

A46 Coventry Junctions (Walsgrave)

Scheme number: TR010066

6.1 Environmental Statement

Chapter 2 – The Scheme

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ENVIRONMENTAL STATEMENT
Chapter 2 - The Scheme

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2. The Scheme

2.1. Need for the Scheme

- 2.1.1. The A46 corridor forms part of the national Strategic Road Network (SRN) connecting the M1, M6 and the M69 with the M5 and provides links to the SRN and the rest of the country. The South Midlands Route Strategy Evidence Report (Highways Agency, 2014) indicated that sections of the A46 to the south and east of Coventry suffer from congestion and poor journey time reliability. These are likely to be exacerbated by future housing growth and economic aspirations. Many communities are located adjacent to the A46 and stakeholders have raised concerns regarding the pedestrian crossing points on and near the A46.
- 2.1.2. The A46 has historically experienced safety performance issues in comparison to the rest of the SRN. The A46 south of Coventry was in the top 45% for total casualties and in the top 250 collision locations in England (National Highways, 2022). As part of the A46 Coventry Junctions Scheme improvements at the A45/A46 Tollbar End Junction, to the south of Coventry, to grade separate (i.e. to be on different levels) the A46 (N) to A45 (W) movements were completed in 2017 and work to upgrade the Binley Junction started in March 2020, and was completed in February 2023. Conversion of a section of the M6 between junctions 2 and 4 into a smart motorway was completed in March 2020.
- 2.1.3. The Tollbar End Junction and M6 smart motorway improvements have increased the pressure on Binley and Walsgrave Junctions. Following the completion of the Binley Junction improvement scheme in 2023, the Walsgrave Junction is the only remaining roundabout east of Coventry and north of Tollbar End Junction that is at grade (i.e., is at the same level), and as such is a pinch point for traffic. The Binley Junction is approximately 1.7km to the south of Walsgrave Junction.
- 2.1.4. There are concerns that without further investment to reduce congestion on the A46, the benefits derived from the improvement works at Tollbar End Junction and Binley Junction would be limited. In particular, the current delays at the Walsgrave Junction could undermine the existing investment which has been made on A46 improvements.
- 2.1.5. The Road Investment Strategy 2 (RIS2) published in 2020 sets a long-term strategic vision for the network (Department for Transport, 2020). With that vision in mind, it then specifies the performance standards National Highways must meet; lists planned enhancement schemes expected to be built; and states the funding that would be made available during the second Road Period (RP2), covering the financial years 2020/21 to 2024/25. The A46 Coventry Junctions Scheme (i.e. both Binley and Walsgrave) is listed as a committed scheme for

RP2. Further detail on the need for the Scheme is set out within the Case for the Scheme (**TR010066/APP/7.1**).

2.2. Scheme objectives

Department for Transport objectives

2.2.1. The Department for Transport's (DfT) RIS2 (DfT, 2020) sets out the following performance outcomes, which the Scheme aims to contribute towards:

- Improving safety for all
- Providing fast and reliable journeys
- A well maintained and resilient network
- Being environmentally responsible
- Meeting the needs of all users
- Achieving efficient delivery

2.2.2. Further information on how the Scheme achieves the RIS2 performance outcomes is presented in the Case of the Scheme (**TR010066/APP/7.1**).

National Highways' Scheme objectives

2.2.3. The main objectives of the Scheme are to provide the following:

- An SRN that supports and facilitates economic growth, supporting employment and residential development opportunities.
- An SRN that is maintained to safe and serviceable condition.
- Improve the operation and efficiency of the existing transport network, delivering capacity enhancements to the SRN.
- An SRN that minimises its negative impacts on users, local communities and the environment.
- An SRN that balances the need of individuals and businesses that use and rely upon it.
- Reducing / minimising the impact on the wider environment, whilst seeking to bring enhancement.
- Operational maintenance to be considered holistically.

2.2.4. Section c of the RIS2 (DfT, 2020) has an ambition to develop a greener network, specifically envisaging the following:

- *'The majority of all vehicles using the SRN, including almost all cars and vans, are zero emission at the tailpipe, transforming the impact of the SRN on air quality and carbon emissions.'*

- *The SRN makes extensive and effective use of environmentally and visually sensitive ‘green infrastructure’, modern materials and careful planting, including trees. Together, these minimise and mitigate the air, light, noise, visual, and water quality impacts of the SRN on those living or working near to it, and sustain habitats and enhance biodiversity.*
- *Enhancements to the network create roads that fit with their surroundings and which keep negative consequences to a minimum. In particular they have employed high standards of design, responding to place-specific issues and in keeping with the natural, built and historic environment.’*

2.2.5. The A46 corridor provides opportunities for economic growth and improved accessibility within Coventry and Warwickshire enabling the unlocking of sites for residential development, such as the allocated land to the west of the A46 described further in paragraph 2.4.4 and improving access to existing commercial areas.

2.2.6. Further details of how the Scheme meets the Department for Transport’s performance outcomes and National Highways’ Scheme objectives are set out within the Case for the Scheme (**TR010066/APP/7.1**).

2.3. Scheme location

2.3.1. The Scheme is located in the West Midlands, approximately 5km to the east of Coventry city centre. Environmental Statement (ES) Figure 2.1 (Location Plan) shows the location of the Scheme (**TR010066/APP/6.2**). The Scheme involves improvements to the B4082 which runs eastwards from Clifford Bridge Road to the existing Walsgrave Junction and the A46 which runs north-south to the east of Coventry. Binley Junction, located on the A46, is approximately 1.7km to the south of the existing Walsgrave Junction and the M6 and M69 junctions are approximately 2.5km to the north of the existing Walsgrave Junction. ES Figure 2.2 (Order Limits) (**TR010066/APP/6.2**) shows the principal elements of the Scheme and the Order Limits. A Location Plan (**TR010066/APP/2.1**) is also provided with the application, which shows the location of the Scheme in its wider geographical context.

2.3.2. The Scheme is situated within the Coventry City Council and Rugby Borough Council administrative areas (ES Figure 2.1 (Location Plan) (**TR010066/APP/6.2**)). The boundary between these two administrative areas is along the western side of the A46. Rugby Borough Council’s administrative area also forms part of Warwickshire County Council’s administrative area¹, which shares the same border with Coventry City Council. The Leicestershire County

¹ There are five district and borough councils in Warwickshire. They are North Warwickshire Borough Council, Nuneaton and Bedworth Borough Council, Rugby Borough Council, Stratford District Council and Warwick District Council.

Council boundary is approximately 12.5km north and east of the existing Walsgrave Junction.

Surrounding areas

- 2.3.3. ES Figure 2.1 (Location Plan) (**TR010066/APP/6.2**) shows the local area. To the west of the existing Walsgrave Junction, the area is densely populated with seven schools within 2km of the junction. University Hospital Coventry is located approximately 1.2km to the north of the existing A46 Walsgrave Junction. The A46 serves as a blue light (i.e., emergency services) route to the hospital.
- 2.3.4. To the immediate north-west of the existing Walsgrave Junction and along the western side of the A46 north of the existing Walsgrave Junction are areas of agricultural land associated with Hungerley Hall Farm and further north with Walsgrave Hill Farm. To the immediate south-west of the existing Walsgrave Junction and north of Smite Brook the land is also associated with Hungerley Hall Farm, south of Smite Brook are areas of public open space, beyond which are residential areas. To the north-east of the existing Walsgrave junction and northwards along the eastern side of the A46 are areas of agricultural land associated with Walsgrave Hill Farm. Isolated properties at Coombe Warren are located to the south-east of the Scheme. An overhead high voltage electricity line runs north-south on the western side of the A46, crossing the B4082 immediately west of the existing Walsgrave Junction, which is described further in paragraph 2.5.109. Further information on topography and land use is presented in the Case for the Scheme (**TR010066/APP/7.1**).
- 2.3.5. Environmental constraints are shown on ES Figure 2.3 (Environmental Constraints) (**TR010066/APP/6.2**). Immediately adjacent to the east side of the existing Walsgrave Junction is Coombe Abbey Park, part of which includes Coombe² Pool Site of Special Scientific Interest (SSSI) and Coombe Abbey Grade II* Registered Park and Garden. The area to the east of the A46 is designated as green belt. This planning policy designation is detailed further in the Case for the Scheme (**TR010066/APP/7.1**).

Description of the existing A46 Walsgrave Junction

- 2.3.6. The A46 is currently owned, maintained and operated by National Highways. The existing B4082 from Clifford Bridge Road to the existing Walsgrave roundabout is owned by National Highways with occupier rights granted to Coventry City Council up to the give way markings on the Walsgrave roundabout. Coventry City Council currently maintain it.

² Coombe is also spelt as Combe in some databases. For consistency, the spelling of Coombe will be used.

- 2.3.7. The existing A46 is a dual carriageway within the Scheme extents. South of the existing Walsgrave Junction the road is generally elevated, and north of the existing roundabout, it is generally in cutting.
- 2.3.8. The existing junction comprises of a three arm at-grade (i.e, at the same level) roundabout connecting the A46 mainline to the B4082 local network (ES Figure 2.1 (Location Plan) (**TR010066/APP/6.2**)). The central island of the roundabout has a diameter of approximately 40m, and a 12.5m wide circulatory carriageway. On all approaches to the roundabout the entry arms flare to provide additional lanes.
- 2.3.9. The B4082 is a two-lane single carriageway road that provides a link between the A46 and Clifford Bridge Road.
- 2.3.10. The B4027 Brinklow Road passes under the A46 mainline approximately 600m south of the existing Walsgrave Junction.
- 2.3.11. Parking laybys are located on the northbound and southbound carriageways of the A46 mainline between the existing Walsgrave Junction and the M6/M69 junction. Emergency telephones are located at these laybys.
- 2.3.12. Two gantries are present on the northbound carriageway within the Order Limits. A variable message sign (VSM) gantry is situated approximately 1.2km to the north of the existing Walsgrave Junction. The second VMS gantry is situated approximately 1.5km to the north of the existing junction, immediately south of the Farber Road overbridge. Both gantries span over the verge of the northbound carriageway of the A46. There are no gantries located on the southbound carriageway within the Order Limits.
- 2.3.13. Hungerley Hall Farm accommodation bridge, located approximately 400m north of the existing Walsgrave Junction, is owned by National Highways with access rights granted to Hungerley Hall Farm. The bridge provides private access between Hungerley Hall Farm to the west of the A46 and the agricultural land to the east of the A46. The bridge is not currently accessible to the public.
- 2.3.14. The Farber Road overbridge is located is located approximately 1.6km north of the existing Walsgrave Junction, and carries the 156/R75x/1 bridleway over the A46 and provides vehicular access to Walsgrave Hill Farm.
- 2.3.15. The A46 and B4082 corridor boundaries are heavily vegetated on all approaches to the existing Walsgrave Junction, which quickly give way to farmland and public open space beyond. The exception is the section of road adjacent to Coombe Abbey Park where there is significant tree belt separating the road from Coombe Pool. This whole woodland is subject to a Tree Preservation Order (TPO).

2.4. Baseline scenario

Existing baseline

- 2.4.1. The environmental baseline is described within the 'Baseline conditions' section of each aspect chapter of this ES (**TR010066/APP/6.1**). Key environmental constraints are shown on ES Figure 2.3 (Environmental Constraints) (**TR010066/APP/6.2**) and include, but are not limited to, the following:

Residential, community, noise and air receptors:

- Nearby residential communities which are part of Walsgrave on Sowe and Binley are located to the north and south of the B4082, west of the A46. A residential property is also located at Hungerley Hall Farm approximately 140m north-west of the existing Walsgrave Junction and approximately 70m west of the existing A46 northbound carriageway. Isolated properties are also located off Brinklow Road to the east, including those at Highfields and Coombe Warren.
- The nearest noise important areas (NIA)³ in relation to road noise are over 1km from the existing Walsgrave Junction.
- Clifford Bridge Academy and Pearl Hyde Community Primary School are situated approximately 325m south-west and 750m north from the existing Walsgrave Junction respectively. A further five schools are within 2km of the existing Walsgrave Junction.
- Wyken Community Centre is located approximately 770m north-west of the existing Walsgrave Junction and University Hospital Coventry is approximately 1.2km to the north.
- Caludon Castle playing fields are situated 1km to the north-west.
- The existing Walsgrave Junction is immediately adjacent to the Coventry City-Wide Air Quality Management Area (AQMA), which has been designated due to exceedances of the annual mean nitrogen dioxide (NO₂) objective, refer to ES Chapter 5 (Air Quality) (**TR010066/APP/6.1**).
- Coombe Abbey Park (immediately east of the existing Walsgrave Junction), the Spring Estate Allotments adjacent to Clifford Bridge Road (approximately 480m west of the existing Walsgrave Junction), recreational open space adjacent to Binley residential area (immediately west of the existing Walsgrave Junction), and Caludon Castle playing field (1km north-west of the existing Walsgrave Junction) may be sensitive to dust soiling during construction.

