magnitude of visual change will remain as <b>high</b>.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
View north-west from the Trent and Mersey Canal, north of Whatcroft (High sensitivity receptors) (VP 310-03-004) and view south-east from the Trent and Mersey Canal, Oakwood Marina (High sensitivity receptors) (VP 310-03-007)	
<p>Year 1 – winter and summer:</p> <p>Users of the canal, Footpath Rudheath 10/1 and mooring facilities of <b>high</b> susceptibility and with views of <b>medium-high</b> value will experience a substantial change to the composition of middle-distance views. Infrastructure elements including the Trent and Mersey and Gad Brook viaducts will be visible. These will create visually imposing new elements over the canal with the open forms retaining a sense of visual connectivity beneath the structures, although substantially altering the local skyline and obscuring current far distance features. The absence of Higgins Lane Farm and of some mature hedgerow trees, removed during construction, will be evident in the middle-distance. The Davenham Road express feeder auto-transformer station including a railway telecommunications mast will be visible in the near distance, partially screened by the Oakwood Marina building.</p> <p>Due to its immaturity, mitigation planting will not integrate Whatcroft North embankment or Whatcroft South embankment by year 1. Overhead line equipment and train movements will be visible along Whatcroft North embankment, existing intervening woodland will partially screen some views.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p> <p>A photomontage from VP 310-03-007 illustrating this scenario is included Volume 5: Appendix LV-001-0MA02, Part 3.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>Mitigation planting on Whatcroft North and South embankments will be sufficiently established to locally integrate the earthworks and partially screen Davenham Road express feeder auto-transformer station. Embankment planting will partially screen overhead line equipment and passing trains and will further soften the appearance and visual prominence of the Trent and Mersey viaduct abutments. The viaducts will, however, remain highly visible elements when viewed from the canal towpath and the magnitude of visual change will remain <b>high</b>.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>

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<b>View north-west from the Trent and Mersey Canal, north of Whatcroft (High sensitivity receptors) (VP 310-03-004) and view south-east from the Trent and Mersey Canal, Oakwood Marina (High sensitivity receptors) (VP 310-03-007)</b>	
A photomontage from VP 310-03-007 illustrating this scenario is included Volume 5: Appendix LV-001-0MA02, Part 3.	
<p>Year 30 – summer:</p> <p>The maturing of the mitigation planting will provide denser screening of overhead line equipment and train movement on the approach embankments to Trent and Mersey and Gad Brook viaducts. The viaducts will be framed by mature vegetation which will more fully integrate the structures into the landscape. However, the Trent and Mersey viaducts’ prominence as a visual focus and imposition on the canal landscape will remain evident. The magnitude of visual change will remain as <b>high</b>.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Major</b> adverse (significant)</p>

<b>View south-east from Brook Farm, Old Lane (High sensitivity receptors) (VP 310-02-005)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of Manor Farm, Brook Farm and Brook Farm Cottage of <b>high</b> susceptibility and with views of <b>medium</b> value will experience a substantial change to the composition of middle-distance views. Infrastructure elements including Trent and Mersey viaduct and Whatcroft embankments to the north and south, together with overhead line equipment and train movements will be visible. Brook Farm access diversion will be visible in the near distance and middle-distance with occasional traffic movements. Trent and Mersey viaduct spanning both the canal and the Sandbach to Northwich Line will be a new component in the local landscape, seen against the skyline and highly visible across part of the view, although its open form will retain visual connectivity beneath the structure. Views will be partially filtered by existing vegetation and farm buildings at Manor Farm and Brook Farm, but views to the east and north will be more open from the adjacent cottages, resulting in a substantial change in the view. Due to its immaturity, mitigation planting will not provide any screening or integration of the embankments to north or south at year 1.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>Due to the growth of landscape mitigation planting on Whatcroft embankments, the appearance and visual prominence of lower elements of the Proposed Scheme north and south of the Trent and Mersey viaduct will be lessened, although the structure itself, with overhead line equipment and train movements, will remain visible. However, a substantial alteration to the view will remain and the magnitude of visual change will remain as <b>high</b>.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Major</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>The mature mitigation planting will provide denser screening of overhead line equipment and train movements on the Whatcroft embankments north and south of the Trent and Mersey viaduct in summer months. The viaduct will be framed by belts of mature vegetation, which will assist in integrating the Proposed Scheme into the local landscape, although the viaduct will remain a prominent local element. The magnitude of visual change will reduce to <b>medium</b>.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>

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View west from Pear Tree Farm Cottages, Davenham Road (High sensitivity receptors) (VP 310-02-008)	
<p>Year 1 – winter and summer:</p> <p>Residents of <b>high</b> susceptibility and road users of lower susceptibility, all with views of <b>medium</b> value will experience a substantial change to the composition of near-distance views. Gad Brook viaduct and Whatcroft North embankment with associated overhead line equipment and passing trains will be visible. Davenham Road express feeder auto-transformer station will be partially visible beyond Gad Brook viaduct. These infrastructure elements will be substantial and uncharacteristic of the rural setting. Although the open form of the viaduct will retain a sense of visual connectivity beneath the structure, its proximity and height, along with the removal of intervening garden and field vegetation, during construction, will substantially alter the near distance and middle-distance view for residents. The immaturity of mitigation planting will not provide any screening or integration at year 1.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>The proximity and open aspect of near-distance views towards Gad Brook viaduct, a noise fence barrier and Whatcroft North embankment will remain, although the growth of landscape mitigation planting on the embankment and immediately south of Davenham Road will soften the embankment’s appearance and visual prominence and filter views of the auto-transformer station. However, Gad Brook viaduct, overhead line equipment and train movements will all remain highly visible from residential properties and gardens. The established mitigation planting will help integrate the Proposed Scheme. However, a substantial alteration to the view will remain and the magnitude of visual change will remain as <b>high</b>.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Major</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>The maturity of the mitigation planting will provide denser screening of Whatcroft North embankment and Davenham Road express feeder auto-transformer station west of the Proposed Scheme in summer months. However, the prominence of Gad Brook viaduct, the noise fence barrier, and the upper elements of train movements and overhead line equipment will remain highly visible in the near distance. The magnitude of visual change will remain as <b>high</b>.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Major</b> adverse (significant)</p>

View east from Footpath Rudheath 5/2, Park Farm, Rudheath (High sensitivity receptors) (VP 310-02-009)	
<p>Year 1 – winter and summer:</p> <p>Residents and footpath users of <b>high</b> susceptibility and with views of <b>medium</b> value, will experience a noticeable change to the composition of middle-distance views. Gad Brook viaduct and Whatcroft North embankment, across the Trent and Mersey Canal will be visible. These will be new linear elements in a largely rural setting, with visible overhead line equipment and train movements. Although the viaduct will retain some visual connectivity beneath the structure, it will be an uncharacteristic feature that will alter the skyline, with train movements visible against the horizon. The immaturity of mitigation planting will not provide any screening or integration at year 1.</p> <p>The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>

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<b>View east from Footpath Rudheath 5/2, Park Farm, Rudheath (High sensitivity receptors) (VP 310-02-009)</b>	
<p>Year 15 – summer:</p> <p>Due to the growth of mitigation planting on Whatcroft North embankment and west of Gad Brook viaduct, far distance visibility will be filtered and the linear appearance of these structures more integrated into the local landscape. Overhead line equipment and train movements on Gad Brook viaduct will remain visible, partially screened by tall intervening field boundary vegetation. However, there will still be a noticeable alteration to the view. The magnitude of visual change will remain <b>medium</b>.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>The magnitude of visual change will reduce to non-significant as a result of maturing planting (reported in detail in Volume 5).</p>	<p>Level of effect:</p> <p>Non-significant</p>

<b>View west from the B5082 Penny's Lane, Lach Dennis (High sensitivity receptors) (VP 311-02-001)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents and users of Footpath Lach Dennis 2/1, 3X/1 and Rudheath 3/4 of <b>high</b> susceptibility and road users of lower susceptibility, both with views of <b>medium</b> value, will experience a substantial change to the composition of near and middle-distance views. Infrastructure elements including Gad Brook viaduct spanning the A530 King Street, Rudheath embankment and B5082 Penny's Lane telecommunications site will be visible in the middle distance. The B5082 Penny's Lane diversion will be evident in the near distance. The removal of mature hedgerows and trees in the near, middle and far distance during construction will allow more open views towards the Proposed Scheme. These combined elements will be highly visible across the majority of the view, substantially altering the near distance and skyline, although the open structure of the viaduct will allow visibility of features beyond. Due to its immaturity, mitigation planting will not integrate Gad Brook viaduct or Rudheath embankment by year 1 and overhead line equipment and train movements will be visible. Footpath Lach Dennis 3X/1 will be diverted. Footpath Rudheath 3/4 will be closed.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>Mitigation planting associated with the B5082 Penny's Lane diversion and east of Rudheath embankment will provide near distance and middle-distance screening of the earthworks as well as the lower elements of train movements and railway infrastructure. However, the scale and length of Gad Brook viaduct, including overhead line equipment and train movements, will remain visible across the width of the view in the far distance. The magnitude of visual change will reduce to <b>medium</b>.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>The maturity of the mitigation planting will provide denser screening of overhead line equipment and train movements on Rudheath embankment. The visual prominence of Gad Brook viaduct will be reduced by the growth of landscape mitigation planting along the Proposed Scheme and along the B5082 Penny's Lane diversion, which will assist in integrating the structure into the local landscape. The viaduct will however remain evident in the far distance. The magnitude of visual change will remain <b>medium</b>.</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>



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<b>View west from the B5082 Penny's Lane, Lach Dennis (High sensitivity receptors) (VP 311-02-001)</b>	
The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.	
<b>View south-east from Broken Cross, the A556 Shurlach Road and the A530 King Street junction (High sensitivity receptors) (VP 311-02-002)</b>	
Year 1 – winter and summer: Residents of <b>high</b> susceptibility and road users of lower susceptibility, both with views of <b>medium</b> value, will experience a substantial change to the composition of near and middle-distance views across the A556 Shurlach Road. Rudheath embankment and the northern extent of Gad Brook viaduct will be visible in the middle distance, with overhead line equipment and train movements visible against the skyline. The removal of roadside boundary vegetation, during construction, will open up views towards the A556 Shurlach Road and its realignment in the near distance resulting in a substantial change in proximity to residential receptors. The loss of field boundary vegetation during construction and demolition of High House Farm will be visible in the middle-distance. Due to its immaturity, mitigation roadside planting south of the A556 Shurlach Road and landscape planting west of Rudheath embankment will not integrate the Proposed Scheme by year 1. The combination of the above will result in a <b>high</b> magnitude of visual change. The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.	Level of effect: <b>Major</b> adverse (significant)
Year 15 – summer: Mitigation planting along the A556 Shurlach Road and on and to the west of Rudheath embankment will be sufficiently established to provide screening of the A556 Shurlach Road in the near distance as well as the earthworks and the lower elements of the Proposed Scheme. Train movements and overhead line equipment along Gad Brook viaduct and Rudheath embankment in the far distance will be visible above the proposed planting. The magnitude of visual change will therefore reduce to <b>medium</b> . The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)
Year 30 – summer: The maturity of the mitigation planting will provide denser screening of overhead line equipment and train movements on Rudheath embankment. The northern extent of Gad Brook viaduct will be framed by mature vegetation which will more fully integrate both the viaduct and the embankment into the local landscape. However, overhead line equipment and train movements will remain noticeable on the viaduct. The magnitude of visual change will remain <b>medium</b> . The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)
<b>View west from Birch Grove, Lostock Green (High sensitivity receptors) (VP 311-02-003)</b>	
Year 1 – winter and summer: Residents along the south-western fringe of Lostock Green of <b>high</b> susceptibility and with views of <b>medium</b> value will experience a substantial change to the composition of near and middle-distance views. Rudheath embankment, landscape earthworks, overhead line equipment and train movement will be visible on the skyline. The realigned Birches Lane will be seen to the north of the village passing beneath Wade Brook viaduct. Although displacing a busy dual carriageway, the Proposed Scheme will include new large-scale earthworks in the near and middle distance substantially changing the view. Road traffic movements on the realigned A556 Shurlach Road	Level of effect: <b>Major</b> adverse (significant)

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<b>View west from Birch Grove, Lostock Green (High sensitivity receptors) (VP 311-02-003)</b>	
west of the Proposed Scheme will be screened by Rudheath embankment. Due to its immaturity, mitigation planting will not provide any visual integration at year 1. The combination of the above will result in a <b>high</b> magnitude of visual change. The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.	
Year 15 and year 30: Effects will reduce to non-significant due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5).	Level of effect: Non-significant

<b>View north-east from Springbank Farm, Birches Lane (High sensitivity receptors) (VP 312-02-001)</b>	
Year 1 – winter and summer: Residents of <b>high</b> susceptibility and with views of <b>medium</b> value will experience a substantial change in the composition of near and middle-distance views. The realigned A556 Shurlach Road will be in the near to middle distance, with the Proposed Scheme on Rudheath embankment and Wade Brook viaduct beyond. The absence of existing vegetation removed during construction between the viewpoint and the existing A556 Shurlach Road will open up views towards the Proposed Scheme. Traffic movements will be closer than at present and seen in the near distance, with the Proposed Scheme at a higher elevation in the middle-distance. Overhead line equipment and passing trains will be visible over the width of the existing view. Due to its immaturity, mitigation planting will not integrate Rudheath embankment, Wade Brook viaduct or the A556 Shurlach Road realignment by year 1. The combination of the above will result in a <b>high</b> magnitude of visual change. The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.	Level of effect: <b>Major</b> adverse (significant)
Year 15 – summer: Landscape mitigation planting alongside the realigned A556 Shurlach Road and the Proposed Scheme will be sufficiently established to locally integrate the realigned A556 Shurlach Road. Planting on Rudheath embankment will screen the lower elements of overhead line equipment and train movements and will soften the appearance and prominence of the embankments to either side of Wade Brook viaduct. The magnitude of visual change will therefore reduce to <b>medium</b> . The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)
Year 30 – summer: The mature mitigation planting will provide denser screening of overhead line equipment and train movements on Rudheath embankment and Wade Brook viaduct. The viaduct will be framed by mature vegetation which will more fully integrate the structure as a component of the landscape although the realigned A556 Shurlach Road will remain evident. The magnitude of visual change will remain <b>medium</b> . The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.	Level of effect: <b>Moderate</b> adverse (significant)
Night-time effects: Year 1: The realigned A556 Shurlach Road will be in closer proximity to visual receptors on Birches Lane, with street lighting and traffic headlights more visible due to the loss of mature roadside vegetation removed during construction. The lights and their support systems will be designed to reduce the visual impact of the lighting installation. There will be a noticeable modification to the	Level of effect: <b>Moderate</b> adverse (significant)

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<p><b>View north-east from Springbank Farm, Birches Lane (High sensitivity receptors) (VP 312-02-001)</b></p>	
<p>night-time views experienced for receptors associated with Birches Lane. The magnitude of visual change will be medium.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p> <p>Year 15 and year 30:</p> <p>Effects will reduce to non-significant due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5).</p>	
<p><b>View west from Restricted Byway Lostock Gralam 1/1, Lostock Green (High sensitivity receptors) (VP 312-02-003)</b></p>	
<p>Year 1 – winter and summer:</p> <p>Residents of Lostock Green and footpath users of <b>high</b> susceptibility and with <b>medium</b> value views will experience a substantial change to the composition of near and middle-distance views. Infrastructure elements including Wade Brook viaduct and earthworks in relation to Rudheath embankment and Lostock Gralam South embankment will be visible. Overhead line equipment and passing trains will be partially visible across the majority of the view, above intervening landscape earthworks. The realigned A556 Shurlach Road however will be largely screened by Lostock Gralam South embankment and Rudheath embankment and the landscape earthworks between the Proposed Scheme and Lostock Green. The absence of mature vegetation associated with the A556 Shurlach Road realignment will be evident, while mitigation planting due to its immaturity will not provide any integration of the Proposed Scheme at year 1.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p> <p>A photomontage illustrating this scenario is included Volume 5, Appendix LV-001-0MA02, Part 3.</p>	<p>Level of effect:  <b>Major</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>Landscape mitigation planting, in combination with screening earthworks will be sufficiently established to locally integrate the Proposed Scheme and the realigned A556 Shurlach Road within the surrounding landscape. The appearance of Wade Brook viaduct and Wade Brook offline overbridge will be softened by planting along Rudheath embankment and Lostock Gralam South embankment. The maturing of mitigation planting will provide an additional screen to overhead line equipment and train movements. Wade Brook viaduct will retain some visual connectivity to the west. Properties on the western edge of Lostock Green will experience views directly onto adjacent established woodland mitigation planting, which will provide an effective screen towards infrastructure and overhead line equipment as well as passing trains. The magnitude of visual change will reduce to <b>medium</b>.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p> <p>A photomontage illustrating this scenario is included Volume 5, Appendix LV-001-0MA02, Part 3.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>The mature mitigation planting will provide denser screening of overhead line equipment and train movements. The belts of mitigation woodland between Lostock Green and the Proposed Scheme will effectively integrate the Proposed Scheme and reinstate mature screen vegetation similar to that along the existing A556 Shurlach Road. Wade Brook viaduct will however remain evident, in combination with traffic movement along the realigned A556 Shurlach Road where both cross the Wade Brook. The magnitude of visual change will remain <b>medium</b>.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b> adverse (significant)</p>

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<b>View west from Mosslane Farm, Moss Lane (High sensitivity receptors) (VP 312-02-004)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of Mosslane Farm, Langford Farm and adjacent properties and users of Footpaths Lostock Gralam 4/1 and 10/1 of <b>high</b> susceptibility and with views of <b>medium</b> value will experience a noticeable change to the composition of middle and far-distance views. The Proposed Scheme will be visible in the far distance including Rudheath embankment, Lostock Gralam South embankment and Wade Brook viaduct. This will alter the skyline and form a new feature on the horizon. Train movements and overhead line equipment will be apparent. Due to its immaturity, mitigation planting will not integrate Rudheath embankment, Lostock Gralam South embankment or Wade Brook viaduct by year 1.</p> <p>The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>
<p>Year 15 and year 30:</p> <p>Effects will reduce to non-significant due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5).</p>	<p>Level of effect:</p> <p>Non-significant</p>

<b>View south-east from Lostock Gralam Station entrance, Lostock Hollow (Medium sensitivity receptors) (VP 312-02-005)</b>	
<p>Year 1 – winter and summer:</p> <p>Residents of Rosetree Meadow, Paulden Road and Harris Road of <b>high</b> susceptibility and rail users of the Mid-Cheshire Line of lower susceptibility, all with views of <b>medium-low</b> value, will experience a noticeable change to the composition of near and middle distance views. Large-scale infrastructure elements including the realigned A556 Shurlach Road and the Proposed Scheme on Lostock Gralam South embankment and Wade Brook viaduct will be visible, with Wade Brook offline overbridge beyond. The presence of these structures will alter the skyline and restrict more distant views. The removal of mature field boundary and roadside vegetation during construction will be evident. Due to the immaturity of the landscape mitigation planting, this will not integrate Lostock Gralam South embankment or Wade Brook viaduct by year 1.</p> <p>The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>medium</b> sensitivity will result in a moderate adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>
<p>Year 15 – summer:</p> <p>Mitigation planting to the west of the realigned A556 Shurlach Road and on the western slopes of Lostock Gralam South embankment will be sufficiently established to locally integrate the realigned A556 Shurlach Road and the Proposed Scheme. Landscape mitigation planting along Rudheath embankment and Lostock Gralam South embankment will partially screen the lower elements of overhead line equipment and train movements and will soften the appearance of the Wade Brook viaduct and Wade Brook offline overbridge. However, traffic and train movements will remain visible in the far distance, with the upper elements of overhead line equipment seen against the skyline. The magnitude of visual change will be <b>medium</b>.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>
<p>Year 30 – summer:</p> <p>The magnitude of visual change will reduce to non-significant as a result of maturing planting (reported in detail in Volume 5).</p>	<p>Level of effect:</p> <p>Non-significant</p>

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View north-west from Footpath Lostock Gralam 4/2, east of Fieldhouse Farm (High sensitivity receptors) (VP 312-02-006)	
<p>Year 1 – winter and summer:</p> <p>Residents of Fieldhouse Farm and nearby properties and users of Footpath Lostock Gralam 4/2 of <b>high</b> susceptibility and with views of <b>medium</b> value, will experience a substantial change to the composition of near and middle-distance views. Overhead line equipment and passing trains will be visible across the majority of the view. The realigned A556 Shurlach Road will be visible in narrow views beyond and through Wade Brook viaduct. A truncated belt of retained vegetation alongside Wade Brook will partially screen views from Fieldhouse Farm towards Rudheath embankment to the south. Intervening farm buildings will screen views towards Lostock Gralam North embankment. However, the new infrastructure will change the skyline profile in the middle-distance. Due to its immaturity, mitigation planting will not provide any screening or integration of the Proposed Scheme at year 1.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Major</b> adverse (significant)</p>
<p>Year 15:</p> <p>Landscape mitigation planting on Lostock Gralam north and south embankments and Rudheath embankment will be sufficiently established to locally integrate the earthworks. The planting will partially screen overhead line equipment and train movements on the elevated Proposed Scheme. Lostock Gralam viaduct will remain visible from the footpath and there will be a narrow but direct view towards the northern abutments of Wade Brook viaduct from Fieldhouse Farm. The establishing landscape mitigation planting will be largely characteristic of the existing view towards the A556 Shurlach Road.</p> <p>The magnitude of visual change will reduce to <b>medium</b>, resulting in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>
<p>Year 30:</p> <p>The maturing of the mitigation planting will provide denser screening of overhead line equipment and train movements along the elevated section of the Proposed Scheme. Ecological woodland planting to the north of the Mid-Cheshire Line will further assist in partially screening Lostock Gralam north embankment. The planting will help integrate the Proposed Scheme locally although the viaduct sections and train movements will remain visible from Fieldhouse Farm and for footpath users.</p> <p>The magnitude of visual change will remain <b>medium</b>, with a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>

View east from Broseley Way, Lostock Gralam (High sensitivity receptors) (VP 312-02-007)	
<p>Year 1 – winter and summer:</p> <p>Residents of <b>high</b> susceptibility, and guests and visitors to the Travelodge Northwich and The Watermead public house of lower susceptibility, all with views of <b>medium</b> value, will experience a noticeable change in the composition of near and middle-distance views. Lostock Gralam North embankment, immediately east of the A556 Shurlach Road will be visible. The absence of mature trees lost during construction at Long Wood will represent a noticeable change in the middle-distance for residents on Broseley Way and Salary Row. The Lostock Gralam North embankment, overhead line equipment and train movement will form a changed skyline beyond intervening roadside planting. The near distance view will not change from properties on Broseley Way. For those at the end of Harris Road the clearance of mature roadside trees during construction will open oblique views up to traffic on the realigned A556 Shurlach Road and overhead line equipment on Lostock Gralam viaduct further east. Residents of Lostock Lodge Care Home and Travelodge Northwich will have filtered views across the A556 Shurlach Road towards the</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>

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<b>View east from Broseley Way, Lostock Gralam (High sensitivity receptors) (VP 312-02-007)</b>	
<p>Proposed Scheme on embankment and A556 Shurlach Road auto-transformer station. At year 1, the immaturity of landscape mitigation planting will not integrate the Proposed Scheme.</p> <p>The combination of the above will result in a medium magnitude of visual change.</p> <p>The medium magnitude of visual change and <b>high</b> sensitivity will result in a moderate adverse significant effect.</p>	
<p>Year 15 – summer:</p> <p>The establishment of mitigation planting on the eastern side of the A556 Shurlach Road and on Lostock Gralam North and South embankments will be sufficiently established to soften the appearance of the Proposed Scheme in the middle-distance seen from Broseley Way, Salary Row and Harris Road. The mitigation planting will partially screen overhead line equipment and passing trains. Mitigation planting will replace and increase the original extent of the woodland lost within Long Wood, helping to integrate the Proposed Scheme into the local landscape. The magnitude of visual change will therefore remain <b>medium</b>.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<p>Year 30:</p> <p>Effects will reduce to non-significant due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5).</p>	<p>Level of effect:            Non-significant</p>

<b>View west from Footpath Lostock Gralam 8/2, Plumley Lime Beds Nature Reserve (High sensitivity receptors) (VP 312-03-008)</b>	
<p>Year 1 – winter and summer:</p> <p>Footpath users of <b>high</b> susceptibility and with views of <b>medium</b> value will experience a substantial change to the composition of near and middle-distance views. Infrastructure elements including Smoker Brook viaduct, Lostock Gralam viaduct and Lostock Gralam North and South embankments to either side of the Mid-Cheshire Line will be visible. Overhead line equipment and train movements on embankment will be seen across the middle-distance. The structures will be evident on the skyline, although partly screened to the south and north by Square Wood and Long Wood where trees will have been retained during construction following underground utilities diversions. Due to its immaturity, the mitigation planting will provide minimal screening or landscape integration at this stage.</p> <p>The combination of the above will result in a <b>high</b> magnitude of visual change.</p> <p>The <b>high</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>major</b> adverse significant effect.</p>	<p>Level of effect:  <b>Major</b> adverse            (significant)</p>
<p>Year 15 – summer:</p> <p>Woodland habitat planting in the vicinity of the Mid-Cheshire Line and associated with Lostock Gralam North embankment will be sufficiently established to partially screen Lostock Gralam viaduct and Lostock Gralam South and North embankments. Views towards Smoker Brook viaduct to the north will also be partially screened by establishing mitigation planting. Views to overhead line equipment and passing trains will be filtered and softened by the maturing landscape and ecological mitigation planting, which will help integrate the Proposed Scheme with the surrounding landscape. The magnitude of visual change will reduce to <b>medium</b>.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:  <b>Moderate</b>            adverse            (significant)</p>
<p>Year 30 – summer:</p> <p>The magnitude of visual change will reduce to non-significant as a result of maturing planting (reported in detail in Volume 5).</p>	<p>Level of effect:            Non-significant</p>



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View east from the A559 Manchester Road, Lostock Gralam (Medium sensitivity receptors) (VP 312-02-009)	
<p>Year 1 – winter and summer:</p> <p>Residents of Wilson Crescent and properties bordering the A559 Manchester Road of <b>high</b> susceptibility and road users of lower susceptibility, both with views of <b>medium-low</b> value, will experience a noticeable change to the composition of middle-distance views for residents and near distance views for road users. Smoker Brook viaduct will be visible over the A556 Chester Road/Shurlach Road and the A559 Manchester Road where there is an existing awareness of traffic on the dual carriageways. The viaduct will be visible in the middle-distance and across the majority of view, against a backdrop of mature trees within Winnington Wood. Overhead line equipment and train movement will be visible along the viaduct and the section of Lostock Gralam North embankment discernible between Cheshire Business Park and the A556 Chester Road/Shurlach Road and the A559 Manchester Road junction. The open form of the viaduct will retain some visual connectivity along the line of the A556 Chester Road/Shurlach Road, although it will be visible as a skyline element partially displacing the existing far distance. Winnington Wood will screen the Proposed Scheme where it passes north of the A556 Chester Road/Shurlach Road. At year 1, the immaturity of landscape mitigation planting will not integrate the Proposed Scheme.</p> <p>The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>medium</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>
<p>Year 15 and year 30:</p> <p>Effects will reduce to non-significant due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5).</p>	<p>Level of effect:</p> <p>Non-significant</p>

View west from A556 Chester Road, Holford Cottages (High sensitivity receptors) (VP 313-02-004)	
<p>Year 1 – winter and summer:</p> <p>Residents of <b>high</b> susceptibility and road users of lower susceptibility, both with views of <b>medium</b> value, will experience a noticeable change to the composition of middle-distance views across the A556 Chester Road towards Smoker Brook viaduct, overhead line equipment and train movements. The viaduct will represent a new component in the local landscape between Smoker Wood and Winnington Wood, although much of the structure and its approach embankments will be screened by existing mature woodland. The Proposed Scheme at this location will be viewed in the context of frequent traffic movement along the A556 Chester Road in the near distance. The viaduct will be a noticeable change in the view, appearing against a far distance of the mature woodland of Peas Wood. Due to its immaturity, mitigation planting will not provide any screening or integration of the viaduct structure at year 1.</p> <p>The combination of the above will result in a <b>medium</b> magnitude of visual change.</p> <p>The <b>medium</b> magnitude of visual change and <b>high</b> sensitivity will result in a <b>moderate</b> adverse significant effect.</p>	<p>Level of effect:</p> <p><b>Moderate</b> adverse (significant)</p>
<p>Year 15 and year 30:</p> <p>Effects will reduce to non-significant due to the growth and maturity of the landscape mitigation planting (reported in detail in Volume 5).</p>	<p>Level of effect:</p> <p>Non-significant</p>

## Other mitigation measures

- 11.5.10 The permanent effects of the Proposed Scheme on landscape and visual receptors have been 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.

## Summary of likely residual significant effects

11.5.11 In many cases, significant effects will reduce over time as the proposed mitigation planting matures and reaches its designed intention. However, the following likely residual significant effects will remain at year 15 of operation:

- major adverse effects in relation to one LCA;
- moderate adverse effects in relation to two LCA;
- major adverse visual effects at seven representative residential viewpoint locations;
- major adverse visual effects at eight recreational viewpoint locations;
- moderate adverse visual effects at 18 representative residential viewpoint locations;
- moderate adverse visual effects at two recreational viewpoint locations;
- major adverse night-time visual effect at one representative residential viewpoint location; and
- moderate adverse night-time visual effects at four representative residential viewpoint locations.

## Cumulative effects

### Cumulative landscape effects

11.5.12 No significant cumulative effects during operation are anticipated.

### Cumulative visual effects

11.5.13 No significant cumulative effects during operation are anticipated.

## Monitoring

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

11.5.15 There are no area-specific requirements for monitoring landscape and visual mitigation during the operation of the Proposed Scheme in the Wimboldsley to Lostock Gralam area.

## 12 Socio-economics

### 12.1 Introduction

- 12.1.1 This section reports on the environmental baseline, likely economic and employment impacts as well as significant effects during construction and operation of the Proposed Scheme within the Wimboldsley to Lostock Gralam area. The assessment considers existing businesses, community organisations, local employment and local economies, including planned growth and development.
- 12.1.2 Engagement with Cheshire West and Chester Council (CWCC) and Cheshire East Council (CEC) has been undertaken as part of the development of the Proposed Scheme. The purpose of the engagement was to increase the understanding of socio-economic characteristics identified through a review of publicly available data.
- 12.1.3 The socio-economic effects on employment at a route-wide level are reported in Volume 3, Route-wide effects (Section 12). 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: MA02 Map Book. The Proposed Scheme is described in Section 2.

### 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 EIA Scope and Methodology Report (SMR)<sup>93</sup>. The assessment of in-combination effects draws upon the findings of other technical disciplines (e.g. air quality, sound, noise and vibration, landscape and visual and traffic and transport).

### 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 Wimboldsley to Lostock Gralam area which lies within the administrative areas of CWCC and CEC and within the North West region. It also falls within the Cheshire and Warrington Local Enterprise Partnership (LEP) area.

