



M5 Junction 10 Improvements Scheme

Environmental Statement (ES) Non-technical Summary TR010063 - APP 6.1

Regulation 5 (2) (a)
Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

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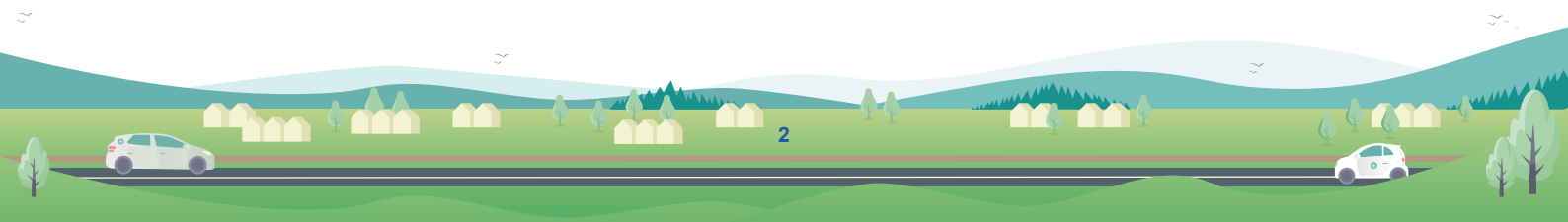
The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

M5 Junction 10 Improvements Scheme
Development Consent Order 202[x]

6.1 Non Technical Summary

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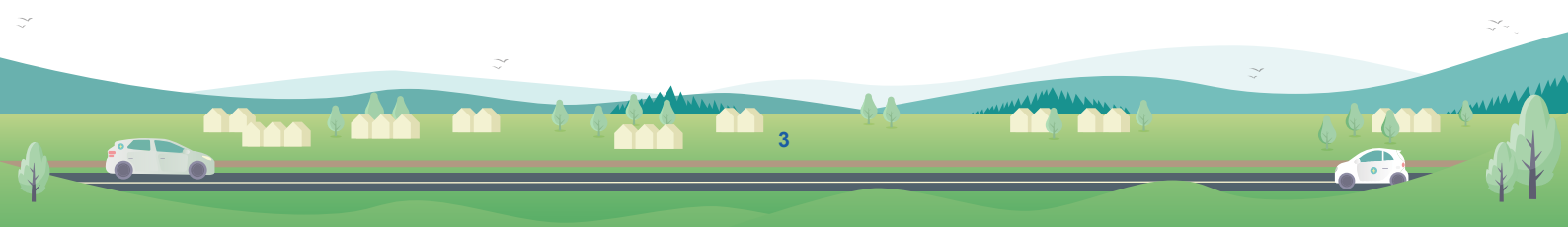


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Introduction

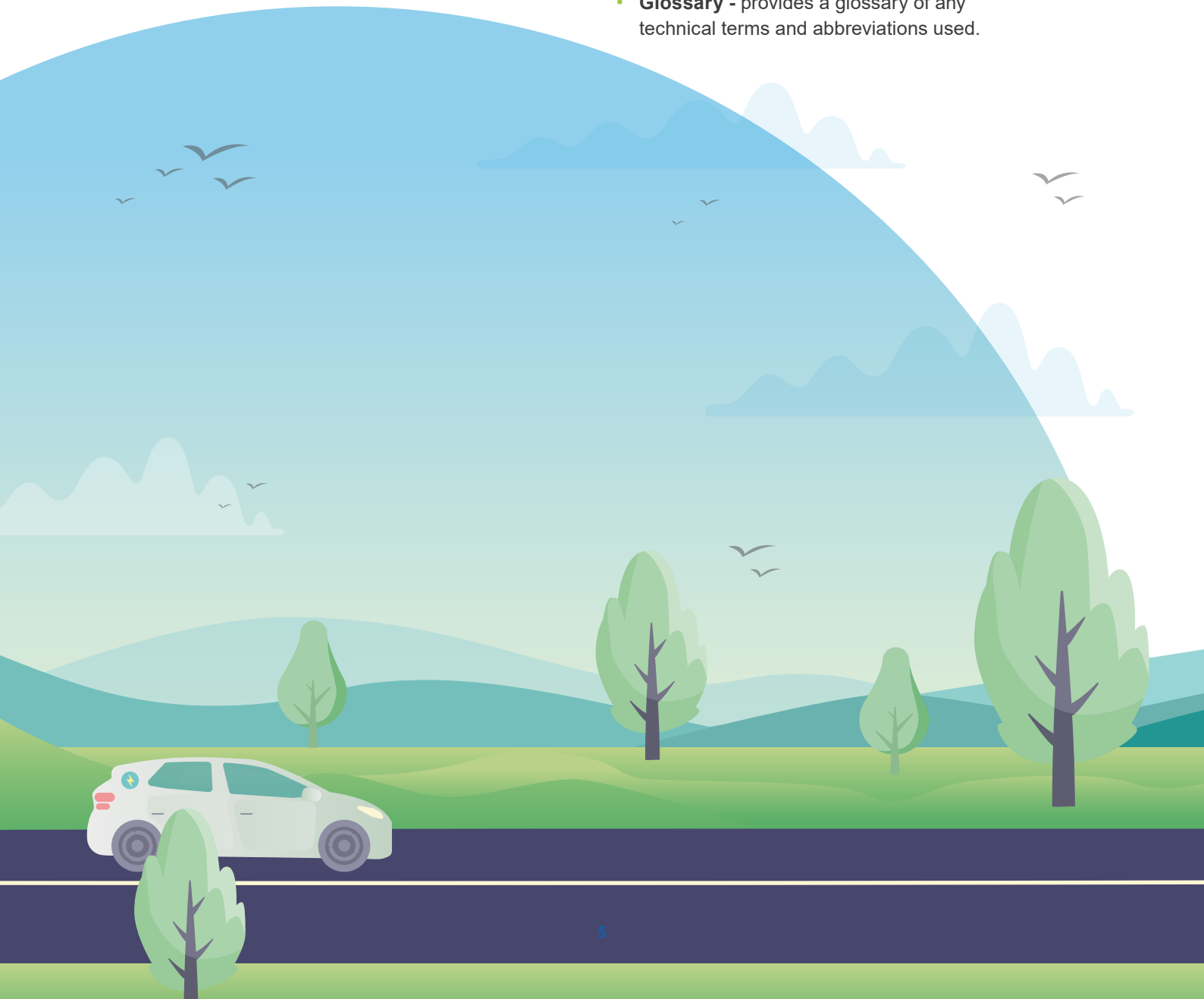


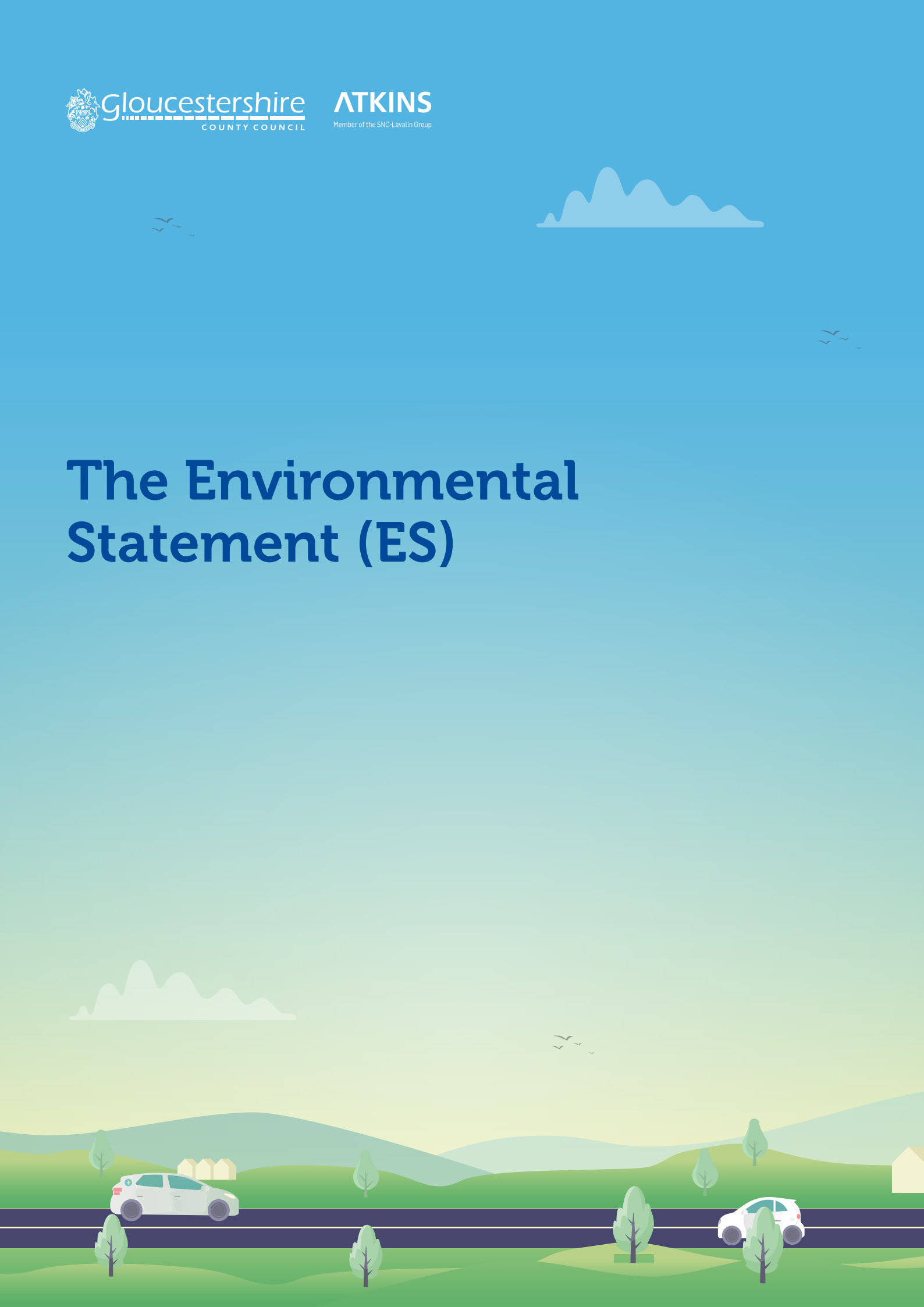
Introduction

This document is the Non-Technical Summary (NTS) of the Environmental Statement (ES) that has been produced for the M5 Junction 10 Improvements Scheme (“the Scheme”).

This NTS is a summary of the ES using non-technical language, and is structured as follows:

- **The Environmental Statement (ES)** - summarises the purpose and structure of the ES, and outlines the methods used for the environmental impact assessment.
- **The Scheme** - summarises the need for the Scheme and the application for planning consent; the Scheme objectives; the Scheme location and existing environment; and a description of the Scheme.
- **Alternatives** - summarises the alternatives considered and justification for the chosen option.
- **Environmental Impact Assessment** - summarises the assessment undertaken.
- **Summary of Significant Environmental Effects** - presents a summary of the significant environmental effects.
- **Glossary** - provides a glossary of any technical terms and abbreviations used.





The Environmental Statement (ES)

The Environmental Statement (ES)

The purpose of the ES is to present the findings of the environmental impact assessment that has been carried out, including identifying any likely significant environmental effects.

This NTS provides a shorter summary of the main ES. The ES provides an account of the main environmental issues. It describes the Scheme design and timescales for delivery, and the alternatives that have been considered, and the reasons why the alternatives were not taken forward. It sets out the methodologies of assessment, as well as a number of uncertainties and assumptions.

Environmental effects

The environmental impact assessment considers the impacts of the Scheme during construction and operation.

- **Construction:** The construction phase assessment looks at impacts arising from the temporary construction activities, and permanent changes arising from those activities.
- **Operation:** the operation phase assessment considers the situation when the Scheme is being used by traffic and people.

Mitigation

Measures to avoid, prevent or reduce adverse environmental impacts are known as mitigation. The Scheme includes:

- **Embedded mitigation:** measures which are integrated into the design of the Scheme, to avoid or reduce adverse impacts on the environment.
- **Essential mitigation:** measures to reduce and if possible offset likely significant adverse environmental impacts.

During construction, most of the Scheme's potential adverse impacts will be avoided or reduced by the implementation of industry standard practice and control measures. These are outlined in the Register of Environmental Actions and Commitments (REAC) (application document TR010063 – APP 7.4) and supported by the ecology and landscape maintenance and management operations set out as part of the EMP (1st iteration) (application document TR010063 – APP 7.3).

Methodology used in the assessment

The environmental impact assessment follows standard methodologies set out in the Design Manual for Roads and Bridges (DMRB), along with topic-specific guidance where appropriate.

The approach to the environmental impact assessment includes:

- Establishing the baseline, by gathering information about the environment to enable the environmental constraints and opportunities to be identified. Receptors are identified and their sensitivity or vulnerability to change is established.
- Identifying the potential adverse and beneficial impacts of the Scheme (without mitigation), on the environmental receptors identified in the baseline, for the construction and operation phases.
- Developing mitigation measures to avoid, reduce or offset the potential adverse environmental impacts, and where possible to enhance beneficial effects.
- Combining the magnitude of residual impacts (taking mitigation into account) with the sensitivity of receptors to provide a prediction of the likely significant effects of the Scheme on receptors, local communities and the environment.

In the detailed assessment, most topics classify the significance of effect from very large, to neutral.

Very large, large and moderate effects are considered to be significant, and slight or negligible effects are not considered to be significant.

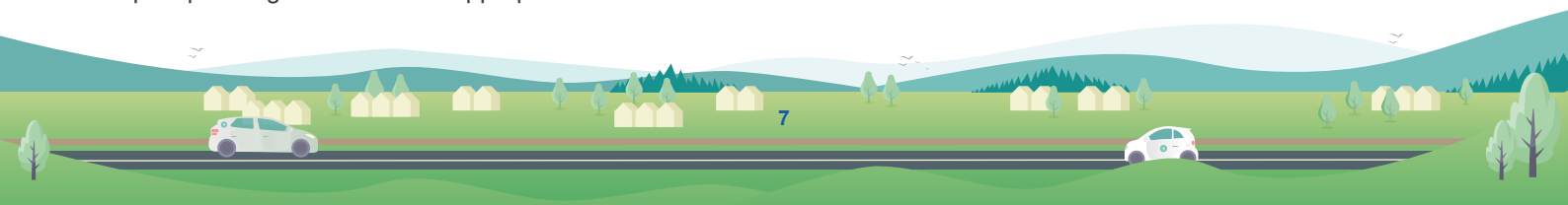
For the purposes of this NTS, only significant effects are reported, and are not categorised other than as significant adverse (negative) or beneficial (positive). Predictions regarding the significance of effects are reported taking into account the proposed mitigation.

The assessment of effects involves comparing the difference between a scenario with the Scheme ('Do-Something') against one without the Scheme ('Do-Minimum').

Dependent upon the topic, this comparison has been carried out for the baseline year and a future assessment year or a series of future assessment years (15 years after opening, or the worst year in the first 15 years of operation).

The main purpose of the Scheme is to provide key infrastructure to support the development set out in the Joint Core Strategy (JCS).

As this development will not be operational in the Scheme opening year (2027), two 'Do-Something' scenarios have been assessed which look at the impacts to air quality, noise and vibration, and water quality from the traffic arising from the Scheme with and without the strategic development sites.



The ES also reports consideration of cumulative effects. Cumulative effects are considered where the expected effects on receptors could alter when considered together.

There are two ways this could occur:

- **Intra Scheme:** where the expected effects for different topics arising from the Scheme would be experienced by the same receptor at the same time.
- **Inter project:** where the expected effects from this Scheme and from other reasonably foreseeable future projects would be experienced by the same receptor at the same time.

Consideration has been given to the potential for major events (such as natural disasters or accidents caused by human activity) to interact with the Scheme. In relation to this Scheme, it has been concluded that the potential for major events is no greater for the Scheme than for other similar schemes in the UK and for other receptors locally.

Major climate events are considered in the climate assessment. Other major events have been scoped out of further consideration.

A precautionary approach has been applied to the assessment undertaken, so that the assessment detailed in the ES (and summarised in this NTS) presents a 'most likely worst case' scenario of the extent and impacts of the Scheme.

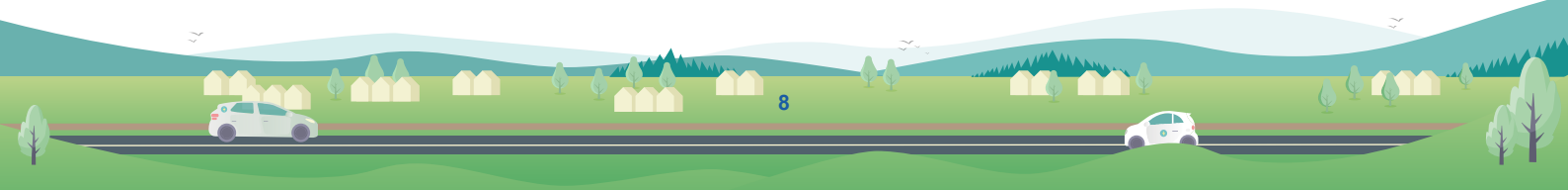
This is because implementing projects on the ground sometimes requires minor changes, and this approach to assessment allows for these minor changes to have been considered.

Structure of the ES

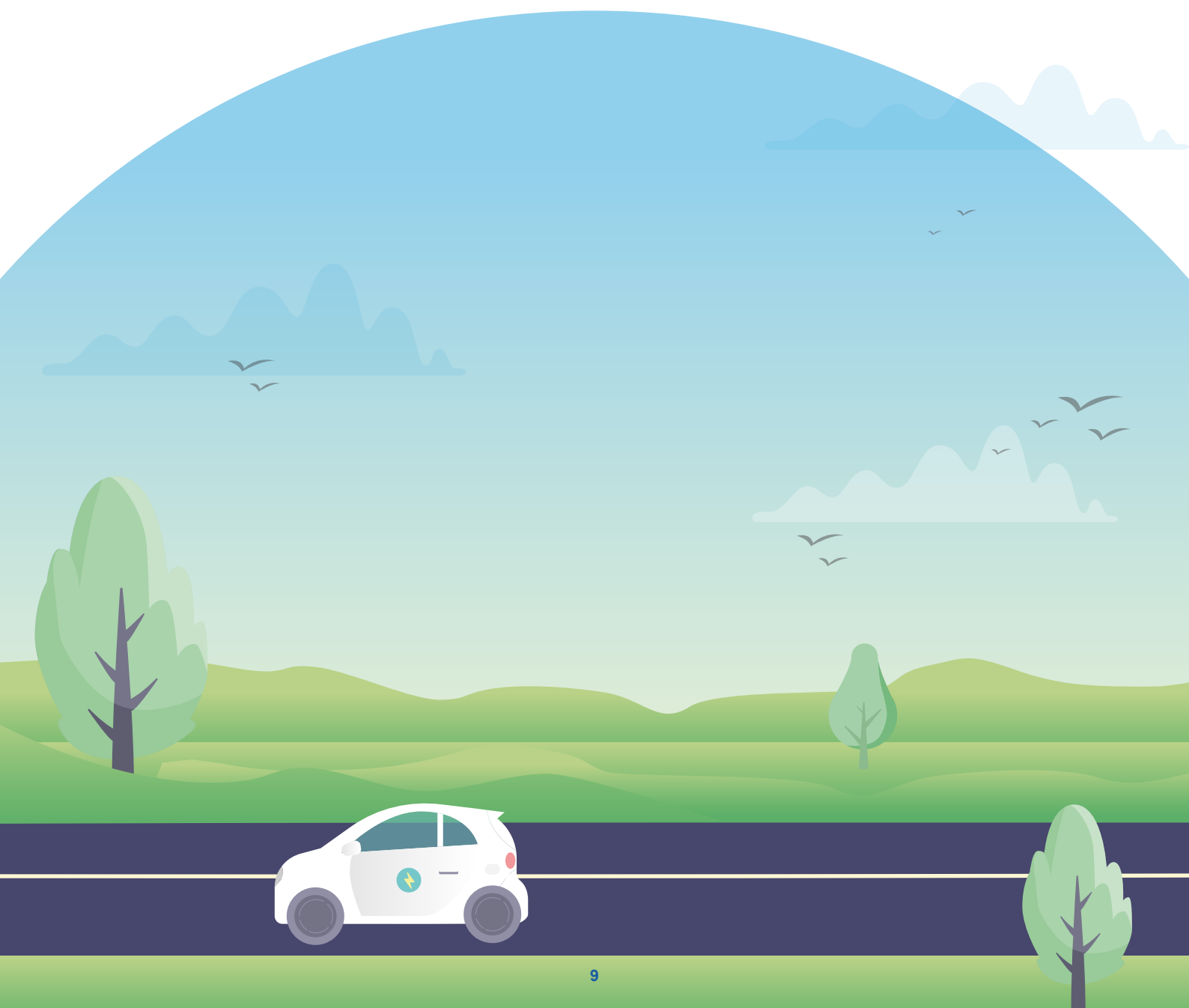
The ES is presented as separate volumes covering each of the environmental assessment topics (with supporting appendices):

