

M1 Junction 19 Improvement
Environmental Statement
Volume 1
Final

REPORT CONTROL SHEET

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Volume 1

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1. INTRODUCTION

1.1 Introduction to the Project and its Location

- 1.1.1 This Environmental Statement (ES) reports the findings of an Environmental Impact Assessment (EIA) carried out for the proposed M1 Junction 19 Improvement, also described in the ES as 'the improvement'.
- 1.1.2 The proposals were announced as the 'Preferred Route' for the improvement by the Secretary of State for Transport in February 2009¹, following public consultation in 2008.
- 1.1.3 M1 Junction 19 forms the intersection between three major parts of the motorway and trunk road network, M1 and M6 and the A14 Trunk Road. The A14 and M6 also form part of the Ireland / UK / Benelux Trans European Network.
- 1.1.4 Figure A shows the location of the project and the current layout of the M1, M6 and A14 intersection. The scheme is in Leicestershire within the District of Harborough, close to the boundaries of Northamptonshire and Warwickshire. Figure B shows the proposed layout. Both plans are included in the separate Appendix 1 to the ES which contains all the plans and illustrations referred to in this volume.
- 1.1.5 More than 100,000 vehicles per day currently use the junction, approximately 20% of which are Heavy Goods Vehicles (HGV's). Free flow links cater for movements between the M6 and M1 south of the junction, but there are no links between the A14 and M1 (south of the junction). A 'dumbbell' or double roundabout arrangement beneath the M1 caters for all other movements at the junction, and provides access to the villages of Catthorpe and Swinford via minor local roads.
- 1.1.6 The existing junction suffers from several problems including congestion, delays and long queues which contribute to accidents sometimes resulting in serious injuries and fatalities. There are also conflicts between local and long distance traffic and poor conditions for vulnerable users.
- 1.1.7 The proposed improvement aims to relieve congestion at the junction, making the roads safer and decreasing journey times, whilst minimising the environmental impacts of the project.
- 1.1.8 The improvement would be constructed on three levels and would be similar in height to the existing junction. It would involve the construction of new free flow links:-
- A14 to M1 northbound
 - M1 southbound to A14
 - M6 to A14 in both directions
- 1.1.9 The M1 motorway would be retained on its current alignment and the existing link from M1 northbound to M6 would be modified.
- 1.1.10 The existing link between M6 and M1 southbound will be modified as part of a maintenance project to replace the Catthorpe Viaduct, due to begin in Summer 2010. The Catthorpe Viaduct carries this link over the M1. It could be utilised in situ by the proposals for M1 Junction 19, but because of its present structural condition the bridge requires replacing to safeguard the integrity of the motorway network.

The proposals to replace Catthorpe Viaduct have been subject to a separate environmental assessment², but their implications are also described in this ES.

- 1.1.11 The improvement would require seven new bridges in addition to Catthorpe Viaduct. Two existing bridges would be modified and three demolished. There would also be changes to existing lighting and gantry provision. The new links would all be constructed to motorway standard, dual two lane carriageways for the M6 to A14 link and single lane carriageways for the remainder, all with hard shoulders.
- 1.1.12 Existing access to the junction from local roads would be closed. A new Local Road Network (LRN) would be provided to maintain access between villages, including a local route under the junction between Swinford and Catthorpe, a new link between Rugby Road and Shawell Lane to the north of the M6, and improvements to Shawell Lane. The local road would be constructed to a width of six metres.
- 1.1.13 Facilities would be provided for vulnerable users, pedestrians, cyclists and horse riders, both as part of the local road network to provide direct utility links, and in the form of new and diverted field paths to provide recreational links.
- 1.1.14 Land take of approximately 25 hectares of mainly agricultural land would be required to accommodate the improvement including the local road network and facilities for vulnerable users. This area also includes measures to reduce, or mitigate adverse environmental effects including tree and shrub planting, wildlife habitats and new drainage ponds to reduce flooding and protect water quality. Other environmental measures would include low noise surfacing for all new motorway and trunk road construction.
- 1.1.15 Approximately 6.5 hectares of agricultural land would also be required temporarily to accommodate working space, the storage of materials and contractor's compound before being returned to agricultural use. These areas are illustrated on Figure G in Appendix 1.

1.2 Legal Basis for the Environmental Statement

- 1.2.1 The requirement to carry out a statutory EIA and publish an ES only applies to projects that are deemed to exceed thresholds and are predicted to have a significant effect on the environment. The process for deciding whether it is necessary to carry out an EIA and publish an ES is called Screening.
- 1.2.2 The EIA Regulations³ implement in relation to highways in England and Wales, European Council Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 97/11/EC and Directive 2003/35/EC. Together these are described in this report as the EIA Directive⁴.
- 1.2.3 The screening process establishes:-
 - Whether the project falls within Annex I of the EIA Directive where EIA is mandatory, or Annex II where a process of determination is required
 - Whether an Annex II project represents a 'relevant project' by virtue of its size and environmental sensitivity
 - The determination of which focuses on whether the project is likely to have a significant effect on the environment

- 1.2.4 The Secretary of State for Transport has determined that an EIA for the M1 Junction 19 Improvement is required:-
- As a motorway improvement the project falls into Annex II of the EIA Directive⁴
 - It is a 'relevant project' under the regulations because it exceeds one hectare in extent
 - It is likely to have a significant effect on the environment
- 1.2.5 In accordance with the EIA Regulations³, the Highways Agency published a Notice of Determination on 18 June 2009 on behalf of the Secretary of State for Transport, to confirm that an EIA of the project was being undertaken.

1.3 Purpose of the Environmental Statement

1.3.1 The ES provides a systematic and objective account of the likely significant environmental effects of the project and the measures proposed to mitigate, that is to prevent, reduce or offset adverse effects. It ensures that the likely significant effects on the environment are understood and taken into account before a decision on whether to proceed with the project is made.

1.3.2 Effects can be:-

- Permanent or temporary
- Positive or negative
- Direct or indirect
- Secondary, or cumulative with other projects
- Short, medium or long term

1.3.3 Methods used to assess environmental effects for highways and whether or not they are significant are those set out in official guidance published by the Government in the Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment⁵. This process is set out in detail in Section 4 of this Volume.

1.3.4 Publishing the ES gives the public, statutory environmental bodies and any other interested parties an opportunity to express their opinion on the likely significant environmental effects of the project before it is initiated. Any comments can then be considered by the Secretary of State for Transport before a decision is taken whether to proceed with the project. The availability of the ES and the procedure for making comments is set out in Section 1.6 below.

1.3.5 The ES is published in association with the following draft Orders prepared under the Highways Act⁶:-

- The M1 Motorway (Junction 19 Improvement) (A14 Trunk Road) Order 2010
- The M1 Motorway (Junction 19 Improvement) (Motorway and Connecting Roads) Scheme 2010
- The M1 Motorway (Junction 19 Improvement) (M6 Motorway and connecting Roads) Scheme 2010
- The M1 Motorway (Junction 19 Improvement) Side Roads Order 2010
- The M1 Motorway (Junction 19 Improvement) Compulsory Purchase Order 2010
- The A14 Trunk Road (Prohibition of Vehicles and 24 Hours Clearway) Order 2010

- Station Road Bridleway Link (Public Path Creation Order) 2010
- Swinford Road Footway Link (Public Path Creation Order) 2010

1.3.6 The draft Orders are available for inspection at the deposit points listed in Section 1.6.

1.4 Scope and Structure of the ES

Information Required by the EIA Directive

1.4.1 The ES reports the findings of the EIA and in particular it contains the information required by the EIA Directive⁴, in Annex IV of Council Directive 97/11/EC, as set out in Table 1.1 below.

Table 1.1 : Information Required by the EIA Directive

1.	<p>Description of the project, including in particular:-</p> <ul style="list-style-type: none"> • a description of the physical characteristics of the whole project and the land-use requirements during the construction and operational phases, • a description of the main characteristics of the production processes, for instance, nature and quantity of the materials used, • an estimate, by type and quantity, of expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc.) resulting from the operation of the proposed project.
2.	An outline of the main alternatives studied by the developer and an indication of the main reasons for this choice, taking into account the environmental effects.
3.	A description of the aspects of the environment likely to be significantly affected by the proposed project, including, in particular, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the inter-relationship between the above factors.
4.	<p>A description of the likely significant effects of the proposed project on the environment resulting from:-</p> <ul style="list-style-type: none"> • the existence of the project, • the use of natural resources, • the emission of pollutants, the creation of nuisances and the elimination of waste, <p>and the description by the developer of the forecasting methods used to assess the effects on the environment.</p>
5.	A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment.
6.	A non-technical summary of the information provided under the above headings.
7.	An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the developer in compiling the required information.

Scope of the EIA

1.4.2 Consultations were carried out with a wide variety of interested parties at an early stage of the EIA between February and May 2009 to agree the scope of the assessment in terms of:-

- the topics to be assessed
- the study area to be covered
- survey and data gathering

- the level of assessment required
- the criteria used to assess significance
- the range of consultations proposed
- the method of reporting in terms of the schedule of this ES

1.4.3 The process was assisted by a Scoping Report⁷ issued to consultees including statutory environmental bodies, local authorities, non-statutory environmental organisations and local parish councils. The results of the scoping consultation and issues raised are set out in Section 4.3.

Structure of the Environmental Statement

1.4.4 The ES is divided into three main sections.

Non-Technical Summary

1.4.5 This leaflet summarises the effects of the project and illustrates the proposals. It is available separately, but is also bound to Volume 1.

Volume 1

1.4.6 This is designed as a self-standing comprehensive report of all issues, covering all topics. Volume 1 is set out as follows:-

- **Introduction.** This section introduces the project and its location. It sets out the legal basis of the ES, its purpose, structure and availability.
- **The Project.** This section sets out the reasons for the project, its history to date and the objectives to be achieved. It provides a description of:-
 - the planning background
 - the junction and its setting
 - the proposals, including major highways, the LRN and public rights of way
 - mitigation measures and where possible proposals to enhance the environment
 - land requirements during construction and operation
 - the construction, operation and long term management of the project
 - traffic issues
- **Alternatives.** This provides an outline of the alternative options considered, including those presented at public consultation in 2008, and the main reasons for the choice of preferred route.
- **Environmental Impact Assessment Methods.** This section provides an overview of the EIA process, the study area, and the scoping and consultations carried out in 2009. It sets out the techniques used in the assessment including any constraints or difficulties in compiling the required information. The criteria used to establish whether effects are likely to be significant or not are described.
- **Statement of Key Issues.** This provides a summary of the main issues identified by the scoping.
- **Topics.** Each of the environmental topics covered in detail in Volume 2 is summarised, including the existing environmental or 'baseline' conditions and their relative value or sensitivity, the magnitude of impacts and significance of effects upon the environment, taking into account the proposed mitigation measures.

- **Assessment of Cumulative Effects.** This part considers the cumulative effect of different impacts arising from other projects which need to be considered in combination with the proposals for M1 Junction 19.
- **Outline Environmental Management Plan.** The plan sets out the processes in place to ensure that the mitigation measures are delivered.
- **Conclusions.** A summary of the EIA and the mitigation and enhancement measures that have been committed to. This section confirms which effects of the project are considered to be significant and describes how the project objectives have been fulfilled.

1.4.7 Volume 1 also provides a set of references and a glossary to explain technical terms.

1.4.8 Appendix 1 to Volume 1 contains all the main drawings and illustrations for the project as a common reference document for Volumes 1 and 2. It is available separately.

Volume 2

1.4.9 Volume 2 is a set of topic chapters presented in more detail, with more technical content including specialist drawings and appendices. The topics covered are those set out in the DMRB Volume 11⁵, they are set out below and each is available separately:-

- Chapter 0 : Introduction and Contents
- Chapter 1 : Air Quality and Climate Change
- Chapter 2 : Cultural Heritage
- Chapter 3 : Ecology and Nature Conservation
- Chapter 4 : Landscape
- Chapter 5 : Materials
- Chapter 6 : Noise and Vibration
- Chapter 7 : Effects on All Travellers
- Chapter 8 : Community and Private Assets
- Chapter 9 : Road Drainage and the Water Environment

1.4.10 A confidential badger report has also been produced as an addendum to Chapter 3, but will not be published as the information it contains is considered sensitive for reasons of animal welfare.

1.4.11 Each chapter follows the same basic contents as follows:-

- **Introduction** : This also sets out the relevant objectives for each topic and the interactions between the chapters.
- **Methodology** : This sets out the relevant guidance for each topic, including the Design Manual for Roads and Bridges (DMRB) Volume 11⁵. Each chapter also sets out the criteria used to define the potential significance of effects for the assessment.
- **Legislation and policy framework** : This sets out the relevant national and international legislation and local land-use policies relevant to each topic.
- **Baseline Conditions** : A description of the existing environmental conditions, together with an analysis of their relative value and sensitivity to environmental impact.

- **Mitigation** : A description of the measures to be included as an integral part of the design and which can therefore be taken into account in terms of avoiding, reducing or remedying adverse effects. This section also identifies measures to enhance the environment and includes future monitoring requirements.
- **Magnitude of impacts** : Consideration is given to both beneficial and adverse impacts and those which are temporary or permanent in nature. In particular the assessment considers impacts due to the construction of the project and those when the road is complete and operational. Where appropriate, the assessment identifies potential impacts with and without mitigation measures.
- **Significance of effects** : The overall significance of effects is defined taking into account value / sensitivity of the existing environment, the magnitude of impacts and mitigation measures.
- **Indication of any difficulties encountered** : This section identifies, for example, when the assessment may have been hampered by the unavailability of data or access for surveys.
- **Summary** : Overall conclusions. Compliance with objectives set out in the introduction is also assessed.

1.5 The Team Preparing the ES

- 1.5.1 The Contractor for the M1 Junction 19 Improvement is Skanska who were appointed, together with their designers Jacobs in March 2005.
- 1.5.2 The environmental team and the production of the EIA has been co-ordinated by Barry Moore of Jacob's environmental sub-consultant Moore Environment.
- 1.5.3 The specialist team leaders for the ES are as follows:-

Air Quality and Climate Change	Yvonne Brown	Bureau Veritas
Cultural Heritage	Vicki Score	University of Leicester Archaeological Services
Ecology and Nature Conservation	Nick Steggall	Middlemarch Environmental
Landscape	Barry Moore	Moore Environment
Materials	Anna Firth	Jacobs
Noise and Vibration	Rob Hill	AIRO
Effects on All Travellers	Andrew Drake	Jacobs
Community and Private Assets	Ted Rogers	Acorus
Road Drainage and the Water Environment	Sharon Woodruff	Jacobs
Policies and Plans	Marie-Louise-Gray	Jacobs

1.6 Availability and Comments

1.6.1 Copies of the full ES may be inspected free of charge together with copies of the draft Orders, at the following locations during business hours until 21st May 2010.

Highways Agency
5 Broadway
Broad Street
Birmingham
B15 1BL

Leicestershire County Council
County Hall
Glenfield
Leicester
LE3 8RA

Daventry District Council
Lodge Road
Daventry
Northamptonshire
NN11 4FP

Northamptonshire Central Library
Abington Street
Northampton
NN1 2BA

Lutterworth Library
George Street
Lutterworth
Leicestershire
LE17 4ED

Harborough District Council
Council Offices
Adam and Eve Street
Market Harborough
Leicestershire
LE16 7AG

Rugby Library and Information Centre
Little Elborow Street
Rugby
Warwickshire
CV21 3BZ

1.6.2 A CD of the full ES is available free of charge. There is also no charge for the Non-Technical Summary. Copies can be obtained from the Highways Agency using the contact details set out below.

M1 Junction 19 Improvement Team
Room C8
Highways Agency
Broadway
Broad Street
Birmingham
B15 1BL

Telephone: 08457 504030
E-Mail: m1junction19@highways.gsi.gov.uk

1.6.3 Printed copies of the ES can also be purchased from the Highways Agency at this address. The ES is priced as follows:-

- Volume 1(without Figures): £10.00
- Appendix 1(Figures): £10.00
- Volume 2 (All Chapters): £75.00

1.6.4 Prices for the individual parts of Volume 2 are available upon request.

- 1.6.5 An electronic copy of the Non-Technical Summary is also published online at www.highways.gov.uk.
- 1.6.6 A notice of the Environmental Statement has been published on behalf of the Secretary of State for Transport on 25th February 2010 in accordance with Section 105B of the Highways Act 1980 (as amended).
- 1.6.7 This gives formal notice that the Secretary of State for Transport has published an ES and confirms its availability.
- 1.6.8 The notice confirms that any comments about the project and / or the ES should be made in writing to the Secretary of State at the Highways Agency's address given above and should arrive with the Secretary of State no later than 21st May 2010.
- 1.6.9 It also confirms that the Secretary of State will take all written comments into consideration before deciding whether or not to proceed with the project, with or without modifications.