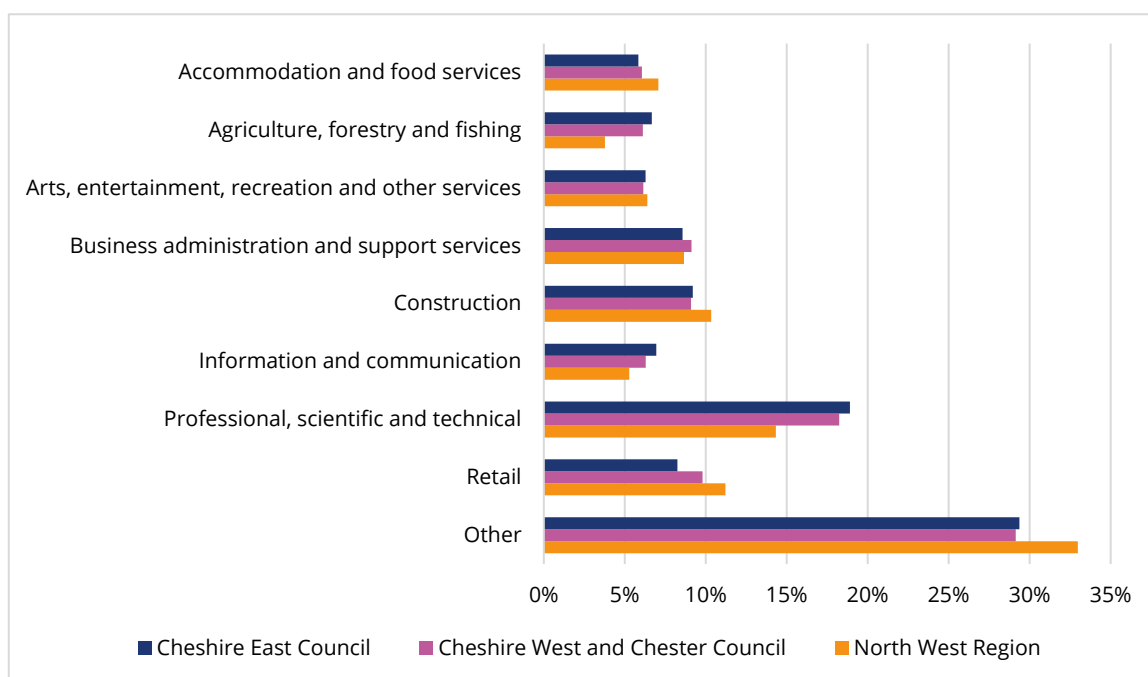
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<sup>93</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

## Business and labour market

12.3.2 Within the CEC and CWCC administrative areas there is a wide spread of business types reflecting a diverse range of commercial activities. In the CEC area in 2020 the professional, scientific and technical sector accounted for the largest proportion of businesses (19%), with construction the second largest (9%), followed by business administration and support services (9%) and retail (8%), as shown in Figure 20. In the CWCC area in 2020 the professional, scientific and technical sector accounted for the largest proportion of businesses (18%), with retail the second largest (10%), followed by business administration and support services (9%) and construction (9%). For comparison within the North West region, the largest sectors were professional, scientific and technical (14%) and retail (11%), followed by construction (10%) and business administration and support services (9%)<sup>94</sup>.

**Figure 20: Business sector composition in the Cheshire East Council and Cheshire West and Chester Council areas and the North West region**



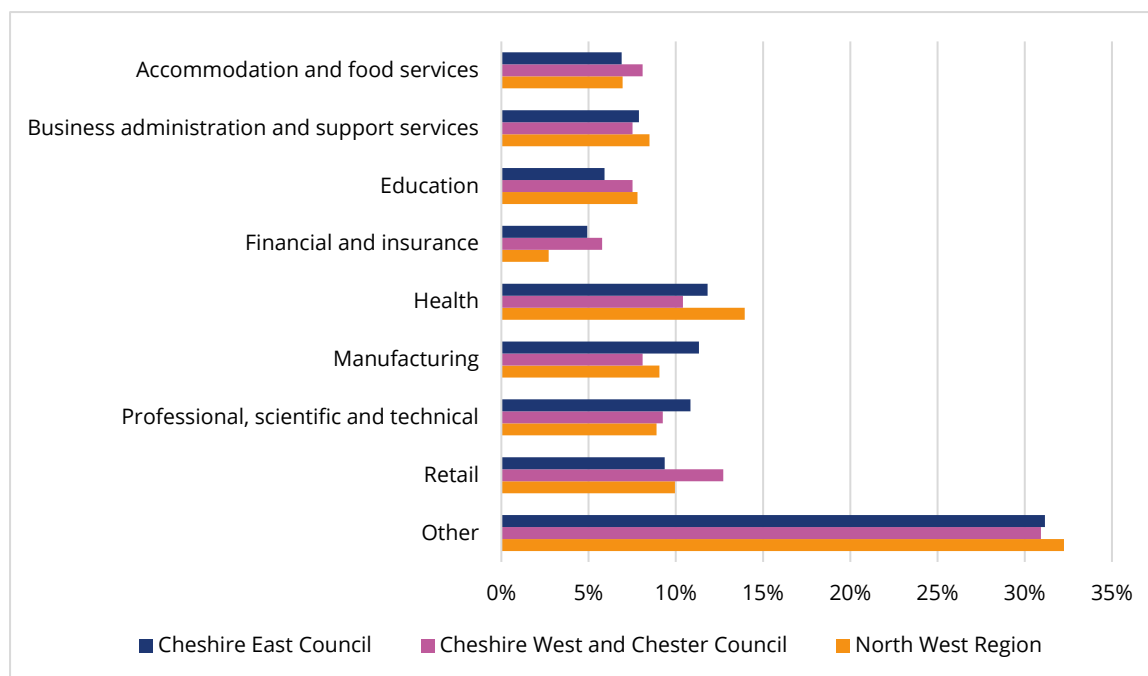
12.3.3 In 2019<sup>95</sup> approximately 203,000 people worked in the CEC area. According to the Office for National Statistics Business Register and Employment Survey 2019, the top four sectors in terms of share of employment in the CEC area were: health (12%); manufacturing (11%); professional, scientific and technical (11%); and retail (9%). In 2019, approximately 173,000 people worked in the CWCC area. The top five sectors in terms of share of employment in the CWCC area were: retail (13%); health (10%); professional, scientific and technical (9%); manufacturing (8%); and accommodation and food services (8%). These compare with the

<sup>94</sup> Office for National Statistics (2020), *UK Business Counts - local units by industry and employment size band*. Available online at: <http://www.nomisweb.co.uk/datasets/idbrlu>.

<sup>95</sup> Office for National Statistics (2019), *Business Register and Employment Survey*. Available online at: <http://www.nomisweb.co.uk/datasets/newbres6pub>. This number includes both residents and non-residents of CEC and CWCC who work within their boundaries.

top four sectors for the North West region, which were: health (14%); retail (10%); manufacturing (9%); and professional, scientific and technical (9%), as shown in Figure 21.

**Figure 21: Employment by industrial sector in the Cheshire East Council and Cheshire West and Chester Council areas and the North West region**



12.3.4 According to the Annual Population Survey (2020)<sup>96</sup>, the employment rate<sup>97</sup> within the CEC area was 76% (171,300 people), and 82% (166,500 people) in the CWCC area. This is higher than the employment rate of 74% recorded for the North West region and 76% for England. In 2020, unemployment in the CEC area was 3.9% and 3.3% in the CWCC area which is lower than the North West region (4.3%) and England (4.8%).

12.3.5 The Annual Population Survey (2020)<sup>98</sup> also shows that 42% of CEC residents and 45% of CWCC residents aged 16-64 were qualified to National Vocational Qualification Level 4 (NVQ4) and above, which compares to the North West region (39%) and in England (43%), while 4.5% of CEC residents and 6.6% of CWCC residents had no qualifications, which compares to the North West region (7.5%) and England (6.2%).

<sup>96</sup> Office for National Statistics (2020), *Annual Population Survey*. Available online at: <http://www.nomisweb.co.uk/datasets/apsnew>. This number includes the jobs held by residents of CEC and CWCC irrespective of where they work.

<sup>97</sup> The proportion of working age (16-64 year olds) residents that is in employment.

<sup>98</sup> Office for National Statistics (2020), *Annual Population Survey*. Available online at: <http://www.nomisweb.co.uk/datasets/apsnew>. This number includes the jobs held by residents of CEC and CWCC irrespective of where they work.

## Property

- 12.3.6 An employment land study in 2013<sup>99</sup> identified a need by 2030 for up to 368ha of additional employment land in the CWCC area. CWCC had an identified realistic employment land supply of 315.7ha across the borough which was less than the projected need. The shortfall compared to identified supply was up to 52.3ha by 2030. This was mainly for office uses as the need for traditional manufacturing space and warehousing had been declining. In both Winsford and Northwich there was found to be a good balance of sites available for both industrial and office uses, for example, at Winsford Industrial Estate. Lostock Triangle (Cheshire Business Park) was identified as a high-quality office location, although the study stated that there was limited land remaining for development of further employment space.
- 12.3.7 A review of employment land in 2012<sup>100</sup> identified a need by 2030 for up to 323.7ha of additional employment land in the CEC area. It was estimated that CEC had an identified employment land supply of 272.4ha across the borough. The employment land shortfall compared to identified supply was up to 51.3ha to 2030. Middlewich had one of the largest employment land supplies in the CEC area and was not identified as a location of potential shortfall. Middlewich also had a large proportion of the industrial space available to the market within the CEC area. The importance of providing a portfolio of readily available and market responsive employment land to support growth has been highlighted in the 2017 Cheshire and Warrington LEP Strategic and Economic Plan<sup>101</sup>.
- 12.3.8 Based on the latest available data from the Estates Gazette (February 2021), the average vacancy rate for industrial and warehousing property in the CEC and CWCC areas has been assessed as 14.7% and 13.1%, respectively, based on marketed space against known stock<sup>102</sup>.
- 12.3.9 Based on the latest available data from the Estates Gazette (February 2021), the average vacancy rate for office space in the CEC and CWCC areas<sup>103</sup> is 12.1% and 9.8%, respectively.

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<sup>99</sup> Cheshire West and Chester Council (2013), *Cheshire West and Chester Council Local Plan: Employment Land Study Update 2013*. Including a 27% flexibility factor buffer, which acts as a buffer to allow scope for churn and offer a range and choice of employment sites.

<sup>100</sup> Ove Arup & Partners Ltd (2012), *Cheshire East Employment Land Review*. Based on upper range covering 2009-2030. This includes a 30% flexibility factor, which acts as a buffer to ensure that future land supply is flexible enough to provide a range and choice of land to meet demand and in case there are issues such as sites no longer being delivered.

<sup>101</sup> Cheshire and Warrington Local Enterprise Partnership (2017), *Strategic Economic Plan: Cheshire and Warrington Matters*. Available online at: [https://www.warrington.gov.uk/sites/default/files/2019-10/appendix\\_10\\_-\\_cheshire\\_and\\_warrington\\_strategic\\_economic\\_plan\\_-\\_extract.pdf](https://www.warrington.gov.uk/sites/default/files/2019-10/appendix_10_-_cheshire_and_warrington_strategic_economic_plan_-_extract.pdf).

<sup>102</sup> Vacant space is based on marketed space identified from Estates Gazette data (EGi) (February 2021).

<sup>103</sup> Based on marketed space identified from Estates Gazette data (EGi) (February 2021).



## Future baseline

### Construction (2025)

12.3.10 Volume 5: Appendix CT-004-00000 provides details of the developments in the Wimboldsley to Lostock Gralam area that are assumed to have been implemented by 2025. The following committed developments of relevance to socio-economics that would materially alter the future baseline during construction of the Proposed Scheme in this area, are set out in Table 39.

**Table 39: Committed developments of relevance to socio-economics during construction**

Map book reference <sup>104</sup>	Planning reference	Description	How this is considered in the assessment
MA02/213	17/5116C	Location: Plot 1A, Ma6nitide 160, Midpoint 18, Pochin Way, Middlewich. Erection of two employment buildings (Use Classes B2 and B8) including a security gatehouse, vehicle access off Pochin Way and ERF Way and associated car parking, trailer parking and landscaping.	Informing future baseline.
MA02/226	17/02295/FUL	Location: Unit 3, Road Three, Winsford, Cheshire, CW7 3PD. Redevelopment of the site to provide a new industrial production warehouse facility with associated offices, associated parking, landscaping, service yard and external cycle and bins storage areas with the demolition of existing buildings on site.	Informing future baseline.
MA02/247	18/04407/FUL	Location: Road One, Winsford, CW7 3QF. Demolition of existing structures and the erection of flexible B2/B8 Use Class employment units (including ancillary trade counters and offices), vehicles and pedestrian access, parking, landscaping and associated works.	Informing future baseline.
MA02/277	17/01434/FUL	Location: 411 Manchester Road, Lostock Gralam, Northwich, Cheshire, CW9 7PJ. 16 no. residential units comprising eight no. four person two bedroom terraced dwellings, four no. seven person dwellings and four no. three person two bedroom maisonette apartments.	Informing future baseline.

<sup>104</sup> Volume 5: Planning Data/Committed Development Map Book: Maps CT-13-304b to CT-13-309a.

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Map book reference <sup>104</sup>	Planning reference	Description	How this is considered in the assessment
MA02/338	18/01850/FUL	Location: Land Junction, Bostock Road, Road One, Winsford, Cheshire.  Hybrid planning application comprising: Full planning application for the creation of new access and associated highway and landscaping enabling works to allow for expansion of employment sites and Outline planning application for the development of Class B1, B2, B8 employment/distribution units with complementary commercial uses including retail, food and drink, petrol filling station and hotel (Use Classes A1, A3, A4, A5, C1 and sui generis).	Informing future baseline.
MA02/339	18/01534/FUL	Location: Minsups Limited Factory, Road One, Winsford, CW7 3RG.  Partial demolition, full refurbishment of external faced and extension of existing factory building forming three industrial units of B1/B2/B8 use classes with ancillary Trade counter use, with associated parking, service yard and landscaping. Full demolition of existing office building is required for service yard and parking provision.	Informing future baseline.
MA02/341	19/00652/REM	Location: Land Off Holmes Chapel Road, Sproston, Crewe, CW10 0JB.  Approval of reserved matters for the appearance, landscaping, layout and scale pursuant to part full/part outline planning permission ref 13/03828/FUL for light industrial, manufacturing and distribution (use class B2/B8), business and office (use class B1), cafe / restaurant (use class A3 / A5), farm shop (use class A1), garden centre (use class A1), veterinary practice (use class D1) and box park (use class A1) with associated car parking, servicing and infrastructure.	Informing future baseline.
MA02/353	19/04199/FUL	Location: 20 Road One, Winsford, CW7 3RD.  Extension to existing factory unit, removal of four silos and erection of nine silos.	Informing future baseline.

12.3.11 Implementation of the committed developments MA02/213, MA02/226, MA02/247, MA02/277, MA02/338, MA02/339, MA02/341 and MA02/353 could result in approximately 3,400 additional net jobs, altering the future baseline against which the Proposed Scheme is assessed. As such, these committed developments have been included as part of the future baseline and considered within this assessment.

12.3.12 The existing composition and numbers of employers, employees and economic sectors in the area is likely to change over time in ways that cannot be accurately forecast.

## Operation (2038)

12.3.13 Volume 5: Appendix CT-004-00000 also provides details of the developments in the Wimboldsley to Lostock Gralam area that are assumed to have been implemented by 2038.

No additional committed developments of relevance for socio-economics have been identified that would materially alter the future baseline in this area.

## 12.4 Effects arising during construction

### Avoidance and mitigation measures

12.4.1 The draft Code of Construction Practice (CoCP)<sup>105</sup> includes a range of provisions that will help mitigate socio-economic effects associated with construction within this area, including:

- reducing nuisance through the 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);
- monitoring and managing flood risk and other extreme weather events that may affect socio-economic resources during construction (Section 16);
- 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

#### Temporary effects

##### Businesses

12.4.2 Businesses directly affected, 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 may be clustered together.

12.4.3 Overall, one resource in the study area will experience temporary direct impacts as a result of the Proposed Scheme. The resource comprises moorings based at Park Farm.

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<sup>105</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

- 12.4.4 It is estimated that fewer than 10 jobs<sup>106</sup> are provided by the businesses affected. Businesses with an interest in land, either being acquired or possessed by the Proposed Scheme, that can demonstrate a loss of profit will be compensated in accordance with the Compensation Code.
- 12.4.5 The construction of the Proposed Scheme offers considerable opportunities to businesses and residents along the line of route in terms of supplying goods and services and obtaining employment. HS2 Ltd is committed to working with its suppliers to build a skilled workforce that promotes further economic growth across the UK.

### **In-combination effects**

- 12.4.6 Businesses within the Wimboldsley to Lostock Gralam area may experience a number of effects as a result of the construction of the Proposed Scheme, for example, air quality, landscape and visual, noise and vibration or construction traffic impacts. Taken in-combination, these multiple residual effects could amount to a significant change in the ambiance at these businesses leading to a possible loss of trade for the following affected business Durations of in-combination effects have been identified in this section where information on the duration of contributing effects is provided in the relevant source assessments. The assessment of in-combination effects draws upon: Section 5, Air quality; Section 11, Landscape and visual; Section 13, Sound, noise and vibration; and Section 14, Traffic and transport.
- 12.4.7 The Holford Hall Estate Wedding Venue, located east of Lostock Gralam, will experience significant noise effects (for one year and two months) and effects from heavy goods vehicle construction traffic (traffic-related severance for non-motorised users) as a result of construction of the Proposed Scheme. The sensitivity of this establishment is assessed to be high, as customers and staff may be sensitive to impacts on the local environment and setting. The construction works may discourage them from using this facility. Given the duration of effects and the high level of sensitivity, the Proposed Scheme is assessed to have an adverse significant in-combination effect on this business.

### **Isolation**

- 12.4.8 No non-agricultural businesses have been identified within the Wimboldsley to Lostock Gralam area that are expected to experience significant isolation effects as a result of the Proposed Scheme.

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<sup>106</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.

## Construction employment

- 12.4.9 There will be four borrow pit compounds, and 19 civil engineering satellite compounds in the Wimboldsley to Lostock Gralam area. Five of the satellite compounds will continue to be used as railway systems compounds following the completion of civil engineering works. In addition, there will be one further satellite compound used for railway systems works only. Up to 11,200 person years of construction employment opportunities will be created at these sites<sup>107</sup>, broadly equivalent to 1,120 full time jobs<sup>108</sup>. Depending on the skill levels required and the skills of local people, these jobs 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).
- 12.4.10 Direct construction employment could lead to opportunities for local businesses to supply the Proposed Scheme or to benefit from expenditure of construction workers. The impact of indirect construction employment creation has been considered as part of the route-wide assessment (see Volume 3, Route-wide effects).
- 12.4.11 The resulting effects on employment are reported in aggregate at a route-wide level (see Volume 3, Route-wide effects).

## Permanent effects

### Businesses

- 12.4.12 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.
- 12.4.13 Overall, three resources in the study area will experience direct impacts as a result of the Proposed Scheme. These are as follows:
- an events business at Greenheyes Farm;
  - part of the Gadbrook Distribution Centre car park, Northwich; and
  - a catering unit off the A556 Chester Road.
- 12.4.14 The resources listed above are those that are anticipated to experience job losses or displacement as a result of construction of the Proposed Scheme. Additionally, land required for the construction of the Proposed Scheme will directly impact other business resources.

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<sup>107</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>108</sup> Based on the convention that 10 employment years is equivalent to one full time equivalent job.

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These businesses are not listed above, as the effect upon them is not expected to result in job losses or displacement.

- 12.4.15 One of the resources is subject to potentially significant effects on business activities and employment. This resource is listed in Table 40.

**Table 40: Resources which will potentially experience significant direct effects**

Resource	Description of business activity
Gadbrook Distribution Centre	Distribution to regional supermarkets

- 12.4.16 The magnitude of impact focuses on the number of jobs that will be affected by the Proposed Scheme, either through displacement or possible job loss. It also considers the implications of this impact in relation to the scale of economic activity and opportunity in the area.
- 12.4.17 The following factors were taken into account when considering the sensitivity of resources:
- availability of alternative, suitable premises;
  - size of the local labour market;
  - skill levels and qualifications of local people; and
  - levels of unemployment.
- 12.4.18 Taking account of the sensitivity of the resource and the magnitude of impact, the significance of the resultant effects is set out in Table 41.

**Table 41: Significance of effects**

Resource	Impact magnitude	Sensitivity	Significance of effect
Gadbrook Distribution Centre	High	Medium	Major adverse - significant

- 12.4.19 The construction of the Proposed Scheme will require the acquisition of land and buildings. An overview of the resource expected to be significantly affected has been included below.
- 12.4.20 The construction of Gad Brook viaduct will require use of approximately 29% of the staff car parking spaces (approximately 210 spaces) at the Gadbrook Distribution Centre for two years and three months, with 6% of the staff car parking spaces (approximately 43 spaces) also required permanently. The operations of the business at this location could be affected by this loss. While it is expected that the lost car parking spaces can be accommodated on site or nearby, a precautionary worst-case scenario has been assumed in the absence of information as to whether the Gadbrook Distribution Centre can operate with reduced car parking spaces or can reconfigure. The sensitivity of the resource is assessed as medium given its strategic location next to the A556 Shurlach Road and that relocation is unlikely given the size and cost of the current infrastructure. The magnitude is high based on the number of jobs located at the site. The effect is assessed to be major adverse and will therefore be significant.
- 12.4.21 In the absence of further information on whether the Gadbrook Distribution Centre can operate at this site with the loss of car parking spaces, it is estimated as a worst-case



scenario that 1,700 jobs<sup>109</sup> will either be displaced or possibly lost within the Wimboldsley to Lostock Gralam area. The impact from the relocation or loss of jobs is considered to be modest in the context of the total number of people employed in the CWCC and CEC areas (approximately 173,000 and 203,000 jobs respectively) and the scale of economic activity and opportunity in the area. HS2 are in continued dialogue with the Gadbrook Distribution Centre as to what mitigation measures can be implemented to avoid this worse case job loss.

- 12.4.22 There is also a reasonable probability that the other two businesses that are directly affected will be able to relocate to places that will still be accessible to residents within the local area 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.

## Isolation

- 12.4.23 Businesses within the Wimboldsley to Lostock Gralam area may experience significant isolation effects as a result of the operation of the Proposed Scheme. As a consequence, this could lead to a loss of trade for the affected businesses.
- 12.4.24 Construction works for the realignment of the A530 Nantwich Road and permanent closure of the existing A530 Nantwich Road where it crosses the Proposed Scheme will mean that The Verdin Arms public house will no longer be on a major road. The ability of The Verdin Arms public house to generate income may be impaired by a loss of passing trade, especially due to a reasonable availability of alternative public houses including on the A530 Nantwich Road, in Crewe and Middlewich. For the reasons stated above, the disruption as a result of the Proposed Scheme is considered to represent a moderate adverse significant isolation effect. The effect on this resource begins part way through the construction phase and continues permanently.

## Other mitigation measures

- 12.4.25 Businesses displaced by the Proposed Scheme will 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 will, therefore, offer additional support over and above statutory requirements to facilitate this process<sup>110,111</sup>. Businesses with an interest in land that is either being acquired or possessed

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<sup>109</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.

<sup>110</sup> High Speed Two Ltd (2022), *Phase 2b Western Leg Information Paper C7: Business relocation*.

<sup>111</sup> High Speed Two Ltd (2022), *Phase 2b Western Leg Information Paper C8: Compensation code for compulsory purchase*.

temporarily may also be eligible for compensation in accordance with the Compensation Code.

- 12.4.26 The construction of the Proposed Scheme offers considerable opportunities to businesses and residents along the line of route in terms of supplying goods and services and obtaining employment. HS2 Ltd is committed to working with its suppliers to build a skilled workforce that promotes further economic growth across the UK.
- 12.4.27 The nominated undertaker will seek to deliver appropriate signage to inform users of the operation of the Verdin Arms public house, subject to securing all relevant consents.

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

- 12.4.28 Likely significant residual effects are shown in Volume 5, Socio-economics Map Book: Maps SE-01-304b to SE-01-309a. Land required for construction of the Proposed Scheme will include part of the staff car parking at the Gadbrook Distribution Centre, which, assuming a precautionary approach, will result in an adverse residual significant effect.
- 12.4.29 During construction of the Proposed Scheme, customers may be discouraged from using the Holford Hall Estate Wedding Venue, east of Lostock Gralam, that is expected to be affected by construction works associated with the Proposed Scheme. This results in an adverse residual significant in-combination effect on this resource.
- 12.4.30 During construction and continuing into operation of the Proposed Scheme, The Verdin Arms public house in Minshull Vernon will experience a permanent adverse residual significant isolation effect as it is likely to experience less exposure and trade from passing travellers.

## **Cumulative effects**

- 12.4.31 No significant cumulative temporary or permanent effects during construction have been identified.

## **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.

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

- 12.5.2 No resources are expected to experience significant direct socio-economic, in-combination or isolation effects during the operation of the Proposed Scheme.

## **Operational employment**

- 12.5.3 Operational employment will be created at locations along the route including stations, train crew facilities and infrastructure/maintenance depots. Within the Wimboldsley to Lostock Gralam area, there will be Crewe North rolling stock depot north-east of Walley's Green, creating 350 HS2 related jobs. These employment opportunities will be accessible to residents in the locality.
- 12.5.4 Direct operational employment created by the Proposed Scheme could also lead to indirect employment opportunities for local businesses in terms of supplying the project or benefiting from expenditure of directly employed workers on goods and services.
- 12.5.5 Some of these employment opportunities will be accessible to residents in the locality and, given the transport accessibility within the local area, to residents living further afield.
- 12.5.6 The impact of operational employment creation has been assessed as part of the route-wide assessment (see Volume 3).

## **Other mitigation measures**

- 12.5.7 The assessment has concluded that operational effects within the area will be either negligible or beneficial and therefore mitigation is not required.

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

- 12.5.8 There are no significant effects arising during operation.

## **Cumulative effects**

- 12.5.9 No significant cumulative effects on socio-economic receptors have been identified in the Wimboldsley to Lostock Gralam area during operation.

## **Monitoring**

- 12.5.10 Volume 1, Section 9 sets out the general approach to environmental monitoring during operation of the Proposed Scheme.
- 12.5.11 On the basis of there being no significant residual operational effects, there are no area-specific requirements for monitoring socio-economic effects during the operation of the Proposed Scheme in the Wimboldsley to Lostock Gralam area.

## 13 Sound, noise and vibration

### 13.1 Introduction

- 13.1.1 This section reports the assessment of the noise and vibration likely significant effects arising from the construction and operation of the Proposed Scheme within the Wimboldsley to Lostock Gralam 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; and
  - ‘non-residential receptors’ such as:
    - community facilities including schools, hospitals, places of worship and ‘quiet areas’; and
    - commercial properties such as hotels.
- 13.1.2 ‘Shared community open areas’ are amenity spaces that the Planning Practice Guidance<sup>112</sup> 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.
- 13.1.3 Non-residential receptors with multiple uses were assessed either based on the most noise sensitive use or were subject to multiple assessments as appropriate.
- 13.1.4 Quiet areas are defined in the EIA Scope and Methodology Report (SMR)<sup>113</sup> as:
- areas designated under Local Plans as being prized for their tranquillity;
  - areas designated under Local Plans or Neighbourhood Development Plans as Local Green Spaces; and
  - areas identified as Quiet Areas through implementation of the Environmental Noise Regulations<sup>114,115</sup>.

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<sup>112</sup> Ministry of Housing, Communities and Local Government (2019), *National Planning Practice Guidance – Noise*. Available online at: <https://www.gov.uk/guidance/noise--2>.

<sup>113</sup> Volume 5: Appendix CT-001-00001, *Environmental Impact Assessment Scope and Methodology Report*.

<sup>114</sup> *The Environmental Noise (England) Regulations 2006 (SI 2006/2238)*. London, Her Majesty’s Stationary Office. Available online at: <https://www.legislation.gov.uk/uksi/2006/2238>.

<sup>115</sup> *Environmental Noise (England) (Amendment) Regulations 2009 (SI 2009/1610)*. London, Her Majesty’s Stationary Office. Available online at: <https://www.legislation.gov.uk/uksi/2009/1610>.

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- 13.1.5 The methodology for the assessment of likely significant noise and vibration effects was developed in line with Government noise policy<sup>116</sup>, planning policy, planning practice guidance on noise<sup>112</sup> and EIA Regulations as described in the SMR.
- 13.1.6 Engagement has been undertaken with Cheshire East Council (CEC) and Cheshire West and Chester Council (CWCC) with respect to the sound, noise and vibration assessment. The purpose of this engagement has been twofold. Firstly, engagement has been undertaken on a route-wide basis covering matters including process, scope, method, approach to baseline and mitigation strategy. Secondly, local engagement has been undertaken to obtain relevant information regarding residential and non-residential receptors, existing baseline sound levels and to discuss the development of the mitigation to be included in the Proposed Scheme. Officers from local authorities have been invited to attend and witness baseline sound measurements. Where appropriate, relevant information identified by the authorities has been taken into account in the assessment.
- 13.1.7 More detailed information regarding the sound, noise and vibration assessment for the Wimboldsley to Lostock Gralam area is available in the relevant appendices in Volume 5:
- Sound, noise and vibration, route-wide assumptions and methodology (Appendix SV-001-00000);
  - Sound, noise and vibration baseline and construction assessment (Appendix SV-002-0MA02); and
  - Sound, noise and vibration operation assessment (Appendix SV-003-0MA02).
- 13.1.8 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: MA02 Map Book. Mapping to support the sound, noise and vibration assessment is presented in Map Series SV-05 (Volume 2: MA02 Map Book) and Map Series SV-02, SV-03, SV-08 and SV-09 (Volume 5, Sound, noise and vibration Map Book).
- 13.1.9 The assessment of likely significant effects from noise and vibration on agricultural, community, ecological, health, heritage and socio-economic receptors and the assessment of tranquillity are presented in Section 4, Agriculture, forestry and soils; Section 6, Community; Section 7, Ecology and biodiversity; Section 8, Health; Section 9, Historic environment; Section 12, Socioeconomic and; Section 11, Landscape and visual of this report respectively. The Proposed Scheme is described in Section 2.

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<sup>116</sup> Department for Environment, Food and Rural Affairs (2010), *Noise Policy Statement for England*.

Available online at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69533/pb13750-noise-policy.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69533/pb13750-noise-policy.pdf).

## 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.
- 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 It is likely that the majority of receptors adjacent to the Proposed Scheme in the Wimboldsley to Lostock Gralam area are not currently subject to appreciable vibration<sup>117</sup>. The predicted vibration levels at all receptors as a result of the Proposed Scheme has, therefore, been assessed using specific absolute thresholds, below which receptors will not be affected by vibration, rather than vibration change criteria. Further information is provided in Volume 1 (Section 8).