Chapters and appendices constituting the ES

ES Chapter	Supporting appendices (TR010063 – APP 6.15)	
Non-technical summary - this document (TR010063 – APP 6.1)	No appendices	
1. Introduction 2. The Scheme 3. Assessment of alternatives 4. Environmental assessment methodology (TR010063 – APP 6.2)	1.1. Glossary 1.2. Scoping opinion responses 1.3. Scheme figures 1.4. Major accidents and disasters- long list	2.1. Drainage strategy report 2.2. Drainage strategy figures
5. Air quality (TR010063 – APP 6.3)	5.1. Air quality assessment emission modelling	5.2. Air quality chapter figures
6. Noise and vibration (TR010063 – APP 6.4)	6.1. Noise chapter figures and data	
7. Biodiversity (TR010063 – APP 6.5)	7.1. Phase 1 habitat survey 7.2. Hedgerow survey 7.3. Bat survey 7.4. Dormouse survey 7.5. Badger survey 7.6. Otter survey 7.7. Water vole survey 7.8. Breeding birds surveys 7.9. Wintering birds survey 7.10. Reptile survey	7.11. Great crested newt survey 7.12. Aquatic ecology survey 7.13. Habitats Regulations Assessment (HRA) - Screening 7.14. HRA Statement to Inform an Appropriate Assessment 7.15. Bat mitigation strategy 7.16. Barn owl survey 7.17. Validation report 7.18. Biodiversity Net Gain 7.19. Biodiversity chapter figures
8. Road drainage and the water environment (TR010063 – APP 6.6)	8.1. Flood risk assessment 8.2. Water Framework Directive (WFD) compliance assessment 8.2A. WFD Surface Water Quality assessment 8.2B. WFD Groundwater Impact assessment	8.3. Surface water quality assessment 8.4. Road drainage and the water environment chapter figures
9. Landscape and visual (TR0101163 – APP 6.7)	9.1. LVIA figures 9.2. LVIA assessment table	9.3. Photo sheets 9.4. Arboricultural survey and Arboricultural impact assessment (AIA)



ES Chapter	Supporting appendices (TR010063 – APP 6.15)	
10. Geology and soils (TR010063 – APP 6.8)	10.1. Definitions of probability and consequence 10.2. Preliminary conceptual site models 10.3. Land contamination impact assessment tables 10.4. Agricultural land survey report - Link road	10.5. Agricultural land survey report - FCA 10.6. Agricultural land survey report - Additional areas 10.7. Ground investigation report 10.8. Geology and soils chapter figures
11. Cultural heritage (TR010063 – APP 6.9)	11.1. Gazetteer 11.2. Cultural heritage chapter figures	11.3. Geophysical survey report 11.4. Evaluation trenching report
12. Materials and waste (TR010063 – APP 6.10)	12.1. Materials and waste chapter figures	
13. Population and human health (TR010063 – APP 6.11)	13.1. Population and human health chapter figures	
14. Climate (TR010063 – APP 6.12)	No appendices	
15. Cumulative effects assessment (TR010063 – APP 6.13)	15.1. RFFP long list 15.2. CEA chapter figures	





The Scheme



The Scheme

Need for the Scheme and the application for planning consent

New housing and employment development sites are proposed close to Junction 10 on the M5, including the West and North West Cheltenham Development Areas (also referred to as the Golden Valley and Elms Park developments, respectively). Land safeguarded for future development is also identified for the area, adjacent to the Junction 10 and to the south of the B4634 (to the north-west and west of Cheltenham respectively). To unlock these housing and job opportunities, there is a need to ensure that there is sufficient capacity to accommodate the increased motorised and non-motorised users these developments will generate, within a sustainable transport context. There is also a need to address existing pressure on the local highway network.

Several of Gloucestershire County Council's policy documents have identified alterations to M5 Junction 10 as a key component for delivering new development sites. To unlock the housing and job opportunities, a highways network is needed that has the capacity to accommodate the increased traffic it will generate.

The existing M5 Junction 10 only has entry and exit slips to and from the north, with no connectivity to the M5 south of the junction. This causes existing traffic to cross Cheltenham through various routes to access and leave the M5 from the south, which contributes significantly to existing traffic flows in the town. Cheltenham currently experiences significant congestion at peak times, which has led to air quality issues at various locations across the town and directed the declaration of an Air Quality Management Area (AQMA) within Cheltenham, which was revised in 2020 to focus on the north-western quarter of the town centre.

An all-movements junction has been identified as a key infrastructure requirement, needed to enable the housing and economic development proposed by the Gloucestershire Local Enterprise Partnership's Strategic Economic Plan. It is also central to the transport network sought by the Council in the Gloucestershire Local Transport Plan .

The planned housing and economic growth have been included by Cheltenham Borough, Tewkesbury Borough and Gloucester City Councils in the adopted Joint Core Strategy.

Alterations to M5 J10 are critical to maintaining the safe and efficient operation of the junction; and enabling the planned development and economic growth around Cheltenham, Gloucester and Tewkesbury.

Gloucestershire County Council secured Homes England funding for the Scheme in March 2020. Work has continued since the March 2020 announcement to produce a Scheme design, which is the subject of this ES.

This Scheme is categorised as a Nationally Significant Infrastructure Project (NSIP) under the Planning Act 2008. As such, an application for a Development Consent Order (DCO) is required to obtain consent to construct the Scheme, rather than the traditional route of applying for planning permission, under the Town and Country Planning Act 1990, from the local planning authorities. For more information on this process, please visit: <http://infrastructure.planninginspectorate.gov.uk/>

Scheme objectives

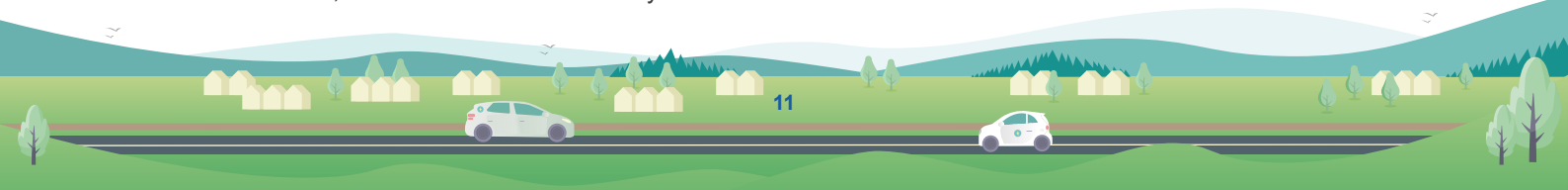
The objectives for the Scheme are to:

- Support economic growth and facilitate growth in jobs and housing by providing improved transport network connections in west and north-west Cheltenham.
- Enhance the transport network in the west and north-west of Cheltenham area with the resilience to meet current and future needs.
- Improve the connectivity between the Strategic Road Network (SRN) and the local transport network in west and north-west Cheltenham.
- Deliver a package of measures which is in keeping with the local environment, establishes biodiversity net gain and meets climate change requirements.
- Provide safe access to services for the local community and including for users of sustainable transport modes within and to west and north-west Cheltenham.

Scheme location and existing environment

The locations of the infrastructure improvements that make up the M5 Junction 10 Improvements Scheme are illustrated in Figure 1 below. In addition, this figure shows proposed development areas (North West Cheltenham and West Cheltenham) and two areas of safeguarded land to the north-west and the west of Cheltenham, to illustrate the planning context of the Scheme.

The Scheme is located in the broadly undulating lowland of the Severn Vale, with Tewkesbury to the north and Cheltenham to the east. Cheltenham is the only sizeable settlement close to the Scheme area.



Several smaller settlements include Boddington to the west of the M5, Uckington to the east of the M5, and the clusters of housing around the M5 Junction 10, along Withybridge Lane, and on the B4634. There is an informal Traveller site close to the southbound off slip of the M5 Junction 10.

Cheltenham provides the significant community facilities. There is also a village hall and place of worship in Uckington, and the Gallagher Retail Park is one of a number of retail locations nearby. There are several small businesses in the Scheme area. The Civil Service Club is located adjacent to the A4019 Tewkesbury Road in this area, as is the Cheltenham West Community Fire Station. Several public footpaths and bridleways cross the Scheme area. As shown in Figure 1, there are development allocations in the Scheme environs.

The area surrounding the Scheme includes a variety of different land uses, and whilst predominantly rural, the Scheme includes land on the outskirts of Cheltenham and clusters of residential properties throughout the area. The Scheme area includes part of areas designated as Noise Important Areas (NIAs) due to traffic on the A4019 Tewkesbury Road. There is a statutory Air Quality Management Area (AQMA) designated in Cheltenham town centre (about 1.8km from the Scheme boundary). The majority of the Scheme lies within land designated as Green Belt.

Arable and grass pasture farmland are the main habitats present, with medium to large scale fields bounded by hedgerows for the most part. These are mixed with pockets of woodland, traditional orchards, and grassland. Along with the watercourses of the River Chelt, Leigh Brook and River Swilgate, these pockets of habitat provide the locations of greater nature conservation value within the Scheme area. There is confirmed evidence and records for the presence of protected and notable species within the Scheme area, including bats, badgers, otters, great crested newts, terrestrial invertebrates and 31 species of birds.

There are no locations designated for nature conservation at a national or international level that are adjacent to or overlapped by the Scheme. Within the wider area are the:

- Severn Estuary SPA, SAC and Ramsar site;
- Walmore Common SPA;
- Bredon Hill SAC;
- Wye Valley and Forest of Dean SAC; and
- Coombe Hill Canal SSSI.

Multiple watercourses cross the Scheme area. Those of particular relevance to the Scheme are the River Chelt and Leigh Brook running from east to west, together with a watercourse known as MW3 and 11 drains.

Downstream of the Scheme area, the River Chelt and Leigh Brook then flow into the River Severn (at least 7.5 km downstream of the Scheme).

The River Chelt floodplain includes land just south of the A4019 and extending either side of the existing M5 Junction 10, with a medium and high probability of flooding. To the immediate north of the A4019 is the floodplain of the Leigh Brook.

There is also land in the floodplain of the River Swilgate (and the Dean Brook that feeds into it) near Stoke Orchard, to the north-east of M5 Junction 10.

There are 31 designated heritage assets within the Scheme area and a further 65 non-designated heritage assets. The most notable of these are the Moat House – a moated Scheduled Monument adjacent to the A4019, and the Grade 1 listed Chapel of St James the Great in Stoke Orchard. Previous investigations have identified the likelihood of buried archaeology across the Scheme area.

Design of the Scheme

Scheme key elements

The Scheme comprises three main elements:

M5 Junction 10

The improvements to M5 Junction 10 will increase the capacity of the junction and upgrade it to an all-movements junction. Four new slip roads will replace the existing two slip roads, and two new single span overbridges will replace the existing Piffs Elm Interchange Bridge which will be demolished. A new elongated roundabout will be created using the two new overbridges. Signage and technology equipment will be installed along the M5 to the north and south of the junction.

The A4019 will be realigned to join the roundabout at an appropriate angle. The new roundabout, and approaches to it, will be lit. The speed limit of the A4019 across the roundabout will be 50mph. The national speed limit for motorways will apply on the motorway slip roads.

The existing Leigh Brook culvert (under the M5) will be extended to run beneath the new slip roads. The River Chelt culvert (under the M5) will be retained and will not need to be extended. River banks for both Leigh Brook and the River Chelt in the environs of the culverts will be reprofiled and planted to improve habitat and biodiversity.

A dedicated route for cyclists and pedestrians will be provided through the junction. A new access track to the northeast of the M5 Junction 10 will replace the existing access points to field areas and to the informal Traveller site. The existing public footpath (ABO14) west of the M5 and south of the A4019 will be rerouted to ensure connectivity. The existing public footpath (ABO16 part 2) through the River Chelt culvert will be retained.

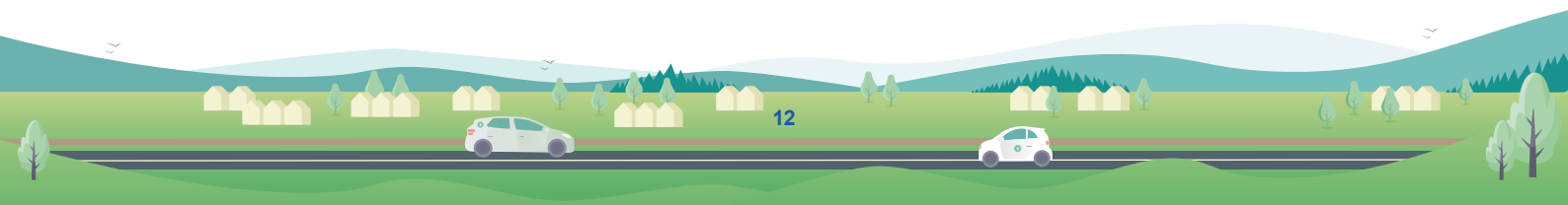




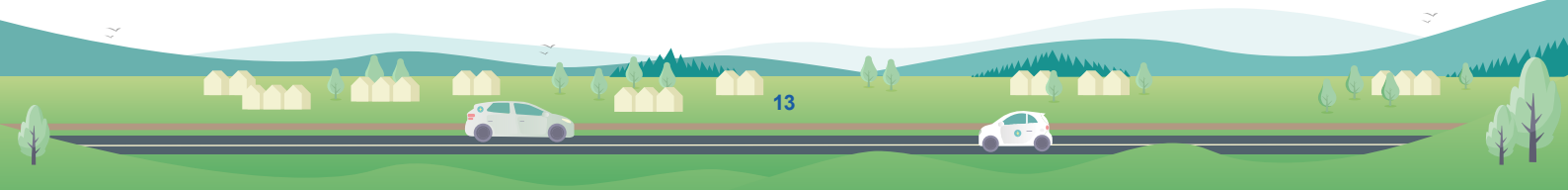
Figure 1 - Location of the Scheme and the component elements (Junction 10, A4019 and Link Road), shown in the context of the strategic development sites

Highway drainage from the new slip roads and roundabout will be to two new attenuation basins to the west of the M5, north and south of the junction. To the southeast of the M5 Junction 10, an area of land will be reprofiled by excavation of material, to provide flood storage for the Scheme, and compensation for the loss of flood storage from the construction of the Scheme. The land around this excavated area will be designed to provide a mix of habitats.

An underpass will be constructed immediately to the east of M5 Junction 10, to provide a traffic free route for pedestrians, cyclists, horse riders and bats to pass under the A4019.

West Cheltenham Link Road

A new single carriageway 1.4km long will be constructed to provide greater connectivity between the reconfigured M5 Junction 10 and the West Cheltenham Development Area, with a 50 mph speed limit. New junctions will connect the Link Road with the A4019 (to the north) and the B4634 (to the south). The junctions, and approaches to them, will be lit and will have a 40 mph speed limit. A segregated cycleway and footway will be provided along the west side of this Link Road. The Scheme extends to the east and west along the B4634 either side of the junction, with minor works to integrate the link road with the existing B4634.



Crossing agricultural land, the Link Road will include flood mitigation structures and a bridge over the River Chelt.

There will be sufficient clearance under the bridge to allow floodwater to pass and to allow the PRoWs that run along the banks of the River Chelt to be maintained. Attenuation basins located at either end of the Link Road will receive the highway drainage.

A4019

The A4019 will be widened to a two lane dual carriageway from Withybridge Lane, eastwards through to the Gallagher Retail Park, where the Scheme will tie into the existing dual carriageway. Widening of the A4019 through Uckington will be predominantly to the southern side of the A4019. Widening to the east and the west of Uckington will be to the northern side of the A4019. To the west of Junction 10 the existing section of two-lane dual carriageway will be replaced with single lanes. A segregated cycleway and footway will be provided along the northern side of the A4019, which will extend from the junction of the A4019 with Stanboro Lane in the west through to the Gallagher junction at the eastern end of the Scheme. This active travel corridor will provide connectivity for pedestrians and cyclists between north-west Cheltenham and the junction of the A4019 and Stanboro Lane (west of M5 Junction 10). A bus lane will be provided eastbound on the A4019 between the West Cheltenham Fire Station and the B4634 (Hayden Road) junction (the Gallagher junction).

The following changes will be made to the existing junctions on the A4019, as well as the creation of three new junctions. For residents and businesses whose current access is directly onto the A4019 (for example those in Uckington, and along the southern side of the A4019 in north-west Cheltenham), short sections of new access roads will be created alongside the widened A4019 to facilitate ease of access both westbound and eastbound and will join the A4019 at signalised junctions. Details are shown on the General Arrangements Plans (application document TR010063 – APP 2.9).

- **Stoke Road** – no change made to the existing junction.
- **Stanboro Lane** – existing junction location retained, with minor changes made to the mouth of the junction. Left and right turning from the junction retained.
- **Withybridge Lane** – existing junction location retained, but access changed to left turn into Withybridge Lane, and left turn only out onto the A4019.
- **Cooks Lane** – existing junction closed, with access from Cooks Lane to the A4019 diverted through to the Link Road via a new access road.

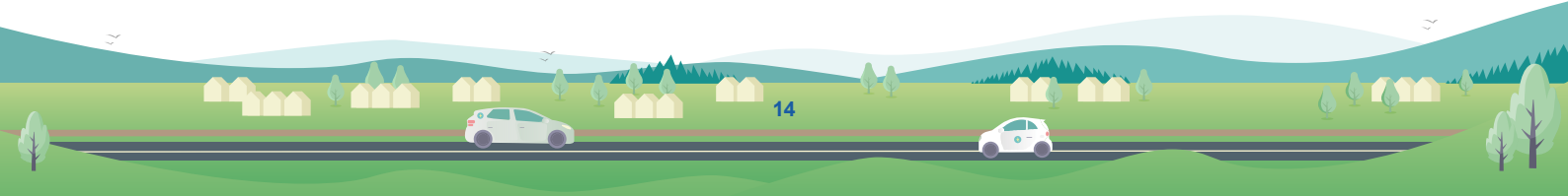
- **The Green and Moat Lane** – modified to form a single signalised crossroads with the A4019.
- **West Cheltenham Fire Station** – access for emergency vehicles retained with left and right turning onto the A4019. Access for non-emergency vehicles diverted onto a new access road and joining the A4019 at a new junction (referred to as Site Access B junction into the proposed North West Cheltenham Development Area).
- **Homecroft Drive and Sandpiper Drive** – existing junctions closed, with access to the A4019 diverted through to the Site Access B junction via a new access road.
- **Civil Service Sports Ground** – existing junction location retained but changed to a signalised crossroads (the Site Access B junction). For traffic westbound on the A4019, the right turn at this junction will be for buses only.
- **B4634 (Hayden Road)** – the Gallagher Junction. Existing junction location retained, but with the layout changed. This will become the Site Access C junction.

Three new junctions will be created to provide access off the A4019 into the proposed North West Cheltenham Development Area:

- **A slip lane** – opposite the West Cheltenham Fire Station for eastbound traffic on the A4019 into the North West Cheltenham Development Area.
- **Site Access A** – a signalised T-junction opposite Homecroft Drive.
- **Site Access B** – a signalised crossroads incorporating the existing access from the Civil Service Sports Ground. The new access road from the West Cheltenham Fire Station, Homecroft Drive and Sandpiper Drive will feed into the southern arm of this junction.

There will be lighting for most of the length of these improvements, apart from sections to the east and west of Uckington which will not be lit to allow bat activity across the road to continue. Three new attenuation basins will receive highway drainage from this section of the A4019.

There will be a 50mph speed limit along the length of the improvement, to a point between the junction with the new Link Road and Cooks Lane where the speed limit will be 40mph through to the Gallagher junction.



Scheme wide design

In order to deliver these elements, the Scheme design includes:

- Embankments, designed on a 1:3 slope principle, with the exception of the embankment to the north of the A4019 (west of the M5) which will be steepened in order to avoid an area of priority habitat.
- Drainage system, using sustainable urban drainage system (SuDS) principles, including gullies, swales and attenuation basins.
- Full directional cut-off lighting at 12m height, the locations described under the Scheme key elements above.
- Fencing of the outer extent of the highway corridor, the type of which is dependent on functional requirements and context, for example stock proof agricultural fencing.
- Signage designed to ensure route legibility for road users travelling on the new and improved sections of the road network.
- Pedestrian and cyclist crossing points to be included at the new signalised junctions on the A4019 and the Link Road, and on the new gyratory roundabout at M5 Junction 10.
- Bus stops east of the junction of The Green and the A4019 in Uckington; adjacent to the Elms Park development; and at the eastern extent of the Scheme adjacent to the Sainsburys store.

