

M5 Junction 10 Improvements Scheme

**Preliminary Environmental Information
Report (PEIR)
Population and Human Health chapter**

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Document accessibility

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Glossary

Term	Abbreviation
AADT	Annual Average Daily Traffic
AAWT	Annual Average Weekday Traffic
AEP	Annual Exceedance Probability
ALC	Agricultural Land Classification
AMP	Archaeological Management Plan
AONB	Area of Outstanding Natural Building
ARN	Affected Road Network
ASPT	Average Score Per Taxon
AQAL	Air Quality Assessment Level
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
BAP	Biodiversity Action Plan
BCT	Bat Conservation Trust
BEIS	Department of Business, Energy and Industrial Strategy
BGS	British Geological Survey
BMV	Best and Most Versatile
BoQ	Bill of Quantities
BS	British Standards
BTO	British Trust for Ornithology
CAMS	Catchment Abstraction Management Strategy
CBC	Cheltenham Borough Council
CBC	Common Birds Census
CCC	Committee on Climate Change
CD&E	construction, Demolition and Excavation
CEMP	Construction Environmental Management Plan
CEA	Cumulative Effects Assessment
CIEEM	Chartered Institute of Ecology and Environmental Management
CIRIA	Construction Industry Research and Information Association
CL:AIRE	Contaminated Land: Applications in Real Environments
CLP	Classification, Labelling and Packaging
CMS	Continuous Monitoring Station
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalent
COP	Conference of the Parties
COSHH	Control of Substances Hazardous to Health
CPS	Connecting Places Strategies
CRoW	Countryside and Rights of Way
CRTN	Calculation of Road Traffic Noise
CSZs	Core Sustenance Zones
DCO	Development Consent Order
DfT	Department for Transport
DM	Do Minimum
DMOY	Do Minimum Scenario in the Opening Year
DMFY	Do Minimum Scenario in the Future Assessment Year
DMRB	Design Manual for Roads and Bridges
DoE	Department of the Environment
DoWCoP	Definition of Waste: Development Industry Code of Practice
DS	Do Something
DSFY	Do Something in the Future Assessment Year
DSOY	Do Something Scenario in the Opening Year
EC	European Commission
ECoW	Ecological Clerk of Works
eDNA	environmental DNA

Term	Abbreviation
EEA	European Economic Area
EFT	Emissions Factors Toolkit
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
END	Environmental Noise Directive
EPA	Environmental Protection Act
EPS	European Protected Species
EPUK	Environmental Protection UK
EQS	Environmental Quality Standards
EU	European Union
ES	Environmental Statement
FRA	Flood Risk Assessment
ES	Environmental Statement
GCC	Gloucester City Council
GCER	Gloucestershire Centre for Environmental Records
GCN	Great Crested Newt
GFirst LEP	Gloucestershire Local Enterprise Partnership
GHER	Gloucestershire Historic Environment Record
GHGs	Greenhouse Gases
GLNP	Gloucestershire Local Nature Partnership
GLVIA3	Guidelines for Landscape and Visual Impact Assessment
GLTA	Ground Level Tree Assessment
GPLC	Guiding Principles for Land Contamination
GWDTE	Groundwater Dependant Terrestrial Ecosystems
GWT	Gloucestershire Wildlife Trust
HDV	Heavy Duty Vehicles
HER	Historic Environment Record
HEWRAT	Highways England Water Risk Assessment Tool
HGVs	High Good Vehicles
HIF	Housing Infrastructure Fund
HLC	Historic Landscape Characterisation
HMC	Habitat Modification Class
HMS	Habitat Modification Score
HRA	Habitat Regulations Assessments
HSI	Habitat Suitability Index
IAQM	Institute of Air Quality Management
IDB	International Drainage Board
IPCC	International Panel on Climate Change
JCS	Joint Core Strategy
JNCC	Joint Nature Conservation Committee
LAQM	Local Air Quality Management
LCA	Landscape Character Assessments
LCRM	Land Contamination: Risk Management
LCT	Landscape Character Type
LDV	Light Duty Vehicles
LLFA	Lead Local Flood Authority
LNR	Local Nature Reserves
LOAEL	Lowest observed adverse effect level
LTP	Local Transport Plans
LVIA	Landscape and Visual Impact Assessment
MAFF	Ministry of Agriculture, Fisheries and Food
MCHW	Manual of Contract Documents for Highway Works
MHCLG	Ministry of Housing, Communities and Local Government
MMP	Materials Management Plan
MSA	Mineral Safeguarding Areas
MW	Minor Watercourse

Term	Abbreviation
NCA	National Character Area
NERC	Natural Environment and Rural Communities
NHLE	National Heritage List for England
NIA	Noise Important Areas
NMP	National Mapping Programme
NMU	Non- Motorised User
NNR	National Nature Reserves
NPS NN	National Policy Statement for National Networks
NOEL	No Observed Effect Level
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
NPSE	Noise Policy Statement for England
NSIP	Nationally Significant Infrastructure Projects
NSR	Noise Sensitive Receptors
NVC	National Vegetation Classification
OS	Ordnance Survey
PAH	Polyaromatic Hydrocarbons
PAS	Portable Antiquities Scheme
PCBs	Polychlorinated Biphenyls
PCF	Project Control Framework
PCL	Potential Contaminant Linkage
PCM	Pollution Climate Mapping
PCSM	Preliminary Conceptual Site Model
PEAOR	Preliminary Environmental Assessment of Options Report
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
PPE	Personal Protective Equipment
PPGs	Pollution Prevention Guidelines
PPG	Planning Practice Guidance
PPS10	Planning Policy Statement 10
PPGN	Planning Practice Guidance: Noise
PRA	Preliminary Roost Assessment
PRoW	Public Right of Way
Q ₉₅	The 5 percentile flow
RAMS	Risk Assessments, Method Statements
RBD	River Basin Districts
RBMP	River Basin Management Plans
RCP	Relative Concentration Pathway
RCS	River Corridor Survey
RFFPs	Reasonably Foreseeable Future Projects
RHS	River Habitat Survey
RNAG	Reason for not Achieving Good
RoWIP	Rights of Way Improvement Plan
SAC	Special Area of Conservation
SHMP	Soil Handling Management Plan
SM	Scheduled Monument
SOAEL	Significant Observed Adverse Effect Level
SoCC	Statement of Community Consultation
SPD	Supplementary Planning Document
SPA	Special Protection Area
SPZ	Source Protection Zones
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
SWMP	Site Waste Management Plan
TAMP	Transport Asset Management Plan
TBC	Tewkesbury Borough Council

Term	Abbreviation
TAR	Technical Appraisal Report
TSCS	Thin Surface Course System
UKCP18	United Kingdom Climate Projections 2018
UNFCCC	United Nations Framework Convention on Climate Change
UXO	Unexploded Ordnance
VfM	Value for Money
WCH	Walkers, Cyclists and Horse Riders
WEEE	Waste Electrical and Electronic Equipment
WER	Water Environment Regulations
WFD	Water Framework Directive
WHTP	Whalley, Hawkes, Paisley & Trigg
WSI	Written Scheme of Investigation
ZTV	Zone of Theoretical Visibility

Chapters 1-4 of this PEIR have been produced as a separate document.

1. Introduction

2. The Scheme

3. Assessment of Alternatives

4. Environmental Assessment Methodology

Table 4-1 - Significance Matrix

Sensitivity of receptor	Magnitude of impact				
	Major	Moderate	Minor	Negligible	No change
Very high	Very large	Large or very large	Moderate or large	Slight	Neutral
High	Large or very large	Moderate or large	Slight or moderate	Slight	Neutral
Medium	Moderate or large	Moderate	Slight	Neutral or slight	Neutral
Low	Slight or moderate	Slight	Neutral or slight	Neutral or slight	Neutral
Negligible	Slight	Neutral or slight	Neutral or slight	Neutral	Neutral

Table Source: DMRB LA 104 Environmental assessment and monitoring Table 3.8.1

Table 4-2 - Significance categories and typical descriptions

Value	Typical descriptors
Very Large	Effects at this level are material in the decision-making process.
Large	Effects at this level are likely to be material in the decision-making process.
Moderate	Effects at this level can be considered to be material decision-making factors.
Slight	Effects at this level are not material in the decision-making process.
Negligible	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Table Source: DMRB LA 104 Environmental assessment and monitoring Table 3.7

The discipline specific chapters of this PEIR have been produced as separate documents.

5. Air Quality
6. Noise and Vibration
7. Biodiversity
8. Road Drainage and the Water Environment
9. Landscape and Visual
10. Geology and Soils
11. Cultural Heritage
12. Materials and Waste

13. Population and Human Health

13.1. Introduction

- 13.1.1. This chapter presents the preliminary environmental assessment of the M5 Junction 10 Improvements Scheme (the Scheme) for Population and Human Health based on the Scheme as it is described in Chapter 2 (and detailed in the Design Fix 2 drawings in Appendix 2.1).
- 13.1.2. The Infrastructure Planning (EIA) Regulations 2017, specifically Regulation 5(2)(a), requires Environmental Statements to include, inter alia, assessment of potential effects upon population and human health. The Directive does not establish the way in which the topic is to be addressed and there is no prescribed EIA definition for 'population and human health'. This chapter has therefore been prepared in accordance with best practice, professional judgement, the latest guidance from National Highways and DMRB¹, the latter contained within LA112.
- 13.1.3. The Population and Human Health assessment will ascertain the likely positive and negative effects of the construction and operation of the Scheme, and opportunities for improving health and reducing inequalities.
- 13.1.4. This chapter opens with an overview of the key planning policy, which informs the assessment presented within this chapter. The chapter provides an introduction to the general methodology for collating baseline information, identifying impacts and, where there is sufficient confidence, assessing the potential effects of the Scheme. It also highlights aspects of the assessment where consultation will be required as the Scheme progresses to the ES assessment stage in the EIA process.
- 13.1.5. The chapter includes an assessment of the effect of the Scheme on agricultural land holdings and associated infrastructure, but not agricultural soils and land quality, which are assessed in Chapter 10 Geology and Soils.
- 13.1.6. In terms of the population aspect of the chapter, the Scheme has been assessed against the following topics:
- private property and housing;
 - community land and assets;
 - development land and local businesses;
 - agricultural land holdings; and
 - walkers, cyclists and horse-riders (WCH).
- 13.1.7. In terms of human health, the Scheme has been assessed against the following topics:
- health profiles of the affected communities;
 - access to community assets and employment sites;
 - green space and land blight;
 - air pollution;
 - noise pollution and vibration;
 - soil and water pollution; and
 - risk of injuries and death.

13.2. Planning policy and topic legislative context

- 13.2.1. There is no specific legislation or planning policy relating to the Population and Human Health assessment; however, national and local policy provides direction on relevant issues, particularly transport and land use.

¹ <https://www.standardsforhighways.co.uk/dmrb/search/1e13d6ac-755e-4d60-9735-f976bf64580a>

- 13.2.2. There are no legislation or policies specifically relating to assessment of impacts on agricultural holdings. Those designed to protect best and most versatile (BMV) land are summarised in the Geology and Soils chapter.

National policy

National Policy Statement for National Networks (NPS NN, 2014)

- 13.2.3. The NPS NN is directly relevant to highway infrastructure projects on the national road network that are defined as NSIP. The Scheme falls within the definition of an NSIP, making the NPS NN the primary planning policy against which an application for a DCO for the Scheme would be judged.
- 13.2.4. Paragraph 2.23 states that the Government's wider policy is to bring forward improvements and enhancements to the existing Strategic Road Network. This includes junction improvements, dualling of single carriageway strategic trunk roads and additional lanes on existing dual carriageways to increase capacity and to improve performance and resilience.
- 13.2.5. The summary of need sets out the Government's vision and strategic objectives for the national networks. These include improving overall quality of life, journey quality, reliability and safety and linking up communities.
- 13.2.6. Paragraph 3.3 establishes the expectation that delivery of new schemes will improve quality of life and avoid and mitigate environmental and social impacts in line with the principles set out in the NPPF (see below) and the Government's planning guidance. Furthermore, paragraph 3.19 states that schemes will be expected to improve accessibility and inclusivity and reduce community severance, to contribute to a network that provides a range of opportunities and choices for people to connect with jobs, services and friends and family.
- 13.2.7. Access to high quality open spaces, PRoW, the countryside and opportunities for sport and recreation can be a means of providing mitigation and/or compensation requirements for developments (Paragraphs 5.162 and 5.184).

National Planning Policy Framework (NPPF, 2021)

- 13.2.8. The NPPF establishes national planning policy to achieve sustainable development, through themes that include promoting sustainable transport, supporting a prosperous rural economy and promoting healthy communities, with a presumption in favour of sustainable development. Given that the Scheme is an NSIP, the NPPF has the status of a material consideration in planning terms.
- 13.2.9. Paragraph 81 states that planning decisions should help create the conditions in which 'businesses can invest, expand and adapt.' Furthermore, planning policies and decisions should aim to achieve healthy, inclusive and safe places that:
- promote social interaction;
 - are safe and accessible; and
 - enable and support healthy lifestyles.
- 13.2.10. Paragraph 99 recognises that access to a network of high-quality open spaces and opportunities for sport and physical activity is important for the health and well-being of communities. As such, 'existing open space, sports and recreational buildings and land, including playing fields, should not be built on.'
- 13.2.11. Paragraph 112 encourages walking, cycling and public transport use. Applications for development should, inter alia:
- 'give priority first to pedestrian and cycle movements, both within the Scheme and with neighbouring areas';
 - 'address the needs of people with disabilities and reduced mobility in relation to all modes of transport'; and
 - 'create places that are safe, secure and attractive – which minimise the scope for

conflicts between pedestrians, cyclists and vehicles.'

Countryside and Rights of Way Act 2000

- 13.2.12. The Countryside and Rights of Way Act 2000 (CRoW) regulates all PRow and ensures access to them. It requires local highway authorities to publish a Rights of Way Improvement Plan (RoWIP), which should be reviewed every 10 years. CRoW also obliges the highway authority to recognise the needs of the mobility impaired when undertaking improvements.

Local policy

Gloucestershire Local Transport Plan (LTP) (2020-2041)

- 13.2.13. The Gloucestershire Local Transport Plan sets the strategic transport vision for the county to 2041. The plan sets out the overarching and mode policies that support the spatial Connecting Places Strategies (CPS) and the Transport Scenarios, looking to 2041. It is a material consideration for the Scheme, given its status as an NSIP.
- 13.2.14. Paragraph 2.3.1 states that Gloucestershire's vision for transport is 'a resilient transport network that enables sustainable economic growth by providing travel choices for all, making Gloucestershire a better place to live, work and visit.' Paragraph 2.3.4 goes on to state that a key objective of the LTP is to 'improve community health and wellbeing and promote equality of opportunity.'
- 13.2.15. Policy LTP PD 0.5 Community Health and Wellbeing ensures that people from all social and economic groups and those with disabilities are encouraged to use safe and affordable multi-modal travel options. Furthermore, there is a focus on '*improving air quality; and connecting people to services, employment, housing, education, health services, social and leisure amenities to allow equality of opportunity to health, social and economic wellbeing and remove barriers that can create social isolation.*'
- 13.2.16. Policy LTP PD 4.4 – Road Safety pledges to 'contribute to improved safety, security and health by reducing the risk of death, injury or illness arising from transport, working with partners to improve personal safety perceptions and the promotion of transport that contributes to good health and wellbeing.'
- 13.2.17. Policy LTP PD 6.1 – Gloucestershire's Pedestrian Network states that 'GCC will work with interested parties to provide an inclusive safe, reliable and efficient highway environment that encourages walking, and provides pedestrian links to connect communities, employment and services.'
- 13.2.18. Policy LTP PD 6.2 - Rights of Way ensures that GCC will 'support the Rights of Way and Countryside Access Improvement Plan in identifying and seeking to support measures to improve safety, accessibility and the quality of the experience for walkers, horse riders, carriage drivers and those travelling by bicycle.'
- 13.2.19. Policy LTP PD 6.4 - Pedestrian Safety states that 'GCC will contribute towards improved safety, security and health by reducing the risk of death, injury or illness arising from journeys on foot or by mobility mode.'