Ecological receptors:

- There are no European protected sites (Special Protection Areas (SPAs), Special Areas of Conservation (SAC) or Wetlands of International Importance (Ramsar sites) within 2km of the existing Walsgrave Junction.

³ Noise Action Planning Important Areas (IAs) for roads and railways are also shown. These areas provide a framework for the local management of the Important Areas.

The nearest European protected site is Ensor's Pool SAC which is located over 10.1km to the north-west.

- There are two SSSIs within 2km of the site. Coombe Pool SSSI is located immediately adjacent to the east of the existing Walsgrave Junction, and a narrow section of the SSSI is within the Scheme's Order Limits. The SSSI lies within Coombe Abbey Park and contains a 36 hectare (ha) pool (fed by Smite Brook), reed beds and woodland. The site is known for its herons (it is the largest heronry in the county with 20 breeding pairs recorded in the past) and wintering waterfowl. The woodland within the SSSI supports a diverse breeding bird community. Herald Way Marsh SSSI, located 1.5km south of the existing Walsgrave Junction, is designated for its assemblage of invertebrates, a number of which are nationally rare. None of this SSSI is within the Scheme's Order Limits.
- Two locally designated Local Nature Reserves (LNRs) are present within 2km of the existing Walsgrave Junction. Herald Marsh Way LNR, located approximately 1.45km to the south, comprises one of the most important areas for rare invertebrates in the county. The site overlaps with Herald Way Marsh SSSI. Stoke Floods LNR is located approximately 900m south-west of the existing Walsgrave Junction. The Stoke Floods LNR has a large lake, reedbeds and scrub next to the River Sowe. The site supports many wetland plants, including flag and reed canary grass. Bird life is varied from many species of duck, seven species of warbler in the summer and occasional black tern and yellow wagtails. The reserve is one of the most important wetland sites in Coventry.

Hydrological, flood risk and geological receptors:

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

- Agricultural land to the east and west of the A46 is classified as a mixture of Grade 2 and Grade 3.

Cultural heritage receptors:

- Coombe Abbey, grade II* Listed Building and Coombe Abbey Registered Park and Garden/Conservation Area which is adjacent to the existing Walsgrave Junction and is situated within the Coombe Abbey Park. The Country Park is owned, managed and maintained by Coventry City Council. The park has been developed on the grounds of the old abbey which was enclosed in 1150 for sheep pasture. The abbey has now been converted into the privately owned Coombe Abbey Hotel.
- Three grade II Listed Buildings including some associated curtilage features at the site of Hungerley Hall Farm, approximately 170m north of the existing Walsgrave Junction. These Listed Buildings are associated with the late 17th – early 18th century farmhouse.
- Other designated heritage assets located up to 1km from the existing Walsgrave Junction include:
 - Two Scheduled Monuments at the site of Caludon Castle (approximately 880m north-west of the Scheme at the nearest point)
 - Two grade I Listed Buildings
 - Two grade II* Listed Building
 - 21 grade II Listed Buildings

Key traffic and transport receptors:

- No public rights of way (PRoW) cross the A46 near the existing Walsgrave Junction, although bridleway 156/R75x/1 crosses the A46 on the Farber Road overbridge approximately 1.6km north of the existing Walsgrave Junction.
- PRoWs located near to the existing Walsgrave Junction include: bridleways 235 and 156/R75x/1 (approximately 1.6km north), bridleway 156/R75b/1 (approximately 1.5km to the north-east) and footpaths 156/R75y/1 (approximately 2.4km to the north-east) and 127/R145/1 (approximately 1.7km to the south).
- The Sowe Valley Walk, a locally promoted walk, is situated approximately 280m west of the existing Walsgrave Junction and follows the River Sowe from Longford through to Willenhall.
- No existing footways are provided along the A46. There is a short length of existing footway on both sides of the B4082 at the Clifford Bridge Road roundabout which provide access to the existing uncontrolled crossing on the B4082.
- Footways are provided along Clifford Bridge Road and there is a crossing point on Clifford Bridge Road near Bridgeacre Gardens. The Sowe Valley Walk also passes beneath Clifford Bridge Road north of the junction with B4082.

- A number of bus routes are serviced along Clifford Bridge Road, with the following route numbers calling at 'Clifford Bridge Rd Stop': 17, 17A, 85, 85B, 60 (travelling north-east) and 8, 85S, 8S, 9, X30, 74, 74A, 74S, X6, 85A (travelling south-west).

Future baseline

- 2.4.2. How the existing baseline conditions would change and evolve without the implementation of the Scheme has been assessed as part of the environmental impact assessment (EIA) and is referred to as the future baseline. Changes to the existing baseline conditions may occur due to a combination of natural influences (e.g. climate change) and human influences (e.g. new developments and changes in land use).
- 2.4.3. The future baseline conditions, applicable to each of the aspects, are reported in ES Chapters 5 to 15 (**TR010066/APP/6.1**). A summary of the future baseline is provided below.
- 2.4.4. There are several development proposals located within the 1km of the Scheme extents that have been considered within the ES during the Scheme's development. A full list of committed developments has been produced for the cumulative effects assessment, as set out in ES Chapter 15 (Combined and Cumulative Effects) (**TR010066/APP/6.1**) and ES Appendix 15.1 (Cumulative Effects Long and Short List) (**TR010066/APP/6.3**). Key strategic developments include the following:
- An area of land on the immediate west side of the A46, from north of the existing Walsgrave Junction and the B4082 to where the A46 crosses a tributary of the River Sowe (north of the Order Limits), has been allocated for development (H2:3) in the Coventry City Council Local Plan 2011 to 2031 (Coventry City Council, 2017). This site is expected to deliver approximately 900 dwellings through future development proposals, which is approximately 3.7% of the homes the Local Plan sets out to provide before 2031.
 - Ansty Park, an existing high profile business technology park for Coventry and Warwickshire, located approximately 1km to the east of the A46 and south-east of the M6 Junction 2.
- 2.4.5. Wider environmental changes are also predicted to occur over time as a consequence of factors such as climate change, which could increase the risk and intensity of flood events affecting the road network. The future baseline for climate is based on 2018 UK climate projections and is described in more detail in ES Chapter 14 (Climate) (**TR010066/APP/6.1**).

2.5. Scheme description

Introduction

- 2.5.1. The Scheme works, comprising the authorised development, are described in Schedule 1 of the draft Development Consent Order (DCO) (**TR010066/APP/3.1**). The General Arrangement (**TR010066/APP/2.6**) illustrates the design of the Scheme and identify its key components and features. The Engineering Drawings and Sections (**TR010066/APP/2.5**) present further Scheme design information. Reference to these plans is made in the following sections where applicable. Temporary elements are detailed within section 2.6 of this chapter. Temporary construction features (i.e. satellite compounds) are presented in ES Figure 2.5 (Temporary Works) (**TR010066/APP/6.2**).

Order Limits

- 2.5.2. The Order Limits define the maximum area of land required both temporarily and permanently to construct, operate and maintain the Scheme, the extents of which are illustrated on ES Figure 2.2 (Scheme Order Limits) (**TR010066/APP/6.2**). Land within the Order Limits covers an area of approximately 36.62 hectares (ha).
- 2.5.3. As the preliminary design and construction information has evolved since the production of the Environmental Scoping Report (**TR010066/APP/6.8**) the draft Order limits presented in the Environmental Scoping Report vary from the Order Limits considered in this assessment. Further detail regarding the changes and the reasons for the changes are detailed in ES Chapter 3 (Assessment of Alternatives) (**TR010066/APP/6.1**). Changes to the Order Limits has resulted in changes to the study area for this assessment.

Land take

- 2.5.4. Although the Applicant is endeavouring to acquire the land required to construct, operate and maintain the Scheme by agreement, powers to compulsorily acquire land are being sought through the draft DCO (**TR010066/APP/3.1**).
- 2.5.5. The Scheme's temporary and permanent land take requirements have been identified during the design development and EIA processes, and through consultation and engagement with affected landowners. Details of consultation with affected landowners is set out in the Consultation Report (**TR010066/APP/5.1**).
- 2.5.6. Land would be acquired permanently to accommodate the engineering, drainage and environmental components of the Scheme, and temporarily for works and

operations including construction compounds, vehicular access, construction working areas, and materials storage.

- 2.5.7. The land required for the Scheme is illustrated on the Land Plans (**TR010066/APP/2.2**), the extents of which are contained within the Order Limits. The Order Limits include permanent acquisition (34.66 ha) required for the Scheme, and temporary possession (1.95 ha) required during construction.
- 2.5.8. In addition, permanent rights in land are being sought within the draft DCO (**TR010066/APP/3.1**) for future maintenance access by the Applicant, statutory undertakers and local authorities, approximately 0.01 ha will be required for permanent acquisition of rights over land.
- 2.5.9. The Statement of Reasons (**TR010066/APP/4.1**), which accompanies the Book of Reference (**TR010066/APP/4.3**) and Land Plans (**TR010066/APP/2.2**), sets out the justification for why each land parcel is to be acquired permanently or temporary possession sought, or where permanent rights are sought.

Scheme design

- 2.5.10. The development of the Scheme design has been an iterative process, undertaken as part of an integrated design team bringing together civil infrastructure disciplines alongside broader design disciplines including landscape architects, and influenced by environmental specialists. The design has been developed to meet the Scheme objectives whilst also minimising environmental effects wherever practicable.
- 2.5.11. The Scheme design adheres to the principles of the design and mitigation hierarchy outlined in the Design Manual for Roads and Bridges (DMRB) LA 104 Environmental Assessment and Monitoring (National Highways, 2020) (further explanation for using the DMRB is detailed in ES Chapter 4 (Environmental Assessment Methodology) (**TR010066/APP/6.1**). The first principle being to avoid potential adverse effects where practicable, before seeking to reduce or mitigate any unavoidable impacts on the environment. This has formed a well-developed embedded and essential mitigation strategy. Further details of the embedded mitigation for the Scheme are captured in paragraphs 2.5.110 to 2.5.120.

Highway alignment

A46 Mainline

- 2.5.12. At the southern extent of the Order Limits (see Sheet 1 of the Works Plans (**TR010066/APP/2.3**)) no permanent works are proposed for approximately 320m to avoid any works over the Brinklow Road underbridge structure. This

section of the A46 is within the Order Limits to allow temporary traffic management works to be undertaken.

- 2.5.13. The realignment of the A46 and new construction, along a length of 880 metres, commences at a location situated 80m north of the existing Brinklow Road underbridge and terminating at a location situated 12m south of the existing Hungerley Hall Farm accommodation overbridge. Through this section of the A46 the vertical profile varies up to 0.75m maximum above existing road level before returning to the existing road level. Widening along the existing A46 has been undertaken for the junction slip roads which also removes existing non-standard lane width and nearside hard shoulder through the new junction.
- 2.5.14. At the northern extent of the Order Limits (see Sheet 5 of the Works Plans (TR010066/APP/2.3)) permanent works includes for the provision of new road signs in the roadside verges as shown on the General Arrangement drawings (TR010066/APP/2.6).
- 2.5.15. The proposed alignment reduces the existing speed limit from 70mph to 50mph from approximately 50m north of the Brinklow Road underbridge to 2m within the northern extent of the Order Limits. The alignment has been designed so the A46 can be kept as far from Coombe Pool SSSI as possible whilst still being able to achieve a 50mph speed limit. The A46 mainline would continue to be owned, maintained and operated by National Highways.
- 2.5.16. The two existing public laybys on the A46 would be removed. Due to the distance between the existing M6/M69 junction and the new proposed Walsgrave Junction there is not a sufficient length to allow a public layby to be incorporated safely. The Scheme includes the construction of a maintenance layby (see Work No 11 on Sheet 4 of the Works Plans (TR010066/APP/2.3)).