Land take

The Scheme will require some land take to enable it to be built, operated and maintained.

There will be two types of land take:

- Outright acquisition, where the land taken will be retained in the ownership of the Applicant after the works are complete.
- Acquisition of rights, where the land will be used to build the Scheme, and then returned to its original owners after construction is complete, but rights of access will be retained to enable future maintenance.

The Applicant is also seeking powers to use some land temporarily, either to re-instate and return to the original owner, or to modify and return to the original owner.

Implementation of the Scheme will also require demolition of the following buildings:

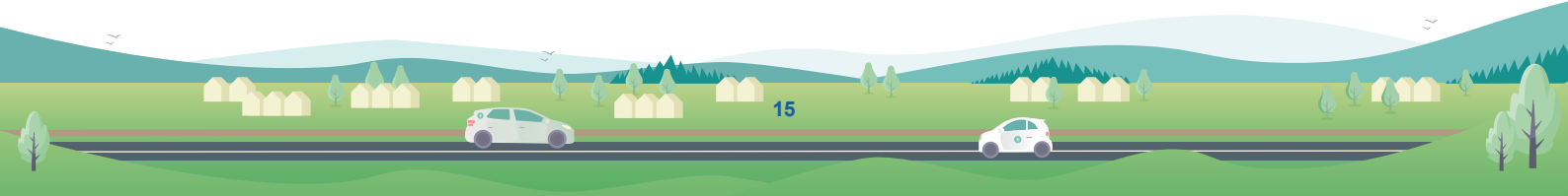
- Three residential properties, and the Sheldon Nurseries business, on Stanboro Lane to the north of the A4019 and west of the M5.
- All fourteen of the residential properties at Withybridge Gardens, plus associated garages and garden outbuildings.

- Two residential properties at Withy Bridge, to the north of the A4019 near Withybridge Lane, plus associated garages and garden outbuildings.
- Three residential properties at Uckington, to the south of the A4019, as well as three farm buildings.
- Ten residential properties (comprising five semi-detached buildings, of which only two are occupied currently) to the north of the A4019, to the east of the West Cheltenham Fire Station, plus three farm buildings near to the Gallagher junction.

Environmental design

The key environmental elements of the Scheme design aim to minimise effects on people and the environment. The key aims of the environmental design for the Scheme are to:

- Ensure the design of the infrastructure components of the Scheme minimise direct impacts to the environment.
- Avoid loss of or damage to hedgerows, woodland and individual trees, as far as possible, by refining alignments of the Scheme elements.
- Retain or replace vegetation that contributes to the landscape character of the area, that is visually appealing and provides screening. In particular:
 - Replacement woodland along the M5 corridor and the junction, for visual appeal and screening.
 - Boundary hedgerow planting including occasional trees, and wildflower grass verges along the A4019 Tewkesbury Road and the Link Road.
 - Woodland plots along the Link Road to provide denser screening, where required.
 - The central reserves of the A4019 Tewkesbury Road to be wildflower grass seeded and with individual trees planted where safe and feasible.
- Use planting to assist in integrating M5 Junction 10, the widened A4019 and the Link Road into the landscape.
- Retain, replace and enhance habitats for biodiversity and visual amenity value, so as to provide habitat corridors along the Scheme as well as links with habitats in the surrounding area.
- Plant a range of species that are non-invasive and tolerant of climate change.
- Provide wildlife crossing points to avoid blocking wildlife movement.
- Retain existing facilities for active travel, including bus stops and public rights of ways. For example, the public footpaths between Uckington and Withybridge Lane, to the north of the River Chelt will be re-routed to cross the Link Road under the new River Chelt bridge.



The key features included in the Scheme design to minimise effects on people and the environment during the operation of the Scheme are:

- Infrastructure components of the Scheme have been designed to avoid impacts on people as much as practical, although some property demolition is unavoidable.
- Provision of a flood storage area to provide compensatory flood storage capacity whilst also providing wildlife habitat.
- A segregated cycleway and footway along the northern side of the A4019 Tewkesbury Road, extending for the full length of the Scheme, and along the Link Road, thereby providing improved facilities for cyclists and pedestrians and reducing reliance on vehicles for all journeys.
- The creation of new service roads to provide safe access to properties along the A4019 Tewkesbury Road separated from the main A4019 carriageway.
- The new bridge over the River Chelt will be a single span structure (over the river) which means there will be no direct impacts of the bridge to the river and its banks.
- The embankments on the M5 at the point where the River Chelt passes under the motorway have been designed so that the existing culvert (tunnel) does not require extending on either side of the motorway, thus avoiding any further culverting of the River Chelt.
- A series of culverts under the Link Road (to the north of the River Chelt bridge) so that the new Link Road does not impede the movement of floodwater across this area.
- Wildlife crossing points for bats (on the A4019) and badgers or otters (tunnels under the A4019 and Link Road).
- The inclusion of environmental noise barriers within the Scheme area, where such features would reduce noise levels in existing Noise Important Areas (NIAs) and where existing noise levels exceed the level of noise above which it has been determined that significant adverse effects on health and quality of life will occur.

Biodiversity Net Gain

Biodiversity Net Gain (BNG) is an approach which aims to leave the natural environment in a measurably better state than beforehand. Natural England have developed an approach to BNG which has been applied to the Scheme, measuring the existing (pre-construction) habitats and measuring predicted losses and gains, as part of the development of the Scheme design.

Whilst there will be initial habitat loss during site clearance, the measures incorporated in the Scheme design will ultimately lead to habitat gains.

The BNG assessment process is reported more fully in Appendix 7.18 (application document TR010063 – APP 6.15). It is based on evaluating the condition and amount of habitat available to calculate the habitat units of the existing and proposed habitat. The Scheme will result in habitat gains for all the habitat unit types. The predicted habitat gains by unit type are approximately:

- **Habitat Units (terrestrial, excluding hedgerow):** 11.59% gain.
- **Hedgerow Units:** 15.96% gain.
- **River Biodiversity Units (rivers and streams):** 34.19% gain.
- **River Biodiversity Units (ditches):** 23.38% gain.

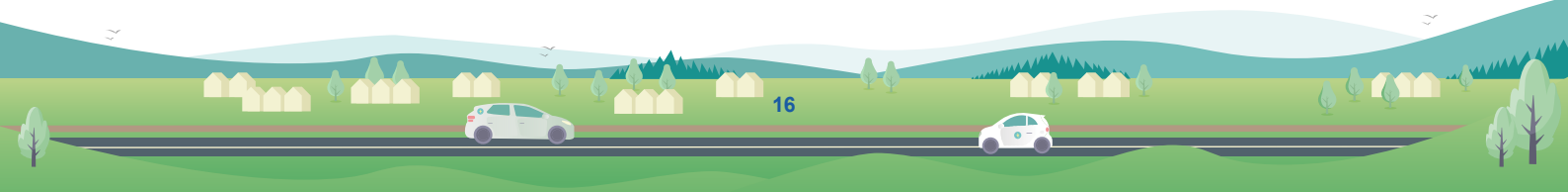
Construction

The Construction of the Scheme is programmed to last 30 months. Based on the current Scheme design and programme, it is anticipated that the construction of the Scheme will commence in 2025, with the Scheme planned to be open for traffic in 2027.

During this time, phasing of works across the Scheme area is required in order to keep routes open to traffic and access to residential properties and businesses as unrestricted as possible.

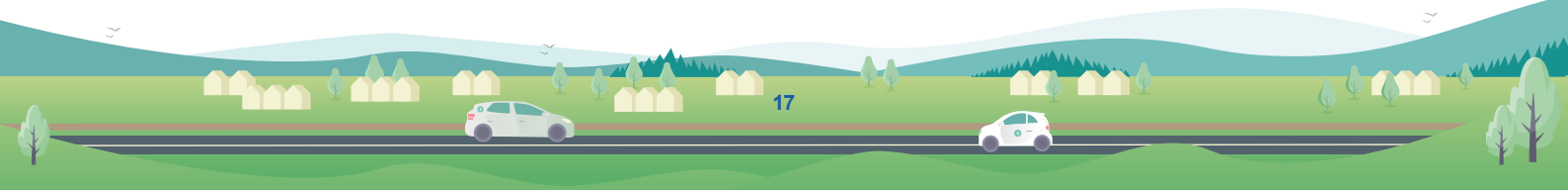
More land is required during the construction period than is ultimately needed for the Scheme when it is open to traffic. This will allow for site compounds, storage of materials and equipment, and temporary haul routes. It is intended to return the additional construction land take to its original owners following agreed restoration works.

Road closures will be minimised although closure of the M5 J10 northbound on slip will take 15 months and nine months for the southbound off slip, with an overlap of five months when both sliproads are closed. A Traffic Management Plan will be produced setting out how traffic diversions will be managed throughout the construction period. Signed diversion routes will include provisions to discourage HDVs (Heavy Duty Vehicles) through movements along local roads where possible.



Indicative construction sequence and duration (based on a construction period, currently planned to commence April 2025)

Location	Activity	Dates (based on a 30 month construction period)
All	Construction starts	Month 1
M5	M5 Junction 10 works commence	Month 5
A4019	A4019 east of the Link Road works commence	Month 5
B4634	B4634 – Link Road junction works commence	Month 6
M5	South bound off slip closed	Month 11
The Link Road	The Link Road works commence	Month 12
Flood storage area	Flood storage area works commence	Month 12
M5	North bound on slip closed	Month 15
The Link Road	Flood alleviation culverts complete	Month 17
M5	North overbridge open	Month 19
M5	New south bound off slip open	Month 20
B4634	B4634 – Link Road junction complete	Month 24
Flood storage area	Flood storage area works complete	Month 26
The Link Road	River Chelt bridge complete	Month 26
The Link Road	The Link Road works complete	Month 26
M5	New south bound on slip open	Month 27
M5	New south overbridge open	Month 28
M5	New north bound off slip open	Month 29
M5	Existing overbridge demolished	Month 30
M5	New north bound on slip open	Month 30
M5	M5 Junction 10 works complete	Month 30
A4019	A4019 east of the Link Road works complete	Month 30
All	Construction complete	Month 30





Alternatives



Alternatives

Proposals for the improvement of the M5 Junction 10 and the A4019, and the creation of the Link Road have been under consideration since 2012.

Proposals for the improvement of the M5 Junction 10 and the A4019, and the creation of the Link Road have been under consideration since 2012.

The developments allocated and safeguarded in the JCS at West Cheltenham and North-west Cheltenham will require new and improved public transport services, walking and cycling schemes, and highway-based solutions to accommodate the large number of trips that will be generated.

A range of infrastructure scenarios were considered and tested using a traffic model to determine how effective they would be, with the aim of developing a deliverable scheme that would enable the housing and economic development proposed by the Gloucestershire Local Enterprise Partnership's Strategic Economic Plan. It is also central to the transport network sought by the Council in the Gloucestershire Local Transport Plan.

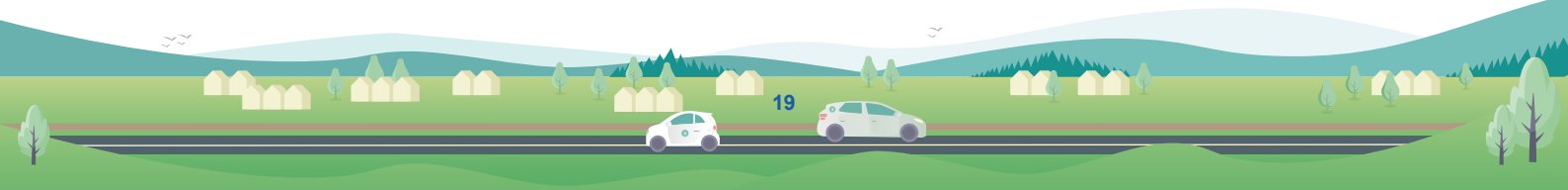
Several options have been identified and refined. These are discussed more fully in application document TR010063 – APP 6.2 (ES Chapter 3 Assessment of Alternatives).

Options for M5 Junction 10

Concept options were considered against criteria including environmental impact, buildability and programme, compatibility with key design considerations, option cost, BCR (Benefit - Cost Ratio) and value for money.

Options for M5 Junction 10

Option	Description	Appraisal outcome
Option 1A	M5 Junction 10 moved to the north of its current location, with an elongated roundabout junction.	Discounted due to complexities and being the most expensive option.
Option 2	Upgrade existing M5 Junction 10 with an all movement gyratory roundabout junction.	High value for money, met the Scheme objectives fully. Marginal differences in benefits or disadvantages when compared with each other. Taken forward to non-statutory public consultation (Autumn 2020).
Option 2A	As Option 2 (upgrade existing M5 Junction 10 with gyratory junction) but moved slightly north, enabling retention of the existing bridge as the southern part of the gyratory carriageway.	
Option 2B	As Option 2 (upgrade existing M5 Junction 10 with gyratory junction) but moved slightly south, enabling retention of the existing bridge as the northern part of the gyratory carriageway.	
Option 3	M5 Junction 10 moved to the south of its existing location.	Discounted due to its greater impact on the River Chelt floodplain than the other options.
Option 4	As Option 2 (upgrade existing M5 Junction 10 with gyratory junction) but with a dumbbell roundabout arrangement instead of a gyratory roundabout.	Discounted due to providing less traffic capacity than the other options.
Option 5	M5 Junction 10 moved to the north of its current location, but with the junction located between the new junction proposed in Option 1A and the existing M5 Junction 10.	Discounted from further appraisal due to complexities and affordability issues.



Options for improvements to the A4019

Improvements to the A4019 were first identified in the August 2016 Transport Assessment, approximately covering the length between the West Cheltenham Fire Station and the B4634 junction. The Homes England funding bid of March 2019 included a Concept Option which extended the improvement to the west, linking with the M5 Junction 10 and the Link Road improvements, widening and upgrading the A4019 to dual carriageway and improving existing junctions.

Whilst three cross section options were considered, it became apparent that a central reserve would be required throughout the improved section of the A4019 to provide consistency of treatment for this complex length of carriageway. This was included in all the shortlisted M5 Junction 10 Scheme options (Options 2, 2A and 2B).

Options for the Link Road

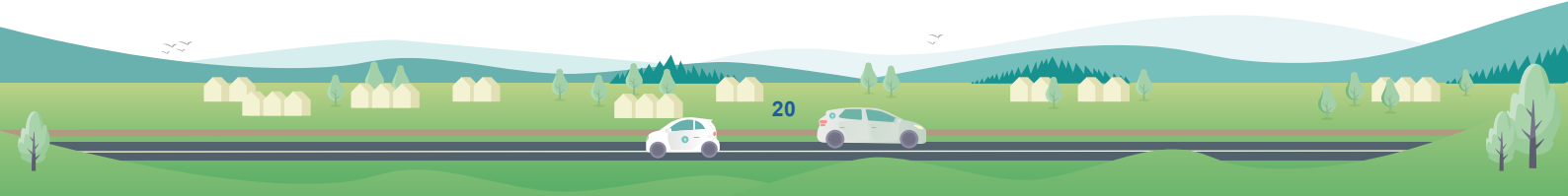
The Homes England bid identified the need for a new road to connect the proposed West Cheltenham Development Area to the M5 Junction 10. An operational and environmental assessment of route options was undertaken, to identify the most appropriate route (the West Cheltenham Link Route Assessment Report). Four route corridors were assessed against the following criteria:

- Impact on floodplain.
- Directness of route from M5 Junction 10.
- Impact on properties.
- Impact on environment (in addition to the floodplain and properties).

Sifting of the Link Road options – Route corridor

Sifting of options for the Link Road route corridor

Corridor	Description	Appraisal outcome
Corridor 1	Exits A4019 100m from M5 Junction 10. Distance from M5 Junction 10 to West Cheltenham Access is 2.7km. Route corridor length is 2km	Greatest impact on the floodplain; discounted from further consideration.
Corridor 2	Exits A4019 450m from M5 Junction 10. Distance from M5 Junction 10 to West Cheltenham Access is 2.5km. Route corridor length is 1.7km	Considered to be the second best performing route corridor, containing existing highway infrastructure (Withybridge Lane). Taken forward for further consideration.
Corridor 3	Exits A4019 700m from M5 Junction 10. Distance from M5 Junction 10 to West Cheltenham Access is 2.1km. Route corridor length is 1.4km	Considered to be the most direct route, with least impact on properties, second least impact on the floodplain and generally the scale of environmental impacts considered to be less than the other corridors. Taken forward for further consideration.
Corridor 4	Exits A4019 1.6km from M5 Junction 10. Distance from M5 Junction 10 to West Cheltenham Access is 3.4km. Route corridor length is 700m	Least direct; discounted from further consideration.



Two options were considered further under Corridor 2:

- **Corridor 2 Option 1** – developed as a ‘Do-Minimum’ to address highway layout and cross section deficiencies within the existing layout.
- **Corridor 2 Option 2** - to improve resilience to flooding. However, its greater elevation would lead to greater environmental impacts including greater loss of floodplain, vegetation and greater likelihood of direct impact on the Grade II listed buildings at Millhouse Farm. The existing carriageway could not be reused because of level change requirements, leading to a requirement for new full pavement construction.

Due to the restrictions of the existing alignment and cross section, it was concluded that using the Withybridge Lane layout is unlikely to be suitable to cater to future traffic, walking cycling and horse riding demands, and therefore neither Corridor 2 options were taken forward.

Corridor 3 was taken forward into all of the shortlisted M5 Junction 10 options (Options 2, 2A and 2B).

Non statutory consultation

M5 Junction 10 design Options 2, 2A and 2B were subsequently taken forward for consideration in the non-statutory consultation held in Autumn 2020.

Preferred route option for the M5 Junction 10 Improvements Scheme

Option 2 was the option that Gloucestershire County Council (GCC) recommended should be taken forward as the preferred route for the M5 Junction 10 Improvements Scheme. Option 2 comprises:

- **For M5 Junction 10** – upgrading the existing junction with a gyratory roundabout centred around the existing bridge. The existing bridge will be demolished.
- **For the A4019** – a standard dual carriageway with an active travel corridor on the northern side of the A4019.
- **For the Link Road** – a new road along route corridor 3.

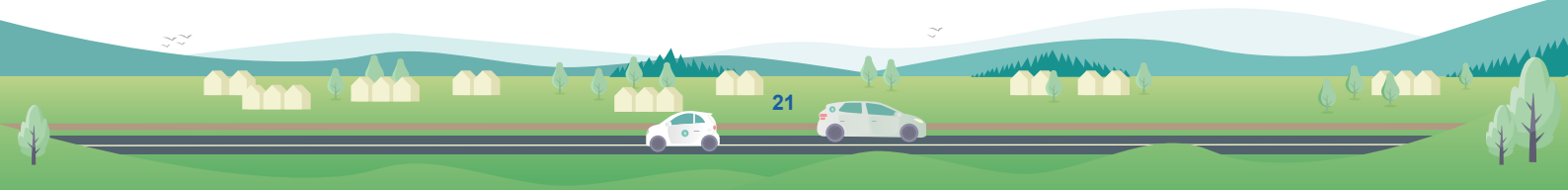
Further assessment and design development work was undertaken following the non-statutory public consultation in Autumn 2020. This took into account feedback received during that public consultation and the results of further survey and assessment work. This work considered:

- Review of the alignment and cross section of the Link Road.
- A4019 widening at Uckington.
- Extending the improvement works on the A4019 eastwards as far as Gallagher Retail Park (junction of the A4019 and B4634).
- Repurposing Withybridge Lane.

The design options selected were included in the Scheme assessed in the PEIR, and presented at the statutory consultation (December 2021 - February 2022).

Summary of the Scheme elements which constitute the selected design as presented and assessed in the PEIR

Scheme element	Description of the element selected
M5 Junction 10	Option 2 - upgrading the existing junction with a gyratory roundabout centred around the existing A4019 bridge. The existing bridge will be demolished.
A4019	Option 1 - a standard dual carriageway with an active travel corridor on the northern side of the A4019. Widening of the existing A4019 will be to the south of the current alignment through Uckington. Improvements on the A4019 will extend eastwards to the Gallagher junction (A4019/B4634 junction).
The Link Road	A new road along route corridor 3. Within route corridor 3, option 3 was selected as the preferred route alignment. The road will comprise a two-way single carriageway road, with an active travel corridor along the western side. New signalised junctions will connect the Link Road into the A4019 (to the north), and the B4634 (to the south).



Development of the design following statutory consultation

Further design development work was undertaken following the statutory consultation to form the Scheme assessed in the ES.