## 13.3 Environmental baseline

### Existing baseline

- 13.3.1 The Wimboldsley to Lostock Gralam area is characterised by a mix of small towns, villages, hamlets and isolated residential properties in a predominantly semi-rural setting, although there are also some urban environments in the larger settlements of Northwich, Winsford and Middlewich. The sound environment is generally dominated by local and distant road traffic, with trains, aircraft flying to/from Manchester Airport, local neighbourhood sources, natural and agricultural sounds also contributing.
- 13.3.2 There are several main roads that contribute to the sound environment near to the route of the Proposed Scheme within the Wimboldsley to Lostock Gralam area, including: the A530 Nantwich Road that runs through Wimboldsley, Middlewich and Rudheath; the A54 Middlewich Road that runs through Winsford and Middlewich; the A533 Northwich Road/Bostock Road that runs through Middlewich, Bostock, Moulton, Davenham and Northwich; the A556 Chester Road/Shurlach Road that runs through Davenham, Northwich,

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<sup>117</sup> Further information is available in the Volume 5: Appendix SV-001-00000, Sound, noise and vibration. Methodology, assumptions and assessment report and the Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.



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Rudheath and Lostock Gralam; the A559 Manchester Road that runs through Northwich, Lostock Gralam, Wincham and Marston; and the M6 that runs east of Byley.

- 13.3.3 There are also a number of railways contributing to the sound environment in the Wimboldsley to Lostock Gralam area, including the West Coast Main Line (WCML) running in a south-north direction, the Sandbach to Northwich Line and the Mid-Cheshire Line.
- 13.3.4 Sound levels close to these main transportation routes are high during the daytime and are generally lower during the night-time. Sound levels decrease with increasing distance from the main transportation routes. Manchester Airport restricts the operations permitted during the night-time so that the aircraft noise levels are lower than during the daytime.
- 13.3.5 Further information on the existing baseline, including baseline sound levels and baseline monitoring results, is provided for the Wimboldsley to Lostock Gralam area in Volume 5: Appendix SV-002-0MA02.

## Future baseline

- 13.3.6 Without the Proposed Scheme, existing sound levels in this area are likely to increase slowly over time. This is primarily due to road traffic growth, which may be as a result of local or national trends or due to specific committed developments. Changes in car technology may offset some of the expected sound level increases due to traffic growth on low speed roads. On higher speed roads, tyre sound dominates and hence the expected growth in traffic is likely to continue to increase ambient sound levels.
- 13.3.7 The future operational baseline takes account of proposed and likely noise reduction provided in Important Areas identified in Defra's Noise Action Plans for agglomerations<sup>118</sup> roads<sup>119</sup> or railways<sup>120</sup>. Following engagement with Highways England, trunk roads, likely to be resurfaced under future routine maintenance programmes, before the opening of the Proposed Scheme, are assumed to have a low noise surface. Airborne noise levels from railways in Important Areas are assumed to be controlled to the level, where necessary, where there is no Noise Action Plan requirement to investigate further mitigation. Map Series SV-05 (Volume 2: MA02 Map Book) shows any noise Important Areas in the

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<sup>118</sup> Department for Environment, Food and Rural Affairs (2019), *Noise Action Plan: Agglomerations (Urban Areas)*. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/813663/noise-action-plan-2019-agglomerations.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/813663/noise-action-plan-2019-agglomerations.pdf).

<sup>119</sup> Department for Environment, Food and Rural Affairs (2019), *Noise Action Plan: Roads (including major roads)*. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/813666/noise-action-plan-2019-roads.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/813666/noise-action-plan-2019-roads.pdf).

<sup>120</sup> Department for Environment, Food and Rural Affairs (2019), *Noise Action Plan: Railways (including major railways)*. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/813664/noise-action-plan-2019-railways.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/813664/noise-action-plan-2019-railways.pdf).

Wimboldsley to Lostock Gralam area. Further information is reported for the Wimboldsley to Lostock Gralam area in Volume 5: Appendix SV-002-0MA02.

- 13.3.8 Committed developments involving sound or vibration sensitive uses within the relevant study area have been included within the assessment and are reported for the Wimboldsley to Lostock Gralam area in Volume 5: Appendix SV-002-0MA02<sup>121</sup>.

## **Construction (2025)**

- 13.3.9 The assessment of noise from construction activities assumes a future construction baseline year of 2025, which represents the period immediately prior to the start of the construction period. As a reasonable worst case, it has been assumed that no change in baseline sound levels will occur between the existing baseline year of 2018 and the future construction baseline year.

## **Operation (2038)**

- 13.3.10 The operational assessment is based upon the absolute sound level and/or predicted change in sound levels that will result from operation of the Proposed Scheme. The future operational baseline is the sound environment that would exist in 2038 without the Proposed Scheme. This is presented in Table 1 in Volume 5: Appendix SV-002-0MA02.

# **13.4 Effects arising during construction**

## **Assumptions and limitations**

### **Local assumptions**

- 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 CoCP<sup>122</sup>.
- 13.4.2 It is assumed that Crewe tunnel support activities, including transport of excavated material via spoil conveyor and material movement at conveyor off-loading sites, will be undertaken during the evening and night-time for reasons of safety, engineering practicability or to reduce the impact on existing transport.
- 13.4.3 Piling and vibratory compaction is likely to result in short-term appreciable ground-borne vibration at a small number of dwellings, situated very close to these activities. These receptors will also be exposed to appreciable noise from the construction of the Proposed Scheme. The significance of the identified vibration effects has been assessed in

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<sup>121</sup> Volume 5: Appendix CT-004-00000 provides details of all of the developments assumed to be implemented.

<sup>122</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

combination with the airborne noise effects also identified at these receptors. The assessment is presented in Volume 5: Appendix SV-002-0MA02.

- 13.4.4 Track laying, power system and signalling installation works are unlikely to result in significant construction noise effects, given the short duration close to any communities, and where included in the Proposed Scheme, the presence of the permanent noise fence barriers.

## 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:
- 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 (including local businesses and quiet areas designated by the local authority);
  - 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 2.4m high 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 will 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 will undertake and report such monitoring as is necessary to assure and demonstrate compliance with all noise and vibration commitments. Monitoring data will be provided regularly to, and be reviewed by, the nominated undertaker and made available to the local authorities; and
  - contractors will be required to comply with the terms of the CoCP and appropriate action will be taken by the nominated undertaker as required to ensure compliance.
- 13.4.6 In addition to this mitigation, to avoid or reduce likely community significant effects, taller screening (provided by solid temporary hoarding, temporary stockpiles, screening close to activities or other means to provide equivalent noise reductions) as described in the draft

CoCP, has been assumed at the following construction compounds or land required for construction of the Proposed Scheme:

- the northern boundary of MA02 Borrow Pit A at Wimboldsley near dwellings on the A530 Nantwich Road;
- Gad Brook viaduct near Pear Tree Farm Cottages, Davenham Road; and
- highway diversion works at Birches Lane near dwellings on Birches Lane, Lostock Green.

- 13.4.7 Noise insulation will be offered for qualifying buildings as defined in the draft CoCP. Noise insulation or, where appropriate, temporary re-housing will avoid residents being significantly affected by levels of construction noise inside their dwellings. The assessment reported in this section provides an estimate of the buildings that are likely to qualify for noise insulation. None are predicted to qualify for temporary rehousing.
- 13.4.8 Qualification for noise insulation and, where appropriate, temporary re-housing will be confirmed, as part of seeking prior consent from the local authority under Section 61 of the CoPA. Qualifying buildings will be identified, as required in the draft CoCP, so that noise insulation can be installed, or where appropriate any temporary re-housing provided, before the start of the works predicted to exceed noise insulation or temporary re-housing criteria.

## Assessment of impacts and effects

### Residential receptors: direct effects – individual dwellings

- 13.4.9 Taking account of the avoidance and mitigation measures set out in the previous paragraphs, the following 17 residential properties are forecast to experience noise above the eligibility criteria for noise insulation, but below the eligibility criteria for temporary rehousing, as defined in the HS2 noise insulation and temporary rehousing policy<sup>123</sup>. The locations of these dwellings are indicated on Map Series SV-03 (Volume 5, Sound, noise and vibration Map Book):
- the dwelling at Verdin Arms, Nantwich Road, Minshull Vernon (assessment location ref.: 610165);
  - Manor Cottage, Wimboldsley, Middlewich (assessment location ref.: 610171);
  - Rose Cottage, Wimboldsley, Middlewich (assessment location ref.: 610173);
  - Clive Bridge Cottage and Yew Tree Cottage, Clive Green Lane, Winsford (assessment location ref.: 610199);
  - Chapel End Cottage, Clive Green Lane, Winsford (assessment location ref.: 610204);
  - 214 and 216 Middlewich Road, Clive Green, Winsford, (assessment location ref.: 610222);

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<sup>123</sup> Further information is provided in High Speed Two Ltd (2022), *Phase 2b Western Leg Information Paper E13: Control of construction noise and vibration*.

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- Bridge Cottage, Canal Cottage and The Barn, Whatcroft Hall Lane, Whatcroft (assessment location ref.: 610258);
- Honeysuckle Cottage, Bellsmithy, and The Croft, Wimboldsley, Nantwich (assessment location ref.: 610746); and
- 12, 14 and 16 Birches Lane, Lostock Green (assessment location ref.: 613207).

13.4.10 For daytime construction, the threshold for eligibility for noise insulation is 75dB measured outdoors as specified in the draft CoCP.

13.4.11 The mitigation measures, including noise insulation for the 17 residential properties, will reduce noise inside all dwellings such that it does not reach a level where it will significantly affect residents.

## Residential receptors: direct effects – communities

13.4.12 The avoidance and mitigation measures to be implemented during construction will reduce airborne construction noise adverse effects on receptors and communities. Residual temporary noise or vibration effects are identified later in this section.

13.4.13 In locations with lower existing sound levels<sup>124</sup>, construction noise effects are likely to be caused by changes to noise levels outside dwellings relative to existing sound levels. These may be considered by the local community as an effect on the acoustic character of the area and hence be perceived as a change in the quality of life for that community. These effects are considered to be significant when assessed on a community basis taking account of the local context.

**Table 42: Direct adverse construction effects on residential communities and shared open areas that are considered to be significant on a community basis**

Significant effect number (and map reference) <sup>125</sup>	Type of significant effect	Time of day	Location	Cause (construction activities) <sup>126</sup>	Assumed approximate duration of impact
MA02-C-C1 (SV-03-305)	Construction noise and vibration	Daytime	Clive Green: Approximately 20 dwellings in the vicinity of Clive Green Lane and Clive Back Lane.	Highway works and earthworks. The typical and highest monthly noise levels are approximately 60dB to 75dB and 70dB to 85dB <sup>127</sup> . Vibratory rollers associated with embankment and finishing works are predicted to cause a moderate	Noise for up to one year and three months. Vibration for up to five months.

<sup>124</sup> Further information is presented in Volume 5: Appendix SV-001-00000.

<sup>125</sup> See Volume 5: Appendix SV-002-0MA02 MA02 Sound, noise and vibration report and Volume 5 map book SV-03.

<sup>126</sup> The construction activity giving rise to the highest predicted noise or vibration level is reported. Multiple construction activities may contribute to the typical noise levels and the approximate duration of impact.

<sup>127</sup> Equivalent continuous sound level at the facade, L<sub>pAeq, 0700-1900</sub>.

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Significant effect number (and map reference) <sup>125</sup>	Type of significant effect	Time of day	Location	Cause (construction activities) <sup>126</sup>	Assumed approximate duration of impact
				vibration impact at properties closest to highway works associated with Clive Green Lane overbridge <sup>128</sup> .	
MA02-C-C2 (SV-03-307)	Construction noise	Daytime	Pear Tree Farm Cottages: Approximately 10 dwellings in the vicinity of Davenham Road.	Viaduct construction. The typical and highest monthly noise levels are approximately 60dB and 70dB <sup>127</sup>	Up to two months.
MA02-C-C3 (SV-03-308)	Construction noise	Daytime	Lostock Green: Approximately 20 dwellings in vicinity of Birches Lane.	Highway works. The typical and highest monthly noise levels are approximately 60 to 80dB and 70 to 85dB <sup>127</sup> .	Up to two months.

## Residential receptors: indirect effects

- 13.4.14 Construction traffic is likely to cause adverse noise effects on residential receptors along Darnhall School Lane, Glebe Green Drive/Durham Drive and Dover Drive/Mount Pleasant Drive, Winsford between the B5074 Swanlow Lane and Woodford Lane West. Approximately 240 dwellings located immediately adjacent to these roads are forecast to experience an increase in road traffic noise levels during the typical and peak months of around 4dB and 6dB  $L_{pAeq,0700-2300}$  respectively, due to traffic diverting away from construction routes on nearby roads. This is considered to be a likely significant effect on a community basis at the dwellings on these roads, denoted as MA02-C-C4 in Volume 5: Appendix SV-002-0MA02. This temporary adverse effect represents a change in the acoustic character of the area, which may be perceived as a change in the quality of life for that community.
- 13.4.15 Construction traffic is likely to cause adverse noise effects on residential receptors along the B5309 Centurion Way, Middlewich between the B5081 Byley Lane and the B5309 King Street. Approximately 35 dwellings located immediately adjacent to the road are forecast to experience an increase in road traffic noise levels during the peak months of around 2dB  $L_{pAeq,0700-2300}$ , due to additional construction vehicles using this route in an area currently exposed to high levels of sound. This is considered to be a likely significant effect on a community basis at the dwellings on this road, denoted as MA02-C-C5 in Volume 5: Appendix SV-002-0MA02. This temporary adverse effect represents a change in the acoustic

<sup>128</sup> Not all dwellings impacted by vibration. See Volume 5: Appendix SV-002-0MA02 MA02 Sound, noise and vibration report for further details.



character of the area, which may be perceived as a change in the quality of life for that community.

- 13.4.16 Construction traffic is likely to cause adverse noise effects on residential receptors along the B5081 Byley Road between Lily Lane and the B5082 Northwich Road. Approximately 30 dwellings located immediately adjacent to the road are forecast to experience an increase in road traffic noise levels during the typical and peak months of around 2dB and 4dB  $L_{pAeq,0700-2300}$  respectively, due to additional construction vehicles using this route in an area currently exposed to high levels of sound. This is considered to be a likely significant effect on a community basis at the dwellings on this road, denoted as MA02-C-C6 in Volume 5: Appendix SV-002-0MA02. This temporary adverse effect represents a change in the acoustic character of the area, which may be perceived as a change in the quality of life for that community.

## **Non-residential receptors: direct effects**

- 13.4.17 The assessment has identified the following non-residential receptors where the predicted airborne noise levels exceed both the relevant impact screening criteria and the noise change criterion (and typically a change of greater than 3dB<sup>129</sup> compared with the existing baseline sound level):
- Byley Primary School, Moss Lane, Byley (assessment location ref.: 610713);
  - FoxHound Recording Studio, Moss Lane, Byley (assessment location ref.: 610807);
  - Travelodge (Hotel), Wells Avenue, Lostock Gralam (assessment location ref.: 612591); and
  - Holford Hall (Wedding Venue), Chester Road, Plumley (assessment location ref.: 612600).
- 13.4.18 These locations are identified in the Wimboldsley to Lostock Gralam area, as shown in Map Series SV-03 (Volume 5, Sound, noise and vibration Map Book). At each of the non-residential receptors identified above an assessment has been undertaken to determine if this impact would result in a significant effect, using the significance criteria set out in Annex A of Volume 5: Appendix SV-001-000.
- 13.4.19 Byley Primary School is a small village school located to the east of Byley. It is located to the north of Moss Lane and is approximately 250m south of the land required for MA02 Borrow Pit D. The school is a brick building with double glazed windows. It is assumed that the building occupants will rely on opening the windows for ventilation. The school has been assessed against the criteria for schools and the outside activity areas against the external amenity criteria. The predicted daytime monthly construction noise level is above the screening criteria defined in the SMR for educational use<sup>130</sup> for a period of two months. The highest predicted daytime monthly construction noise level at the school building is 1dB

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<sup>129</sup> The exception is where the use and sensitivity of the receptor or land use is very sensitive to noise and have been included in the detailed assessment where there is a change less than 3dB. Further information can be found in Volume 5, Appendix SV-002-0MA02.

<sup>130</sup> 50dB  $L_{pAeq,0700-2300}$  (free-field) during the day, which is equivalent to 53dB  $L_{pAeq,0700-2300}$  (façade).

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above the screening criteria defined in the SMR. The predicted typical monthly daytime construction noise level is below the screening criteria defined in the SMR. The highest and typical predicted daytime monthly construction noise levels within outdoor activity areas are below the criteria defined in the SMR for external amenity space<sup>131</sup>. Given the small exceedance of the screening criteria for a short duration, a likely significant effect is not identified at Byley Primary School.

- 13.4.20 FoxHound Recording Studio comprises a music recording studio and live room located within an industrial unit on an industrial estate east of Byley. It is located to the north of Moss Lane and is approximately 150m to the south of the land required for MA02 Borrow Pit D. FoxHound Recording Studio is a traditional industrial clad building containing the recording studio and associated spaces. It is assumed that the studio and live room will have no external windows located on the northern façade of the building. This is considered reasonable as external windows would be rare in noise sensitive rooms within studio spaces. The recording studio has been assessed against the criteria for sound recording and broadcast studio use. The predicted daytime monthly construction noise level is above the screening criteria defined in the SMR for sound recording and broadcast studio use<sup>132</sup> for a period of two months. The highest predicted daytime monthly construction noise level is 2dB above the screening criteria defined in the SMR. The predicted typical monthly daytime construction noise level is below the screening criteria defined in the SMR. Given the small exceedance of the screening criteria for a short duration and that recording and performance spaces are likely to be acoustically isolated within the building to prevent noise ingress from industrial activities taking place within other nearby units on the industrial estate, a likely significant effect is not identified at FoxHound Recording Studios.
- 13.4.21 The Travelodge hotel is a modern hotel building located on Wells Avenue in Lostock Gralam. The hotel is located 50m to the west of the A556 Shurlach Road and the land required for the construction of the Proposed Scheme. The brick building is two storeys high and has double-glazed windows that appear to be openable. The hotel overlooks the A556 Shurlach Road and internal noise levels due to the ingress of road traffic noise are not likely to be acceptable if opening windows were the primary means of ventilation. It is assumed, therefore, that the hotel has alternative means of ventilation to openable windows. The building has one facade that faces the Proposed Scheme, which has only a small proportion of the hotel's windows. The buildings have been assessed against the criteria for hotel use. The typical and highest predicted daytime monthly construction noise levels at these buildings are 13dB and 19dB respectively above the screening criteria defined in the SMR for this use<sup>133</sup> for a period of up to two months. As the local road noise levels are high, the predicted noise change during the month with the highest level is 4dB. Furthermore, the highway works that are predicted to generate the highest noise levels are not likely to be close to the building for the full two months. Given the small increase in baseline noise levels

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<sup>131</sup> 55dB L<sub>pAeq,0700-2300</sub> (free-field) during the day, which is equivalent to 58dB L<sub>pAeq,0700-2300</sub> (façade).

<sup>132</sup> 50dB L<sub>pAeq,0700-2300</sub> (free-field) during the day, which is equivalent to 53dB L<sub>pAeq,0700-2300</sub> (façade).

<sup>133</sup> 50dB L<sub>pAeq,2300-0700</sub> (free-field) during the day, which is equivalent to 53dB L<sub>pAeq,2300-0700</sub> (façade).

for a short duration and that most bedrooms are not likely to be affected, a likely significant effect is not identified at the Travelodge hotel.

- 13.4.22 Holford Hall is a wedding venue located off the A556 Chester Road in Plumley. It is located approximately 500m from the land required for the construction of the Proposed Scheme at Smoker Brook Viaduct south satellite compound. The use of the hall has been assessed against the criteria for places of meeting for religious worship. The predicted daytime monthly construction noise level is above the screening criteria defined in the SMR for this use<sup>134</sup> for a period of up to one year and two months. The highest predicted daytime monthly construction noise level at the building is 3dB above the screening criteria defined in the SMR. The venue is a two-storey timber-framed building with single-glazed openable windows. The eastern facades of the venue face the Proposed Scheme. Holford Hall is identified, on the basis of a precautionary assessment, as being subject to a likely significant adverse effect (denoted by MA02-C-N1 in Table 6 Volume 5: Appendix SV-002-0MA02). This temporary adverse effect from construction site noise may take the form of activity disturbance to users of the wedding venue.

## **Non-residential receptors: indirect effects**

- 13.4.23 Construction traffic is likely to cause an adverse noise effect on Lorien House, a building located adjacent to Darnhall School Lane used as a meeting space for a charity (Men in Sheds). Increases in road traffic noise levels during the typical and peak months of around 4dB and 6dB  $L_{pAeq,0700-2300}$  respectively, due to traffic diverting away from construction routes on nearby roads, are predicted. A likely significant effect, denoted as MA02-C-N2 as presented in Volume 5: Appendix SV-002-0MA02, has been identified at Lorien House. This temporary adverse effect may take the form of activity disturbance to people visiting or working at the facility.
- 13.4.24 Construction traffic is likely to cause an adverse noise effect on Darnhall Primary School (Early Years Department) which is located adjacent to Darnhall School Lane. Increases in road traffic noise levels during the typical and peak months of around 4dB and 6dB  $L_{pAeq,0700-2300}$  respectively, due to traffic diverting away from construction routes on nearby roads, are predicted. A likely significant effect, denoted as MA02-C-N3 as presented in Volume 5: Appendix SV-002-0MA02, has been identified at Darnhall Primary School (Early Years Department). This temporary adverse effect may take the form of activity disturbance to students and people visiting or working at the school.

## **Other mitigation measures**

- 13.4.25 No other mitigation measures are proposed in this area.

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<sup>134</sup> 50dB  $L_{pAeq,0700-2300}$  (free-field) during the day, which is equivalent to 53dB  $L_{pAeq,0700-2300}$  (façade).

## Summary of likely residual significant effects

- 13.4.26 The proposed avoidance and mitigation measures will reduce construction noise inside all individual dwellings from the construction activities such that residents will not be significantly affected<sup>135</sup>.
- 13.4.27 The measures will also reduce the construction noise and vibration effects on the acoustic character in the majority of residential communities. Despite these measures the noise and vibration effects on the acoustic character in the following residential community areas are considered likely to be significant:
- Clive Green;
  - Pear Tree Farm Cottages (noise only); and
  - Lostock Green (noise only).
- 13.4.28 Construction traffic is likely to cause significant noise effects on adjacent residential properties on:
- Darnhall School Lane, Glebe Green Drive and Mount Pleasant Drive between the B5074 Swanlow Lane and Woodford Lane West;
  - B5309 Centurion Way between the B5081 Byley Lane and the B5309 King Street; and
  - B5081 Byley Road between Lily Lane and the B5082 Northwich Road.
- 13.4.29 Noise from specific construction activities has been identified as resulting in significant residual temporary effects on the non-residential buildings at Holford Hall on the A556 Chester Road, Plumley.
- 13.4.30 Construction traffic is likely to cause significant noise effects on the following non-residential properties:
- Lorien House on Darnhall School Lane; and
  - Darnhall Primary School (Early Years Department) on Darnhall School Lane.
- 13.4.31 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 receptors, their use and the benefit of the measures.

## Cumulative effects

- 13.4.32 This assessment has considered the potential cumulative construction noise effects of the Proposed Scheme and other committed developments<sup>136</sup>. It is not anticipated that there will be any significant cumulative noise effects during construction of the Proposed Scheme.

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<sup>135</sup> Refer to Volume 5: Appendix SV-001-00000.

<sup>136</sup> Refer to Volume 5: Appendix CT-004-00000, Planning data.

## 13.5 Effects arising from operation

### Assumptions and limitations

#### Local assumptions

- 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 the Proposed Scheme is described in Volume 1 (Section 4) and is outlined below for the Wimboldsley to Lostock Gralam area.
- 13.5.2 For the purpose of the operation sound, noise and vibration assessment it is assumed that passenger services in this area will start at around 05:00. Services will increase to the number of trains per hour in each direction on the lines set out in Table 43<sup>137</sup>. This number of services is generally assumed to operate throughout the day then decrease as trains are stabled with services typically finishing by midnight. The number of trains, shown in Table 43, takes account of HS2 Phase One, Phase 2a and the Proposed Scheme in operation, and other services using HS2 as a result of connections to other conventional lines, including NPR. Assumptions for maximum operational train speeds are also shown in Table 43. Further information is presented in Volume 1 (Section 8).

**Table 43: Local passenger service assumptions**

Description of line	No. of trains per hour in each direction	Speed
Route of the Proposed Scheme (south of Crewe Northern Connection)	9	205mph (330kph) for 90% of services and 225mph (360kph) for 10% of services
Route of the Proposed Scheme (north of Crewe north connection)	12	205mph (330kph) for 90% of services and 225mph (360kph) for 10% of services
Crewe North Connection	5	110mph (180kph)

#### Local assumptions – Crewe North rolling stock depot (RSD)

- 13.5.3 Crewe North RSD will operate throughout the day and night, but with the majority of operations occurring during the night. Night-time operations that generate noise will be reduced to a practical minimum. Passenger trains will be prepared and dispatched from approximately 05:00. Trains will return to Crewe North RSD during the evening as passenger services decrease on the operational railway, with the last train expected to arrive back from

<sup>137</sup> The effects of noise and vibration from the operation of the Proposed Scheme are assessed based on the reasonably foreseeable worst case train flows which differ from the train flows described in Section 2. For further information see Volume 1 (Section 8).

service by midnight. Trains will arrive at Crewe North RSD during the night for routine inspections and maintenance. Trains will typically undergo planned maintenance (generally inside maintenance sheds) during the night-time when they are not in service. Where night-time inspections identify urgent maintenance, it will be undertaken that night, if necessary.

- 13.5.4 Crewe North RSD will provide access to the Crewe North infrastructure maintenance base – rail (IMB-R). The IMB-R will provide support to the core maintenance facility at Stone IMB-R (located between Yarnfield and Stone as part of HS2 Phase 2a). Further information about the railway maintenance activities along the route of the Proposed Scheme and the use of Crewe North RSD and IMB-R to support these activities is provided in Volume 1, Section 4 and Section 2.4 of this report.
- 13.5.5 For the purpose of assessing the impact of noise from railway maintenance vehicles travelling from Crewe North RSD and IMB-R, it has been assumed that two railway maintenance vehicles would depart the RSD as soon as possible after the close of passenger services and travel to the location where maintenance is required. Railway maintenance vehicles would return to Crewe North RSD, IMB-R or the core facility at Stone before the start of passenger services.

## Avoidance and mitigation measures

- 13.5.6 The development of the Proposed Scheme has sought to reduce noise impact insofar as reasonably practicable.
- 13.5.7 Envisaged avoidance and mitigation measures that apply route-wide are described in Volume 1 (Section 9).

## Airborne noise

- 13.5.8 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 UK<sup>138</sup> and European standards<sup>139</sup>. HS2 trains will include reduction of aerodynamic noise from the pantograph that otherwise would occur above 186mph (300kph) with current pantograph designs. The reduction in aerodynamic noise draws on proven technology in use in East Asia. Overall it is assumed that proven international technology would reduce noise emissions by approximately 3dB at 225mph (360kph) compared to the current minimum UK and European standards.

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<sup>138</sup> Department for Transport (2021), *National Technical Specification Notice (NTSN), Rolling Stock – Noise (NOI)*. Available online at: [https://www.gov.uk/government/publications/railway-interopability-national-technical-specification-notices-ntsnshttps://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/945203/NTSN\\_rolling\\_stock\\_noise\\_NOI\\_.odt](https://www.gov.uk/government/publications/railway-interopability-national-technical-specification-notices-ntsnshttps://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945203/NTSN_rolling_stock_noise_NOI_.odt).

<sup>139</sup> Technical Specification for Interoperability (TSI) Noise – EU Commission Regulation No. 1304/2014.



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- 13.5.9 The Proposed Scheme incorporates 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 approximately 5m from the outer rail on surface sections and approximately 3m from the outer rail on viaducts.
- 13.5.10 In the Wimboldsley to Lostock Gralam area, noise barriers have been incorporated into the Proposed Scheme to avoid or reduce adverse effects due to airborne noise at the following communities:
- Wimboldsley;
  - Clive;
  - Stanthorne;
  - Whatcroft;
  - Pear Tree Farm Cottages;
  - Rudheath;
  - Lostock Green;
  - Lostock Gralam; and
  - Ascol Drive, Plumley.
- 13.5.11 The envisaged noise barrier locations based upon the currently available information are shown on Map Series SV-05 (Volume 2: MA02 Map Book) and described in Section 2.2.
- 13.5.12 In other specific locations along the route of the Proposed Scheme, where there are no noise barriers envisaged, noise will be reduced by landscape earthworks provided to avoid or reduce significant visual effects and engineering structures such as cuttings and safety fences on viaducts. The location of the landscape earthworks and relevant engineering structures is shown on Map Series SV-05 (Volume 2: MA02 Map Book).
- 13.5.13 Significant noise effects from the operational static sources, such as line-side equipment, will be avoided through their design and the specification of noise emission requirements. Further information is presented in Volume 5: Appendix SV-001-00000.
- 13.5.14 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<sup>140</sup> and the Noise Insulation Regulations 1975<sup>141</sup> ('the NI Regulations'). Additionally, HS2 Ltd will apply criteria, to provide the same mitigation as defined in 'the NI Regulations' at residential buildings where noise from the use of the Proposed Scheme measured outside a dwelling exceeds the Interim Target defined by the World Health

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<sup>140</sup> *The Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1996*, Her Majesty's Stationery Office, London.

<sup>141</sup> *Noise Insulation Regulations 1975*, Her Majesty's Stationery Office, London.

Organization's Night Noise Guidelines for Europe<sup>142</sup> or the maximum noise level criteria<sup>143</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.

- 13.5.15 Crewe North RSD and the IMB-R will be designed and operated to control noise and vibration and hence avoid likely significant effects. Mitigation may include: limiting the sounding of train horns; control of noise from train movements along tightly curved tracks including wheel squeal; control of train equipment such as heating, ventilation and air-conditioning (HVAC) units while vehicles are stabled; control of noise from maintenance and cleaning through the design of the maintenance sheds; enclosures for the carriage wash and wheel lathe; and boundary noise barriers as necessary.

## Ground-borne noise and vibration

- 13.5.16 Significant ground-borne noise or vibration effects from the operational railway will be reduced or avoided through the design of the track and track-bed.

## Assessment of impacts and effects

### Residential receptors: direct effects – individual dwellings

#### Airborne noise

- 13.5.17 Taking account of the avoidance and mitigation measures incorporated into the Proposed Scheme, the assessment has identified 15 dwellings, close to the Proposed Scheme, where noise levels are predicted to exceed the daytime trigger threshold set out in the NI Regulations<sup>144</sup>. It is, therefore, anticipated that these buildings are likely to qualify for noise insulation under the Regulations. These dwellings are indicated on Map Series SV-02 (Volume 5, Sound, noise and vibration Map Book):
- Manor Cottage, Wimboldsley, Middlewich (assessment location ref.: 610171);
  - Rose Cottage, Wimboldsley, Middlewich (assessment location ref.: 610173);
  - Heyescroft, Northwich Road, Stanthorne (assessment location ref.: 610238);
  - The Barn, Bridge Cottage and Canal Cottage, Whatcroft Hall Lane, Whatcroft (assessment location ref.: 610258);
  - Honeysuckle Cottage, Bellsmithy and The Croft, Wimboldsley, Middlewich (assessment location ref.: 610746); and

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<sup>142</sup> World Health Organization (2010), *Night Noise Guidelines for Europe*.