Existing Walsgrave roundabout

- 2.5.17. The existing central island forming the existing Walsgrave Junction is covered with woody vegetation. Vegetation would be removed as the central island would be surfaced and used as a live lane for traffic management purposes during construction. Following the traffic management requirements, the hard surfacing would be removed and incorporated into the landscape planting proposals.
- 2.5.18. The surrounding earthworks comprise of vegetated earth bunds with a maximum height of 5m towards the junction. Vegetation would be retained where practicable, however a 5m strip of grass would be provided either side of an existing drainage pipe to allow for access and maintenance.

B4082 link road

- 2.5.19. The existing B4082 (single lane carriageway) connects into the local road network at Clifford Bridge Road roundabout. The existing alignment of the B4082 eastwards towards the existing A46 Walsgrave roundabout is retained for 240m from Clifford Bridge Road roundabout. As the existing Walsgrave roundabout is removed the B4082 would, via a new section of road, run north and parallel to the A46 to the new grade separated junction (i.e., the junction is on a different level to the A46) described further below. The B4082 link road consists of a realigned single lane carriageway with 1m hard strips. The existing B4082 from Clifford Bridge Road is owned by National Highways with occupier rights granted to Coventry City Council, up to the give way markings on the existing Walsgrave Junction. Coventry City Council currently maintain the B4082.
- 2.5.20. The new section of the B4082 link road would be approximately 975m in length. The new B4082 link road would commence at a location situated 240 metres east of the existing Clifford Bridge Road roundabout and run for approximately 890m as a single carriageway running generally northwards parallel to the A46. The new section of the B4082 would pass between Hungerley Hall Farm buildings and the existing A46 before connecting to the new A46 grade separated junction. The vertical profile ties in with the existing B4082, and then enters a section in cut, with a maximum 1.25m below existing ground. The vertical alignment then rises above the existing ground level to match with the existing Hungerley Hall Farm accommodation overbridge level. The vertical alignment then rises again up to a maximum of 8.4m above ground to connect with the new grade separated junction.
- 2.5.21. The new B4082 link road commences at a location situated 240m east of the existing Clifford Bridge Road roundabout. The entire length of the B4082 link road between Clifford Bridge Road roundabout and the new segregated A46 Walsgrave junction would be owned, maintained and operated by Coventry City Council. The speed limit would be reduced from 60mph to 40mph along its entire length. The B4082 has been proposed to be kerbed along the entire length in line with drainage requirements as discussed with Coventry City Council. The existing Hungerley Hall Farm accommodation overbridge is retained and the vertical alignment of the new B4082 link road allows for vehicular access to the accommodation overbridge. This would also allow the potential to facilitate a new walking, cycling and horse riding (WCH) route from Clifford Bridge Road and the Binley Cycleway (to be delivered by Coventry City Council) to Coombe Abbey Park in the future, at a substantially reduced cost and disruption. The existing Hungerley Hall Farm accommodation overbridge is owned by National Highways, who would continue to maintain this asset, with access rights for the adjacent landowner.

- 2.5.22. A new farm access has been provided for Hungerley Hall Farm north of the farm buildings to access the B4082. This would provide a more direct route to access the accommodation overbridge and the fields to the east of the A46. This would shorten the length of the B4082 on which the farm vehicles need to travel.

Dumbbell junction

- 2.5.23. The new Walsgrave Junction consists of a dumbbell roundabout arrangement with single entry and exits which will be located over (i.e. at a higher level) the A46 mainline. The junction connects the A46 mainline to the B4082 local network. The dumbbell junction is made up of a western and eastern roundabout connected by a new overbridge that crosses over the A46 mainline at approximately 8m above existing road level. The cross section across the bridge consists of a single lane in each direction and a hatched out central island.
- 2.5.24. The roundabouts are connected to the A46 mainline with two new merge (on slip) and two new diverge (off slip) slip roads allowing movements northbound and southbound between the A46 and local road network. The speed limit on the slip roads would be 50mph. All four slip roads are single lane with hard shoulder.
- 2.5.25. The western roundabout comprises of four arms connecting the A46 northbound merge and diverge slip roads, the new junction overbridge, and the new B4082 link road. The geometry of the roundabout has been designed to accommodate another arm to not preclude a potential future blue light route to University Hospital Coventry. The provision of the blue light route does not form part of this Scheme and would be delivered by the adjacent housing development to be progressed by others in accordance with the site allocation within the Coventry City Council Local Plan 2011 to 2031 (Coventry City Council, 2017).
- 2.5.26. The eastern roundabout comprises of three arms connecting the A46 southbound merge and diverge slip roads to the new junction overbridge leading to the western roundabout.
- 2.5.27. The slip roads and roundabouts are above existing ground level with embankments on both sides with a maximum height of 9m. The grade separated junction, including roundabouts and slip roads, would be owned, maintained and operated by National Highways.

Structures

New overbridge

- 2.5.28. The new overbridge at the dumbbell junction would provide access across the A46 between the two roundabouts and would carry a two-way single carriageway. A hatched area would be provided in the central reserve to accommodate broken down vehicles safely. No footways would be provided for

pedestrians over the bridge to prevent erroneous pedestrian access onto the A46 mainline.

- 2.5.29. The proposed Walsgrave overbridge is a single 30m span structure with a superstructure comprising steel plate girders with a composite reinforced concrete deck slab. The materials are chosen for durability and low maintenance requirements. The superstructure is made fully integral with the substructure by means of reinforced concrete diaphragms at either end. The slender profile of the deck would allow a lower earthworks height which has the potential to reduce noise and visual impacts on nearby receptors. The lower earthworks height allows shallower gradients for slopes which increases opportunities for planting. Less earthworks can also result in a shorter construction programme. The proposed superstructure typology minimises the weight of the deck, leading to reduced quantities of material required in the substructure and foundations.
- 2.5.30. Foot and cycleway provision has not been allowed for in the proposed junction overbridge. It is not considered to be reasonable or practicable that pedestrian provision, except for maintenance, would be required in future therefore no space proofing has been considered over the proposed structure. Due to the planned future development of housing on the west side of the A46, it is considered likely that alternative WCH user crossings over the A46 mainline may be required in future.

Other structures

- 2.5.31. There are five existing structures within the Order Limits:
- Hungerley Hall Farm accommodation overbridge
 - Farber Road overbridge
 - Smite Brook culvert under the A46
 - Smite Brook culvert under the existing B4082
 - Brinklow Road underbridge
- 2.5.32. The Hungerley Hall Farm accommodation overbridge structure comprises a continuous two span post-tensioned 63m long concrete overbridge with a single concrete column at mid-span. The bridge was constructed in 1989. The A46 mainline alignment has been designed to ensure the central column is not affected. Following structural surveys, no works are required to the bridge to deliver the Scheme.
- 2.5.33. The Farber Road overbridge is located approximately 1.6km north of the existing Walsgrave Junction and carries the R75x bridleway over the A46. The structure comprises a two-span deck supported on reinforced concrete abutments and a

reinforced concrete pier as the intermediate support. No works are proposed to this structure.

- 2.5.34. The Smite Brook carries water from Coombe Pool and crosses the A46 mainline in a culvert located approximately 50m to the south of the existing Walsgrave Junction. The culvert comprises a single span in situ reinforced concrete box culvert. The overall length (based on as-built information) is approximately 80m. Splayed wingwalls are provided on each side of the headwalls. A structural assessment has been undertaken and there is no impact to this structure because of the Scheme. No works are proposed to this culvert. Smite Brook culvert is within National Highways land but maintained by Coventry City Council.
- 2.5.35. Smite Brook also crosses the B4082 in a culvert approximately 300m to the west of the Walsgrave roundabout. The culvert comprises a single span in situ reinforced concrete box. The structure has a square length of approximately 20m and a skew length of 18m (from as-built information). Wingwalls are provided on each side of the headwalls. No works are proposed to this culvert.
- 2.5.36. Brinklow Road underbridge is located approximately 35m south of the existing Walsgrave Junction and carries the A46 over the B4027 Brinklow Road. Although located within the Order Limits, the structure is outside the extent of works and is not affected by the Scheme.

Geotechnical

- 2.5.37. Geology and soil conditions underlying the Scheme are described in ES Chapter 9 (Geology and Soils) (**TR010066/APP/6.1**). Ground Investigation (GI) work has been undertaken in summer and autumn 2023 and the GI Report is presented in ES Appendix 9.3 (Ground Investigation Report) (**TR010066/APP/6.3**).
- 2.5.38. The historical borehole data and recent GI have been used to undertake the preliminary foundation design of the new overbridge forming the grade separated junction. The proposed integral overbridge is supported by concrete bankseat abutments which act as retaining walls for the backfill material behind the abutments. The bankseat abutments would be cast-in-situ and be supported on spread footings which would sit directly on reinforced soil walls and wrap around wingwalls. Modular concrete facing panels would form the vertical face of the reinforced soil wall supporting the bankseat abutment while steel reinforcements are attached to the modular panels.
- 2.5.39. Approximately 1.5m depth of ground improvement is anticipated under the footprint of the reinforced soil walls for the overbridge. The ground improvement

would likely consist of excavation of soft material until a suitable strength formation is reached, and replacement with a Class 1 granular fill.

- 2.5.40. Retaining walls are needed to the four slip roads in the vicinity of the dumbbell roundabouts to allow the provision of signage and technology assets. The retaining walls would be developed at the detailed design stage and would likely be either concrete or reinforced soil walls.
- 2.5.41. The Scheme would require a number of embankments and cuttings to accommodate the horizontal and vertical alignment of the Scheme. As a general principle, these slopes are proposed to be between 1:2 and 1:3 or shallower.
- 2.5.42. The A46 is on an embankment as it passes over the culverted Smite Brook adjacent to Coombe Pool. On the eastern (southbound) side lies a further embankment (bund). The bund lies within the existing eastern verge of the A46 and provides part of the embankment slope upon which the A46 is built. The current purpose of this bund is unknown, with as-built drawings referring to it as an environmental bund. Consultation to date with the lead local flood authorities (LLFA) of Coventry City Council and Warwickshire County Council and the Environment Agency has been unable to determine its purpose. This bund would be reduced in height along some sections as part of the Scheme to facilitate the A46 alignment and associated earthworks which allows a 50mph speed limit. Details of how the applicant has undertaken engagement with statutory consultees is set out in the Consultation Report (**TR010066/APP/5.1**)
- 2.5.43. The Scheme would impact the agricultural land by removing excellent (grade 1) and good to moderate (grade 3) classified agricultural soils. This would be mainly to the west of the A46 (in the area allocated for future housing development as described in paragraph 2.4.4). An agricultural survey has been undertaken to confirm the agricultural land classification to inform the design and any required mitigation. This is presented in ES Appendix 9.2 (Soil Resource Plan and Agricultural Land Classification) (**TR010066/APP/6.3**).

Walkers, cyclists and horse riders

- 2.5.44. At present only the R75x bridleway from Farber Road to Walsgrave Hill Farm (via the Farber Road overbridge) provides WCH facilities within the Order Limits. No works are proposed to this bridge. Operation of the Scheme would not result in any impacts on any existing WCH facilities, and the Scheme would not lead to any changes to the existing local WCH network.
- 2.5.45. As part of the Scheme a signalised pedestrian crossing would be provided on the B4082 link road to the immediate east of the Clifford Bridge Road/B4082 roundabout. This would improve the north-south movement of pedestrians along

the eastern side of Clifford Bridge Road between Wyken and Binley, including children walking to school from the nearby residential areas. This would become a Coventry City Council asset. The crossing also involves installing loops for the functioning of the crossing within the circulatory carriageway of Clifford Bridge Road roundabout. Associated with the crossing, pedestrian guard railing may also be installed around the south-eastern and north-eastern curves of the roundabout.

- 2.5.46. The Scheme incorporates enabling works for future WCH provision to be provided by others. This includes additional earth works which provides verge widening along the new section of the B4082 link road to accommodate the future provision by others of a segregated walking and cycling route and a section of shared use path (to LTN 1/20 standards). The enabling works also include the retention of Hungerley Hall Farm accommodation overbridge for continued use by Hungerley Hall Farm, and which National Highways will continue to maintain.
- 2.5.47. These enabling works have the potential to facilitate a new route from Clifford Bridge Road and the Binley Cycleway (to be delivered by Coventry City Council) to Coombe Abbey Park in the future, at a substantially reduced cost and disruption. Such a route would connect with committed and proposed future active travel schemes within Coventry and Warwickshire local authority areas.
- 2.5.48. No verge widening is proposed within this Scheme to the existing B4082 to deter unauthorised WCH access along the new B4082 towards the A46. Ducting would be provided in the road and verge to allow for a future signalised pedestrian crossing to be installed across the B4082 link road to access the Hungerley Hall Farm accommodation overbridge.
- 2.5.49. A surfaced WCH route and signalised crossing at the Hungerley Hall Farm accommodation overbridge would not be provided as part of the Scheme to deter the public from erroneously entering the agricultural land to the east of the A46 mainline. A gate would be provided across the western entrance to Hungerley Hall Farm accommodation overbridge to prevent trespass onto agricultural / private land. Access would be maintained for agriculture.