Summary of design changes following statutory consultation

Scheme element	Mitigation measure	Summary / comment
M5 Junction 10	Mitigation for bats	Construction of an underpass to the east of the junction to allow bats to cross underneath the elevated A4019 near the new elevated M5 Junction 10 gyratory. Unlit from dusk to dawn. Dimensions allow use for walkers and horse riders to pass under the A4019. Box design selected because an arch would be likely to require piled foundations.
	Priority habitat	An area of priority habitat was identified during survey work after the statutory consultation along part of the northern edge of Stanboro Lane. The embankment has been steepened in this area so as to avoid this habitat. This has also enabled the retention of Stanboro Lane between its junction with the A4019 and Sheldon Cottages, and the retention of Sheldon Cottages as well.
	Flood storage area	The flood storage area design was compressed into a smaller area of land, which also incorporated attenuation for highway drainage from the northern end of the Link Road, enabling further land take efficiencies.
	Withybridge Lane	Consultation feedback indicated a preference to retain current level of access through Withybridge Lane but with left turn only onto the A4019.
The Link Road	Flood mitigation structures under the Link Road to the north of the River Chelt	Corrugated arch and concrete box designs were considered. The concrete box design was selected because the corrugated arch would require more significant foundation works.
	River Chelt bank protection	Existing active bank erosion was detected in the vicinity of the new River Chelt bridge combined with potential high stream powers. Rip-rap or non-biodegradable geotextile solutions will be considered and consultation with the Environment Agency will be undertaken at detailed design stage.
A4019	Reducing impacts to Moat House Scheduled Monument	The new connection linking Cooks Lane and Moat Lane was reviewed and, due to the predicted increase in traffic past the Moat House scheduled monument, the link was removed. In addition, to reduce visual impacts on the Moat House scheduled monument, the alignment of Moat Lane was changed so that its junction with the A4019 and The Green will form a more straightened crossroads.
	Improved Site Access A, B and C	Site Access B is the middle of the three junctions off the A4019 that tie into the planned North West Cheltenham Development Area. Site Access A is to the west, and the Gallagher Junction (Site Access C) is to the east.
	Site Access A - Changed to a signalised T-junction with the A4019.	Consideration of allowance for a bus lane to be provided at a later date along the east side of the A4019.
	Site Access B - changed to a signalised crossroads with the A4019.	A simplified northern arm of the signalised crossroads with the Link Road and the A4019, allowing future developer more flexibility in their junction design. Increased central reserve width between this junction and Uckington, to avoid any future A4019 widening.
	Site Access C (Gallagher junction) - crossings of the northern arm moved further north; left turn lane at B4634 removed.	Lighting revised to avoid two sections of the A4019 to the east and west of Uckington, creating dark corridors for bat foraging.
	Improved provision for buses	Inclusion of a bus lane eastbound along the A4019, between the West Cheltenham Fire Station and the B4634 (Hayden Road) junction.
	Futureproofing for the development of the safeguarded land to the north-west of Cheltenham	A simplified northern arm of the signalised crossroads with the Link Road and the A4019, allowing future developer more flexibility in their junction design. Increased central reserve width between this junction and Uckington, to avoid any future A4019 widening.
	Lighting design mitigation for bats	Lighting revised to avoid two sections of the A4019 to the east and west of Uckington, creating dark corridors for bat foraging.
Mitigation for dormice	Dormice have been identified north of the A4019. Improvements to existing hedgerows and creation of new hedgerows in fields north of the A4019 will mitigate for some loss of existing hedgerows.	

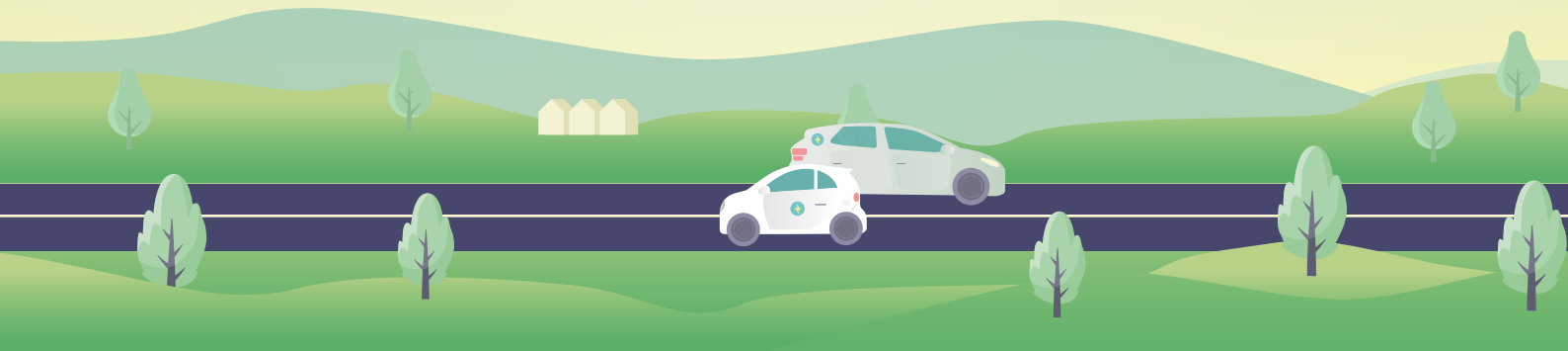
Justification for the chosen option

The development of the preliminary design for the Scheme, that is being taken forward in this application for DCO consent, has included consideration of strategic development and local requirements, environmental factors, engineering considerations and cost.

- **Strategic development** – JCS and wider transport network requirements met by providing transport network connections required in west and north-west Cheltenham to support economic and employment growth.
- **Local requirements** – feedback from public consultation and engagement with the local community, landowners and statutory consultees.
- **Environmental factors** – environmental assessment and design refinement to minimise environmental impacts and to maximise the opportunities for environmental enhancement and for people living and working in the area through the creation of new active travel corridors along both the A4019 and the Link Road.
- **Engineering considerations** – the multidisciplinary team of engineers and environmental specialists has developed the design through the iterative process of development, testing and refining the design and the consideration of feedback received through the consultation process.
- **Cost** – the preliminary design has considered buildability, cost and programme implications through the development of its respective components.



Environmental Impact Assessment



Environmental Impact Assessment

This section summarises the environmental impact assessments presented in the ES for each of the topics.

For each topic, a summary is provided of:

- What the existing environment is like (the baseline environment).
- What are the key receptors (people and environment) that could be affected by the Scheme.
- What impacts could arise as a result of the construction and operation of the Scheme.
- What mitigation has been included in the design to avoid or reduce the impacts.
- Assessment of the residual impacts with mitigation considered, combined with the sensitivity of receptors, and the resulting significant adverse or beneficial effects.

Air Quality (Chapter 5)

Baseline

The air quality section of the assessment considers the effects of the Scheme on air quality conditions in the area. The assessment considers the potential for significant effects to arise from construction dust and construction traffic during the construction of the Scheme, and changes in road traffic volume and distribution during the operation of the Scheme.

The key air quality pollutants of concern in the UK are nitrogen dioxide (NO₂) and particulate matter. Areas where air pollutant concentrations exceed UK air quality strategy objectives are designated as Air Quality Management Areas (AQMAs) by local authorities. There is one AQMA within the air quality study area, in an area north-west of Cheltenham town centre (about 1.9km from the Scheme boundary).

Within the air quality study area, baseline air quality monitoring data between 2017 and 2021 indicated that the only exceedances of the annual mean objective for NO₂ were located within the Cheltenham AQMA. There was also an exceedance of the annual mean NO₂ air quality limit value, as projected by Defra, on the A40 between Arle Court and Princess Elizabeth Way in 2018, however, this was projected to reach compliance by 2019 and future years beyond this.

Construction

The potential impact of the Scheme was assessed at receptors sensitive to construction dust. 646 sensitive receptors were identified within 200 m of the boundary of the Order limits for the Scheme, 219 of which are located less than 50 m from the boundary of the Order limits of the Scheme. The Scheme is considered to have a high dust risk potential.

The construction traffic was examined and found not to exceed the traffic scoping criteria and is therefore considered unlikely to significantly affect air quality.

Any air quality impacts due to construction dust will be temporary and are expected to be minimised by using best practice and appropriate mitigation measures. With the adoption of suitable and proportionate mitigation for a site with high dust risk potential, there is not expected to be a significant residual effect on air quality from construction activities.

Operation

The Scheme will not have an overall significant adverse effect on human health receptors or on designated habitats in the opening year.

The redesign of the M5 Junction 10 and provision of the proposed Link Road will result in traffic using the road network differently. Most receptors are predicted to experience decreases in annual mean NO₂ concentrations with the Scheme as a result of decreases in traffic flows. This is because the Scheme provides improved connectivity between the Strategic Road Network (SRN) and the local transport network in west and north-west Cheltenham.

In the opening year, three of the 90 human health receptors selected for assessment are expected to exceed the annual mean NO₂ objective without the Scheme in place. These three receptors all have improved air quality as a result of the Scheme, with results showing reductions in annual mean NO₂ when compared to without scheme results. There are a further 46 receptors across the air quality study area where decreases in pollution concentrations are forecast as a result of the Scheme.

Of the worst case receptors, 28 will experience an increase in annual mean NO₂ concentrations, mostly as a result of increases in traffic flows with the Scheme, including those located near: Stoke Road between A4019 and Bishops Cleeve, A38 between B4213 and Gupshill Roundabout south of Tewkesbury, A40 between M5 J11 and the A417, M5 between Junction 11 and Junction 10, A4019 between Junction 10 and the A38, and A4019 between B4634 and Manor Road.

None of these receptors are expected to exceed the annual mean objective with the Scheme.

There are a further 46 receptors where decreases in pollution concentrations are forecast as a result of the Scheme, and a further 13 receptors where the changes are imperceptible.

No exceedances of the particulate matter (PM10 and PM2.5) air quality objectives were identified in the base year (2019). It is considered unlikely that there will be any exceedances of the objectives in the opening year with the Scheme.

An assessment was also undertaken to consider the cumulative effect together with reasonably foreseeable future projects (RFFPs) in the future year (2042), with the assumption that the RFFPs will be fully complete by this time. The RFFPs are included within the traffic model for this Scheme.

No exceedances of the annual mean NO2 objectives were identified at either the existing human health receptors or the proposed receptors introduced within the strategic development sites in the future year.

Where construction of the Scheme overlaps with other construction projects, both in time and space, there is the potential for cumulative effects arising from both construction traffic and construction dust. However, with the application of appropriate mitigation measures at each site the effect on air quality should not be significant.

Noise and Vibration (Chapter 6)

Baseline

The noise and vibration section reports the assessment of the effects of the Scheme on noise and vibration, both during construction and operation, as a result of construction activities and road traffic.

The dominant source of noise close to the Scheme is road traffic, generated primarily from vehicles using the existing M5 and the existing A4019 Tewkesbury Road.

There are eight Noise Important Areas (NIAs) within or close to the Scheme. These are areas where 1% of the population is affected by the highest noise levels from major roads, according to strategic noise mapping undertaken by the Department for Environment, Food, and Rural Affairs (DEFRA).

The Scheme has the potential to have an impact on noise levels during both construction and operation, due to changes in traffic on the affected road network - that is, roads that will experience an appreciable change in traffic caused by the Scheme.

Construction noise and vibration

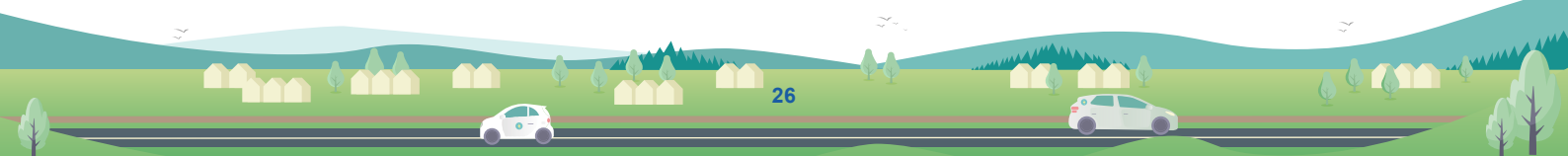
Construction noise and vibration impacts will be dependent on the construction methods used, and by how close the work is to residential properties and other noise and vibration sensitive venues. Construction noise effects are unlikely to be significant beyond 25m from the works during the day and beyond 75m from the works at night. Effects from construction vibration during compaction are unlikely to be significant beyond 50m from the works. Several of the activities within each phase are short lived in nature, which means that construction noise and vibration impacts at many of the properties will only be for a short time.

The impacts of noise during the construction stage will be minimised through the implementation of best practice measures during construction, and the siting of construction compounds away from properties, where possible. During construction, local residents will be kept informed of the progress of the works, and when the noisiest activities will be taking place. In most cases, where it is unavoidable for roadworks to be close to residential properties, they will not be in place for lengthy periods. This means that construction noise is not anticipated to lead to significant effects, avoiding the need for temporary rehousing or noise insulation.

Road closures leading to diversion routes will be required for the construction of the two new bridge decks, and the demolition of the existing structure, at Junction 10. This will require road closures over three 12-hour periods. Although the properties within the diversion route study area are likely to experience a significant adverse change in noise, the limited duration of the closures means that this will not cause a significant adverse effect.

Temporary traffic diversion routes will be in place for 19 months because of the closure of the two existing M5 J10 slip roads. This will include a five month period when both slip roads will be closed. On the signed diversion routes themselves, no significant effects are predicted. Traffic rerouting on other local roads could cause significant adverse effects on the road through Elmstone Hardwicke, the road through Boddington and Pamington Lane. There could also be significant beneficial effects for the A4019, Walton Cardiff Road, St James' Square and Lansdown Road from traffic rerouting away from M5J10. The Traffic Management Plan will be designed to manage the traffic and minimise the impact of traffic and noise during these diversions.

The levels of construction vibration are likely to lead to a significant adverse impact during ground compaction, but since the works will not be in place for lengthy periods, this is not anticipated to lead to significant effects.



Operation

In the short term, significant beneficial effects are predicted for a total of 411 residential properties during the day and 273 residential properties during the night. These beneficial effects are predicted where noise barriers have been installed or where changes in traffic flows will cause a reduction in noise levels, including the A4019 (East of the M5 Junction), the M5 and Withybridge Lane, Hayden Lane, St James Terrace, Bamfurlong Lane and Princess Elizabeth Way. Significant beneficial effects are predicted at twelve non-residential receptors including the House in the Tree public house, the Cheltenham West Fire Station and bars in St James Square during the day.

Also in the short term, significant adverse effects are predicted for a total of 89 residential properties during the day and 169 residential properties located at Stoke Road, Moat Lane, Brooklyn Road, Up Hatherley Way, Gloucester Road and on the A4019 West of the M5 Junction during the night. Measures to mitigate noise on Stoke Road will be investigated by GCC as a separate project, to be completed in advance of the Scheme opening.

In the long term (without the strategic development sites), the Scheme leads to significant beneficial effects at 159 residential and two non-residential properties during the day and 200 residential properties during the night. These beneficial effects are predicted where noise barriers have been installed or where changes in traffic flows will cause a reduction in noise levels, including the A4019 (East of the M5 Junction), the M5 and Withybridge Lane, Hayden Lane, St James Terrace, Bamfurlong Lane and Princess Elizabeth Way.

Also in the long term, adverse effects are predicted for 99 residential properties during the day and 238 residential properties during the night, located on Stoke Road, A4019 (West of the M5 Junction), Up Hatherley Way, Boddington Road, Gloucester Road and Brooklyn Road.

An assessment was also undertaken to consider the future year scenario - when the strategic development sites have been built. The results are broadly similar to the long term assessment, with additional traffic from the strategic development sites at safeguarded land to the north-west of Cheltenham, the North West Cheltenham Development Area and the West Cheltenham Development Area affecting the road network.

In the long term, the Scheme with strategic development sites lead to significant beneficial effects at 99 residential properties during the day and 161 residential properties during the night. These beneficial effects are predicted where noise barriers have been installed or where changes in traffic flows will cause a reduction in noise levels; including the A4019 (East of the M5 Junction), the M5 and Withybridge Lane, Hayden Lane, St James Terrace, Bamfurlong Lane and Hesters Way Road.

In this long term scenario, with the strategic development sites, significant adverse effects are predicted for 202 residential properties during the day and 436 residential properties at night. These properties are located at Boddington Road/Church Lane, The Green/Road to Elmstone Hardwicke, Moat Lane, Fiddlers Green Lane, Down Hatherley Lane, Cirencester Road, Brockworth Road and Innsworth Lane, as well as in Bishops Cleeve, and on the road network between Stoke Orchard and Ashchurch (through Fiddington and Natton). Significant adverse effects are predicted during the day at three non-residential receptors, located at the Orchard, the Village Hall Uckington and the Church of St Mary Magdalene.

Biodiversity (Chapter 7)

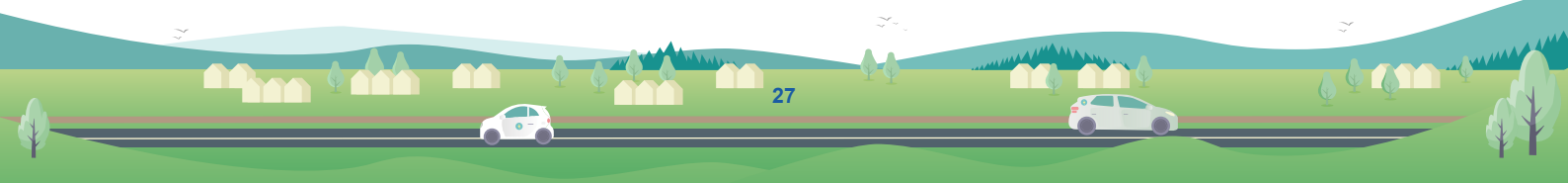
Baseline

The biodiversity section reports the assessment of the effects of the Scheme on protected species and habitats, both during construction and operation. It considers biodiversity net gain, an approach which aims to leave the natural environment in a measurably better state than beforehand. The Natural England Biodiversity Metric provides a way of measuring and accounting for biodiversity losses and gains resulting from development and/or land management change.

Whilst there are no sites designated for nature conservation at a national or international level that are adjacent to or overlapped by the Scheme, there are a number of designated sites approximately 2 km or further away from the Scheme that have been considered:

- **Severn Estuary SPA, SAC and Ramsar site** (21 km south west of the Scheme, or over 40 km downstream via the shortest hydrological connection) is designated for its internationally important populations of wintering wildfowl, estuarine habitats and fish.
- **Walmore Common SPA** (17.5 km south-west of the Scheme), designated for its internationally important population of wintering Bewick's swan.
- **Wye Valley and Forest of Dean SAC** (21 km south-west of the Scheme) is designated for bats.
- **The Cotswold Beechwoods SAC** (7.4 km south of the Scheme) is designated for its ancient beech woodland and unimproved grassland.
- **Coombe Hill Canal SSSI** (located 1.9 km west of the Scheme) is a disused canal designated for its groups of nationally rare and scarce invertebrates and nationally scarce plants.

No non-statutory designated sites for nature conservation have been identified within the Scheme area. Seven non-statutory designated sites are within 200 m of the affected road network.



There are a variety of habitats within 200 m of the Scheme, predominantly arable fields and poor quality grassland with pockets of broadleaved and mixed plantation woodland, broadleaved semi-natural woodland, scrub, traditional orchard, semi-improved neutral grassland, unimproved neutral grassland and hedgerows. Aquatic habitats are also present, including the River Chelt, the Leigh Brook, a number of ditches and ponds.

The habitats within the Scheme have the potential to support protected species, and extensive surveys have been undertaken to confirm the presence or likely absence of protected species within or close to the Scheme. The results have identified:

- Numerous bat roosts within and surrounding the Scheme, as well as a number of areas of importance for foraging and commuting bats.
- The presence of dormice to the north of the A4019 and east of the M5.
- A number of badger setts.
- The presence of otters on the River Chelt and another unnamed watercourse.
- The presence of barn owl close to the Scheme.
- Small numbers of reptile in suitable habitat.
- Great crested newts within ponds to the south of the A4019 and north of the Scheme.
- Notable fish species within the River Chelt.

Construction

During construction of the Scheme, the expected effects on the species and habitats present include the physical loss of habitats, or damage and fragmentation of habitats during site clearance works, and construction activities. At construction stage the effects on biodiversity will be minimised through the application of best practice environmental management, so that damage to habitats, soils and water quality are avoided, where possible.

Operation

Effects may arise as a result of traffic and the presence of new areas of street lighting.

The Scheme design has minimised these potential effects by reducing land take (both permanent and temporary), where possible, and minimising losses of key features, such as hedgerows, woodland and more valuable grassland. The new River Chelt bridge is designed specifically so that it crosses the river in a single span and does not impact directly onto the river channel. The design includes mitigation measures such as purpose built structures to compensate for loss of bat roosts, underpasses under the Link Road and the A4019 to facilitate movement of species and, where lighting is required, the design minimises light spill beyond the road. The landscape planting will also create strong green corridors that link with the wider area to create a robust habitat network.