Joint Core Strategy (JCS) 2011-2031

- 13.2.20. The JCS is a partnership between GCC, CBC and TBC which will set out a strategic planning framework for the three areas.
- 13.2.21. The JCS Strategic Objective 1 – 'Building a strong and competitive urban economy' seeks to provide the right conditions and sufficient land in appropriate locations to support existing businesses and attract new ones.
- 13.2.22. Strategic Objective 7 – 'Promoting sustainable transport' states a preference for improving access to services in rural and urban areas through new development, improved integrated transport links and supporting local and community led transport initiatives.
- 13.2.23. Relating to Policy SD1: 'Employment – except retail development', paragraph 4.1.12 of the JCS states that there is agreement across relevant partners that the upgrading of M5

Junction 10 to an all movements junction will support the economy of the JCS area and that of wider Gloucestershire.

- 13.2.24. Policy SD14: 'Health and Environmental Quality' states that new development must result in no unacceptable levels of air, noise, water, light or soil pollution or odour, either alone or cumulatively, with respect to relevant national and EU limit values.
- 13.2.25. Policy INF1: 'Transport Network' states that developers should provide safe and accessible connections to the transport network to enable travel choice for residents and commuters. Of particular relevance to the Scheme is the notion that proposals should ensure that safe and efficient access to the highway network is provided for all transport modes.
- 13.2.26. Policy INF6: 'Infrastructure Delivery' states that local planning authorities will seek to secure appropriate infrastructure which is necessary, directly related, and fairly and reasonably related to the scale and kind of the development proposal, including the highway network, traffic management, sustainable transport and disabled peoples' access.

[The Cheltenham Plan \(July 2020\)](#)

- 13.2.27. The Cheltenham Plan was adopted at a full council meeting of Cheltenham Borough Council on 20 July 2020.
- 13.2.28. Policy HM3: Loss of Residential Accommodation states that development which involves the loss of residential accommodation through the demolition of existing housing will not be permitted, except where *'the proposed use would be beneficial to the wider economy and the local community.'*
- 13.2.29. Policy SL1: Safe and Sustainable Living requires new development to avoid 'unacceptable harm to the amenity of adjoining land users'.

[Cheltenham Borough Local Plan – Saved Policies \(2006\)](#)

- 13.2.30. Policy CP 4: 'Safe and Sustainable Living' states that development should not result in levels of traffic to and from the site attaining an environmentally unacceptable level.

[Pre-Submission Tewkesbury Borough Plan 2011 to 2031 \(May 2020\), plus schedule of changes and updated Proposals Map – composite Submission version](#)

- 13.2.31. Policy HEA1 Healthy & Active Communities states that major development should be designed in line with 'active design' principles.
- 13.2.32. Policy COM1 Protecting Community Assets states that where proposals would lead to the loss of existing community assets, there should be no demonstrable current or future need for the asset. Furthermore, all efforts will need to have been made to maintain the asset.
- 13.2.33. Policy TRAC1 Pedestrian Accessibility outlines the stance that pedestrian networks will be protected across Tewkesbury Borough, as well as extended and enhanced.

13.3. Methodology

- 13.3.1. The study area for this assessment has been set according to:
- The extent and characteristics of the Scheme; and
 - The location (in relation to the Scheme), characteristics and sensitivity of communities and associated facilities / amenities.
- 13.3.2. The study area falls within the local authority areas of TBC and CBC.
- 13.3.3. In October 2019 LA112 (Population and Human Health) replaced DMRB Volume 11, Section 3, Parts 6, 8 and 9. This edition, in contrast to its predecessor, provides precise descriptions of environmental sensitivity (value) and magnitude of impact for each element of the assessment. The PEIR follows the methodology set out in LA112.

- 13.3.4. LA112 guidance states that land use effects shall be assessed during construction and for the first year of operation (future year scenario). After the first year of operation, effects on land use associated with routine maintenance operations are unlikely to be significant.
- 13.3.5. DMRB guidance for the Population assessment requires the study area to be based on the construction footprint / Scheme boundary. This requires the assessment to include compounds and temporary land, plus a 500 m area surrounding the Scheme boundary. The Population assessment has therefore explored a study area of 500 m from the current red line boundary / construction footprint of the Scheme. It should be noted that the methodology also allows some flexibility within this to extend or redact the 500 m area depending on the sensitivity of receptors identified within it.
- 13.3.6. For the agricultural component of this assessment the study area is the entirety of the farm holdings crossed by the consolidated study area for the Scheme. At the next stage of the EIA process, this study area will take account of the temporary land take required during the construction phase.
- 13.3.7. For Human Health, the study area is required by DMRB guidance to encompass the communities and wards that are directly or indirectly affected by the Scheme. The selection of wards is informed by the extent and characteristics of the Scheme.
- 13.3.8. Effects within the Human Health assessment are largely derived from changes in wider health determinants largely selected from the other technical assessments. Consequently, the study areas defined in each contributing technical chapter also apply, allowing for variations due to the absence of construction phase land take proposals. For the next stage of the EIA, these study areas will include:
- Air Quality – for construction, within 200 m of the construction site boundary to assess potential effects of construction dust; for operation, human health receptors identified within 200 m of the ARN;
 - Noise and Vibration – for construction, within 300 m of any construction works; for operation, within 1 km of any new or altered routes and 600 m from any affected roads within the study area;
 - Landscape and Visual Amenity – for construction and operation, 1 km from the Scheme boundary;
 - Geology and Soils – for construction and operation, for the assessment of agricultural land and agricultural holdings, for the entirety of the agricultural land which is crossed; and
 - Road Drainage and Water Conservation – for construction and operation, features of the water environment within 1 km of the Scheme.

13.4. Consultation

- 13.4.1. To date the stakeholder engagement team has undertaken non-statutory consultation activities with landowners who own land that is expected to be directly affected by the Scheme. These include businesses in proximity to the Scheme, including the Gloucester Old Spot pub. Landowners were engaged in the run up to the consultation and the preferred route announcement.
- 13.4.2. Extensive consultation has been held with key stakeholders as part of the Scheme. A Public Consultation event for the Scheme was held between 14th October and 25th November 2020 and the needs of pedestrians, cyclists and equestrians were a popular topic for respondents. Stakeholders contacted for comment who are relevant to this assessment include:
- Boddington Parish Council;
 - Elmstone Hardwicke Parish Council;
 - Uckington Parish Council;
 - Staverton Parish Council;
 - Leigh Parish Council;

- Principal Public Rights of Way officer (GCC);
 - British Horse Society;
 - Cheltenham and Tewkesbury Cycle Campaign (via website contact page);
 - Cycling UK (formerly Cyclists Touring Club);
 - Sustrans;
 - Ramblers; and
 - Royal National Institute for the Blind.
- 13.4.3. Key responses from the consultation to date, which have been considered in developing the Scheme, are summarised below:
- A number of dedicated cycle paths should be provided as part of the Scheme;
 - Footways in the area being poorly maintained;
 - Support for walking and cycling improvements along the A4019 corridor;
 - Include WCH facilities over the M5 at the new junction;
 - West Cheltenham Link Road – include segregated routes/crossings for pedestrians/cyclists on the link road; and
 - Provide facilities that connect to local villages and the wider WCH network.
- 13.4.4. In order to further inform the Population and Health assessment, a shortlist of receptors with whom consultation will be desirable will be provided to the stakeholder engagement team. A number of questions will also be provided, in order to gain as much from the meeting as possible. The aim of the further engagement will be to ensure that:
- Understanding of user catchments is enhanced;
 - Community assets are confirmed;
 - School transport provision is identified (i.e. where children are picked up and dropped off);
 - Key access routes, including for WCH, are identified; and
 - Opportunities identified by users regarding enhancement along desire lines / linking up WCH routes are considered.
- 13.4.5. In terms of local businesses and community assets, the consultation will look to gain information on usage levels relating to user groups and their characteristics, as well as the spatial distribution of user groups.
- 13.4.6. Further groups to be contacted in order to inform the assessment include local ramblers groups, equestrian clubs and cycle groups.
- 13.4.7. Undertaking the consultation activities outlined above ensures a greater level of confidence in the assumptions made about the size and spatial distribution of user catchments for the facilities expected to be affected by the Scheme, allowing for the correct assignment of the level of impact. The priority will be those likely to experience direct effects, such as land take, then those expected to experience substantial disruption (relating to access, but it may also relate to disturbance).
- 13.4.8. The aim of the conversations with stakeholders relates to fact finding. However, a further aim relates to ascertaining any possible impacts so that solutions can be agreed that would work for the consultees and ensure that the design team can accommodate those solutions, or identify alternatives where this is not possible.
- 13.4.9. Some farm impact assessments have been undertaken with affected landowners and occupiers where there was a need to inform the design. Full consultation with agricultural landowners and occupiers will continue in line with design development, as some design features have not yet been finalised. This is particularly with regard to the locations of compensatory floodplains which may require a significant amount of agricultural land.

13.5. Baseline conditions – Population

13.5.1. This section sets out the key receptors identified during the review of baseline conditions and assigns a level of sensitivity to change for each receptor. Key criteria that have been considered in assigning this sensitivity include:

- The total number of properties/premises/facilities/assets within the receptor cluster;
- The location of the receptor cluster in relation to the Scheme; and
- The extent to which key access routes fall (or are considered likely to fall) within the working corridor.

13.5.2. The component topics of Population are each divided into subheadings.

Private Property and Housing

13.5.3. Due to the isolated nature of M5 Junction 10, there are few key settlements of note located in and around the study area, with the exception of Cheltenham, which is located directly east of the Scheme. This section of north-west Cheltenham has over 150 dwellings located within the study area. Access to these dwellings from the west is within the Scheme works area. This receptor cluster is of **very high sensitivity to change**.

13.5.4. There are several small settlements in the study area containing a limited number of private dwellings. These settlements include Boddington to the west of the study area, approximately 500 m from the Scheme. There are less than 30 dwellings located here (a threshold quantum within the DMRB LA 112 guidance), and access routes fall outside the Scheme works area. This receptor is of **medium sensitivity to change**.

13.5.5. Uckington is located in the east of the study area, adjacent to the Scheme. There are less than 30 dwellings located here. At least three residential properties and one farm building are within the Scheme works area and may be subject to demolition works to allow for the construction of the Scheme. This receptor cluster is of **medium sensitivity to change**.

13.5.6. There is a small number of private dwellings in proximity to M5 Junction 10, both to the north-west at Stanboro Lane and adjacent to Sheldon Nurseries; and at Withybridge Gardens, which runs adjacent to the A4019 and the Scheme. There are less than 30 dwellings located here. All 14 of the residential properties at Withybridge Gardens, plus two properties adjacent to the A4019 and three properties at Sheldon Nurseries would be the subject of demolition works to allow for the construction of the Scheme. This receptor cluster is of **medium sensitivity to change**.

13.5.7. There is an operational informal gypsy and traveller site adjacent to the southbound carriageway of the M5, approx. 250 m to the north of the existing M5 Junction 10. There appear to be less than 30 separate caravans within the site curtilage. The nature of the use means that occupation levels can change. The vehicular access to the site is from the A4019 to the south, running parallel to the M5 southbound carriageway and is wholly within the Scheme construction works area. Part of the gypsy and traveller site is also within the Scheme construction works area. This receptor cluster is of **medium sensitivity to change**.

13.5.8. There is a small number of properties located on the B4634, which links the west of Cheltenham to Staverton via Hayden. These properties are located adjacent to the Scheme. There are less than 30 dwellings located here. Access to these properties falls within the Scheme works area. This receptor cluster is of **medium sensitivity to change**.

13.5.9. A small number of properties is located to the west of Elmstone Hardwicke, to the north of the study area, located approximately 400 m from the Scheme. There are less than 30 dwellings located here, and access routes to these properties fall outside the Scheme works area. This receptor is of **medium sensitivity to change**.

13.5.10. There is a small number of isolated properties adjacent to the M5 and Withybridge Lane, south of M5 Junction 10, approximately 90 m from the Scheme. There are less than 30 dwellings located here. Key access routes to these properties fall within the Scheme works area. This receptor cluster is of **medium sensitivity to change**.

- 13.5.11. The following unimplemented residential planning applications (as at August 2021) and development allocations have been identified within the study area:
- 18/01218/OUT: Outline application for the removal of an agricultural building and the erection of 4 dwellings with all matters reserved except for access;
 - 20/00759/FUL: Demolition of a dwelling and the erection of 260 dwellings (Use Class C3), new vehicular and pedestrian access off Manor Road, attenuation basin and ancillary infrastructure;
 - Policy A4 – North West Cheltenham: approximately 4,285 new dwellings;
 - Policy A7 – West Cheltenham: approximately 1,100 new dwellings; and
 - Policy HD8 – Old Gloucester Road: approximately 175 new dwellings.

13.5.12. Application 18/01218/OUT is of **low sensitivity to change** due to the application being for <30 homes on an unallocated site. Application 20/00759/FUL allows for the construction of 260 dwellings and, as this is above the threshold of 150 homes relating to residential development land, it is of **very high sensitivity to change**.

13.5.13. The residential properties included in the land allocated under Policies A4, A7 and HD8 are considered to be of **very high sensitivity to change** due to the extent of the housing allocated. Policies A7 and HD8 are also located adjacent to the Scheme, which further increases their sensitivity.

Community land and assets

13.5.14. The study area is predominantly rural in character. As such, the study area benefits from limited amounts of community land and assets. Residents within the study area are considered likely to predominantly use community land and assets within Cheltenham, to the east of the study area.

13.5.15. Uckington & Elmstone Hardwicke Village Hall is located towards the east of the study area, approximately 140 m from the Scheme. The principal access route passes through the Scheme works area, with limited alternative facilities being available at a local level. This receptor is likely to be used by the majority of the community within which it sits. This receptor is of **medium sensitivity to change**.

13.5.16. The Circle of Light place of worship is located towards the east of the study area at the north of Uckington, approximately 280 m from the Scheme. The principal access route passes through the Scheme works area, with limited alternative facilities being available at a local level. This receptor is likely to be used by the majority of the community within which it sits, including Uckington and the various rural settlements located in and around the study area. This receptor is of **medium sensitivity to change**.