1.7 What Happens Next?

- 1.7.1 The publication of the draft Orders allows the public to examine the proposals and make comments in the form of support or objection. Following publication of draft Orders there will be an official objection period of 12 weeks during which time written representations can be made. Any expressions of support or objection should be sent or e-mailed to the Highways Agency at the address given in Section 1.6 of this report no later than 21st May 2010.
- 1.7.2 Depending on the nature and number of objections received, a Public Inquiry may be held before an independent Inspector. If an inquiry is to be held, all those who have responded during this period will be notified individually at least six weeks beforehand. Notices will also appear in the local press.
- 1.7.3 All comments received will be made available to the Inspector, who may decide to make them public. The information sent may also need to be passed to colleagues within the Highways Agency or agents acting on their behalf and may be published along with a response from the Government.
- 1.7.4 The Highways Agency assumes those making comments are content for them to be published and that if replying by e-mail their consent overrides any confidentiality disclaimer that is generated by their organisation's information technology system, unless they specifically include a request to the contrary in the main text of their submission. Anyone requesting their name or response to be kept confidential should ensure they state this clearly in their response. (Confidential responses will be included in any statistical summary of numbers of comments received and views expressed). Publicity will be given to any alternative proposals received.
- 1.7.5 Following any Inquiry, the Secretary of State will then consider the Inspector's Report, together with any objections and representations made, before making a decision on the future of the scheme.
- 1.7.6 Booklets explaining the statutory process for rights of compensation can be obtained free of charge from the Highways Agency team at the address in Section 1.6.

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2. THE PROJECT

2.1 Background and Reasons for the Project

2.1.1 The existing junction raises several issues:-

- There are considerable delays for traffic from the M1, M6 and the A14 especially during peak periods.
- The high volume of traffic regularly causes long queues on the A14 and on exit slip roads on the M6 and the M1, the latter two frequently extending to the main line.
- The queues on the M6 and M1 cause high severity accidents including a number of fatal accidents. Numerous accidents also occur at the existing dumbbell roundabouts.
- The existing junction layout is inadequate for the demands placed upon it and allows mixing of local traffic, including non-motorised traffic (ie. vulnerable users), with strategic movements. This is not compliant with the normal layouts for junctions connecting strategic routes of such importance. Also, the existing configurations of the dumbbell roundabouts make them awkward for use by HGV's and other vehicles.
- The general layout of the junction and high volume of traffic makes it unattractive for pedestrians, cyclists and equestrians.

2.1.2 If no improvements are made these problems will get worse.

2.1.3 The aim of the project is to resolve these issues. The project objectives as set out in the Preferred Route Announcement¹ are to:-

- Relieve congestion at the junction and improve journey reliability
- Improve road safety
- Separate local traffic from long distance traffic
- Improve conditions for cyclists, pedestrians and horse riders
- Provide good value for money

2.2 A Brief History of the Project to Date

2.2.1 Table 2.1 below sets out the project history. The various junction options described are illustrated by Figure E in Appendix 1 and described in more detail in Section 3 Alternatives Considered.

Table 2.1 : History of the Project

Date	Event
1998	The Government published 'A New Deal for Trunk Roads in England'. It identified M1 Junction 19 as a key junction on the strategic highway network that was experiencing considerable traffic congestion, delays and safety problems.
December 2000	Road Based Study commenced. The purpose of this study was to undertake a detailed appraisal of the congestion and safety problems at the junction, to identify viable and sustainable options to address the problems and to recommend a preferred strategy for action and investment.
June 2002	Public Consultation held.

Date	Event
February 2003	Preferred Improvement Scheme announced. In this report this is described as the Blue Junction.
March 2005	Contract awarded to Skanska under Early Contractor Involvement (ECI).
March 2006	Draft Orders and ES prepared for Preferred Route, but not published.
July 2006	Value Management exercise commenced to determine whether better value alternatives exist.
January 2007	Findings of Value Management study presented. Five potential solutions were identified, these being:- <ul style="list-style-type: none"> • Blue Junction and Green LRN • Brown Junction and Green LRN • Red Junction and Orange LRN • Red Junction and Purple LRN • Red Junction and Green LRN
July 2007	Formal Comparative Assessment ¹³ of the five Junction Improvement options commenced.
January 2008	Findings of the Comparative Assessment presented with the recommendation that all five options be taken to public consultation.
June 2008	Public Consultation.
February 2009	Preferred Route announced based on Red Junction and Orange LRN, taking into account the findings of the Comparative Assessment and views expressed during the public consultation.
February 2010	Environmental Statement and draft Orders published.

2.3 Project Objectives

2.3.1 Section 2.1 confirms the objectives set out in the Preferred Route Announcement¹. This section sets out in more detail the objectives set by the Department for Transport for the project.

Strategic Case

2.3.2 A strategic case for the project is set by:-

- HM Treasury Public Service Agreement 5 – Deliver reliable and efficient transport networks that support economic growth⁸.
- Towards a Sustainable Transport System, Supporting Economic Growth in a Low Carbon World. Department of Transport, October 2007⁹.
Department of Transport Business Plan 2008-09¹⁰.

2.3.3 The various Indicators, Goals and Departmental Strategic Objectives for the project are set out below.

HM Treasury Public Service Agreement 5 – Deliver reliable and efficient transport networks that support economic growth.

a) *Indicator 1 – Journey time on main roads into urban areas*

A free flow link between the M6 and A14 will eliminate traffic queues that currently build up on the M6 southbound off-slip and back onto the mainline of the M6. Eliminating these queues will decrease congestion and decrease the accident rate, both of which will decrease journey times and increase journey time reliability on the key M6 connection to Birmingham.

- b) *Indicator 2 – Journey time reliability on the strategic road network as measured by the average daily experienced in the worst 10% of journeys for each monitored route.*

In addition to relieving congestion on the M6 into and out of Birmingham, improving the junction will decrease journey times for traffic movements between the UK's largest conurbations, for example London – Birmingham, and on the key A14 corridor, which links the port of Felixstowe with the Midlands.

Towards a Sustainable Transport System Supporting Economic Growth in a Low Carbon World, Department for Transport, October 2007.

- a) *Goal – Maximising the overall competitiveness and productivity of the national economy, so as to achieve a sustained high level of GDP growth.*

M1 Junction 19 is at the north-west edge of the Milton Keynes – South Midlands Growth Area, which will see the provision of over 100,000 new houses in Northamptonshire by 2021. Efficient operation of both the A14 and M1, including their junctions, is critical to delivering the Government's growth agenda,

- b) *Goal – Reducing transport's emissions of CO₂ and other greenhouse gases, with the desired outcome of avoiding dangerous climate change.*

Improving flow rates and reducing the frequency of queues decreases the amount of fuel burned for a given journey and hence emissions. An increase in traffic volumes will negatively impact emissions.

- c) *Goal – Contributing to better health and longer life expectancy through reducing the risk of death, injury or illness arising from transport, and promoting travel modes that are beneficial to health.*

The current non-standard junction arrangement is inappropriate for a route of this importance (M1-A14-M6). Congestion regularly causes long tailbacks on to the M6, M1 and A14 and results in a high volume of accidents, which is a particular concern to the emergency services. There were seven fatal accidents in 2008.

- d) *Goal – Improving quality of life for transport users and non-transport users, including through a healthy natural environment, with the desired outcome of improved well-being for all.*

Maintaining key local links and relieving congestion on the local roads improves the living environment for the local community. Transport users benefit from improved journey times, ambience and road quality.

- e) *Goal – Promoting greater equality of transport opportunity for all citizens, with the desired outcome of achieving a fairer society.*

The existing junction, due to its cramped layout, is a hazard to local vehicular and non-motorised user movements. Farm traffic with direct access to the trunk road also conflicts with through traffic. Proposals include separating the local roads from the junction to segregate strategic and local traffic flows. The proposal includes a safer alternative route between the villages of Catthorpe and Swinford along with modifications to the existing public rights of way.

Department for Transport Business Plan. The plan sets out four Departmental Strategic Objectives (DSO) as set out below

- f) *DSO1 To sustain economic growth and improved productivity through reliable and efficient transport networks.*

As described above, the improved junction will increase the reliability, resilience, safety and efficiency of a key part of the strategic transport network. See a) and c) above.

- g) *DSO2 To improve the environmental performance of transport and tackle climate change.*
See d) and f) above.
- h) *DSO3 To strengthen the safety and security of transport.*
For safety see c) and e) above. The link will be built to current standards, which are designed to support transport security.
- i) *DSO4 To enhance access to jobs, services and social networks, including for the most disadvantaged.*
See c) and g) above.

2.3.4 Junction 19 forms an important interchange between three major routes – the M1 and M6 motorways, and the A14 trunk road. More than 100,000 vehicles per day use this junction and there has been significant growth in east-west traffic since the opening in the early 1990's of the A14, which forms part of the Trans European Network (TEN), a key trade corridor.

2.3.5 The current non-standard junction arrangement is inappropriate for a strategically important route (A14-M6) carrying over 40,000 vehicles per day with a high proportion of heavy goods vehicles.

2.3.6 The Department for Transport (DfT) has set several objectives which are included in their requirements for the scheme. They are presented below in terms of:-

- Overall objectives
- The government's objectives for transport
- Other objectives
- Special requirements

Overall Objectives

2.3.7 The DfT's overall objectives for the project are as follows:-

- The project shall provide high value for money, when compared with its whole life costs.
- The scheme shall resolve the problems stated above under challenges and issues.
- Ensure that the scheme is designed to suit the requirements of ongoing maintenance and to minimise whole life costs.
- Current design standards should be adhered to unless there is an economic case for a departure.

The Government's Objectives for Transport

2.3.8 Objectives outlined in a New Deal for Transport¹¹ and A New Deal for Trunk Roads¹² White Papers are set out below.

Transport

- Once open to traffic, the scheme shall reduce queuing on the M6, M1 and A14 due to congestion at the junction. For the design life of the scheme there shall be no stationary queues on the main line of the M6, M1 or A14, due to congestion at M1 Junction 19.
- The scheme should provide free-flow links for the major traffic flows between the trunk roads at the junction.

- The scheme shall improve journey times and journey time reliability for the strategic traffic travelling on the trunk roads through the junction, from the time of opening and through the design life of the scheme, compared to the 'do-minimum' baseline.

Environment

- The detrimental environmental effects of the scheme shall be offset by mitigation efforts where technically feasible and economic to do so.

Safety

- The scheme shall reduce the number of vehicular collisions occurring at or near the junction due to queuing and congestion at the junction from the time the scheme opens to traffic and through its design life.
- The scheme should ensure appropriate safety measures are implemented for vulnerable users.

Accessibility

- The scheme should aim to minimise the impact of the additional severance of local thoroughfares for non-motorised (vulnerable) users.

Integration

- The scheme should not be to the detriment of local and regional development plans or other government policy.

Interfaces with Other Projects

- Ensure that the design takes into account the proposed capacity improvements on the M6 from J11a to J19
- Ensure the design is compatible with the A14 communications upgrade project

Other Objectives

2.3.9 Here the scheme requirements re-affirm the need to mitigate the environmental impact of the project and where possible improve on assessment results, as the design progresses.

2.3.10 There are also requirements to:-

- Ensure that the design takes account of the Milton Keynes – South Midlands Sub-Regional Strategy for growth
- Ensure that the design is compatible with possible extensions of active traffic management (ATM) on the M1 from Junction 13 to Junction 19 and through Junction 19 on the M1 and M1/M6 link roads

Special Requirements

2.3.11 The following requirements also apply in addition to the objectives set out above:-

- Segregate strategic traffic from local traffic movements and provide an appropriate Local Road Network to mitigate the impact of severing the local movements from the junction.
- Provide appropriate provisions for non-motorised users (NMU's) and where possible enhance the existing provision.
- The M6 to A14 Link through the junction is to be dual two lanes standard (D2M cross section), although the infrastructure is to be provided to accommodate dual three lanes (D3AP cross section minimum) in the future.
- Take into consideration and allow for future possible capacity improvement of the M6 to the west of the M1 (outcome of M6 Junction 4 to M1 Capacity Study).
- Allowance should be made in the design of the scheme for the M1 being part of the heavy load grid.
- Replace the existing M6 to M1 Catthorpe Viaduct, which has been assessed as having a minimal residual life.
- Other than the M6 to M1 Catthorpe Viaduct, seek to retain existing structures where possible.
- Outline planning permission has been granted for a roadside service area (RSA) next to M1 Junction 19. Investigate options for retaining the access proposals to the RSA.
- Provide safe traffic management measures and road diversions to limit traffic disruption during Scheme construction. The need for diversion routes for longer distance traffic during the works will require careful consideration.

2.4 Planning Background, Relevant Policies and Plans Supported by the Project

2.4.1 Table 2.2 below provides an overview of regional and local policy objectives covering economic development, transportation and safety issues. A *Neutral* impact demonstrates that the proposals are in broad compliance with the policy. A *Beneficial* impact demonstrates that the project would provide positive support for the policy.

Table 2.2 : Policy Impact Table

Policy	Key Principles	Impact
Regional Policies		
Regional Spatial Strategy for the West Midlands January 2008		
Policy PA1: Prosperity for All	A. Economic growth should, wherever possible, be focused on the Major Urban Areas (MUA's), with an emphasis on creating greater opportunities for development and support for existing economic activities with agreed regeneration areas. B. In the development of related policies and programmes, local authorities AWM and other agencies should: i) Ensure the conditions in 'areas of need' are addressed so that they also become 'areas of opportunity'. ii) Maintain and improve transport accessibility, within and through all parts of the Region. iii) Ensure that the environmental and cultural assets are maintained and enhanced to help attract and develop business activity. iv) Develop the skills and abilities of the West Midlands people by improving access to training, higher education and employment opportunities.	Neutral

Policy	Key Principles	Impact
Policy T9: The Management and Development of National and Regional Transport Networks	<p>A. The Primary Route Network (PRN) within the Region will consist of motorways, trunk roads and other primary routes.</p> <p>B. Local authorities and the Highways Agency will give high priority to the maintenance, management and selective improvement of this network in order to maintain accessibility for essential movements, including freight, with and through the Region.</p> <p>C. Local authorities, the Highways Agency, transport operators and other agencies should work together to provide and maintain a strategic transport system.</p> <p>D. In bringing forward detailed policies, proposals and programmes, consideration should be given to:</p> <ul style="list-style-type: none"> i) Optimising the use of existing infrastructure across all modes. ii) Ensuring capacity is safeguarded by appropriate selection of development location, minimising the need for local movements to use the strategic network. iii) Adopting the priorities for investment in strategic networks to support the objectives and policies of the RPG. iv) Ensuring that motorways and trunk roads are managed and improved to operate effectively as part of the national transport network. v) Road building only after all other solutions have been examined and where proposals support other objectives of the RPG. <p>E. New accesses on the PRN will not be encouraged and should not inhibit the strategic function of these routes.</p>	Beneficial
East Midlands Regional Plan March 2009		
Policy 18: Regional Priorities for the Economy	Local authorities in all parts of the region should work together with emda and other organisations with relevant responsibilities to encourage and foster the regional economy through implementing the Regional Economic Strategy. It will be especially important to raise skill levels, develop the service sector and high value manufacturing and create innovative businesses, so that the region is better placed to maintain economic competitiveness.	Neutral
Policy 43: Regional Transport Objectives	<p>The development of transport infrastructure and services across the Region should be consistent with the following Objectives:</p> <ol style="list-style-type: none"> 1. To support sustainable development in the Region's Principal Urban Areas, Growth Towns and Sub-Regional Centres as described in Policy 3. 2. To promote accessibility and overcome peripherality in the Region's rural areas. 3. To support the Region's regeneration priorities outline in Policy 19. 4. To promote improvements to inert-regional and international linkages that will support sustainable development with the Region. 5. To reduce traffic growth across the Region. 6. To improve air quality and reduce carbon emission from transport by reducing the need to travel. 	Neutral
Milton Keynes and South Midlands Sub-Regional Strategy 2005		
	No relevant/specific policies	
Local Policies		
Warwickshire Local Transport Plan 2006 – 2011 (2006)		
The Shared Priorities in Warwickshire	<p>Warwickshire's transport priorities have been developed within the context of the wider priorities for the County:</p> <p>To achieve improvement for all, but with the fastest improvement for the most deprived;</p> <p>To ensure equality of opportunity for all; and,</p> <p>To pursue sustainability by taking into account the needs of future generations in our planning.</p> <p>Within each category, our main priorities are:</p> <p><i>Accessibility:</i> to improve accessibility to health and educational facilities;</p> <p><i>Road Safety:</i> to maintain a special focus on improving road safety for children, particularly in disadvantaged areas;</p> <p><i>Congestion:</i> to discourage traffic growth during peak periods in urban areas; and</p> <p><i>Air Quality:</i> to tackle the declared Air Quality Management Areas (AQMAs) and prevent any further areas being declared.</p>	Neutral

Policy	Key Principles	Impact
Policy: Safe Together – Working in Partnership	The County Council support the Governments endorsement of partnership working. Our policy is to work in partnership with anyone who will help us reduce casualties.	Slight beneficial
Northamptonshire Local Transport Plan 2006-2011 (2006)		
Key Objectives	To maintain the county's highway assets in the most economically and environmentally sustainable long-term manner. To reduce the number and severity of casualties in road accidents. To reduce the congestion experienced by road users essential to the prosperity of Northamptonshire. To improve access to workplaces, education, health, shopping and other facilities for all the population. TO provide the transport system necessary to support and manage growth in the county, ensuring it is integrated with the planning system to create a sustainable and viable future environment. To minimise and wherever possible reduce the effect of traffic and transport on the built and natural environment.	Beneficial
North Northamptonshire Core Strategy (2008)		
Policy 6: Infrastructure Delivery and Developer Contributions	Progress on the delivery of strategic infrastructure will be monitored. Planning permission will be granted for development in accordance with phasing in the Core Spatial Strategy, subject to solutions to infrastructure constraints being resolved, or by interim measures or phasing conditions where appropriate.	Neutral
Daventry District Council Local Plan 1997		
	No relevant/specific policies	
West Northamptonshire Joint Core Strategy Issues and Options (2007)		
Spatial Objective 2: Infrastructure Provision	To ensure existing and future social, physical and green infrastructure is adequately provided to meet people's and business' needs in a timely and sustainable manner.	Slight beneficial
Spatial Objective 4: Economic Prosperity	To strengthen and diversify the economic base of West Northamptonshire.	Neutral
Harborough District Council Local Plan 2001		
	No relevant saved policies	
Harborough Borough Council Core Strategy, Towards a Final Draft, October 2009		
Potential Strategy SP9	All development will be expected to demonstrate high quality, inclusive, safe and sustainable design and will only be allowed where proposals are of a scale, density and design that would not cause damage to the qualities, character and amenities of the area in which they are situated.	Neutral
Rugby Borough Council Local Plan 2006		
Policy T1: Integrated and Sustainable Transport	The Borough Council will expect all development proposals that generate traffic to contribute positively towards the safe, efficient and easy movement of people and goods throughout the Borough in order to create an integrated and sustainable transport network for Rugby.	Slight beneficial
Rugby Borough Council Core Strategy DPD Preferred Options Paper, July 2009		
Economic Spatial Objective 6	To stimulate economic growth through provision of access to educational and learning opportunities that attracts and retains high quality employers and business.	Neutral

2.5 Environmental Objectives

2.5.1 Project specific environmental objectives have been set for each environmental topic as set out in Table 2.3 below. The concluding section of this Volume of the ES returns to these objectives and reviews how far they have been met.