Watercourse crossings and flood risk

- 2.5.50. The River Sowe is designated as Main River which flows south approximately 300m west of the Walsgrave Junction. It is hydrologically connected to the surrounding watercourses directly or via Smite Brook. The Scheme does not encroach within the floodplain of the River Sowe nor have any direct impacts upon this river.

- 2.5.51. Smite Brook is an Ordinary Watercourse, which originates to the east of the study area and supplies Coombe Pool. Coombe Pool then discharges back into Smite Brook which flows in a westerly direction where it is culverted beneath the A46. Smite Brook then flows north-west passing beneath the B4082 before its confluence with the River Sowe. No works are proposed within Smite Brook as part of the Scheme.
- 2.5.52. Coombe Pool is a 32ha designated raised reservoir under the Reservoirs Act 1975, located 100m to the east of the existing Walsgrave Junction. Coombe Pool is part of the wider Coombe Abbey Country Park. A bellmouth structure, sluice gates and a spillway discharge overflows into Smite Brook and Birchley Beck. The proposed works will have no impact upon Coombe Pool.
- 2.5.53. Birchley Beck is an Ordinary Watercourse originating southeast of the Order Limits and flows north-west. Birchley Beck is culverted beneath the B4027 (Brinklow Road). Birchley Beck and an unnamed tributary originate south of Coombe Pool and flow north-west before they confluence with the Smite Brook. The works will not impact Birchley Beck.
- 2.5.54. An unnamed Ordinary Watercourse, located approximately 1km north of the existing Walsgrave Junction, flows west beneath the existing A46 via pipework to the River Sowe. Approximately 300m south of this an unnamed ordinary watercourse flows in a westerly direction to the River Sowe. This watercourse is contained to the west of the existing A46, where it originates. On the eastern side of the carriageway, a drainage ditch flows in a westerly direction and connects to the existing drainage system, east of the A46.
- 2.5.55. According to the Environment Agency Flood Map for Planning (Environment Agency, 2024a), the majority of the Scheme boundary falls within Flood Zone 1, however, there are areas of the Scheme that fall within Flood Zones 2 and 3 (refer to ES Chapter 13 (Road Drainage and the Water Environment) (TR010066/APP/6.1):
- The A46 culvert south of the existing Walsgrave Junction lies within Flood Zones 2 and 3.
 - Smite Brook is throttled at the B4082 culvert and excess flow spills onto the B4082 which is located within Flood Zone 2.
 - Flood Zone 2 extends along Brinklow Road which passes beneath the A46, 600m south of the existing Walsgrave Junction.
- 2.5.56. There are no designated flood defence structures within the Order Limits.
- 2.5.57. Hydraulic modelling of the River Sowe, Withy Brook, Smite Brook and its tributaries was carried out to increase confidence in assessing the impacts of the

Scheme on fluvial flood risk. The model results predicted similar flood extents to those shown in the Environment Agency flood maps albeit with slight reductions in flood extents in the Smite Brook and its tributaries (refer to ES Chapter 13 (Road Drainage and the Water Environment) (**TR010066/APP/6.1**).

- 2.5.58. The hydraulic model demonstrates that the majority of the Scheme lies outside of the design event extent. The proposed A46 southbound carriageway level of at least 74.0mAOD (the 1% AEP plus climate change and 600mm freeboard) is maintained the full length of the Scheme design. This ensures no flooding of the carriageway itself and ensures the Scheme adheres to DMRB LA 113.
- 2.5.59. Watercourse crossings within the Order Limits would occur at the following locations:
- Smite Brook culvert which passes under the A46
 - Smite Brook culvert which passes under the B4082
 - An un-named ditch (approximately 1km north of the existing Walsgrave Junction)

Drainage design

- 2.5.60. The Scheme introduces new road surface areas which require new and improved drainage, and in some locations where the existing drainage network would be impacted it would be replaced. The drainage design would be based on the principles of the standard Design Manual for Roads and Bridges (DMRB) CG 501: Design of Highway Drainage Systems (National Highways, 2022) for the majority of the works.
- 2.5.61. ES Appendix 13.6 (Drainage Strategy Report) (**TR010066/APP/6.3**) details the drainage design. The following is a general overview of the strategy.
- 2.5.62. Within the Order Limits eight existing outfalls have been identified from National Highways data, four of which discharge to Smite Brook in the location of the A46 culvert.
- 2.5.63. A closed-circuit television (CCTV) and condition survey has been undertaken of the existing drainage networks. Existing assets would be retained where practicable, if they are in a suitable condition.
- 2.5.64. Surface water would be collected through a combination of the following features:
- Mainline nearside verges: combined filter drains.
 - Mainline central reserve: concrete surface water channel with carrier drains.

- Slip roads: combined filter drains.
- Dumbbell junction: circulatory islands kerbs and gullies, V-ditches at the toe of the embankments.
- Junction bridge: bridge deck kerbing.
- B4082 link road: combined filter drain in the nearside and offside verges.

2.5.65. The drainage design replicates the existing drainage arrangement and includes six drainage catchments (Annex A of ES Appendix 13.3 (Water Quality Assessment) (**TR010066/APP/6.3**). The proposed drainage catchments have been designed in order to separate the maintenance responsibilities of National Highways and Coventry City Council. Separate drainage features in the form of a basin and ponds are provided for each maintainer as follows (General Arrangement (**TR010066/APP/2.6**)):

- One near Hungerley Hall Farm junction off the B4082 link road (to be owned and maintained by Coventry City Council). This 'southern detention basin' would be predominantly dry except when detaining runoff after a rainfall event. This detention basin would discharge to Smite Brook near the B4082 culvert via an existing outfall.
- One 'central pond' between the B4082 link road and A46 mainline (to be owned and maintained by National Highways). The level of the outlet would enable the pond to remain wet to improve water quality of the road runoff prior to discharge. The central pond would discharge to new highways drainage ditch along the western side of the B4082 which would connect to an existing un-named ditch which flows to the River Sowe.

2.5.66. A third 'northern pond' is purely for water quality treatment purposes and would be located north of the western roundabout of the dumbbell adjacent to the northbound merge (to be owned and maintained by the National Highways). The northern pond would be designed to be permanently wet in order to provide water quality treatment for road runoff. This pond would discharge via a new outfall into an un-named ditch which flows to the River Sowe.

2.5.67. At the northern pond location, the existing drainage outfalls will be relocated to accommodate the pond. The field drainage would be kept separate from the road drainage and both would outfall to the same watercourse as they currently do now.

2.5.68. Due to high groundwater levels on the western side of the A46 the basin and ponds would be lined. At the detailed design stage measures would be investigated to ensure no hydraulic uplift occurs when the pond is empty due to the high groundwater levels. This would be determined in consultation with the Environment Agency where required.

- 2.5.69. The drainage features (i.e. basin and ponds) would be designed to allow for a minimum 300mm freeboard in the event of rainfall of a 100-year return period with 20 percent climate change allowance. A sensitivity test would be carried out for 40 percent climate change allowance to ensure the proposed basins do not flood.
- 2.5.70. Each detention basin / pond would have a minimum 3.5m wide circulation track around it with a 0.5m verge width on either side to allow for maintenance access.
- 2.5.71. For the three other drainage catchments, flows would pass through filter drains or pipes and discharge unattenuated into Smite Brook near the A46 culvert, via existing outfalls. In these instances, discharge rates would be the same or less than the existing greenfield discharge rates.
- 2.5.72. Where filter drains pass through areas where high groundwater is present, lining may be required, or alternatively pipework maybe needed. This would be considered at the detailed design stage in consultation with the Environment Agency.

Road pavement and surfacing

- 2.5.73. New sections of road would be constructed using different types and layers of bituminous materials. All new sections of road as part of the Scheme would be constructed of either fully flexible or flexible composite road construction. The depth of the road construction layers on each section of road varies based on the volumes of traffic that are forecast to use the road.
- 2.5.74. Where existing roads would be modified to connect with new sections of road, or where improvements to accommodate future traffic growth are required, a surface treatment or a thin surface course system would be applied.
- 2.5.75. Low noise surfacing would be provided along the new dual carriageway. Where existing sections of the A46 are retained then these would be re-surfaced with low noise surfacing as part of the Scheme where this has not been undertaken already.
- 2.5.76. The preliminary design does not include for material selection, which would occur during the detailed design stage.
- 2.5.77. Where existing roads would be modified to accommodate traffic management arrangements, localised repairs would be undertaken to reinstate the existing carriageway to its original condition upon completion of the works.

- 2.5.78. Coventry County Council preference is not to have either High Friction Surfacing or coloured surfaces applied on the top of the surface course due to future maintenance burden associated with these.
- 2.5.79. The design for maintenance accesses, following initial discussions with Coventry Country Council, is proposed to be of some form of cellular paver construction to the bell mouth of a junction and of unbound construction thereafter. The cellular type paving products allow grass to grow through which is expected to blend in with landscape and make it less obvious to general road users, consequently deterring undesirable behaviours such as unauthorised parking and fly tipping.

Kerbing

- 2.5.80. Kerbs would be provided at roundabouts and on the B4082 side roads where the potential future WCH route would run adjacent to the carriageway. Combined kerb and drainage systems would be installed on bridges where required.
- 2.5.81. Where required, combined kerb and drainage systems would be installed to convey surface water off the carriageway to nearby drainage systems.

Lighting

- 2.5.82. Road lighting incorporated into the design of the Scheme reflects the level of safety required for road users. A Scheme wide lighting assessment using DMRB TA501 (Road Lighting Appraisal) has determined the street lighting provision for the Scheme is as follows:
- Mainline: none required.
 - Slip roads: lighting provided in the nearside verge of each of the four slip roads.
 - Dumbbell junction: lighting provided around each of the circulatory islands.
 - B4082 link road: lighting provided in the southbound nearside verge along the entire length of the link road.
- 2.5.83. The requirements for road lighting at these locations has been determined based on increasing safety for all road users, the design of which has sought to minimise adverse impacts and effects on the following:
- Nocturnal species (for example bats and barn owl).
 - The existing landscape and visibility from nearby properties and dwellings after dark.
 - The setting of features associated with the historic environment (for example Listed Buildings and the Registered Park and Garden at Coombe Abbey).

- 2.5.84. Lighting column locations are shown on the General Arrangement (TR010066/APP/2.6). Lighting used would be appropriate for the Scheme and would consist of 10m high columns with full cut-off lighting technology and light emitting diodes (LED) luminaires.
- 2.5.85. The design has been carried out in accordance with the latest BS 5489 standard (British Standards Institution, 2020) and National Highways' specifications. The design also takes into consideration guidance notes from the Institution of Lighting Professionals, including Guidance Note 01/21 – The Reduction of Obtrusive Light (2021) and Guidance Note 08/23 (in conjunction with the Bat Conservation Trust) – Bats and Artificial Lighting at night (2023). The assessment of lighting impacts on biodiversity is presented in ES Chapter 8 (Biodiversity) (TR010066/APP/6.1).

Roadside technology

- 2.5.86. Within the Scheme Order Limits there are several technology asset installations. These include two existing Variable Message Signs (VMS), two existing Emergency Roadside Telephones (ERTs), two existing communications network cabinets, one existing power supply cabinet, and two existing traffic flow loops. Due to Scheme proposals and the introduction of a new dumbbell junction some of these existing installations would be impacted.
- 2.5.87. A summary of the impacted existing assets is as follows:
- One of the two existing VMS would require removal and a new VMS installed at a new location.
 - Both ERTs would be removed as they are not required from a road operational perspective.
 - The existing communications cabinets would be relocated.
 - The existing power cabinet would remain in its current location but the power cable from one of the two existing VMS would be replaced.
 - The existing traffic flow loops may need to be replaced at the same location.
- 2.5.88. On the northern side of the Scheme, there are additional existing technology assets which fall outside the Order Limits and are unaffected by Scheme.
- 2.5.89. A new VMS is proposed on the A46. The proposed structure consists of a steel cantilever gantry supported on a reinforced concrete foundation, which spans over the verge of the northbound carriageway of the A46 mainline, south of the proposed new Walsgrave Junction. The proposed gantry would be located approximately 38m away from the new bridge to avoid or minimise any interface with it.