13.5.17. The Cheltenham Civil Service Tennis and Football Clubs are located on the north-western edge of Cheltenham, approximately 40 m from the Scheme. These assets are likely to be used frequently by the wider Cheltenham community in their respective seasons and alternative facilities are unlikely to be available locally. However, key access routes to these facilities fall outside the Scheme works area. This receptor is of **high sensitivity to change**.

13.5.18. St Mary Magdalene Church is located in Boddington to the west of the study area, approximately 500 m from the Scheme. Key access routes to this facility fall outside the Scheme works area. However, there are limited alternative facilities being available at a local level. This receptor is likely to be used by the majority of the community including Boddington and the various rural settlements located in and around the study area. This receptor is of **medium sensitivity to change**.

13.5.19. All Saints Academy is located at the western fringe of Cheltenham, approximately 180 m from the Scheme. Key access routes to this facility fall outside the Scheme works area. However, there are limited alternative facilities being available at a local level. This receptor is likely to be used daily by the majority of the within western Cheltenham. This receptor is of **medium sensitivity to change**.

Development land and businesses

- 13.5.20. There are several businesses within the study area. These include, but are not necessarily limited to, the businesses below. Within the guidance, considerable emphasis is placed on size when determining sensitivity to change. Proximity to the Scheme and the potential for severance of key access routes is also considered.
- 13.5.21. The following businesses are located in the vicinity of M5 Junction 10:
- the Gloucester Old Spot pub;
 - Martine's Flowers florist;
 - Stanboro Cottage fish farm;
 - Glos Detailing valeting service; and
 - Sheldon Nurseries horticultural nursery.
- 13.5.22. Although under 1 hectare, Martine's Flowers florist, Glos Detailing valeting service and Sheldon Nurseries horticultural nursery will be subject to land take and potentially some property demolition in order to construct the Scheme. These businesses are of **high sensitivity to change**.
- 13.5.23. The Gloucester Old Spot pub, Stanboro Cottage fish farm and Sheldon Nurseries are under one hectare in size. Furthermore, no direct land take is currently anticipated to occur and key access routes will not be severed by the Scheme. These businesses are of **medium sensitivity to change**.
- 13.5.24. A number of businesses are located at Springbank Way Shopping Centre, located on the western edge of Cheltenham, approximately 180 m from the Scheme. This receptor is approximately 2.6 hectares in size and no direct land take is currently anticipated to occur. Key access routes to these businesses will also be unaffected during operation. This receptor is of **high sensitivity to change**.
- 13.5.25. A number of businesses are located at Gallagher Retail Park, located on the north-western edge of Cheltenham adjacent to the Scheme. This receptor is approximately 8.6 hectares in size and no direct land take is currently anticipated to occur. Key access routes to these businesses will also be unaffected during operation. This receptor is of **very high sensitivity to change**.
- 13.5.26. A number of businesses are located on the western edge of the Kingsditch Trading Estate, approximately 260 m from the Scheme. This section of the business park is approximately 7.4 hectares in size and no direct land take is currently anticipated to occur. Key access routes to these businesses will also be unaffected during operation. This receptor is of **very high sensitivity to change**.
- 13.5.27. The House in the Tree pub is located on the B4634 / Withybridge Lane junction adjacent to the Scheme. This receptor is under one hectare in size and no direct land take is currently anticipated to occur. Key access routes to this receptor will avoid severance during operation. This receptor is therefore of **medium sensitivity to change**.
- 13.5.28. Holmedale guest house is located on the B4634 approximately 500 m west of Cheltenham and approximately 350 m from the Scheme. This receptor is under one hectare in size and no direct land take is currently anticipated to occur. Key access routes to this receptor will avoid severance during operation. This receptor is therefore of **medium sensitivity to change**.
- 13.5.29. Comfy Campers camper van hire company, Distinctive Ironwork blacksmith and Cheltenham Auto Services vehicle repair shop are located on the A4019 west of Uckington, adjacent to the Scheme. These businesses are under one hectare in size and no direct land take is currently anticipated to occur. These receptors are therefore of **medium sensitivity to change**.
- 13.5.30. The following unimplemented commercial development allocations have been identified within the study area:
- Policy A4 – North West Cheltenham: a 10 hectare B-class office park. 13 hectares of predominantly non B-Class employment generating land; and

- Policy A7 – West Cheltenham: 45 hectares of B-class led employment land.
- 13.5.31. Policies A4 and A7 are considered to be of **very high sensitivity to change** as they exceed 5 ha of proposed employment land and are adjacent to the Scheme.
- 13.5.32. The planning applications for the following are of **low sensitivity to change**.
- The erection of 3 No. B1 and B8 units (20/00213/FUL); and
 - The erection of 12 no. business incubator units (20/02132/FUL).
- 13.5.33. The list of applications was reviewed in August 2021 and no further applications of relevance were identified.

Agricultural land holdings

- 13.5.34. Agricultural land use is a mixture of grassland and arable, the latter including combinable and fodder crops. Historic Google Earth imagery indicates that some land is under long term grass, while other is under ley grass and arable rotations.
- 13.5.35. Eleven agricultural holdings will be permanently affected by the Scheme, as shown in Figure 13-1.
- Holding A, farmed by a lifetime tenant of Gloucestershire County Council (GCC), is a 52.6 ha mainly grassland farm of **medium sensitivity**, producing beef cattle. There is one arable field east of the M5, accessed from the Elmstone to Hardwicke Road. Most of the farm is in a mid-tier Countryside Stewardship Scheme.
 - Holding B is a 65 ha, mainly arable farm with a grass field around the house and is of **medium sensitivity**. The land and farm buildings are let on short term tenancies. There is a small area of woodland next to the M5 that is in receipt of Farm Woodland Scheme payments.
 - Holding C is a 19.6 ha grassland farm of **medium sensitivity**, producing beef cattle and let on a short term tenancy.
 - Holding D is a 10 ha mixed arable and grass unit of **medium sensitivity**.
 - Holding E is a 70 ha arable farm of **medium sensitivity** farmed by a tenant. The farm is in a mid-tier Countryside Stewardship Scheme.
 - Holding F is a 19 ha mainly arable farm of **medium sensitivity**.
 - Holding G is a 46 ha arable farm of **medium sensitivity**.
 - Holding H comprises 12 ha of arable land of **medium sensitivity** that, in future, is likely to be let to neighbouring farmers on short term tenancies.
 - Holding I, owned by GCC, is a 49 ha grassland farm of **medium sensitivity**, extending from Withybridge Lane to the fire station, whose tenancy became vacant in September.
 - Holding J is in excess of 300 ha. It is a mainly arable farm of **medium sensitivity**, mostly west of the M5 but with two fields in the north east quadrant of Junction 10, accessed from the A4019 at Withy Bridge.
 - Holding K is a 41 ha mixed arable and grass holding of **medium sensitivity**.



Walking, Cycling and Horseriding (WCH)

- 13.5.36. The following WCH information is derived from 'rowmaps'², an online information source that uses Ordnance Survey mapping to display PRow mapping. The Atkins WebGIS tool has also been used to inform the understanding of baseline conditions.
- 13.5.37. The PRow definitive map has also been utilised in outlining the baseline conditions, having been obtained from discussions with the LPA PRow officer.
- 13.5.38. A level of sensitivity to change has been assigned to each PRow receptor. Key criteria that have been considered include:
- the type, location and extent of WCH provision;
 - the frequency of use of the WCH provision; and
 - the likelihood of severance of the PRow.
- 13.5.39. Boddington Footpath 16 passes underneath the M5 adjacent to the River Chelt, approx. 800 m south of M5 Junction 10. This provides PRow access between Boddington and Uckington. This links to another footpath that links Withybridge and Uckington. This PRow is located adjacent to the Scheme and will be severed by the Scheme. This PRow may provide access for commuters wishing to access Cheltenham from the west of the study area. Furthermore, limited alternative routes are available. This receptor is of **high sensitivity to change**.
- 13.5.40. Uckington Bridleway 1 provides access from the A4019 to Elmstone Hardwicke. This PRow is located adjacent to the Scheme. This route is likely to be used predominantly for recreational purposes, although cyclists may use this route for commuting into Cheltenham. There are alternative routes available for walkers, but cyclists would be required to use this route. This receptor is of **high sensitivity to change**.
- 13.5.41. Boddington Footpath 13 provides access from the A4019 to Boddington. This PRow is located approximately 410 m from the Scheme. This route is likely to be recreational and alternative routes are available. This receptor is of **medium sensitivity to change**.
- 13.5.42. Boddington Footpath 14 provides access from M5 Junction 10 to Boddington. This PRow is located adjacent to the Scheme. This route is likely to be recreational and alternative routes are available. This receptor is of **medium sensitivity to change**.
- 13.5.43. Boddington Bridleway 25 and Uckington Footpath 15 provide access from Uckington to the western edge of Cheltenham. These PRow are located approximately 80 m from the Scheme. These PRow may provide a commuting route from Uckington to Cheltenham, although alternative access is available via the A4019. These receptors are of **medium sensitivity to change**.
- 13.5.44. Boddington Footpath 29 provides access from the B4634 to Hayden. This PRow is located approximately 60 m from the Scheme. This route is likely to be recreational and alternative routes are available. This receptor is of **medium sensitivity to change**.
- 13.5.45. Uckington Footpath 8 provides access from the A4019 to the north of Uckington. This PRow is located adjacent to the Scheme. This route is likely to be recreational and alternative routes are available. This receptor is of **medium sensitivity to change**.
- 13.5.46. Swindon Footpath 16 provides access from Gallagher Retail Park to Manor Park Business Centre. This PRow is located approximately 200 m from the Scheme. Although this route is likely to be used for commuting from Swindon Village, there are alternative routes available with similar distances. This receptor is therefore of **medium sensitivity to change**.

² Rowmaps – maps showing rights of way. <http://www.rowmaps.com/>

13.6. Baseline conditions – Human Health

Local public health profile of the study area

- 13.6.1. The study area falls into four electoral wards (based on the 2011 Census datasets). These are outlined and expanded upon below.
- 13.6.2. It is the intention to use the 2021 census datasets to inform the baseline for Human Health if this becomes available prior to the ES being finalised.
- 13.6.3. Data taken from the Census datasets is outlined in a series of tables in order to outline the key health baseline conditions in each of the four wards.
- 13.6.4. Coombe Hill and Badgeworth wards fall within the Tewkesbury local authority area, whilst Springbank and Swindon Village wards fall within the Cheltenham local authority area.

Coombe Hill

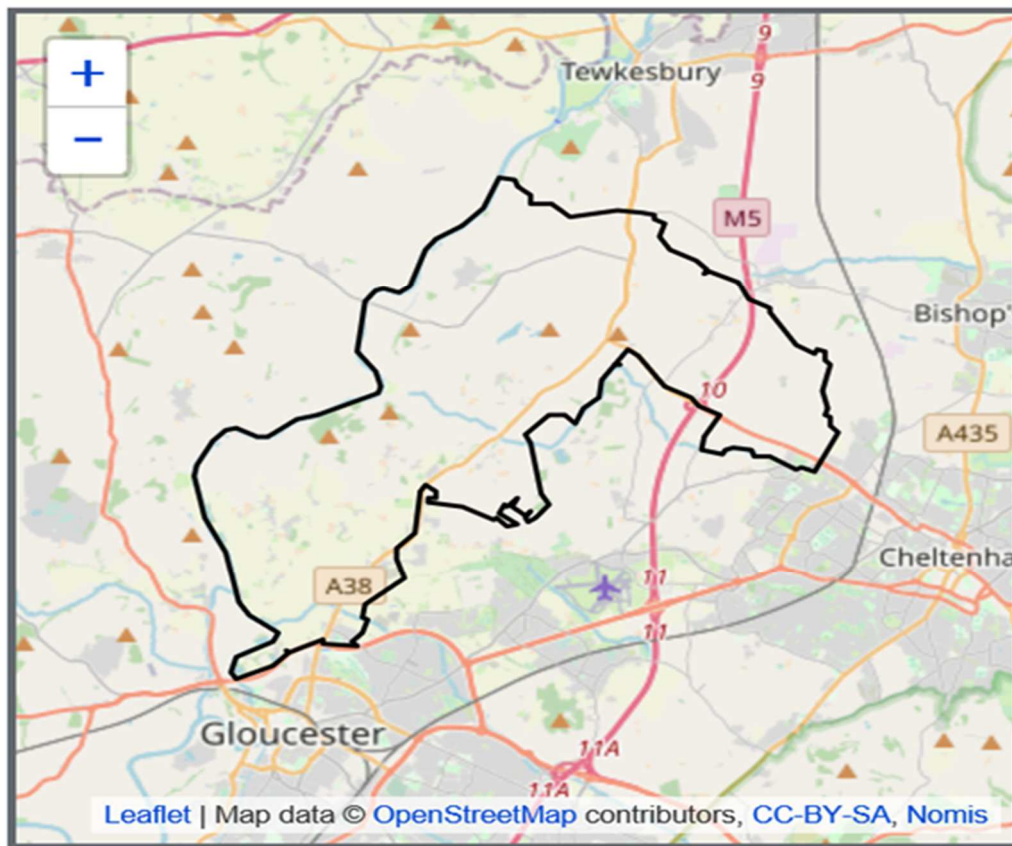


Figure 13-2 - Coombe Hill Ward Boundary

- 13.6.5. Coombe Hill ward is located largely to the north of Gloucester and to the west of Cheltenham. The A38 runs through the ward and provides access from Gloucester to Tewkesbury. The ward is predominantly rural and has very little settlements of note.
- 13.6.6. Daily movements through the study area should be limited due to the small number of residents located within the ward. However, this section of the study area is likely to provide a key route for residents in the ward wishing to access Tewkesbury and Gloucester along the A38.
- 13.6.7. The ward is partially within the catchment area for Norton C of E Primary School and Deerhurst and Apperley C of E Primary School. Due to these educational facilities being located outside of the study area towards the west, there will be limited requirement for residents within this ward to cross the study area to access them.