Table 2.3 : Project Specific Environmental Objectives

Topic	Objective
Air Quality and Climate Change	<ul style="list-style-type: none"> To improve local air quality in line with National Air Quality Objectives. To reduce emissions of Carbon Dioxide.
Cultural Heritage	<ul style="list-style-type: none"> To minimise adverse impacts on archaeological remains, historic buildings and historic landscapes.
Ecology and Nature Conservation	<ul style="list-style-type: none"> To minimise adverse impacts on habitats and species. To maximise opportunities for the creation of new habitats.
Landscape	<ul style="list-style-type: none"> To protect the character of the landscape and to minimise adverse visual impacts and loss of features.
Materials	<ul style="list-style-type: none"> To make the most efficient use of materials by reducing, re-using and recycling, setting quantitative targets. To ensure legislative compliance. Zero waste to landfill for bulk construction materials. To prevent the mobilisation of contamination. To safeguard the quality of soils for re-use.
Traffic Noise and Vibration	<ul style="list-style-type: none"> To reduce noise levels.
Effects on all Travellers	<ul style="list-style-type: none"> To promote accessibility for pedestrians, cyclists and equestrians, to reduce severance and encourage physical fitness. To minimise inconvenience for local traffic travelling between the villages or accessing the strategic highway network. To improve conditions for Long Distance Vehicle Travellers.
Community and Private Assets	<ul style="list-style-type: none"> To minimise the adverse impact on farms. To conserve 'best and most versatile land' and soils wherever possible.
Road Drainage and the Water environment	<ul style="list-style-type: none"> To protect the water environment. To reduce the risk of pollution and flooding.

2.6 The Junction and its Setting

2.6.1 The location of the junction is illustrated on Figure A in Appendix 1. Figure C shows the environmental features in the surrounding area. Further detailed descriptions of these features, together with their relative value or sensitivity are also given in Sections 6 – 14 as part of the assessment of environmental effects.

Topography and Watercourses

2.6.2 The area is bisected by the valley of the River Avon and its flood plain. The river flows from east to west and is a relatively narrow watercourse in this part of the East Midlands. It is bridged by both the A14 and M1.

2.6.3 Landform to the north of the river is made up of a series of low ridges and valleys with a north south orientation, rising to a maximum height of 144 m above Ordnance Datum (AOD). Catthorpe Hill is a more pronounced feature immediately south of the junction rising to 128 m AOD. The current M1 to M6 northbound link cuts into the side of the hill.

2.6.4 To the south of the river there is an east west ridge of land extending through the village of Lilbourne.

2.6.5 The Avon has several small tributaries including the Clay Coton Yelvertoft Brook and Swinford Lodge Brook.

Settlements

2.6.6 There are four villages nearby:-

- Swinford is sited one kilometre north east of the junction on rising ground. It is a dense nucleated settlement, for the most part defined as a Conservation Area with an attractive historic core. It contains several listed buildings. There is some new development of housing on the western side.
- Catthorpe is a smaller settlement with a linear shape and one kilometre south west of the junction. It is sited on a ridge extending from Catthorpe Hill. Again the main part of the village is a Conservation Area. The grounds of nearby Catthorpe Manor include some attractive woodlands and a small settlement of bungalows.
- Lilbourne is a compact settlement on a ridgeline overlooking the Avon Valley. The village contains quite a high proportion of post war development. It is immediately adjacent to the M1 but lies 1.8 kilometres south of the existing junction.
- Shawell is an attractive linear village again within a Conservation Area, with a mix of older traditional properties and more recent development. The village is sited in a relatively low-lying valley and is sheltered from the junction by an intervening low ridge to the east.

Public Rights of Way

2.6.7 As shown on Figure C there is a dense network of public footpaths and bridleways generally radiating from the villages described above, but interrupted by the four arms of the strategic highways, M6, M1 north and south and A14. Some of these were diverted along highway boundary fence lines during past phases of construction, and two footpaths, X8 and X7, cross the A14 at grade. Other 'grade separated' crossing points of the strategic road network are available to pedestrians cyclists and equestrians at Shawell Road between Swinford and Shawell, at Shawell Lane, between Shawell and Catthorpe, and under the M1 Avon bridge, between Catthorpe and Swinford. At present there is a footway through the existing junction, connecting Swinford and Catthorpe.

Landscape

2.6.8 The gently rolling and undulating farm land is of good to ordinary quality in scenic terms. The existing motorway junction is clearly a significant feature, but established planting and nearby woodlands help to fit it into the landscape. The combination of woodland and Catthorpe Hill forms an established backdrop to the junction and is important in views from the north east, for example from Swinford. Other features affecting the landscape include electricity pylons and the high masts of Rugby Radio Station.

2.6.9 The pattern of the rural landscape is created by hedgerows and fields trees with occasional woodlands for example at Catthorpe Manor. Where hedgerows and trees are most numerous, the landscape is smaller in scale and more attractive, for example to the south and west of Swinford and east of Shawell. Areas of arable land to the north west and south east are more open in character.

Biodiversity

- 2.6.10 Figure C illustrates designated sites for nature conservation and locations which have been identified as locations for protected species.
- 2.6.11 Cave's Inn Pits, a Site of Special Scientific Interest (SSSI) lies to the west of the scheme, 0.35 kilometres from the proposals for the local road network. The site contains some of the best remaining areas of marsh in Leicestershire, but would not be affected by the proposals. Stanford Park SSSI lies to the south east of the scheme some 1.25 kilometres from the junction improvement. The site contains some of the best collections of lichens in Leicestershire, but would not be affected by the proposals. A further site Misterton marshes SSSI is five kilometres north of the junction improvement and 3.35 kilometres north of proposed signing and gantry works, is also unaffected. There are no European designated sites in the area.
- 2.6.12 There are three Local Nature Reserves within five kilometres of the project and 121 other sites of local designations within two kilometres including Local Wildlife Sites and Potential Local Wildlife Sites. Those closest to the project include a small field pond north of the M6, woodland at Tomley Hall Farm, a hedgerow at Catthorpe and a marsh at Catthorpe now destroyed.
- 2.6.13 Stretches of the River Avon, upstream and downstream of the M1 are also designated as a Potential Local Wildlife Site. It is also designated as a cyprinid (coarse) fishery with very good water quality.
- 2.6.14 Protected species include great crested newt, present in several ponds to the north and east of the junction and otter in the River Avon. There are also bats in the area, most commonly pipistrelle, badgers and reptiles.
- 2.6.15 Trees and hedges throughout the area have some value for wildlife, though most of the agricultural fields are arable or 'improved' grassland which have limited value. Improved grasslands have been treated with herbicides or artificial fertilisers which limits their nature conservation value. Mature planting within the junction has some value for wildlife and many of the motorway embankments are considered to be 'semi-improved' grassland and therefore of greater value than the adjacent agricultural land.

Heritage

- 2.6.16 Conservation Areas at Shawell, Swinford and Catthorpe are referred to above. Each village has several listed buildings as shown on Figure C. Swinford Lodge and All Saints Church Lilbourne are also listed.
- 2.6.17 There are three scheduled monuments of national importance within the area. Two are motte and bailey castles at Lilbourne, with one to the north of the village close to the M1 and associated with All Saints Church. A third site, at Shawell is also a motte and bailey. Stanford Hall and Stanford Park are sited two kilometres to the east of the existing junction. The parkland is recorded in the National Parks and Gardens Register, the designated area is shown on Figure C. It extends to the west along a former oak avenue approach to Swinford village.
- 2.6.18 The area around the junction is also noted for extensive tracts of ridge and furrow, which contribute to the value of historic landscapes.

2.6.19 As shown on Figure C there are also extensive areas of known archaeology, identified from the Historic Environment Record (HER) maintained by the County Councils, and from fieldwalking. Areas of alluvium have been identified because these can contain well preserved remains.

2.7 Description of the Proposals

2.7.1 The engineering proposals are shown on the Environmental Master Plan at Figure B together with the mitigation measures. The cross sections at Figure H, illustrate the levels of the various features of the junction and the proposed planting after 15 years of growth.

2.7.2 Appendix 1 also includes a set of eight photomontages Figures V1 – V8. Photomontages are digitally enhanced panoramic photographs which show:-

- The existing scene
- The same view with the project in place during its opening year without the benefit of established planting
- The same view 15 years after opening when proposed tree and shrub planting has had time to take effect.

2.7.3 Figure P illustrates the viewpoints.

2.7.4 Figure G illustrates areas required during the construction of the project on a temporary basis, including the site compound, storage areas, temporary haul routes and temporary road diversions.

2.7.5 The junction would be constructed on three levels and would be similar in height to the existing junction. It would provide free flow links between M6 and A14, between M6 and M1 south of the junction and between A14 and M1 north of the junction, all in both directions. Movement between M6 and M1 north of the junction and between A14 and M1 south of the junction would not be provided.

2.7.6 As set out in the introduction, Catthorpe Viaduct will be replaced in advance of the junction improvement as a maintenance project called the Catthorpe Viaduct Replacement. Both the viaduct and the realigned M6 to M1 Southbound link to the south would be incorporated into the layout for the junction improvement as illustrated on Figure B.

2.7.7 The layout would comprise the following main features as illustrated on the Environmental Master Plan Figure B:-

- At the lowest level, Level 0, a new link connecting the M6 motorway directly to the A14 Trunk Road, beneath the M1. The standard of this link would vary between dual three lane motorway at the western end to merge with M6 and dual two lane all purpose at the eastern end to merge with the A14 Trunk Road. The central section through the junction would be dual two lane motorway but with widened verges and structures to accommodate future widening to dual three lane all purpose carriageway.
- At level 1, M1 motorway retained in its current position
- At Level 2, a realigned link connecting the M6 to the M1 southbound including the Catthorpe Viaduct Replacement and a new link connecting A14 with M1 northbound. Both links would be two lane carriageways with hard shoulders and would be the highest part of the scheme, at the same level over M1 as the

existing M6 - M1 Southbound link. The A14 - M1 Northbound link would require a new flyover approximately 270m long. The M6 – M1 Southbound link would include a new viaduct over the M6 to A14 Link of 208m.

- A new link road connecting M1 with A14 eastbound
- The existing M1 to M6 northbound link retained with minor amendments
- A LRN providing direct links from Rugby Road, Swinford to Catthorpe Road, Shawell, and via a junction with Swinford Road, Catthorpe, using a series of bridges beneath the main junction links

2.7.8 In addition to these a number of minor link roads would be provided for the use of emergency and maintenance vehicles only. Other features to be included are drainage ponds, lighting, signs and gantries and routes for vulnerable users.

2.7.9 The following section provides a description of the proposals, sub-divided into the following sections:-

- Highways
- Structures
- Other features
- Proposals for vulnerable users
- Land required for construction

Highways

M6 – M1 Motorway Links

2.7.10 The proposals would not require a realignment of the existing M1 to M6 northbound link, except for the merge with M6 where minor amendments would be required.

2.7.11 This means that significant impacts in the south west quadrant of the scheme, i.e. to Lilbourne, Catthorpe Manor and Old Barn Farm can be avoided. As shown on Figure B all the woodland to the west of M1 and the link, which creates a wooded backdrop to the junction, viewed from the north east could be retained. There would be no requirement for a new River Avon bridge.

2.7.12 With the exception of an emergency access road, no works would be required to the existing M6 embankments on the northbound side enabling existing planting to be retained. Further new planting would be added to these embankments.

2.7.13 For the M6 to M1 Southbound link, already modified by the Catthorpe Viaduct Replacement, further realignment would be required to cross the M6 to A14 link. Its maximum level would remain only slightly higher than that of the existing link. The link would diverge from the M6 approximately 500m west of the Shawell Lane underbridge crossing farmland to the north of the motorway on embankment at a similar level to the existing link. It would then cross the LRN and M6 to A14 link on a 270m long viaduct at 124m AOD, before crossing the M1 using Catthorpe Viaduct just to the south west of the existing bridge. Heights given are based on current design information and are approximate. However, they are not expected to change significantly during further design development.

2.7.14 Well established dense tree and shrub planting on the existing embankment slopes both adjacent to the existing M6 to A14 slip road and approaching the bridge over M1 would be removed, but replaced with new planting including earth shaping to provide additional height where indicated on Figure B.

- 2.7.15 East of the M1, much of the existing planting associated with the existing M6 to M1 southbound link would be retained.

M6 – A14 Link

- 2.7.16 The M6 to A14 Link would begin at the Shawell Lane underbridge, at first remaining at a similar level to the existing motorway before passing under the M1 in a cutting reaching a maximum depth of 11 metres immediately to the east of the M1. The cutting and associated bridge below the M1 would result in the loss of established planting on the M1 embankments. It would then merge with the A14 to the west of the existing River Avon bridge, remaining close to existing ground level. However its alignment combined with the slip road joining from the M1 to the north would extend into the fields to the north east of the existing A14, impacting upon existing field boundaries and roadside hedgerows to a point 230 metres west of the River Avon bridge.

M1 Motorway

- 2.7.17 The M1 motorway would be retained on its current alignment. As described below, north of the M6 to A14 Link, existing hedges would be affected by the merge and diverge with the free flow A14 to M1 links to each side. The merge and diverge would require replacement of the existing Shawell Road bridge over M1. The proposal here is to construct the new bridge offline, to the north of the existing. This would enable existing vegetation on the approach embankments to be retained on the south side.
- 2.7.18 To the south of these links, the M1 corridor would remain unchanged with no impact to either side.

M1 – A14 Links

- 2.7.19 The alignment of the A14 to M1 northbound link begins to diverge from the A14 approximately 40m west of the River Avon crossing. The link would cross the open farmland to the south of the A14 rising on to an embankment five metres high before bridging the M1 on a viaduct approximately 270m long, adjacent to and at a similar level to the existing M6 to M1 southbound link at 123 AOD. Given the proximity of these two structures and the opposing traffic flows it is possible that screening may be provided in the form of a solid parapet to avoid conflicting headlight glare. New planting would be provided on the embankment slopes facing Swinford to the north east with earth shaping added to provide additional height and more effective screening of traffic.
- 2.7.20 The new viaduct would also cross the M6 – A14 Link before merging with the M1 northbound carriageway. The loss of boundary hedges at this point would be replaced with new hedges and planting on the embankment slopes.
- 2.7.21 The M1 to A14 eastbound Link would diverge from M1 at first at a similar level to the existing M1 Southbound Off-Slip, though existing boundary hedges would be lost and would need to be replaced.
- 2.7.22 The link would then rise on to an embankment, crossing the LRN on an eight metre high embankment before merging with the A14 in a cutting between one to two metres deep. Dense planting combined with mounding is proposed to assist screen views from Swinford and the network of public rights of way to the north and east.