New habitats will be created including woodland, scrub, hedgerows and species-rich grassland. In addition, wetland habitat will also be created that will include areas of water that are present for all and for some of the year, as well as ditches and associated wetland loving planting. The habitat creation will ensure that the Scheme provides more habitat in the long term than is currently available.

Taking these measures into account, significant adverse effects in relation to biodiversity resources are not anticipated as a result of the Scheme.

Road Drainage and the Water Environment (Chapter 8)

Baseline

The road drainage and water environment section reports on the assessment of the effects of the Scheme on surface watercourses and groundwater, both during construction and operation. Flood risk is also considered in this topic, with both the effects of flood risk to the Scheme, and the effects of the Scheme to increasing flood risk, being considered.

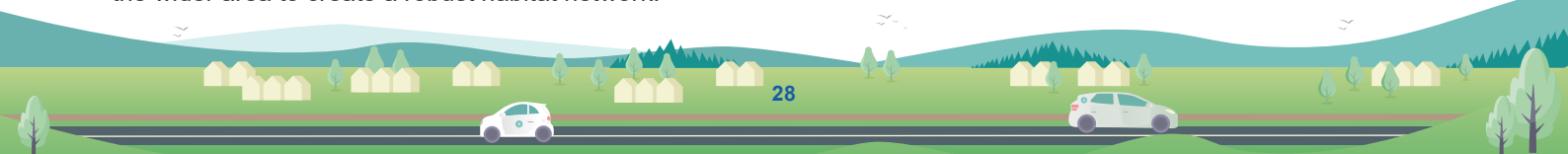
Surface watercourses within the Scheme area generally flow from east to west and are located within the Severn River Basin District (RBD), as set out in the Severn River Basin Management Plan (RBMP). The key surface water receptors include:

- The River Chelt (a WFD water body and Main River).
- 13 ordinary watercourses including the Leigh Brook.

The Scheme area is underlain by aquifers (underground permeable rock which can contain or transmit groundwater):

- Cheltenham Sand and Gravel Secondary A aquifer.
- Alluvium Secondary A aquifer.
- Rugby Limestone Member Secondary A aquifer.
- The following groundwater bodies are related to the Scheme area:
 - Severn Vale - Secondary Combined WFD groundwater body.
 - Warwickshire Avon - Secondary Mudrocks WFD groundwater body.

The Scheme is located within an existing floodplain, and includes areas classified as having a medium probability and a high probability of flooding. The floodplain cannot be avoided, as the improvement work is required on the existing highway infrastructure, already located in the floodplain. However, the Scheme layout and design have sought to minimise its impact on the floodplain.



Construction

Construction activities have the potential to affect the water environment through the following:

- The excavation of materials, and the subsequent deposition of soils, sediment, or other construction materials.
- Runoff from construction sites to surface water bodies.
- The creation of temporary construction sites within the floodplain.
- Below ground works changing groundwater flows.

The effects of these will be minimised through the application of best practice mitigation measures to manage construction activities, and the creation of floodplain compensation areas to allow for the temporary loss of floodplain caused by the creation of construction sites within the floodplain.

Operation

Any potential effects on water quality will be minimised through a drainage design that uses sustainable drainage systems, so that all water from the road surfaces is captured and treated before release into watercourses, at greenfield run off rate. The impacts to the River Chelt will be minimised through the implementation of ecological enhancements upstream and downstream of the new watercourse crossing.

The effects of the Scheme on flooding will be minimised through the embedded mitigation measures within the design, including a series of culverts under part of the new Link Road, and the creation a flood storage basin between the M5 motorway and Withybridge Lane.

These will ensure that the new roads do not block the movement of flood water, to avoid causing any additional flooding.

Flood modelling indicates that there remain potential localised significant adverse effects to the River Chelt floodplain, with an increase in flood depth by around 60 mm for some localised areas of existing farmland, as a result of predicted changes in the movement of floodwater. These effects do not increase the frequency or consequence of flooding. The land is contained within the Order limits although landowner acceptance of the change is being sought.

The effects of the Scheme on the groundwater environment will be minimised through the embedded mitigation measures within the design. Site specific groundwater data, piling risk assessments and the use of best practice have been included in the design considerations.

For all other aspects of road drainage and the water environment, the Scheme will not result in significant adverse effects.

Landscape and Visual (Chapter 9)

Baseline

The landscape and visual section reports the assessment of the effects of the Scheme on the landscape and views, within the land surrounding the Scheme, during both construction and operation.

The Scheme sits within the Cheltenham and Gloucester Greenbelt. The Cotswolds Area of Outstanding Natural Beauty (AONB) has been considered but given its distance at over 6km from Junction 10, and as agreed with the Cotswold AONB board, this area and views from within it are unlikely to be significantly affected and no further assessment has been undertaken.

The Scheme is located in the local landscape character area SV6B Vale of Gloucester as defined by the Gloucestershire Landscape Character Assessment (GLCA) (undertaken by Landscape Design Associates in 2006). The Scheme study area is a gently undulating vale landscape of agricultural fields and scattered clusters of settlements with the M5, A4019 and electricity pylons being the main 'detractors' in the landscape. Verge hedgerows, arable grasslands, field trees and small blocks of woodland are the major habitats of the area.

The Gloucester-Cheltenham-Tewksbury Joint Core Strategy Landscape Characterisation and Sensitivity Analysis (JCSLCSA, 2013) further breaks down much of the study area into three smaller scale landscape character areas (LCA C, D and E) and the assessment also considers the very localised Scheme scale landscape (the site and immediate vicinity).

Visual receptors are mainly property residents and PRow users. There are several small clusters of properties dotted within the study area, such as at Uckington, Withybridge Gardens and Sheldon; whilst at the eastern end of the Scheme the density of properties increases approaching Cheltenham.

Some views are enclosed by property, vegetation or outbuildings, but more open views are also available across quite a rural landscape, or, particularly toward the eastern end of the A4019, over a more urbanised landscape. Most views are punctuated with detracting elements including pylons and road infrastructure.

The PRow's are generally within agricultural or pastoral fields, often running along hedged boundaries or the side of streams or rivers, occasionally crossing open areas within the fields. Mid-range views are limited by intervening hedge boundaries, buildings and the flat topography. Longer ranging views are possible of the raised land beyond the study area which includes the Cotswold escarpment and outliers.

Construction and at Scheme opening (Year 1)

The greatest effects for receptors will occur during construction with the loss of existing vegetation, demolition and the construction of new infrastructure components.

Given the scale of LCA SV6B Vale of Gloucester, significant adverse effects on the landscape are not anticipated during construction or on completion. However, for the JCSLCSA, 2013 character areas significant adverse effects are predicted to occur arising from the intrusion of construction works, loss of trees, shrubs and hedgerows, and increased presence of roads and associated infrastructure. Similarly, significant effects are predicted for the more localised Scheme scale landscape.

Significant adverse effects on visual amenity during construction and/or on completion are predicted for:

- Residents of properties at:
 - VR3a** (Sheldon Cottages);
 - VR4** (Barn Farm, Stanboro Lane);
 - VR5** (informal Traveller site);
 - VR6** (Butler's Court complex);
 - VR8** (Withybridge);
 - VR 9** (Elm Cottage and Orchard House);
 - VR10** (Hayden Fruit Farm);
 - VR11** (properties at Hayden Hill and Pilgrove Farm);
 - VR18a** (north Uckington along The Green);
 - VR18b** (Holly Bank, Uckington);
 - VR18c** (east of The Green on A4019, Uckington);
 - VR19** (Forge House and adjacent properties, Uckington);
 - VR20** (Moat Lane);
 - VR24** (south side of A4019 east of West Cheltenham Fire Station);
- Users of PRowWs / the strategic road network in:
 - VR9** (PRowW FPAB026);
 - VR12** (Cheltenham Circular);
 - VR16** (PRowW BWAUC1);
 - VR26a, b & c** (users of M5, A4109, B4634).
- Users of recreational business premises:
 - VR9** (The House in the Tree PH).

To reduce these effects during construction, the design has been developed to minimise the area required for construction and the amount of vegetation clearance required. Vegetation that can be retained near the Scheme will be protected using best working practices. The lighting has been designed to minimise light pollution. Where public rights of way have been diverted or severed by the Scheme, new links will be introduced.

Operation (in the longer term, Year 15)

The landscape design aims to integrate the Scheme into the landscape, to minimise the adverse effects. Existing vegetation will be retained and protected where possible. Replacement and new planting will be designed to contribute to the landscape character, to be visually appealing and to provide screening as appropriate, as it matures. The new planting will be varied, species rich, non-invasive, and tolerant of climate change.

As the planting establishes and matures it will help to integrate the Scheme into the landscape and views and provided planting achieves successful establishment, it will provide beneficial effects for some views where the new planting will enhance the existing views or landscape features.

Taking these measures into account, the Scheme is not anticipated to result in significant adverse effects on the landscape even at local landscape scale in the longer term. A significant beneficial effect is anticipated for VR4 Barn Farm, Stanboro Lane. Other (non-significant) beneficial effects are anticipated across several PRowWs, some properties and users of the M5 and A4019 due to improved visual screening and enhanced sense of place as the proposed planting matures to soften views and integrate the transport infrastructure.

Geology and Soils (Chapter 10)

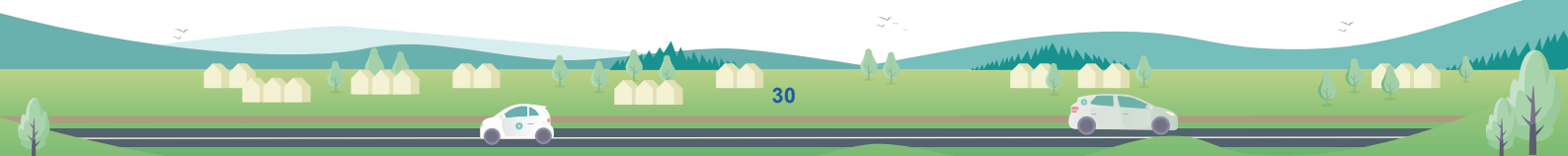
Baseline

The geology and soils section reports the assessment of the effects of the Scheme on the underlying ground including effects on agricultural land and soils, and effects from soil and ground contamination on human health, surface water and groundwater, both during construction and operation.

Charmouth Mudstone bedrock underlies the majority of the Scheme area, with the Rugby Limestone Member present in the south-west of the Scheme area. Superficial deposits of Cheltenham Sand, Gravel, and Alluvium are present along the alignment of the existing watercourses (River Chelt and Leigh Brook), sections of the M5, and the A4019 Tewkesbury Road between the M5 Junction 10 and Cheltenham.

The superficial Alluvium and Cheltenham Sand and Gravel layers are classified as high vulnerability, secondary A aquifers. The bedrock Charmouth Mudstone Formation is classified as a medium vulnerability secondary undifferentiated aquifer (unproductive) and the Rugby Limestone Member is classified as a high vulnerability secondary A aquifer.

The Scheme affects broadly similar areas of agricultural land categorised as 'best and most versatile' (BMV) (Subgrade 3a) and non-BMV (Subgrade 3b).



There are no EU designated sites, UK designated or non-statutory designated present within the study area, where sensitive soils could be directly affected.

Areas of deciduous woodland are present around M5 Junction 10, which are designated as Priority Habitats/National Forest Inventory sites. However, the soils within these areas are not considered to be significantly or uniquely important.

There are two historical landfill sites located close to the Scheme. There is a historical landfill located at Gallagher Retail Park (Violet Villa) 30 m north of the south-eastern extent of the Scheme. Licence records indicate that inert materials were placed in this landfill. Colman's Farm landfill is the second site, located 200 m north of the Scheme adjacent to the M5 northbound carriageway. Licence records indicate that natural soils and household waste were placed in this landfill.

A review of aerial photographs suggests an unauthorised landfill is present approximately 85 m north of the Piffs Elm Interchange Bridge, adjacent to the east of the M5 southbound carriageway. The extent, depth and waste type associated with this feature is unknown.

Construction

A total of 31.56 ha of subgrade 3a BMV agricultural land is anticipated to be lost resulting in a significant adverse effect.

A total of 22.56 ha of subgrade 3b agricultural land is also anticipated to be lost resulting in a significant adverse effect; both of which as a result of the construction of the Scheme.

A further 1.13 ha of Subgrade 3b agricultural land is anticipated to have permanent reduction in ALC classification to Grade 4, due to the ground level being reduced to create a flood compensation area.

The land will be returned to agriculture, but its use may be restricted to grass production. This results in a significant adverse effect.

No significant land contamination effects during construction have been predicted.

Operation

No significant effects are predicted for agricultural land or land contamination during operation.

Cultural Heritage (Chapter 11)

Baseline

The cultural heritage section reports the assessment of the effects of the Scheme on the historic environment, during both construction and operation.

A total of 31 designated heritage assets are recorded within 1 km of the Scheme. Three groups of designated assets have been identified as having the potential to be affected by the Scheme:

- The Scheduled Monument and four Grade II Listed Buildings located at Moat House, approximately 100 m south of the A4019 Tewkesbury Road at Moat Lane.
- Two Grade II Listed Buildings approximately 160 m north of the A4019 Tewkesbury Road near the Uckington & Elmstone Hardwicke Village Hall.
- Two Grade II Listed Buildings, approximately 200 m west of the new Link Road between the B4634 and the A4019 Tewkesbury Road and associated with archaeological remains of Withybridge Mill.

There are also a variety of non-designated heritage assets within 1 km of the Scheme, providing evidence of prehistoric settlement, as well as Bronze Age, Romano-British, and medieval activities. More recent heritage is seen in sites related to World War II defences of the area.

Construction

Impacts from the construction of the Scheme on the historic environment are expected to arise from the removal of part, or all, of the remains associated with archaeological deposits, and also potential impacts to the setting of historic buildings.

Six heritage assets will be removed either partially or wholly. For one heritage asset, an area of cropmarks of later prehistoric or Romano-British settlement and field systems, this will be a significant effect. The other assets are already partially or mostly removed as a result of previous development.

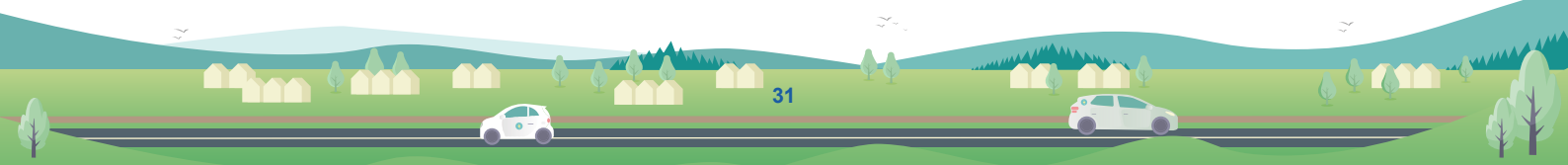
A robust programme of archaeological investigation and recording will mitigate these effects. This will be undertaken in consultation with the local planning authority's archaeological advisor.

Archaeological investigations seek to preserve important information through the scientific analysis and recording of the findings of excavations, although some level of information is likely to be lost. Taking these measures into consideration, the Scheme will not result in a significant effect on cultural heritage assets.

Effects to the settings of heritage assets will be mitigated through design and landscaping.

Operation

Two groups of designated assets may experience impacts through changes to their settings: assets grouped around Moat House and assets off Withybridge Lane. It is anticipated that identified design and landscaping measures will be suitable to mitigate most effects caused by the introduction of new infrastructure, and the accompanying changes to noise and light levels, resulting in no significant effects on heritage assets during the operation of the Scheme.



Materials and Waste (Chapter 12)

Baseline

The materials and waste section reports the assessment of the material use and waste generation effects associated with the Scheme during construction. Material use and waste generation when the Scheme is open is considered to be negligible and has therefore not been assessed.

Construction

The impacts from the Scheme during construction will be the consumption of materials and the generation and management of waste. The effects from these impacts will be minimised through the development of an efficient design and construction methodology that will prevent, reduce, reuse, recycle and recover materials and wastes so that volumes of materials required, and the quantities of wastes generated, are minimised.

During construction, the effect of material asset use and waste generation is assessed as not significant, based on the Scheme meeting the following criteria:

- **Material Assets:**
 - Project achieves 70-99% overall material recovery / recycling (by weight) of non-hazardous CDW to substitute use of primary materials.
 - aggregates required to be imported to site comprise re-used/recycled content in line with the relevant regional percentage target.
- **Waste:**
 - ≤1% reduction or alteration in the regional capacity of landfill.

The region's waste infrastructure has sufficient capacity to accommodate waste from the Scheme, without compromising its design life or capacity.

Operation

During operation there will be negligible material asset use or waste generation, based on discussions with design engineers (for materials) and road maintainers (for waste) on previous schemes.

No significant cumulative effects are anticipated and no additional mitigation is anticipated.

Population and Human Health

(Chapter 13)

The population and human health section reports the assessment of the effects on people living and working in the Scheme area, and the opportunities for improving health and reducing inequalities, in relation to the construction and operation of the Scheme.

Cheltenham is the only sizeable settlement close to the Scheme area. Several smaller settlements include Boddington to the west of the M5, Uckington to the east of the M5, and the clusters of housing around the M5 Junction 10, along Withybridge Lane, fronting the A4019 and on the B4634. Cheltenham provides the significant community facilities. There is a village hall and place of worship in Uckington, and the Gallagher Retail Park is one of a number of retail locations nearby. There are several small businesses in the Scheme area. Several public footpaths and a small number of bridleways cross the Scheme area.

Population

Baseline

The Population assessment considers the potential of the Scheme to affect people and communities, either temporarily or permanently, due to land take, changes to key characteristics of settlements and places, reductions in connectivity, changes to access routes for different modes, and impacts on amenity.

An assessment of the construction and operational impacts of the Scheme on the following Population topics has been undertaken:

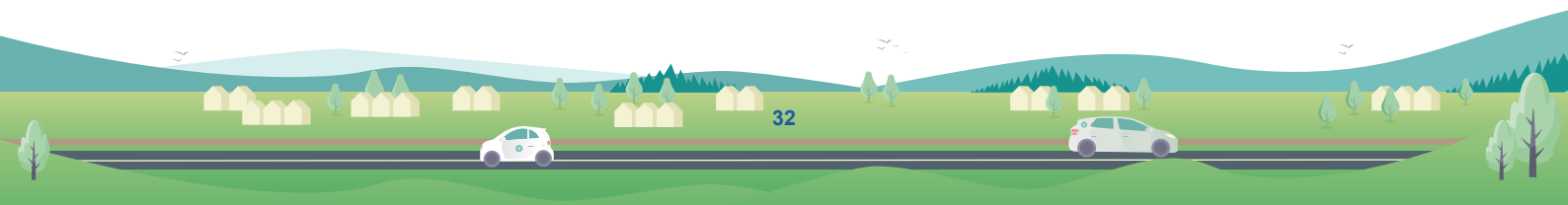
- Private property and housing.
- Community land and assets.
- Development land and businesses.
- Agricultural land holdings.
- Walkers, cyclists and horse riders (WCH).

The assessment has identified the impacts to these topics that have the potential to result in significant effects once approaches to avoiding, lessening or mitigating effects have been taken into account. The summary assumes that both embedded and essential mitigation measures are fully implemented, resulting in the identification of potentially significant residual effects.

A precautionary approach has been adopted, allowing for uncertainty about the implementation of essential mitigation (for example, where it relies on the contractor, third parties or responding to further targeted engagement).

The impacts on the WCH network occur in the construction phase. The Scheme design reinstates routes along different alignments, and these are realised within the construction phase. There are therefore no identified significant residual effects relating to WCH for the Scheme, for the operational phase.

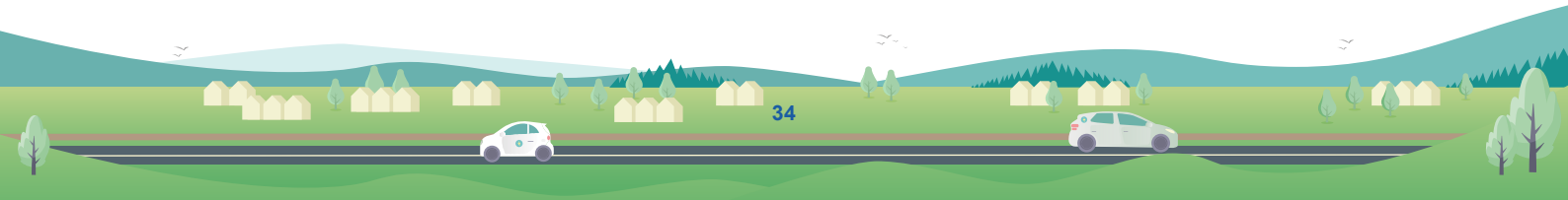
The population assessment focuses on changes to journey length for WCH routes only. Aspects of the Scheme design that introduce new WCH assets and their attendant impacts are addressed within the Human Health assessment.