Badgeworth

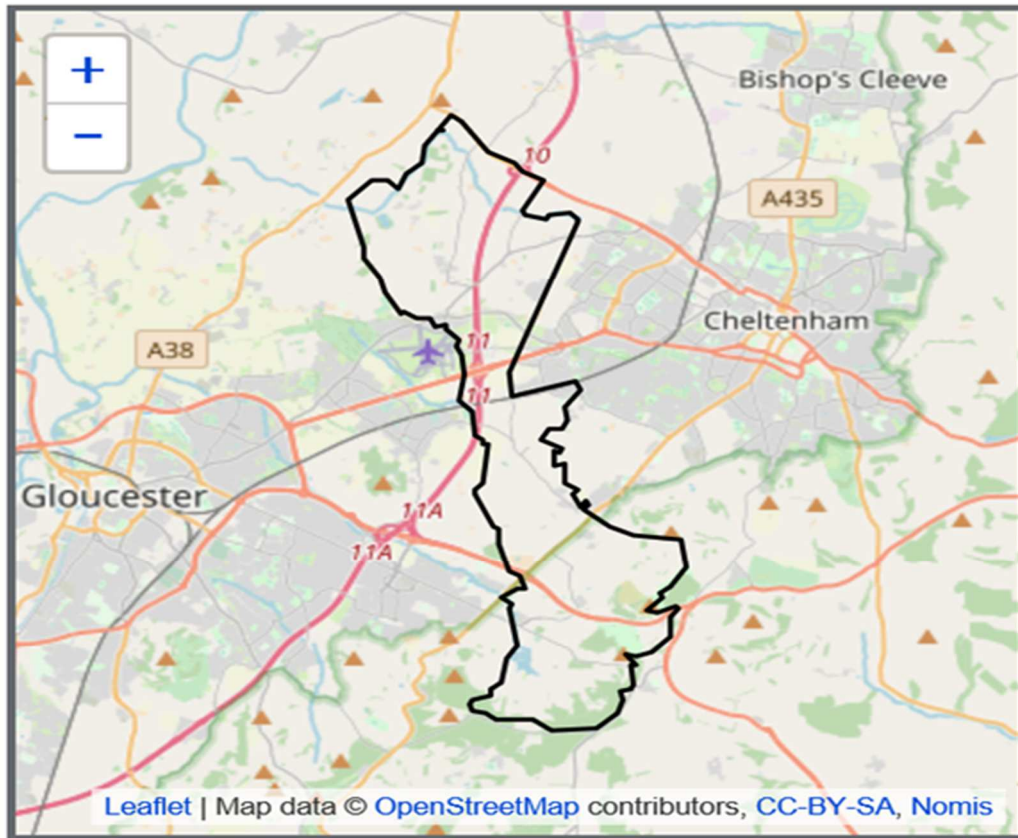


Figure 13-3 - Badgeworth Ward Boundary

- 13.6.8. Badgeworth ward is located directly south of the study area, and covers a large section of the study area south of M5 Junction 10. This ward also covers a largely rural area and includes few residential settlements.
- 13.6.9. The ward includes the M5 carriageway, south of M5 Junction 10, which provides a route from the strategic road network for vehicles to potentially access other sections of the study area through this ward.
- 13.6.10. The ward is partially within the catchment area for Shurdington C of E Primary School. It is unlikely that extensive numbers of residents will be required to travel through the study area in order to access this educational facility.

Springbank

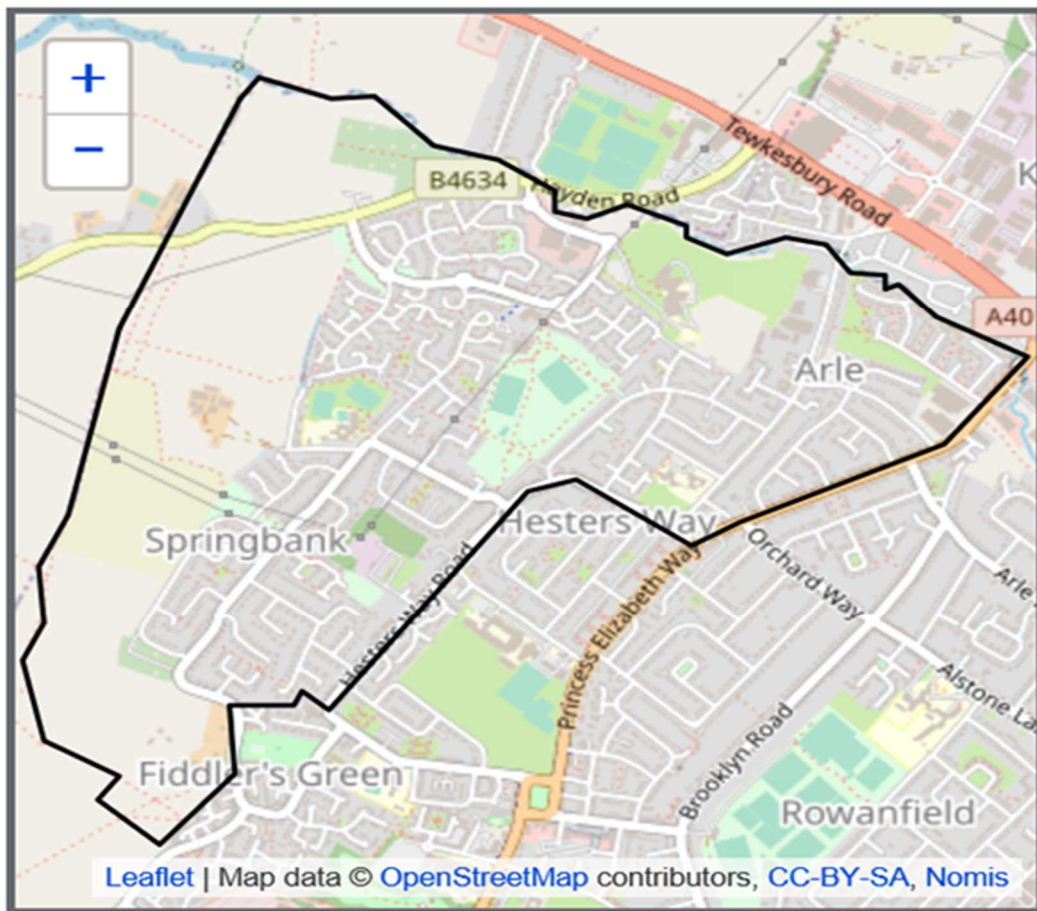


Figure 13-4 - Springbank Ward Boundary

- 13.6.11. Springbank ward is located at the eastern edge of the study area, on the western fringe of Cheltenham. The ward is largely residential and movements through the study area are likely in order for residents to access their properties having exited the M5 at Junction 10.
- 13.6.12. Many key services are provided within the ward including green open space facilities, possibly limiting extensive movements through the study area to access day to day services and facilities.
- 13.6.13. The ward is wholly within the catchment area for Springbank Primary Academy, All Saints' Academy (secondary) and Hesters Way Primary School. Residents within this ward are located in proximity to the educational facilities listed above and can access them without crossing the study area.

Swindon Village

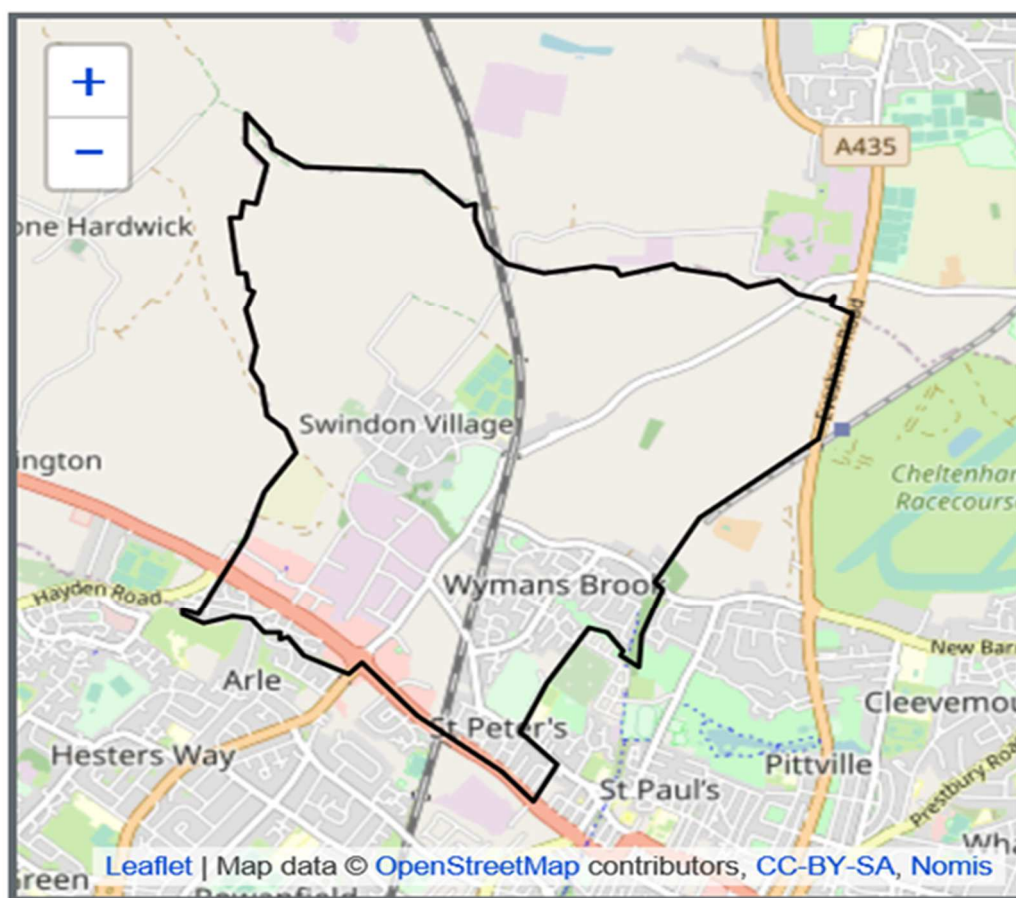


Figure 13-5 - Swindon Village Ward Boundary

- 13.6.14. Swindon Village ward is located at the eastern edge of the study area, on the western fringe of Cheltenham, directly north of Springbank ward. The ward includes the residential areas of Wymans Brook and Swindon Village, although the majority of the ward is rural in nature.
- 13.6.15. Many key services are provided within the ward including green open space facilities, possibly limiting extensive movements through the study area to access day to day services and facilities.
- 13.6.16. The ward is wholly within the catchment area for Swindon Village Primary School. Residents within this ward are located in proximity to this educational facility and can access it without crossing the study area. However, travel across the study area is likely to be required in order to access secondary schools.

Health statistics

Table 13-1 - Baseline Conditions – Human Health: Demographic Profile³

Location	Population	% Under 16	% Over 65
Coombe Hill	4,561	12.9%	19.1%
Badgeworth	2,113	12.3%	29%
Springbank	6,536	20.5%	14.2%
Swindon Village	5,700	17%	13.7%

³ ONS 2011 Census, via www.nomisweb.co.uk

Location	Population	% Under 16	% Over 65
England	53,012,456	18.9%	16.4%

- 13.6.17. Table 13-1 displays the proportion of the local population by ward that were under 16 and over 65 in 2011.
- 13.6.18. In terms of the proportion of the population over 65, Coombe Hill and Badgeworth wards are above the national average, with Springbank and Swindon Village wards falling below the national average.
- 13.6.19. The population figures for under 16s largely mirror the figures for over 65s, with Coombe Hill and Badgeworth wards falling below the national average. Springbank ward has a higher proportion of over 65s than the national average, with Swindon Village falling just below the national average.
- 13.6.20. The figures indicate an overall split in terms of the distribution of age across the wards. Springbank and Swindon Village wards has a younger population overall, whilst Coombe Hill and Badgeworth wards have an older population on average, which could be construed as increased susceptibility to health issues from development when compared to the national average. The elderly and the young are both more susceptible to health issues and have a heavier reliance on primary healthcare. Both age groups will also have greater needs in terms of social infrastructure, and both age groups tend to have greater reliance on public transport, walking and cycling. These four wards are therefore considered to have a greater susceptibility to health issues in terms of the proportion of the population who are under 16 and over 65.

Table 13-2 - Baseline Conditions – Human Health: General Health of Residents ⁴

Location	Very good health	Good health	Fair health	Bad health	Very bad health
Coombe Hill	46.7%	36.4%	12.5%	3.4%	1%
Badgeworth	44.3%	34.5%	14.8%	5.3%	1.1%
Springbank	46.9%	36.5%	13%	2.8%	0.8%
Swindon Village	42.2%	38.7%	13.5%	4.3%	1.3%
England	47.2%	34.2%	13.1%	4.2%	0.9%

- 13.6.21. Table 13-2 displays the various levels of health within the four wards. All wards are below the national average for 'very good health', and all wards except Springbank are above the national average for 'very bad health'.
- 13.6.22. However, all wards are above the national average for 'good health'. Furthermore, Coombe Hill and Springbank wards are below the national average for 'bad health'.
- 13.6.23. The figures indicate that although the population has a higher proportion of over 65s and under 16s than the national average, this has generally not resulted in an increased susceptibility to health issues.
- 13.6.24. It should be noted, however, that figures for Badgeworth are generally unfavourable when compared to the other two wards.

⁴ ONS 2011 Census, via www.nomisweb.co.uk

Table 13-3 - Baseline Conditions – Human Health: Health Limited Activity ⁵

Location	Day-to-day activities limited a lot	Day-to-day activities limited a little	Day-to-day activities not limited
Coombe Hill	6.7%	9.5%	83.8%
Badgeworth	10.3%	11%	78.7%
Springbank	8%	8.9%	83.1%
Swindon Village	5.8%	8.4%	85.8%
England	8.3%	9.3%	82.4%

- 13.6.25. Table 13-3 above reflects the findings in Table 13-2 above, in that those whose day-to-day activities are limited a lot in Badgeworth are above the national average. Furthermore, those whose activities are not limited are below the national average.
- 13.6.26. The rest of the ward statistics are generally favourable when compared to the national average.
- 13.6.27. Overall, the three tables indicate that although the population has a high number of under 16s and over 65s, this is not reflected in any perceived susceptibility to health issues. However, Badgeworth ward has generally unfavourable health statistics when compared to the other three wards.

Access to community, recreational and educational facilities

- 13.6.28. The baseline conditions are characterised by rat-running through residential areas to gain access to the M5 at Junction 11. This can have an adverse effect on driver stress, especially during peak times.
- 13.6.29. Congestion and queuing are also key prevailing conditions for vehicle travellers using the M5 in proximity to Junction 10.
- 13.6.30. The majority of community facilities within the study area are located within the areas of townscape character to the west of Cheltenham. The more rural areas of the study area offer less options for access to community facilities, although this mirrors the density of the population who reside there.
- 13.6.31. It is considered unlikely that residents of the larger settlements such as Cheltenham will travel through the study area in large numbers in order to access these facilities.
- 13.6.32. There are regular bus services which provide public transport access between Cheltenham, Northway and Mitton. These services pass through the study area and there is a limited reliance on the use of private vehicles to access community, recreational and educational facilities.
- 13.6.33. Although residents within isolated locations experience greater severance from the bus network than those within areas of dense townscape, this mirrors the density of these settlements and there is a proportionate level of accessibility based on the density of the townscape.

Access to green space and open space

- 13.6.34. There is very little public green space in the study area, with much of the agricultural land being privately owned. However, the various PRoW within the study area provide WCH access to green space assets outside of the study area.
- 13.6.35. The majority of the study area lies within Green Belt land.

⁵ ONS 2011 Census, via www.nomisweb.co.uk

- 13.6.36. Green and open space in the form of riverside areas at the River Chelt can be accessed from within the study area via a network of PRow linking Cheltenham and the more rural locations to the west of the study area. The network of PRow also provide access to green space outside of the study area, including the River Swilgate and Springfields Park.

Access to healthcare facilities

- 13.6.37. Residents of rural isolated settlements within the study area experience severance from key healthcare facilities located outside the study area, with the majority of GPs and dentist surgeries located within Cheltenham. This is likely to require travel along the A4019, although suitable public transport provision is available.
- 13.6.38. Residents at the eastern end of the study area, within west Cheltenham, experience relatively greater accessibility to healthcare facilities than those residing elsewhere in the study area, due to their relative proximity to these facilities and public transport connections.