Local Road Network

- 2.7.23 To fit in, as far as possible, with the character of other local roads in the area, the standard of construction for the LRN would be a six metre carriageway with a minimum of two metre verges to either side. Where necessary to accommodate vulnerable users, these verges would be widened to three metres where no footway is provided and four metres where a one and a half metre footway is provided. The proposals for vulnerable users are described below.
- 2.7.24 Provision would also be made for two metre wide hardened verges on either side of the LRN through the various structures, to accommodate vulnerable users and as illustrated on Figure B, a tarmac footway between one and a half and 1.2 metres wide is proposed between Swinford and Catthorpe.
- 2.7.25 The LRN consists of two main components:-
- A direct link between Rugby Road, Swinford and Catthorpe Road, Shawell. From east to west this would first cross underneath the proposed M1 to A14 eastbound link which would be elevated to eight metres above ground. It would then cross under the M1 using the existing underbridge, as well as the A14 to M1 Northbound Link on its high flyover. The route then runs parallel to the M6 embankment, before merging with the existing Shawell Lane near its underbridge below the M6. As described above planting and earth shaping is proposed to create positive separation between the LRN and motorway. The LRN would then require an improvement to Shawell Lane / Catthorpe Road west towards A5. In designing this section the objective has been to retain the existing hedgerow and trees on one side. A replacement hedgerow on the opposite side would be provided as accommodation works with the agreement of the landowners. A small area of severed land at the junction between Shawell Lane and Catthorpe Road would be retained for habitat creation.
 - The link to Catthorpe village would be provided from a 'T' junction with the above road, passing below the M6 to A14 Link and the M1 to M6 Northbound Link in a cutting, to merge with Swinford Road, Catthorpe

Structures

- 2.7.26 The project has a high structural content requiring the following seven new bridges and viaducts in addition to Catthorpe Viaduct being replaced as a maintenance project:-
- M1 over M6 to A14 Link
 - A14 - M1 Northbound Link Flyover
 - M6-M1 Southbound Link over the M6 to A14 Link
 - Shawell Road over M1
 - M1- A14 Eastbound Link over LRN
 - M6-A14 Link over Swinford Road
 - M1-M6 Northbound Link over Swinford Road
- 2.7.27 In addition two existing bridges carrying the M6 over Shawell Lane and the M1 over the LRN would require modification.
- 2.7.28 Those most likely to be visible from the wider area would be the higher level viaducts, the A14 to M1 northbound link flyover and the two major structures

associated with the M6 to M1 southbound link, the viaduct over the M6 to A14 Link and Catthorpe Viaduct.

- 2.7.29 A similar approach has been taken to the design of these structures to provide a consistent, unified appearance.
- 2.7.30 A typical illustration of the viaducts (a computer aided perspective of the A14-M1 Northbound Link Flyover) is included in Appendix 1, the main elements are:-
- Vertical concrete abutment walls to the full height of the structure would be required
 - Supporting piers would be triple columns
 - The decks would be supported by beams constructed from weathering steel which is unpainted, but develops its own protective coating of iron oxide. The colour would vary between a red orange to a darker purple brown, dependant upon time and local weather conditions
 - The darker beams would contrast with a light coloured concrete deck fascia above.
- 2.7.31 For vulnerable road users and local drivers on the LRN there would be a sequence of underbridges on the direct link between Swinford and Catthorpe, including the existing bridge below the M1, which would be re-used, a structure of similar length below the M6 to A14 Link, shorter bridges below the M1 –to A14 eastbound link and the M1 to M6 northbound link, as well as the two higher level viaducts described above.
- 2.7.32 In general these bridges would be at a lower level and would not be so widely visible. The most noticeable would be the M1 to A14 eastbound link over Rugby Road, which given its height at eight metres above ground, would be visible from the north-east and is illustrated by Photomontage Figure V3.
- 2.7.33 Their designs would vary according to structural requirements but all incorporate concrete walls, with weathering steel or concrete beams. Walls associated with the M1 to A14 eastbound link over Rugby Road would be clad in pre-cast concrete panels as illustrated on the photomontage. Elsewhere solid concrete walls would be detailed with a feature finish which is yet to be decided. All are sufficiently wide to accommodate two metre verges to either side for vulnerable users.

Other Features

Lighting

- 2.7.34 All new sections of the junction would be lit using flat glass luminaires mounted on 15m high columns. For new sections of dual carriageway such as the M6 to A14 link, it is anticipated that these would be mounted in the central reservation on a concrete barrier though this will remain under review. Column spacing would vary between 34 metres and 54 metres.
- 2.7.35 Flat glass luminaires provide the optimum cut-off of the light source, minimising light spillage to the surrounding area. They would be similar to those already provided along the A14 and in parts of the existing junction. Existing lighting within the central reservation of the M1 would be retained. All lighting would be “high pressure sodium”, which gives true colour rendering.

- 2.7.36 Lighting is not proposed for the LRN.
- 2.7.37 In general terms, as the existing junction is lit the proposed lighting would not add significantly to the scale of lighting in the area, though the number of columns would increase given the additional carriageways. The exception to this general principle is along the M6 to A14 Link where lighting would need to be extended to a point approximately 40 metres west of the centre of the River Avon bridge to cover the merges and diverges of the proposed slip roads.

Signs and Gantries

- 2.7.38 Several signs and gantries would be needed on the approaches to the junction and their locations are indicated on Figure N. In all, 17 gantries would be required set at a minimum height of 5.7m above the carriageway. Their overall height as seen in the landscape would vary in relation to the signs placed upon them, but the maximum would be approximately 12m. It is also anticipated that six new cantilevered Variable Message Signs (VMS) would be required in addition to five existing VMS that would be retained. The overall height of the VMS would be approximately nine metres. Typical elevations of the VMS and gantries are included in Appendix 1, they are also illustrated on Photomontages. It should be noted that some of the gantries and VMS are remote from the junction itself, but have been included in the assessment. 14 existing VMS and four gantries would be removed.

Drainage Ponds

- 2.7.39 Five drainage ponds are proposed as part of the project to deal with run-off from the road surface and to deal with potential pollution and flooding impacts.
- 2.7.40 The design and function of these ponds is dealt with in detail in ES Volume 2, Chapter 9, Road Drainage and the Water Environment. In terms of their appearance they are shaped to look like natural water bodies with irregular outlines and gentle side slopes, incorporating reeds and aquatic plants. Access tracks would be required across agricultural land to manage ponds DP6, DP3 and DP7, as shown on the Environmental Master Plan Figure B.

Proposals For Vulnerable Users

- 2.7.41 Proposals for vulnerable users are covered in detail in ES Volume 2, Chapter 7 Effects on All Travellers, which also deals with the amenity effects for users. Provision within the LRN, including a footway between Swinford and Catthorpe has been described above.
- 2.7.42 Measures also include the provision of a new bridleway route adjacent to the River Avon designed to replace two existing footpaths X7 and X8 and one existing bridleway X12, which would need to be closed to accommodate the junction improvement. As noted on the Environmental Master Plan Figure B this new route would be 'surfaced', i.e. it would have a stone foundation, but blinded over by soil to provide a green surface. It would be three metres wide and would require two new bridleway bridges over the river. The new bridleway would also be accompanied by some habitat enhancement works along the River Avon itself, designed to mitigate the potential disturbance for otters using the river. This issue is dealt with in ES Volume 2, Chapter 3 Ecology and Nature Conservation.
- 2.7.43 At its western end, the bridleway would connect to the existing bridleway X13 and Station Road Lilbourne via a section of the dismantled railway. At its northern end

the bridleway would connect to the existing network via footpath X6 which would be upgraded to bridleway status. It would also connect to a diversion of footpath X8 following the boundary of the A14 with an extension across the fields to connect to the bridleway bridge.

Land Required for Construction

2.7.44 These areas would be required temporarily during the construction works and those outside the permanent footprint of the project would be restored after use. They are shown on Figure G in Appendix 1. In general restoration would require their return to agricultural use. The implications of the temporary loss of such land for agriculture is covered in ES Volume 2, Chapter 8 Community and Private Assets and the measures used to achieve restoration are covered in ES Volume 2, Chapter 5 Materials. Figure G also indicates some construction features such as storage areas, temporary haul routes and road diversions that would take place on the land to be retained after construction. It also shows the drainage ponds referred to above. Since these would be constructed at an early stage where possible to provide protection from construction run-off. The exception to this is pond DP2b, where a pond in a temporary location would be required.

Haul Routes

- 2.7.45 Temporary land is required for 10 metre wide haul routes for use by the Contractor's plant and machinery, in the north-east quadrant between Shawell Road and Rugby Road and in the south-west quadrant between Old Barn Farm and Swinford Road. A short section is also required adjacent to the north side of the M6, on the west of Shawell Lane.
- 2.7.46 The section in the south-west quadrant would require the removal of some woodland and this would be replaced with new planting upon completion. Other sections would be restored to their former agricultural use.

Contractors Compound

- 2.7.47 Figure G indicates the location of the site compound, to the east of M1 on agricultural land adjacent to Rugby Road. The compound area has been included in the draft Orders for the project and occupies an area of 2.7 hectares.
- 2.7.48 The compound area would be temporarily developed with office accommodation, workshops, car parking, plant, materials and fuel storage resulting in some visual impacts. Areas not required for permanent land take would be restored to agricultural use upon completion. Existing boundary hedges would be retained and protected during the construction period.

Storage Areas

- 2.7.49 As shown on Figure G other areas of land would be required for the temporary storage of soils and as construction laydown areas, in particular for bridge construction. Several areas including access to the River Avon for bridge construction and bridleway works, are also identified on Figure G.

Flood Compensation Areas

- 2.7.50 Works to the M6 to A14 Link would require land within the existing River Avon flood plain. The extent of the flood plain is shown on Figure C the Environmental Resources Plan.
- 2.7.51 As compensation some land at appropriate locations within or adjacent to the flood plain would need to be reduced in level. Some of this would be used for habitat creation, the remainder would be restored to agricultural use. These areas are illustrated on Figure B.

2.8 Mitigation and Enhancement Measures

- 2.8.1 Mitigation measures are elements in the design which are included to prevent, reduce and offset any significant adverse effects on the environment.
- 2.8.2 Where necessary, the Highways Act 1980⁶ provides powers to acquire land by Compulsory Purchase Order to mitigate any adverse effect.
- 2.8.3 It is also possible for measures included in the project to have incidental but beneficial effects for the environment. For example a drainage pond intending to reduce flood risk or pollution may bring other benefits for wildlife as a wetland habitat. Similarly planting intended to reduce visual impact can have benefits for wildlife as a woodland habitat given the careful selection of diverse native species. Grassland included as part of the highway in any event can also provide an improved resource for nature conservation, compared with existing habitats or adjacent farmland.
- 2.8.4 Measures can also be carried out with the agreement of landowners. Typical examples included in this ES are the provision of boundary hedges along the LRN, which are treated as accommodation works for the landowner, or off site planting which can be negotiated with landowners under Section 253 of the Highways Act⁶. Proposals for such measures are described in this ES, but because they are subject to agreement they are not relied upon by the environmental assessment as a mitigation measure. For example the potential effect of off site planting in providing screening has not been taken into account in assessing visual impact.
- 2.8.5 Except where described in the text as being subject to agreement, all the mitigation measures set out in this ES, and illustrated on the Environmental Master Plan Figure B, the cross sections in Figure H and Photomontages V1 – V8, are regarded as an integral part of the proposals. Land required for the mitigation measures is included within the draft Compulsory Purchase Orders listed at Section 1.3 of this Volume, and measures would be carried out should the draft Orders be confirmed by the Secretary of State. Potential impacts without the mitigation in place and the residual effects, which take mitigation measures into account, are described in the assessment.
- 2.8.6 Measures related to individual topics are set out in each topic section, but an outline of the main measures is set out below.

Air Quality and Climate Change

- 2.8.7 Measures would be taken during construction to suppress dust and to minimise exhaust emissions from contractor's plant and machinery.

- 2.8.8 There are no project specific measures to reduce emissions during the operation of the project once complete, though general reductions are being achieved by improvements in vehicle technology and tighter emissions controls set by the Government.

Cultural Heritage

- 2.8.9 Landscape and noise mitigation measures described below would help to protect the setting of built heritage features such as the village conservation areas and scheduled monuments. Landscape measures would also mitigate effects on historic landscapes.
- 2.8.10 Wherever possible known archaeological remains have been protected by avoiding direct impacts. Where impacts cannot be avoided mitigation would comprise preservation by record, which is ensuring that all the details of any features uncovered are recorded for future generations and that any portable finds can be removed to a museum. A strategy for dealing with archaeological remains has been agreed with Leicestershire County Council's Senior Planning Archaeologist and is described in Section 7. Where there is known archaeological interest this would be carried out in advance of the construction works.
- 2.8.11 During construction an archaeologist would be present on site to conduct a watching brief in order to record any unforeseen finds that occur during the works.

Ecology and Nature Conservation

- 2.8.12 Measures described under *Landscape* below would also have some benefits for nature conservation by providing habitats such as species-rich hedgerows and woodland. Using native species grown from seed or stock from the local area, and species-rich grasslands on low fertility soils which promote diversity of plant life. In addition, new ponds are proposed on severed land within the highway boundary. Several drainage ponds, described below, would also create new wetland habitats. Such habitats benefit nature conservation because they host insects and other invertebrates which in turn attract birds and mammals.
- 2.8.13 Potential impacts on various species protected by UK and European Law such as great crested newts, bats and otters would require particular mitigation measures including:-
- The timing of construction operations to minimise disturbance
 - Moving individuals out of harms way under licences granted by Natural England, a process known as 'translocation'
 - Compensation through new or improved habitats, bird or bat boxes, places for hibernation known as 'hibernacula'
 - Monitoring of species and long term management of the measures provided
- 2.8.14 Several measures are proposed to protect otters present in the River Avon, given potential disturbance created by the proposed new bridleway. These include screening, new habitats and works to the river bank to provide more vegetation cover for the species. In mitigating the effects for otters these measures would also have positive environmental benefits for the river and its wildlife in general.
- 2.8.15 As set out under scoping and consultations in Section 4.3, Natural England are seeking a net gain for biodiversity from the project which can be achieved by the

measures described. This issue is covered in more detail in Section 8 and in Volume 2, Chapter 3, Ecology and Nature Conservation.

- 2.8.16 Measures would also make a positive contribution to Biodiversity Action Plans (BAPs) put in place in each County and by the Highways Agency.

Landscape

- 2.8.17 Typical landscape measures shown on Figure B include:-

- Woodland and shrub planting within the highway boundary
- Boundary hedgerows, to integrate with the surrounding field pattern
- Large areas of species-rich grassland, where wildflowers could be established providing visual interest and nature conservation value
- Earth mounding to help screen views and to provide additional height to screen planting.

- 2.8.18 Care has been taken in the design and alignment of the proposed LRN to respect the character of the landscape and the existing lanes. The width has been limited to six metres and the alignment has been designed to make the best use of existing hedgerows. In general the existing hedge has been retained on one side where the alignment follows the existing road. Replacement hedges would be offered to landowners as accommodation works on new LRN boundaries.

- 2.8.19 In addition to the planting shown on the Environmental Master Plan it would also be possible to carry out off-site planting with the agreement of landowners under Section 253 of the Highways Act 1980⁶. As it is subject to agreement, it is not shown on the Environmental Master Plan and is not relied upon as mitigation with the landscape assessment.

Materials

- 2.8.20 The proposals have been designed to minimise the requirements for importing or exporting bulk earthworks materials. For the junction improvement an overall balance is anticipated, with material arising from cuttings being used to create embankments. As a separate maintenance contract the Catthorpe Viaduct Replacement would require the importation of 20,000m³ of material.
- 2.8.21 The design also avoids known areas of contaminated land, but if contamination is encountered an appropriate mitigation strategy would be put in place.
- 2.8.22 Soils required for re-use or for agricultural use would be stripped, stored and re-distributed in accordance with best practice guidelines.
- 2.8.23 In terms of construction materials, steps would be taken to minimise the production of waste by implementing a Site Waste Management Plan. The proposal is to reduce the requirement for new materials by the re-use of those existing on the site, such as concrete from bridge demolition or broken out road surfacing. Wherever possible materials which could not be re-used on site would be recycled for use elsewhere, to avoid sending waste to landfill.

Noise and Vibration

- 2.8.24 Measure would be taken to minimise noise and vibration arising from construction activities and contractor's plant.
- 2.8.25 All new and altered trunk roads and motorways within the junction would be surfaced with low noise surface (LNS). This results in a typical reduction of 3.5 decibels (dB(A)), compared with more conventional hot rolled asphalt surface. It is important to note that this benefit would be realised in any event even if the scheme were not to proceed, as it is likely that LNS would be used for any subsequent resurfacing under maintenance. It has been assumed that the LNR would not be surfaced with LNS.

Effects on All Travellers

- 2.8.26 Proposals for vulnerable users described in Section 2.7 are designed to replace public rights of way that would be lost due to the works. At the same time they would create improved conditions for vulnerable users. In addition the establishment of a direct link between the villages of Swinford and Catthorpe would be a positive enhancement.
- 2.8.27 To mitigate the loss of direct access on to the motorway junction for local vehicle travellers improvements would be made to the LRN to provide a direct link between Swinford and Catthorpe and to the A5.

Community and Private Assets

- 2.8.28 Measures include minimising the permanent landtake and ensuring the effective restoration back to agriculture of temporarily land used.
- 2.8.29 Access arrangements for farms, both during construction of the project and when it is in operation are also important.

Road Drainage and the Water Environment

- 2.8.30 Measures would be taken to reduce the risk of pollution to water resources arising during construction.
- 2.8.31 Five drainage ponds are proposed as part of the scheme to deal with run-off from the road surface and to deal with potential pollution and flooding impacts. The design includes two main ponds at each location, the first collecting the majority of sediments and pollutants from the road drains, the second containing vegetation such as reeds to carry out further cleansing of the water before it is released to the watercourse. Although required to meet modern standards of mitigation including those established by the Environment Agency, these measures would improve the quality of run-off compared with the existing drainage arrangements and improve the level of protection to the River Avon.
- 2.8.32 In addition, the loss of some existing areas of flood plain would need to be replaced by creating new areas that could take floodwater. Such areas, illustrated on Figure B, are called 'flood compensation areas' and are required to offset the effects of any development within a flood plain.