- 2.5.90. The proposed gantry would be supported on a reinforced concrete pile cap founded on in-situ bored piles. The foundation design would be developed during the detailed design stage.
- 2.5.91. The gantry foundation would be setback from the edge of the carriageway and protected by a road restraint system. The pile cap would be mainly exposed above ground level.
- 2.5.92. Parking for maintenance vehicles would be provided in the A46 northbound verge on the north side of the proposed Walsgrave Overbridge, and a maintenance walking route (under the new overbridge) would be provided between the parking location and the gantry site, protected by a vehicle restraint system (VRS).
- 2.5.93. The gantry base and mast would be provided with fixed ladder access including fall protection hoops to allow access to the VMS sign face for maintenance. The gantry would be secure from vandals and unauthorised access.

Road restraint system

- 2.5.94. The proposed road restraint systems are shown on the General Arrangement (TR010066/APP/2.6).
- 2.5.95. The following types of road restraint system have been provided:
- Mainline nearside verges: steel barrier.
 - Mainline central reserve: Concrete barrier. Steel transition units are used at either end of the concrete barrier to connect into the existing steel barrier.
 - Slip roads: steel barrier.
 - B4082: steel barrier.
 - Bridge parapet.
- 2.5.96. There is a gap between the recently completed Binley Junction Scheme and the proposed Walsgrave Junction works. With the approach to only replace the central barrier where highways works would be undertaken for Walsgrave Junction and A46 realignment this would leave a section of existing steel barrier. This has had a condition survey and is in accordance with current standards.

Road signs and markings

- 2.5.97. New road signage and markings would be installed across the Scheme to ensure route legibility for road users travelling on new and improved roads, and to support the Scheme objectives of reducing congestion and improving safety.

Indicative road markings are shown on the General Arrangement **(TR010066/APP/2.6)**.

- 2.5.98. As the Scheme would involve modifications to both the SRN and local road network, the signage strategy has been agreed with Coventry City Council to ensure continuity is achieved along the adjoining routes.
- 2.5.99. Where existing signs within the Order Limits do not conform to new or modified road layouts within the Scheme, these would be removed and replaced with new signage containing updated information.
- 2.5.100. New and modified sections of road would be permanently marked using a combination of road markings and road studs to improve drivers understanding of the new road layout.

Fencing

- 2.5.101. The proposed fencing is shown on the General Arrangement **(TR010066/APP/2.6)**.
- 2.5.102. New fencing is only anticipated where the land boundaries change and to prevent falls from height (generally at structures or at the top of steep embankments). Types of fencing proposed:
- Post and rail fencing provided on highway boundaries to be owned and maintained by the adjacent landowner.
 - Badger-proof fencing is provided from the existing Hungerley Hall Farm accommodation overbridge towards a badger crossing under the B4082 and 500m north and south of the Scheme from the badger crossing point.
 - Gates would be provided to prohibit unauthorised access to Hungerley Hall Farm, to the Hungerley Hall Farm accommodation overbridge and to detention basins / ponds.
- 2.5.103. Requirements for anti-glare fencing would be confirmed during the detailed design stage.
- 2.5.104. Part of the land required for the Scheme comprises of open space, forming part of Coombe Abbey Park, a Registered Park and Garden (not currently accessible to the public), to the east of the Scheme. The land will be required temporarily during construction for the removal and reinstatement of existing boundary fencing. The land is in the ownership of Coventry City Council and is only subject to temporary possession. Further detail about the use of this land is provided in the Statement of Reasons **(TR010066/APP/4.1)**.

- 2.5.105. A record of condition or precondition survey will be undertaken prior to taking possession of this temporary land where the preconstruction landscape is to be reinstated. Restoration of this land to its former condition, based on the pre-construction site survey, will be carried out if required.

Maintenance Accesses

- 2.5.106. Offline drainage features such as the detention basin and ponds would be accessed by separate access tracks. These would be owned and maintained by the respective highway authority. A 3.5m wide maintenance access track would be provided to allow future maintenance at each drainage basin and pond.
- 2.5.107. A layby for the proposed gantry would be located off the A46 northbound carriageway with a footpath to the gantry for access. Other road assets such as lighting columns, signs, noise barriers, VRS, retaining walls, bridges, underground utilities, pavement, landscaping, etc. would be maintained through temporary traffic management.

Utilities

- 2.5.108. Utilities searches have identified that there is statutory undertaker's equipment located within the Order Limits belonging to various utility companies. Most notably, this includes 132kV overhead high voltage electricity line operated by National Grid Electrical Distribution and a pumped sewer main operated by Severn Trent.
- 2.5.109. The overhead high voltage electricity line runs north-south on the western side of the A46, crossing the B4082 immediately west of the existing Walsgrave Junction. This overhead transmission line would not be impacted by the Scheme. The proposed alignments have been designed to not affect the required clearances of the existing overhead lines. Working restrictions in the vicinity of the overhead lines and the pylons would be in place and agreed with the utility company.
- 2.5.110. The pumped sewer main runs north-south along the western side of the A46. It is within the Order Limits at the satellite compound. In this location it veers westwards towards the River Sowe. Any protection works required to the sewer would be identified with Severn Trent during the detailed design stage.
- 2.5.111. There is a Vodafone ducted cable asset located in the western verge of the A46 south of the existing Walsgrave Junction. This has been located by trial hole. This asset does not require diversion due to the scheme proposals. Proposed drainage outfalls will cross beneath the asset, these works will be coordinated with Vodafone.

Environmental design and mitigation

- 2.5.112. The Scheme design is an iterative process which considers the key potential significant effects on environmental receptors. The first option in mitigating any impact is to seek design measures that would enable the impact to be avoided or, if this is not possible, reduced. This is referred to as embedded mitigation and includes measures such as changing the road's horizontal and vertical alignment, reducing the temporary and permanent footprint of the Scheme and altering construction methods.
- 2.5.113. Environmental considerations that have influenced the option development and selection process, and Scheme design, are set out in ES Chapter 3 (Assessment of Alternatives) (TR010066/APP/6.1).

Embedded mitigation

- 2.5.114. Embedded mitigation designed as part of the Scheme is described below.

Embedded mitigation measures for landscape and visual impact

- 2.5.115. The following embedded mitigation measures are presented on the Environmental Masterplan, which is ES Figure 2.4 (TR010066/APP/6.2) and include:
- Restoration of existing landscape pattern including hedgerows along field boundaries, use of tree and shrub planting to create screening to the Scheme in line with local landscape character.
 - Planting proposals to reflect the wider historical character and wider former parkland estate character of Coombe Abbey.
 - Planting proposals developed to integrate the Scheme into the existing landscape setting.
 - Reinstatement / mitigation planting, using local native species to aid landscape integration and provide biodiversity benefits, as well as visual screening where required.
 - Reinstatement / mitigation planting, featuring hedgerows, woodland (roadside belts), individual trees and grassland areas, features present within vicinity to aid integration and screening.
 - Building in resilience for climate change by including diversity within the plant and grass species mixes to ensure that a range of species types suitable for a range of local conditions are incorporated. Also taking into consideration the creation of soil conditions favourable to plant establishment under either dryer or wetter conditions.
 - Sourcing plant and grass species of local provenance where practicable in the interests of extending local flora and construction sustainability.

- Specific mitigation measures in relation to Hungerley Hall Farm including a hedgerow with trees, and a woodland belt near the property and associated buildings. Landscape integration of the proposed detention basin at Hungerley Hall Farm includes hedgerow planting with individual trees, scrub planting, scattered trees, small woodland block and different grassland habitats.

Embedded mitigation measures for biodiversity

2.5.116. The following habitat-focused embedded mitigation have been incorporated into the Scheme design:

- Permanent and temporary working areas kept to a minimum to reduce habitat loss, with habitat temporarily lost to construction works focused on lower quality habitats for biodiversity such as the arable land.
- Habitat creation appropriate to those habitats lost whilst also providing more ecologically valuable habitat in some cases (for example in place of cereal crops) and composed primarily of native species and species recognised of being of higher benefit to pollinators and birds with regards to food sources.
- Habitat creation along the verges of the Scheme and including species-rich grassland, woodland, scrub, native hedgerows with trees, wet grassland and tree planting.
- Woodland planting to mitigate for loss of woodland due to the Scheme.
- Habitat creation to mitigate for the impacts of habitat loss upon species including great-crested newt (GCN), breeding birds, wintering birds, bats, badger, common reptiles, hedgehog, brown hare and polecat.
- Habitat connectivity along the Scheme achieved through the creation of native hedgerows and tree lines along the verges.
- Provision of permanently wet drainage ponds to allow the enhancement of aquatic and terrestrial invertebrates, fish, amphibians and potentially otter, water vole and GCN should these species colonise.
- Provision of a mammal (i.e. badger) crossing of the new B4082 link road and badger proof fencing to maintain the existing commuting route and restrict access to road carriageways.
- Retention of the existing Hungerley Hall Farm accommodation overbridge maintains a commuting route for mammals and other species.
- Designing lighting to best practice to reduce light spill and impacts on bats and other species.

Other embedded mitigation measures

2.5.117. Other embedded mitigation that has been incorporated into the Scheme design includes:

- A Level 3 Historic Building Recording (HBR) to be carried out on the grade II listed yard wall at Hungerley Hall Farmhouse prior to demolition. This would form a written, photographic and drawn record of the wall.
- The use of a low noise surface course on new and existing carriageways to provide a reduction in road surface noise.
- Retention of the existing Hungerley Hall Farm accommodation overbridge to maintain farm access across the A46 and to potentially facilitate a future WCH route towards Coombe Abbey Park.
- Provision of sustainable drainage systems and attenuation to reduce flood risk and mitigate water quality impacts.
- Only lighting the new grade separated junction, slip roads and the B4082, which reduces the impact of lighting on ecology. Lighting designed to reduce light spill and lighting columns designed to the minimum height necessary.
- Limiting the amount of new pavement works associated with the A46 mainline to reduce the extent of pavement works and material requirements.
- The minimisation of the area of permanent and temporary land take of agricultural land within the Order Limits has been a fundamental consideration throughout the design of the Scheme.

2.5.118. Embedded mitigation that is integral to the construction process, such as the siting of construction compounds and traffic management measures is included in Section 2.6 of this chapter.

2.5.119. It is not always possible to design out environmental impacts. As such, it is necessary to develop essential mitigation measures to reduce and, if practicable, offset likely significant impacts. This is discussed further in ES Chapter 4 (Environmental Assessment Methodology) (**TR010066/APP/6.1**).

2.5.120. Further details on specific mitigation for each environmental aspect are provided in ES Chapters 5 to 15 (**TR010066/APP/6.1**).

2.5.121. An Environmental Masterplan has been produced which shows the Scheme design and areas within the Order Limits reserved for environmental mitigation. This is included in ES Figure 2.4 (Environmental Masterplan) (**TR010066/APP/6.2**).

2.5.122. The Environmental Masterplan ES Figure 2.4 (Environmental Masterplan) (**TR010066/APP/6.2**) shows the mitigation measures that are integral elements of the Scheme design where these are known to be effective and deliverable. The mitigation measures shown on the Environmental Masterplan have been factored into the assessment of significant effects presented in ES Chapters 5 to 15 (**TR010066/APP/6.1**).

- 2.5.123. Mitigation measures are also described in the Register of Environmental Actions and Commitments (REAC), which is within the First Iteration Environmental Management Plan (EMP) (**TR010066/APP/6.5**) and secured through the DCO. For pre-commencement works the mitigation measures are outlined in the Pre-commencement Plan (**TR010066/APP/6.7**) summarised below in section 2.6.
- 2.5.124. The First Iteration EMP (**TR010066/APP/6.5**) would be developed further prior to construction into the Second Iteration EMP to confirm how environmental mitigation would be delivered. The First Iteration EMP is secured through Requirement 1, Schedule 2 of the draft DCO (**TR010066/APP/3.1**), and the Second Iteration EMP is secured through Requirement 4, Schedule 2 of the draft DCO (**TR010066/APP/3.1**). These measures would be secured by the Applicant by placing a contractual responsibility on the appointed Principal Contractor and subcontractors to comply with the DCO requirements.