The transport network

- 13.6.39. There is an extensive range of footpaths which provide pedestrian access from within and beyond the study area, allowing pedestrian access between the rural settlements. It is considered that these will primarily be used recreationally, although there would be some level of use for commuting, particularly where the PRow provide access to Cheltenham.
- 13.6.40. There is much less bridleway provision in the study area, which restricts the extent to which cyclists and horse riders can travel around the study area.
- 13.6.41. The study area includes the A4019, which provides a key route for vehicular traffic into Cheltenham from the west. The M5 also crosses through the study area. The B4634 provides vehicular access from Bamfurlong to Cheltenham, allowing for local traffic to access Cheltenham whilst avoiding M5 Junction 10.
- 13.6.42. There is ample public transport provision within the study area, providing access from Cheltenham to Tewkesbury, Ashchurch and Northway.

Air quality

- 13.6.43. The air quality study area includes the AQMA administered by CBC for exceedances of the national NO₂ annual mean AQS objective.
- 13.6.44. Further information on the baseline conditions can be found in Chapter 5 Air Quality.

Noise pollution and vibration

- 13.6.45. Road traffic noise from the trunk roads in the study area, such as the M5 and A4019, is the dominant source of ambient noise in the study area.
- 13.6.46. There are a number of NIAs near the Scheme. Close to the M5 there are two NIAs. There is also an NIA on the A4019, to the west of Junction 10, as well as five NIAs on the A4019 to the east of Junction 10.
- 13.6.47. Further information on the baseline conditions can be found in Chapter 6 Noise and Vibration.

Pollution of soils and water

- 13.6.48. There are two historic landfill sites located within the Scheme study area. These are:
- Approximately 140 m north of the Scheme boundary adjacent to the M5 northbound carriageway (Colman's Farm landfill); and
 - Adjacent to the Scheme boundary at the A4019, within Gallagher Retail Park.
- 13.6.49. There have been six recorded pollution incidents to controlled waters within the Scheme study area, the last of which occurred in 1999.
- 13.6.50. Further information on the baseline conditions can be found in Chapter 10 Geology and Soils.

Landscape amenity

- 13.6.51. The Scheme is wholly located in the LCT 'Settled Unwooded Vale'. The key characteristics of this LCT include soft gently undulating to flat landscape, limited woodland cover with mature hedgerow trees and mixed arable and pastoral land use.
- 13.6.52. The Scheme lies wholly within the SV6B: Landscape Character Area (LCA) 'Vale of Gloucester'. However, the M5 forms a spine through the heart of the Vale and there are frequent filtered views towards the motorway from the surrounding Vale landscape and the noise generated by motorway traffic is readily audible.
- 13.6.53. Further information on the baseline conditions can be found in Chapter 9 Landscape and Visual.

Transport user safety

- 13.6.54. Accident data for WCH is to be considered as part of the EIA assessment.

Summary of identified communities

- 13.6.55. Having set out the baseline conditions above in terms of matters that contribute to human health within each of the wards within the study area, this summary defines sub-communities within the study area for the purposes of assessment of Scheme impacts. Each of these sub-communities is assigned a level of sensitivity to change based on the 'community sensitivity' bands established in LA 112.
- 13.6.56. The definition of sub-communities is based on a qualitative judgement that evaluates known characteristics of identified receptors, in terms of their geographical location, function, likely user groups and their susceptibility to experiencing impacts from the Scheme. The geographical extents of these communities have been identified where the receptors relate to residential properties; and other sub-communities have been defined on a receptor-centric basis, such as a recreational or employment destination.
- 13.6.57. The following community clusters have been identified in and around the study area:
- residents of properties at north-west Cheltenham;
 - residents of properties at Uckington;
 - residents of properties adjacent to the B4634;
 - residents of properties at Withybridge Gardens and Stanboro Lane;
 - residents of properties at Withybridge Lane;
 - residents of the informal gypsy and traveller site adjacent to the M5;
 - residents of properties at Hayden;
 - residents of properties at Staverton;
 - residents of properties at Swindon Village;
 - residents of properties at Elmstone Hardwicke;
 - residents of properties at Hardwicke;
 - residents of properties at Boddington;
 - educational community at All Saints' Academy;
 - employees at Gallagher Retail Park; and
 - employees at Kingsditch Trading Estate.
- 13.6.58. Their sensitivity to change has been identified based on evaluating the relative experience of different communities in relation to a number of criteria, including:
- identified ward health profiles;
 - the extent of options for accessibility to communities and key services;
 - existing susceptibility to air, noise and light pollution;
 - density of the community; and
 - existing landscape amenity or townscape character.

- 13.6.59. The following defined communities have been identified as having **high sensitivity to change**:
- residents of properties at Withybridge Gardens and Stanboro Lane;
 - residents of properties at Withybridge Lane;
 - residents of the informal gypsy and traveller site adjacent to the M5;
 - residents of properties at Uckington;
 - residents of properties adjacent to the B4634;
 - educational community at All Saints' Academy;
 - employees at Gallagher Retail Park; and
 - employees at Kingsditch Trading Estate.
- 13.6.60. These communities are identified as having high sensitivity due to their likelihood of experiencing disruption and/or change from the Scheme and often combined with their existing rural character, which is generally allied to good air quality, low background noise levels, tranquillity and good existing landscape amenity in a rural setting.
- 13.6.61. The following defined communities have been identified as having **medium sensitivity to change**:
- residents of properties at Hayden;
 - residents of properties at Staverton;
 - residents of properties at Swindon Village;
 - residents of properties at Boddington;
 - residents of properties at Elmstone Hardwicke; and
 - residents of properties at Hardwicke.
- 13.6.62. These communities are identified as having medium sensitivity to change. Although these communities do not form part of a dense townscape, they already experience noise, air and light pollution due to their proximity to the existing road network. This could potentially reduce the perception of change that may be experienced from the Scheme, when compared to the more rural character of the receptors in the high sensitivity group.
- 13.6.63. Due to their relative proximity to the road network, which includes public transport routes, these communities also experience relatively greater accessibility than the highly sensitive communities.
- 13.6.64. The following defined community has been identified as having **low sensitivity to change**:
- residents of properties at north-west Cheltenham.
- 13.6.65. This community is identified as having low sensitivity due to the availability of different options for access to other communities and service centres. Furthermore, this community is considered to be an area of townscape character, as opposed to rural character; and therefore already experiences sources of light, noise and air pollution.

13.7. Potential impacts – Population

- 13.7.1. Potential impacts, during construction and the first year of operation of the Scheme, on Population sub-topic receptors resulting from the Scheme are set out below. This is then considered against the sensitivity of the affected receptor to change in order to determine resultant effects and, where possible, their likely significance.

Private property and housing

Construction

- 13.7.2. The Scheme will result in reduced access to the properties at north-west Cheltenham from the west of the Scheme and from the M5 due to construction works on the A4019. These properties are of **very high sensitivity to change**. The impact will be temporary in

duration, representing a **minor magnitude of impact**. As such, the resultant effect is likely to be **moderate or large adverse**. In this case, due to the impact being temporary in duration, the resultant effect is likely to be **moderate adverse which is significant**.

- 13.7.3. The Scheme will result in the permanent land take of properties at Stanboro Lane and adjacent to Sheldon Nurseries; and at Withybridge Gardens, which runs adjacent to the A4019 and the Scheme. These properties are of **medium sensitivity to change**. The permanent land take would result in the total loss of the properties, resulting in a **major magnitude of impact**. The resultant effect would therefore be **moderate or large adverse**. In this case, due to the relatively small number of properties lost to the Scheme, a **moderate adverse effect has been identified, which is significant**.
- 13.7.4. The Scheme will result in partial land take of the informal gypsy and traveller site adjacent to the southbound carriageway of the M5 during the construction phase, including vegetation clearance. The primary access route to the site will also be lost due to construction of the southbound off slip widening. This receptor is of **medium sensitivity to change**. The land take would result in site being inaccessible during construction, resulting in a **moderate magnitude of impact**. As such, the resultant effect is likely to be **moderate adverse, which is significant**.
- 13.7.5. The Scheme will result in the demolition of four properties at Uckington, on the southern verge of the A4019. These properties are of **medium sensitivity to change**. The permanent land take would result in the total loss of the properties, resulting in a **major magnitude of impact**. The resultant effect would therefore be **moderate or large adverse**. In this case, due to the relatively small number of properties lost to the Scheme, a **moderate adverse effect has been identified, which is significant**.

Operation

- 13.7.6. At the operational phase, it is considered that the Scheme will improve access for existing residents and incoming residents of any committed residential schemes that will be built out in year one of the Scheme's operation.
- 13.7.7. The Scheme will result in adverse impacts on landscape and the current relative rural setting of the properties in proximity to the proposed access road from the A4019 to the B4634. These properties are of **medium sensitivity to change**. These properties may experience the loss of key characteristics of their rural setting, although this will be considered to be **minor** due to the proximate location of Withybridge Lane. The resultant effect is would therefore be **slight adverse, which is not significant**.
- 13.7.8. The Scheme will provide access to the land allocated under Policies A4, A7 and HD8 when operational. These are considered to be of **very high sensitivity to change**. The Scheme will result in the removal of severance with adequate existing accessibility provision, resulting in a **minor magnitude of impact**. The resultant effect on these allocations could therefore be **moderate or large beneficial**. As the existing accessibility provision is already identified as adequate, the resultant effect is likely to be **moderate beneficial and significant**.

Community land and assets

Construction

- 13.7.9. Potential impacts during construction of the Scheme mostly relate to reduced access and temporary severance for residents wishing to access community facilities within the study area.
- 13.7.10. The Scheme will result in reduced access to Uckington & Elmstone Hardwicke Village Hall and the Circle of Light place of worship due to construction works taking place on the A4019. These receptors are of **medium sensitivity to change**. The impact will be temporary in duration, resulting in a **minor magnitude of impact**. As such, the resultant effect is assessed as **slight adverse and not significant**.
- 13.7.11. The Scheme will result in reduced access to the Cheltenham Civil Service Tennis and Football Clubs due to construction works taking place on the A4019 and the B4634. This

receptor is of **high sensitivity to change**. The impact will be temporary in duration, resulting in a **minor magnitude of impact**. As such, the resultant effect could therefore be **slight or moderate adverse, which could be significant**. In this case, due to the impact being temporary in duration, the resultant effect is likely to be **slight adverse which is not significant**.

- 13.7.12. The Scheme may result in reduced access to St Mary Magdalene Church in Boddington for those wishing to access the receptor via the A4019. This receptor is of **medium sensitivity to change**. The impact will be temporary in duration and alternative access can be made via the A4019 from the west, or from the south via Staverton. As such, the impact will be **minor**. The resultant effect is assessed as **slight adverse and not significant**.
- 13.7.13. The Scheme will result in reduced access to the All Saints Academy due to construction works taking place on the A4019 and the B4634. This receptor is of **medium sensitivity to change**. The impact will be temporary in duration, resulting in a **minor magnitude of impact**. As such, the resultant effect is assessed as **slight adverse and not significant**.

Operation

- 13.7.14. The Scheme will improve access between the study area and other destinations in and around Cheltenham, which could benefit the communities within the study area.
- 13.7.15. Reduced congestion and queuing on the A4019 and in proximity to M5 Junction 10 may result in reduced severance during operation for residents wishing to access community facilities such as St Mary Magdalene Church, All Saints Academy, Uckington & Elmstone Hardwicke Village Hall and the Circle of Light place of worship. These receptors are of **medium sensitivity to change**. The change in accessibility will amount to the removal of severance with adequate existing accessibility provision, resulting in a **minor magnitude of impact**. The resultant effect is assessed as **slight beneficial and not significant**.
- 13.7.16. The Scheme may also result in increased accessibility to the Cheltenham Civil Service Tennis and Football Clubs, which are of **high sensitivity to change**. The change in accessibility will amount to the removal of severance with adequate existing accessibility provision, resulting in a **minor or moderate magnitude of impact, which could be significant**. As the existing accessibility provision is already identified as adequate, the resultant effect is likely to be **minor beneficial, which is not significant**.

Development land and businesses

Construction

- 13.7.17. Key construction effects to development land and local businesses relate to disrupted access to key employment sites within the study area due to increased congestion. However, some cases of land take will also occur to facilitate the development of the Scheme.
- 13.7.18. Access to the businesses at Kingsditch Trading Estate and Gallagher Retail Park will be temporarily reduced, particularly from the west, due to construction works on the A4019 and at M5 Junction 10. These receptors are of **very high sensitivity to change**. The impact will be temporary in duration, resulting in a **minor magnitude of impact**. As such, the resultant effect could be **moderate or large adverse**. As the impact will be temporary, the effect is identified as **moderate adverse, which is significant**.
- 13.7.19. Martine's Flowers florist, Glos Detailing valeting service and Sheldon Nurseries horticultural nursery will be subject to land take in order to construct the Scheme. These receptors are of **high sensitivity to change**. As the land take will amount to the acquisition of land compromising viability of the receptors, a **moderate magnitude of impact will occur**. The resultant effect could be **moderate or large adverse**. As the impact will compromise the viability of the receptor, the resultant effect is identified as **large adverse, which is significant**.

- 13.7.20. Access will be temporarily reduced at the House in the Tree pub located on the B4634 / Withybridge Lane junction. This receptor is of **medium sensitivity to change**. The impact will be temporary in duration, resulting in a **minor magnitude of impact**. As such, the resultant effect is assessed as **slight adverse and not significant**.
- 13.7.21. Access to Comfy Campers camper van hire company, Distinctive Ironwork blacksmith and Cheltenham Auto Services vehicle repair shop on the A4019 west of Uckington will be reduced during construction of the Scheme. These receptors are of **medium sensitivity to change**. The reduced access will be temporary in duration, resulting in a **minor magnitude of impact**. As such, the resultant effect is assessed as **slight adverse and not significant**.

Operation

- 13.7.22. The Scheme will contribute to unlocking access to key employment allocations and employment generating development which has planning permission outside of the study area.
- 13.7.23. Within the study area, the Scheme will unlock and provide access to Policies A4 and A7 which both exceed 5 ha of proposed employment land, and as such are of **very high sensitivity to change**. Unlocking these allocations will amount to the removal of complete severance with no accessibility provision, resulting in a **major magnitude of impact**. The resultant effect is assessed as being **very large beneficial and significant**.
- 13.7.24. The Scheme will improve access to businesses within the study area, particularly on the A4019 and in proximity to M5 Junction 10, due to a reduction in congestion and queuing. These businesses include the Glos Detailing van hire service, the Gloucester Old Spot pub and Stanboro Cottage Fish Farm, which are of **medium sensitivity to change**. The operational Scheme will amount to the removal of severance with adequate existing accessibility provision, a **minor magnitude of impact**. The resultant effect is assessed as being **slight adverse and not significant**.
- 13.7.25. The proposed Elms Park junction will provide increased access into the Gallagher Retail Park, due to the revised junction providing greater accessibility for those accessing the site from Cheltenham through reduced queuing. The businesses at Gallagher Retail Park are of **very high sensitivity to change**. The operational junction will remove severance where adequate accessibility is provided, resulting in a **minor magnitude of impact**. The resultant effect could therefore be **moderate or large beneficial**. As the existing accessibility provision is already identified as adequate, the resultant effect is likely to be **moderate beneficial, which is significant**.