Construction Issues

2.8.33 Mitigation of construction impacts touches on many topics as described above including the protection of wildlife and landscape features, water quality, emissions to air and noise. It also includes measures to minimise disruption for farmers, pedestrians, cyclists, equestrians and the travelling public. Physical measures such as temporary diversions, and the restoration of land to agriculture would be incorporated. The process of construction would be controlled by means of a Construction Environmental Management Plan (CEMP) to the internationally recognised Standard ISO 14001, to ensure that construction impacts on environmental assets are kept to a minimum. Section 16 deals with environmental management in more detail.

2.9 Land Requirements During Construction and Operation

2.9.1 Table 2.4 below identifies the land required for the project.

Table 2.4 : Land Required for the Project

Land-Use	Permanent Landtake (hectares)	Temporary Landtake (hectares)	Total (hectares)
Agricultural Land	23.7	12.1	
Non Agricultural Land	1.6		
Total	25.3	12.1	37.4

2.9.2 The overall landtake for the project would be approximately 38 hectares of which 12.1 hectares would be required temporarily. 34.5 hectares of existing highway, including side roads would also be utilised.

2.9.3 Nearly all of the 25.3 hectares of the permanent and 12.1 hectares of temporary landtake is currently in agricultural use. The implications of this set out in detail in ES Volume 2, Chapter 8 Community and Private Assets and summarised in Section 13 of this volume.

2.9.4 The permanent landtake is required for highways, associated earthworks and mitigation measures as illustrated on Figure B. This is with the exception of proposed planting, the creation of extended river margins and flood plain compensation adjacent to the River Avon, where the proposal is to return the areas to landowners on completion. These areas are included in the calculations for temporary landtake. They have been included in the draft Compulsory Purchase Orders to ensure that the measures can be carried out.

2.9.5 Other areas are required temporarily during the construction works, for a site compound, materials storage, haulage routes, temporary road diversions and access. These are illustrated on Figure G and described in more detail in section 2.10 below. Where necessary the areas have been included in the draft Compulsory Purchase Orders. The breakdown of areas is as follows:-

- Contractor's site compound: 2.71 hectares
- Contractor's working space and haulage / access roads: 2.55 hectares
- Soil Storage: 0.93 hectares
- River Avon new bridleway and associated habitat works: 3.19 hectares
- Flood Compensation: 0.23 hectares

- 2.9.6 With the exception of the River Avon habitat works which would remain as environmental features, the temporary landtake areas would be restored to agricultural use upon completion.
- 2.9.7 It should also be noted that an area of existing agricultural land adjacent to the A14, south west of Swinford received planning approval in 2000 and 2003 for the development of a roadside service area.
- 2.9.8 At this stage there is uncertainty about the future of this site, and the status of the planning consent is currently unclear. Given the time that has elapsed since the consent, it is possible that conditions attached have not been discharged within the appropriate time limit. 2.2 hectares of the proposed site would be required for the junction improvement, approximately 40% of the area.

2.10 Construction, Operation and Management of the Project

Construction

- 2.10.1 Construction would be likely to begin late in 2011 and be completed by Autumn 2014, a period of around three years.
- 2.10.2 As set out in the introduction, the replacement of Catthorpe Viaduct will begin in summer 2010 and be completed by November 2011. The construction aspects of the Catthorpe Viaduct replacement are dealt with in a separate environmental assessment². The description that follows deals with the main junction improvement, though many of the issues described would also apply to Catthorpe Viaduct.

Traffic Management

- 2.10.3 All traffic management proposals would be subject to negotiations and agreement with the relevant highway authorities, the Police and Highways Agency. The description below provides an overview, details may change as the project develops.
- 2.10.4 Traffic management would seek to minimise disruption through the junction during the construction process. It is intended to reduce the M1 Northbound carriageway from 3 lanes to 2 lanes and occasionally to adopt a contraflow arrangement on the M1 Northbound carriageway during the construction period.
- 2.10.5 Traffic speeds through the works would be restricted to 50mph for the protection and safety of the workforce and travelling public.
- 2.10.6 The main objectives in the traffic management proposal would be to:-
- maintain safe routes for all traffic for the duration of the works
 - minimise delays and disruption to local and trunk road / motorway traffic whilst allowing the works to be completed
 - minimise the disturbance to the local community by minimising the construction traffic on the local road network for the duration of the works
 - segregate local traffic from the trunk road / motorway traffic where possible

2.10.7 A Communications Plan has been prepared to ensure traffic management proposals receive wide publicity and includes the following methods:-

- Regular updates on the works to local press and radio
- A telephone line for reporting traffic incidents would be available at all times
- Highways Agency advanced signage would be used as appropriate including the message signing
- A website would be set up providing comprehensive information about the works
- Information leaflets would be available in local service areas
- Local meetings would be held in local villages (Swinford, Shawell, Catthorpe, Lilbourne and Welford) to advise communities of proposed works and deal with concerns and enquiries
- Notices would be published in local papers and trade publications
- The road haulage association would be kept informed
- A register would be maintained identifying stakeholders to inform of key events including changes to the traffic management.

Closure of Local Road and Public Rights of Way

2.10.8 As set out in Section 2.1 one of the project objectives is to separate local and long distance traffic. Access to the junction from local roads would be closed requiring the construction of an LRN, as described in Section 2.7, including a direct road link between Swinford and Catthorpe. This access would be closed for about 12 months, starting in late 2012, and a temporary diversion put in place via Shawell Village while the new link is being constructed. Once direct access to the junction is closed, access to the strategic road network from the villages would be via M1 Junctions 20 and 18, M6 Junction 1 and A14 Junction 1, using the local road network and this would continue for the operation of the completed project. There are also existing routes to the A5 from Shawell and Catthorpe and completion of the LRN would provide a further connection for Swinford.

2.10.9 Construction of the project would also necessitate the closure of several public rights of way including Bridleway X12 and Footpaths X7 and X8. The routes are indicated on Figure C. The existing footway through the junction would also be closed. It is currently anticipated that with the exception of the footway through the junction, the replacement links described in Section 2.7 can be in place before the closure of these routes.

Temporary Road Diversions

2.10.10 Temporary road diversions would be required to take mainline traffic during the course of the works to allow construction to take place. The locations of these are shown on Figure G and are as follows:-

- A temporary Northbound onslip to the M1
- A temporary Southbound offslip from the M1 to A14
- A temporary alignment for the M1 to M6 Northbound link
- A temporary link between M6 Southbound and the newly constructed LRN parallel to the M6

2.10.11 As indicated on Figure G, some of these routes would be on land retained on the completion of construction. Others would be returned to agricultural use.

2.10.12 In addition to these temporary diversions, temporary closures would be required of the strategic routes, M1, M6 and A14 to:-

- Erect steelwork for new bridges
- Demolish three existing structures including Shawell Lane bridge, and the two structures carrying the M6 Northbound and Southbound over Swinford Road.
- Gantry erection
- Completion of tie ins between new and existing roads

2.10.13 Similar closures would also be required for implementing the Catthorpe Viaduct Replacement and demolishing the existing structure.

2.10.14 Such closures would be of limited duration ranging from 10 to 24 hours. It is anticipated that 22 closures would be required for the improvement during the 36 month construction period. Twelve such closures would also be required for Catthorpe Viaduct Replacement.

2.10.15 Advance warning would be given of closures using the Communications Plan described above. Diversion routes would be limited to the major road network as illustrated on Figures M1 and M2 in Appendix 1 in consultation with the relevant Highway Authorities. Traffic would not be directed on to local roads and the A5199 through Welford would not be signed as a diversion route.

Haul Routes and Contractor's Access

2.10.16 Haul routes for incoming and outgoing materials would be agreed with the highway authority. These would also be restricted to major roads as construction traffic would be instructed not to use routes through the local villages.

Haul Routes and Contractor's Access

2.10.17 Haul routes for incoming and outgoing materials would be agreed with the highway authority. These would also be restricted to major roads as construction traffic would not be permitted to use routes through the local villages.

2.10.18 Haul routes within the site are illustrated on Figure G. In general they are proposed on the perimeter of the construction area. With the exception of those required to access works for public rights of way, they would be 10 metres wide.

2.10.19 Speed restrictions would be operated along the haul routes, depending upon prevailing traffic and site conditions.

2.10.20 Access points from the public road system would need to be developed and amended as the works progress and linked into traffic management operations.

2.10.21 Haul routes outside the permanent footprint of the project would be restored and returned to agriculture on completion of the works.

Drainage

2.10.22 The drainage ponds described in Section 2.7 would be constructed at an early stage so that they can be used to deal with run-off from the construction site and act as a pollution control. As indicated on Figure G, at one location adjacent to Rugby Road a temporary pond would be required.

Contractor's Site Compound, Storage and Laydown Areas

2.10.23 A number of alternative sites were considered for the site compound taking into consideration issues such as access, safety, fitness for purpose and environmental issues.

2.10.24 The preferred location is illustrated on Figure G and has been included in the draft CPO with the intention that the land would be returned to the landowner and agricultural use upon completion of the works. The extent of the proposed compound is 2.7 hectares and part of the area will be used initially for the compound for the Catthorpe Viaduct Replacement.

2.10.25 The location was preferred for the following reasons:-

- There would be good access from M1 Junction 19 for construction and delivery traffic, which could be maintained for the duration of the works.
- The site would not be affected by any other construction activity.
- There would be no severance of existing access arrangements to adjacent fields.
- There would be no significant environmental impacts. Footpath X11 which crosses the site would need to be diverted and advance archaeological investigations would be required, some of which will be carried out for the Catthorpe Viaduct Replacement.
- The compound can be accessed safely from the local road network, Rugby Road.

2.10.26 Facilities to be provided would include offices, canteen facilities, testing laboratories, parking for vehicles and contractor's plant, refuelling facilities and material storage.

2.10.27 Figure G also illustrates a variety of sites required for:-

- Soil storage, including topsoil for re-use in the works
- Construction laydown areas often associated with bridgeworks where areas are required to store structural materials and for access by large plant such as cranes.

2.10.28 Where appropriate these areas have been included in the draft CPO. Those outside the permanent works area would be restored to agricultural use upon completion.

Earthworks, Materials and Waste

2.10.29 At this stage the quantities of materials described are approximate and are a best estimate. Further design development would be likely to lead to changes in the quantities of materials required.

2.10.30 In terms of bulk earthworks materials it is anticipated that there would be a general balance for the junction improvement, with material arising from cuttings being used for the creation of embankments and landscape mounding. No export or import of bulk earthworks materials would be required for the improvement. Soils required for landscape measures or agricultural restoration would also be derived from the site.

2.10.31 However, it should be noted that 20,000m³ of earthworks materials would need to be imported for the Catthorpe Viaduct Replacement.

2.10.32 There would be a movement of 390,000m³ of materials over a period of 34 months using the network of haul routes previously described.

2.10.33 Construction materials would need to be imported for the works and Table 2.5 below estimates the quantities and number of lorry movements involved. It includes the earthworks for Catthorpe Viaduct Replacement.

Table 2.5 : Delivery of Main Construction Materials to Site

Material	Quantity	Lorry Movements
Concrete	37,000m ³	6,000
Earthworks for Catthorpe Viaduct	23,000m ³	1,800
Structural steel bridge beams, etc.	4,600 tonnes	80
Steel reinforcement for concrete	8,500 tonnes	425
Highway pavement. Sub-base	69,000m ³	6,210
Highway pavement. Black top	100,000 tonnes	5,010

2.10.34 There would also be requirements to bring in items such as bridge parapets, steel barriers, drainage pipes and materials, lighting, signs, gantries and formwork.

2.10.35 A Site Waste Management Plan would be put into operation to reduce the import of new materials through the re-use of existing materials where possible, and to minimise the quantity of materials going off-site as waste by promoting recycling.

2.10.36 The Site Waste Management Plan is summarised by Table 2.6 below which sets out the estimated quantity of materials arising from the site and the action proposed for their re-use, recycling or disposal. The quantities again include the material arising from the Catthorpe Viaduct Replacement as the intention is to store usable materials arising from the maintenance project for use in the junction improvement. If the improvement did not go ahead, alternative arrangements would have to be included in the Catthorpe Viaduct Replacement project for the disposal of this material, including recycling.

Table 2.6 : Site Waste Management Plan

Waste Type	Estimated Quantity	Action Proposed
Earthworks	390,000m ³	Import of 23,000m ³ of fill for Catthorpe Viaduct Replacement and specialist backfill for bridge abutments. Existing earthworks and inert material arising from excavations to be reused on site.
Structures		
<ul style="list-style-type: none"> • concrete 	25,000m ³	Re-use of concrete on site following screening and crushing. Steel to be sent off-site for recycling.
<ul style="list-style-type: none"> • steel 	3,900 tonnes	

Waste Type	Estimated Quantity	Action Proposed
Carriageway materials <ul style="list-style-type: none"> • asphalt surfacing • asphalt planings • aggregates used in sub-base or drainage 	144,000 tonnes 90,000 tonnes 150,000 tonnes	Re-use on site or leave in-situ
Wood / timber waste <ul style="list-style-type: none"> • fencing • semi-mature vegetation 	200m ³ 260m ³	Reduce by keeping as much vegetation in-situ as possible Limited reuse on site as hibernacula Remainder sent off site for:- <ul style="list-style-type: none"> • recycling into new timber products • energy recovery as fuel • biological recovery as compost
Metals <ul style="list-style-type: none"> • railings • signs • gantries • lamp columns • armco barriers • cables 	850 tonnes	Sent off-site for recycling
Plastics <ul style="list-style-type: none"> • drainage pipes • packaging • cable covering 	14,500 lin m	Sent off site for recycling dependant on type of plastic. Some plastic may require disposal to landfill.
Hazardous Materials <ul style="list-style-type: none"> • contaminated soils • asbestos • oil-based waste • contaminated packaging • road sweepings 	Not possible to quantify at this stage	Reduce Contaminated soils would be avoided, as in the case of the Cleanaway Site or wherever possible treated in-situ. Further contamination, e.g. by accidental spillage avoided by operation of CEMP. Alternatives to the use of hazardous chemicals used wherever possible. Where necessary hazardous materials to go for disposal at nearest licensed facility.
Office / Canteen waste <ul style="list-style-type: none"> • paper • electrical goods / computers • furnishings • packaging • food waste • sewage waste / water 	Not possible to quantify at this stage	Reduce use of paper and packaging materials. Reuse furnishings / electrical goods at other sites. All recyclable materials including paper, packaging and redundant electrical goods to be collected for off site recycling. Food waste collection for biological recovery. Sewage waste water disposed of off site via public sewer.

Operation and Long Term Management

2.10.37 On completion of the construction works, operation of the junction would be the responsibility of the Highways Agency and their Managing Agent Contractor (MAC).

2.10.38 Responsibility for the aftercare of environmental measures would remain with the contractor Skanska for a period of five years post completion. Typical activities for this period would include:-

- Maintenance of new tree and shrub planting, including weed control and replacement stock as required
- Management of new habitats including cutting of species-rich grass areas and aquatic vegetation
- Species monitoring, including population monitoring required as a condition of protected species licences, monitoring of bat and bird boxes and hibernacula

2.10.39 On completion of the five year aftercare period environmental measures would be handed over to the MAC with a Handover Environmental Management Plan or HEMP. The HEMP would include:-

- All the environmental data collected by the project
- Environmental commitments entered into, including those included in this ES
- The objectives to be met by the various environmental measures
- The long term management actions to be carried out by the MAC to achieve and maintain those objectives. These would include the long term management of landscape measures, habitat creation and features to protect the water environment, including the drainage ponds described in Section 2.7.

2.11 Traffic

2.11.1 There are currently considerable delays for traffic from the M1, M6 and A14 especially during peak periods. The high volumes of traffic regularly cause long queues on the A14 and on exit slip roads on the M6 and M1, the latter two frequently extending back to the main carriageways of the motorways.

2.11.2 This is a potentially hazardous situation and the queues on the M6 and M1 cause high severity accidents, including a number of fatal accidents.

2.11.3 The total forecast traffic flows added together from all the main routes approaching the junction, M1, M6 and A14 are shown in Table 2.7 below for:-

- The year that the project would be completed and open for use, the 'opening year' 2014
- For 15 years later 2029. This is known as the 'design year' as these are the traffic flows used for the engineering design of the project

2.11.4 The flows for each year are divided into 'Do-minimum', this is the situation the project is not built, and the 'Do-something', the situation assuming the project is built.

2.11.5 Figures K and L in Appendix 1 show these flows broken down for each part of the network, including the local road network. Figure K shows the flows for 2014 and 2029 in the 'Do-minimum' and Figure L shows the flows in the same years for the 'Do-something'.

2.11.6 In addition Figure J shows the current flows for 2007 to provide a baseline. The figures represent a typical flow per day, based on an average taken over a year (Annual Average Daily Traffic AADT).