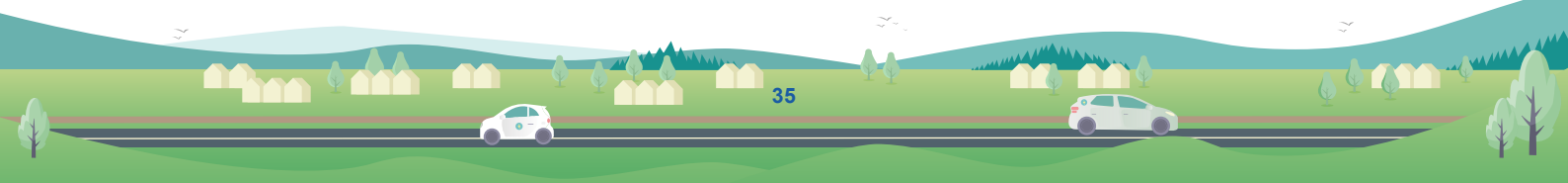
Summary of significant effects – Population

Receptor	Significant effect	Main cause
Private Property and Housing		
Construction		
Three residential properties, Stanboro Lane	Adverse	Demolition
All fourteen residential properties at Withybridge Gardens	Adverse	Demolition
Two residential properties at Withy Bridge, north of the A4019 near Withybridge Lane	Adverse	Demolition
Three residential properties at Uckington, south of the A4019	Adverse	Demolition
Ten residential properties (five semi-detached buildings) east of West Cheltenham Fire Station	Adverse	Demolition
Residents of the community of Uckington	Adverse	Changes to key rural characteristics
Residents of the informal Traveller site	Adverse	Land take and loss of vegetation
Residents of Sheldon Cottages	Adverse	Changes to key rural characteristics
Planned development consented under application no. 20/00759/FUL (266 homes) at Swindon Village, within the North West Cheltenham Development Area – Policy A4.	Adverse	Access: both construction traffic and incoming residents would be expected to use the A4019 as a key access route, although alternative options are available from the east.
Planned development seeking consent under application no. 23/00354/OUT (180 homes) within the North West Cheltenham Development Area – Policy A4.	Adverse	Access: both construction traffic and incoming residents would be expected to use the A4019 as a key access route, although alternative options are available from the east.
Operation		
Retained residential properties at Uckington	Adverse	Impacts on key characteristics of the settlement from urbanisation
<30 homes at Uckington	Beneficial	Access improved for a range of modes
<30 homes adjacent to M5 Junction 10, including on Stanboro Lane and the A4019	Beneficial	Access improved for a range of modes
Sheldon Cottages	Beneficial	Access improved for a range of modes
Informal Traveller site	Beneficial	Access improved for a range of modes
Voyage Care, Orchard Leigh	Beneficial	Access improved for a range of modes
<30 homes at Boddington	Beneficial	Access improved for a range of modes
Properties west of Elmstone Hardwicke	Beneficial	Access improved for a range of modes
Planned development seeking consent under application 21/02832/OUT (215 homes) relating to part of the site allocated as Policy H2 Lansdown industrial estate.	Beneficial	Access improved for a range of modes
Planned development consented under application 21/00872/REM (85 homes) relating to the south-west portion of land allocated under Policy HD8 Old Gloucester Road (175 homes).	Beneficial	Access improved for a range of modes
Planned development seeking consent under application 16/02000/OUT (4115 homes) relating to land allocated under Policy A4 – the North West Cheltenham Development Area (4285 homes).	Beneficial	Access improved for a range of modes
Planned development consented under application 20/00759/FUL (266 homes) within the North West Cheltenham Development Area – Policy A4.	Beneficial	Access improved for a range of modes
Planned development seeking consent under application 23/00354/OUT (180 homes), within the North West Cheltenham Development Area – Policy A4.	Beneficial	Access improved for a range of modes

Receptor	Significant effect	Main cause
Planned development seeking consent under applications 22/01817/OUT and 22/01107/OUT within West Cheltenham Development Area – Policy A7 (1100 homes).	Beneficial	Access improved for a range of modes
Policy SD5 – safeguarded land to the north-west of Cheltenham, north east of M5 Junction 10 (assumed at least 2000 homes)	Beneficial	Access improved for a range of modes
Properties in north-west Cheltenham.	Beneficial	Access improved for a range of modes
Properties between Uckington and the Gallagher Retail Park, fronting or accessed from the A4019	Beneficial	Access improved for a range of modes
Community Land and Assets		
Construction		
West Cheltenham Fire Station	Adverse	Impacts on the provision of emergency access/response through the areas under traffic management during the construction works.
Operation		
Cheltenham Civil Service Tennis and Football Clubs	Beneficial	Access improved for a range of modes
West Cheltenham Fire Station	Beneficial	Access improved for a range of modes
Development Land and Businesses		
Construction		
Gloucester Detailing valeting service	Adverse	Demolition
Sheldon Nurseries premises	Adverse	Demolition
Gallagher Retail Park	Adverse	Impacts on access to these shopping and trading destinations and in recognition that due to the nature of the use, interruptions or delays to access may affect operational requirements, as well as deter customers.
Kingsditch Trading Estate	Adverse	Impacts on access to these shopping and trading destinations and in recognition that due to the nature of the use, interruptions or delays to access may affect operational requirements, as well as deter customers.
Junction 10 breakfast van	Adverse	The loss of the established business location (lay-by).
Operation		
Bailey's Nurseries	Beneficial	Access improved for a range of modes
Aldi and neighbouring business premises at the A4019, B4634 junction	Beneficial	Access improved for a range of modes
Gloucester Old Spot public house	Beneficial	Access improved for a range of modes
Stanboro Cottage Fish Farm	Beneficial	Access improved for a range of modes
Elmstone Business Park	Beneficial	Access improved for a range of modes
Blaisdon Way Commercial Premises	Beneficial	Access improved for a range of modes
The House in the Tree public house	Beneficial	Access improved for a range of modes
Comfy Campers	Beneficial	Access improved for a range of modes
Cheltenham Auto Services	Beneficial	Access improved for a range of modes
Distinctive Ironwork	Beneficial	Access improved for a range of modes
Premier Inn Cheltenham north-west and associated restaurants	Beneficial	Access improved for a range of modes
Arle Nursery	Beneficial	Access improved for a range of modes
Cheltenham Fencing	Beneficial	Access improved for a range of modes



Receptor	Significant effect	Main cause
Applegreen filling station and associated businesses	Beneficial	Access improved for a range of modes
Holmedale Guest House	Beneficial	Access improved for a range of modes
Gateway Retail Park	Beneficial	Access improved for a range of modes
Gallagher Retail Park	Beneficial	Access improved for a range of modes
Kingsditch Trading Estate	Beneficial	Access improved for a range of modes
Policy A4 – North West Cheltenham Development Area (23 ha. employment allocation)	Beneficial	Access improved for a range of modes
Planned development seeking consent under application 22/01817/OUT and 22/01107/OUT relating to land within the West Cheltenham Development Area (45 ha. employment allocation).	Beneficial	Access improved for a range of modes
Agricultural Holdings		
Construction		
Holding C	Adverse	Severance by the Link Road
Holding F	Adverse	Severance by the Link Road
Holding H	Adverse	Severance by the Link Road
Holding I	Adverse	Severance by the Link Road
Holding B	Adverse	Site of the flood storage area and loss of Farm Woodland Scheme payments
Walkers, cyclists and horse riders (WCH)		
Construction		
Uckington footpath 8 (AUC8)	Adverse	Length of diversion required to maintain WCH movement
Boddington footpath 14 (ABO14)	Adverse	Length of diversion required to maintain WCH movement
Boddington footpath 16 (ABO16)	Adverse	Length of diversion required to maintain WCH movement
Uckington footpath 11 (AUC11)	Adverse	Length of diversion required to maintain WCH movement
Boddington footpath 24 (ABO24)	Adverse	Length of diversion required to maintain WCH movement
Cheltenham Circular Route, (including AU8, AU14 and ABO25)	Adverse	Length of diversion required to maintain WCH movement
Uckington Bridleway 1 (AUC1)	Adverse	Closure of the route to horse riders for the duration of the construction works. Severance of the route and diversion for other user groups



Human Health

Baseline

The construction and operation of the Scheme is anticipated to generate changes to things that can affect health (which are termed determinants of health) close to the Scheme and for residents of the wards that form the study area for the Human Health assessment. An assessment of the likely nature of these changes has been made, based on the collation and evaluation of desktop study and other data sources.

Human health receptors have been identified and grouped together when they share physical characteristics and/or location.

The impacts of the Scheme on these receptor groups have been assessed under following topics, which link to the determinants of health:

- Community, recreational and educational facilities: accessibility and severance in relation to community, recreational and educational facilities.
- Green space and outdoor space: accessibility and severance in relation to green space and open space as recreational assets.
- Healthcare: accessibility and severance in relation to healthcare facilities (as a specific sub-set of community facilities), including groups and networks supporting mental health identified through consultation.
- Transport network: changes to the existing spatial characteristics of the transport network and usage in the study area, encompassing

the road network, PRoW, cycle ways, non-designated public routes and public transport.

- Air quality: changes to ambient air quality and impacts for AQMA.
- Noise environment and vibration: changes to noise levels and noise generation in the study area, including the presence of areas sensitive to noise such as NIAs.
- Soil and water pollution: changes to the sources and pathways of potential pollution leading to light spill, odour and contamination.
- Landscape amenity: changes to landscape amenity, particularly where this may be linked to health and well-being.
- Safety information: with particular focus on transport user safety across modes, including changes to risk of injury and deaths for all users.

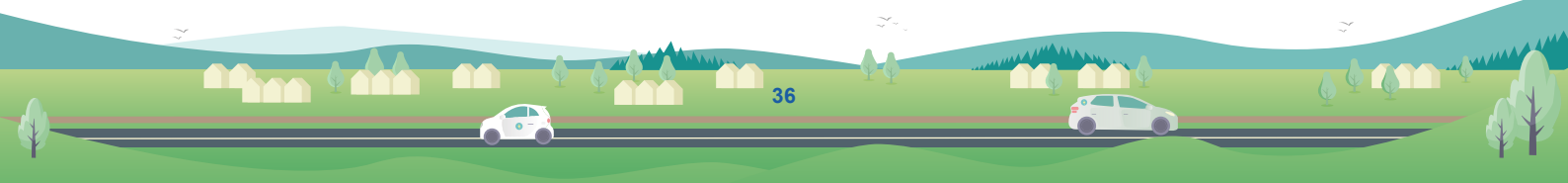
The assessment has identified the impacts to each receptor group that have the potential to result in significant effects once approaches to avoiding, lessening or mitigating effects have been taken into account. The summary assumes that both embedded and essential mitigation measures are fully implemented, resulting in the identification of potentially significant residual effects.

The results are summarised in the table below. The following abbreviations have been used:

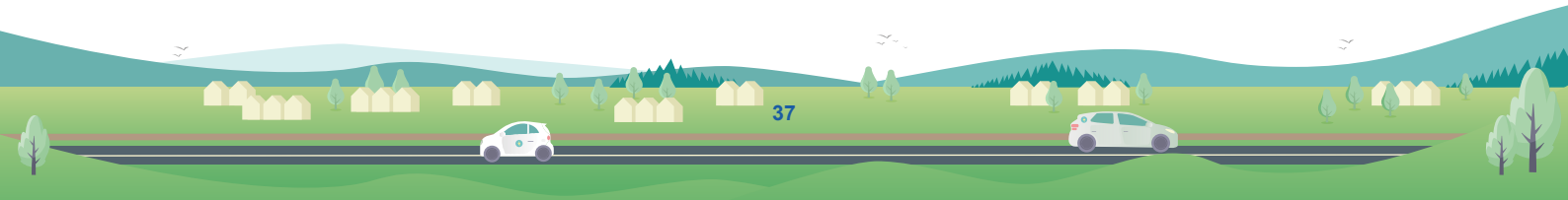
- OY - Opening Year.
- FY - 15 years after OY.

Summary of significant effects – Human health

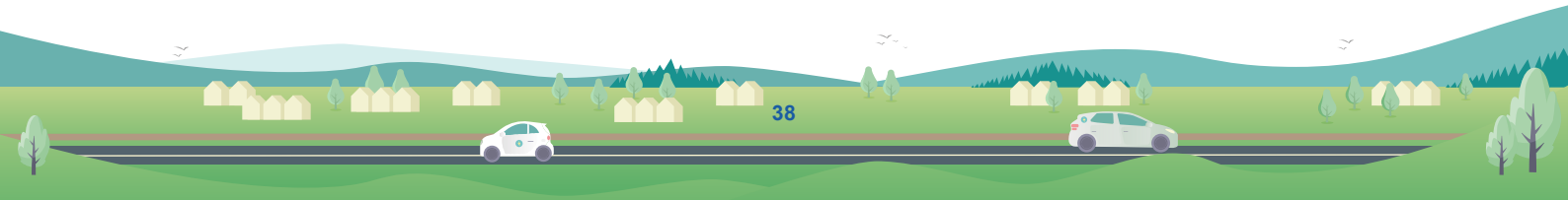
Receptor	Significant effect	Main cause
Wider population		
Construction		
Wider population (rural context)	Adverse	Changes to air quality, noise and landscape amenity
Wider population (rural context)	Adverse	Demolition
Wider population (urban context)	Adverse	Changes to landscape amenity and demolition
Operation		
Wider population (urban context)	Beneficial	Access improved for a range of modes



Receptor	Significant effect	Main cause
Population sub-groups		
Construction		
Families with children and adolescents	Adverse	Changes to air quality, safety, access, noise and separation from open space and recreational routes, and changes in landscape amenity Changes to noise and characteristics of the transport network along roads experiencing temporary changes in through traffic distribution due to the M5 J10 slip road closures.
People who are physically or mentally disadvantaged	Adverse	Changes to air quality, safety, access, noise and separation from open space and recreational routes, and changes in landscape amenity
People who are materially disadvantaged; People from black and minority ethnic groups	Adverse	Changes to safety and access
People who are materially disadvantaged; People from black and minority ethnic groups	Beneficial	Vocational training opportunities through construction work
Operation		
Families with children and adolescents; People who are physically or mentally disadvantaged; People who are materially disadvantaged; People from black and minority ethnic groups	Beneficial	Access improvements for a range of modes and to community facilities at OY; and improvements to safety at OY and FY, due to the removal of modal conflicts and enhanced WCH routes arising from Scheme implementation.
Residents of properties		
Construction		
Residents of properties at Uckington, Moat Lane and Cooks Lane	Adverse	Changes in access arrangements and landscape amenity. Changes to noise and characteristics of the transport network within Uckington due to temporary changes in through traffic distribution arising from the M5 J10 slip road closures.
Residents of properties adjacent to the B4634	Adverse	Changes to noise and characteristics of the transport network within Uckington due to temporary increases in through traffic arising from the M5 J10 slip road closures
Residents of properties at Homecroft Drive and Appleyard Close	Adverse	Demolition Changes in access arrangements
Residents of properties at Withybridge Gardens, Withybridge Lane and Stanboro Lane	Adverse	Demolition Changes in landscape amenity
Operation		
Residents of properties at north west Cheltenham, in Springbank, properties adjacent to the B4634, at Uckington, Moat Lane, Cooks Lane, Homecroft Drive and Appleyard Close	Beneficial	Access improvements for a range of modes and to community facilities in OY and FY.
Residents of Swindon Village, Withybridge Gardens, Withybridge Lane and Stanboro Lane	Beneficial	Access improvements for a range of modes and to community facilities in FY.
Residents at Uckington, Moat Lane, Cooks Lane, Withybridge Gardens, Withybridge Lane and Stanboro Lane and properties adjacent to the B4634	Adverse	Changes in landscape amenity at FY.



Receptor	Significant effect	Main cause
Walkers, cyclists and horse riders (WCH)		
Construction		
Users of PRoW and WCH networks	Adverse	Changes in landscape amenity; access arrangements; separation from open space and recreational routes; and safety due to the presence of construction works.
Operation		
Users of PRoW and WCH networks	Beneficial	Improved safety in OY and FY; and access improvements for a range of modes and to community facilities in OY and FY.
Community facilities		
Construction		
West Cheltenham Fire Station	Adverse	Changes in access arrangements
Users of Cheltenham Civil Service Tennis and Football Clubs	Adverse	Increases in noise associated with construction activities.
Operation		
West Cheltenham Fire Station	Beneficial	Access improvements for a range of modes and to community facilities in OY and FY
Users of Cheltenham Civil Service Tennis and Football Clubs	Beneficial	Access improvements for a range of modes and to community facilities in OY and FY
Community facilities		
Construction		
Employees and students at Greensteps, National Star	Adverse	Changes in access arrangements
Employees at Gallagher Retail Park and Kingsditch Trading Estate	Adverse	Changes in access arrangements
Employers and employees to businesses adjacent to the A4019	Adverse	Changes in access arrangements and landscape amenity
Operation		
Employees and students at Greensteps, National Star	Beneficial	Access improvements for a range of modes and to community facilities in OY and FY.
Employees at Gallagher Retail Park and Kingsditch Trading Estate	Beneficial	Access improvements for a range of modes and to community facilities in OY and FY.
Employers and employees to businesses adjacent to the A4019	Beneficial	Access improvements for a range of modes and to community facilities in OY and FY.



Climate (Chapter 14)

The climate section reports the assessment of Scheme effects in relation to climate. The topic is divided into two sub-sections:

- The potential for the Scheme to impact on climate, in particular the level of greenhouse gas emissions during construction and operation.
- The vulnerability of the Scheme to climate change, in particular the impacts of extreme weather (caused by climate change) during construction and operation, and adaptation to mitigate the effects of these impacts.

Effects of the Scheme on climate

Baseline

The effects on climate are measured by the expected change in emission of greenhouse gases due to the Scheme. Sources of direct emissions are primarily vehicles using the existing road and nearby roads. Sources of indirect emissions include maintenance and refurbishment activities, materials production and energy use by technology and lighting on the Scheme.

The assessment of the vulnerability of the Scheme to climate change considers the likelihood of impacts and their consequences. The assessment considers climate variables including extreme temperatures and rainfall and hazards (flooding, snowstorms), and how they are expected to change over the lifetime of the project (more extreme weather events and warmer wetter winters and hotter drier summers).

The Scheme will lead to an increase in emissions of greenhouse gases during its construction and operation.

Construction

The Scheme will lead to an increase in emissions of greenhouse gases during its construction.

The construction activities required will involve processes and use materials, that emit carbon and greenhouse gases. Wherever possible, emissions during the construction stage will be minimised by reducing the amount of materials required, by minimising construction traffic miles, by choice of construction plant and fuel, and by maintaining equipment at optimum operating levels.

The emissions produced as a result of construction of the Scheme will have a negligible impact on the country's overall carbon emissions and will not affect the UK's ability to meet its carbon targets.

Operation

The Scheme will lead to an increase in emissions of greenhouse gases during its operation.

Traffic forecasts indicate that once the Scheme is open, traffic levels are expected to increase across the local network. Forecasts also indicate that the uptake of electric vehicles will reduce the emissions of greenhouse gases in time.

The assessment has concluded that the emissions produced as a result of operation of the Scheme will have a negligible impact on the country's overall carbon emissions and will not affect the UK's ability to meet its carbon targets.

Vulnerability to climate change

The assessment has shown that climate vulnerability impacts are not expected to significantly affect the construction of the Scheme. The vulnerability of the Scheme to climate change once it is open, particularly in relation to future extremes of temperature and the management of heavier rainfall, has been included as a consideration during the development of the design. It is not considered that the Scheme will experience significant adverse effects from climate change.

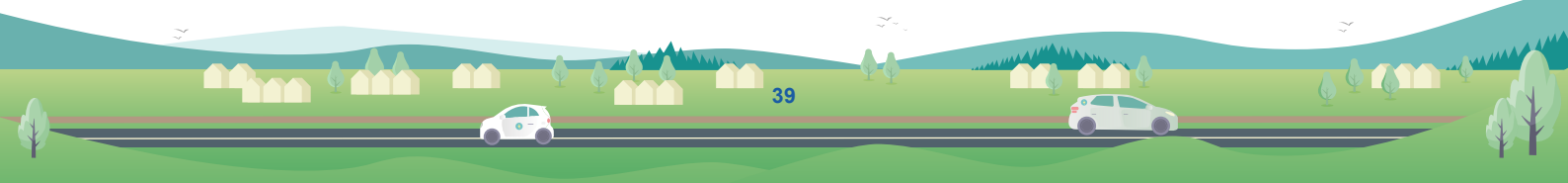
Cumulative effects assessment

(Chapter 15)

The cumulative effects assessment (CEA) section considers two ways that impacts may arise and how this may change the effects overall:

- Intra-Scheme: where the expected effects for different topics arising from the Scheme would be experienced by the same receptor at the same time.
- Inter-project: where the expected effects from this Scheme and from other reasonably foreseeable future projects (RFFPs) would be experienced by the same receptor at the same time.