Agricultural land holdings

Construction

- 13.7.26. Around 18 ha will be acquired temporarily during the construction phase for compounds and haul roads and stockpiles and these will affect all holdings, but the locations of these are only provisional.
- 13.7.27. In all but one case the temporary land take will probably not add significantly to the impact of permanent land take. No additional severance will be caused and so, with one exception, temporary land take impacts are assessed in the PEIR as only **minor**.
- 13.7.28. A construction compound, topsoil store and temporary working areas, totalling a little over three hectares will be sited on Holding I, and here the the impact will be **moderate**.
- 13.7.29. The greatest amount of land take will result from the construction of the link road and its roundabouts, removing land from Holdings C, E, F, H, I and K.
- 13.7.30. There will be land take on the edge of fields alongside the M5, A4019 and B4634, through road widening, but the areas are small.
- 13.7.31. Attenuation ponds will each occupy about one ha in fields on Holdings A, C, I and J.
- 13.7.32. The link road will sever Holdings C, F, H and I.

- 13.7.33. Some field accesses off the A4019 and south of the B4634 will be closed, but alternatives are incorporated in the Scheme design so they are not considered to be residual impacts.
- 13.7.34. Compensatory floodplain will occupy around 10 ha on Holding B in the south east quadrant of Junction 10 and a smaller area of 1.4 ha on Holding I.
- 13.7.35. The topsoil and upper subsoil will be stripped and temporarily stockpiled and the lower subsoil removed to the required depth to form a floodplain. The topsoil and upper subsoil will be replaced and the land returned to farming, but its quality will be inferior and more suited to grass than arable cropping.
- 13.7.36. A barn on Holding I at Uckington, currently used for housing young livestock and machinery, will be demolished by the widening of the A4019 at Uckington.
- 13.7.37. Most of the affected land contains field drains and ditches which may be affected during construction. In particular, there is an important collector drain on the boundary of Holding B and Withybridge Gardens that carries water under the M5.
- 13.7.38. All grass fields have water troughs fed by mains water. Some troughs and mains will be affected during construction.
- 13.7.39. Some fields and woodlands are in grant schemes which may be affected if the land is taken.
- 13.7.40. Noise and dust have the potential to affect crops and livestock during construction. The greatest impact of noise would be on housed livestock within 40 m of a construction site but this does not apply here. Livestock are in fields and free to move away if disturbed.

Operation

- 13.7.41. The assumption is that all impacts will have ceased by the end of year one of operation and will be no new impacts to agricultural holdings after that time. The residual effects of land-take and severance will, however, persist.

Walkers, Cyclists and Horseriders

Construction

- 13.7.42. Principal construction impacts of the Scheme on WCH derive from the temporary stopping up of footpaths within the study area. In the majority of cases, alternative routes adding a shortest diversion as possible are available and the magnitude of impact will therefore be minor or negligible. Such impacts only result in potentially significant adverse effects where the affected PRow has a sensitivity of high or very high.
- 13.7.43. The Scheme will result in the temporary stopping up of Boddington Footpath 16 which passes underneath the M5 adjacent to the River Chelt. This PRow is of **high sensitivity to change**. Although journey distances will increase, the impact on the footpath will be temporary in duration, representing a **minor magnitude of impact**. The resultant effect on the users could be **slight or moderate adverse, which could be significant**. As the impact on the footpath will be temporary in duration, the resultant effect is assessed as **slight adverse and not significant**.
- 13.7.44. The Scheme will result in the temporary stopping up of Uckington Bridleway 1 in order to construct the A4019 element of the Scheme. This receptor is of **high sensitivity to change**. Although journey times will increase, the duration of the impact will be temporary, representing a **minor magnitude of impact**. The resultant effect on the users could be **slight or moderate adverse, which could be significant**. As the impact on the footpath will be temporary in duration, the resultant effect is assessed as **slight adverse and not significant**.
- 13.7.45. The Scheme will result in the temporary stopping up of Boddington Footpath 14 in order to construct the new junction. This receptor is of **medium sensitivity to change**. The impact will be temporary in duration and alternative access routes are available, representing a **minor magnitude of impact**. The resultant effect on the users is assessed as **slight adverse and not significant**.

Operation

- 13.7.46. The majority of effects on WCH relate to the construction phase. It is anticipated that the mitigation measures set out in Section 13.9 will ensure that any potentially significant construction effects are mitigated through design such that they do not endure into the operational phase. However, this should be reviewed through the final detailed design at the next stage of EIA. This will ensure that where mitigation measures such as structures and diversions result in significant increases in journey length and loss of convenience, effects will be identified.

13.8. Potential impacts – Human Health

- 13.8.1. Potential impacts on Human Health receptors resulting from the Scheme are also set out below.
- 13.8.2. The initial Human Health sub-categories have been considered cumulatively within the identified communities, taking into account that each identified community may experience a number of health effects simultaneously. The sub-categories considered are listed below:
- the location and type of community, recreational, educational, green/open space and healthcare facilities and severance/separation of communities from such facilities;
 - the spatial characteristics of the transport network and usage in the study area;
 - air quality management areas and ambient air quality;
 - areas recognised as being sensitive to noise;
 - sources and pathways of potential pollution;
 - landscape amenity; and
 - safety information associated with the existing affected road network.
- 13.8.3. Information collated from stakeholder consultation will be incorporated into the next stage of the assessment within the ES.
- 13.8.4. Taking into account the cumulative nature of the Human Health assessment, the Human Health sub-categories outlined above have been amalgamated in three Human Health topics. These topics, which are termed as follows, have been used to organise the reporting of the assessment undertaken:
- connections and ease and movement – draws together consideration of the experience of severance/separation; and the characteristics of the transport network and usage patterns;
 - amenity and enjoyment of the environment – collectively considers the experience of impacts on air quality, noise and landscape amenity; and
 - physical health – takes account of pollution risks to health; and safety for all users of the road network.
- 13.8.5. Each identified community is assessed against the three defined human health topics. However, the assessment only draws out those topics where an effect has been identified. Where no reference is made to a particular Human Health topic, the assessment has not identified a likely impact interaction relating to that topic.
- 13.8.6. Human Health effects are assessed during construction and up to year 15 of operation: the 'year 15 future year scenario'. This allows for the assessment to include any potential changes in the population's perceptions of the environment over time, as well as any landscape mitigation planting being semi-mature after 15 years.
- 13.8.7. This also takes into account the notion that after year 15 of operation, population and health effects associated with routine maintenance operations are unlikely to be significant.

Residents of properties at north-west Cheltenham

Construction

- 13.8.8. Residents of properties at north-west Cheltenham are considered to have **low sensitivity to change**. Construction works may result in decreased ease of movement relating to access to community, recreational, educational and healthcare facilities both within and outside the study area. However, it is considered likely that residents in this cluster would utilise facilities in Cheltenham, avoiding the construction works. Furthermore, as the effects will be temporary, this is likely to result in a **neutral health outcome**.
- 13.8.9. The Scheme has the potential to affect physical health at the construction stage. The Scheme runs across the River Chelt and this has potential to cause pollution through run off from construction sites. Notwithstanding the fact that the duration of the impacts would be temporary, the significance of any negative health outcome would be reduced by achieving construction best practice through a CEMP or similar construction management measures. A **neutral health outcome** is predicted.

Operation

- 13.8.10. The Scheme will alleviate congestion on the A4019 and consequently will ensure that key community, recreational, educational and healthcare services both within and beyond the study area will be subject to increased accessibility. A **positive health outcome** will therefore occur up to year 15 of operation.

Residents of properties at Uckington

Construction

- 13.8.11. Residents of properties at Uckington are considered to have **high sensitivity to change**. Construction works are expected to result in a decrease in amenity due to the proximity of the Scheme to the properties. Although the duration of the effects will be temporary and controls would be provided through a CEMP or equivalent, the proximity to the route alignment will result in a **negative health outcome**.
- 13.8.12. Physical health may also be adversely affected through dust emissions and reduced air quality. A **negative health outcome** is predicted due to the proximity of the properties to the works, although by achieving construction best practice through a CEMP or similar construction management measures, a **neutral health outcome** may occur.

Operation

- 13.8.13. The Scheme will alleviate congestion on the A4019 and consequently will ensure that key community, recreational, educational and healthcare services both within and beyond the study area will be subject to increased accessibility. A **positive health outcome** will therefore occur up to year 15 of operation.
- 13.8.14. It is possible that increased numbers of vehicles travelling at higher speeds due to ease of traffic movement may result in reduced physical health for residents in this cluster. Mitigation measures such as a pedestrian crossing across the A4019 may reduce the severity of the **negative health outcome**. Furthermore, it is considered that, by year 15, the residents will be accustomed to the conditions.
- 13.8.15. The Scheme may also result in reduced amenity as a result of increased numbers of vehicles travelling at higher speeds resulting in increased noise. However, the residents at this cluster already experience adverse noise due to the proximity to the A4019. Furthermore, the proposed noise barrier, the design of which is to be finalised, will further mitigate any adverse impacts relating to amenity, resulting in a **neutral health outcome**.

Residents of properties adjacent to the B4634

Construction

- 13.8.16. Residents of properties adjacent to the B4634 are considered to have **high sensitivity to change**. Residents may experience adverse construction impacts relating to noise and air quality, affecting both amenity and physical health. However, the impacts will be temporary, and a **neutral health outcome** is envisaged.
- 13.8.17. Ease of movement may also be adversely affected due to potential disruption to traffic flow along the B4634 resulting from the new link road construction works. However, the impacts will be temporary, and a **neutral health outcome** is envisaged.

Operation

- 13.8.18. Residents are likely to experience reduced amenity due to the presence of the new link road, both in terms of the road structure being a proximate land feature to the community, and the resultant noise impacts from the new road. Although a **negative health outcome** is predicted, this is considered to be the case for year 1 of operation, as by year 15, residents will be accustomed to the conditions, as well as mitigation planting maturing to form a noise and visual barrier.

Residents of the informal gypsy and traveller site

Construction

- 13.8.19. Residents of the informal gypsy and traveller site are considered to have **high sensitivity to change**. Construction works are expected to result in a decrease in amenity due to the proximity of the Scheme to the properties. Although the duration of the effects will be temporary and controls would be provided through a CEMP or equivalent, the proximity to the route alignment will result in a **negative health outcome**.
- 13.8.20. Residents may experience adverse construction impacts relating to noise and air quality, affecting both amenity and physical health, due to the construction of the southbound off-slip. Although the impacts will be temporary, due to the sensitivity of the cluster a **negative health outcome** is envisaged.
- 13.8.21. Residents will experience reduced access and ease of movement relating to the stopping up of the primary access route into the site. Due to the sensitivity of the cluster a **negative health outcome** is envisaged.

Operation

- 13.8.22. Residents may experience reduced amenity in the form of increased noise and reduced air quality due to the presence of the larger all-movements junction, as well as the southbound off-slip. Although a **negative health outcome** is predicted, this is considered to be the case for year 1 of operation, as by year 15, residents will be accustomed to the conditions, as well as mitigation planting maturing to form a noise and visual barrier.
- 13.8.23. Without appropriate mitigation through design, residents at the site will experience a **negative health outcome** relating to reduced access and ease of movement due to the stopping up of the primary access route into the site, which will endure into the operational phase.

Residents of properties at Withybridge Gardens and Stanboro Lane

Construction

- 13.8.24. Residents of properties at Withybridge Gardens and Stanboro Lane are considered to have **high sensitivity to change**. The majority of residents will be displaced due to the requirement to construct the Scheme on the footprint of these properties. However, at least two will remain at Stanboro Lane, which will experience a decrease in amenity due to the proximity of the Scheme to the properties. Although the duration of the effects will

be temporary and controls would be provided through a CEMP or equivalent, the proximity to the route alignment will result in a **negative health outcome**.

- 13.8.25. Decreased ease of movement may also occur due to the works taking place at M5 Junction 10 and on the A4019. Access to Cheltenham will be restricted and may require the use of M5 Junction 11 to reach Cheltenham during peak usage periods on the road network. When considering this and the proximity of the cluster to a key section of the Scheme, it is envisaged that a **negative health outcome** will occur.

Operation

- 13.8.26. Residents are likely to experience reduced amenity in the form of increased noise due to the proximity of the northbound on-slip at the proposed junction being in closer proximity to the existing alignment. Although a **negative health outcome** is predicted, this is considered to be the case for year 1 of operation, as by year 15, residents will be accustomed to the conditions, as well as mitigation planting maturing to form a noise and visual barrier.
- 13.8.27. It is envisaged that increased ease of movement will be enjoyed by the residents in this cluster due to the Scheme resulting in reduced congestion and queuing in the study area. A **positive health outcome** will therefore occur up to year 15 of operation.

Residents of properties at Withybridge Lane

Construction

- 13.8.28. Residents of properties at Withybridge Lane are considered to have **high sensitivity to change**. Residents may experience adverse construction impacts relating to noise and air quality, affecting both amenity and physical health, due to the construction of the link road. Although the impacts will be temporary, due to the sensitivity of the cluster a **negative health outcome** is envisaged.

Operation

- 13.8.29. Residents are likely to experience reduced amenity due to the presence of the new link road east of Withybridge Lane, both in terms of the road structure being a proximate land feature to the community which could affect the current characteristic features of the cluster, and the resultant noise impacts from the new road. Although a **negative health outcome** is predicted, this is considered to be the case for year 1 of operation, as by year 15, residents will be accustomed to the conditions, as well as mitigation planting maturing to form a noise and visual barrier.
- 13.8.30. However, residents may also experience reduced noise resulting from the link road providing an alternative option for vehicle travellers accessing the B4634 from the A4019 and vice-versa. A **positive health outcome** will therefore occur up to year 15 of operation, which could offset the noise element of the negative health outcome outlined above.

Residents of properties at Hayden

Construction

- 13.8.31. Residents of properties at Hayden are considered to have **medium sensitivity to change**. Key impacts during construction are likely to relate to decreased ease of movement in a northerly direction due to the construction works taking place on the B4634. However, residents in this cluster can access Cheltenham via Golden Valley and the Arle Court roundabout, and the M5 can be accessed via junction 11. Therefore, a **neutral health outcome** is envisaged.

Operation

- 13.8.32. During the operational phase residents at this cluster should experience increased ease of movement due to the Scheme alleviating congestion generally, as well as the introduction of the new link road providing another option for accessing the A4019 and M5 Junction 10. A **positive health outcome** is envisaged up to year 15 of operation.

Residents of properties at Staverton

Construction

- 13.8.33. Residents of properties at Staverton are considered to have **medium sensitivity to change**. Residents may experience decreased amenity as a result of potential rat-running from vehicle travellers avoiding the construction works and travelling south from the A4019, resulting in increased noise. This may also result in reduced physical health due to the safety concerns of increased vehicle numbers possibly travelling at high speeds. However, the impacts will be temporary and a **neutral health outcome** will occur.

Operation

- 13.8.34. Residents should experience increased ease of movement due to the Scheme alleviating congestion generally, as well as the introduction of the new link road providing another option for accessing the A4019 and M5 Junction 10. A **positive health outcome** is envisaged up to year 15 of operation.