- 2.11.7 The period between the opening and the design year is conventionally used to define changes that would take place in traffic flows over the medium term. The traffic predictions presented over this period have been used in traffic related environmental assessments reported in this ES. These are Traffic Noise and Vibration, Section 10, Air Quality, Section 5 and Water Quality and Drainage, Section 13 of this volume, and their respective chapters in Volume 2.
- 2.11.8 In considering traffic changes over time the computer model takes into account the Government's forecasts for future traffic growth as well as local housing or employment developments which are part of adopted plans or which already have planning permission. These proposed developments are set out in more detail in Section 15 which deals with the assessment of cumulative effects.
- 2.11.9 The model also takes into account other road improvements which could affect traffic flows. These include:-
- M1 widening Junctions 6a - 10
 - M1 widening Junctions 10 - 13
 - A428 West Haddon Bypass, Northamptonshire

Table 2.7 : Traffic Forecasts

Scenario	Opening Year 2014	Design Year 2029
Do-minimum	172900	221800
Do-something	200900	259000
% change between Do-minimum and Do-something	16.2 %	16.8 %

- 2.11.10 The figures show that without the project in place, the 'Do-minimum', traffic flows would increase from a total of 172,900 vehicles per day in 2014 to 221,800 in 2029, an increase of 48,900 or approximately 28%. Given the retention of the existing junction layout this would add significantly to the present problems of congestion and safety.
- 2.11.11 With the project in place, the 'Do-something', there would be higher traffic flows in overall terms. 200,900 in 2014 to 259,000 in 2029 an increase of 58,100 or approximately 28%. Comparing the 'Do-minimum' with the 'Do-something' in 2029 this would represent an increase of 16.8% in overall flows.
- 2.11.12 The environmental effects of these increases have been assessed, particularly in terms of Air Quality and Climate Change and Noise and Vibration, with the results summarised in Sections 6 and 11.
- 2.11.13 However, the proposed junction layout is designed to relieve congestion taking into account these increased flows. The proposals significantly increase the capacity of the junction compared with the current layout and the addition of the free flow links, listed below, would make the junction much more efficient:-
- M6 to A14
 - M1 southbound to A14 Eastbound
 - A14 Westbound to M1 Northbound

2.11.14 The traffic increases would be largely confined to the strategic routes within the junction. One important effect of improving the junction would be to encourage travellers to remain on the strategic road network and to transfer from the local roads. At present, given the congestion problems, there is evidence that drivers use local roads to avoid the junction.

2.11.15 The effect of this is to reduce traffic on local roads as shown on Figures K and L.

2.11.16 Table 2.8 illustrates some of the changes on local roads for 2029. The flows in the table are added together from the numbers on the plan which are separated into flows in each direction. All are typical daily flows expressed as AADT.

Table 2.8 : Traffic Flows on Local Road Network

Reference Point	Local Road	2029 Do-Minimum (2-way AADT)	2029 Do-Something (2-way AADT)
1	Catthorpe Road, Shawell	4,000	200
2	Shawell Road	4,800	300
4	Rugby Road, Swinford	1,900	3,500
15	Shawell Lane, Catthorpe	200	200
14	Swinford Road, Catthorpe	3,400	1,000

* Reference point / locations indicated on Figures K & L.

2.11.17 As set out in the table there would be reductions in flows for all of the links described except for Rugby Road Swinford. The increase at Rugby Road is due to its connection to the proposed direct link to the A5. The model anticipates that this route would be more attractive to travellers than for example Shawell Road. The reduction in the flow along Shawell Road shown in Table 2.7 suggests that drivers would transfer to the new link.

2.11.18 Flows on the local roads are important in environmental terms because they impact directly on the villages and the dwellings that front the roads. The resulting effects in terms of noise and air quality are reported in Sections 6 and 11.

2.11.19 The traffic changes and improved efficiency of the junction have been taken into account in the economic appraisal of the project which confirms a positive economic rate of return.

2.11.20 They also inform the safety assessment. Over a 60 year period following the opening of the project it is estimated that the improvement would result in over 481 fewer accidents and would save over 15 fatal accidents.

3. ALTERNATIVES CONSIDERED

3.1 Road Based Study

- 3.1.1 Improvement options for M1 Junction 19 have been considered since the Road Based Study in 2000. This study was carried out by Halcrow Group Limited, in consultation with a wider reference group of interested parties and the local community. Several options as illustrated on Figure D were appraised against the Government's Objectives for Transport, Economy, Environment, Safety, Accessibility and Integration set out in section 2.3 of this report. They were exhibited at a public consultation in 2002.
- 3.1.2 As illustrated on Figure D, Options 1A and 1B included a roundabout and provided for all possible turning movements between the four main arms of the junction, the M6, A14, M1 north and the M1 south. Options 2, 3 and 4 were free flow layouts. Similar to the new Preferred Route, announced by the Secretary of State in February 2009, Options 2 and 4 limited the turning movements available by not providing a link between M1 south and the A14, or between the M6 and the M1 north.
- 3.1.3 Taking into account the results of the public consultation the Road Based Study recommended Option 1A as the Preferred Scheme. At this time the provision of an all movements junction was the prime consideration and Option 1A was selected as it provided an all movements junction at the least cost.
- 3.1.4 The free flow layouts, Options 2, 3 and 4 were rejected, either because they failed to provide an all movements junction, or required more land with a greater environmental impact. All three were considered to be more expensive than Option 1A and to produce a negative economic return. It was recognised that Option 1B would have some environmental advantages because of its lower level compared with 1A, but considered that these were outweighed by significantly greater construction cost.
- 3.1.5 Option 1A was announced as the Preferred Improvement Scheme in February 2003 and in this report is described as the Blue Junction.

3.2 Local Road Network

- 3.2.1 Several options for the LRN were also considered by the Road Based Study and subsequently by consulting engineers White Young Green. Amendments to the LRN have been considered for all junction options given a consistent requirement throughout the development of the scheme to segregate strategic traffic from local traffic movements, by severing the current access to the junction from local roads.
- 3.2.2 LRN options were subject to public consultation in 2002 and public exhibitions displaying the preferred route for the local roads held in 2004.
- 3.2.3 The LRN chosen in 2004 took into account the public's view, relative costs and accessibility for vulnerable users. It involved a new cross country link between Shawell Road and Shawell Lane to the east of Shawell village, and improvements to Shawell Lane and Catthorpe Road between Catthorpe village and the A5.
- 3.2.4 After some minor realignment to improve its environmental impact this network developed into the option described in this report as the Green LRN.

Value Management 2006

- 3.2.5 As the Preferred Improvement Scheme, the Blue Junction, together with the Green LRN as illustrated on Figure E was prepared for draft Orders Publication in 2006.
- 3.2.6 In the event value management undertaken in 2006 identified alternatives which were considered to have potential benefits when compared with the Blue Junction and Green LRN in terms of:-
- Reduced cost
 - Increased economic benefits
 - Reduced environmental impact
 - Reduced land take
- 3.2.7 It was considered that these alternatives would be able to deal effectively with the challenges and issues raised by the existing junction in terms of delays, queuing, high severity accidents and the mixing of local and strategic traffic.
- 3.2.8 The alternatives identified did not provide for all possible movements within the junction. Traffic studies confirmed that there was little demand for movements between:-
- M1 south and A14 in both directions – a movement not provided by the existing layout
 - M6 to M1 north in both directions
- 3.2.9 In the light of this and given the potential benefits of the alternatives it was considered no longer necessary to provide an all movement junction.

Comparative Assessment of Options

- 3.2.10 In 2007/8 a comparative assessment was carried out for the five options illustrated on Figure E:-
- Blue Junction and Green LRN
 - Brown Junction and Green LRN
 - Red Junction and Orange LRN
 - Red Junction and Purple LRN
 - Red Junction and Green LRN
- 3.2.11 A Comparative Environmental Assessment¹³ was carried out to a detailed level as defined in DMRB Volume 11⁵, to ensure an effective comparison between the options.
- 3.2.12 Some of the main findings of the assessment work are set out in Table 3.1 below which was included in the Public Consultation leaflet published in 2008. In considering these findings it should be noted that:-
- Data on the Brown and Red Junction options, for example for landtake, was based upon a preliminary stage of design compared with Blue which had been worked up in more detail for draft Orders publication
 - The biodiversity assessment was based on a precautionary, risk based approach pending more detailed survey work for a preferred route, which has since been carried out

Table 3.1 : Options Comparison Table

Option	Blue and Green	Brown and Green	Red and Green	Red and Orange	Red and Purple
Construction Period	36 months	36 months	27 months	33 months	27 months
Estimated Cost	£205 to £325 million	£205 to £325 million	£185 to £285 Million	£200 to £310 million	£195 to £295 million
Present Value Benefits	£515 million	£520 million	£590 million	£590 million	£570 million
Long Distance Traffic	This option provides an all movement junction.	Movements between the A14 and M1 south of the junction would not be provided.	Movements between the A14 and M1 south of the junction would not be provided. Existing movements between the M6 and M1 north of the junction would be removed.	Movements between the A14 and M1 south of the junction would not be provided. Existing movements between the M6 and M1 north of the junction would be removed.	Movements between the A14 and M1 south of the junction would not be provided. Existing movements between the M6 and M1 north of the junction would be removed.
Local Roads	The link between Swinford and Catthorpe increases from 1.4 miles to 2.6 miles. The proposed route passes Swinford primary school.	The distance between Swinford and Catthorpe increases from 1.4 miles to 2.6 miles. The proposed route passes Swinford primary school.	The distance between Swinford and Catthorpe increases from 1.4 miles to 2.6 miles. The proposed route passes Swinford primary school.	The distance between Swinford and Catthorpe remains 1.4 miles. Local traffic flows through Catthorpe would increase.	The distance between Swinford and Catthorpe increases from 1.4 miles to 2.1 miles.
Noise	<i>Moderate Beneficial</i> overall. Increase for 44 dwellings. Decrease for 265 dwellings.	<i>Moderate Beneficial</i> overall. Increase for 49 dwellings Decrease for 272 dwellings.	<i>Moderate Beneficial</i> overall. Increase for 25 dwellings Decrease for 273 dwellings.	<i>Slight Beneficial</i> overall. Increase for 145 dwellings. Decrease for 196 dwellings	<i>Moderate Beneficial</i> overall. Increase for 69 dwellings. Decrease for 245 dwellings
Landscape	<i>Moderate Adverse</i> effect from loss of 9.7 hectares of established screen planting and increased scale and height of this option. Adverse impact on 46 dwellings.	<i>Moderate Adverse</i> effect from loss of 5.2 hectares of established screen planting and increased scale and height of this option. Adverse impact on 44 dwellings.	<i>Slight Adverse</i> effect from loss of 3.8 hectares of established screen planting. Option similar in scale and height to existing junction. Adverse impact on 23 dwellings.	<i>Slight Adverse</i> effect from loss of 3.8 hectares of established screen planting. Option similar in scale and height to existing junction. Adverse impact on 18 dwellings.	<i>Slight Adverse</i> effect from loss of 3.8 hectares of established screen planting. Option similar in scale and height to existing junction. Adverse impact on 20 dwellings.

Option	Blue and Green	Brown and Green	Red and Green	Red and Orange	Red and Purple
Cultural Heritage	<i>Slight Adverse overall. Moderate Adverse effects on Lilbourne Motte and Bailey Scheduled Monument.</i>	<i>Slight Adverse overall.</i>	<i>Slight Adverse overall.</i>	<i>Slight Adverse overall.</i>	<i>Slight Adverse overall.</i>
Biodiversity	<i>Moderate Adverse effects on otter (new River Avon crossing and potential bridleway) and great crested newt (new local road close to 5 breeding ponds).</i>	<i>Moderate Adverse effects on otter (potential bridleway) and great crested newt (new local road close to 5 breeding ponds).</i>	<i>Moderate Adverse effects on otter (potential bridleway) and great crested newt (new local road close to 5 breeding ponds).</i>	<i>Moderate Adverse effects on otter (potential bridleway) and great crested newt (new local road 100m from 1 breeding pond).</i>	<i>Moderate Adverse effects on otter (potential bridleway) and great crested newt (new local road 100m from 1 breeding pond).</i>
Agriculture	9 farms affected Land take 33.5 hectares including 16.4 hectares BMV	8 farms affected Land take 31.3 hectares including 15.6 hectares BMV	7 farms affected. Land take 23.5 hectares including 14.0 hectares BMV	6 farms affected Land take 19.1 hectares including 13.6 hectares BMV	7 farms affected. Land take 20.0 hectares including 14.0 hectares BMV
Disruption during Construction	800,000 m ³ of material imported for embankments. 24 dwellings within 100m of the works. Local roads would be built prior to closing local access through the junction.	760,000 m ³ of material imported for embankments. 16 dwellings within 100m of the works. Local roads would be built prior to closing local access through the junction.	27,000 m ³ of material imported for embankments. 14 dwellings within 100m of the works. Local roads would be built prior to closing local access through the junction.	42,000 m ³ of material imported for embankments. 5 dwellings within 100m of the works. Temporary local road closures and diversions required.	50,000 m ³ of material imported for embankments. 13 dwellings within 100m of the works. Temporary local road closures and diversions required.

Environmental effects described for 2027.

Terms in italics are the results of the formal comparative assessment.

Agricultural land take is that required permanently for the works. Other land would be required temporarily.

BMV is Best and Most Versatile land, as defined by government policy.

Present Value Benefits (PVB) is a term used in the economic appraisal of a project and represents the future benefits associated with a project tin financial terms discounted in 2002 prices.

- 3.2.13 Following the assessment all five options were taken to public consultation in 2008. Exhibitions were held at Swinford and Lilbourne villages in July 2008. At the same a wide range of stakeholders were consulted including statutory and non-statutory environmental bodies and Local Authorities.
- 3.2.14 The Red Junction and Orange LRN was selected as the Preferred Route¹ in February 2009 taking into account the technical assessment work and the feedback from the public consultation¹⁴.

The Red Junction

- 3.2.15 The technical assessment concluded that the Red Junction performs best in terms of:-
- Engineering
 - Traffic benefits
 - Environment
- 3.2.16 In environmental terms the Red Junction has the least adverse environmental impact. Its design is limited to three levels, similar in scale to the existing junction, compared with the Blue and Brown junctions which would require an additional level seven metres higher than the existing. Based on the preliminary designs available at that stage it had the smallest land take restricting impacts on landscape, biodiversity, heritage and agricultural assets.
- 3.2.17 Here it should be noted that further design development has resulted in an increase in agricultural landtake from 19.1 hectares to 23.7 hectares. However given that similar design development would have been needed for the other options considered, it remains the case that the now preferred Red Junction design has the smallest landtake, significantly less than the Blue and Brown options. The Red Junction also allows for the retention of more of the existing woodland surrounding junction than either the Blue or Brown junctions.
- 3.2.18 The feedback from the public consultation was that 57% of the respondents to a questionnaire supplied with the leaflet placed the Red Junction as their first choice.
- 3.2.19 Environmental stakeholders including Natural England, English Heritage and the Environment Agency, vulnerable user groups and specialist advisers within local authorities preferred Red. Harborough District Council, the local planning authority for the majority of the junction also preferred Red.
- 3.2.20 Other planning bodies, or those responsible for using or maintaining the junction, preferred Blue on the grounds of it providing for all movements. However no compelling evidence was found, either in the technical assessment or in the stakeholder responses, of the need for all movements.
- 3.2.21 There was little support for the Brown Junction.

The Orange Local Road Network

- 3.2.22 In environmental terms the Orange LRN performs best and provides the greatest opportunity for improving facilities for vulnerable users by facilitating a direct link between the villages of Swinford and Catthorpe. It continues to have the minimum land take, taking into account the subsequent design development. By comparison

the Green LRN had the disadvantage of a new cross country link which would adversely affect the environment, including proximity to five great crested new ponds.

- 3.2.23 In engineering terms Green would have been easier and quicker to construct and could be provided in advance of severing the local links through the junction, thus reducing disruption during the construction period.
- 3.2.24 The response from the public consultation questionnaire was that the Orange LRN is the preferred local road solution, with 42% selecting it as their first choice.
- 3.2.25 The majority of key stakeholders favouring the Red Junction also preferred the Orange LRN. In particular, vulnerable user groups including Ramblers, Cyclists' Touring Club, the British Horse Society and local authority representatives strongly favoured a direct link between Swinford and Catthorpe as provided by the Red Junction and Orange LRN, or potentially by adding such a link to the Purple LRN. Other than this there was little support for the Red Junction and Purple LRN.