<sup>143</sup> Dependent on the number of train passes.

<sup>144</sup> Equivalent to a daytime free-field level of 65dB  $L_{pAeq,0700-2300}$ .

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- Wynwood, Woodside, Brooklyn, Hollingwood, Fernlea and Millwood, Cranage Villas, Manchester Road, Plumley (assessment location ref.: 612601).

13.5.18 The assessment has identified 14 additional dwellings close to the Proposed Scheme where the daytime forecast noise level does not exceed the threshold set in the NI Regulations but the predicted night-time noise level exceeds the WHO's Interim Target of 55dB, or the maximum noise level as a train passes exceeds the relevant criteria<sup>145</sup>. It is anticipated that these buildings will also be offered noise insulation as described previously in the avoidance and mitigation measures section. These dwellings are indicated on Map Series SV-02 (Volume 5, Sound, noise and vibration Map Book):

- the dwelling at Verdin Arms, Nantwich Road, Minshull Vernon (assessment location ref.: 610165);
- nos. 1 and 2 Leahead Cottages, Nantwich Road, Stanthorne (assessment location ref.: 610193);
- Yew Tree Cottage and Clive Bridge Cottage, Clive Green Lane, Winsford (assessment location ref.: 610199);
- Park Farm and Oaklea, Clive Green Lane, Stanthorne (assessment location ref.: 610206);
- Hillsbro, Middlewich Road, Stanthorne (assessment location ref.: 610409);
- nos. 1, 3, 5 and 7 Penny's Lane, Lach Dennis (assessment location ref.: 612516)
- Melvin Holme Farm, Penny's Lane, Lach Dennis (assessment location ref.: 612519); and
- 10 Birches Lane, Lostock Gralam (assessment location ref.: 612561).

13.5.19 The mitigation measures, set out in the previous section, including noise insulation, will reduce noise inside all dwellings such that it will not reach a level where it will significantly affect residents.

## **Residential receptors: direct effects – communities**

13.5.20 The proposed mitigation measures in the Wimboldsley to Lostock Gralam area will avoid or reduce adverse effects due to airborne noise on the majority of receptors, and in the following communities:

- Wimboldsley;
- Clive;
- Stanthorne;
- Whatcroft;
- Pear Tree Farm Cottages;
- Rudheath;

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<sup>145</sup> During the night (2300-0700) a significant effect is also identified where the Proposed Scheme results in a maximum sound level at the façade of a building at or above: 85dB  $L_{pAFmax}$  (where the number of train pass-bys exceeding this value is less than or equal to 20); or 80dB  $L_{pAFmax}$  (where the number of train pass-bys exceeding this value is greater than 20).

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- Lostock Green;
- Lostock Gralam; and
- Ascol Drive, Plumley.

- 13.5.21 Taking account of the envisaged mitigation, Map Series SV-05 (Volume 2: MA02 Map Book) shows the long-term 40dB<sup>146</sup> night-time and the 50dB daytime sound level contours. In general, below these levels adverse effects are not expected.
- 13.5.22 Above 40dB during the night and 50dB during the day, the community effect of noise is dependent on the baseline sound levels in that area and the change in sound level (magnitude of effect) brought about by the Proposed Scheme. The airborne noise impacts and effects forecast for the operation of the Proposed Scheme are presented on Map Series SV-05 (Volume 2: MA02 Map Book). The changes in noise levels shown on these maps are likely to affect the acoustic character of the area such that taking account of the local context<sup>147</sup>, there may be a significant effect when assessed on a community basis<sup>148</sup>.
- 13.5.23 Approximately 55 isolated properties within the area have been identified as being subject to a likely adverse noise effect. These effects are likely to be received as an effect on the acoustic character of the area. However, as the affected properties are spatially remote from larger defined residential areas, are subject to smaller magnitudes of noise effect, or are small in number, the effects are not considered to be significant on a community basis.
- 13.5.24 In this study area, the direct adverse effects on the acoustic character of the areas of the residential communities identified in Table 44 are considered to be significant on a community basis.

**Table 44: Direct adverse operational effects on residential communities and shared open areas that are considered significant on a community basis**

Significant effect number <sup>149</sup> and map reference	Source of significant effect	Time of day	Location and details
MA02-O-C1 (SV-05-305)	Airborne noise increase from new train services	Daytime and night-time	Clive Green Approximately 15 dwellings in the vicinity of Stanthorne Park Mews and Park Farm, Clive Green Lane. Forecast increases in sound from the railway are likely to cause a major noise increase affecting the acoustic character of the area around the properties. There are no shared open spaces identified as being affected in this community.

<sup>146</sup> Defined as the equivalent continuous sound level from 23:00 to 07:00 or L<sub>pAeq,night</sub>.

<sup>147</sup> Further information is provided in Volume 5: Appendices SV-001-00000 and SV-003-0MA02.

<sup>148</sup> Further information is contained in Volume 1.

<sup>149</sup> See Map Series SV-05 (Volume 2: MA02 Map Book).

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Significant effect number <sup>149</sup> and map reference	Source of significant effect	Time of day	Location and details
MA02-O-C2 (SV-05-305)	Airborne noise increase from new train services	Daytime and night-time	Clive Approximately 10 dwellings in the vicinity of the A54 Middlewich Road. Forecast increases in sound from the railway are likely to cause a moderate noise increase affecting the acoustic character of the area around the properties. There are no shared open spaces identified as being affected in this community.
MA02-O-C3 (SV-05-305)	Airborne noise increase from new train services	Daytime and night-time	Stanthorne Approximately 25 dwellings in the vicinity of Birch Lane and Coalpit Lane. Forecast increases in sound from the railway are likely to cause a moderate noise increase affecting the acoustic character of the area around the properties. The effect on the acoustic character of residential areas that are located further from the railway would be minor adverse. There are no shared open spaces identified as being affected in this community.
MA02-O-C4 (SV-05-307)	Airborne noise increase from new train services	Daytime and night-time	Whatcroft Approximately 25 dwellings in the vicinity of Whatcroft Hall Lane, Manor Lane and Old Lane. Forecast increases in sound from the railway are likely to cause a major noise increase affecting the acoustic character of the area around the properties. The effect on the acoustic character of residential areas that are located further from the railway would be moderate or minor adverse. There are no shared open spaces identified as being affected in this community.
MA02-O-C5 (SV-05-307)	Airborne noise increase from new train services	Daytime and night-time	Pear Tree Farm Cottages Approximately 10 dwellings in the vicinity of Davenham Road. Forecast increases in sound from the railway are likely to cause a moderate noise increase affecting the acoustic character of the area around the properties. There are no shared open spaces identified as being affected in this community.

13.5.25 In this study area, the direct beneficial effects on the acoustic character of the areas of the residential communities identified in Table 45 are considered to be significant on a community basis.

**Table 45: Direct beneficial effects on residential communities and shared open areas that are considered significant on a community basis**

Significant effect number <sup>150</sup> and map reference	Source of significant effect	Time of day	Location and details
MA02-O-C6 (SV-05-308)	Airborne noise decreases from road realignment	Daytime and night-time	Lostock Green Approximately 40 dwellings in the vicinity of Village Close, Cinder Lane and Birches Lane. Forecast decreases in sound from road traffic are likely to cause a moderate to major beneficial airborne noise effect on the acoustic character of the area around the properties. There are no shared open spaces identified as being affected in this community.

## Residential receptors: indirect effects

- 13.5.26 The assessment of operational noise and vibration indicates that significant indirect effects on residential receptors are unlikely to occur in this area.

## Non-residential receptors: direct effects

- 13.5.27 The assessment has identified airborne sound levels greater than the screening criteria relevant to the particular building use<sup>151</sup> and typically a change of greater than 3dB<sup>152</sup> compared to the future baseline sound level at Oakwood Marina, Davenham Road, Rudheath (assessment location ref.: 610398) in the Wimboldsley to Lostock Gralam area, as shown in Map Series SV-02 (Volume 5, Sound, noise and vibration Map Book). An assessment has been undertaken to determine if this impact will result in a significant effect using the significance criteria defined in Section A, Volume 5: Appendix SV-001-00000.
- 13.5.28 Oakwood Marina, Davenham Road, Rudheath is a marina which includes canal moorings and an office. The screening criteria for offices set out in the SMR has been used for the purposes of the assessment of noise impacts. An adverse operational noise effect has been identified at the office at Oakwood Marina, Davenham Road, Rudheath based on the change in operational airborne sound level outside of the receptor of greater than 10dB compared to the future baseline sound level. Daytime operational noise levels at the office are predicted to exceed the screening criterion for offices of 55dB<sub>LpAeq,16hr</sub> by 4dB, as defined in the SMR. The office is contained in a building with openable windows and is naturally ventilated. The office windows in the eastern façade face the route of the Proposed Scheme. Oakwood Marina, Davenham Road, Rudheath is identified, on a precautionary basis, as

<sup>150</sup> See Map Series SV-05 (Volume 2: MA02 Map Book).

<sup>151</sup> As defined in the Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report and Volume 5: Appendix SV-001-0000.

<sup>152</sup> The exception is where the use and sensitivity of the receptor or land use is very sensitive to noise and have been included in the detailed assessment where there is a change less than 3dB. Further information can be found in Volume 5: Appendix SV-002-0MA02.



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being subject to a likely significant adverse effect, denoted by MA02-O-N1 on Map SV-05-307 (Volume 2: MA02 Map Book).

- 13.5.29 The assessment has not identified any ground-borne noise or vibration levels greater than the relevant screening criteria in the Wimboldsley to Lostock Gralam area.
- 13.5.30 The assessment of effects on non-residential receptors has been undertaken on a reasonable worst-case basis. Further information can be found in Volume 5: Appendix SV-003-0MA02. The non-residential receptor, where direct significant effects are likely, is summarised in Table 46.

**Table 46: Likely significant noise or vibration effects on non-residential receptors arising from operation of the Proposed Scheme**

Significant effect number <sup>153</sup> and Map reference	Type of significant effect and source	Time of day	Location and details
MA02-O-N1 (SV-05-307)	Activity disturbance to users of offices resulting from operational airborne noise.	Daytime	Oakwood Marina (office), Davenham Road, Rudheath

### Non-residential receptors: indirect effects

- 13.5.31 The assessment of operational noise and vibration indicates that significant indirect effects are unlikely to occur on non-residential receptors in this area.

### Other mitigation measures

- 13.5.32 No other mitigation measures are proposed in this area.

### Summary of likely residual significant effects

- 13.5.33 At the majority of individual residences, the proposed mitigation measures will reduce operational noise inside all dwellings such that it does not reach a level where it will significantly affect residents, and therefore, no likely residual significant effects are identified.
- 13.5.34 At the community level, the envisaged mitigation, including landscape earthworks and noise fence barriers, described in this section, and presented in Map Series SV-05 (Volume 2: MA02 Map Book), will substantially reduce the potential operational airborne sound impacts and noise effects that would otherwise arise from the Proposed Scheme. Likely residual significant operational adverse airborne noise effects due to increased noise levels around the following communities have been identified:

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<sup>153</sup> See Map Series SV-05 (Volume 2: MA02 Map Book).

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- Clive Green: occupants of residential properties on Stanthorne Park Mews and Park Farm, Clive Green Lane identified by MA02-O-C1 on Map SV-05-305;
- Clive: occupants of residential properties on the A54 Middlewich Road identified by MA02-O-C2 on Map SV-05-305;
- Stanthorne: occupants of residential properties on Birch Lane and Coalpit Lane identified by MA02-O-C3 on Map SV-05-305;
- Whatcroft: occupants of residential properties on Whatcroft Hall Lane, Manor Lane and Old Lane identified by MA02-O-C4 on Map SV-05-307; and
- Pear Tree Farm Cottages: occupants of residential properties on Davenham Road identified by MA02-O-C5 on Map SV-05-307.

13.5.35 Likely residual significant operational beneficial airborne noise effects due to decreased noise levels have been identified at Lostock Green including occupants of residential properties on Village Close, Cinder Lane and Birches Lane identified by MA02-O-C6 on Map SV-05-308.

13.5.36 The assessment has identified a likely residual significant operational airborne noise effect at Oakwood Marina (Office), Davenham Road, Rudheath, identified by MA02-O-N1 on Map SV-05-307 in Map Series SV-05 (Volume 2: MA02 Map Book).

13.5.37 HS2 Ltd will continue to seek reasonably practicable measures to further reduce or avoid these significant adverse operational effects. In doing so HS2 Ltd will continue to engage with stakeholders to fully understand the receptors, their use and the benefit of any identified measures.

## Cumulative effects

13.5.38 It is not anticipated that there will be any significant cumulative noise effects during operation of the Proposed Scheme.

## Monitoring

13.5.39 Volume 1 (Section 9) sets out the general approach to environmental monitoring during operation of the Proposed Scheme.

13.5.40 Operational noise and vibration monitoring will 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.

13.5.41 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 will 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 consequential potential significant effects on transport users arising from the construction and operation of the Proposed Scheme through the Wimboldsley to Lostock Gralam area. The effects on traffic and transport are assessed quantitatively, based on existing baseline traffic conditions and future scenarios.
- 14.1.2 Engagement with Highways England, Cheshire West and Chester Council (CWCC), Cheshire East Council (CEC) and the Canal & River Trust 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 A detailed report on traffic and transport impacts within the Wimboldsley to Lostock Gralam area is contained in the Transport Assessment (see Volume 5: Appendices TR-001, 002, 003 and 005).
- 14.1.4 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 can be found in the Volume 2: MA02 Map Book.
- 14.1.5 Maps showing traffic and transport significant effects during construction (Map Series TR-03) and operation (Map Series TR-04) and construction HGV routes to compounds (Map Series TR-08) can be found in Volume 5, Traffic and transport Map Book.
- 14.1.6 In addition, further traffic and transport data are set out in Background Information and Data (BID)<sup>154</sup> (see BID TR-004-00001: Transport Assessment policy and data report).
- 14.1.7 The Proposed Scheme is described in Section 2.

### 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 EIA Scope and Methodology Report (SMR)<sup>155</sup>.
- 14.2.2 The peak level of construction traffic activity is expected to be 2030 and the opening year to be 2038. The forecasts used in the assessment have been produced prior to the development of a full understanding of the likely impact of COVID-19 on economic growth and travel behaviour. The full impact of COVID-19 is not yet known but is considered likely to

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<sup>154</sup> High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background Information and Data*. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

<sup>155</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

result in lower travel demand in the medium term than the forecasts used in the assessment for background traffic and rail, including HS2.

- 14.2.3 Consequently, the assessment is considered to overstate travel demand for both construction and operation scenarios and therefore to present a robust case for traffic and transport. This also means that the operational assessment for 2046 is likely to include a level of growth more representative of 2048 or later, representing likely impacts at least 10 years post-opening of the Proposed Scheme.
- 14.2.4 The study area for traffic and transport includes the communities of Wimboldsley, Middlewich, Stanthorne, Winsford, Bostock Green, Byley, Moulton, Davenham, Lach Dennis, Rudheath, Northwich, Lostock Gralam, Plumley, Higher Wincham and Higher Marston.
- 14.2.5 The study area for traffic and transport also includes all strategic and local roads potentially affected by the Proposed Scheme. The M6 (including junction 18) is the only strategic route in this area.
- 14.2.6 Forecast future transport movements by road, with and without the Proposed Scheme, have been derived from the Winsford (and Middlewich) to M6 model and the Northwich Town Centre model. The Winsford (and Middlewich) to M6 model has been developed by CWCC and covers the area from Bostock Green in the north to Walley's Green in the south, and from Winsford in the west to Holmes Chapel in the east. The Northwich Town Centre model has been developed by CWCC and covers the area from Higher Wincham in the north to Wharton Green in the south, and from Sandiway in the west to the M6 in the east. These models represent the average weekday morning (08:00-09:00) and evening (17:00-18:00) peak hours.
- 14.2.7 Junction assessments for construction have been undertaken against the peak month of construction traffic and include robust assumptions on the level of construction traffic in the peak hours. The assessments also address the impact of highway interventions. The effects identified are considered to be a reasonable worst case.
- 14.2.8 Where the effects vary through the construction programme the highest magnitude significant effects are reported. Where there are both adverse and beneficial effects at different times, the highest magnitude adverse and highest magnitude beneficial are both reported.

## 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, CWCC and CEC (including provision of

information on public transport, public rights of way (PRoW) and accident<sup>156</sup> data) and desktop analysis.

## Surveys

- 14.3.2 Traffic surveys, comprising junction turning counts, manual classified counts, queue length surveys and automatic traffic counts, were undertaken in June 2017 with additional surveys carried out in November 2017, February 2018, July 2018 and November 2019. These data have been supplemented by existing traffic data from other sources, including from Highways England, CWCC and CEC. Assessment of the data indicates that the weekday peak hours in the area are generally 08:00-09:00 and 17:00-18:00 which correspond to the Proposed Scheme assessment hours.
- 14.3.3 PRoW surveys were undertaken in August and September 2017 to establish their nature and usage by non-motorised users (pedestrians, cyclists and equestrians). The surveys included PRoW and roads that will be crossed by 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 M6 is the only strategic route in this area. The strategic road network in and around the area is generally busy during peak hours and delays can be experienced.
- 14.3.5 The local roads include (ordered by road class from south to north):
- A530 Nantwich Road/Newton Bank/Croxtan Lane/King Street/Griffiths Road;
  - A54 Middlewich Road/Chester Road/St Michael's Way/Kinderton Street/Holmes Chapel Road/Middlewich Road (between M6 junction 18 and Clive Lane);
  - A533 Northwich Road/Bostock Road/Davenham Bypass/London Road (between A54 Middlewich Road and A556 Shurlach Road);
  - A556 Chester Road/Shurlach Road;
  - A559 Manchester Road;
  - B5309 Centurion Way/King Street/Griffiths Road;
  - B5081 Byley Road; and
  - B5082 Penny's Lane.

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<sup>156</sup> The term accident in this report refers to injury related collisions reported to/recorded by the police. This data, known as *STATS19*, relate only to personal injury accidents on public roads that are reported to the police, and subsequently recorded, using the *STATS19* accident reporting form.

- 14.3.6 The local road network in this area generally operates well, although some localised delays can be experienced, particularly at peak times.
- 14.3.7 Relevant accident data for the road network subject to assessment have been obtained from the Department for Transport (DfT)<sup>157</sup>. Data for the three-year period July 2016 to June 2019 have been assessed and any identified clusters (i.e. where there are nine or more accidents in the three year period) have been examined.
- 14.3.8 No accident clusters were identified within the Wimboldsley to Lostock Gralam area.
- 14.3.9 The route of the Proposed Scheme will cross five roads with roadside footways within the Wimboldsley to Lostock Gralam area. These are the A54 Middlewich Road, the A533 Northwich Road, the A556 Shurlach Road, the A559 Manchester Road and Birches Lane.

## Parking and loading

- 14.3.10 There is off-street parking within the Wimboldsley to Lostock Gralam area that may be impacted by the Proposed Scheme. This includes staff and operational parking for the Gadbrook Distribution Centre on the A530 King Street to the south-east of Northwich.

## Public transport network

- 14.3.11 Ten bus services operate on 10 roads that will be crossed or could be affected by the route of the Proposed Scheme in the Wimboldsley to Lostock Gralam area. There are also bus stops primarily located to serve the main built-up area. The bus routes that could be affected by the Proposed Scheme include:
- A530 Nantwich Road: route 30 (Shavington - Crewe - Leighton Hospital - Middlewich - Winsford - Northwich); and route 42 (Crewe - Leighton Hospital - Middlewich - Congleton);
  - A54 St Michael's Way: route 37/37A/37E (Crewe - Sandbach - Middlewich - Winsford - Northwich);
  - A54 Kinderton Street/Holmes Chapel Road: route 42 (Crewe - Leighton Hospital - Middlewich - Holmes Chapel - Congleton);
  - B5309 Centurion Way: route 43 (Crewe - Leighton Hospital - Middlewich - Holmes Chapel - Congleton);
  - A54 Middlewich Road: route 30 (Shavington - Crewe - Leighton Hospital - Middlewich - Winsford - Northwich); route 37/37A/37E (Crewe - Sandbach - Middlewich - Winsford - Northwich); and route 42 (Crewe - Leighton Hospital - Middlewich - Congleton);
  - Road One: route 29 (Northwich - Winsford - Over St Johns);

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<sup>157</sup> Department for Transport (2021), *STATS19 Road Safety Data July 2016 – June 2019*. Available online at: <https://www.gov.uk/government/collections/road-accidents-and-safety-statistics>.



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- A533 Davenham Bypass/London Road: route X29 (Northwich – Winsford); route 29 (Northwich - Winsford - Over St Johns); route 31 (Northwich - Winsford - Crewe); and route 37E (Northwich - Winsford - Sandbach - Crewe);
- A533 Davenham Bypass: route 37/37A (Crewe - Sandbach - Middlewich - Winsford - Northwich);
- A559 Manchester Road: route 89 (Northwich – Wincham - Knutsford); and
- A556 Chester Road: route 89 (Northwich - Wincham - Knutsford).

14.3.12 Local rail services are accessible via Winsford Station, Greenbank Station, Northwich Station, Lostock Gralam Station and Plumley Station within the Wimboldsley to Lostock Gralam area. Winsford Station provides access to local services on the West Coast Main Line (WCML) and Greenbank Station, Northwich Station, Lostock Gralam Station and Plumley Station provide access to local services on the Mid-Cheshire Line. The Sandbach to Northwich Line is primarily used by freight services.

## **Non-motorised users**

- 14.3.13 There are pedestrian footways adjacent to many of the roads in the built-up areas of Wimboldsley, Middlewich, Stanthorne, Winsford, Bostock Green, Byley, Moulton, Davenham, Lach Dennis, Rudheath, Northwich, Lostock Gralam, Plumley, Higher Wincham and Higher Marston. Roadside footways vary in width and condition within these areas. Where there is no formal roadside footway provision, non-motorised user numbers are generally low.
- 14.3.14 Two promoted walking routes pass through the Wimboldsley to Lostock Gralam area: the Cheshire Ring Canal Walk; and the Dane Valley Way.
- 14.3.15 In the Wimboldsley to Lostock Gralam area, National Routes 5 and 573 (part of the National Cycle Network) will be crossed by the route of the Proposed Scheme. National Route 551 and Regional Cycle Network Route 71 also pass through the area.
- 14.3.16 The route of the Proposed Scheme will cross the route of eight PRow within the Wimboldsley to Lostock Gralam area. Further PRow and roadside footways in the Wimboldsley to Lostock Gralam area could be affected by the Proposed Scheme and have been included in the assessment.
- 14.3.17 The surveys undertaken to inform the assessment showed that the routes with the greatest daily usage during the survey day were: Footpath Lostock Gralam 14/3, which was used by 40 pedestrians and five cyclists; Clive Green Lane, which was used by 21 cyclists, Davenham Road (National Route 573) which was used by 27 cyclists; and Footpath Byley 3/1, Footpath Davenham 6/1, Footpath Davenham 6X/2, Footpath Rudheath 6X/1 and Footpath Rudheath 10/1 (which together form part of the Trent and Mersey Canal towpath) were used by three pedestrians and 11 cyclists.

## Waterways and canals

- 14.3.18 There are two navigable waterways in the Wimboldsley to Lostock Gralam area. The Shropshire Union Canal (Middlewich Branch) passes through the south of the area on a south-west to north-east alignment and extends between Wardle and Middlewich. The Shropshire Union Canal (Middlewich Branch) will be crossed by the route of the Proposed Scheme between Winsford and Middlewich. The Trent and Mersey Canal passes through the area on a south to north alignment and extends between Northwich and the East Midlands. The Trent and Mersey Canal will be crossed by the Proposed Scheme in three locations: between Bostock and Byley; between Lach Dennis and Rudheath; and between Davenham and Lach Dennis.

## Air transport

- 14.3.19 There is no relevant air transport in the Wimboldsley to Lostock Gralam area. Consequently, this topic is not considered further in this assessment.

## Future baseline

- 14.3.20 The future baseline traffic volumes have been calculated for the future years of 2030, 2038 and 2046. These have been used to support the assessment of construction and operation of the Proposed Scheme, reflecting the assumed route-wide construction peak (2030), opening year (2038) and a future assessment year (2046). Growth factors have been checked to ensure that committed developments are appropriately reflected in the growth forecasts. The assumptions underlying committed developments and transport schemes for each assessment year have been discussed with CWCC and CEC and are considered to be appropriately reflected in the traffic forecasts.
- 14.3.21 There is one planned substantial change to the transport network highway that has been taken into account in the future baseline scenarios. This is the Middlewich Eastern Bypass, which is promoted by CEC and is intended to provide a bypass to reduce congestion in Middlewich, whilst providing capacity for future housing and employment growth. At the time of the assessment, the scheme was programmed to commence in 2022 and to be completed in 2024. It has been assessed within the Winsford (and Middlewich) to M6 model in the 2030, 2038, and 2046 future baseline scenarios.
- 14.3.22 It is difficult to forecast how public transport services may change in the future; therefore, unless information on future services is available, it has been assumed that public transport services for the future years of assessment will be the same as those currently operating. Similarly, pedestrian and cycle demand and facilities and parking are assumed to remain unchanged from the base year. For the Wimboldsley to Lostock Gralam area, there are no known substantial committed changes to the public transport network, parking and pedestrian and cycling facilities.

## Construction

- 14.3.23 Construction of the Proposed Scheme is expected to commence in 2025 with construction activity continuing to 2038 (although activity in 2038 will be limited to testing and commissioning). Construction activities have been assessed against 2030 baseline traffic flows, irrespective of when they occur during the construction period.
- 14.3.24 The year 2030 is the common future baseline year and the impact of individual or overlapping activities are considered against this single year.
- 14.3.25 Future baseline traffic volumes in the peak hours are forecast to grow by an average of 16% by 2030 compared to a baseline year of 2018.

## Operation

- 14.3.26 Future baseline traffic volumes in the peak hours are forecast to grow by an average of 24% by 2038 compared to the baseline year of 2018.
- 14.3.27 Future baseline traffic volumes in the peak hours are forecast to grow by an average of 34% by 2046 compared to the baseline year of 2018.

## 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) will be constructed and will be operational prior to the permanent closure of any existing highways, insofar as reasonably practicable;
  - the majority of roads crossed by the route of the Proposed Scheme will be maintained or locally diverted during construction;
  - traffic management measures will be implemented to limit any disruption;
  - road closures will be restricted to overnight and weekends, insofar as reasonably practicable;
  - temporary alternative routes for roadside footways and PRoW will 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 will 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;
  - HGVs will be routed, insofar as reasonably practicable, along the strategic and/or primary road network;

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- the use of the local road network will, 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 will be provided, as required, to manage the safe and efficient movement of vehicles on construction HGV routes;
- on-site welfare facilities will be provided, which will reduce daily travel by site workers;
- four borrow pits will be provided in this area which will reduce the use of local roads for the import of materials. Three borrow pits (MA02 Borrow Pits A, B and C) will be in proximity to the route of the Proposed Scheme and one borrow pit (MA02 Borrow Pit D) will be 4.5km to the east of the route of the Proposed Scheme);
- temporary construction sidings at the site of Crewe North rolling stock depot (RSD) will be used to manage the movement of excavated material, mainly from Crewe tunnel in the adjacent Hough to Walley's Green area (MA01), by rail which will reduce the volume and impact of road traffic on local roads and communities;
- material extracted from MA02 Borrow Pits A, B and C, which will be close to the route of the Proposed Scheme, is planned to be moved on site haul routes whenever practical. Material extracted from MA02 Borrow Pit D will be transported on the public highway to material storage areas within the land required for construction for onward distribution using site haul routes whenever practical; and
- the restoration of the MA02 Borrow Pits A, B and C will make use of material recovered from the construction of the Proposed Scheme that is unsuitable for re-use (such as material excavated from Crewe tunnel, cuttings and other earthworks to construct the Proposed Scheme). Where reasonably practicable, the transport of this material will be via site haul routes. Where the source for this material is Crewe tunnel, the material will be transported via a conveyor along the route of the Proposed Scheme.

14.4.2 Section 14 of the draft Code of Construction Practice (CoCP)<sup>158</sup> 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 will 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 will

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<sup>158</sup> Volume 5: Appendix CT-002-00000, draft Code of Construction Practice (CoCP).

consider the local traffic management strategy including consideration of sensitive receptors, such that adverse impacts will be reduced, insofar as reasonably practicable.

- 14.4.5 Specific measures 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. Activities such as major concrete pours may involve extended working hours for reasons of engineering practicability, with very few workers travelling within the peak traffic hours.
- 14.4.6 The number of private car trips to and from the construction compounds (both workforce and visitors) will be reduced by encouraging alternative sustainable modes of transport or vehicle sharing. This will be supported by an overarching framework travel plan that will require construction workforce travel plans to be produced that will include a range of potential measures to mitigate the impacts of workers' traffic and transport movements associated with construction of the Proposed Scheme. The travel plans will promote the use of sustainable transport modes as appropriate to the location and types of trip. They will 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.
- 14.4.7 Where works potentially affect Network Rail assets, disruption to travelling passengers and freight movements will be reduced insofar as reasonably practicable. This includes measures such as:
- programming the construction works to coincide with the possessions 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.

## **Assessment of impacts and effects**

### **Temporary effects**

- 14.4.8 The following section considers the impacts on traffic and transport and the likely consequential significant effects resulting from the construction of the Proposed Scheme.

### **Key construction transport issues**

- 14.4.9 The assessment takes account of all of the impacts of the Proposed Scheme in the Wimboldsley to Lostock Gralam area. The main traffic and transport impacts during the construction period within this area will include:
- construction vehicle movements to and from the various construction compounds;

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- road closures, realignments and diversions;
- alternative routes for PRoW and roadside footways; and
- possessions and blockades on the conventional rail network.

14.4.10 The construction assessment has also considered any impacts in the Wimboldsley to Lostock Gralam area that arise from construction of the Proposed Scheme in the adjoining community areas.

14.4.11 Construction vehicle movements required to construct the Proposed Scheme will include the delivery of plant and materials, movement of excavated materials and site worker trips. Works will include utility works, earthworks, underpass, viaduct, bridge and highway construction.

14.4.12 Details of the construction compounds are provided in Section 2.3. Table 47 provides details of the compound set up date and the duration of active use. The duration of active use excludes any period where there are no substantial workforce trips or movement of materials to and from the compound.

14.4.13 Table 47 also provides a summary of the HGV and car/light goods vehicle (LGV) access trips at each compound in the peak month of activity and during the busy period. For each compound, the peak month of activity is the month within which HGV traffic is at its highest for that compound. The busy period is the period during which HGV traffic serving that compound will be greater than 50% of the HGV traffic in the peak month. Two-way trips refer to the total number of vehicle movements in both directions (e.g. with 200 westbound vehicles and 100 eastbound, there would be 300 two-way trips). The average daily combined two-way vehicle trips for the busy period is the lower end of the range shown in Table 47 and the average daily combined two-way vehicle trips for the peak month is the upper end of the range shown. The estimated duration of busy period is also provided.