Residents of properties at Swindon Village

Construction

- 13.8.35. Residents of properties at Swindon Village are considered to have **medium sensitivity to change**. Key impacts are likely to relate to reduced ease of movement relating to the construction works taking place on the A4019. However, residents will be able to avoid the construction works to access Cheltenham, can also access M5 Junction 9 via the A435. Furthermore, the impacts will be temporary in duration. As such a **neutral health outcome** is predicted.

Operation

- 13.8.36. During operation residents should experience increased ease of movement due to the Scheme alleviating congestion generally, as well as the introduction of the dualled A4019 providing increased access to M5 Junction 10. A **positive health outcome** is envisaged up to year 15 of operation.

Residents of properties at Elmstone Hardwicke and Hardwicke

Construction

- 13.8.37. Residents of properties at Elmstone Hardwicke are considered to have **medium sensitivity to change**. Key impacts during construction are likely to relate to decreased ease of movement for residents wishing to access the A4019 and M5 Junction 10. Although other routes are available to access M5 Junction 11 in the north, residents would be required to travel through the works area to access Cheltenham via a reasonable route. As such, although the impact will be temporary in duration, a **negative health outcome** is predicted.
- 13.8.38. Residents may also experience decreased amenity and physical health as a result of potential congestion on the A4019 resulting in vehicle travellers using The Green and The Orchard as a rat-run to avoid the works and access destinations in the north. However, the impacts will be temporary and a **neutral health outcome** will occur.

Operation

- 13.8.39. During operation residents should experience increased ease of movement due to the Scheme alleviating congestion generally, as well as the introduction of the dualled A4019 providing increased access to M5 Junction 10. A **positive health outcome** is envisaged up to year 15 of operation.

Residents of properties at Boddington

Construction

- 13.8.40. Residents of properties at Boddington are considered to have **medium sensitivity to change**. Key impacts during construction are likely to relate to decreased ease of movement for residents wishing to access the A4019 and M5 Junction 10. However, residents can access Cheltenham via Staverton and the B4634, and the impacts will be temporary. As such, a **neutral health outcome** is likely to occur.
- 13.8.41. Residents may also experience decreased amenity as a result of potential rat-running from vehicle travellers avoiding the construction works and travelling south from the A4019, resulting in increased noise. This may also result in reduced physical health due to the safety concerns of increased vehicle numbers possibly travelling at high speeds. However, the impacts will be temporary and a **neutral health outcome** will occur.

Operation

- 13.8.42. It is envisaged that increased ease of movement will be enjoyed by the residents in this cluster due to the Scheme resulting in reduced congestion and queuing in the study area. A **positive health outcome** will therefore occur up to year 15 of operation.

Educational community at All Saints' Academy

Construction

- 13.8.43. The educational community at All Saints' Academy is considered to have **high sensitivity to change**. It is possible that construction works may reduce access to All Saints Academy. However, it is considered that sufficient routes are available and access is only generally required during specific time slots in the day. Furthermore, the catchment area for the facility extends towards Cheltenham in the east, and avoids the Scheme works area. As a result, a **neutral health outcome** is predicted.

Operation

- 13.8.44. The Scheme will result in a **positive health outcome** for the educational community at All Saints Academy as a result of increased access to the facility. As the community is identified as being of high sensitivity to change, it is considered that the positive health outcome will be evident at both year 1 and by year 15 of operation.
- 13.8.45. However, the introduction of free-flowing traffic along main access route to the facility could give rise to increased risk of damage to physical health to vulnerable road users, particularly cyclists and new drivers. A **negative health outcome** is predicted.

Employees at Gallagher Retail Park and Kingsditch Trading Estate

Construction

- 13.8.46. Employees at Gallagher Retail Park are considered to have **high sensitivity to change**. Construction works in proximity to the site may reduce accessibility for employees wishing to access the site from Cheltenham and M5 Junction 10 due to increased congestion and associated delays. A **negative health outcome** is predicted.
- 13.8.47. The proximity of the works in relation to the cluster may also give rise to a temporary **negative health outcome** relating to both amenity and physical health. This is due to elevated dust deposition from construction works, as well as construction vehicle movements resulting in adverse noise and air quality impacts. Appropriate mitigation measures during the construction phase may reduce any negative health outcome associated with construction.

Operation

- 13.8.48. The Scheme will provide increased levels of access to the site due to the Scheme alleviating congestion on the A4019. Those using public transport will also experience

increased levels of access. This will result in a **positive health outcome** for the employees at both year 1 and year 15 of operation.

13.9. Potential mitigation measures

13.9.1. There are opportunities to introduce mitigation and enhancement measures into the Scheme design, and the management of construction of the Scheme. The design would be developed with the impacts on Population and Human Health, sensitive receptors and future development requirements in mind. The use of best practice construction methods would reduce disruption to users of sensitive receptors near the Scheme and minimise the effects on the community, especially those susceptible or vulnerable to health issues. This includes mitigation measures identified in the other topic specific assessments that have been taken into consideration in this Population and Human Health assessment.

13.9.2. It is recommended that the following mitigation measures should be implemented at the construction and operational stages of the Scheme.

Construction

13.9.3. The following mitigation measures should be implemented during construction:

- The extent of direct, permanent land take affecting identified individual receptors should be minimised;
- Users of affected PRow, footpaths and cycleways should be notified of planned diversions, and closures, with signs along sections to be closed during construction, at least one month prior to the work;
- Construction works should be programmed so that affected PRow, footpaths or cycleways remain open for part, or the duration, of the construction period, and also that other routes can act as a diversion route for those affected. Diversions should avoid exceeding a maximum diversion distance of 250 m;
- All the environmental design mitigation from the other topics, notably Landscape, Air Quality and Noise and Vibration which are linked to this topic should be implemented;
- Clear signage and provision of access information for all users during construction and before operation should be provided. Appropriate temporary traffic management and signage will reduce the potential for injury and death during the construction phase;
- Pedestrian linkages and accessibility should be maintained;
- Public transport routes and stops should be maintained / disruption managed;
- Restrictions to working hours should be used to limit the amenity impact on users of green space;
- During construction there is no environmental mitigation temporary land take apart from the provision of livestock fencing. Financial compensation is matter for negotiation between the district valuer and landowner and is outside the scope of this PEIR;
- Land acquired temporarily will be restored to its original capability. This will be achieved through a Soil Handling and Management Plan (also known as a Soil Resources Plan), according to Defra's Construction Code of Practice for the Sustainable Use of Soils on Construction Sites;
- There is no environmental mitigation for permanent land-take. Financial compensation is matter for negotiation between the district valuer and landowner and is outside the scope of this PEIR;
- The link road will also render unusable 0.3 ha of land belonging to Holding H, west of the link road and this is likely to be purchased for the Scheme;
- Any impact on these payments is a matter for negotiation between the district valuer and landowner and is outside the scope of this PEIR;
- No farmland will be permanently severed by the Scheme. Agricultural vehicles, but

not walking livestock, will be able to cross the link road. Handling pens will be needed on either side of the road and recessed field entrances provided for farm vehicles to stop safely while gates are opened;

- A cattle creep may be created under the link road where it crosses the River Chelt;
- Alternative accesses will be provided where these are lost by widening of the A4019 and B4634;
- There is no environmental mitigation for demolition of a building. Replacement or financial compensation is matter for negotiation between the district valuer and landowner and is outside the scope of this PEIR;
- Water troughs displaced by the Scheme will be located and reconnected to a water main; and
- Dust suppression measure will be in place during dry weather. Noise abatement measures should not be necessary as livestock are not housed close to the construction areas and can move away if disturbed.

Operation

13.9.4. The following mitigation measures should be implemented during operation:

- Enhanced connectivity for WCH through the revised M5 Junction 10 and continuity of connection to the wider footpath network west of the junction;
- Improved WCH experience along the A4019 and the Link Road such that it is safer and continuous and does not require users to cross the road, except in safe locations where signalised crossings are provided;
- Careful consideration should be given to the positioning of crossing facilities, focusing on known or anticipated desire lines in the interests of encouraging their use and enhancing safety for all users. This is especially important relative to bus stops and school charter bus stops;
- Careful consideration should be given to pedestrian priority and ease of movement through the new junction design;
- Opportunities should be explored to enhance equestrian provision as a benefit from the Scheme, including crossing provision;
- Clear signage and access information for all users should be provided before and during operation;
- The production of a communication plan by GCC would help inform the local community (particularly residents, employees, road users and WCH of the improvements to accessibility, connectivity and journey times delivered);
- Pedestrian linkages and accessibility should be maintained;
- During the operational phase, clear lighting and signage provision, as well as appropriate WCH crossing facilities, should reduce fear of accidents and the extent to which accidents occur; and
- In terms of agricultural land holdings there will be no additional impacts requiring mitigation during operation of the Scheme.

13.9.5. There is no environmental mitigation for permanent land-take. Financial compensation is matter for negotiation between the district valuer and landowner and is outside the scope of this PEIR.

13.9.6. The link road will also render unusable 0.3 ha of land belonging to Olney west of the link road, adjacent to Millhouse Farm and this is likely to be purchased for the Scheme.

13.9.7. Any impact on grant scheme payments is a matter for negotiation between the district valuer and landowner and is outside the scope of this PEIR.

13.9.8. There is no environmental mitigation for demolition of a building. Replacement or financial compensation is matter for negotiation between the district valuer and landowner and is outside the scope of this PEIR.

13.10. Residual effects – Population

- 13.10.1. This section focuses on impacts that have the potential to result in significant effects once approaches to avoiding, lessening or mitigating effects have been taken into account – these are termed potentially significant residual effects.

Private property and housing

- 13.10.2. The Scheme is likely to result in a **moderate adverse significant effect** relating to reduced access to the properties at north-west Cheltenham, a **very high sensitivity** receptor. It may be possible to reduce the residual effect through mitigation measures such as ensuring appropriate signage to divert road users away from the works to reduce queuing and delays. Further mitigation measures could include providing residents with a notification letter regarding the Scheme, including traffic management measures and contact details for the contractor team. With these mitigation measures applied, however, it is considered that the residual effect would still be **moderate adverse and significant**. This is due to the mitigation measures outlined being unable to reduce the magnitude of impact to negligible.
- 13.10.3. The Scheme will result in the permanent land take of properties at Stanboro Lane and adjacent to Sheldon Nurseries; and at Withybridge Gardens, which runs adjacent to the A4019 and the Scheme. The resultant effect is considered be **moderate adverse and significant**. This cannot be mitigated in regards to this assessment and will require compensation, which falls outside the scope of this assessment. The **moderate adverse significant effect** will therefore remain.
- 13.10.4. The Scheme will result in the demolition of four properties at Uckington, on the southern verge of the A4019. The resultant effect is identified as **moderate adverse which is significant**. This also cannot be mitigated in regards to this assessment and will require compensation, which falls outside the scope of this assessment. The **moderate adverse significant effect** will therefore also remain.
- 13.10.5. The Scheme will result in the partial land take of the informal gypsy and traveller site adjacent to the southbound carriageway of the M5. The resultant effect is identified as **moderate adverse and significant**. In order to reduce the significance of the effect, opportunities should be explored to reduce the footprint of the construction buffer zone during the construction phase. Furthermore, the landscape impact and noise buffer effect of the removed vegetation adjacent to the carriageway should be replicated in the environmental design. This would reduce the residual effect to **slight adverse, which would not be significant**. Furthermore, it should be considered that this effect is unlikely to endure into the operational phase, as the land will be returned to its original use upon operation of the Scheme.

Community land and assets

- 13.10.6. There are no identified significant residual effects relating to community land and assets for the Scheme.

Development land and businesses

- 13.10.7. Access to the businesses at Kingsditch Trading Estate and Gallagher Retail Park will be temporarily reduced, particularly from the west, due to construction works on the A4019 and at M5 Junction 10. A **moderate adverse effect** is predicted. Proposed mitigation measures to reduce the significance of the effect could include ensuring that the majority of the non-noisy works fall outside of core trading hours, to avoid further impacts on residents. This could include deconstructing rather than demolishing during these hours, which would reduce the amount of construction time required during core trading hours. This could ensure that the residual effect is reduced to **slight adverse which would not be significant**.
- 13.10.8. Martine's Flowers florist, Glos Detailing valeting service and Sheldon Nurseries horticultural nursery will be subject to land take in order to construct the Scheme. The effect is assessed as **large adverse which is significant**. This cannot be mitigated in

regards to this assessment and will require compensation which falls outside the scope of this assessment. The **large adverse significant effect** will therefore remain.

Agricultural land holdings

- 13.10.9. Agricultural land temporarily acquired for haul roads and construction compound will be restored to farming and so the residual effect will be neutral.
- 13.10.10. Alternative field accesses are incorporated into the Scheme design, where necessary, and so there is no change in terms of farming operations.
- 13.10.11. Repair of field drains and replacement of water troughs will have been carried out by the end of construction and so the effect will be **neutral**.
- 13.10.12. Permanent agricultural land-take cannot be mitigated and this, coupled with the effects of division of land on internal farm traffic and livestock movements by the link road, means the residual effect on five holdings will be **moderate adverse which is significant**.
- 13.10.13. Four significantly affected holdings (C, F, H and I) are severed by the link road and the fifth is Holding B where there will be a large FCA.
- 13.10.14. Table 13-1A in Appendix 13.2 summarises the main impacts on individual holdings, proposed mitigation and residual effects.

Walkers, cyclists and horse riders

- 13.10.15. There are no identified significant residual effects relating to WCH for the Scheme.

13.11. Residual effects – Human Health

- 13.11.1. The methodology for assessing the nature of effects on human health does not seek to assign significance. Consequently, this section provides a narrative on those communities identified as potentially experiencing negative health outcomes after taking account of the proposed mitigation and enhancement measures.
- 13.11.2. The mitigation measures proposed are considered effective in addressing negative health outcomes identified in relation to constraints on access during construction and operation, through maintaining vehicular access to identified communities throughout; and the provision of minor diversions for WCH, which would be well-related to existing routes and clearly signed and publicised.
- 13.11.3. The residual effects represent instances where mitigation cannot currently be assured to remove the potential for a negative health outcome on 'human health' sub-topic receptors.

Connections and ease of movement

- 13.11.4. A **negative health outcome** has been identified in relation to decreased ease of movement for residents wishing to access the A4019 and M5 Junction 10. The **negative health outcome** will remain during construction as an attractive alternative access route is unlikely to be available. However, the negative health outcome will be **neutral** during operation.
- 13.11.5. A **negative health outcome** has been identified relating to the stopping up of the primary access route into the informal gypsy and traveller site. The provision of an alternative access route, included as part of the design, will ensure that the effect will be reduced to a **neutral health outcome**.

Amenity and enjoyment of the environment

- 13.11.6. A **negative health outcome** has been identified in relation to construction impacts relating to noise and air quality due to the construction of the southbound offslip. Further noise barriers and construction mitigation could be implemented through liaison with a noise consultant. With this application of mitigation and the consideration that the impacts will be temporary in duration, a **neutral health outcome** may be ensured.
- 13.11.7. A **negative health outcome** has been identified in relation to loss of amenity at the properties at Uckington, as well as at Withybridge Lane. As with the above, further noise

barriers and construction mitigation could be implemented through liaison with a noise consultant. With this application of mitigation and the consideration that the impacts will be temporary in duration, a **neutral health outcome** may be ensured.