In order to provide essential CEA mitigation, GCC has developed commitments for actions to be undertaken for both Intra-Scheme and inter-project significant adverse effects. These essential CEA mitigation measures are set out in the REAC. This ensures commitment to coordinating with the public and other stakeholders, relevant GCC officers, and Scheme representatives to ensure that the best outcomes are achieved. In addition, there is a commitment to meaningful engagement with local communities and stakeholders in order to support people in adapting to transformational change.



With the strategic development sites anticipated in the locality of the Scheme, the essential mitigation developed considers the following in particular:

- Ensuring that elements of the Scheme that provide mitigation or enhancement are adopted and maintained where necessary by the developers of the strategic development sites. This includes in particular:
 - The continuity and integrity of habitat replacement for dormouse and bats.
 - A plan for land use structure to maintain the rural character of Uckington.
 - Maintenance of recreational route connectivity with the underpass beneath the A4019.
- Ensuring that developers of the strategic development sites are required to ensure that their construction proposals co-ordinate with the Environmental Management Plan for the Scheme and that the Scheme's Public Liaison Officer is engaged and informed.

The intention is that the residents identified as likely to experience the greatest level of impact from the Scheme and strategic development sites, which includes members of the community of Uckington, can be informed, supported and influential in shaping how construction activities from all the strategic developments are managed. The intention is to allow a route for pro-active prevention and reactive response to issues emerging, particularly around noise, disturbance and community anxiety.

Intra-Scheme effects

Construction

Two receptors have been identified as experiencing significant adverse intra-Scheme residual effects during construction, on a precautionary basis. These cumulative intra-Scheme effects arise from the temporary impacts of traffic re-routing while the M5 J10 slip roads are closed, and affect the following receptors:

- Residents of Uckington.
- Families with children and adolescents along affected routes (rural and urban context).

Additional CEA mitigation measures identified include effective traffic management, discouraging HDVs from deviating to unsuitable local roads, and targeted communication of road closures and diversions to the affected communities, who would also be supported through the work of the Public Liaison Officer.

The assessment findings are precautionary – the degree to which they may be significant will vary for individuals, depending on their capacity to cope with the change associated with the additional traffic.

Operation

There would be no significant adverse Intra-Scheme effects during operation of the Scheme.

There would be a significant beneficial Intra-Scheme cumulative effect on receptors (biodiversity, agricultural land and WCH) in the area to the south of the M5 Junction 10.

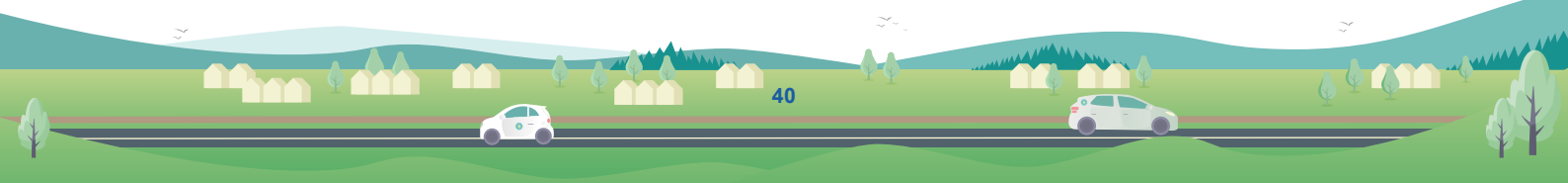
Inter-project cross-topic effects

A scoping exercise reviewed the RFFPs against considerations including the type, frequency and/or limited extent of the schemes; and the requirement for all developers to adhere to all relevant environmental legislation regarding the impacts of their own proposals and the timing of these other developments compared to the programme for the Scheme.

Potential interactions that could lead to significant adverse cumulative inter-project effects were identified in relation to the following RFFPs:

- **16/02000/OUT (Elms Park)** – relating to land allocated under Policy A4 – North West Cheltenham Development Area.
- **20/00759/FUL (Swindon Farm)** – relating to part of the land allocated under Policy A4 – North West Cheltenham Development Area.
- **Safeguarded land to the north-west of Cheltenham (Policy SD5).**
- **22/01817/OUT and 22/011107/OUT** – duplicate applications to the relevant local planning authorities relating to part of the land allocated under Policy A7 – West Cheltenham Development Area.

The essential CEA mitigation measures broadly described above and set out in the REAC have been identified to address potential significant adverse effects. With such mitigation in place and working effectively with the support of and co-ordination with third party developers, the residual adverse cumulative inter-project effects would not be significant. However, at this stage there remains a level of uncertainty associated with the actions of third party developers. On this basis, the CEA findings for inter-project effects are reported without assuming the effectiveness of such mitigation measures.



16/0200/OUT (Elms Park) – relating to land allocated under Policy A4 – North West Cheltenham Development Area

During construction, there will be a significant adverse cumulative effect on the availability of habitat suitable to support protected species.

During construction and operation, there will be a significant adverse cumulative effect of urbanising and transformational change on the existing residents of Uckington. This will vary for individuals, depending on their capacity to cope with the change associated with the residential development within this part of the North West Cheltenham Development Area, partly concurrent with the Scheme.

20/00759/FUL (Swindon Farm) – relating to part of the land allocated under Policy A4 –North West Cheltenham Development Area

During construction, there will be a significant adverse cumulative effect on the availability of habitat suitable to support protected species.

During construction and operation, there will be a significant adverse cumulative effect of urbanising and transformational change on the existing residents of Uckington. This would vary for individuals, depending on their capacity to cope with the change associated with the residential development within this part of the North West Cheltenham Development Area, partly concurrent with the Scheme.

Safeguarded land to the north-west of Cheltenham (Policy SD5)

During construction, there will be a significant adverse cumulative effect on the availability and continuity of habitat suitable to support protected species.

During construction and operation, there will be a significant adverse cumulative effect of urbanising and transformational change on the existing residents of Uckington and north of the A4019. This will vary for individuals, depending on their capacity to cope with the changes associated with the residential and employment growth within the safeguarded land to the north-west of Cheltenham, partly concurrent with the Scheme.

During construction and operation, there will be a significant adverse cumulative effect of changes to the configuration, availability, amenity and wider connectivity of the WCH network on WCH users of the recreational network close to M5.

The extent to which this is significant will depend on the sensitivity of the user and the purpose of their journeys. It is most likely to be significant for horses and their riders, and those seeking a rural outlook for recreation, but may also be experienced by other users, depending on the capacity of individuals to adapt to change.

22/01817/OUT and 22/01107/OUT - relating to part of the land allocated under Policy A7 – West Cheltenham Development Area

During construction, there will be a significant adverse cumulative effect on the availability of habitat suitable to support protected species.

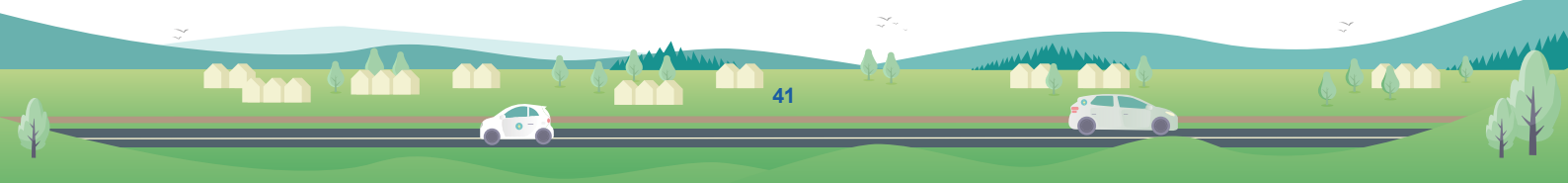
During construction and operation, there will be a significant adverse cumulative effect of introducing urbanising development within the agricultural landscape on the existing residents of the B4634 and Withybridge Lane, which will vary for individuals, depending on their capacity to cope with the change associated with the residential and employment growth within the West Cheltenham Development Area, partly concurrent with the Scheme.

Strategic highways projects

There are several strategic highway projects in the Gloucester County Council and National Highways pipelines that could have a period of construction overlap with the Scheme. Construction overlap could give rise to significant adverse cumulative effects on residents and habitual users of the strategic highway network between parts of Cheltenham and north-east Gloucester, due to temporary disruption and traffic management activities.

Essential CEA mitigation measures have been identified to address these effects including coordination of all street works, ensuring programme streamlining where possible. For example, the planned closure for the A4019 west of the M5 J10 related to the separate Coombe Hill project should not coincide with closure of the M5 J10 slip roads, and dissemination of advance accurate network disruption information.

The mitigation measures link to established GCC processes, which adds confidence in their delivery. This will ensure that people living in or travelling through the Cheltenham and north-east Gloucester area will not experience significant adverse cumulative effects due to temporary traffic management activities from pipeline highway projects.





The background features a stylized landscape illustration. The top half is a solid blue sky with a few white birds flying. Below the sky is a light blue, wavy cloud-like shape. The middle section is a light green gradient. The bottom section shows rolling green hills with several small green trees and a cluster of three yellow houses. In the foreground, a dark road with white lane markings runs across the scene. Two white cars are driving on the road: a smaller car on the left and a larger car on the right. The overall style is clean and modern.

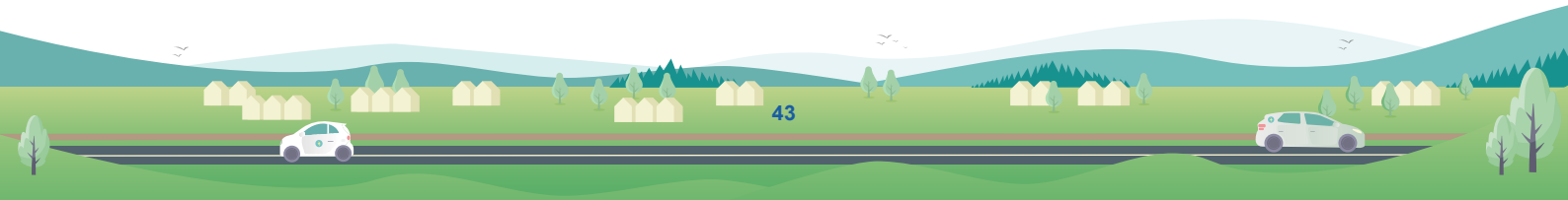
Summary of Significant Environmental Effects

Summary of Significant Environmental Effects

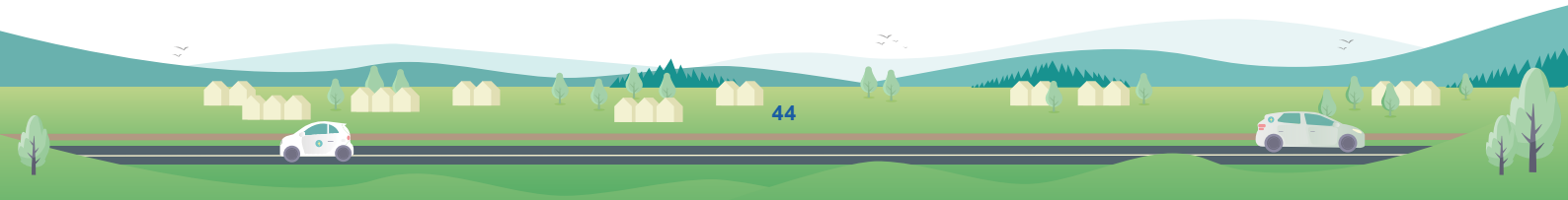
This table summarises the significant environmental effects of the Scheme, whether adverse or beneficial, once the embedded and essential mitigation measures are taken into account.

Neutral, slight adverse or slight beneficial effects are not considered to be significant for most topics and are not included in the table. Moderate, large or very large effects are considered significant.

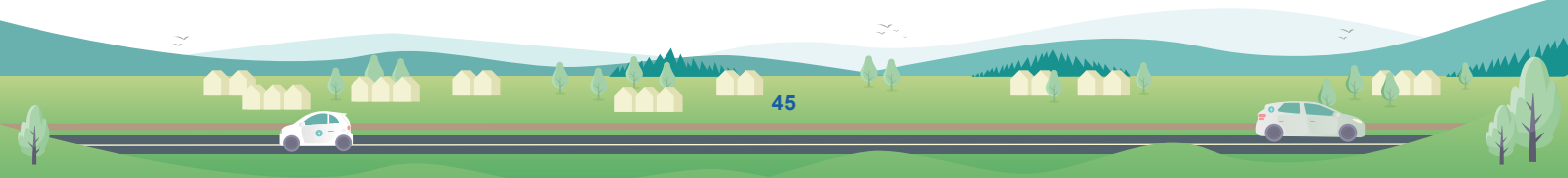
Topic	Construction stage	Operation stage
Air quality	No significant effects	No significant effects
Noise and vibration	<p>Throughout the construction period, construction noise is predicted to exceed the threshold at noise sensitive receptors, but works are unlikely to exceed the duration threshold, and so this is not assessed as a significant effect.</p> <p>Temporary traffic diversion routes will be in place for 19 months because of the closure of the two existing M5 J10 slip roads. This will include a five month period when both slip roads will be closed. On the diversion routes themselves no significant effects are predicted. Traffic rerouting on other local roads is anticipated to give rise to temporary changes:</p> <ul style="list-style-type: none"> Significant beneficial effects for receptors on the A4109, Walton Cardiff Road, St James' Square and Lansdown Road. Significant adverse effects for receptors on the road through Elmstone Hardwicke, the road through Boddington and Pamington Lane. 	<p>During the opening year:</p> <ul style="list-style-type: none"> Significant beneficial effects are predicted for 411 residential properties during the day and 273 residential properties during the night. Significant beneficial effects are predicted during the day for twelve non-residential receptors (including the House in the Tree PH, the Cheltenham West Fire Station and bars in St James Square), with no significant beneficial effects predicted for non-residential receptors at night. Significant adverse effects are predicted for 89 residential properties during the day and 169 residential properties during the night (located on Stoke Road, Up Hatherley Way and Brooklyn Road). <p>Long-term effects:</p> <ul style="list-style-type: none"> Significant beneficial effects are predicted for 159 residential properties, and two non-residential, during the day and 200 residential properties during the night. Significant adverse effects are predicted for 99 residential properties during the day and 238 residential properties during the night (located on Stoke Road, A4019, Up Hatherley Way, Gloucester Road and Brooklyn Road). <p>Long term effects (with/on the strategic development sites):</p> <ul style="list-style-type: none"> Significant beneficial effects are predicted for 99 residential properties, and one non-residential, during the day and 161 residential properties during the night. Significant adverse effects are predicted for 202 residential properties during the day and 436 residential properties at night (located at Boddington Road/Church Lane, The Green/ Road to Elmstone Hardwicke, Monks Lane, Moat Lane, Telstar Way, Fiddlers Green Lane, Down Hatherley Lane, Cirencester Road, Stilchester Road and Innsworth Lane, as well as in Bishops Cleeve, and on the road network between Stoke Orchard and Ashchurch (through Fiddington and Natton). Significant adverse effects are predicted during the day for three non-residential receptors, located at the Orchard, Village Hall Uckington and the Church of St Mary Magdalene.
Biodiversity	No significant effects	No significant effects



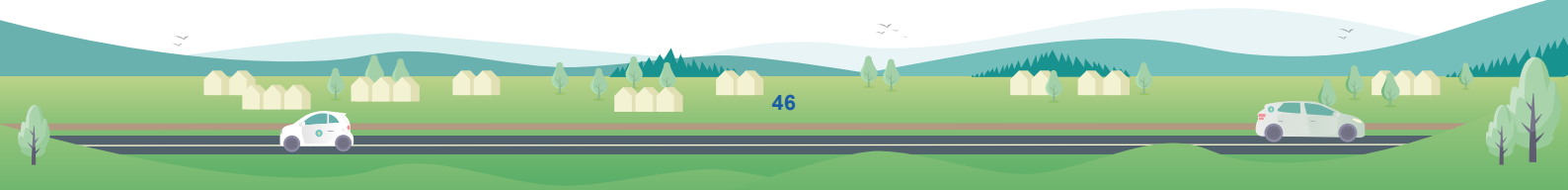
Topic	Construction stage	Operation stage
Road drainage and the water environment	No significant effects	<p>There will be some localised significant adverse effects to the River Chelt floodplain upstream of the M5 on existing farmland. However, for most of the River Chelt Floodplain upstream of the M5 there would be significant beneficial effects.</p> <p>There will also be significant beneficial effects for the River Chelt Floodplain downstream of the M5; Leigh Brook Floodplain (both upstream and downstream of the M5); Barn Farm East; Elmstone Business Park; the B4634; and the A4019 west and east of the M5.</p>
Landscape and visual	<p>Site clearance and construction activity are predicted to give rise to significant adverse effects on:</p> <ul style="list-style-type: none"> Landscape character: local landscape character areas LCA C, D & E and Scheme scale (localised to the site and immediate vicinity). Visual amenity for: <ul style="list-style-type: none"> Residents of properties at: <ul style="list-style-type: none"> VR3a (Sheldon Cottages); VR4 (Barn Farm Stanboro Lane); VR5 (the informal Traveller site); VR6 (Butler's Court complex); VR8 (Withybridge); VR 9 (Elm Cottage and Orchard House); VR10 (Hayden Fruit Farm); VR11 (properties at Hayden Hill and Pilgrove Farm); VR18a (north Uckington along The Green); VR18b (Holly Bank, Uckington); VR18c (east of The Green on A4019, Uckington); VR19 (Forge House and adjacent properties, Uckington); VR20 (Moat Lane); VR24 (south side of A4019 east of West Cheltenham Fire Station). Users of PRoWs: <ul style="list-style-type: none"> VR12 Cheltenham Circular PRoW; VR16 (BWAUC1); VR26a, b & c (users of SRN). Users of non-residential locations: <ul style="list-style-type: none"> VR9 (The House in the Tree PH). 	<p>Significant adverse effects arising from the presence of the Scheme upon opening will remain for:</p> <ul style="list-style-type: none"> Landscape character: local landscape character areas LCA C, D & E and Scheme scale (localised to the site and immediate vicinity). Visual amenity for residents of properties at: <ul style="list-style-type: none"> VR3a (Sheldon Cottages); VR6 (Butler's Court complex); VR8 (Withybridge); VR 9 (Elm Cottage and Orchard House); VR10 (Hayden Fruit Farm); VR18a (north Uckington along The Green); <p>These adverse effects will reduce as mitigation planting grows and integrates the Scheme better into the view; resulting in no significant adverse effects anticipated by Year 15.</p> <p>Significant beneficial effects may be experienced for:</p> <ul style="list-style-type: none"> Visual amenity for residents of property at VR4 (Barn Farm, Stanboro Lane). <p>No other significant beneficial effects on visual amenity are predicted. Some less significant beneficial effects can be anticipated across several PRoWs and some properties</p>
Geology and soils	<p>Significant adverse effects for the permanent loss of 31.56 ha subgrade 3a best and most versatile agricultural land.</p> <p>Significant adverse effects for the permanent loss of 22.56 ha subgrade 3b agricultural land.</p> <p>A further 1.13 ha of land will be downgraded from subgrade 3b to subgrade 4 as a result of reprofiling work in order to provide a flood compensation area.</p>	No significant effects
Cultural heritage	No significant effects	No significant effects
Materials and waste	No significant effects	No significant effects



Topic	Construction stage	Operation stage
Population and human health - Population	<p>Significant adverse effects have been identified for:</p> <ul style="list-style-type: none"> Residents of the following properties which are due to be demolished: <ul style="list-style-type: none"> Three properties in the vicinity of Sheldon Nurseries on Stanboro Lane; All 14 properties at Withybridge Gardens together with their outbuildings and garages; Two properties at Withy Bridge together with their outbuildings and garages; Three properties at Uckington; Ten properties (five semi-detached buildings) to the east of West Cheltenham Fire Station. Residents of Uckington community - arising from change to key rural characteristics from construction works, demolition of buildings and the introduction of urbanising features along the A4019. Residents of the informal Traveller site to the north of the M5 Junction 10 and adjacent to the M5 corridor - arising from land take and loss of vegetation that provides screening and enclosure to the western edge of the site. Residents of Sheldon Cottages - arising from the construction works, demolition of buildings and the reconfiguration of access and formation of earthworks. Planned development seeking consent under application no. 20/00759/FUL at Swindon Village - since both construction traffic and incoming residents will be using the A4019 as a key access route. West Cheltenham Fire Station - arising from impacts on the provision of emergency access/ response through the areas under traffic management during the construction works. Two businesses which are due to be demolished - Gloucester Detailing and Sheldon Nurseries. Gallagher Retail Park and Kingsditch Trading Estate - arising from impacts on access to these shopping and trading destinations and in recognition that due to the nature of the use, interruptions or delays to access may affect operational requirements, as well as deter customers. Junction 10 breakfast van - arising from the loss of the established business location (lay-by). Agricultural land holdings C, F, H and I - arising from severance by the Link Road (initially this will occur during construction and continue in perpetuity). Agricultural land holding B - arising from the flood storage area (initially this will occur during construction and continue in perpetuity). Uckington footpath 8 (AUC8), Boddington footpath 14 (ABO14), Boddington footpath 16 (ABO16), Uckington footpath 11 (AUC11), Boddington footpath 24 (ABO24), Cheltenham Circular Route (including AU8, AU14 and ABO25) - arising from the length of diversion required to maintain WCH movement. Uckington Bridleway 1 (AUC1) - arising from the closure of the route for the duration of the construction works. 	<p>Significant adverse effects have been identified for:</p> <ul style="list-style-type: none"> Residents of retained properties at Uckington - arising from impacts on key characteristics of the settlement from demolition of buildings and urbanisation of the junction of The Green with the A4019 and the A4019 corridor. Agricultural land holdings C, F, H and I - arising from severance by the Link Road (initially this will occur during construction and continue in perpetuity). Agricultural land holding B - arising from the flood storage area (initially this will occur during construction and continue in perpetuity). <p>Significant beneficial effects have been identified for:</p> <ul style="list-style-type: none"> Residents of the following properties - arising from improved access to a range of transport modes as part of the Scheme: <ul style="list-style-type: none"> <30 homes at Uckington; <30 homes adjacent to M5 Junction 10, including Stanboro Lane and fronting the A4019; Sheldon Cottages; Informal Traveller site adjacent to the M5 north of Junction 10; Voyage Care, Orchard Leigh; <30 homes at Boddington; Properties west of Elmstone Hardwicke. The following policies and planning applications - arising from improved access to a range of transport modes as part of the Scheme: <ul style="list-style-type: none"> Policy A4 – the North West Cheltenham Development Area (4285 homes), associated with application 16/02000/OUT (4115 homes); Application 20/00759/FUL (266 homes), within the North West Cheltenham Development area; Policy A7 – West Cheltenham Development Area (1100 homes) associated with application 22/01817/OUT; Policy HD8 Old Gloucester Road (175 homes); Policy SD5 – safeguarded land to the north-west of Cheltenham, north east of M5 Junction 10 (assumed for the ES to be at least 2000 homes); Policy A4 – North West Cheltenham Development Area (23 ha. employment allocation); Policy A7 – West Cheltenham Development Area (45 ha. employment allocation), associated with application 22/01817/OUT; Properties in north-west Cheltenham (well over the 150 home threshold used in the assessment); Properties between Uckington and the Gallagher Retail Park, fronting or accessed from the A4019. Cheltenham Civil Service Tennis and Football Clubs - arising from improved access to a range of transport modes as part of the Scheme. West Cheltenham Fire Station - arising from improved access to a range of transport modes as part of the Scheme.