4. ENVIRONMENTAL IMPACT ASSESSMENT METHODS

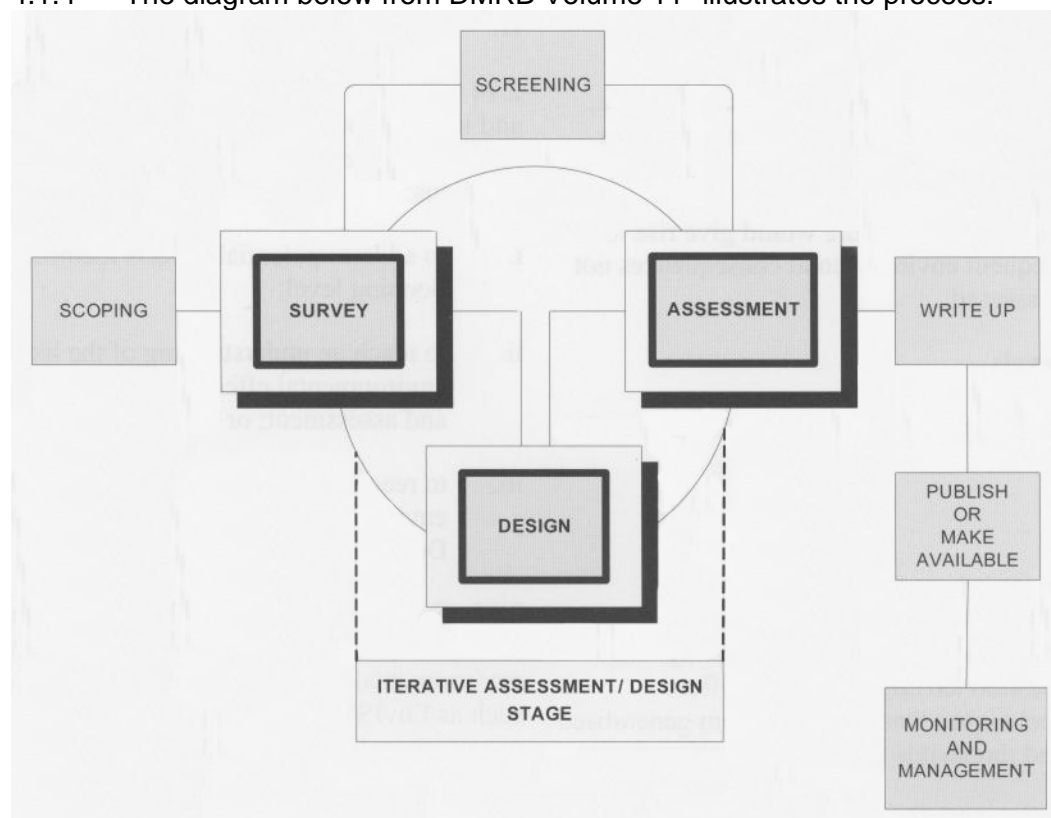
4.1 The EIA Process

4.1.1 Section 1 establishes the legal basis for the ES and the screening process undertaken so as to determine whether a statutory EIA is required. Section 1 also sets out the information required to be included in the ES by the EIA Directive⁴ and Regulations³.

4.1.2 The potential environmental effects of a project must be understood not only to satisfy those legal obligations, but also to inform option choice, as described in the previous section, and to aid the planning and design process. Adverse effects can be avoided or reduced and opportunities for beneficial effects realised by taking into account the issues identified by environmental assessment in decision making and design from the earliest stage.

4.1.3 Environmental assessment is an ongoing or iterative process where information gained from the assessment is fed back into the design to improve and to reduce any adverse environmental effects as far as possible within engineering and economic constraints.

4.1.4 The diagram below from DMRB Volume 11⁵ illustrates the process.



4.1.5 The overall methodology used for the assessment is that set out in the DMRB Volume 11⁵, where appropriate complemented by topic specific best practice guidance. Detailed methodologies are set out for each topic in the respective Chapters of Volume 2.

4.1.6 The DMRB Volume 11 is currently undergoing amendment and revised sections are issued on a regular basis.

4.1.7 The version used is that current on the 31st October 2009. Changes subsequent to that date, including HD 45/09 Road Drainage and the Water environment issued in November 2009, have not been included.

4.1.8 The assessment methodology derived from the DMRB Volume 11 to meet the requirements of the EIA Directive and Regulations involves:-

- the collection, description and evaluation of baseline environmental information by a combination of field survey and published data, in turn leading to conclusions on sensitive, importance and quality of the environmental resource
- identification and prediction of the magnitude of environmental impacts
- development of measures to mitigate environmental impacts
- evaluation of the significance of effects

4.1.9 Where appropriate, guidance set out in the Department for Transport's Transport Analysis Guidance (TAG)¹⁵ has also been taken into account.

4.2 The Study Area

4.2.1 In general terms the study area is illustrated by the environmental resources shown on Figure C in Appendix 1. Where necessary data has been obtained from further afield. The areas defined for ecological surveys are defined on Figure F, but data on designated sites such as Sites of Special Scientific Interest have been gathered from a range of up to five kilometres, and 10 kilometres for sites of international value.

4.2.2 Traffic based studies such as air quality or noise rely upon traffic changes on the road network as their threshold for assessment. For noise this is an increase in traffic of at least 25% or a decrease of 20%. Calculations also have to be carried out at least for 'sensitive receptors' such as dwellings within 600 metres of the project. For air quality, criteria are more complex and include roads with changes in daily traffic flows of 1,000 vehicles or more.

4.2.3 The study areas for each topic are set out in detail in Volume 2.

4.3 Scoping and Consultations

4.3.1 The aim of scoping is to decide which environmental topics are to be examined by the EIA and how much effort should be expended upon them. The process has been carried out in consultation with interested parties including:-

- Statutory bodies
- Non-statutory organisations
- Local communities

4.3.2 A full list of the organisations consulted is at Table 4.1.

4.3.3 At the same time opportunities have been taken to discuss the developing proposals for the project and the scope of mitigation measures both with organisations and individual landowners and their agents.

4.3.4 A scoping report⁷ was issued in March 2009 to engage consultees in the process. This provided information about the project, the alternatives considered, the key environmental issues and the assessment methodology intended to be followed.

4.3.5 For each of the key environmental topics identified information was provided on:-

- Objectives
- The study area
- Relevant legislation
- Current data describing the baseline environment
- Further information and surveys required
- Potential impacts and mitigation measures
- Assessment methodology
- The criteria for determining significance of effect (significance criteria)
- The scope of consultations

4.3.6 Issue of the document was followed by a series of meetings involving representatives from each organisation to discuss particular topics as follows:-

- Air quality and noise
- Cultural heritage
- Ecology and nature conservation
- Landscape
- Vulnerable users
- Road drainage and the water environment
- planning and policy

4.3.7 Separate meetings were held with Natural England and the Environment Agency, with representatives of Parish Council's and Parish Meetings, and with the Campaign to Protect Rural England (CPRE).

4.3.8 In general there was broad agreement on the scope of the EIA and the methodology to be used. Many of the issues raised related to design issues and the scope of mitigation measures to be employed.

4.3.9 In addition to the meetings, formal responses to the scoping were received by the Highways Agency from:-

- Natural England
- Environment Agency
- Byways and Bridleway Trust
- Leicestershire County Council
- Northamptonshire County Council

4.3.10 Table 4.1 summarises the issues raised under each topic. They are not attributed to individual consultees, except where indicated.

4.3.11 All of the issues raised have been taken into account in the assessment.

Table 4.1 : Scoping and Consultations

Topic	Organisation	Issues
Air Quality and Noise	Harborough District Council Daventry District Council Rugby Borough Council	<ul style="list-style-type: none"> • The junction should include turning movements between M6 and M1 Northbound and between A14 and M1 south of the junction, to serve local industrial traffic and proposed development. • Additional congestion due to construction could increase traffic within Rugby’s Air Quality Management Area. • Advance notice to be given of unusual operations such as night-time working. • CEMP including standard codes of practice to be used to address construction dust. • A complaints procedure to be put in place by the contractor during construction. • Need for air quality monitoring to be considered in advance of construction.
Cultural Heritage	English Heritage Leicestershire County Council Northamptonshire County Council Warwickshire County Council Harborough District Council Daventry District Council Rugby Borough Council	<ul style="list-style-type: none"> • Stanford Hall and its Registered Park and Garden would not be affected by the proposals. • The Scheduled Monument of Lilbourne motte and bailey castle would not be affected by the proposals. • No further archaeological evaluation works are required for the EIA. • An agreed strategy of archaeological evaluation and mitigation would need to be carried out in advance of the works.
Ecology and Nature Conservation	Natural England Environment Agency Leicestershire County Council Warwickshire County Council Harborough District Council Daventry District Council Rugby Borough Council BCNP Wildlife Trust Leicestershire and Rutland Wildlife Trust Warwickshire Wildlife Trust	<ul style="list-style-type: none"> • Achievement of net biodiversity gain for the project in keeping with landscape character. • New habitats to be tailored to local BAP targets. • Use of a local seed project to provide local provenance stock for tree, shrub and hedgerow planting. • Importance of a long term plan for the habitats created which can evolve in the light of changing needs. • Enhancement of the River Avon corridor. • Natural England to be consulted further on the scope of bat surveys on completion of the first survey. • An otter crossing to be provided beneath the A14 bridge with protective fencing. • Design measures to be developed to minimise potential disturbance to otters from the proposed bridleway adjacent to the River Avon. • Use of low nutrient soils for species-rich grassland and wetlands. • Proposed drainage ponds to include pollution control features, swales at the outfall, habitat creation and separate ponds to act as wildlife refuges in case of a pollution incident.

Topic	Organisation	Issues
		<ul style="list-style-type: none"> • Include wildlife ponds where possible. • Service diversions should be planned at an early stage to avoid unforeseen impacts on wildlife. • The EIA should measure habitats 'before and after' the proposals to identify 'profit and loss' for biodiversity gain. • Effects on protected species should be at least <i>Neutral</i> and preferably <i>Beneficial</i>. Opportunities should be taken to enhance habitats. • Provide connected habitats, also known as 'Green Infrastructure'.
Landscape	Natural England Leicestershire county Council Warwickshire County Council Harborough District Council Daventry District Council Rugby Borough Council	<ul style="list-style-type: none"> • The assessment should evaluate the existing landscape in terms of its sensitivity, capacity and ability to accommodate change. • No access for contractor's vehicles through the villages. • The landscape design should provide visual interest through strong contrasts in planting types including some non-local species. • Importance of long term management planning. • Adequate visual screening to be provided, including off-site planting.
Vulnerable Users	Natural England Leicestershire County Council Northamptonshire County Council Warwickshire County Council Local Access Forum British Horse Society Cyclist's Touring Club Byways and Bridleways Trust Ramblers Association Sustrans Living Streets	<ul style="list-style-type: none"> • The existing junction seriously disrupts the substantial network in the area. • There is a need to improve accessibility and repair the disrupted connections. • Some rationalisation, ie. closure of existing routes is acceptable, but only within the context of an overall enhancement. • A two tier network should be provided to deal with utility and recreational needs. • A direct link between Swinford and Catthorpe is of particular importance, with provision extending to each village. • Consideration should be given to traffic calming where vulnerable user routes are shared with the LRN. • Routes should be practical. • The recreational network should provide the opportunity of a bridleway circuit. • The network should pay regard to the historic context and include opportunities of links to the wider network. • Where vulnerable users share the LRN, provision needs to be made for equestrians to use verges on either side. • Closed sections of footpaths X7 and X8 should be linked to X6. • The proposed bridleway adjacent to the River Avon should connect to Station Road, Lilbourne.

Topic	Organisation	Issues
Road Drainage and the Water Environment	Environment Agency	<ul style="list-style-type: none"> • See also issues raised under ecology and nature conservation for enhancement of the River Avon and protection of otters, and measures for drainage ponds. • The rate of additional run-off from new sections of highway to be 'attenuated' (reduced) to an equivalent rate for a greenfield (5 litres / second / hectare) up to a 1 in 100 year event, with an additional allowance of 20% for climate change. • Run-off from existing highways within the scheme limits to be attenuated by at least 20%. • A Flood Risk Assessment to be carried out. • Pollution controls, such as drainage ponds, to be provided during the construction and operation of the project. • Emergency procedures and facilities to be put in place to deal with accidental spillages. • Any loss of flood plain to be compensated, modelled on a 1 in 100 year event.
Planning Policy	Leicestershire County Council Northamptonshire County Council Warwickshire County Council Harborough District Council Daventry District Council Rugby Borough Council	<ul style="list-style-type: none"> • The junction layout should provide for all turning movements to serve existing developments such as the Daventry International Rail Freight Terminal (DIRFT) and commercial sites in Rugby, and future development proposals (Rugby, Daventry and Northamptonshire). • Support for the preferred route as it would have the least impact on local communities (Harborough). • Identify potential benefits of traffic reductions on the A5199 through Welford, following the implementation of the scheme.
Parish Councils / Meetings	Shawell Parish Meeting Catthorpe Parish Meeting Swinford Parish Council Lilbourne Parish Council	<ul style="list-style-type: none"> • Support for the preferred route as it improves the linkage between the villages. • Need to consult emergency services on access to the strategic road network, once access to the junction from local roads is closed. • Concerns about the safety of the proposed junction between the LRN and A5. • Drainage ponds to be designed with safety in mind. • Concern over existing motorway noise at Lilbourne and request for low noise surfacing or barrier. • Importance of managing construction to limit light and noise impacts, particularly at night. • Access for local traffic and businesses to be maintained. • Construction traffic through villages to be limited. • Support for vulnerable user strategy, including link between Swinford and Catthorpe.

Topic	Organisation	Issues
Others	CPRE	<ul style="list-style-type: none">• M1 corridor is being considered as a route for a high speed rail link.• The preferred route would be less harmful to the landscape than a four level junction such as Blue.• Drainage measures proposed have the potential to improve water quality.• The EIA needs to consider the implications of the proposed Roadside Service Area at Swinford.

4.4 Surveys

4.4.1 A programme of environmental site work as set out in the scoping report⁷ has been carried out in 2009 to inform the EIA, including a visual impact assessment and soil sampling to determine the quality of soils available for agricultural restoration and habitat creation.

4.4.2 A full Ground Investigation (GI) has also been carried out to inform the engineering and structural design of the project. This will provide data on the nature and strength of soils, any levels of contamination and groundwater levels. As set out below the results of this GI are not available in time for the EIA, but it has been possible to complete the EIA on the basis of investigations carried out at earlier stages of the project.

4.4.3 As agreed with cultural heritage consultees, no further archaeological evaluations have been carried out. The EIA is based upon work completed at an earlier stage for the Blue option including:-

- a walkover survey in 2003
- evaluation of two sites, 19 and 20, potentially directly affected by geophysical survey and trial trenching in 2005
- geophysical survey of several areas in 2006

4.4.4 Surveys were carried out between 2003 and 2005 on the use of public rights of way and the junction by vulnerable users. The numbers encountered were low.

4.4.5 Ecological surveys have been carried out throughout the development of the project. Those carried out in late 2008 and throughout 2009 to provide up to date data for the EIA are as follows:-

- Phase 1 habitat
- hedgerows
- scarce arable weeds
- breeding birds
- amphibians
- reptiles
- white-clawed crayfish
- invertebrates
- bats
- brown hare
- otters
- water vole

4.4.6 The results of the surveys are described in detail in Volume 2 of the ES and summarised in this Volume for each of the topics.

4.5 Indication of any Difficulties Encountered

4.5.1 This section summarises any difficulties that were encountered in compiling information to complete the EIA.

Air Quality and Climate Change

- 4.5.2 There are uncertainties inherent in the comparison of monitored pollution levels and calculations made from the modelled results. However the data has been thoroughly analysed to ensure that the monitoring results are consistent and robust.

Cultural Heritage

- 4.5.3 The assessment of archaeological remains in particular presents problems as there is always a risk that their presence, value and the degree of impact may remain uncertain, even after the appropriate methods of identification and evaluation have been carried out.

Ecology and Nature Conservation

- 4.5.4 All of the protected species surveyed for are mobile and could change their location or colonise the area affected by the project at any point in the future. Therefore further survey and monitoring would be required as the project develops.
- 4.5.5 All of the 2009 surveys were undertaken at suitable times of the year and during weather conditions for the species being surveyed. However access to some areas was not possible, either because permission was not granted or because of physical constraints.
- 4.5.6 However in overall terms it is considered that sufficient survey has been carried out to inform the EIA.

Landscape

- 4.5.7 No difficulty was encountered for survey work.
- 4.5.8 Mitigation measures relied upon for the EIA are committed to as an integral part of the project and are included in the draft Orders to secure their delivery.
- 4.5.9 Where there is uncertainty by:-
- the use of off-site planting agreements under Section 253 of the Highways Act⁶
 - the planting of hedgerows along local roads as accommodation works

it is made clear that such measures are subject to agreement and they have not been taken into account in the assessment.

Materials

- 4.5.10 Some limitations have been identified which is not unusual in the assessment of geology contaminated land and materials. These are associated mainly with a lack of site data and specific information relating to ground, contaminants wastes and materials.
- 4.5.11 The Ground Investigation carried out in 2009 will provide further detailed information, but in the absence of these results the assessment has been carried out using data from previous investigations and studies of historic land use. It is not considered likely that significant contamination would be encountered, and if

unforeseen contamination were encountered there would be procedures in place to ensure it was dealt with.

- 4.5.12 In relation to construction materials the design is at a relatively early stage and some uncertainty must be attached to the quantities described in this ES.

Noise and Vibration

- 4.5.13 No difficulties were encountered in the preparation of the assessment.

Effects on all Travellers

- 4.5.14 The key difficulty encountered during this assessment was the existing low level of use of the PROW network as indicated by the surveys. Given the problems for the existing network, including conflicts with strategic traffic, the low level use is not surprising, but given the location of the three communities of Shawell, Swinford and Catthorpe, it indicates that there is likely to be some level of suppressed demand. However the actual level of likely demand cannot be quantified. Nor have consultations with user groups been able to confirm any likely level of use.

Community and Private Assets

- 4.5.15 The lawful planning status of two sites has not been fully determined:-
- the siting of three residential caravans at Stonebank
 - the status of the planning consent for a Roadside Service Area (RSA) at Swinford
- 4.5.16 An assumption has been made that the caravans are lawfully sited, so that they can be considered by the EIA.
- 4.5.17 For the RSA, two scenarios have been considered, as agricultural land and as development land.
- 4.5.18 Manor Farm, Catthorpe, is a diversified farm business where the improvement of M1 Junction 19 is expected by the owners to have an adverse impact on passing trade at the farm shop and tea room. The potential impact of the proposals on the diversification enterprises of Manor Farm is not quantifiable within the scope of this environmental assessment. Any reduction in 'passing trade' arising from the closure of the local road link at M1 Junction 19 would be a matter for the compensation procedures.