Land for mitigation

- 2.5.125. A triangular shaped area of land to the east of the A46 immediately north of Coombe Pool SSSI was identified at the options selection stage for compensatory planting, which is a type of mitigation involving the planting of new trees to directly replace those lost elsewhere within the Order Limits. The location has been chosen as it provides the greatest opportunity for habitat connectivity with the SSSI and associated woodland habitats, so is the most suitable location to replace the habitat types being lost. Early discussions with Coventry City Council have been held to discuss this mitigation area being managed as part of Coombe Abbey Country Park.
- 2.5.126. Land to the west of the A46 provides fewer opportunities for connectivity due to the existing A46 being a barrier to movement for species that may be present in Coombe Abbey Country Park to the east. The approach to identifying land for ecological mitigation has followed the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for ecological impact assessment in the UK and Ireland in relation to their guidance on compensation which states in paragraph 6.6 *“As a general rule, compensation should be focused on the same type of ecological features as those affected and equivalent levels of ecological ‘functionality’ sought.....Any replacement area should be similar in terms of ecological features and ecological functions that have been lost or damaged, or with appropriate management have the ability to reproduce the functions and conditions of those ecological features. Compensation should be provided as close as possible to the location where effects have occurred and benefit the same habitats and species as those affected.”*

- 2.5.127. The area chosen for ecological mitigation north of Coombe Abbey Park enables compensation habitat to be provided as close as possible to the areas affected (i.e. the SSSI) and will benefit the same habitats and species affected. It also enables future maintenance to be facilitated by Coventry City Council as part of the Coombe Abbey Country Park Estate. Locations elsewhere would not provide this. Habitat creation multipliers within the Statutory Biodiversity Metric have been used as guidance to determine the appropriate area of mitigation planting. Further information is provided in ES Chapter 8 (Biodiversity) **(TR010066/APP/6.1)**.
- 2.5.128. This mitigation area would be bounded by a post and rail fence with access for maintenance provided via the Hungerley Hall Farm accommodation overbridge. It is proposed that land levels within this area would be raised above existing through the re-use of topsoil excavated on site to reduce the amount of material that needs to be exported off site. Excavated materials to be used in this environmental mitigation area would undergo analysis to ensure they are of a suitable standard to enable vegetation growth. Material would be placed in the environmental mitigation area up to the level permitted by the Limits of Deviation as discussed below and pursuant to Article 7 of the draft DCO **(TR010066/APP/3.1)**.
- 2.5.129. Whilst land for mitigating the impacts of the Scheme can be included within the Order Limits and DCO application, any other landowner's land solely required for Biodiversity Net Gain (BNG) cannot. At the time of the DCO application (Autumn 2024) there would be no statutory requirement to provide for BNG for Nationally Significant Infrastructure Projects (NSIPs). However National Highways organisational objective currently requires the Scheme to provide 10% BNG. The mitigation areas within the Scheme have been calculated for BNG and can provide the required 10% target. Reviews will be undertaken during detailed design to ensure the target is met. Further information on BNG is provided in ES Appendix 8.1 (Biodiversity Net Gain Report) **(TR010066/APP/6.3)**.

Limits of deviation

- 2.5.130. Limits of Deviation (LoD) are the geographical limits within which the DCO would authorise the Scheme to be constructed, both horizontally and vertically. Lateral (horizontal) and vertical LoD have been incorporated around the main engineering components of the Scheme.
- 2.5.131. The purpose of the LoD is to allow minor modifications and refinements to be made to the preliminary design (the design that forms the application for development consent), where necessary, during the subsequent detailed design and construction stages.

- 2.5.132. The lateral LoD are illustrated on the Works Plans (**TR010066/APP/2.3**) and pursuant to Article 7 of the draft DCO (**TR010066/APP/3.1**). Any deviation from the lines, situations or locations shown on those plans would be contained within the extents of the LoD defined around the respective components or works.
- 2.5.133. The vertical LoD are referenced against the vertical profile levels indicated on the Engineering Drawings and Sections (**TR010066/APP/2.5**), and pursuant to Article 7 of the draft DCO (**TR010066/APP/3.1**) permit deviation of up to a maximum of 1.0m upwards or 1m downwards for all works.
- 2.5.134. In no case would the Scheme extend beyond the Order Limits without the necessary consent.
- 2.5.135. The EIA of the Scheme has accounted for the potential of minor design flexibility and variation being required within the LoD and this approach is described further in ES Chapter 4 (Environmental Assessment Methodology) (**TR010066/APP/6.1**).
- 2.5.136. Further details on the LoD can be found at Article 7 of the draft DCO (**TR010066/APP/3.1**).

2.6. Construction Overview

- 2.6.1. At the preliminary design stage, the construction methodologies, programme and works information are indicative but are considered to be representative of the likely approach to how the Scheme would be implemented. The approach to construction would be further refined and finalised during the detailed design stage, post consent of the draft DCO (**TR010066/APP/3.1**).
- 2.6.2. It is expected that certain works (referred to as pre-commencement works) would be undertaken ahead of the main construction works to allow these works to proceed, and to optimise the overall delivery programme for the Scheme. Details of the pre-commencement works are described further below and shown in Table 2-2 and the Pre-Commencement Plan (**TR010066/APP/6.7**).

Construction programme

- 2.6.3. Construction is scheduled to commence in 2026. The Scheme would take approximately 23 months to construct, with an assumed opening year of 2028.
- 2.6.4. A delivery programme has been developed for the Scheme based upon an anticipated DCO decision in May 2026 which influences the project's ability to pursue the land purchases required. The dates representing the targeted key milestones for the Scheme are presented in Table 2-1.

Table 2-1 : Key milestones and targeted dates

Milestone	Targeted start date	Targeted completion date
Anticipated DCO decision	May 2026	
Pre-commencement works	August 2026	October 2026
Start of main works	October 2026	June 2028
Full proposed scheme open to traffic	May 2028	

Pre-commencement works

2.6.5. To minimise the disruption caused by construction of the Scheme, certain works (referred to as pre-commencement works) would be undertaken ahead of the main construction works to allow these works to proceed, and to optimise the overall delivery programme for the Scheme.

2.6.6. Pre-commencement works are defined in the Pre-Commencement Plan (**TR010066/APP/6.7**). Pre-commencement works would include:

- Pre-construction ecological surveys
- Establishment of site survey control
- Site clearance / vegetation clearance (on the Applicant's land) - to commence as early as possible after the DCO is made under the supervision of an ecologist where required. If during the bird breeding season, only areas required to maintain the programme would be cleared (until the season is over) and then other areas would be cleared.
- Closure of existing layby's and removal of emergency telephones.
- Construction of site access / egress points (on the Applicant's land) at the three locations shown on ES Figure 2.5 (Temporary Works) (**TR010066/APP/6.2**). Each location would have hardened access / egress points constructed ahead of the start of works. This would include an 8m wide strip through low level vegetation directly off the existing Walsgrave roundabout which would require two weeks of night time lane closures. The other two locations are off the A46 mainline; west and east north of the proposed dumbbell. These would take two weeks each during daytime as they align with the existing laybys which would provide access into the working areas.
- Utility protection works to Vodafone apparatus and Severn Trent Water foul rising main.
- Temporary boundary fencing, where possible with landowner agreement.
- Establishment of the satellite compound and bridge laydown area to the west of the A46, north of the new junction, as shown on ES Figure 2.5 (Temporary Works) (**TR010066/APP/6.2**).

- Badger mitigation works.
- Scheme information boards for the A46 and B4082.
- Non-intrusive surveys including ground penetrating radar surveys.
- Intrusive surveys including ground investigations and unexploded ordnance surveys.

2.6.7. A Pre-Commencement Plan (**TR010066/APP/6.7**) has been prepared and submitted as part of this application. The Pre-Commencement Plan sets out the relevant works, controls and mitigation required for all Pre-Commencement Works and is secured by Requirement 17 of the draft DCO (**TR010066/APP/3.1**). The pre-commencement activities have been assessed within the ES.

Construction phasing

2.6.8. The main construction works would commence following on from the pre-commencement works in line with the discharge of requirements. The construction phasing is outlined in Table 2-2.

Table 2-2: Construction phasing

Works phase	Approximate duration	Summary of the main construction activities within each phase
Pre-commencement works	7 weeks	<ul style="list-style-type: none"> • Ecological surveys – site walkover • Establishment of survey control • Scheme boards for the mainline and B4082 • Intrusive surveys • Non-intrusive surveys • Layby closure and removal of emergency roadside telephones • Vegetation clearance on Applicant land to facilitate access construction • Temporary accesses on Applicant land • Temporary boundary fencing on third party land, under agreement • Construction of satellite compound • Statutory utility protection works
1	12 weeks	<ul style="list-style-type: none"> • Works access / egress points extended beyond the Applicant's land boundary. • Site clearance / vegetation clearance on the remainder of the Scheme area. • Temporary fencing to the remainder of the Scheme area. • Construction of the new junction slip roads, roundabouts and B4082, including topsoil strip, cut / fill earthworks, drainage installation, ducting and lighting installation, signage, kerbs and installation of the VRS barrier and retaining walls, where required.

Works phase	Approximate duration	Summary of the main construction activities within each phase
		<ul style="list-style-type: none"> Construction of drainage features including fencing, excavation, drainage, lining, soiling. Construction of new private access farm road off the B4082 link road to Hungerley Hall Farm. Phase 1 would also include the mitigation planting area to the east of the A46. Badger - proof fencing and noise barrier installation would start where practicable. Temporary noise barriers would be installed where practicable at start of project. Phase 1 would be completed without static traffic management with A46 lanes remaining at full width and current speed limits.
1a	18 weeks	<ul style="list-style-type: none"> Construction continues for the new junction slip roads, roundabouts and B4082, including carriageway construction. Construction of the overbridge substructure and drainage. Construction of the new overbridge at the satellite compound and driven into place during a night closure of both A46 carriageways. Temporary widening of the existing A46 mainline southbound (south of existing Walsgrave Junction) into the southbound verge, pushing the road up to 5m eastwards to allow for a running lane for traffic during construction (to be removed in Phase 6). Removal of the existing bund (90m) by Coombe Pool, placement of clay, and construction of a new bund to the design height. Undertaken in parallel to the temporary widening. Installation of temporary crossovers (i.e. hardening of the central reservation so it can take traffic for approximately 500m) of the A46 for traffic management during later phases. A46 mainline carriageway construction works including earthworks, drainage, ducting, VRS installation, carriageway sub-base and surfacing as well as verge works including lighting and signage. B4082 link road works continue, including carriageway construction and the tie into the existing B4082. Construction of signalised crossing at Clifford Bridge Road roundabout. Phase 1a would also include the mitigation planting area to the east of the A46. Narrow lanes installed on the mainline A46 and B4082 to allow construction of the tie-ins. Speed limits reduced to 40mph on both the A46 and B4082
2	17 weeks	<ul style="list-style-type: none"> Temporary widening completed to the southbound verge to facilitate later phases. Construction of the new bund alongside Coombe Pool. Works to the northbound carriageway of the A46 from the existing Walsgrave roundabout to beyond the new junction. A46 northbound traffic to be diverted on the newly constructed B4082. A46 southbound traffic to be diverted onto the newly construction slip roads.