**Table 47: Typical vehicle trip generation for construction compounds in the Wimboldsley to Lostock Gralam area**

Compound type	Compound name	Indicative start/set up date (years/quarter)	Estimated duration of active use (years/months)	Average daily combined two-way car/LGV trips during busy period and within peak month of activity	Average daily combined two-way HGV trips during busy period and within peak month of activity	Estimated duration of busy period (months)
Satellite	A530 Nantwich Road satellite compound	2027 Q2	5 years	200-270	129-162	5
Satellite	Crewe North RSD satellite compound 1	2025 Q3	8 years	238-334	519-554	3
Satellite	Crewe North RSD satellite compound 2	2025 Q3	9 years	465-632	82-126	51
Satellite	Crewe North RSD satellite compound 3	2025 Q3	8 years	236-354	642-732	15



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Compound type	Compound name	Indicative start/set up date (years/quarter)	Estimated duration of active use (years/months)	Average daily combined two-way car/LGV trips during busy period and within peak month of activity	Average daily combined two-way HGV trips during busy period and within peak month of activity	Estimated duration of busy period (months)
Rail Systems	Minshull Vernon satellite compound	2027 Q4	1 year and 6 months	122-122	4-4	7
Borrow Pit	MA02 Borrow Pit A	2027 Q2	2 years and 3 months	90-112	36-44	5
Borrow Pit	MA02 Borrow Pit B	2027 Q2	1 year and 6 months	162-162	34-42	5
Borrow Pit	MA02 Borrow Pit C	2027 Q2	1 year and 9 months	162-162	33-42	4
Satellite	Clive Green Lane satellite compound	2027 Q2	3 years and 6 months	167-214	49-70	19
Satellite	Shropshire Union Canal South satellite compound	2027 Q2	2 years and 3 months	244-340	60-76	7
Satellite	Shropshire Union Canal North satellite compound	2027 Q2	4 years	321-434	79-92	7
Satellite	A54 Middlewich Road satellite compound	2027 Q2	4 years and 3 months	297-404	77-122	10
Satellite	A533 Bostock Road satellite compound	2027 Q2	4 years and 6 months	202-284	425-516	14
Satellite	River Dane viaduct South satellite compound	2027 Q2	3 years	209-284	72-94	9
Satellite	River Dane viaduct North satellite compound	2027 Q2	3 years	191-248	54-76	9
Satellite	Puddinglake Brook viaduct satellite compound	2027 Q2	3 years and 6 months	237-384	65-94	11
Borrow Pit	MA02 Borrow Pit D	2027 Q2	4 years and 9 months	130-148	398-488	36
Satellite	Gad Brook viaduct south satellite compound	2027 Q2	3 years and 9 months	288-408	413-496	3
Satellite	Gad Brook viaduct north satellite compound	2025 Q2	6 years and 6 months	246-368	238-260	5
Satellite	Rudheath embankment satellite compound	2028 Q3	3 years and 3 months	198-210	443-476	4
Satellite	B5082 Penny's Lane satellite compound	2028 Q3	3 years and 3 months	200-210	427-498	4

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Compound type	Compound name	Indicative start/set up date (years/quarter)	Estimated duration of active use (years/months)	Average daily combined two-way car/LGV trips during busy period and within peak month of activity	Average daily combined two-way HGV trips during busy period and within peak month of activity	Estimated duration of busy period (months)
Satellite	Birches Lane satellite compound	2025 Q2	6 years and 6 months	179-270	463-498	3
Satellite	Lostock Gralam viaduct satellite compound	2028 Q4	1 year and 6 months	231-276	72-88	8
Satellite	Smoker Brook viaduct south satellite compound	2027 Q3	4 years and 6 months	244-328	423-486	4

14.4.14 The locations of the compounds and the associated construction HGV routes are shown in Map Series TR-08 (Volume 5, Traffic and transport Map Book). Table 48 summarises the construction HGV routes to and from each compound to the main road network. For some compounds, Table 48 includes multiple construction HGV routes. This is either because the construction HGV route varies depending on the origin/destination of the trip or because the construction HGV route varies over time to account for changes to the highway network through the construction period.

14.4.15 The average daily combined two-way HGV trips reported in Table 47 represent the total number of HGV movements to and from each compound during the busy period and in the peak month of activity on all of the available construction HGV routes combined. Where multiple construction HGV routes are shown in Table 48, the split of construction traffic between the available construction HGV routes will vary based on the point in the construction programme and the origin/destination of the construction HGV traffic.

**Table 48: Construction HGV routes for construction compounds in the Wimboldsley to Lostock Gralam area**

Compound name(s)	Access routes to/from compound(s) to main road network
A530 Nantwich Road satellite compound Crewe North RSD satellite compound 1	<ul style="list-style-type: none"> <li>A530 Nantwich Road</li> </ul>
Crewe North RSD satellite compound 2	Route to/from south: <ul style="list-style-type: none"> <li>On-site construction traffic route, Clive Green Lane and A530 Nantwich Road</li> </ul> Route to/from north (to be used after opening of the Clive Green Lane realignment): <ul style="list-style-type: none"> <li>On-site construction traffic route, Clive Green Lane and A54 Middlewich Road</li> <li>On-site construction traffic route, Clive Green Lane, Road One and A533 Davenham Bypass</li> </ul>
Crewe North RSD satellite compound 3	<ul style="list-style-type: none"> <li>On-site construction traffic route, Clive Green Lane and A530 Nantwich Road</li> <li>On-site construction traffic route and A530 Nantwich Road</li> </ul>

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Compound name(s)	Access routes to/from compound(s) to main road network
Minshull Vernon satellite compound	<ul style="list-style-type: none"> <li>A530 Nantwich Road</li> </ul>
MA02 Borrow Pit A MA02 Borrow Pit B	Route to/from south: <ul style="list-style-type: none"> <li>A530 Nantwich Road</li> </ul> Route to/from north (to be used after opening of the Clive Green Lane realignment): <ul style="list-style-type: none"> <li>A530 Nantwich Road, Clive Green Lane and A54 Middlewich Road</li> <li>A530 Nantwich Road, Clive Green Lane, Road One and A533 Davenham Bypass</li> </ul>
MA02 Borrow Pit C	<ul style="list-style-type: none"> <li>On-site construction traffic route and A54 Middlewich Road</li> </ul>
Clive Green Lane satellite compound	Route to/from south: <ul style="list-style-type: none"> <li>Clive Green Lane and A530 Nantwich Road</li> </ul> Route to/from north (to be used after opening of the Clive Green Lane realignment): <ul style="list-style-type: none"> <li>Clive Green Lane and A54 Middlewich Road</li> <li>Clive Green Lane, Road One and A533 Davenham Bypass</li> </ul>
Shropshire Union Canal South satellite compound	Route to/from south: <ul style="list-style-type: none"> <li>On-site construction traffic route, Clive Green Lane and A530 Nantwich Road</li> </ul> Route to/from north (to be used after opening of the Clive Green Lane realignment): <ul style="list-style-type: none"> <li>On-site construction traffic route, Clive Green Lane and A54 Middlewich Road</li> <li>On-site construction traffic route, Clive Green Lane, Road One and A533 Davenham Bypass</li> </ul>
Shropshire Union Canal North satellite compound	<ul style="list-style-type: none"> <li>On-site construction traffic route and A54 Middlewich Road</li> </ul>
A54 Middlewich Road satellite compound	<ul style="list-style-type: none"> <li>A533 Bostock Road</li> </ul>
A533 Bostock Road satellite compound	<ul style="list-style-type: none"> <li>A54 Middlewich Road</li> </ul>
River Dane viaduct South satellite compound	<ul style="list-style-type: none"> <li>On-site construction traffic route and A533 Bostock Road</li> </ul>
River Dane viaduct North satellite compound	<ul style="list-style-type: none"> <li>On-site construction traffic route, Whatcroft Hall Lane and A530 King Street</li> </ul>
Puddinglake Brook viaduct satellite compound	<ul style="list-style-type: none"> <li>Whatcroft Hall Lane and A530 King Street</li> </ul>
MA02 Borrow Pit D	<ul style="list-style-type: none"> <li>On-site construction traffic route, B5081 Byley Road, B5309 Centurion Way and A54 Holmes Chapel Road</li> </ul>
Gad Brook viaduct south satellite compound Gad Brook viaduct north satellite compound	<ul style="list-style-type: none"> <li>A530 King Street</li> </ul>

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Compound name(s)	Access routes to/from compound(s) to main road network
Rudheath embankment satellite compound	<ul style="list-style-type: none"> <li>On-site construction traffic route and A530 King Street</li> </ul>
B5082 Penny's Lane satellite compound	<p>Route to/from the north:</p> <ul style="list-style-type: none"> <li>B5082 Penny's Lane and A556 Shurlach Road (to be used before opening of the Penny's Lane diversion)</li> <li>B5082 Penny's Lane diversion to A530 King Street (to be used after opening of the Penny's Lane diversion)</li> </ul> <p>Route to/from the south:</p> <ul style="list-style-type: none"> <li>B5082 Penny's Lane, Crowders Lane and A530 King Street (to be used before opening of the Penny's Lane diversion)</li> <li>B5082 Penny's Lane diversion to A530 King Street (to be used after opening of Penny's Lane diversion)</li> </ul>
Birches Lane satellite compound	<ul style="list-style-type: none"> <li>Birches Lane and A556 Shurlach Road</li> </ul>
Lostock Gralam viaduct satellite compound	<ul style="list-style-type: none"> <li>On-site construction traffic route, Birches Lane and A556 Shurlach Road</li> </ul>
Smoker Brook viaduct south satellite compound	<ul style="list-style-type: none"> <li>A556 Shurlach Road</li> </ul>

- 14.4.16 Information on the indicative construction programme is provided in Section 2.3 and the construction methodology is summarised in Volume 1 (Section 6). This illustrates how the phasing of activities at different compounds will generally be staggered and that construction activities at individual compounds may not occur over the whole duration presented in Table 47.
- 14.4.17 The effects of construction of the Proposed Scheme on the highway network in the Wimboldsley to Lostock Gralam area have been assessed by undertaking strategic model runs for a number of 'with HS2' construction scenarios, and by comparing the flows and delays against the 2030 future baseline scenario. The assessment is based on the highest volume of construction traffic on each construction HGV route in each construction scenario. Where construction HGV routes will serve more than one construction compound, the assessment is based on the highest combined volume of construction traffic on each section of each construction HGV route in each construction scenario.
- 14.4.18 In using the strategic model, the impacts and effects have been considered in four scenarios covering the main construction phases. These scenarios ensure that the assessment addresses the different combinations and interactions of advance works, utility works, temporary highway closures and diversions and construction lorry movements through the construction period. The scenarios are:
- scenario 1, peak between 2025 Q1 and 2028 Q4. This scenario corresponds with utility and advance works, compound set up and early main construction works. The main construction activities taking place during this scenario include construction of the Crewe North RSD, extraction of material from MA02 Borrow Pits A, B, C and D and the

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construction of several highway modifications, including the A530 Nantwich Road realignment, the Clive Green Lane realignment the A54 Middlewich Road realignment, the A533 Nantwich Road diversion and the A556 Shurlach Road realignment. A number of viaducts will also be under construction during this scenario, including the Shropshire Union Canal viaducts, River Dane viaduct, Puddinglake Brook viaduct, Trent and Mersey Canal viaduct, Gad Brook viaduct, Lostock Gralam viaduct and Smoker Brook viaduct. This scenario equates to 100% of the overall peak in construction traffic across the whole construction period;

- scenario 2, peak between 2029 Q1 and 2029 Q4. This scenario corresponds with the construction peak following the opening of the A54 Middlewich Road realignment and the A533 Northwich Road diversion. The main construction activities taking place during this scenario include the construction of the Crewe North RSD, River Dane viaduct, Trent and Mersey Canal viaduct, Gad Brook viaduct, Wade Brook viaduct, Lostock Gralam viaduct, Smoker Brook viaduct, Walley's Green embankment, Clive Green South and North embankments, Stanthorne South and North embankments, Dane Valley embankment, Whatcroft South and North embankments, Rudheath embankment, Lostock Gralam South and North embankments, the A530 Nantwich Road realignment, the B5082 Penny's Lane diversion and the Middlewich box structure. This scenario equates to 91% of the overall peak in construction traffic across the whole construction period;
- scenario 3, peak between 2030 Q1 and 2030 Q2. This scenario corresponds with the construction peak following the opening of the Clive Green Lane realignment, enabling construction traffic associated with the Proposed Scheme to use routes between the Crewe North RSD and the A54 Middlewich Road. The majority of construction activities taking place during scenario 2 will continue into scenario 3. This scenario equates to 89% of the overall peak in construction traffic across the whole construction period; and
- scenario 4, peak after 2030 Q2. This scenario corresponds with the construction peak following the opening of the B5082 Penny's Lane realignment. The main construction activities taking place during this scenario comprise works associated with the construction of Crewe North RSD. This scenario equates to 87% of the overall peak in construction traffic across the whole construction period.

14.4.19 The construction works and construction traffic movements associated with the Proposed Scheme differ for each of these scenarios. The assessment considers the impacts in all scenarios and reports the highest magnitude of significant effects, regardless of which scenario they arise in. The most relevant highway interventions and works for each scenario are shown in Table 49.

**Table 49: Construction highway interventions by scenario**

Type	Intervention	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Utilities	A54 Middlewich Road shuttle working	Included	Not included	Not included	Not included
Main works	A54 Middlewich Road realignment	Not included	Included	Included	Included

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Type	Intervention	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Main works	A533 Northwich Road diversion	Not included	Included	Included	Included
Main works	Clive Green Lane available to construction traffic	Not included	Not included	Included	Included
Main works	B5082 Penny's Lane realignment	Not included	Not included	Not included	Included
Key construction activities	Crewe North RSD	Included	Included	Included	Included
Key construction activities	Clive Green Lane overbridge and realignment	Not included	Included	Included	Included
	<b>Construction HGV traffic assessed as a percentage of peak construction HGV traffic (Winsford and Northwich models combined)</b>	<b>100%</b>	<b>91%</b>	<b>89%</b>	<b>87%</b>

14.4.20 The strategic models have been used to assess these construction scenarios taking account of the construction traffic movements and any road closures, traffic management or changes to junction operations in each scenario. The strategic model outputs for each of these scenarios are only relevant to the assessment of the effects on traffic delays to vehicle occupants and traffic related severance.

## Highway network

### Strategic and local highway network

14.4.21 The primary HGV access routes for construction vehicles will be the strategic and/or primary road network with the use of the local road network limited, so far as reasonably practicable. The construction HGV routes will also provide access to compounds. Where reasonably practicable, site haul routes alongside the route of the Proposed Scheme will be used to reduce the impact on the local road network. In this area, the main construction HGV routes will be (ordered by road class from south to north):

- M6 (including junction 18);
- A530 Nantwich Road/Newton Bank/Croxton Lane/King Street/Griffiths Road (between the southern boundary of the Wimboldsley to Lostock Gralam area and the A559 Manchester Road);
- A54 Middlewich Road/Chester Road/St Michael's Way/Kinderton Street/Holmes Chapel Road/Middlewich Road (between M6 junction 18 and Clive Lane);
- A533 Northwich Road/Bostock Road/Davenham Bypass/London Road (between the A54 Middlewich Road and the A556 Shurlach Road);



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- A556 Shurlach Road (between the A533 London Road and Wimboldsley to Lostock Gralam area northern boundary);
- A559 Manchester Road (between the A530 Griffiths Road and the A556 Chester Road);
- B5309 Centurion Way/King Street (between the A54 Holmes Chapel Road and the A530 King Street);
- B5081 Byley Road (between the B5309 Centurion Way and MA02 Borrow Pit D);
- B5082 Penny's Lane (between Crowders Lane and the A556 Shurlach Road);
- Clive Green Lane;
- Coalpit Lane (short section at the southern extent);
- Clive Lane;
- Road One, through Winsford Industrial Estate;
- London Road (short section at the southern extent);
- Whatcroft Hall Lane (between the A530 King Street and Puddinglake Brook viaduct satellite compound);
- Davenham Road (between the A530 King Street and Higgins Lane Farm);
- Crowder's Lane (between the A530 King Street and B5082 Penny's Lane);
- Birches Lane (between Lostock Gralam and Station Road);
- Station Road (between Birches Lane and the A559 Manchester Road);
- Ascol Drive; and
- Linnards Lane (short section at the southern extent).

14.4.22 A number of these construction HGV routes will have limited use (i.e. a low level of HGVs use generally over a short length of time, for example for site set up or minor works) including the A530 Croxton Lane (between Croxton Hall Farm and the B5309 King Street) and Ascol Drive.

14.4.23 In addition to changes in traffic flows due to construction traffic, temporary highway closures and diversions or realignments will be required in a number of locations 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. In most cases, these works will be restricted to short-term overnight and/or weekend closures, and are not, therefore, considered significant. The following works will have a longer duration:

- A530 Nantwich Road – the existing A530 Nantwich Road will remain open during construction of the A530 Nantwich Road realignment, which will take three years to complete. Temporary traffic signals will be required for some of the construction phases, with no change in journey length;
- Clive Green Lane – in order to construct the permanent realignment of Clive Green Lane, a section of the existing highway to the west of the Shropshire Union Canal (Middlewich Branch) will be temporarily realigned for one year and nine months. A 340m section of Clive Green Lane will be realigned, up to 80m north of its existing alignment, resulting in a negligible change in journey length. Traffic management measures will be implemented

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for three months to connect the existing highway with the permanent realignment of Clive Green Lane;

- A530 Nantwich Road/Clive Green Lane/Coalpit Lane roundabout – temporary realignment of the A530 Nantwich Road for 10 months to accommodate the construction of the A530 Nantwich Road/Clive Green Lane/Coalpit Lane roundabout, resulting in a negligible change in journey length;
- Birch Lane – temporary traffic management for two months during construction of the Birch Lane diversion, with no change in journey length;
- Bell Lane – temporary closure of Bell Lane during the construction of the A54 Middlewich Road realignment for a period of four years and three months. Traffic will be diverted via the A533 Northwich Road, the existing A54 Middlewich Road and the realigned A54 Middlewich Road following its opening, increasing journey length for some users by 660m;
- Whatcroft Hall Lane – temporary realignment of Whatcroft Hall Lane, over a distance of 200m, up to 30m south of its current alignment, which will be in use for three months, resulting in a negligible change in journey length;
- Davenham Road – temporary closure of a section of Davenham Road where it is crossed by the route of the Proposed Scheme for 4 weeks. Traffic will be diverted via Davenham Road, Shipbrook Road, Church Street, London Road and the A556 Chester Road, increasing journey length for some users by 7.2km;
- A530 King Street – temporary diversion of a section of the A530 King Street, 50m east of its existing alignment, which will be in use for seven months, resulting in a negligible change in journey length. On completion of construction, the A530 King Street will be reinstated along its existing alignment;
- A556 Shurlach Road/Chester Road – temporary realignment of the A556 Shurlach Road/Chester Road at its junction with the A559 Manchester Road over a distance of 240m, 22m north of its existing alignment, which will be in use for two years and six months, resulting in a negligible change in journey length. The current configuration will be reinstated once construction of Wade Brook viaduct and Lostock Gralam viaduct are complete;
- A559 Manchester Road – temporary realignment of the A559 Manchester Road at its junction with A556 Shurlach Road/Chester Road over a distance of 335m, 25m north of its existing alignment, which will be in use for two years and six months, resulting in a negligible change in journey length. The current configuration will be reinstated once construction of Wade Brook viaduct and Lostock Gralam viaduct are complete; and
- Linnards Lane – temporary closure of Linnards Lane for four weeks during the construction of Smoker Brook viaduct. Traffic will be diverted via the A559 Manchester Road/Hall Lane and the B5391 Church Street, increasing journey length for some users by 1.7km.

14.4.24 The temporary diversions or realignments will change journey length for vehicle occupants. Many of the diversions or realignments are less than 1km in length and will not result in any

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significant effects with regard to changes in journey times for vehicle occupants. However, some of the diversion or realignments are greater than 1km, which may result in significant effects for vehicle occupants. They may also affect non-motorised users, which is considered separately below. The effects, which are significant, will be:

- Davenham Road – major adverse effect from increase in journey length for some users of 7.2km; and
- Linnards Lane - minor adverse effect from increase in journey length for some users of 1.7km.

14.4.25 The movement of excavated or fill material and construction vehicles accessing construction compounds during the construction of the Proposed Scheme together with temporary road closures and diversions is expected to result in changes in daily traffic flows.

14.4.26 These changes in traffic flow will lead to changes in delays to vehicle occupants and congestion, which are significant. The significant effects with the highest magnitude at each junction will be (ordered by road class from south to north):

- A530 Nantwich Road/Chapel Lane - major adverse effect during scenario 1;
- A533 Booth Lane/Cledford Lane/Cross Lane - minor adverse effect during scenario 1;
- A530 Nantwich Road/Clive Green Lane - major adverse effect during scenarios 1 and 2;
- Clive Green Lane/Coalpit Lane - major adverse effect during scenario 1;
- B5074 Swanlow Lane/Townfields Road/Townfields Drive - major adverse effect during scenario 1;
- A530 Nantwich Road/Brynlow Drive - major adverse effect during scenario 1;
- Clive Lane/Clive Green Lane - major adverse effect during scenario 1;
- Clive Lane/Rilshaw Lane - major adverse effect during scenarios 1, 2, 3 and 4;
- A54 Middlewich Road/Clive Lane/Road One - major adverse effect during scenarios 3 and 4;
- A530 Nantwich Road/St Ann's Road - major adverse effect during scenario 2;
- A54 St Michael's Way/A54 Kinderton Street/A533 Leadsmithy Street - major adverse effect during scenarios 1, 2, 3 and 4;
- A54 Chester Road/A530 St. Michael's Way/A530 Nantwich Road - major adverse effect during scenarios 2, 3 and 4;
- A54 Chester Road/A530 Newton Bank - major adverse effect during scenarios 2, 3 and 4;
- A54 Chester Road/A530 Croxton Lane - major adverse effect during scenarios 2, 3 and 4;
- A54 Holmes Chapel Road/Pochin Way/Centurion Way - major adverse effect during scenarios 2, 3 and 4;
- A5018 Wharton Road/B5355 Wharton Road/A5018 Wharton Park Road/Collingtree Avenue - major adverse effect during scenario 1;
- A533 Bostock Road/A5018 Bostock Road/A533 Davenham Road/Road One - moderate adverse effect during scenarios 1, 2, 3 and 4;

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- A530 King Street/A530 Croxton Lane/B5309 King Street - major adverse effect during scenarios 1, 2, 3 and 4;
- A533 Davenham Bypass/Jack Lane - major adverse effect during scenarios 1, 2 and 3;
- London Road/Jack Lane - major adverse effect during scenarios 1, 2 and 3;
- London Road/Church Street - major adverse effect during scenarios 1, 2, 3 and 4;
- Shurlach Lane/Davenham Road/Shipbrook Road/Manor Lane - major adverse effect during scenarios 1 and 2;
- A556 Shurlach Road/A533 Davenham Bypass - minor adverse effect during scenario 3 and minor beneficial effect during scenarios 1 and 2;
- A556 Shurlach Road/A556 Chester Road/A533 London Road/London Road - minor adverse effect during scenarios 1, 2, 3 and 4;
- A530 King Street/Davenham Road/Crowders Lane - major adverse effect during scenarios 1, 2, 3 and 4;
- A533 Kingsmead/Moor Park Way/Regency Way - minor beneficial effect during scenario 4;
- A556 Shurlach Road/Shurlach Lane - major adverse effect during scenarios 1, 2, 3 and 4;
- A556 Shurlach Road/A530 King Street - major adverse effect during scenarios 1, 2, 3 and 4;
- Gadbrook Road/East Avenue - major adverse effect during scenarios 3 and 4;
- A533 London Road/A533 Kingsmead - minor adverse effect during scenarios 1, 2 and 3;
- A530 Griffiths Road/A530 King Street/B5082 Middlewich Road - moderate adverse effect during scenario 4;
- A559 Watling Street/Apple Market Street - moderate adverse effect during scenarios 1, 2 and 3;
- B5082 Station Road/Manchester Road/B5062 Middlewich Road/Victoria Road - minor adverse effect during scenarios 1, 2 and 4;
- A559 Chester Way/B5082 Station Road/B5075 New Warrington Road - moderate adverse effect during scenarios 1 and 2;
- A556 Shurlach Road (southbound) realignment/Birches Lane diversion - major adverse effect during scenarios 1 and 2;
- A530 Griffiths Road/A559 Manchester Road - major adverse effect during scenarios 1, 2, 3 and 4;
- A559 Manchester Road/A559 Hall Lane/Station Road - major adverse effect during scenarios 1, 2 and 4;
- A559 Manchester Road/Stubbs Lane - moderate adverse effect during scenarios 1, 2, 3 and 4;
- B5075 Ollershaw Lane/B5075 New Warrington Road/Chapel Street - moderate adverse effect during scenarios 1 and 2;

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- A559 Marston Lane/B5391 Church Street/A559 Hall Lane/Wincham Lane - moderate adverse effect during scenarios 1, 2 and 3;
- A556 Chester Road/B5569 Plumley Moor Road - minor adverse effect during scenario 3;
- B5391 Church Street/B5391 Pickmere Lane/Linnards Lane/Earles Lane - major adverse effect during scenario 2;
- A559 Marston Lane/B5075 Ollershaw Lane/Dark Lane - major adverse effect during scenarios 1, 2 and 4 and minor beneficial effect during scenario 3; and
- A50 Tofts Road/Goughs Lane - major adverse effect during scenario 3 and moderate beneficial effect during scenario 2.

14.4.27 Construction of the Proposed Scheme will result in substantial changes in traffic flows (i.e. more than 30% for HGVs or for all vehicles) in some locations, which can lead to changes in traffic-related severance for non-motorised users, which are significant. The significant effects with the highest magnitude in each location are set out in Table 50 and Table 51.

**Table 50: Roads with changes in daily all vehicle movements (more than 30%) resulting in significant effects on traffic-related severance for non-motorised users, 2030**

Road name	Significant effect	Construction scenario
Swanlow Drive (between B5074 Swanlow Lane and Darnhall School Lane)	Minor adverse	Scenario 1
B5074 Swanlow Lane (between Moors Lane and Swanlow Drive)	Moderate adverse	Scenario 1
Darnhall School Lane (between Glebe Green Drive and B5074 Swanlow Lane)	Major adverse	Scenario 1
Durham Drive/Glebe Green Drive (between Darnhall School Lane and Townsfields Drive)	Major adverse	Scenarios 1, 2, 3 and 4
Durham Drive/Dover Drive/Mount Pleasant Drive (between Townsfields Drive and Denbigh Drive)	Major adverse	Scenarios 1, 2, 3 and 4
Clive Green Lane realignment/Clive Lane (between A530 Nantwich Road and A54 Middlewich Road)	Moderate adverse	Scenarios 1, 3 and 4
Cledford Lane (between Jones Lane and Bradwall Road)	Minor adverse	Scenarios 2, 3 and 4
Mount Pleasant Drive (between Denbigh Drive and Woodford Lane West)	Major adverse	Scenarios 1, 2, 3 and 4
Woodford Lane West (between Mount Pleasant Drive and A54 Oakmere Road)	Major adverse	Scenario 1
St Ann's Road (between Sutton Lane and Manor Lane)	Minor beneficial	Scenario 1
St Ann's Road (between Manor Lane and King Edward Street)	Minor beneficial	Scenario 1
A54 Middlewich Road realignment (between Clive Lane and A533 Northwich Road diversion)	Moderate beneficial	Scenario 1
St Ann's Road (between King Edward Street and A530 Nantwich Road)	Moderate beneficial	Scenario 1
A54 Chester Road (between A530 Newton Bank and A530 Croxton Lane)	Moderate beneficial	Scenario 1
King Street (between New King Street and Hadrian Way)	Moderate adverse	Scenarios 3 and 4

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Road name	Significant effect	Construction scenario
Road One (between A533 Bostock Road and A54 Middlewich Road)	Moderate adverse	Scenario 1
A533 Northwich Road/Bostock Road (between London Road and Bell Lane)	Moderate beneficial	Scenario 1
London Road (between A533 Bostock Road and Brick Kiln Lane)	Moderate adverse	Scenarios 2, 3 and 4
B5082 Penny's Lane (between A556 Shurlach Road and Crowders Lane)	Moderate adverse	Scenario 4
Birches Lane diversion (between A556 Shurlach Road and B5082 Holmes Chapel Road)	Major adverse	Scenarios 1 and 2
Grange Road (between West Avenue and East Avenue)	Moderate adverse	Scenarios 1, 2, 3 and 4
West Avenue (between Gadbrook Road and Grange Road)	Moderate adverse	Scenario 4
Central Road (between West Avenue and East Avenue)	Moderate adverse	Scenarios 1, 2, 3 and 4
Greenway Drive (between Agecroft Road and Belmont Road)	Minor adverse	Scenarios 1 and 2
A556 Shurlach Road (between Birches Lane and A559 Manchester Road)	Major adverse	Scenarios 1, 2 and 3
School Lane (between Station Road and Stubbs Lane)	Minor adverse	Scenario 4

**Table 51: Roads with changes in daily HGV movements (more than 30%) resulting in significant effects on traffic-related severance for non-motorised users, 2030**

Road name	Significant effect	Construction scenario
Davenham Road (between Shurlach Lane and A530 King Street)	Major adverse	Scenarios 1, 2, 3 and 4
Middlewich Eastern Bypass (between A533 Booth Lane and Cledford Lane)	Moderate adverse	Scenarios 1, 3 and 4
Clive Green Lane realignment/Clive Lane (between A530 Nantwich Road and A54 Middlewich Road)	Moderate adverse	Scenarios 3 and 4
A54 Middlewich Road (between Clive Lane and A54 Winsford Bypass)	Moderate beneficial	Scenario 1
A54 Kinderton Street (between A533 Leadsmithy Street and King Street)	Moderate adverse	Scenarios 3 and 4
A54 St Michael's Way (between A533 Leadsmithy Street and The Bull Ring)	Moderate adverse	Scenarios 3 and 4
A54 St Michael's Way (between The Bull Ring and A54 Chester Road)	Moderate adverse	Scenarios 3 and 4
Middlewich Eastern Bypass (between Cledford Lane and A54 Holmes Chapel Road)	Moderate adverse	Scenarios 1, 3 and 4
A54 Chester Road (between A54 St Michael's Way and A530 Newton Bank)	Moderate adverse	Scenarios 3 and 4
A54 Holmes Chapel Road (between King Street and B5309 Centurion Way)	Moderate adverse	Scenarios 3 and 4
A54 Chester Road (between A530 Newton Bank and A530 Croxton Lane)	Moderate adverse	Scenarios 3 and 4
A54 Chester Road (between A530 Croxton Lane and A533 Northwich Road)	Moderate adverse	Scenarios 1, 3 and 4



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Road name	Significant effect	Construction scenario
B5309 Centurion Way (between B5081 Byley Road and A54 Holmes Chapel Road)	Moderate adverse	Scenarios 1, 2, 3 and 4
B5309 Centurion Way (between White Park Close and B5081 Byley Road)	Major adverse	Scenarios 1, 2, 3 and 4
B5309 Centurion Way (between White Park Close and B5309 King Street)	Major adverse	Scenarios 1, 2, 3 and 4
B5081 Byley Road (between B5309 Centurion Way and Moss Lane)	Major adverse	Scenarios 1, 2, 3 and 4
B5309 King Street (between B5309 Centurion Way and Yatehouse Lane)	Major adverse	Scenarios 1, 2, 3 and 4
B5309 King Street (between Yatehouse Lane and A530 Croxton Lane)	Major adverse	Scenarios 1, 2, 3 and 4
A530 King Street (between Whatcroft Hall Lane and Davenham Road)	Major adverse	Scenarios 1, 2 and 3
A533 Davenham Bypass (between London Road and A556 Shurlach Road)	Moderate adverse	Scenarios 1 and 2
A556 Shurlach Road off-slip (between A556 Shurlach Road and A533 Davenham Bypass)	Moderate adverse	Scenarios 1 and 2
Crowders Lane (between B5082 Penny's Lane and A530 King Street)	Major adverse	Scenarios 1 and 2
A530 King Street (between Davenham Road and Gadbrook Distribution Centre)	Moderate adverse	Scenario 4
A530 King Street (between Gadbrook Distribution Centre Access and A556 Shurlach Road)	Major adverse	Scenario 4
Birches Lane diversion (between A556 Shurlach Road and B5082 Holmes Chapel Road)	Major adverse	Scenario 4
Gadbrook Road (between East Avenue and A556 Shurlach Road)	Moderate adverse	Scenarios 1 and 2
East Avenue (between Gadbrook Road and Grange Road)	Minor adverse	Scenarios 1 and 2
A556 Shurlach Road (between A530 King Street and Birches Lane)	Moderate adverse	Scenarios 1 and 2
East Avenue (between Grange Road and South Drive)	Minor adverse	Scenarios 1 and 2
East Avenue (between South Drive and Central Road)	Minor adverse	Scenarios 1 and 2
Birches Lane/Station Road (between A556 Shurlach Road and School Lane)	Major adverse	Scenarios 1 and 2
A556 Shurlach Road (between Birches Lane and A559 Manchester Road)	Major adverse	Scenarios 1, 2 and 3
A530 Griffiths Road (between A559 Manchester Road and B5082 Middlewich Road)	Major adverse	Scenarios 1, 2, 3 and 4
A559 Manchester Road (between A530 Griffiths Road and A559 Hall Lane)	Moderate adverse	Scenarios 1 and 2
Station Road (between School Lane and A559 Manchester Road)	Moderate adverse	Scenarios 1, 2, 3 and 4
A559 Manchester Road (between A559 Hall Lane and Stubbs Lane)	Moderate adverse	Scenarios 1 and 2
A559 Manchester Road (between Stubbs Lane and Fryer Road)	Moderate adverse	Scenarios 1 and 2
A559 Manchester Road (between Fryer Road and A556 Shurlach Road)	Moderate adverse	Scenarios 1 and 2

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Road name	Significant effect	Construction scenario
A556 Chester Road (between A559 Manchester Road and Linnards Lane)	Moderate adverse	Scenarios 1, 2 and 3
A556 Chester Road (between Linnards Lane and Plumley Moor Road)	Moderate adverse	Scenarios 3 and 4

14.4.28 Utility works have been included in the assessment where they are major and where the traffic or transport impacts from the works separately, or in combination with other works, will be greater than other construction activities arising within the area. Most utility works are expected to result in only localised traffic and pedestrian diversions, which will be of short-term duration and are not expected to result in significant effects.