- 13.11.8. A **negative health outcome** has been identified in relation to loss of amenity for residents at Withybridge Gardens and Stanboro Lane. Although the presence of the northbound on-slip may impact of the characteristics of the setting of the properties which remain, increased landscaping and noise mitigation may reduce the impact, especially considering the relative proximity of the current junction. This may reduce the effect to a **neutral health outcome**.

Physical health

- 13.11.9. A **negative health outcome** has been identified in relation to vehicles travelling at higher speeds at Uckington. It is considered that the introduction of dedicated cycle lanes may ensure a **neutral health outcome** for cyclists, although the **negative health outcome** for new drivers and pedestrians would remain.
- 13.11.10. A **negative health outcome** has been identified in relation to free-flowing traffic giving rise to increased risk of damage to physical health to vulnerable road users at All Saints' Academy. As above, the introduction of dedicated cycle lanes may ensure a **neutral health outcome** for cyclists, although the **negative health outcome** for new drivers would remain.

13.12. Cumulative effects

- 13.12.1. In terms of inter-project effects, the Population assessment takes into account committed residential and employment developments through both the local policy plans and through developments going through the planning process. This chapter therefore considers inter-project cumulative effects as a core element of the methodology. The consideration of cross-topic intra-Scheme cumulative effects is to be addressed in the next stage of the EIA, reported in the cumulative effects assessment chapter.
- 13.12.2. In terms of intra-Scheme effects, the Human Health assessment is by nature a cumulative effects assessment of the various topic chapters that feed into this assessment. The human health assessment therefore provides a cumulative assessment of the various health determinants outlined in the baseline conditions section of this chapter.

13.13. NPS compliance

- 13.13.1. The following text provides a summary of compliance with the key policy requirements in the NN NPS which relate to the sub-topics in the Population and Human Health assessment.
- 13.13.2. Paragraph 2.23 states the Government's overall vision to improve overall quality of life, journey quality, reliability and safety and link up communities. Junction improvement is stated as being a key driver for this. The Scheme seeks to provide an all-movements junction which will contribute towards unlocking housing and job opportunities in and around Cheltenham. The planned 35,175 new homes and 39,500 new jobs by 2031 will improve the quality of life within and around Cheltenham, and Scheme will increase the capacity of the highways network, ensuring that the infrastructure is in place to enable these housing and economic developments. The Scheme is therefore considered to align with this policy.
- 13.13.3. Paragraph 3.3 ensures that delivery of new schemes will improve quality of life and avoid and mitigate environmental and social impacts, as well as improve accessibility and inclusivity and reduce community severance. The Scheme design has been finalised after an option assessment process whereby the most favourable option from an environmental perspective has been taken forward. Where adverse environmental and social impacts have been anticipated, appropriate mitigation has been included to ensure that any significant adverse effects are minimised. The Scheme therefore conforms with this policy.

- 13.13.4. Paragraph 3.19 ensures that schemes will improve accessibility, reduce community severance and connect people with jobs, services, friends and family. The Scheme will ensure that any community severance is largely confined to the construction phase, as a result of construction works and traffic management measures. The operational Scheme will improve connectivity to key employment and housing sites both within and beyond the study as a result of the increased capacity on the road network. The Scheme is therefore considered to align with this policy.
- 13.13.5. Paragraphs 5.162 and 5.184 highlight access to open space, PRow, the countryside and opportunities for sport and recreation as potential means for providing mitigation and/or compensation for schemes. The Scheme will provide a new PRow at the revised Junction 10, and the Scheme will seek to preserve and enhance the network of PRow in proximity to the works which provide access to open space, sport and recreation facilities both within and beyond the study area. The Scheme is considered to align with this policy.

13.14. Assumptions and limitations

- 13.14.1. The following assumptions and limitations have been applied to the methodology for this assessment:
- Potential effects on population and human health receptors arising from the reassignment of traffic will be completed once relevant traffic data is available;
 - The assessment provides a broad, high level indication of potential effects on Population and Human Health, both adverse and beneficial, and is based on a proportionate assessment;
 - Assessment is based upon a desk-based study of the area and professional judgement and knowledge based on previous highway schemes;
 - The assessment is preliminary only and some elements will need to be refined with consultation and site work. As such, there are elements of the assessment that will be confirmed in later stages of the EIA process at PCF Stage 3;
 - The search for planning applications and development land provides a snapshot of the key planning developments in proximity to the Scheme. This will need to be updated periodically, including close to the submission and planned implementation of the Scheme;
 - The main limitation to the agricultural assessment is reliance on aerial imagery, farming directories and professional judgement rather than actual interviews with landowners and occupiers. It is intended to carry out interviews with agricultural land holdings owners/occupiers at the next stage of the assessment;
 - No user surveys or consultation regarding community land or assets have been undertaken as part of the assessment. This will be included in future stages of assessment as appropriate. For this assessment, comments relating to likely usage levels are based on an application of professional judgement;
 - Whilst it will be possible to identify changes to some of the determinants of health likely to arise from the route options, health outcomes are dependent on multiple factors, some of which rest with individuals and/or outside the powers or influence of physical infrastructure and/or planning decisions. Identifying health effects of the Scheme and their significance will therefore be a qualitative exercise. The findings are based upon a desk-based study of the area, along with professional judgement and knowledge based on previous similar schemes. Information, where relevant, is also used from other specialist topic assessments to help to assess the magnitude of impact of the Scheme on receptors; and
 - The Human Health assessment section of this chapter is by nature a cumulative assessment that considers the human health impacts of all environmental effects of the route options. Therefore, there will be a degree of overlap between this chapter and the other technical chapters, including Air Quality, Noise & Vibration, Landscape and Road Drainage and the Water Environment.

13.15. Chapter summary

- 13.15.1. The Scheme results in a number of residual effects that are significant. These predominantly relate to land take of private property at Stanboro Lane, Withybridge Gardens and Uckington.
- 13.15.2. A significant residual effect will also occur at Martine's Flowers florist, Glos Detailing valeting service and Sheldon Nurseries horticultural nursery due to land take being required in order to construct the Scheme.
- 13.15.3. The significance of the above effects cannot be mitigated – they are a matter for compensation, which falls outside the scope of the Population assessment.
- 13.15.4. A significant residual effect relating to reduced access to the properties at north-west Cheltenham will also occur. Current proposed mitigation is unable to effectively reduce the effect to the point where it would not be significant.
- 13.15.5. Eleven agricultural holdings are affected by the Scheme and the main impacts arise from the construction of the link road which significantly adversely affects four holdings. Holding B will suffer loss of quality on 10 ha and the the adverse effect on the holding will also be significant.
- 13.15.6. In terms of Human health, residual negative health outcomes have been identified in relation to vehicles travelling at higher speeds at Uckington and at All Saints' Academy.

13.16. References

- 13.16.1. DMRB Guidance (LA112).
<https://www.standardsforhighways.co.uk/dmrb/search/1e13d6ac-755e-4d60-9735-f976bf64580a>
- 13.16.2. Office for National Statistics (2011) Census data. www.nomisweb.co.uk
- 13.16.3. Department for Environment, Food and Rural Affairs (2009), Construction Code of Practice for the Sustainable Use of Soils on Construction Sites.
<https://www.gov.uk/government/publications/code-of-practice-for-the-sustainable-use-of-soils-on-construction-sites>

The discipline specific chapters of this PEIR have been produced as separate documents.

14. Climate

15. Cumulative Effects Assessment

Appendices to the Population and Human Health chapter

- Appendix 13.1
- Appendix 13.2



Appendix 13.1 – Figure

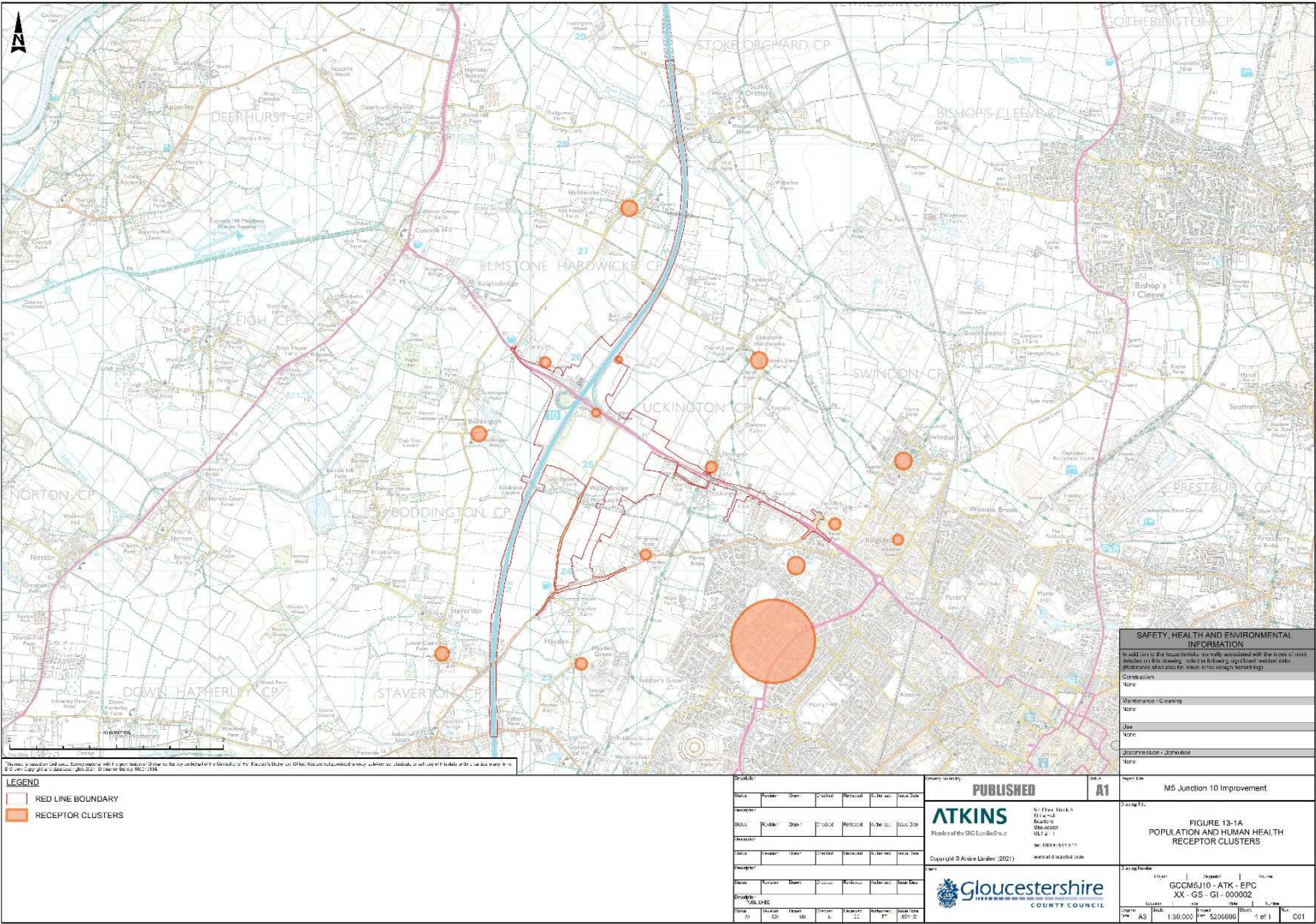


Figure 13-1A - Population and human health receptor clusters

Appendix 13.2 - Table of impacts, mitigation and residual effects on agricultural holdings

Table 13-1A - Impacts, mitigation and residual effects on agricultural holdings

Holding	Size and land use	Sensitivity	Land-take and severance	Impact without mitigation	Environmental mitigation	Impact with mitigation	Residual adverse effect
Holding A	52.6 ha Grazing and arable.	Medium	Permanent loss of up to 2 ha to M5 widening and attenuation pond. Access from A4019 will be retained. Some temporary land-take.	Minor	None possible for land-take. Restoration of temporarily acquired land to its original condition.	Minor	Slight
Holding B	65 ha mainly arable farm with some grazing. Woodland in Farm Woodland Scheme.	Medium	10 ha required for compensatory floodplain. Loss of Farm Woodland Scheme payments	Moderate due loss of land quality on compensatory floodplain.	None possible for compensatory floodplain.	Moderate	Moderate (significant)
Holding C	19.6 ha of grass.	Medium	Permanent loss of up to 3.7 ha to link road and attenuation pond. Severance of two fields.	Moderate	None possible for permanent land-take. Provide recessed gateways and handling pens in severed fields.	Moderate	Moderate (significant)

Holding	Size and land use	Sensitivity	Land-take and severance	Impact without mitigation	Environmental mitigation	Impact with mitigation	Residual adverse effect
			Some temporary land-take.				
Holding D	10 ha of arable and grass.	Medium	Permanent loss of up to 1.7. ha. Alternative access to be provided from A4019. Some temporary land-take.	Minor	None possible for land-take	Minor	Slight
Holding E	70 ha Arable farm.	Medium	Permanent loss of up to 1 ha. Some temporary land-take.	Minor	None possible for land-take	Minor	Slight
Holding F	21 ha of arable and grass.	Medium	Permanent loss of up to 1.7 ha to link road. Some temporary land-take.	Moderate	None possible for land-take. Provide recessed gateways and handling pens in severed fields.	Moderate	Moderate (significant)
Holding G	46 ha of arable.	Medium	Alternative access to be provided from A4019, so access unaffected. Permanent loss of up to 2.0 ha to road widening and junction. Some temporary land-take.	Minor	None possible for land-take.	Minor	Slight

Holding	Size and land use	Sensitivity	Land-take and severance	Impact without mitigation	Environmental mitigation	Impact with mitigation	Residual adverse effect
Holding H	49 ha of grazing.	Medium	Permanent loss of up to 9.0 ha to link road and attenuation ponds. Severance of two fields Loss of barn. 1.4 ha required for compensatory floodplain. Some temporary land-take.	Moderate due to land-take and loss of land quality on compensatory floodplain.	None possible for land-take Provide recessed gateways and handling pens in severed fields. Alternative access to be provided from A4019 next to fire station.	Moderate	Moderate (significant)
Holding I	12 ha of arable.	Medium	Permanent loss of up to 2.5 ha including loss of use of 0.3 ha west of link road. Severance of two fields. Temporary land take for compound and topsoil storage.	Moderate	None possible for land-take. Provide recessed gateways and handling pens in severed fields.	Moderate	Moderate (significant)
Holding J	In excess of 300 ha. Mainly arable.	Medium	Permanent loss of up to 3 ha to M5 widening and attenuation pond. Alternative access provided from A4019 east of M5. Some temporary land-take.	Minor	None possible for land-take.	Minor	Slight

Holding	Size and land use	Sensitivity	Land-take and severance	Impact without mitigation	Environmental mitigation	Impact with mitigation	Residual adverse effect
Holding K	41 ha of arable and grass.	Medium	Permanent loss of around 0.3 ha. Some temporary land-take.	Negligible	None possible for land-take	Negligible	Slight



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