Works phase	Approximate duration	Summary of the main construction activities within each phase
3	12 weeks	<ul style="list-style-type: none"> Works to the A46 mainline southbound carriageway to rebuild the carriageway including earthworks, drainage, ducting, VRS installation, carriageway sub-base and surfacing as well as verge works including lighting and signage. A46 southbound traffic to be diverted onto the newly construction A46.
4	9 weeks	<ul style="list-style-type: none"> Works to the existing Walsgrave Junction (pavement of existing roundabout removed once traffic has been moved onto new carriageway), B4082 spur off the existing roundabout and the new western dumbbell roundabout including earthworks, drainage, ducting, VRS installation, carriageway sub-base and surfacing as well as verge works including lighting and signage. Surfacing of A46 mainline southbound and western dumbbell roundabout. A46 southbound traffic to use the newly constructed A46 through the new junction and diverted onto temporary widened verge to the south of the existing roundabout. A46 northbound traffic to use the newly constructed A46 through the new junction. B4082 traffic to use the new B4082 and junction roundabouts and slip roads.
5	8 weeks	<ul style="list-style-type: none"> Works to the existing roundabout (pavement removal once traffic has moved back) and to the northbound carriageway on the mainline A46 south of the existing Walsgrave roundabout (pavement widening). Northbound traffic diverted onto new southbound carriageway, south of the existing roundabout. Southbound traffic continues to use temporary widened verge to the south of the existing roundabout. B4082 traffic to use the new B4082 and junction roundabouts and slip roads.
6	11 weeks	<ul style="list-style-type: none"> Northbound A46 traffic on permanent A46 alignment. Southbound A46 traffic in narrow lanes south of the roundabout. Removal of the temporary widening south of the existing roundabout, verge reinstated. Central reservation constructed south of existing roundabout. Final resurfacing.
7	2 weeks	<ul style="list-style-type: none"> Removal of satellite compound and reinstatement of temporary areas to original condition / land use (where required). Removal of temporary fencing. Landscaping of remaining areas to be completed (programme dependent on season).

2.6.9. Phasing maybe restricted by weather and ground conditions and may not be consecutive. Harvesting may be a constraint to land access in some locations, dependent upon crop types and harvesting dates.

Compounds

- 2.6.10. The proposed main site compound is located on land to the south of Brinklow Road and the east of the A46. The location of the Brinklow Road compound is shown on ES Figure 2.5 (Temporary Works) (**TR010066/APP/6.2**).
- 2.6.11. This site compound has been secured under an extension to the existing planning permission (Rugby Borough Council planning reference: R24/0164) relating to the Binley Junction Improvement Scheme and thus has not been included within the Order Limits and is not part of this consent.
- 2.6.12. The Brinklow Road site has been selected as a suitable location due to its existing infrastructure and previous use as a site compound. The Brinklow Road compound currently contains site offices, welfare and storage facilities for plant and materials and was used as the main site compound for the Binley Junction Improvement Scheme (now completed) and has therefore been considered to form part of the existing baseline environment. It will continue to provide the same function for the Walsgrave Scheme. The Brinklow Road compound is approximately 1.3 ha and accessed via an existing road from Brinklow Road.
- 2.6.13. A satellite compound within the Order Limits would also be required to provide welfare facilities. The satellite compound would be approximately 110m by 50m in size and accessed off the A46 north bound carriageway via the existing layby. It would be in use throughout the construction phase. The location is shown on ES Figure 2.5 (Temporary Works) (**TR010066/APP/6.2**).
- 2.6.14. The construction of the satellite compound area would require a topsoil strip, which would be windrowed, seeded and stabilised. The compound would require the placement of sub-base followed by planings or similar, which would be compacted to create the temporary surface. The compound would be secured by 2.1m tall temporary welded mesh fencing panels and gates on the access.
- 2.6.15. The satellite compound would be operational during normal working hours (07:00 to 19:00) and during carriageway closures. LED background lighting would be fixed to the perimeter fencing and / or office units for security at a height of 2 to 3m. Lights would be turned off when the satellite compound is not in use. Task lighting would be required outside of daylight hours. This would consist of towable tower lights or similar which would be lowered and turned off when not in use.
- 2.6.16. A 32 ft long canteen, toilet and drying room unit would be installed. A 32kVa generator would be used to power the units and lights. A 10,000 litre bowser and effluent tank would be installed. These would be serviced at appropriate intervals. The generator would be on whenever the satellite compound is in use.

- 2.6.17. A parking area and material storage area within the satellite compound (to a maximum height of 2m) would also be provided. Materials that would be stored at the satellite compound include drainage materials, kerbs, reinforced soil retaining wall panels, bridge deck materials and ducting. Segregated waste skips would be stored within the satellite compound and emptied as required.
- 2.6.18. Temporary drainage would be installed to capture run off from the satellite compound. The design of this would be undertaken during detailed design stage and the appropriate consent sought.
- 2.6.19. It is not proposed to create any temporary haul roads. Site access routes would be cut and built along the permanent road alignment of the slips and the new B4082 link road.
- 2.6.20. On completion of the permanent works, these areas would be incorporated into the Scheme or removed and reinstated as part of the landscaping works.

Logistics and traffic management

Logistics

- 2.6.21. Workforce and material sourcing would aim to be as local to the Scheme as practicable and where it would be cost effective to do so. However, it is recognised that this is not entirely practicable for all subcontractors and speciality works. It is therefore anticipated that much of the workforce would access, and many materials would be delivered to, the Scheme via the following routes:
- via the A46 and the B4027 Brinklow Road for the Brinklow Road compound.
 - via the A46 and the B4082 for the satellite compound.
- 2.6.22. The Scheme would aim for just-in-time deliveries of materials to the point of work where practicable to reduce inefficient material handling. Some bulk materials would need to be stored in the Brinklow Road compound, satellite compound, and laydown areas that have been strategically positioned across the Scheme so they could be distributed when needed.
- 2.6.23. Heavy Goods Vehicle (HGV⁴) movements during the construction phase would consist of two types of vehicle movements on public highways:
- Internal – These are the HGVs dedicated to the haulage of materials within the extents of the Scheme along the public highway. This refers exclusively to the movement of excavated materials between work fronts (e.g. cut to fill) and the distribution of materials stored in the compounds to the different

⁴ DMRB refers to HGVs and Heavy-Duty Vehicles (HDVs) dependent upon the DMRB standard for an environmental aspect. HGVs include wagons only, HDVs include wagons and buses.

work fronts. For the peak month of cut and fill operations (expected to be during the spring of 2027), there are estimated to be 60 daily internal movements on Mondays to Fridays (i.e. 30 movements in, and 30 out), 30 movements on Saturdays, and none on Sundays.

- Imports – These encompass all the deliveries coming into the Scheme from outside its boundaries and include, but are not limited to, readymix concrete, asphalt, granular materials, and miscellaneous materials such as pipes, signs, barriers, fences and cabins. For the peak month of the construction phase period (expected to be during the winter of 2026 and spring of 2027), there are estimated to be approximately 212 (i.e. 106 movements in, and 106 out) daily import HGV movements on Mondays to Fridays, 106 (53 movements in and 53 movements out) daily movements on Saturdays (based on the assumption of 50% of a working weekday), and none on Sundays. These numbers represent daily movements for the peak month of construction.

- 2.6.24. Vehicle movements, including HGV movements, would be required during night-time and weekend (including Sundays) working to support certain activities to be undertaken outside of standard working hours. During off-peak working, vehicle movements would be targeted to areas where works are being undertaken. Where practicable, any deliveries to support off-peak working would be undertaken during standard working hours, but this may not be feasible in all cases.
- 2.6.25. After travelling on the public roads the HGVs transporting materials would enter the site at the defined access / egress points for access to the work areas and satellite compound. Measures would be put in place to ensure construction vehicles and equipment (machines, HGVs, and light goods vehicles) can gain quick and easy access to the required location onsite without impacting local traffic. Details can be found in the Outline Traffic Management Plan (Outline TMP) (**TR010066/APP/7.5**).

Traffic management

- 2.6.26. Where construction activities, such as online bridge installation prohibit safe road operation, road closures would be required at nights and weekends to minimise disruption to road users. Advance notice regarding any road closures would be given to local communities and road users. A suitable diversion would be put in place.
- 2.6.27. To increase the working area and safety zones during offline working, narrow lanes, temporary safety barriers and reduced speed limits would be implemented. High level details of the traffic management required related to each phase of works is detailed in Table 2-2. Further detailed traffic management including the number of night time closures is included in the

Outline TMP (**TR010066/APP/7.5**). In summary the traffic management arrangements would include:

- Narrow lane running and a reduced speed limit on the A46 northbound and southbound carriageways
- Night closures of the A46 northbound and southbound carriageways
- Narrow lane running and a reduced speed limit on the B4082
- Night closures of the existing B4082
- Use of temporary crossovers between carriageways (i.e., the central reservation would be made suitable to take traffic).
- Construction of temporary lanes in the southbound verge south of the existing roundabout.

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

- Construction of the new B4082 link road (other than tie-ins to A46)
- Construction of the new slip roads and roundabouts
- Construction of the new overbridge
- Removal of the existing Walsgrave roundabout

2.6.29. Works requiring carriageway closures are as follows:

- Installation of new traffic management layouts
- Construction of central reservation south of the existing Walsgrave Junction
- Final surfacing / road marking visits
- Completion of tie in works for new slip roads and the B4082 link road

2.6.30. Where carriageway closures are noted above, these would be undertaken during nights or over weekends to minimise disruption. Closures would be communicated to stakeholders and suitable diversion routes would be in place. Article 20(2) (traffic regulation) of the draft DCO (**TR010066/APP/3.1**) sets out the mechanism through which night closures will be secured.

2.6.31. An Outline TMP (**TR010066/APP/7.5**). has been prepared and submitted with the DCO application. This provides traffic management proposals for each area of construction work. The Outline TMP would be updated ahead of commencement of the construction phase of the Scheme. The Construction TMP would be drafted in consultation with the local highway authority and submitted to the Secretary of State for approval.

Workforce management

- 2.6.32. The approximate size of the workforce is expected to peak at 120 staff onsite per day. Approximately 110 would be site based, and the remainder would be site-office based or working from home.
- 2.6.33. It is expected that site staff would stay overnight in the local area, if not already from the local area. Onsite accommodation is therefore not proposed.
- 2.6.34. Peak workforce travelling times are expected to fall in line with the usual peak commuting times of 07:00–09:00 and 16:00–18:00. It is intended that the construction team would travel by minibus from the Brinklow Road compound to work areas and the satellite compound where feasible to reduce the volume of site traffic on the road at these times. This arrangement would not be feasible for all subcontractors or trade types due to the necessity of transporting work equipment in their company vehicles.

Working methods and hours

- 2.6.35. Standard working hours are considered to be between 07:00 and 19:00 between Monday and Friday, and between 07:00 and 14:00 on Saturday. Any night working would be between 19:00 and 07:00.
- 2.6.36. The working hours include a period of up to one hour before and up to one hour after normal working hours for start-up and close-down of activities.
- 2.6.37. Repairs or maintenance of construction equipment where it is not practicable to complete during core working hours will normally be carried out on Saturday afternoons between 13.00 and 18.00 or Sundays between 10:00 and 17:00. Only essential repairs or maintenance works will be undertaken on Sundays where it is not possible to complete these works on Saturday afternoon.
- 2.6.38. During the winter months, task lighting would be required outside of daylight hours. This would consist of towable tower lights or similar which would be lowered and turned off when not in use.
- 2.6.39. The satellite compound would also be used to construct the bridge deck offline. This would require 6m tower lights to be installed during this period. The relocation of the constructed bridge deck from the satellite compound into its permanent location would be undertaken by specialist machinery that would carry the complete bridge deck. This would be undertaken during a full weekend closure (Friday 20:00 to Monday 06:00) of the A46 northbound and southbound carriageways requiring 24 hour working. Two consecutive weekend closures would be booked to facilitate the placement of the new bridge deck with the second one being a contingency.

- 2.6.40. Piling would be required for the road gantry which is located between the diverge and merge slip road on the A46 north bound carriageway. This would require four 600mm diameter bored piles to a depth to be determined during detailed design. Some off-peak working may be required for piling. Assumptions related to night time piling works are included in ES Chapter 11 (Noise and Vibration) (TR010066/APP/6.1).
- 2.6.41. Cast in-situ concrete works would be required for the following:
- Bridge deck (constructed offline)
 - Bridge bankseats and diaphragm pours
 - Signage bases
 - Gantry base including piles
 - General civils (drainage / kerbs etc)
- 2.6.42. No abstraction from watercourses to support the works is anticipated to be required at this stage. Water will be obtained from other sources which will be confirmed during the detailed design stage. Potable water will be delivered by tanker into a bowser for the satellite compound.

Plant and equipment

- 2.6.43. Construction activities would involve the use of heavy plant items with the potential to increase the levels of noise and vibration and contribute to pollution, such as excavators, dumper trucks, dozers and compaction equipment. Perceived noisy activities also include, but are not limited to, demolition of existing features and piling for structures and retaining walls. Further information of noise impacts during construction is included in ES Chapter 11 (Noise and Vibration) (TR010066/APP/6.1). A list of the plant and equipment required for various construction activities, along with the assumed noise levels, is provided in ES Appendix 11.5 (Construction Noise and Vibration Model and Assessment) (TR010066/APP/6.3).
- 2.6.44. To mitigate the impacts associated with construction plant and equipment, standard mitigation measures would be undertaken as necessary during the construction phase of the works. This includes measures such as programming works to minimise work outside standard working hours and specifying use of lower-noise emitting equipment. This is standard sector practice in accordance with BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise (British Standards Institution, 2014a) and BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration (British Standards

Institution, 2014b). Measures for minimising noise impacts would be detailed in the First Iteration EMP (TR010066/APP/6.5).