### **Accidents and safety**

14.4.29 There will be no significant effects on accidents and safety as there are no locations where there are both accident clusters and substantial changes in traffic during construction.

### **Parking and loading**

14.4.30 The Proposed Scheme will impact parking in the local area. This is likely to result in a major adverse effect, which is significant, at the Gadbrook Distribution Centre, where approximately 210 out of 733 off-street parking spaces will be temporarily lost. The loss of off-street parking spaces will be associated with the construction of Gad Brook viaduct, which will take two years and three months to complete. Thirteen Blue Badge bays will be relocated.

14.4.31 HS2 Ltd will work with the businesses affected to identify opportunities where reasonably practicable to mitigate effects on parking.

14.4.32 Permanent loss of parking is reported under the operational assessment.

### **Public transport network**

14.4.33 Construction of the Proposed Scheme will not result in any significant effects upon the operation of existing bus services or stops.

14.4.34 There are interfaces with the existing rail network in this area, in particular on the operation of the WCML, the Sandbach to Northwich Line and the Mid-Cheshire Line and its passengers and rail freight services.

14.4.35 The construction of the Proposed Scheme is expected to require a number of rail possessions and blockades over a period of up to four years in this area. Overall, there will be 22 possessions comprising nine possessions of up to 27 hours, 12 possessions up to 54 hours and one possession up to 72 hours. The possessions will be required to enable the construction of scheme elements including the following: A530 Nantwich Road overbridge, Crewe North RSD, Trent and Mersey Canal viaduct, Lostock Gralam viaduct and utility works.

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- 14.4.36 Disruption to rail users will be reduced by limiting possessions, where reasonably practicable, to existing maintenance periods. Possessions will affect users of the WCML, the Sandbach to Northwich Line and the Mid-Cheshire Line and will be managed through a combination of measures, which could include rail service diversions or replacement bus services, which will reduce the disruption to the travelling public. The WCML will be affected by possessions in the Wimboldsley to Lostock Gralam area, the Hough to Walley's Green area (MA01) and the Risley to Bamfurlong area (MA05). The combined effects of these possessions are reported in Volume 3, Route-wide effects, Section 14. As the possessions on the Sandbach to Northwich Line and the Mid-Cheshire Line will be short term in nature, the effect on delay to rail passengers and freight services will not be significant.
- 14.4.37 HS2 Ltd will work with Network Rail and the train and freight operating companies to ensure that any need for additional possessions can be reduced with good planning and communication (including appropriate advance notice).

### **Non-motorised users**

- 14.4.38 The construction works associated with the Proposed Scheme will require the temporary closure, diversion or realignment of PRow and roads in the vicinity of the Proposed Scheme, including, where necessary, around construction compounds. In most cases, these will be of a short duration and/or distance and will not have a significant effect on users.
- 14.4.39 Nonetheless, there will be temporary effects, which are significant, on non-motorised users during construction as a result of changes in journey length and/or hindrances such as substantial changes in levels for non-motorised users due to temporary PRow and road realignments or diversions at:
- Footpath Wimboldsley 1/1 - moderate adverse effect from an increase in journey length for some users of 1.5km;
  - Footpath Winsford 3/4 - moderate adverse effect from an increase in journey length for some users of 585m;
  - Footpath Winsford 3/1 and Footpath Stanthorne 3/1 – moderate adverse effect from an increase in journey length for some users of 511m;
  - Bell Lane – moderate adverse effect from an increase in journey length for some users of 625m;
  - Footpath Winsford 37/1 and Footpath Stanthorne 1/1 – moderate adverse effect from an increase in journey length for some users of 765m;
  - Footpath Rudheath 3/4, Footpath Rudheath 3/3, Footpath Lach Dennis 3X/2 and Footpath Lach Dennis 3X/1 – moderate adverse effect from an increase in journey length for some users of 660m; and
  - Linnards Lane – moderate adverse effect from an increase in journey length for some users of 3.6km.
- 14.4.40 Permanent diversions to PRow and roads are reported under the operational assessment.

## **Waterways and canals**

- 14.4.41 The Proposed Scheme will include the construction of the Shropshire Union Canal Offline Overbridge, three viaducts over the Shropshire Union Canal and one viaduct over the Trent and Mersey Canal. The construction of the Proposed Scheme will require temporary closures of the canals. However, the closures will be short in duration and consequently will not have a significant effect upon navigable waterways or canals in the Wimboldsley to Lostock Gralam area.

## **Permanent effects**

- 14.4.42 Any permanent effects of construction are considered in the assessment of operation for traffic and transport. This is because the impacts and effects of ongoing changes in travel demand and the wider impacts and effects of the operational phase need to be considered together.

## **Other mitigation measures**

- 14.4.43 The implementation of the measures in the draft CoCP, including travel plans, will help mitigate the transport-related effects during construction of the Proposed Scheme.
- 14.4.44 No further appropriate traffic and transport mitigation measures have been identified. HS2 Ltd will, however, continue to work with the relevant highway authorities to identify whether further mitigation measures should be provided.

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

- 14.4.45 The temporary residual significant effects during construction remain as described above. These effects will be temporary and reversible in nature lasting only for the duration of the construction works.
- 14.4.46 The construction of the Proposed Scheme will result in changes in journey lengths for vehicle users during the construction period, resulting in the following temporary effects, which are significant:
- major adverse effect on users of one road; and
  - minor adverse effect on users of one road.
- 14.4.47 The most intensive periods of construction of the Proposed Scheme will cause changes in traffic that will result in the following temporary effects, which are significant, through changes in congestion and/or delays for road users:
- major adverse effects at 30 junctions;
  - moderate adverse effects at seven junctions;
  - minor adverse effects at six junctions;
  - moderate beneficial effects at one junction; and
  - minor beneficial effects at three junctions.

- 14.4.48 Changes in traffic during the construction period will result in the following temporary effects, which are significant, on traffic-related severance for non-motorised users:
- major adverse effects on 18 roads;
  - moderate adverse effects on 32 roads;
  - minor adverse effects on seven roads;
  - moderate beneficial effects on four roads; and
  - minor beneficial effects on two roads.
- 14.4.49 The loss of parking spaces during the construction period will result in a temporary major adverse effect, which is significant, at one location.
- 14.4.50 Changes in journey length for non-motorised users during the construction period will result in temporary moderate adverse effects, which are significant, on users of five PRoW and two roads.

## Cumulative effects

- 14.4.51 The assessment includes the cumulative effects of planned and committed development during construction by taking this into account within the background traffic growth.
- 14.4.52 The assessment also takes into account Proposed Scheme construction traffic and transport impacts of works to construct the Proposed Scheme being undertaken in neighbouring community areas.

## 14.5 Effects arising from operation

- 14.5.1 This section presents the likely significant environmental effects of the operation of the Proposed Scheme in 2038 and 2046.

### Avoidance and mitigation measures

- 14.5.2 The following measures have been included as part of the design of the Proposed Scheme and will 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.
- 14.5.3 A depot travel plan for Crewe North RSD will be developed and will include measures that aim to reduce the impacts and effects of traffic and transport movements.

### Assessment of impacts and effects

- 14.5.4 The following section considers the impacts on traffic and transport and the consequential effects resulting from the operational phase of the Proposed Scheme in 2038 and 2046.

## Key operation transport issues

- 14.5.5 The assessment takes account of all of the impacts of the Proposed Scheme in the Wimboldsley to Lostock Gralam area. The main traffic and transport impacts during operation of the Proposed Scheme in this area will be associated with the operation and maintenance of Crewe North RSD and Crewe North IMB-R, partly located in the Hough to Walley's Green area (MA01), which will generate additional vehicle movements due to staff, servicing and operational traffic.

## Highway network

### Strategic and local highway network

- 14.5.6 The Proposed Scheme will require the permanent widening, diversion, closure or realignment of (ordered by road class from south to north):
- A530 Nantwich Road – realignment of a section of the A530 Nantwich Road, 55m south of its current alignment, where it is crossed by the existing WCML and the route of the Proposed Scheme on A530 Nantwich Road overbridge, resulting in a negligible change in journey length. It will be retained as access to both sides of the Proposed Scheme for the Verdin Arms public house, Wimboldsley Hall and Wimboldsley Grange to the west, and Manor Cottage to the east and used as an emergency access for the Crewe North RSD;
  - A54 Middlewich Road – realignment of a section of the A54 Middlewich Road, 137m north of its existing alignment, connecting with the diverted A533 Northwich Road at a new three-arm priority controlled (give-way) roundabout. The A54 Middlewich Road realignment will be crossed by the route of the Proposed Scheme on A54 Middlewich Road viaduct. The Bell Lane realignment and the Birch Lane diversion will connect with the A54 Middlewich Road realignment at a priority controlled (give-way) staggered crossroads. The realignment will increase journey length for users of the A54 Middlewich Road by 154m;
  - A533 Northwich Road – closure of the A533 Northwich Road where it crosses the route of the Proposed Scheme and diversion of a section of the A533 Northwich Road, up to 300m south of its existing alignment. The A533 Northwich Road diversion will connect with the realigned A54 Middlewich Road at a new roundabout, increasing journey length for some users by 221m;
  - A556 Shurlach Road – realignment of a section of the A556 Shurlach Road up to 90m to the north-west of its current alignment for 2.3km, resulting in a negligible change in journey length;
  - B5082 Penny's Lane – the existing B5082 Penny's Lane will be closed where it is crossed by the route of the Proposed Scheme. It will be retained as access to both sides of the route of the Proposed Scheme, with turning heads provided to facilitate vehicle access on the retained sections of the road. A section of the B5082 Penny's Lane will be diverted 420m south of its current alignment, connecting with A530 King Street as a new fourth



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arm of the existing A530 King Street/Gadbrook Distribution Centre roundabout junction, increasing journey length for some users by 468m;

- Clive Green Lane – realignment and modification of a section of Clive Green Lane, up to 120m south of its current alignment, where it is crossed by the route of the Proposed Scheme on Clive Green Lane overbridge, increasing journey length for some users by 182m. At its western extent, the Clive Green Lane realignment will cross the Shropshire Union Canal on a new overbridge and at its eastern extent will connect to the A530 Nantwich Road and Coalpit Lane via a new roundabout. The existing section of Clive Green Lane will be closed where it is crossed by the route of the Proposed Scheme;
- Coalpit Lane – permanent realignment of the southern section of Coalpit Lane, up to 25m west of its current alignment for 140m, to connect with the A530 Nantwich Road/Clive Green Lane/Coalpit Lane roundabout, resulting in a negligible change in journey length;
- Birch Lane – diversion of a section of Birch Lane to connect with the realigned A54 Middlewich Road, up to 50m west of its existing alignment, increasing journey length for some users by 128m;
- Bell Lane – realignment of a section of Bell Lane where it is crossed by the realigned A54 Middlewich Road, reducing its length by 40m, resulting in a negligible change in journey length;
- Cookes Lane – the closure of the north-eastern section of Cookes Lane where it is crossed by A556 Shurlach Road realignment. An access road serving land to the west of the A556 Shurlach Road realignment will be provided, resulting in a negligible change in journey length;
- Birches Lane (east) – diversion of a section of Birches Lane east of the route of the Proposed Scheme, 300m north-east of the current alignment for 494m, under Wade Brook offline overbridge, increasing journey length for some users by 395m; and
- Birches Lane (west) - realignment of a section of Birches Lane west of the route of the Proposed Scheme and connecting with the realigned A556 Shurlach Road, resulting in a negligible change in journey length.

14.5.7 The permanent diversions or realignments will increase journey length for vehicle occupants. However, all of the diversions or realignments are less than 1km in length and will not result in any significant effects with regard to changes in journey times for vehicle occupants. They may affect non-motorised users, which is considered separately below.

14.5.8 The proposed Crewe North IMB-R and Crewe North RSD will generate additional vehicle movements due to staff, servicing and operational traffic. However, Crewe North IMB-R is expected to generate infrequent traffic movements and will not result in any traffic and transport impacts. The majority of trips generated by Crewe North RSD are expected to occur during off-peak periods, however, the Proposed Scheme may result in traffic and transport impacts on the local road network. The maintenance of the Proposed Scheme will generate limited vehicular trips.

14.5.9 The diversion of traffic associated with highway changes, including the realignment of the A54 Middlewich Road, the diversion of the A533 Bostock Road and the A556 Shurlach Road

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realignment, combined with depot related traffic will lead to flow changes on the highway network. This will result in changes in congestion and delays at junctions. The junctions with changes in delay in 2038, which are significant, will be:

- A54 Middlewich Road/Clive Lane/Road One - moderate adverse effect;
- A530 Nantwich Road/St Ann's Road - minor adverse effect;
- A556 Shurlach Road/Shurlach Lane - moderate adverse effect;
- A530 Griffiths Road/A530 King Street/B5082 Middlewich Road - moderate adverse effect;
- A556 Shurlach Road (southbound) realignment/Birches Lane diversion – major adverse effect;
- A530 Griffiths Road/A559 Manchester Road - major adverse effect;
- A559 Manchester Road/A559 Hall Lane/Station Road - major adverse effect; and
- A556 Chester Road/A559 Manchester Road – minor adverse effect.

14.5.10 The junctions with changes in delay in 2046, which are significant, will be:

- A530 Nantwich Road/Clive Green Lane realignment/Coalpit Lane - major adverse effect;
- A54 Middlewich Road/Clive Lane/Road One - moderate adverse effect;
- A54 St Michael's Way/A54 Kinderton Street/A533 Leadsmithy Street - minor adverse effect;
- A54 Chester Road/A530 St. Michael's Way/A530 Nantwich Road - minor adverse effect and minor beneficial effect;
- A533 Bostock Road/Road One/A5018 Bostock Road/A533 Davenham Road - moderate adverse effect;
- A556 Chester Road/Hartford Road/Hill Top Grange - minor adverse effect;
- A530 King Street/Davenham Road/Crowders Lane - moderate adverse effect;
- A556 Shurlach Road/Shurlach Lane - moderate adverse effect;
- A530 Griffiths Road/A530 King Street/B5082 Middlewich Road - moderate adverse effect;
- A556 Shurlach Road (southbound) realignment/Birches Lane diversion - major adverse effect;
- A530 Griffiths Road/A559 Manchester Road - moderate adverse effect;
- A559 Manchester Road/A559 Hall Lane/Station Road - major adverse effect; and
- A556 Chester Road/A559 Manchester Road - minor adverse effect.

14.5.11 A change in traffic levels can result in changes to traffic-related severance for non-motorised road users, particularly pedestrians using or seeking to cross a road. The permanent highway changes which are forecast to result in changes in peak hour traffic flow (more than 10% for all vehicles) that will result in changes in traffic-related severance for non-motorised users, which are significant, are set out in Table 52. Where there is no significant effect on a road during a particular time period it is represented by a dash.

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**Table 52: Roads with changes in traffic flow resulting in significant effects on traffic-related severance for non-motorised users, 2038 and 2046**

Road name	2038 AM peak hour	2038 PM peak hour	2046 AM peak hour	2046 PM peak hour
Darnhall School Lane (between Glebe Green Drive and B5074 Swanlow Lane)	Moderate adverse	-	Minor adverse	-
Durham Drive/Glebe Green Drive (between Darnhall School Lane and Townsfields Drive)	Moderate adverse	-	-	-
Townfields Drive (between B5074 Swanlow Lane and Durham Drive)	-	-	Moderate adverse	-
Durham Drive/Dover Drive/Mount Pleasant Drive (between Townsfields Drive and Denbigh Drive)	Moderate adverse	-	Moderate beneficial	-
Woodford Lane West (between Mount Pleasant Drive and A54 Oakmere Road)	-	-	Moderate beneficial	-
Elm Road (between Long Lane South and A533 Booth Lane)	-	-	Minor adverse	-
Beeston Drive (between Denbigh Drive and Handley Hill)	-	Minor adverse	Minor adverse	Minor adverse
Brynlow Drive (between Long Lane and A530 Nantwich Road)	-	-	Moderate adverse	-
Hayhurst Avenue (between Long Lane and Sutton Lane)	-	-	Moderate adverse	-
St Anne's Avenue (between Sutton Lane and A533 Booth Lane)	-	-	Major adverse	-
Beeston Drive (between Handley Hill and B5074 Swanlow Lane)	-	Minor adverse	Minor adverse	Minor adverse
Sutton Lane (between St Ann's Road and A533 Lewin Street)	-	-	-	Moderate adverse
Clive Green Lane realignment/Clive Lane (between A530 Nantwich Road and A54 Middlewich Road)	Major adverse	Major adverse	Major adverse	Major adverse
Station Road (between B5355 Crook Lane and Rilshaw Lane)	Moderate adverse	-	-	-
Dingle Lane/Weaver Street (between The Drumber and A54 Winsford Bypass)	-	-	Moderate beneficial	-
Dene Drive (between A54 High Street and The Drumber)	-	Moderate adverse	-	-
B5355 Station Road (between A54 Middlewich Road and B5355 Crook Lane)	Moderate adverse	-	-	-
Dingle Lane (between A54 High Street and The Drumber)	-	-	Moderate adverse	-
Nixon Drive (between Abbots Way and Basford Way)	-	-	Minor adverse	-
Nixon Drive (between B5074 Delamere Street and Abbots Way)	-	-	Moderate adverse	-
Road One (between A533 Bostock Road and A54 Middlewich Road)	Moderate adverse	-	-	-

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Road name	2038 AM peak hour	2038 PM peak hour	2046 AM peak hour	2046 PM peak hour
B5355 Wharton Road (between Nat Lane and Bradbury Road)	-	-	-	Moderate adverse
B5355 Wharton Road (between A5018 Wharton Park Road and Bradbury Road)	-	-	-	Moderate adverse
A533 Northwich Road/Bostock Road (between London Road and Bell Lane)	-	-	-	Moderate adverse
A533 Bostock Road (between A5018 Bostock Road and London Road)	Moderate adverse	-	-	Moderate adverse
London Road (between A533 Bostock Road and Brick Kiln Lane)	Moderate adverse	-	-	-
A530 King Street (between A530 Croxton Lane and Whatcroft Hall Lane)	-	-	Moderate adverse	-
London Road (between Hartford Road and Church Street)	Moderate beneficial	-	Moderate beneficial	-
Church Street/Shipbrook Road (between London Road and Shurlach Lane)	Major beneficial	-	Moderate beneficial	-
A50 London Road (between B5082 Northwich Road and Booth Bed Lane)	-	-	Moderate beneficial	-
A50 Holmes Chapel Road (between Booth Bed Lane and B5081 Middlewich Road)	-	-	Moderate beneficial	-
Booth Bed Lane (between Main Road and A50 London Road)	-	Minor adverse	-	-
London Road (between Green Lane and A556 Chester Road)	Moderate beneficial	-	Moderate beneficial	-
Davenham Road (between Shurlach Lane and A530 King Street)	Moderate beneficial	-	Moderate beneficial	-
B5082 Holmes Chapel Road (between B5081 Byley Lane and Birches Lane)	-	Moderate adverse	Moderate adverse	Moderate adverse
Crowders Lane (between B5082 Penny's Lane and A530 King Street)	Major beneficial	Moderate adverse	Major beneficial	Moderate adverse
London Road (between Dunham Road and Old Hall Road)	-	-	Moderate beneficial	-
Old Hall Road (between Clifton Drive and Fairfield Road)	-	-	Major beneficial	-
Old Hall Road (between Granville Road and Clifton Drive)	-	-	Major beneficial	-
Old Hall Road (between London Road and Granville Road)	-	-	Major beneficial	-
London Road (between Old Hall Road and Lime Avenue)	-	-	Major beneficial	-
A530 King Street (between Gadbrook Distribution Centre Access and A556 Shurlach Road)	Major adverse	Major adverse	Major adverse	Major adverse
B5082 Penny's Lane (between A556 Shurlach Road and Crowders Lane)	Major adverse	Major adverse	Major adverse	Major adverse

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Road name	2038 AM peak hour	2038 PM peak hour	2046 AM peak hour	2046 PM peak hour
Kingsley Drive (between Old Hall Road and Langley Road)	-	-	Moderate adverse	-
Shipbrook Road (between Gadbrook Road and A556 Shurlach Road)	Moderate adverse	-	Moderate adverse	-
Birches Lane diversion (between A556 Shurlach Road and B5082 Holmes Chapel Road)	Major adverse	Major adverse	Major adverse	Major adverse
A556 Shurlach Road (between A530 King Street and Birches Lane)	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial
A530 King Street (between B5082 Middlewich Road and A556 Shurlach Road)	-	Moderate adverse	-	Moderate adverse
Percy Street (between Whalley Road and A559 Chester Way)	-	-	Moderate adverse	-
Brockhurst Street (between Percy Street and A5509 Chester Way)	-	-	Minor beneficial	-
Applemarket Street (between Weaver Way and A559 Watling Street)	-	-	Moderate adverse	-
Birches Lane/Station Road (between A556 Shurlach Road and School Lane)	Moderate adverse	Major adverse	Major adverse	Major adverse
A530 Griffiths Road (between A559 Manchester Road and B5082 Middlewich Road)	-	Moderate adverse	-	-
Station Road (between School Lane and A559 Manchester Road)	Moderate adverse	-	Major adverse	Major adverse
School Lane (between Station Road and Stubbs Lane)	Minor adverse	Moderate adverse	Moderate adverse	Moderate adverse
Fryer Road/Townshend Lane (between A559 Hall Lane and A559 Manchester Road)	-	Moderate adverse	-	-
A569 Hall Lane (between Townshend Road and Green Lane)	-	Moderate adverse	-	Moderate adverse
A559 Manchester Road (between Fryer Road and A556 Shurlach Road)	-	Moderate adverse	-	Moderate adverse
A559 Hall Lane (between Green Lane and B5391 Church Street)	-	-	-	Moderate adverse
A569 Marston Lane (between B5391 Church Street and Earles Lane)	-	Moderate adverse	-	-
B5391 Church Street (between Earles Lane and A559 Marston Lane)	-	-	-	Moderate beneficial
Linnards Lane (between Green Lane and B5391 Church Street)	-	Moderate beneficial	-	Moderate beneficial

## Accidents and safety

- 14.5.12 There will be no significant effects on accidents and safety as there are no locations where there are both accident clusters and substantial changes in traffic due to the operation of the Proposed Scheme.

## **Parking and loading**

- 14.5.13 There will be a permanent loss of approximately 43 out of 733 car parking spaces at the Gadbrook Distribution Centre. This will result in a major adverse effect, which is significant.
- 14.5.14 HS2 Ltd will work with the businesses affected to identify opportunities where reasonably practicable to mitigate effects on parking.

## **Public transport network**

- 14.5.15 The permanent realignment of roads will increase journey lengths for bus passengers. However, the realignments are less than 1km in length and will not result in any significant effects on public transport within the Wimboldsley to Lostock Gralam area.

## **Non-motorised users**

- 14.5.16 There will be permanent widening, realignment, diversion or extension of three PRow and 10 roads in the Wimboldsley to Lostock Gralam area that will have an impact on journey length or introduce hindrances such as substantial changes in levels for non-motorised users.
- 14.5.17 There will be severance effects, which are significant, on non-motorised users of three of these PRow and six of these roads as a result of changes in journey length and/or hindrances. These are:
- Footpath Wimboldsley 1/1 – moderate adverse effect from increase in journey length for some users of 960m;
  - A54 Middlewich Road – minor adverse effect from increase in journey length for some users of 164m;
  - Birch Lane – minor adverse effect from increase in journey length for some users of 128m;
  - A533 Bostock Road – minor adverse effect from increase in journey length for some users of 232m;
  - Footpath Winsford 37/1 and Footpath Stanthorne 1/1 – minor adverse effect from increase in journey length for some users of 223m;
  - B5082 Penny's Lane – moderate adverse effect from increase in journey length for some users of 913m;
  - Cookes Lane – moderate adverse effect from increase in journey length for some users of 588m;
  - Footpath Rudheath 3/4, Footpath Rudheath 3/3, Footpath Lach Dennis 3X/2 and Footpath Lach Dennis 3X/1 – moderate adverse effect from increase in journey length for some users of 1.7km; and
  - Birches Lane – moderate adverse effect from increase in journey length for some users of 581m.



## Waterways and canals

- 14.5.18 Operation of the Proposed Scheme will have no significant effect upon the Shropshire Union Canal (Middlewich Branch) and Trent and Mersey Canal in the Wimboldsley to Lostock Gralam area.

## Other mitigation measures

- 14.5.19 No further appropriate traffic and transport mitigation measures have been identified. HS2 Ltd will, however, continue to work with the relevant highway authorities to identify whether further mitigation measures should be provided.

## Summary of likely residual significant effects

- 14.5.20 The residual significant effects during operation remain as described above. The highest magnitude effects are summarised below. For traffic-related effects, where there are adverse and beneficial effects in different time periods in the same year, only the adverse effects are reported in this summary.
- 14.5.21 The operation of the Proposed Scheme will cause changes in traffic that will result in the following effects, which are significant, through changes in congestion and/or delays for road users in 2038:
- major adverse effects at three junctions;
  - moderate adverse at three junctions; and
  - minor adverse effects at two junctions.
- 14.5.22 The residual significant effects of changes in congestion and/or delays for road users in 2046 will be:
- major adverse effects at three junctions;
  - moderate adverse effects at six junctions;
  - minor adverse effects at four junctions; and
  - minor beneficial effects at one junction.
- 14.5.23 Changes in traffic during operation of the Proposed Scheme will result in the following effects, which are significant, on traffic-related severance for non-motorised users in 2038:
- major adverse effects on five roads;
  - moderate adverse effects on 20 roads;
  - minor adverse effects on three roads;
  - major beneficial effects on two roads; and
  - moderate beneficial effects on five roads.
- 14.5.24 The residual significant effects on traffic-related severance for non-motorised users in 2046 will be:

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- major adverse effects on seven roads;
- moderate adverse effects on 22 roads;
- minor adverse effects on five roads;
- major beneficial effects on five roads;
- moderate beneficial effects on 13 roads; and
- minor beneficial effects on one road.

14.5.25 The loss of parking spaces during the operation of the Proposed Scheme will result in a major adverse effect, which is significant, at one location.

14.5.26 Changes in journey lengths for non-motorised users due to the operation of the Proposed Scheme will result in the following effects, which are significant:

- moderate adverse effects on two PRow and three roads; and
- minor adverse effects on one PRow and three roads.

## Cumulative effects

14.5.27 The assessment includes cumulative effects of planned and committed development during operation, by taking into account background traffic growth in the future baseline.

## Monitoring

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

14.5.29 A depot travel plan will detail monitoring of travel associated with operation of Crewe North RSD.

14.5.30 There are no other area-specific monitoring requirements currently proposed for traffic and transport.

## 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 Wimboldsley to Lostock Gralam area. The likely impacts and significant effects identified 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;
  - Natural England;
  - Cheshire West and Chester Council (CWCC) and Cheshire East Council (CEC), which are the Lead Local Flood Authorities (LLFA);
  - Canal & River Trust;
  - Weaver Goway Catchment Partnership; and
  - United Utilities Group plc (the local water and sewerage undertaker).
- 15.1.3 The purpose of this engagement has been to obtain relevant baseline information and to discuss the Proposed Scheme and potential impacts and effects. The engagement has informed the assessments, including issues such as the possible loss of natural saline habitat at Wimboldsley Woods Site of Special Scientific Interest (SSSI), due to dilution of natural saline water by freshwater discharges from the Proposed Scheme.
- 15.1.4 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 can be found in the Volume 2: MA02 Map Book.
- 15.1.5 Map Series WR-01, WR-02, WR-03, WR-05 and WR-06, showing details of the water features referred to in this section, are contained in the Volume 5, Water resources and flood risk Map Book.
- 15.1.6 Detailed information on the water resources and flood risk issues specific to the Wimboldsley to Lostock Gralam area are contained in the Volume 5 appendices. These comprise:
- Appendix WR-003-0MA02, Water resources assessment; and
  - Appendix WR-005-0MA02, Flood risk assessment.
- 15.1.7 Volume 5 also includes a detailed route-wide, stand-alone Water Framework Directive (WFD) compliance assessment (Appendix WR-001-00000) and a draft route-wide water resources and flood risk operation and maintenance plan (Appendix WR-007-00000).