Topic	Construction stage	Operation stage
<p>Population and human health - Population (continued)</p>		<ul style="list-style-type: none"> • The following businesses - arising from improved access to a range of transport modes as part of the Scheme: <ul style="list-style-type: none"> • Bailey's Nurseries and Arle Nursery; • Aldi and neighbouring business premises at the A4019, B4634 junction; • Gloucester Old Spot and The House in the Tree (public houses); • Stanboro Cottage Fish Farm; • Elmstone Business Park; • Blaisdon Way Commercial Premises; • Comfy Campers; • Cheltenham Auto Services; • Distinctive Ironwork; • Premier Inn Cheltenham north-west and associated restaurants; • Cheltenham Fencing; • Applegreen filling station and associated businesses; • Holmedale Guest House; • Gateway Retail Park, Gallagher Retail Park and Kingsditch Trading Estate.
<p>Population and human health - Human Health</p>	<p>Significant adverse effects arising from health and wellbeing outcomes have been identified for:</p> <ul style="list-style-type: none"> • The wider population (rural context), arising from demolition, and from changes to air quality, noise and landscape amenity • The wider population (urban context) - arising from demolition, and from changes to landscape amenity • Families with children and adolescents – arising from changes to air quality, safety, access, noise, landscape amenity, and separation from open space and recreational routes. Also arising from changes to noise and characteristics of the transport network along roads experiencing temporary changes in the distribution of through traffic due to the M5 J10 slip road closures. • People who are materially disadvantaged; People from black and minority ethnic groups - arising from changes to safety and access. • Residents of properties at Uckington - arising from changes to noise and characteristics of the transport network affecting the village due to temporary changes in the distribution of through traffic during the M5 J10 slip road closures. <p>Significant beneficial effects have been identified for:</p> <ul style="list-style-type: none"> • People who are materially disadvantaged. • People from black and minority ethnic groups - arising from vocational training opportunities through construction work. • Residents of properties at Uckington, Moat Lane, Cooks Lane, Homecroft Drive and Appleyard Close - arising from changes in access arrangements. • Residents of properties at Homecroft Drive and Appleyard Close - arising from the demolition of properties. • Residents of properties at Withybridge Gardens, Withybridge Lane and Stanboro Lane - arising from the demolition of properties and changes in landscape amenity. 	<p>Significant adverse effects arising from health and wellbeing outcomes have been identified for:</p> <ul style="list-style-type: none"> • Residents of properties at Uckington, Moat Lane, Cooks Lane, Withybridge Gardens, Withybridge Lane, Stanboro Lane and properties adjacent to the B4634 - arising from changes in landscape amenity. <p>Significant beneficial effects arising from health and wellbeing outcomes have been identified for:</p> <ul style="list-style-type: none"> • The wider population (urban context) - arising from access improvements for a range of modes and to community facilities. • Families with children and adolescents; • People who are physically or mentally disadvantaged; • People who are materially disadvantaged; • People from black and minority ethnic groups - arising from access improvements for a range of modes and to community facilities, and; • Improvements to safety, due to the removal of modal conflicts and enhanced WCH routes. • Residents of properties at: <ul style="list-style-type: none"> • North West Cheltenham; • Within Springbank; • Uckington, Moat Lane and Cooks Lane; • Properties adjacent to the B4634: <ul style="list-style-type: none"> • Homecroft Drive and Appleyard Close; • Withybridge Gardens, Withybridge Lane and Stanboro Lane, and; • Swindon Village - arising from access improvements for a range of modes and community facilities. • Residents of properties at: <ul style="list-style-type: none"> • Uckington, Moat Lane and Cooks Lane, and; • Properties adjacent to the B4634 - arising from changes in landscape amenity.



Topic	Construction stage	Operation stage
Population and human health - Human Health (continued)	<ul style="list-style-type: none"> Users of the PRoW and WCH networks - arising from: <ul style="list-style-type: none"> Changes in landscape amenity; Changes in access arrangements; Separation from open space and recreational routes, and; Changes to safety due to the presence of construction works. West Cheltenham Fire Station - arising from changes in access arrangements. Users of Cheltenham Civil Service Tennis and Football Clubs - arising from increases in noise associated with construction activities. Employees and students at Greensteps and National Star - arising from changes in access arrangements. Employees at Gallagher Retail Park and Kingsditch Trading Estate - arising from changes in access arrangements. Employers and employees to businesses adjacent to the A4019 - arising from changes in access arrangements and landscape amenity. 	<ul style="list-style-type: none"> Users of the PRoW and WCH networks - arising from improved safety and access improvements for a range of modes and to community facilities. West Cheltenham Fire Station - arising from access improvements for a range of modes and to community facilities. Users of Cheltenham Civil Service Tennis and Football Clubs - arising from access improvements for a range of modes and to community facilities. Employees and students at Greensteps and National Star - arising from access improvements for a range of modes and to community facilities. Employees at Gallagher Retail Park and Kingsditch Trading Estate - arising from changes in access arrangements. Employers and employees to businesses adjacent to the A4019 - arising from access improvements for a range of modes and to community facilities.
Climate	No significant effects	No significant effects
Cumulative effects - Intra-Scheme	Significant adverse effect on established characteristics, principally from changes in noise and landscape amenity on the existing residents of Uckington arising from temporary changes in the distribution of through traffic while the M5 J10 slip road closures and signed diversion routes are in place. Significant adverse effect on established characteristics of residences / residential areas along routes affected by temporary changes in the distribution of through traffic while the M5 J10 slip road closures and signed diversion routes are in place.	Significant beneficial effect on receptors (biodiversity, agricultural land and WCH) in the area to the south of the M5 Junction 10.
Cumulative effects- Inter-project (RFFP references- see below)	<ul style="list-style-type: none"> Significant adverse effect of urbanising and transformational change on the existing residents of Uckington arising from interactions with RFFPs A and B. Significant adverse effect of urbanising and transformational change on the existing residents of the A4019 arising from interactions with RFFP C. Significant adverse effect of introducing urbanising development within the agricultural landscape on the existing residents of the B4634 and Withybridge Lane arising from interactions with RFFP D. Significant adverse effect of changes to the configuration, availability, amenity and wider connectivity of the WCH network on WCH users of the recreational network close to M5 arising from interactions with RFFP C. Significant adverse effect of the availability of habitat to support protected species, arising from interaction with RFFPs A, B and D. Significant adverse effect of the availability and continuity of habitat to support protected species, arising from interaction with RFFP C. 	<ul style="list-style-type: none"> Significant adverse effect of urbanising and transformational change on the existing residents of Uckington arising from interactions with RFFPs A and B. Significant adverse effect of urbanising and transformational change on the existing residents of Uckington and north of the A4019 arising from interactions with RFFP C. Significant adverse effect of introducing urbanising development within the agricultural landscape on the existing residents of the B4634 and Withybridge Lane arising from interactions with RFFP D. Significant adverse effect of changes to the configuration, availability, amenity and wider connectivity of the WCH network on WCH users of the recreational network close to M5 arising from interactions with RFFP C.

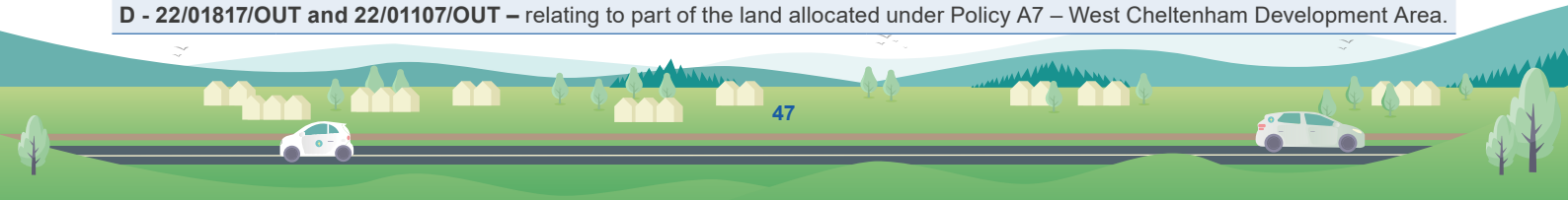
NOTE: Inter-project cumulative effects - For brevity, the RFFPs which have been assessed as giving rise to inter-project cumulative effects when considered with the Scheme have been referenced as follows for this table:

A - 16/02000/OUT (Elms Park) – relating to land allocated under Policy A4 – North West Cheltenham Development Area.

B - 20/00759/FUL (Swindon Farm) – relating to part of the land allocated under Policy A4 – North West Cheltenham Development Area.

C - Safeguarded land to the north-west of Cheltenham (Policy SD5).

D - 22/01817/OUT and 22/01107/OUT – relating to part of the land allocated under Policy A7 – West Cheltenham Development Area.



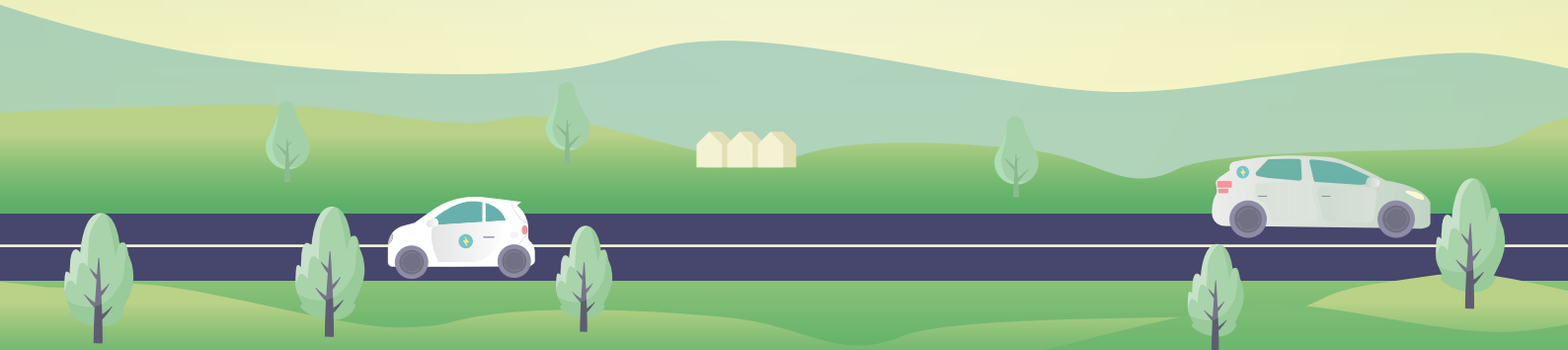


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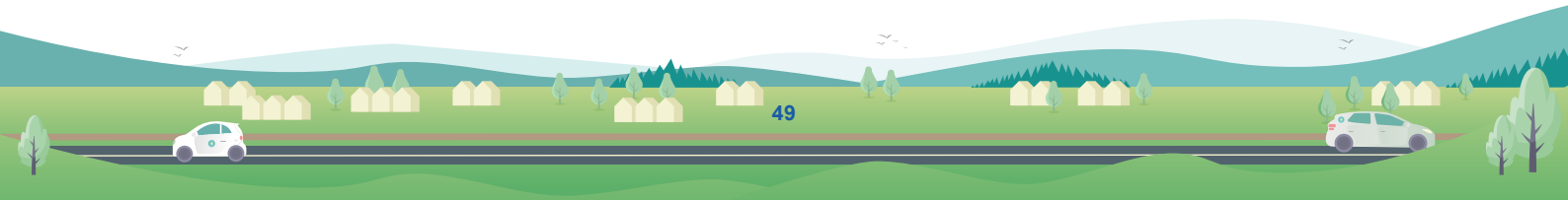


Glossary

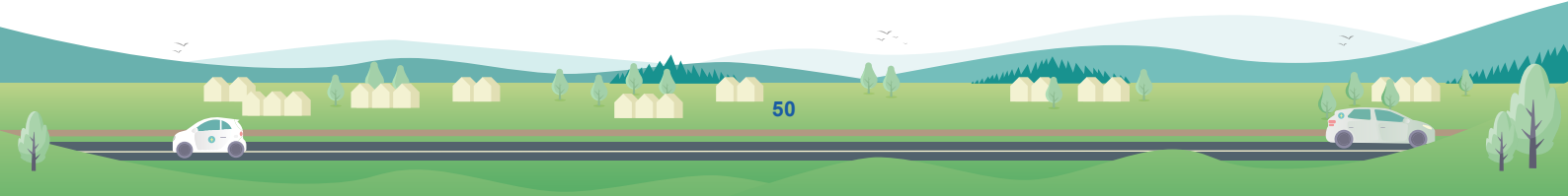


Glossary

Term	Acronyms or abbreviations	Definition
Air Quality Management Area	AQMA	An area identified where the National Air Quality Strategy Objectives are not likely to be achieved. The Local Authority is required to produce a Local Air Quality Action Plan to plan how air quality in the area is to be improved.
Best and Most Versatile	BMV	Land defined as grades 1, 2 and 3a of the Agricultural Land Classification. This land is considered the most flexible, productive and efficient and is most capable of delivering crops for food and non-food uses.
Department for Environment, Food and Rural Affairs	DEFRA	Defra is the government department responsible for environmental protection, food production and standards, agriculture, fisheries and rural communities in the United Kingdom of Great Britain and Northern Ireland.
Designated Heritage Asset	-	A World Heritage Site, Scheduled Monument, Listed Building, Protected Wreck Site, Registered Park and Garden, Registered Battlefield or Conservation Area designated under the relevant legislation.
Development Consent Order	DCO	The means of applying for consent to undertake a Nationally Significant Infrastructure Project (NSIP). NSIPs include, for example, major energy and transport projects.
Environmental Statement	ES	A document produced in accordance with the EIA Directive as transposed into UK law by the EIA Regulations, to report the results of an Environmental Impact Assessment (EIA).
Green Belt	-	The fundamental aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open; the essential characteristics of Green Belts are their openness and their permanence.
Greenfield run off rate	-	The rate of run off from the site in its undeveloped state; the rate of run off from the site if it had just vegetated soil.
Health outcome	-	The Public Health Outcomes Framework sets out indicators that are intended to help health and care professionals and the public to understand trends in public health, based on the national vision and targets for public health, focusing on improvement and protection. Relevant target indicators include: reducing killed and seriously injured casualties on England's roads; reducing the percentage of the population affected by noise; increasing utilisation of outdoor space for exercise/health reasons; increasing the proportion of physically active adults; reducing the fraction of mortality attributable to particulate air pollution; reducing mortality rate for causes considered preventable; and reducing numbers of 16-18 year olds not in education, employment or training.
Listed Buildings	-	Building included on the list of buildings of special architectural or historic interest and afforded statutory protection.
Local Nature Reserve	LNR	A statutory designation made under Section 21 of the National Parks and Access to the Countryside Act 1949 by principal local authorities for places with wildlife or geological features that are of special interest locally, which make an important contribution to England's biodiversity.
National Forest Inventory	NFI	The NFI provides an extensive record of key information about woodland and trees within Great Britain. It includes the most in depth survey carried out on Britain's woodland and trees to date.
Nationally Significant Infrastructure Project	NSIP	A project of a type and scale defined under the Planning Act 2008 and by order of the Secretary of State relating to energy, transport, water, wastewater and waste generally. These projects require a single development consent.
Noise Important Area	NIA	These are areas where 1% of the population are affected by the highest noise levels from major roads and are designated according to the strategic noise mapping undertaken by Defra.
Non-Designated Heritage Asset	-	Buildings, monuments, sites, places, areas or landscapes identified by plan-making bodies as having a degree of heritage significance meriting consideration in planning decisions, but which do not meet the criteria for designated heritage assets.



Term	Acronyms or abbreviations	Definition
Non-Statutory Designated Sites for Nature Conservation	-	Sites that receive protection from local planning policy (e.g. the Local Development Plan) rather than 'Statutory' legislation. These include Sites of Importance for Nature Conservation, Sites of Nature Conservation Importance and County Wildlife Sites.
Order limits	-	The limits described as the DCO boundary on the works plan within which the authorised development may be carried out. This is also referred to as the Red Line Boundary.
Priority Habitat	-	Priority habitats are taken as principal habitats for the conservation of biodiversity listed under Section 41 of the Natural Environment and Rural Communities Act 2006.
Ramsar Site	-	Wetland sites that are of international importance, as designated under Article 2(1) of the Convention on Wetlands of International Importance especially as Waterfowl Habitat. Ramsar (Iran), 2 February 1971. UN Treaty Series No. 14583.
River Basin District	RBD	Area of land and sea, made up of one or more neighbouring river basins together with their associated groundwaters and coastal waters, identified under Article 3(1) of Directive 2000/60/EC as the main unit for management of river basins.
River Basin Management Plan	RBMP	Sets out how organisations, stakeholders and communities will work together to improve the water environment.
Scheme area	-	The area of the environment surrounding the M5 Junction 10 Improvements Scheme which may be relevant in considerations of potential effects. The Scheme area will vary according to the requirements of different topics.
Secondary A aquifer	-	These are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.
Secondary B aquifer	-	These are predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.
Secondary Undifferentiated Aquifer	-	Assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.
Special Area of Conservation	SAC	Site designated under EU legislation for the protection of habitats and species considered to be of European interest.
Scheduled Monument	-	A 'nationally important' archaeological site or historic building, given protection against unauthorised change and included in the Schedule of Monuments kept by the Secretary of State for Culture, Media and Sport. The protection given to scheduled monuments is given under the Ancient Monuments and Archaeological Areas Act 1979.
Special Protection Area	SPA	Area classified under regulation 15 of the Conservation of Habitats and Species Regulations 2017 which have been identified as being of international importance for the breeding, feeding, wintering or the migration of rare and vulnerable species of birds.
Site of Special Scientific Interest	SSSI	Area of land notified by Natural England under section 28 of the Wildlife and Countryside Act 1981 as being of special interest due to its flora, fauna or geological or physiological features.
Water Framework Directive	WFD	The WFD introduced a new system for monitoring and classifying the quality of surface and ground waters. The Directive requires that Environmental Objectives be set for all surface waters and groundwater to enable them to achieve Good Ecological Potential/ Status by a defined date.





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