Earthworks

- 2.6.45. Large amounts of fill material would be required, estimated at approximately 248,000m³ comprising of approximately 216,000m³ of fill, approximately 12,000m³ of topsoil, approximately 12,000m³ of sub-base and capping, and approximately 8,000m³ of topsoil for use within the environmental mitigation area.
- 2.6.46. Topsoil and sub-soil would be windrowed along the edge of excavated areas to form bunds. Separate windrows will be formed for topsoil and subsoil. Generally, the height of stockpiles would be less than 2m. The maximum height of stockpiles would be 4m. It is not anticipated that any topsoil would be required to be imported.

Environmental bund works near the SSSI

- 2.6.47. The existing environmental bund along the eastern side of the existing A46 near to Walsgrave roundabout will be partially removed due to the realignment of the A46 for approximately 310m.
- 2.6.48. The bund will be re-built to a level of 74m AoD that protects the Scheme from flooding during the 1 in 100-year plus 32% Climate Change (CC) design event. This flood protection level has been determined through hydraulic modelling that has been agreed with the Environment Agency. The bund will be re-built over a distance of approximately 150m in order to achieve the 74mAOD flood level requirements. The re-built section of the bund would be constructed of impermeable Class 2A / B / C material. The bund may be lined, if required, with an impermeable barrier to avoid seepage through the bund during a flood event. This will be considered further at the detailed design stage.
- 2.6.49. The slopes of the new bund would have a gradient of around 1V:3H, with a height of around 1m above the proposed carriageway. These slopes would not require any special geotechnical measures.
- 2.6.50. To ensure no groundwater flow through the in-situ permeable ground (granular Made Ground, granular Alluvium and Baginton Sand and Gravel Formation), an excavation around 1.5m deep would be carried out at the toe of the rear of the bund. This would then be backfilled with impermeable Class 2A / B / C material. This would require approximately 800m³ of the material. An impermeable geomembrane would be placed at the base of the excavation.

- 2.6.51. To mitigate the impact on the Coombe Pool SSSI all works related to the bund would be undertaken from the A46 southbound verge (i.e., outside of the SSSI). The crown raising of some trees within the SSSI that overhang the works area would be required to provide the necessary clearance to undertake the works. Details of the crown raising are provided in ES Appendix 7.4 (Arboricultural Impact Assessment) (**TR010066/APP/6.3**).

Dewatering

- 2.6.52. De-watering is expected to be required during detention basin and pond construction and while constructing the cut section and drainage to the B4082 due to high groundwater levels in these locations. At this stage, it is anticipated that de-watering would be managed utilising a silt buster, or similar, which would discharge into a watercourse. Discharge would be in compliance with the current legislation and using the Principal Contractor's Permit to Pump system.
- 2.6.53. Environmental permits for water discharge would be sought from the Environment Agency before this work commenced. Other works may require de-watering dependent upon groundwater levels, ground conditions and the timing of works.

Environmental management

- 2.6.54. All construction works would be undertaken with appropriate environmental controls in place, in line with the EMP. The First Iteration EMP (**TR010066/APP/6.5**) is included with the DCO application. The First Iteration EMP includes the REAC (Appendix A), which outlines the essential mitigation developed as part of the ES.
- 2.6.55. A Second Iteration of the EMP would be developed and implemented by the Principal Contractor prior to the start of construction works, based on the requirements of the First Iteration EMP (**TR010066/APP/6.5**). This would include the implementation of industry standard practice and control measures for environmental impacts arising during construction, such as, but not limited to, the control of dust, noise and other emissions, and the approach to waste and material management onsite.

Carbon management

- 2.6.56. In order to deliver the Applicants' aspirations with respect to the minimisation of carbon emissions and the efficient use of resources, the carbon intensity of the Scheme has been established and would be monitored throughout the detailed design and construction phases. An Outline Carbon Management Plan is included as Appendix B.8 of the First Iteration EMP (**TR010066/APP/6.5**).

- 2.6.57. Processes to evaluate greenhouse gas emissions associated with construction of the Scheme are embedded into the design process, thereby informing and identifying opportunities for iterative reductions in such emissions. These processes have supported the preliminary design decision making (and will inform the detailed design stage), allowing greenhouse gas emissions to be considered in a timely manner, rather than at the end of the design process. The sharing of information is being promoted, along with the identification of innovations and engagement with suppliers, across the project team to ensure that greenhouse gas emissions along the supply chain have been considered. Further information is provided in ES Chapter 14 (Climate) (**TR010066/APP/6.1**).

Sustainable procurement

- 2.6.58. In addition to ensuring a carbon efficient design, a sustainable procurement strategy would be implemented during the detailed design and construction stages. This would include the responsible sourcing of the key material elements (asphalt, concrete, aggregate, steel, aluminium, plastics, timber and wood-derived products) to be used in the construction of the Scheme. This is detailed in the REAC (Appendix A of the First Iteration EMP) (**TR010066/APP/6.5**).

Materials and waste management

- 2.6.59. Material resource efficiency would be implemented throughout the detailed design and construction of the Scheme. This would include the implementation of resource efficient construction principles, management of waste in accordance with the waste hierarchy, adoption of responsible sourcing practices, preparation of a Site Waste Management Plan and compliance with relevant legislation, policies and statutory guidance for materials and waste. The Site Waste Management Plan will form part of the Second Iteration EMP at detailed design. Site-won (including demolition and excavation) materials arising from the Scheme would be reused and recycled, and where practicable, construction materials would be responsibly sourced from local sources of supply with consideration for secondary and recycled content.

Excavation, re-use and disposal

- 2.6.60. Approximately 99,000m³ of material is expected to be generated on site, comprising of approximately 20,000m³ of topsoil, approximately 10,000m³ of subsoil, approximately 43,000m³ of acceptable material for re-use, approximately 5,000m³ of hard material and approximately 21,000m³ of unacceptable material (for engineering purposes).

- 2.6.61. Of the material generated on site, approximately 73,000m³ is expected to be re-used on site, comprising of approximately 20,000m³ of topsoil, approximately 10,000m³ of subsoil, and approximately 43,000m³ acceptable fill.
- 2.6.62. Of the material generated on site, approximately 26,000m³ is expected to be exported from site, comprising of approximately 5,000m³ hard material, and 21,000m³ of unacceptable fill.
- 2.6.63. Where excavation arisings cannot be re-used on the Scheme, opportunities would be sought to re-use them on other off-site construction projects. Where this is not possible, they would be diverted from landfill or sent to an appropriately licenced recovery, treatment and recycling facility.
- 2.6.64. Through implementation of 'good practice' during construction and the local and regional availability of waste processing, treatment and recovery facilities, it is predicted that the Government's 70% target for the recovery or recycling of construction waste (either on or off the Scheme or both) could be achieved where technically appropriate and economically feasible.

Import

- 2.6.65. At this stage, there is predicted to be approximately 191,000m³ of material imported to site, comprising approximately 163,000m³ secondary / recycled general fill materials and approximately 16,000m³ asphalt and approximately 12,000m³ of sub-base materials constituting primary aggregates. Various options would be explored to obtain additional fill material from local sources, including other nearby construction projects which have a surplus of suitable fill, as well as local quarries.
- 2.6.66. Prioritising the use of secondary, recycled or site-won resources and implementing the principles of local and responsible sourcing of key resources.
- 2.6.67. Through implementation of 'good practice' during construction and the local availability of secondary and recycled aggregates or earthworks materials from other development schemes within the locality, it is predicted that the regional (West Midlands) guideline target of 27% relating to the use of secondary and recycled aggregates could be achieved where technically appropriate and economically feasible.

Demolitions

- 2.6.68. Where the existing road is to be upgraded, there may also need to be demolition of road infrastructure, planing of surfaces and removal of existing drainage, signs etc. This would be managed as part of the wider construction programme

and controls to manage environmental effects implemented through the First Iteration EMP (**TR010066/APP/6.5**).

- 2.6.69. The Scheme will require the demolition of approximately 96% of the eastern yard wall at Hungerley Hall Farmhouse. The yard wall forms part of the grade II listing. This impact of this and the management required to control environmental effects for this demolition is described further in ES Chapter 6 (Cultural Heritage) (**TR010066/APP/6.1**) and in the First Iteration EMP (**TR010066/APP/6.5**).

2.7. Operation and maintenance

Operation and long-term management

- 2.7.1. The Scheme has been designed in a way that minimises the frequency of future interventions and, accordingly, no major maintenance activities are likely to be required within the first five years of the Scheme being operational.
- 2.7.2. The maintenance responsibilities for the SRN and new junction (associated slip roads, roundabouts and bridge structure) as shown in the Classification of Roads Plans (**TR010066/APP/2.10**) and Schedule 5 of the draft DCO (**TR010066/APP/3.1**) would rest with the Applicant.
- 2.7.3. The maintenance responsibility for the new B4082 link road as shown in the Classification of Roads Plans (**TR010066/APP/2.10**) and Schedule 5 of the draft DCO (**TR010066/APP/3.1**) would rest with the Coventry City Council.
- 2.7.4. Short-term maintenance and repair activities are likely to comprise inspections on the new works and installed assets, and any unplanned, emergency repair works due to damage following events such as road traffic incidents. The highway assets within the Scheme would be subject to the routine maintenance operations, similar to those being undertaken elsewhere on the existing SRN and local road network. These maintenance activities would, wherever feasible, be programmed in a way that enables their combination with other planned operations to reduce disruption to road users associated with land closures and diversions.
- 2.7.5. Traffic Management deployed during such operations would comprise a combination of temporary speed restrictions, lane closures and reduced running lane widths to enable continued access for traffic.

Landscape aftercare

- 2.7.6. Landscape planting would require maintenance as part of the long-term management of the soft estate, including grass strimming, watering and weed

control. Maintenance would be planned to ensure the successful establishment of any planting.

- 2.7.7. An Outline Landscape and Ecology Management Plan (OLEMP), part of the First Iteration EMP (**TR010066/APP/6.5**), has been included with the DCO application. This presents how the landscape and ecological mitigation would be implemented, monitored and maintained. A detailed Landscape and Ecology Management Plan, landscape specification and maintenance schedule would be produced at the detailed design stage.

2.8. Decommissioning

- 2.8.1. It is highly unlikely that the Scheme would be decommissioned as the improvements would have become an integral part of the strategic and local road networks. In the unlikely event of the Scheme needing to be decommissioned, this would conform to the statutory process in place at that time, including any requirements for EIA as appropriate. Decommissioning of the Scheme has therefore not been considered further in the ES. This has been confirmed by the Planning Inspectorate in the Scoping Opinion (ID 3.10.1) (**TR010066/APP/6.9**).

Acronyms

Acronym	Meaning
AEP	Annual exceedance probability
AQMA	Air Quality Management Area
BNG	Biodiversity Net Gain
BS	British Standards
CCTV	Close circuit television
DCO	Development Consent Order
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
FRA	Flood Risk Assessment
GCN	Great-crested newt
GI	Ground Investigation
Ha	hectares
HBR	Historic Building Recording
HGV	Heavy Goods Vehicle
LED	Low emitting diode
LLFA	Lead local flood authorities
LoD	Limits of Deviation
LNR	Local Nature Reserves
LWS	Local Wildlife Sites
NO ₂	Nitrogen dioxide
NSIP	Nationally Significant Infrastructure Projects
NIA	Noise important areas
OLEMP	Outline Landscape and Ecology Management Plan
PRoW	Public rights of way
REAC	Register of Environmental Actions and Commitments
RIS2	Road Investment Strategy 2
RP2	Road Period 2
SAC	Special Areas of Conservation
SPA	Special Protection Areas
SRN	Strategic Road Network
SSSI	Site of Special Scientific Interest
TMP	Traffic Management Plan
TPO	Tree Protection Order
VRS	Vehicle restraint system
VMS	Variable message sign
WCH	walking, cycling and horse riding
WFD	Water Framework Directive

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