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- 15.1.8 In addition, the following documents are provided as Background Information and Data (BID)<sup>159</sup>:
- BID WR-004-0MA02 – Water resources baseline; and
  - BID WR-002-00001 – Water Framework Directive compliance assessment baseline data.
- 15.1.9 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 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>160</sup>.
- 15.1.10 The Proposed Scheme is described in Section 2.
- 15.1.11 All distances, lengths and area measurements in this section are approximate.

## 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 EIA Scope and Methodology Report (SMR)<sup>161</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 of the route of the Proposed Scheme, as described in Section 2.2 of this report. In the Wimboldsley to Lostock Gralam area, the study area has been extended to include the land required for MA02 Borrow Pit D, located 4.5km to the east of route of the Proposed Scheme, north of Moss Lane and immediately west of the M6.
- 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 A precautionary approach has been used in the assessment to identify impacts and effects where there is limited information. Where surveys have not been undertaken due to land access constraints, a precautionary approach has been adopted in the assessments of

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<sup>159</sup> High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background Information and Data*. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement>.

<sup>160</sup> Ministry of Housing, Communities and Local Government (2019), *National Planning Policy Framework*. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/779764/NPPF\\_Feb\\_2019\\_web.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/779764/NPPF_Feb_2019_web.pdf).

<sup>161</sup> Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

receptor value and impact magnitude. Where this precautionary approach indicates the requirement for mitigation, preliminary mitigation is described, which may include further data collection and/or assessment.

- 15.2.5 Hydraulic analysis has been undertaken of watercourses and key structures within flood risk areas. This includes analysis of flood risk impacts on the River Dane, Wade Brook, Puddinglake Brook, Gad Brook, Tributary of Gad Brook 3, Peover Eye, Tributary of Peover Eye and Smoker Brook. Details of the analysis carried out can be found in Volume 5: Appendix WR-005-0MA02, Flood risk assessment.
- 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 The hydrological impacts on biological receptors such as aquatic fauna and flora are referred to in the Volume 5: Appendix WR-003-0MA02, Water resources assessment and the Volume 5: Appendix WR-001-00000, WFD compliance assessment. Where these impacts have the potential to result in significant effects these are described in Section 7, Ecology and biodiversity, together with any other mitigation required.
- 15.2.8 Impacts from existing land contamination, which lead to significant effects, on groundwater quality are presented in Section 10, Land quality. Further information on Winsford Rock Salt Mine and Holford Brinefield is presented in BID LQ-002-0MA02.

## 15.3 Environmental baseline

### Existing baseline - water resources

#### Surface water

- 15.3.1 All surface water bodies in the study area fall within the Weaver Gowy management catchment of the North West river basin district (RBD).
- 15.3.2 The current river basin management plan<sup>162</sup> identifies the chemical and ecological status of surface water bodies, and the quantitative and chemical status of groundwater bodies within this RBD.
- 15.3.3 The statutory objective of the WFD<sup>163</sup> is to achieve 'good status' for all designated water bodies. The purpose of the WFD compliance assessment<sup>164</sup> is to demonstrate that the

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<sup>162</sup> Environment Agency (2015), *Water for life and livelihoods Part 1: North West river basin district: River basin management plan*. Available online at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/718335/North\\_West\\_RBD\\_Part\\_1\\_river\\_basin\\_management\\_plan.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/718335/North_West_RBD_Part_1_river_basin_management_plan.pdf).

<sup>163</sup> *The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (SI 2017 No. 407)*.

<sup>164</sup> Volume 5: Appendix WR-001-00000, Water Framework Directive compliance assessment.

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Proposed Scheme does not result in a deterioration in current water body status, and that water bodies are not prevented from achieving status objectives.

- 15.3.4 Specialist field surveys have been undertaken, where access has been available. Receptor values have been 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 ditches or ponds, have been identified within this assessment as being of either moderate, high or very high value based on various criteria including watercourse flow and taking into account any habitat which the watercourse may support.
- 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 53. The receptor value attributed to each individual water body is based on the methodologies set out in the SMR. The feature locations are indicated by the grid coordinates on the relevant Volume 5, Water resources and flood risk Map Brook: Map series WR-01, at the point closest to the Proposed Scheme.

**Table 53: Surface water body receptors**

Water body name and location	Type (at point closest to Proposed Scheme) <sup>165</sup>	Q95 value (m <sup>3</sup> /s) <sup>166</sup>	Receptor value	Parent WFD water body name and identification number <sup>167</sup>	Current WFD status/ Objective <sup>168</sup>	Crossed by the Proposed Scheme?
Tributary of River Weaver 2 WR-01-302b - E4	Ordinary watercourse	<0.002	Moderate	Weaver (Marbury Brook to Dane) GB1120680604 60	Poor/good by 2027	No
River Weaver WR-01-302b - E3	Main river	1.9	Very high	Weaver (Marbury Brook to Dane) GB1120680604 60	Poor/good by 2027	No

<sup>165</sup> The term 'minor ditch' has been used to denote a small trench or drain that has been constructed for the purpose of draining water from the land or roads and is isolated from the wider river network.

<sup>166</sup> This is the flow within the watercourse that is exceeded for 95% of the time. The Q95 has been provided as an indication of watercourse size but is only one of several criteria used to inform receptor value. Other criteria include the WFD watercourse classification which takes into account the value of any habitat which the watercourse supports. Details are provided in the Volume 5: Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report.

<sup>167</sup> The Environment Agency has attributed each surface water and groundwater body a unique water body identification (ID) number.

<sup>168</sup> Status and objectives presented in this assessment are based on those set out in the 2015 river basin management plan (RBMP). The RBMPs will be updated in 2021.



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Water body name and location	Type (at point closest to Proposed Scheme) <sup>165</sup>	Q95 value (m <sup>3</sup> /s) <sup>166</sup>	Receptor value	Parent WFD water body name and identification number <sup>167</sup>	Current WFD status/ Objective <sup>168</sup>	Crossed by the Proposed Scheme?
The Dingle WR-01-302b - B5	Ordinary watercourse	<0.002	Low	Weaver (Marbury Brook to Dane) GB112068060460	Poor/good by 2027	No
Tributary of River Wheelock 1 WR-01-302b - G7	Ordinary watercourse	<0.002	Moderate	Wheelock (Fowle Brook to Dane) GB112068055380	Poor/good by 2027	No
Tributary of River Weaver 3 WR-01-302b - G4	Ordinary watercourse	<0.002	Moderate	Weaver (Marbury Brook to Dane) GB112068060460	Poor/good by 2027	No
River Wheelock WR-01-302b - F8	Main river	0.090	Moderate	Wheelock (Fowle Brook to Dane) GB112068055380	Bad/moderate by 2027	No
Tributary of River Wheelock 2 WR-01-302b - G7	Ordinary watercourse	<0.002	Moderate	Wheelock (Fowle Brook to Dane) GB112068055380	Poor/good by 2027	No
Tributary of River Wheelock 3 WR-01-302b - G7	Ordinary watercourse	<0.002	Moderate	Wheelock (Fowle Brook to Dane) GB112068055380	Poor/good by 2027	No
Tributary of River Weaver 4 WR-01-302b - H5	Ordinary watercourse	0.003	Low	Weaver (Marbury Brook to Dane) GB112068060460	Poor/good by 2027	No
Tributary of River Wheelock 4 WR-01-302b - H7	Ordinary watercourse	<0.002	Moderate	Wheelock (Fowle Brook to Dane) GB112068055380	Poor/good by 2027	No
Shropshire Union Canal WR-01-302b - F4	Canal	n/a	Very high	Weaver (Marbury Brook to Dane) GB112068060460	Poor/good by 2027	Yes

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<b>Water body name and location</b>	<b>Type (at point closest to Proposed Scheme)<sup>165</sup></b>	<b>Q95 value (m<sup>3</sup>/s)<sup>166</sup></b>	<b>Receptor value</b>	<b>Parent WFD water body name and identification number<sup>167</sup></b>	<b>Current WFD status/ Objective<sup>168</sup></b>	<b>Crossed by the Proposed Scheme?</b>
Tributary of River Wheelock 5 WR-01-302b - I7	Ordinary watercourse	<0.002	Low	Wheelock (Fowle Brook to Dane) GB112068055380	Poor/good by 2027	No
Middlewich Road Drains WR-01-302b - I5	Minor ditch	<0.002	Low	Weaver (Marbury Brook to Dane) GB112068060460	Poor/good by 2027	No
Birch Lane Drain WR-01-303 - B7	Minor ditch	<0.002	Low	Dane (Wheelock to Weaver) GB112068060470	Bad/moderate by 2027	No
River Dane WR-01-303 - E5	Main river	0.8	Very high	Dane (Wheelock to Weaver) GB112068060470	Bad/moderate by 2027	Yes
The Willowbeds WR-01-303 - C4	Minor ditch	<0.002	Low	Dane (Wheelock to Weaver) GB112068060470	Bad/moderate by 2027	No
A533 Drain WR-01-303 - C6	Minor ditch	<0.002	Low	Dane (Wheelock to Weaver) GB112068060470	Bad/moderate by 2027	No
Tributary of River Dane 3 WR-01-303 - C6	Ordinary watercourse	<0.002	Low	Dane (Wheelock to Weaver) GB112068060470	Bad/moderate by 2027	No
Tributary of River Dane 4 WR-01-303 - D6	Ordinary watercourse	<0.002	Moderate	Dane (Wheelock to Weaver) GB112068060470	Bad/moderate by 2027	No
Trent and Mersey Canal - First Crossing WR-01-303 - C7	Canal	n/a	Very high	Trent and Mersey Canal (summit to Preston Brook Tunnel) GB71210247	Moderate/moderate by 2027	Yes

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Water body name and location	Type (at point closest to Proposed Scheme) <sup>165</sup>	Q95 value (m <sup>3</sup> /s) <sup>166</sup>	Receptor value	Parent WFD water body name and identification number <sup>167</sup>	Current WFD status/ Objective <sup>168</sup>	Crossed by the Proposed Scheme?
River Croco – First Crossing WR-01-303 - C9	Main river	0.049	Moderate	Dane (Wheelock to Weaver) GB112068060470	Bad/moderate by 2027	No
River Croco – Second Crossing WR-01-303 - C9	Ordinary watercourse	<0.002	Moderate	Dane (Wheelock to Weaver) GB112068060470	Bad/moderate by 2027	No
Tributary of River Wheelock 6 WR-01-303 - B7	Ordinary watercourse	0.2	Moderate	Wheelock (Fowle Brook to Dane) GB112068055380	Poor/good by 2027	No
Hill Wood Drain WR-01-303 - D5	Minor ditch	<0.002	Low	Dane (Wheelock to Weaver) GB112068060470	Bad/moderate by 2027	No
Tributary of Trent and Mersey Canal WR-01- 303 - E5	Ordinary watercourse	<0.002	Low	Trent and Mersey Canal (summit to Preston Brook Tunnel) GB71210247	Moderate/moderate by 2015	Yes
Trent and Mersey Canal - Second Crossing WR-01-303 - F4	Canal	n/a	Very high	Trent and Mersey Canal (summit to Preston Brook Tunnel) GB71210247	Moderate/moderate by 2015	No
Puddinglake Brook WR-01-303 - F5	Main river	0.008	High	Puddinglake Brook GB112068060220	Poor/good by 2027	Yes
Byley Road Drain WR-01-303 - G10	Minor ditch	<0.002	Low	Wade Brook GB112068060370	Poor/good by 2027	No
Tributary of Gad Brook 1 WR-01-303 - G9	Ordinary watercourse	<0.002	Moderate	Wade Brook GB112068060370	Poor/good by 2027	No

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<b>Water body name and location</b>	<b>Type (at point closest to Proposed Scheme)<sup>165</sup></b>	<b>Q95 value (m<sup>3</sup>/s)<sup>166</sup></b>	<b>Receptor value</b>	<b>Parent WFD water body name and identification number<sup>167</sup></b>	<b>Current WFD status/ Objective<sup>168</sup></b>	<b>Crossed by the Proposed Scheme?</b>
Tributary of Gad Brook 2 WR-01-303 - G9	Ordinary watercourse	0.004	High	Wade Brook GB112068060370	Poor/good by 2027	No
Trent and Mersey Canal - Third Crossing WR-01-303 - I4	Canal	n/a	Very high	Trent and Mersey Canal (summit to Preston Brook Tunnel) GB71210247	Moderate/moderate by 2015	Yes
Gad Brook WR-01-303 - G5	Ordinary watercourse	0.004	Moderate	Wade Brook GB112068060370	Poor/good by 2027	Yes
Tributary of Gad Brook 3 WR-01-303 - H7	Ordinary watercourse	<0.002	Moderate	Wade Brook GB112068060370	Poor/good by 2027	Yes
Tributary of Gad Brook 4 WR-01-303 - H5	Ordinary watercourse	<0.002	Moderate	Wade Brook GB112068060370	Poor/good by 2027	No
Broken Cross Drains WR-01-303 - I5	Minor ditch	<0.002	Low	Wade Brook GB112068060370	Poor/good by 2027	No
Tributary of Wade Brook 1 WR-01-303 - I8	Ordinary watercourse	<0.002	Moderate	Wade Brook GB112068060370	Poor/good by 2027	No
Tributary of Wade Brook 2 WR-01-303 - I8	Ordinary watercourse	<0.002	Moderate	Wade Brook GB112068060370	Poor/good by 2027	No
Wade Brook WR-01-304a - B7	Main river	0.08	High	Wade Brook GB112068060370	Poor/good by 2027	Yes
Square Wood Drains WR-01-304a - B7	Minor ditch	<0.002	Low	Peover Eye GB112068060390	Poor/good by 2027	No
A556 Drainage WR-01-304a - B6	Minor ditch	<0.002	Low	Peover Eye GB112068060390	Poor/good by 2027	No

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Water body name and location	Type (at point closest to Proposed Scheme) <sup>165</sup>	Q95 value (m <sup>3</sup> /s) <sup>166</sup>	Receptor value	Parent WFD water body name and identification number <sup>167</sup>	Current WFD status/ Objective <sup>168</sup>	Crossed by the Proposed Scheme?
Wincham Brook WR-01-304a - B4	Main river	0.3	High	Peover Eye GB1120680603 90	Poor/good by 2027	No
Tributary of Peover Eye WR-01-304a - C7	Ordinary watercourse	<0.002	Moderate	Peover Eye GB1120680603 90	Poor/good by 2027	Yes
Peover Eye WR-01-304a - C8	Main river	0.2	High	Peover Eye GB1120680603 90	Poor/good by 2027	Yes
Tributary of Wincham Brook 2 WR-01-304a - C5	Ordinary watercourse	<0.002	Moderate	Peover Eye GB1120680603 90	Poor/good by 2027	No
Tributary of Wincham Brook 3 WR-01-304a - C6	Ordinary watercourse	<0.002	Moderate	Peover Eye GB1120680603 90	Poor/good by 2027	No
Smoker Brook WR-01-304a - D7	Main river	0.07	High	Smoker Brook (Gale Brook to Wincham Brook) GB1120680604 10	Bad/good by 2027	Yes

### Abstractions and permitted discharges (surface water)

15.3.6 Table 54 sets out the surface water abstractions and permitted discharges in the study area of 1km from the Proposed Scheme in the Wimboldsley to Lostock Gralam area.

**Table 54: Surface water abstraction and permitted discharges in the study area**

Feature	Details	Value
Licensed surface water abstractions	None	None
Registered private unlicensed surface water abstractions	None	None
Consented discharges to surface water	Twenty-one, of which three are within the land required for the construction of the Proposed Scheme	Low

15.3.7 Private unlicensed surface water abstractions comprise those for quantities of less than 20m<sup>3</sup> per day. There is no obligation to register private water supplies, but available records have been obtained from the local authorities. Unregistered private surface water supplies

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may be present. Private water supplies are assumed to be high value receptors unless details obtained from supply owners indicated otherwise.

- 15.3.8 The number of abstractions and permitted discharges listed in Section 10, Land quality may be different to that stated here, due to different definitions of spatial scope. This is because the water resources and flood risk study area comprises all land within 1km of the route of the Proposed Scheme, whereas the default land quality study area comprises all land within 250m from the land required for the construction of the Proposed Scheme. The default study areas may be extended where the potential for pathways to more remote receptors exists.

## Groundwater

- 15.3.9 The location of abstractions, geological formations and indicative groundwater levels, where available, are shown in Map Series WR-02, in Volume 5, Water resources and flood risk Map Book.
- 15.3.10 The geology of the study area, including distribution and formation description, is described in Section 10, Land quality. The aquifer classification, WFD status and receptor value of the superficial and bedrock hydrogeology is summarised in Table 55 (for superficial deposits) and Table 56 (for bedrock). Unless stated otherwise, the geological groups listed will all be crossed by the Proposed Scheme. The current overall status of, and objective for, the WFD groundwater body is as stated in the current river basin management plan. Where the Environment Agency has not assigned an individual water body ID to a unit, it has been assumed that it is connected to the overlying water body.

**Table 55: Summary of geology and hydrogeology in the study area – superficial deposits**

Geology	Aquifer classification	WFD body (ID) and current overall status	WFD status objective	Receptor value
Alluvium	Secondary A	Weaver and Dane Quaternary Sand and Gravel Aquifer (GB41202G991700) Poor	Good by 2027	Moderate
River terrace deposits	Secondary A	Weaver and Dane Quaternary Sand and Gravel Aquifer (GB41202G991700) Poor	Good by 2027	Moderate
Glaciofluvial deposits Not crossed by the route of the Proposed Scheme	Secondary A	Weaver and Dane Quaternary Sand and Gravel Aquifer (GB41202G991700) Poor	Good by 2027	Moderate
Glaciofluvial sheet deposits	Secondary A	Weaver and Dane Quaternary Sand and Gravel Aquifer (GB41202G991700) Poor	Good by 2027	Moderate



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Geology	Aquifer classification	WFD body (ID) and current overall status	WFD status objective	Receptor value
Glacial till	Secondary (Undifferentiated)	Weaver and Dane Quaternary Sand and Gravel Aquifer (GB41202G991700) Poor	Good by 2027	Moderate

**Table 56: Summary of geology and hydrogeology in the study area - bedrock**

Geology	Aquifer classification	WFD body (ID) and current overall status	WFD status objective	Receptor value
Mercia Mudstone Group - Sidmouth Mudstone Formation	Secondary B	Not assessed by the Environment Agency	Not assessed by the Environment Agency	Moderate
Mercia Mudstone Group - Sidmouth Mudstone Formation - Northwich Halite Member	Unproductive	Not assessed by the Environment Agency	Not assessed by the Environment Agency	Low

### Superficial deposit aquifers

15.3.11 The basis of the receptor values attributed to the superficial deposit aquifers present within the study area, as shown in Table 55, is outlined briefly as follows:

- alluvium, river terrace deposits, glaciofluvial deposits and glaciofluvial sheet deposits are all designated as Secondary A aquifers; and
- glacial till is designated as a Secondary (Undifferentiated) aquifer.

15.3.12 These 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 watercourses. These aquifers have, therefore, been classified as moderate value receptors.

### Bedrock aquifers

15.3.13 The basis of the receptor values attributed to the bedrock aquifers present within the study area, as shown in Table 56, is outlined briefly as follows:

- the Sidmouth Mudstone Formation of the Mercia Mudstone Group is classified as a Secondary B aquifer and has traditionally been regarded as predominantly impermeable, or at best a poor aquifer. Limited quantities of groundwater suitable for domestic or agricultural use are, however, occasionally obtainable within this bedrock formation. This aquifer has, therefore, been classified as a moderate value receptor; and
- the Northwich Halite Member of the Sidmouth Mudstone Formation (Mercia Mudstone Group), is classified as unproductive. It is unlikely to provide baseflow to watercourses or support groundwater abstraction and has, therefore, been classified as a low value receptor.

## WFD status of groundwater bodies

- 15.3.14 A summary of the 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 56. The value attributed to each of these receptors is also indicated.
- 15.3.15 The bedrock aquifers in the study area are not formally designated as WFD groundwater bodies but may be hydraulically connected to the overlying WFD superficial aquifers.

## Abstraction and permitted discharges (groundwater)

- 15.3.16 Table 57 sets out the groundwater abstraction and permitted discharges in the study area of 1km from the Proposed Scheme in the Wimboldsley to Lostock Gralam area.

**Table 57: Groundwater abstraction and permitted discharges in the study area**

Feature	Details	Value
Source Protection Zones (SPZ) associated with licensed public water supplies	None	None
Private licensed groundwater abstractions	None	None
Registered unlicensed private groundwater abstractions	One at Mellor Knowl Farm used for commercial or public activity.	Moderate
Registered unlicensed private groundwater abstractions	One at the Lagoon at Rudheath Woods, Cranage used for agricultural purposes.	Moderate
Registered unlicensed private groundwater abstractions	One at Bank Farm, Stanthorne, unknown purpose (assumed for potable supply).	Assumed high
Consented discharges to groundwater	None	None

## Groundwater – surface water interactions

- 15.3.17 A desk-based assessment using Ordnance Survey maps and detailed river network data provided by the Environment Agency identified 19 features within the study area that had the potential to be springs or sinks. Access was possible to inspect 13 of these features. The value of these features has been determined based on consideration of the feature's importance as a water resource as well as any ecological, heritage, cultural or community asset importance. Further details on these features can be found in Volume 5: BID WR-004-0MA02. Of the 13 features identified:
- two features have been confirmed to be springs supporting moderate value watercourses, without water dependent habitats. They have, therefore, been assessed as moderate value receptors;
  - one feature has been confirmed to be a spring supporting a low value watercourse, without a water dependent habitat. It has, therefore, been assessed as a low value receptor;

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- one potential feature within Wimboldsley Wood SSSI is quoted as a saliferous spring in the SSSI citation but could not be located during survey. It has, therefore, been assessed as a high value receptor on a precautionary basis;
- the nature of two potential features could not be confirmed during survey. They have, therefore, been assessed as high value receptors on a precautionary basis;
- three potential springs were verified as land drainage features and are excluded from the groundwater - surface water assessment; and
- four features were identified to be culverts and not groundwater features.

15.3.18 The remaining six potential spring features are assumed to be high value receptors on a precautionary basis, pending site inspection. These include the potential spring at pond 40m west of Coalpit Lane and the potential spring 140m north of Yew Tree Farm, which are adjacent to and within the land required for construction of the Proposed Scheme respectively.

15.3.19 There are 70 ponds within the land required for the construction of the Proposed Scheme. Where there is the potential for the Proposed Scheme to have significant effects on these features the assessment, and any mitigation required, is presented in Section 7, Ecology and biodiversity.

## **Water dependent habitats**

15.3.20 There is one nature conservation site within the study area that is potentially groundwater dependent. Wimboldsley Wood SSSI is located 25m west of the land required for construction of the Proposed Scheme and includes a brackish marsh which is fed by a saliferous spring. The saliferous spring is likely to be issuing from the Northwich Halite Member of the Sidmouth Mudstone Formation (Mercia Mudstone Group), which crops out between areas of glacial till and alluvium. In addition, Wimboldsley Wood SSSI is located on the banks of the River Weaver and may also be dependent upon surface water flows.

15.3.21 No designated nature conservation sites within the study area that are dependent on surface water flows have the potential to be affected by the Proposed Scheme.

15.3.22 A more detailed description of the ecology of this site is provided in Volume 5 reports relating to ecology and biodiversity.

## **Existing baseline – flood risk and land drainage**

15.3.23 The Environment Agency's Flood map for planning (rivers and sea)<sup>169</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

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<sup>169</sup> Environment Agency (2021), *Flood map for planning*. Available online at: <https://flood-map-for-planning.service.gov.uk>.

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(1%) or greater annual probability of river flooding). The Environment Agency's Risk of Flooding from Surface Water map<sup>170</sup> has been used to scope surface water flood risks. All of these flood zones are shown in Map Series WR-01 in Volume 5, Water resources and flood risk Map Book.

- 15.3.24 Infrastructure failure flood risks have been scoped using the Environment Agency Risks of flooding from reservoirs national dataset. The British Geological Survey (BGS) Susceptibility to groundwater flooding dataset<sup>171</sup> has been used to assess the future risk of groundwater flooding.
- 15.3.25 The following reports were used to help determine the baseline flood risk within the study area:
- CEC Preliminary Flood Risk Assessment (PFRA) (2011)<sup>172</sup>;
  - CWCC PFRA (2011)<sup>173</sup>;
  - CEC Strategic Flood Risk Assessment (SFRA) (2014)<sup>174</sup>;
  - CWCC SFRA (2016)<sup>175</sup>;
  - CEC Local Flood Risk Management Strategy (LFRMS) (2015)<sup>176</sup>; and
  - CWCC LFRMS (2016)<sup>177</sup>.
- 15.3.26 Historical flood investigation reports undertaken by the LLFA under Section 19 of the Flood and Water Management Act<sup>178</sup> relevant to this area have been reviewed (see Volume 5:

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<sup>170</sup> Environment Agency (2021), *Flood warning information service*. Available online at: <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>.

<sup>171</sup> BGS (2021), *Susceptibility to groundwater flooding dataset*. Available online at: <https://www.bgs.ac.uk/datasets/groundwater-flooding/>.

<sup>172</sup> Jacobs (2011), *Cheshire East Council Preliminary Flood Risk Assessment (PFRA)*. Available online at: <https://moderngov.cheshireeast.gov.uk/ecminutes/documents/s13286/Cheshire%20East%20PFRA%20-%20Final%20version%20issued%201st%20June%202011.pdf>.

<sup>173</sup> Jacobs (2011), *Cheshire West and Chester Preliminary Flood Risk Assessment (PFRA)*. Available online at: [http://consult.cheshirewestandchester.gov.uk/portal/cwc\\_ldf/cwc\\_lp/ev\\_base\\_1/fra?tab=files](http://consult.cheshirewestandchester.gov.uk/portal/cwc_ldf/cwc_lp/ev_base_1/fra?tab=files).

<sup>174</sup> JBA Consulting (2013), *Cheshire East Council Strategic Flood Risk Assessment (SFRA)*. Available online at: <https://www.cheshireeast.gov.uk/pdf/planning/spatial-planning/researchand-evidence/strategic-flood-assessment/cheshire-east-council-sfra-final-report-v4.0.pdf>.

<sup>175</sup> JBA Consulting (2016), *Cheshire West and Chester Strategic Flood Risk Assessment (SFRA)*. Available online at: [http://consult.cheshirewestandchester.gov.uk/portal/cwc\\_ldf/cw\\_lp\\_part\\_two/ev\\_base/sfra2016](http://consult.cheshirewestandchester.gov.uk/portal/cwc_ldf/cw_lp_part_two/ev_base/sfra2016).

<sup>176</sup> Cheshire East Council (2017), *Cheshire East Council Local Flood Risk Management Strategy (LFRMS)*. Available online at: <https://moderngov.cheshireeast.gov.uk/ecminutes/documents/s59547/Local%20Flood%20Risk%20Management%20Strategy%20-%20app%202.pdf>.

<sup>177</sup> Cheshire West and Chester Council (2016), *Cheshire West and Chester Council Local Flood Risk Management Strategy (LFRMS)*. Available online at: [http://consult.cheshirewestandchester.gov.uk/portal/cwc\\_ldf/cw\\_lp\\_part\\_two/ev\\_base/sfra2016](http://consult.cheshirewestandchester.gov.uk/portal/cwc_ldf/cw_lp_part_two/ev_base/sfra2016).

<sup>178</sup> *Flood and Water Risk Management Act 2010* (No. 2010/2169), London, Her Majesty's Stationery Office. Available online at: <http://www.legislation.gov.uk/ukpga/2010/29/contents>.

Appendix WR-005-0MA02, Flood risk assessment for further details). None of these reports include details of any historical flooding within the study area.

## River flooding

15.3.27 The study area includes areas of floodplain (Flood Zone 2 and 3) associated with the River Dane, Wade Brook, Puddinglake Brook, Gad Brook, Tributary of Gad Brook 3, Peover Eye, Tributary of Peover Eye and Smoker Brook. Other floodplains that will be crossed by the route of the Proposed Scheme include those associated with Tributary of River Weaver 2, Tributary of River Dane 3, Tributary of the Trent and Mersey Canal, and Broken Cross Drains. Table 58 shows all relevant watercourses within the study area with receptors that would potentially be affected by any changes in the level and extent of flooding. The value of these receptors, based on the definitions in Section 21 of the SMR, is also indicated. The location description and figure/coordinate is the location at which the source intersects the Proposed Scheme, as indicated by the grid coordinates on the relevant Volume 5, Water resources and flood risk Map Brook: Map series WR-01.

**Table 58: River flood risk sources and receptors**

Source	Location description and figure/coordinate	Receptor potentially affected	Receptor value/sensitivity to flooding
River Dane	River Dane WR-01-303 D5, D6	Agricultural land	Moderate
Wade Brook	Wade Brook WR-01-304a B6	Agricultural land	Moderate
Puddinglake Brook	Puddinglake Brook WR-01-303 F5	Residential property on the left bank of the brook just downstream of the crossing	High
Puddinglake Brook	Puddinglake Brook WR-01-303 F5	Agricultural land	Moderate
Gad Brook	Gad Brook WR-01-303 G6	Davenham Road, Rudheath	Moderate
Gad Brook	Gad Brook WR-01-303 G6, H5	Agricultural land	Moderate
Peover Eye and Tributary of Peover Eye	Peover Eye and Tributary of Peover Eye WR-01-304a C6, C7	Woodland (Winnington and Peas Wood)	Low
Peover Eye	Peover Eye WR-01-304a C7	A559 Manchester Road	Moderate
Peover Eye	Peover Eye WR-01-304a C7	Mill Lane	Moderate
Smoker Brook	Smoker Brook WR-01-304a D7	Linnards Lane	Moderate
Smoker Brook	Smoker Brook WR-01-304a D7	Agricultural land	Moderate

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Source	Location description and figure/coordinate	Receptor potentially affected	Receptor value/sensitivity to flooding
Tributary of River Weaver 2	Tributary of River Weaver 2 WR-01-302b E5	Agricultural land	Moderate
Tributary of River Dane 3	Tributary of River Dane 3 WR-01-303 C6	Agricultural land	Moderate
Tributary of the Trent and Mersey Canal	Tributary of the Trent and Mersey Canal WR-01-303 E5	Agricultural land	Moderate
Broken Cross Drains	Broken Cross Drains WR-01-303 I6	Agricultural land	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 59. The value of these receptors, based on Section 21 of the SMR, is also indicated. The location description and figure/coordinate is the location at which the source intersects the Proposed Scheme, as indicated by the grid coordinates on the relevant Volume 5, Water resources and flood risk Map Brook: Map series WR-01.

**Table 59: Surface water flood risk sources and receptors**

Source	Location description and figure/coordinate	Receptor potentially affected	Receptor value
Surface water flow path at Clive Green	Clive Green WR-01-302b H5	Agricultural land	Moderate
Surface water flow path east of Rudheath	Rudheath WR-01-303 I6	Utilities building and telecoms mast	Very high
Surface water flow path east of Rudheath	Rudheath WR-01-303 I6	Agricultural land	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:

- Shakerley Mere (approximately 4.5km east of the Proposed Scheme);
- Bosley Reservoir (approximately 27km east of the Proposed Scheme);
- Redesmere (approximately 17km east of the Proposed Scheme);
- Tabley Mere (approximately 2km north-east of the Proposed Scheme); and
- Shropshire Union Canal and the Trent and Mersey Canal, which pass through the Wimboldsley to Lostock Gralam area.

- 15.3.30 The reservoirs are large raised reservoirs or impounded water bodies<sup>179</sup> shown on the Environment Agency's flood risk from reservoirs mapping<sup>180</sup>. The reservoirs are subject to the requirements of the Reservoirs Act 1975<sup>181</sup>, and as such are inspected annually. Therefore, the inundation risk posed by these water bodies is considered to be low and the Proposed Scheme will not affect local flood characteristics in the event of a failure of these reservoirs.
- 15.3.31 The Proposed Scheme will not encroach into the Shropshire Union Canal or Trent and Mersey Canal channels or embankments and will therefore not change the canal flood risk. In the event of embankment failure, flood risk posed to the Proposed Scheme will be unchanged as the Proposed Scheme is elevated over both Shropshire Union Canal (overbridge) and the Trent and Mersey Canal (viaduct). Track elevations are designed to be above the estimated peak 1 in 100 year plus climate change flood level.
- 15.3.32 The assessment does not identify any changes in flood risk posed by failure of artificial water sources.

## Groundwater flooding

- 15.3.33 Information related to historical incidents of groundwater flooding in the Wimboldsley to Lostock Gralam area is provided within the CEC and CWCC SFRA<sup>174,175</sup>, PFRA<sup>172,173</sup> and LFRMS<sup>176,177</sup>. The SFRA and LFRMS state that there is no history of groundwater flooding within the study area.
- 15.3.34 The BGS Susceptibility to groundwater flooding data set indicates that there is some potential for groundwater flooding to occur at the following locations: Wimboldsley, Clive Green, Whatcroft, Rudheath and Wincham.

## Land drainage

- 15.3.35 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.

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<sup>179</sup> Meres listed have been analysed for dam breach by the Environment Agency and are included in the Reservoir Flood Maps dataset.

<sup>180</sup> Environment Agency (2019), *Long term flood risk information*. Available online at: <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>.

<sup>181</sup> Department for Communities and Local Government (2014), *Reservoirs: owner and operator requirements*. Available online at: <https://www.gov.uk/guidance/reservoirs-owner-and-operator-requirements>.



## Future baseline

### Construction (2025)

- 15.3.36 Volume 5: Appendix CT-004-00000 provides details of the developments in the Wimboldsley to Lostock Gralam area that are assumed to have been implemented by 2025. No committed developments have been identified in this study area that will materially alter the baseline conditions in 2025 for water resources and flood risk.

### Operation (2038)

- 15.3.37 Volume 5: Appendix CT-004-00000 provides details of the developments in the Wimboldsley to Lostock Gralam area that are assumed to have been implemented by 2038. No committed developments have been identified in this study area that will materially alter the baseline conditions in 2038 for water resources and flood risk.

## Climate change

- 15.3.38 Detailed analysis of the potential impacts of climate change on the Proposed Scheme has been undertaken and is reported in Volume 3, Route-wide effects (Section 4). In general, the design of the Proposed Scheme has adopted a precautionary approach to potential future increase in peak river flows and rainfall intensities, using guidance issued by the Environment Agency.
- 15.3.39 Although no definitive guidance is available, climate change may also affect future surface water and groundwater resources. However, any such changes are unlikely to alter the significance of the effects identified in this assessment.

## 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 Code of Construction Practice (CoCP)<sup>182</sup> includes a range of mitigation measures to reduce construction impacts insofar 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.

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<sup>182</sup> Volume 5: Appendix CT-002-00000, Draft Code of Construction Practice.

## Water resources

- 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 alignment of the Proposed Scheme will avoid passing along river or stream valleys, such as that of River Dane, Wade Brook, Puddinglake Brook, Gad Brook, Tributary of Gad Brook 3, Peover Eye, and Smoker Brook and their associated floodplains. Instead it will pass over these larger watercourses 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: MA02 Map Book have been informed by a detailed consideration of the water resources constraints and have sought to avoid sensitive features wherever reasonably practicable.
- 15.4.5 Watercourse realignments are proposed at the following locations:
- Tributary of River Weaver 2 (90m in length including 60m of culvert);
  - Tributary of River Weaver 4 (56m in length including 20m of culvert);
  - Tributary of Trent and Mersey Canal (340m in length including 30m of culvert);
  - Broken Cross Drains (270m in length including 90m of culvert);
  - Peover Eye (44m in length); and
  - Tributary of Peover Eye (two realignments of 46m and 20m in length respectively).
- 15.4.6 Realignments will be designed to have equivalent hydraulic capacity to the existing channels, insofar as reasonably practicable. Where such watercourses are natural channels, appropriate features will be incorporated to replicate and, where reasonably practicable, enhance their hydromorphological condition. The 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. The design of these realignments will be developed in consultation with the Environment Agency and LLFA, with due consideration of WFD status objectives. The design of the Proposed Scheme will also ensure that existing drainage outfalls can be adapted to discharge into the new channel.

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- 15.4.7 Watercourse diversions, which would result in changes in flow regime within discrete sections of channel, have been avoided wherever reasonably practicable. There are no diversions proposed within this study area.
- 15.4.8 For watercourses that are not in their natural condition, where reasonably practicable, the watercourse diversion design will incorporate measures to improve their hydromorphological condition. The design of these diversions will be developed in consultation with Environment Agency and LLFA, with due consideration of WFD status objectives.
- 15.4.9 Infrastructure required within or in proximity to an existing channel (including bridge abutments, intermediate piers and outfalls) will be designed to reduce impacts on the natural hydromorphology of watercourse channels, insofar as is reasonably practicable.
- 15.4.10 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.
- 15.4.11 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.
- 15.4.12 Permanent culverts proposed on the smaller watercourse crossings within the Wimboldsley to Lostock Gralam area include those on:
- Tributary of River Weaver 2 (A530 Nantwich Road offline east culvert 25m in length, A530 Nantwich Road offline west culvert 25m in length);
  - Tributary of River Weaver 4 (Clive Green Lane offline culvert 20m in length);
  - Tributary of River Dane 3 (Bank culvert 65m in length);
  - Tributary of Trent and Mersey Canal (30m of culvert including Whatcroft culvert 25m in length); and
  - Broken Cross Drains (90m of culvert including A556 Shurlach Road culvert 80m in length).

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- 15.4.13 The 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 and inverted siphons have been avoided;
  - culvert lengths have been made as short as reasonably practicable; and
  - invert levels will be set below the firm bed of the watercourse to allow a natural substrate to develop along the bed of the culvert.
- 15.4.14 The wider issues associated with these culverts, and how insofar as reasonably practicable the design will ensure no deterioration in the status of any of the relevant water body's WFD quality elements, is considered within the Volume 5: Appendix WR-001-00000, WFD compliance assessment. Any mitigation required in response to significant ecological effects of these culverts is set out in Section 7, Ecology and biodiversity.
- 15.4.15 Existing groundwater abstraction boreholes or monitoring points will be protected from physical damage, insofar as reasonably practicable, including appropriate decommissioning of abandoned boreholes in order to remove potential pollution pathways. If boreholes are to be decommissioned and replaced with alternatives, the contractors will follow the latest industry standard. This principle will also be applicable to springs potentially affected by the Proposed Scheme, although additional measures may be required to mitigate temporary construction impacts. Wherever a spring is to be covered or displaced by design elements then additional mitigation measures may be applied to relocate the spring, where reasonably practicable.
- 15.4.16 Measures will be introduced, as required, to mitigate the temporary and permanent effects on groundwater flows and water quality during excavation and construction of foundations and borrow pits, insofar as is reasonably practicable. The types of measure that could be adopted include:
- installation of cut-off structures (impermeable barriers preventing water flow) around excavations;
  - 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.
- 15.4.17 The exact requirements will be refined and method of mitigation will be designed following ground investigation at foundations and borrow pits, where appropriate.

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- 15.4.18 For major utilities, the following specific measures are considered in addition to the above points:
- trenchless crossing techniques will be used wherever reasonably practicable for main rivers/sensitive watercourses and key designations to reduce the impact on these features;
  - where temporary watercourse diversions are required, during the reinstatement the watercourse will be returned to its natural course and condition where reasonably practicable after work is complete, with due consideration to its WFD status objectives; and
  - at watercourse crossings, hard bank reinforcement will be avoided where reasonably practicable.
- 15.4.19 Four borrow pits are proposed within this study area, three for cohesive material and one for granular material. The assumed average and maximum excavation depths of the borrow pits are described in Section 2.3 of this report. The cohesive borrow pits (MA02 Borrow Pits A, B and C) will be excavated in glacial till in proximity to Hoggins Brook, The Dingle and tributaries of River Wheelock 1, 2, 3, 5 and 6. The MA02 Borrow Pit D will be excavated in glaciofluvial sheet deposits in proximity to Puddinglake Brook and Tributary of Carr Brook. To reduce the potential for impacts on these surface watercourses, buffer strips have been incorporated into the design of each borrow pit within which no excavation will be undertaken.
- 15.4.20 All activities related to the borrow pits will be managed in accordance with the measures in the draft CoCP to reduce the potential for adverse impacts on the water environment.
- 15.4.21 The borrow pit areas will be reinstated to their existing levels and land use by the end of the construction period. The reinstatement works will be designed to ensure that the land within the borrow pit areas drains in a manner suitable for its continued use as agricultural land. The restoration will ensure that existing baseflow and catchment runoff characteristics will be maintained for surface water features. Similarly, measures will be taken to ensure the groundwater regime maintains baseflow connectivity with the surface water regime. This will be achieved through appropriately designed drainage systems.

## **Flood risk and land drainage**

- 15.4.22 The design of the Proposed Scheme will, insofar as reasonably practicable, 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, will be limited to those associated with the intermediate pier structures on the viaducts, which will be located in the River Dane, Wade Brook, Puddinglake Brook, Gad Brook, Tributary of Gad Brook 3, Peover Eye, Tributary of Peover Eye and Smoker Brook floodplains. The Proposed Scheme includes replacement floodplain storage areas to compensate for the loss of flood storage volume associated with the viaduct piers;

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- the temporary works shown on Map Series CT-05 in the Volume 2: MA02 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 will cross surface water flow paths where reasonably practicable. This will 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 alignment of the Proposed Scheme will cross watercourses, structures will be designed to accommodate flood flows up to and including the 1 in 100 (1%) annual probability flood with an allowance for climate change;
- runoff from the footprint of the infrastructure could occur more rapidly post-construction due to steeper slope angles and the permeability (or compacted nature) of the newly-created surfaces. The drainage systems will be designed to ensure that there will be no significant increases in flood risk, during storms up to and including the 1 in 100 (1%) annual probability design event, with an allowance for climate change;
- 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 will pass in cutting, drainage measures will be provided to limit overland flow into the cutting. This overland flow along with seepage and runoff from the cuttings will, where reasonably practicable, be drained to the catchments 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 will be introduced to reduce any potentially significant effects on groundwater flood risk insofar 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.

15.4.23 The nominated undertaker will, insofar as reasonably practicable, ensure that flood risk is managed throughout the construction period when planning sites and storing materials. If necessary, temporary provision will 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:

- having regard to the requirement for construction activities to avoid any increases in flood risk to vulnerable receptors;
- 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; and
- 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.

15.4.24 In accordance with Section 16 of the draft CoCP, monitoring will 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 any impacts on existing land drainage systems are managed appropriately.

- 15.4.25 For major utilities, the following specific measures are considered in addition to the above points:
- trenchless crossing techniques will be used wherever practicable for main rivers/sensitive watercourses to reduce the impact of temporary watercourse diversions on flood risk; and
  - at watercourse crossings hard bank reinforcement and piers in floodplains will be avoided where reasonably practicable.

## **Assessment of impacts and effects**

15.4.26 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 will be avoided or mitigated by the working methods outlined in the draft CoCP. The mitigation included in 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**

### **Surface water**

- 15.4.27 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.
- 15.4.28 Construction compounds may have substantial water demands that may require approval through the protective provisions in the Bill for abstractions to augment other supply options. The assessment will include location-specific engagement with the Environment Agency and other water undertakers on the availability of water at that location. The Environment Agency will be able to impose conditions on any abstractions approved so that no significant effects are likely to arise. In this case, in the Wimboldsley to Lostock Gramam



area, information from the current Environment Agency Abstraction Licensing Strategy (ALS)<sup>183</sup> suggests that there may be some restrictions on obtaining water supplies from surface water sources, particularly around the River Weaver, River Dane and Wade Brook which are assessed as 'restricted water available for licensing'.

- 15.4.29 Where construction highway drainage is discharged to local watercourses, assessments for determining whether routine runoff and spillage risk are likely to have detrimental impacts on water quality are carried out using the Highways England Water Risk Assessment Tool (HEWRAT)<sup>184</sup>. These assessments have identified a major impact on the moderate value Tributary of Gad Brook 3 relating to the A530 King Street. This will result in a major adverse effect, which is significant. Potential moderate impacts are also assessed on the high value Puddinglake Brook and the moderate value Gad Brook. There is no data on background concentrations in Puddinglake Brook and Gad Brook. Therefore, on a precautionary basis it is assumed that background concentrations in these watercourses could be sufficient to lead to exceedances of EQS relating to the highways discharges from the A530 King Street. This would result in moderate adverse effects on both of these watercourses, which are significant.

## Groundwater

### Aquifers

- 15.4.30 The Proposed Scheme will intersect alluvium, river terrace deposits, glaciofluvial deposits and glaciofluvial sheet deposits Secondary A aquifers, the glacial till Secondary (Undifferentiated) aquifer, the Mercia Mudstone Group - Sidmouth Mudstone Formation Secondary B aquifer and the Mercia Mudstone Group Sidmouth Mudstone Formation - Northwich Halite Member Unproductive aquifer in the study area. Whilst there are likely to be some localised impacts, the implementation of the measures outlined in the draft CoCP should mean that any effects on the overall status of these aquifers will not be significant.
- 15.4.31 Excavation of the borrow pits may require dewatering of the glaciofluvial sheet deposits Secondary A aquifer. The need for dewatering is assumed as a worst case and could lead to localised and temporary impacts on groundwater flow and levels within the glaciofluvial sheet deposits Secondary A aquifer and the glacial till Secondary (Undifferentiated) aquifer. Implementation of the measures in the draft CoCP and the excavated materials management strategy<sup>185</sup> will ensure that groundwater levels are controlled with minimal

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<sup>183</sup> Environment Agency (2020), *Weaver and Dane abstraction licensing strategy*. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/938206/Weaver-and-Dane-abstraction-licensing-strategy.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938206/Weaver-and-Dane-abstraction-licensing-strategy.pdf).

<sup>184</sup> Highways England (2020), *Design Manual for Roads and Bridges (DMRB), LA 113 Road Drainage and the Water Environment Revision 1 (formally HD 45/09)*. Available online at: <https://www.standardsforhighways.co.uk/dmrbs/search/d6388f5f-2694-4986-ac46-b17b62c21727>.

<sup>185</sup> High Speed Two Ltd (2020), *HS2 Phase 2b Excavated Materials Management Strategy*.

losses of water from the aquifer system. Whilst there are likely to be minor localised impacts, any effects on the overall status of the aquifer will not be significant.

- 15.4.32 Where foundations or borrow pits could affect local receptors, such as groundwater abstractions or springs, this is reported in the sections below.
- 15.4.33 The construction of the Proposed Scheme will require dewatering activities to take place, which will require approval under protective provisions in the Bill. The current assessment covers the dewatering activities associated with cuttings and borrow pits. As well as assessing the specific impacts of these activities on potential water receptors, an evaluation of water resource policy in this area, using the Environment Agency's Abstraction Licensing Strategy (ALS)<sup>183</sup>, has been carried out. Owing to the nature of the aquifers in the Weaver and Dane Quaternary Sand and Gravel Aquifer WFD groundwater body, there are no groundwater management units (GWMU) managed as part of the current ALS covering the Wimboldsley to Lostock Gralam area. Engagement with the Environment Agency will be undertaken in relation to each of the dewatering locations. The Environment Agency will be able to impose conditions on any abstractions which are approved, so that no significant adverse effects are likely to arise.

### **Abstractions**

- 15.4.34 The assessment has not identified any temporary significant effects on groundwater abstractions.

### **Groundwater – surface water interactions**

- 15.4.35 If dewatering is required during the excavation of MA02 Borrow Pit D there is the potential for baseflow in the nearby Puddinglake Brook to be impacted, due to lowering of groundwater levels. This is assessed to be a moderate impact, resulting in a moderate adverse effect, which is significant.

### **Water dependent habitats**

- 15.4.36 The assessment has not identified any temporary hydrological impacts on water dependent habitats in the study area.

### **Temporary effects – Flood risk and land drainage**

- 15.4.37 Construction of River Dane viaduct, Puddinglake Brook viaduct, Gad Brook viaduct, Wade Brook viaduct, Wade Brook offline overbridge and Smoker Brook viaduct, which will cross the River Dane, Puddinglake Brook, Wade Brook, Gad Brook, Tributary of Gad Brook 3, Peover Eye, Tributary of Peover Eye and Smoker Brook, will require temporary working within areas at risk of flooding. This will include the site haul routes that involve spanning the main channels of the River Dane, Gad Brook, Tributary of Gad Brook 3, Wade Brook, Peover Eye, Tributary of Peover Eye and Smoker Brook. Construction sequencing and temporary works will be designed to reduce potential flood risk to a level that is not

significant. Method statements will be produced by the nominated undertaker and subject to approvals required under the protective provisions in the Bill for the EA and LLFA<sup>186</sup>.

- 15.4.38 If the Environment Agency do not grant permission for dewatering, then wet working will be required during excavation of the MA02 Borrow Pit D which could lead to localised changes in groundwater level. In this instance, there is potential for groundwater flooding on the downgradient side of the granular borrow pit during excavation to impact receptors including a factory, agricultural land, a gas distribution station and an electricity substation. However, given the distance to these receptors and the likely small open working area at any one time during the excavation process, this is assessed as a negligible impact on receptors downgradient of the granular borrow pit including a factory (moderate value), agricultural land (moderate value), a gas distribution station (very high value) and an electricity substation (very high value). This leads to negligible effect which is not significant.

## Permanent effects – Water resources

- 15.4.39 Permanent effects are those initially caused by activity to construct the Proposed Scheme, but which will also remain after the Proposed Scheme has been constructed and is present in the area.

### Surface water

- 15.4.40 Where highway drainage is discharged to local watercourses, assessments for determining whether routine runoff and spillage risk are likely to have detrimental impacts on water quality are carried out using the HEWRAT<sup>187</sup>. The assessment undertaken for the following watercourses result in significant effects:
- the cumulative discharges relating to the realignment of the A530 Nantwich Road, identified a moderate impact on Tributary of River Weaver 2. For the moderate value Tributary of River Weaver 2, this results in a moderate adverse effect, which is significant.
  - the cumulative discharges relating to the realignment of the A556 Shurlach Road, identified a moderate impact on Wade Brook, due to high background concentrations of copper historically recorded in the Wade Brook (above environmental quality standards (EQS)). For the high value Wade Brook, this results in a moderate adverse effect, which is significant.
  - the discharge relating to the realignment of Penny's Lane, identified a potential moderate impact on Tributary of Gad Brook 3. There is no data on background concentrations in Tributary of Gad Brook 3. Therefore, on a precautionary basis it is assumed that background concentrations in the watercourse could be sufficient to lead to an

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<sup>186</sup> High Speed Two Ltd (2022), *Phase 2b Western Leg Information Paper E15: Water resources flood risk and authorisation of related works*.

<sup>187</sup> Highways England (2020), *Design Manual for Roads and Bridges (DMRB), LA 113 Road Drainage and the Water Environment Revision 1 (formally HD 45/09)*. Available online at: <https://www.standardsforhighways.co.uk/dmrbs/search/d6388f5f-2694-4986-ac46-b17b62c21727>.

exceedance of EQS relating to this highways discharge. For this moderate value watercourse this results in a moderate adverse effect, which is significant.

## **Groundwater**

### **Aquifers**

- 15.4.41 It is anticipated that implementation of the avoidance and mitigation measures will ensure there are no permanent significant effects related to the impact of the Proposed Scheme on water levels and quality in the aquifers intercepted by the Proposed Scheme. Where the impacts of the Proposed Scheme 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 and are described below.
- 15.4.42 Where watercourses have a low Q95 and may be dry under some conditions, any highways drainage discharging to these watercourses have the potential to be discharging to the underlying aquifer. Therefore, HEWRAT groundwater assessment has been undertaken for discharges to Broken Cross Drains, Tributary of River Weaver 4 and Tributary of River Wheelock 4.
- 15.4.43 Highways drainage discharge, from the A556 Shurlach Road, to Broken Cross Drains has the potential to be discharging into the underlying glacial till (Undifferentiated) aquifer. The HEWRAT groundwater assessment reports a moderate impact, on this moderate value aquifer, resulting in a moderate adverse effect, which is significant.
- 15.4.44 Similarly, the highways drainage discharges, from Clive Green Lane, to Tributary of River Weaver 4 and Tributary of River Wheelock 4 have the potential to be discharging into the underlying glacial till (Undifferentiated) aquifer. The HEWRAT groundwater assessment reports a moderate impact, on the moderate value aquifer, resulting in a moderate adverse effect, which is significant.

### **Abstractions**

- 15.4.45 The assessment has not identified any permanent significant effects on groundwater abstractions.

### **Groundwater – surface water interactions**

- 15.4.46 As set out in the Borrow Pit Report<sup>188</sup> the nominated undertaker will be required to create a site specific borrow pit restoration plan which will set out the measures required to ensure that restoration measures are in place to ensure the groundwater regime maintains baseflow connectivity with local surface water bodies. These plans will be designed in detail following ground investigation and monitoring. This will be achieved through appropriately designed drainage systems. The implementation of these measures will ensure that there

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<sup>188</sup> Volume 5: Appendix CT-008-00000, Borrow pit report.

are no permanent significant effects on groundwater – surface water interactions caused by the restoration of the borrow pits.

- 15.4.47 The potential spring 140m north of Yew-Tree Farm, Coalpit Lane is located within MA02 Borrow Pit C and will be lost during construction. This is assessed as a major impact, resulting in a major adverse effect, which is significant.

### **Water dependent habitats**

- 15.4.48 Crewe North rolling stock depot (RSD) will be located on glacial till in the upper catchment of Tributary of River Weaver 3 which flows through Wimboldsley Wood SSSI further downstream. Crewe North RSD will consist of extensive areas of hardstanding which could reduce groundwater recharge to the glacial till. The permeability and extent of groundwater present in the glacial till aquifer in this area is unknown. If the glacial till is permeable, then it is possible that baseflow in Tributary of River Weaver 3, and groundwater flow beneath the SSSI, may be affected by this reduction in groundwater recharge. On a precautionary basis, this is assessed as a minor hydrological impact at Wimboldsley Wood SSSI.
- 15.4.49 The assessment of local ecological effects is provided in Volume 5, Ecology register of local level effects, and for any significant effects, mitigation is identified in Volume 2, Section 7, Ecology and biodiversity.

### **Permanent effects – Flood risk and land drainage**

- 15.4.50 Due to mitigation embedded in the design there are no significant impacts on flood risk.
- 15.4.51 The borrow pit areas will be reinstated to their existing levels and land use by the end of the construction period. The restoration works will be designed to ensure that the land within the borrow pit areas drains in a manner suitable for its continued use as agricultural land. The restoration will ensure that existing baseflow and catchment runoff characteristics are maintained for surface water features. These measures will be designed in detail following ground investigation and monitoring to ensure no overall increase in flood risk.

### **Summary of significant effects**

- 15.4.52 On a precautionary basis the Proposed Scheme is anticipated to result in the following significant effects which require other mitigation:
- a temporary major adverse effect on water quality in Tributary of Gad Brook 3 due to water quality changes from highways drainage;
  - temporary moderate adverse effects on water quality in Puddinglake Brook and Gad Brook due to water quality changes from highways drainage;
  - a temporary moderate adverse effect on Puddinglake Brook due to a reduction in baseflow from dewatering of MA02 Borrow Pit D;
  - a permanent moderate adverse effect on water quality in Tributary of River Weaver 2 due to water quality changes from highways drainage;

- a permanent moderate adverse effect on water quality in Wade Brook due to water quality changes from highways drainage;
- a permanent moderate adverse effect on water quality in Tributary of Gad Brook 3 due to water quality changes from highways drainage;
- a permanent moderate adverse effect on water quality in glacial till (Undifferentiated) aquifer due to water quality changes from highways drainage (Broken Cross Drains, Tributary of River Weaver 4 and Tributary of River Wheelock 4); and
- a permanent major adverse effect due to the loss of the potential spring 140m north of Yew-Tree Farm, Coalpit Lane.

## Other mitigation measures

- 15.4.53 Additional mitigation measures have been developed 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.

### Surface water

- 15.4.54 Mitigation measures are required to address the temporary impacts of changes to highways drainage on water quality in Tributary of Gad Brook 3. These mitigation measures may include the use of a swale and a vortex grit separator before discharge or temporarily rerouting the drainage into a larger watercourse, to ensure no significant adverse effect on water quality.
- 15.4.55 Mitigation measures are required to address the potential temporary impacts of highways drainage on water quality in Puddinglake Brook and Gad Brook. During the passage of the Bill further investigations, such as monitoring and analysis of the bioavailability of metals and dilution, will be carried out, where reasonably practicable, to identify whether additional mitigation measures are required. If mitigation is required these will be designed in consultation with the Environment Agency and other stakeholders to ensure no significant adverse effect on water quality.
- 15.4.56 Mitigation measures are required to address the impacts of changes to highways drainage on water quality in Tributary of River Weaver 2. These mitigation measures may include change of existing balancing ponds to wet ponds for retention and settlement before discharge, to ensure no significant adverse effect on water quality.
- 15.4.57 Mitigation measures are required to address the permanent impacts of changes to highways drainage on water quality in Wade Brook and Tributary of Gad Brook 3. During the passage of the Bill further investigations, such as monitoring and analysis of the bioavailability of metals and dilution, will be carried out, where reasonably practicable, to identify whether additional mitigation measures are required. If mitigation is required these will be designed in consultation with the Environment Agency and other stakeholders to ensure no significant adverse effect on water quality.

## Groundwater

15.4.58 Mitigation measures are required to address the impacts of changes to highways drainage on water quality in the glacial till Secondary (Undifferentiated) aquifer, relating to the discharges into Broken Cross Drains, Tributary of River Weaver 4 and Tributary of River Wheelock 4. Mitigation may include changing the existing balancing ponds to wet ponds for retention and settlement before discharge. Further investigations will be undertaken in consultation with the Environment Agency and other stakeholders, to identify appropriate mitigation measures to mitigate any significant effects on water quality. On a precautionary basis, until such time as these investigations are carried out, a residual significant effect will remain.

## Groundwater – surface water interactions

15.4.59 A field survey of the potential spring 140m north of Yew-Tree Farm, Coalpit Lane will be undertaken to determine its value and to identify whether further mitigation is required for any permanent adverse impact from Borrow Pit C. If field surveys confirm the feature to be a spring of high or moderate value, measures will be implemented, insofar as is reasonably practicable, to re-establish the spring in a manner that mitigates any adverse effects that may arise from its loss as a result of the borrow pit. The mitigation could also reduce any adverse impact on flows in downstream waterbodies. The exact requirements will be refined, and mitigation designed following ground investigation.

15.4.60 Additional mitigation measures will be required for the management of groundwater baseflows to Puddinglake Brook during excavation and dewatering of MA02 Borrow Pit D, which has also been assessed as an adverse effect for WFD compliance. Mitigation measures will be designed in detail following ground investigation and monitoring of surface water and groundwater levels to minimise any impacts on base flow to the brook, insofar as reasonably practicable. Mitigation could take the form of:

- a wider buffer strip, or shallower batter on the excavations;
- installation of a groundwater cut-off structure;
- adoption of wet working techniques that avoid the need for dewatering; and
- recirculation of intercepted water to the Puddinglake Brook at an appropriate rate and location.

15.4.61 Any such additional measures will be designed in consultation with the Environment Agency, during the passage of the Bill, to ensure that any potential impact is fully mitigated and there is a negligible effect on flow in Puddinglake Brook. However, on a precautionary basis to ensure long term compliance to WFD, until such time as these investigations are carried out, a residual significant effect will remain.



## **Flood risk and land drainage**

- 15.4.62 During design development, additional surveys, hydraulic analysis and modelling of replacement floodplain storage will be identified and agreed with the Environment Agency to refine the mitigation, where appropriate, with the aim of ensuring no significant effects on flood risk.

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

- 15.4.63 Implementation of the other mitigation measures described above will reduce a number of the identified effects to a level that is not significant. However, on a precautionary basis, it is anticipated that significant residual effects will remain on:
- the water quality in the glacial till Secondary (Undifferentiated) aquifer relating to highway discharges to Broken Cross Drains and Clive Green Lane (permanent moderate adverse effect); and
  - the groundwater baseflow to Puddinglake Brook due to the excavation and potential dewatering of MA02 Borrow Pit D (temporary moderate adverse effect).

## **Cumulative effects**

- 15.4.64 No significant cumulative temporary or permanent effects during construction related to water resources or flood risk are anticipated.

## **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 is provided in Volume 5: Appendix WR-007-00000.
- 15.5.2 The design takes into account the policies in the NPPF and will ensure that the Proposed Scheme is safe from flooding without increasing flood risk elsewhere, as outlined in the Volume 5: Appendix WR-005-0MA02 - Flood risk assessment. 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 ensure that the

quantity and quality of water draining from the Proposed Scheme during its operational phase will have a negligible impact on the water environment.

- 15.5.4 A route-wide WFD compliance assessment is provided in Volume 5: Appendix WR-001-00000. This describes how the Proposed Scheme complies with the requirements of the WFD.

## **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 indicates that there will be no residual significant effects on surface water, groundwater or flood risk during operation of the Proposed Scheme.

## **Cumulative effects**

- 15.5.8 No significant cumulative effects during operation related to water resources or flood risk are anticipated.

## **Monitoring**

- 15.5.9 Volume 1, Section 9 sets out the general approach to monitoring of water resources and flood risk during operation of the Proposed Scheme.
- 15.5.10 There are no area-specific requirements for monitoring water resources and flood risk during operation of the Proposed Scheme.





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