Road Drainage and the Water Environment

- 4.5.19 Water quality data is not available for some of the tributaries of the River Avon in the study area. For these watercourses, it has been assumed that the quality is of the same high standard as the River Avon upstream of the junction, thus ensuring that a precautionary approach has been taken during the assessment.

Summary

- 4.5.20 In overall terms it is considered that sufficient information has been obtained to complete the EIA. The uncertainties described are typical of the EIA process and appropriate steps have been taken to minimise the risk of unforeseen impacts.

4.6 Significance Criteria

4.6.1 This section sets out the methodology for assessing whether or not environmental effects are likely to be significant or not. The terms used to describe relative significance are called significance criteria.

4.6.2 The significance of environmental effects is affected by:-

- the characteristics of the project
- the importance of the receiving environment
- the likely scale of change
- the duration of effects
- the area affected
- the time period when effects could occur
- the consideration of past, present and reasonably foreseeable actions and trends

4.6.3 As a general principle significance is derived as a product of:-

- the sensitivity, importance or value of the environmental resource affected
- the magnitude of impact

4.6.4 To ensure a consistent approach to defining significance within the assessment the following tables from DMRB Volume 11, Section 2, HA 205/08⁵ will be used, wherever possible.

4.6.5 It should be noted that the DMRB currently uses different terminology for the description of visual impact (as described in Section 10 below) and these are used in addition to the tables below.

Table 4.2 : Environmental Value (or Sensitivity) and Typical Descriptors

Value (Sensitivity)	Typical Descriptors
Very High	• Very high importance and rarity, international scale and limited potential for substitution
High	• High importance and rarity, national scale, and limited potential for substitution
Medium	• High or medium importance and rarity, regional scale, limited potential for substitution.
Low (or Lower)	• Low or medium importance and rarity, local scale.
Negligible	• Very low importance and rarity, local scale.

Table 4.3 : Magnitude of Impact and Typical Descriptors

Magnitude of Impact	Typical Criteria Descriptors
Major	<ul style="list-style-type: none"> Loss of resource and/or quality and integrity; severe damage to key characteristics, features or elements (Adverse). Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial)
Moderate	<ul style="list-style-type: none"> Loss of resource, but not adversely affecting the integrity. Partial loss of/damage to key characteristics, features or elements (Adverse). Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial)
Minor	<ul style="list-style-type: none"> Some measurable change in attributes quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse) Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial)
Negligible	<ul style="list-style-type: none"> Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse) Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial)
No change	<ul style="list-style-type: none"> No loss or alteration of characteristics, features or elements; no observable impact in either direction.

4.6.6 Assigning significance relies upon reasoned argument, professional judgement and taking on board the advice and views of appropriate organisations. The typical descriptors in Table 4.4 and the matrix in Table 4.5 will be used in reaching an overall conclusion. Where a range is indicated a single description will be determined.

Table 4.4 : Descriptors of Significance of Effects

Significance Category	Typical Descriptors of Effect
Very Large	Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of district importance may also enter this category.
Large	These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
Moderate	These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such issues may become a decision-making issue if leading to an increase in the overall adverse effect on a particular resource or receptor.
Slight	These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Table 4.5 : Arriving at Significance

		No change	Negligible	Minor	Moderate	Major
		MAGNITUDE OF IMPACT (DEGREE OF CHANGE)				
ENVIRONMENTAL VALUE (SENSITIVITY)	Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or Slight	Neutral or slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

4.6.7 Using this methodology, for the majority of topics considered by the assessment, the overall significance effect will be defined using the same eight point scale employed in TAG¹¹ appraisals:-

- *Large Beneficial*
- *Moderate Beneficial*
- *Slight Beneficial*
- *Neutral Effect*
- *Slight Adverse*
- *Moderate Adverse*
- *Large Adverse*
- *Very Large Adverse*

4.6.8 All impacts and effects are perceived as a change caused by providing the scheme. The change is assessed as the difference between the environment with the scheme in place and what it would have been if the scheme were not to be built. This existing environment, identified by surveys and given a value or sensitivity for the assessment, is described in this report as the 'Baseline'.

4.6.9 As described in 2.11 Traffic, these two scenarios are called:-

- Do-something, i.e. with the project in place.
- Do-minimum, i.e. without the project.

4.6.6 Both scenarios take into account other amendments to the network, which are planned or happening in any event.

4.6.10 Also as set out under traffic and depending on the topic, this comparison may take place for different years projected into the future, ie. the opening year of 2014 and 15 years after opening sometimes called the 'design year'.

4.7 Mitigation and Enhancement

4.7.1 Section 2.8 has described the powers under the Highways Act⁶ for mitigation and enhancement and the measures proposed.

4.7.2 Measures for both mitigation and enhancement have been taken into account in the assessment. Enhancement measures in particular, such as the creation of improved wildlife habitats compared with the existing, are likely to be responsible for some of the beneficial impacts and effects identified by the assessment.

4.7.3 To demonstrate the effectiveness of such measures where appropriate impacts have been reported separately without such measures in place and then taking them into account enabling a comparison to be made.

4.8 Cumulative Effects

4.8.1 When considered in isolation the environmental effects for a single topic may not be regarded as significant. However when individual effects can interact, they will be considered in combination, which may result in the cumulative effect being significant.

4.8.2 Section 15 of this Volume describes the likely cumulative effects. As previously described, the EIA is also taking into account the Catthorpe Viaduct Replacement project which is being constructed in advance as a maintenance project. Where appropriate it refers to the separate impacts of the Catthorpe Viaduct Replacement, which are reported in more detail in a separate non-statutory environmental assessment².

4.8.3 At the same time, as the new Catthorpe Viaduct would become an integral part of the junction when the M1 Junction 19 Improvement project is completed, the impacts and effects assessed for the Do-something also include the Catthorpe Viaduct.

4.8.4 The significance of cumulative effects should be determined by the extent to which the various impacts can be accommodated by a particular receptor or resource.

4.8.5 The following factors should be considered:-

- Which receptors or resources are affected?
- How will the resource be affected?
- What is the probability of such effect occurring?
- How far can the resource absorb cumulative effects before the change becomes irreversible?

4.8.6 Table 4.6 below sets out criteria from the DMRB Volume 11 Section 2, HA 205/08⁵ for judging the significance of cumulative effects.

Table 4.6 : Determining Significance of Cumulative Effects

Significance	Effect
Severe	Effects that the decision maker must take into account as the receptor / resource is irretrievably compromised.
Major	Effects that may become key decision making issue
Moderate	Effects that are unlikely to become issues on whether the project design should be selected, but where future work may be needed to improve on current performance
Minor	Effects that are locally significant
Not Significant	Effects that are beyond the current forecasting ability or are within the ability of the resource to absorb such change

4.8.7 Here it should be noted that the cumulative effect reported is not the sum of the effects for each project. A potential cumulative effect arises when the effect of the whole may be considered to be greater than the sum of the two parts, where the two considered in combination may result in an effect of greater significance. The cumulative assessment defines this additional effect.

4.8.8 As set out in the criteria in Table 4.6, where the additional effect is *Major* or *Severe*, taking into account the capacity of the environment to accommodate both projects, it could influence the decision making process for the project. If *Moderate*, further work may be required in the future to reduce the cumulative effect, as the project progresses. A *Minor* effect is still considered to be of significance for the local area, it does not imply that the effects for each project considered separately are *Minor*.

Page Not Used

5. STATEMENT OF KEY ISSUES

5.1 Table 5.1 sets out the key environmental issues for the scheme identified at the scoping stage and discussed and agreed with consultees. It sets out:-

- The topic area to be considered.
- The potential impact or environmental risk arising from the project.
- The level at which the topic is considered to be important, local, regional, national or international.
- An assessment of the sensitivity of each topic and the effects at construction stage or from the operation of the project assessed by the earlier Comparative Environmental Assessment (CEA)¹³. Here it also identifies where issues will need to be reviewed or when further work is required for the EIA.
- Whether or not the topic is a key issue which needs to be reported in detail in the ES. Here the table confirms that townscape can be scoped out from the assessment as no other areas of townscape are affected.

5.2 In identifying key issues for scoping, the following criteria were taken into account:-

- Significance of effect. The EIA Directive⁴ requires all likely significant effects to be reported whether permanent or temporary, positive or negative, as a result of direct, indirect, secondary, cumulative, short, medium and long term effects. Section 6 Methodology identifies the criteria used to assess significance. Positive and negative effects at a *Moderate* level or above can be regarded as significant.
- The sensitivity of receptors. Even where the assessment is likely to confirm that overall effects are not significant, the issue may be considered to be of key importance because of its sensitivity. Here noise and air quality impacts which affect people and possibly their health have to be considered in detail and should be reported so that the information is accessible.
- Where detailed assessment is needed to inform a mitigation strategy required to avoid significant effects and deliver the project. An example here would be cultural heritage where a detailed strategy will need to be implemented to overcome potentially significant effects on archaeological sites.

5.3 The following sections 6 – 14 set out the results of the assessment for:-

- air quality and climate change
- cultural heritage
- ecology and nature conservation
- landscape
- materials
- noise and vibration
- effects on all travellers
- community and private assets
- road drainage and the water environment

5.4 Each section summarises the detailed reports on these issues included in Volume 2 dealing with:-

- the study area
- legislation and policies
- existing or 'baseline' conditions, including value and sensitivity

- mitigation
 - magnitude of impacts
 - significance of effects
- 5.5 Detailed technical methodologies for each assessment are set out in the respective Chapters. A general review of methodology and significance criteria is set out in Section 4 of this volume.
- 5.6 References are made to the Catthorpe Viaduct as appropriate.

Table 5.1 : Key Issues Identified for the Scheme at Scoping

*indicates that a topic is considered to be a key issue for the scheme.

L – Important at a Local Level, R – Important at a Regional Level, N – Important at a National Level, I – Important at an International Level

Topic Area	Potential Impact / Risk	Level	Assessment	Key Issue
Air Quality and Climate Change	<p><i>Construction</i> Dust and emissions from plant. Traffic emissions due to delays.</p> <p><i>Operation</i> Changes in local pollutant concentrations and across the regional network.</p> <p>Air Quality Strategy (AQS) exceedances.</p> <p>Adverse Impacts on Air Quality Management Areas (AQMA's) or nationally designated nature conservation sites.</p>	L&R	<p>CEA Sensitivity : <i>Very High</i> CEA Construction Effect : <i>Not Significant</i> CEA Operational Effect : <i>Neutral</i></p> <ul style="list-style-type: none"> • Sensitivity is <i>Very High</i> as air quality changes affect human health. • The CEA does not identify any significant effects during construction given the implementation of a Construction Environmental Management Plan to control dust and emissions. However the effects of traffic delays were not assessed. • The scheme would result in only minor changes in pollutant levels at local and regional level, with no exceedances of the AQS and no significant impact on AQMA's. In terms of climate change carbon emissions will increase over time with or without the scheme, however the scheme would result in a small reduction compared with not building it. • Given their sensitivity air quality and climate change will be reported in detail. CEA results will be reviewed in the light of amended traffic forecasts. • Traffic emissions during construction will be assessed. 	*
Cultural Heritage	<p><i>Construction and Operation</i> Loss of archaeological features and impacts on the setting of built heritage features including the Scheduled Monument of Lilbourne Motte and Bailey, Conservation Areas and Listed Buildings.</p> <p>Impacts on historic landscape character.</p>	L&R	<p>CEA Sensitivity : <i>High – Low</i> CEA Construction Effect : <i>Slight Adverse</i> CEA Operational Effect : <i>Slight Adverse</i></p> <ul style="list-style-type: none"> • There is considerable archaeological potential within the study area including prehistoric cropmarks and a possible Roman settlement, as well as historic buildings in the villages and historic landscapes including ridge and furrow. • Construction would lead to the direct loss of some archaeological and landscape features, with effects on the setting of historic buildings continuing through the operation of the Scheme. The Preferred Route would not affect the Scheduled Monument. • There would be a risk of <i>Moderate</i> and <i>Major Adverse</i> impacts, but these would be reduced by the mitigation strategy arising from the detailed assessment, including the recording of any features lost. • The CEA will need to be reviewed in the light of any detailed design changes, including any changes in the temporary use of land required during construction. 	*

Topic Area	Potential Impact / Risk	Level	Assessment	Key Issue
Ecology	<p><i>Construction</i> Loss of habitats. Disturbance to wildlife in particular species protected at International and National Level.</p> <p><i>Operation</i> There are opportunities for enhancement of habitats.</p> <p>Continuing disturbance to wildlife.</p>	I&N	<p>CEA Sensitivity : <i>Very High – Low</i> CEA Construction Effect : <i>Moderate Adverse</i> CEA Operational Effect : <i>Moderate Adverse</i></p> <ul style="list-style-type: none"> • Much of the habitat directly affected including land within the current highway and surrounding agricultural land is of <i>Low</i> to <i>Medium</i> sensitivity, though some habitats including the River Avon, ponds and trees are either known to support protected species, or have the potential to do so. As a precautionary measure protected species identified, including otter and great crested newts, were assigned a <i>Very High</i> sensitivity given their international importance. • The CEA identified <i>Moderate Adverse</i> effects due to the disturbance of these species, but also considered that there was scope to enhance lower value habitats by measures included in the scheme. • The CEA results will be reviewed in the light of:- <ul style="list-style-type: none"> • updated surveys planned for 2009 • detailed design development including PROW adjacent to the River Avon • a more detailed assessment of the sensitivity of protected species 	*
Landscape	<p><i>Construction and Operation</i> Impacts on landscape character due to the disruption of landform and skylines, and loss of vegetation.</p> <p>Visual impact on dwellings and public right of way.</p>	L	<p>CEA Sensitivity : <i>High</i> (visual impact on dwellings) <i>Medium</i> (landscape character) CEA Construction Effect : <i>Moderate Adverse</i> CEA Operational Effect : <i>Slight Adverse</i></p> <ul style="list-style-type: none"> • Established planting in and around the existing junction helps to protect the setting of the four nearby villages of Shawell, Swinford, Catthorpe and Lilbourne, as well as PROW and cultural features. The landscape is then important at a local level and views from dwellings are regarded as particularly sensitive. • The loss of existing planting and addition of new structures would result in a <i>Moderate Adverse</i> effect initially, though as new planting establishes this would reduce to <i>Slight Adverse</i> in the longer term. • The CEA will be reviewed in the light of further design development including the provision of signal gantries and matrix signs, as well as more detailed mitigation measures. 	*
Townscape	No Townscape affect.	N/A	Townscape can be scoped out from the assessment.	

Topic Area	Potential Impact / Risk	Level	Assessment	Key Issue
Materials	<p><i>Construction</i> Loss of agricultural soils Loss of geological features Disturbance of contaminated soils Production of waste materials</p> <p><i>Operation</i> Routine maintenance waste</p>	R&L	<p>The CEA did not consider material resources as a whole, but did include geology, encompassing geological features and contaminated soils, and the loss of agricultural soils. A section on disruption due to construction also considered the import and movement of bulk fill materials, structural materials and waste.</p> <p>Agricultural Soils - CEA Sensitivity : <i>Low</i> CEA Construction Effect : <i>Slight Adverse</i></p> <p>Geology - CEA Sensitivity : <i>Negligible – Low</i> Construction Effect : <i>Slight Adverse</i></p> <ul style="list-style-type: none"> • The scheme would result in the permanent loss and temporary use of agricultural land, some of which is classified as BMV. No Important geological features would be affected, but there is a risk of <i>Moderate Adverse</i> effects on known landfill sites, which could contain hazardous materials. The scheme is likely to require the importation of 42,000m³ of bulk materials. Improvements to the existing junction are also likely to generate waste materials. • The EIA will need to include a comprehensive assessment of all material resources used in the construction, maintenance and operation of the scheme, including the surrounding soft estate. This will take into account the potential for the reduction, re-use and recycling of materials, both on and off site and where necessary disposal as waste including any hazardous materials. Agricultural soil and geological impacts will be reviewed against the developing design and data obtained from ground investigation. 	*
Noise	<i>Construction</i>	L	<p>CEA Sensitivity : <i>High for all dwellings</i> CEA Construction Effect : <i>Slight Adverse</i></p>	*

Topic Area	Potential Impact / Risk	Level	Assessment	Key Issue
	<p>Temporary noise from construction activities.</p> <p><i>Operation</i> Changes in traffic noise levels at dwellings.</p>		<p>CEA Operational Effect : <i>Slight Beneficial</i></p> <ul style="list-style-type: none"> • There are very few residential properties that are close to the junction improvement. Those that are would continue to be exposed to traffic noise from the junction, but would receive some benefit from the low noise surface proposed on the new highway sections. Such benefits would occur eventually without the junction improvement. • The most significant change would occur at dwellings close to the LRN, due to the redistribution of local traffic. Here there would be some significant increase and decreases in Swinford, and significant increases in Catthorpe. • The EIA will need to present a detailed assessment of noise changes, and those assessed by the CEA will need to be reviewed in the light of amended traffic figures. 	
Effects on all Travellers	<p><i>Construction</i> Temporary disruption for vulnerable users and vehicle travellers.</p> <p><i>Operation</i> Severance and diversion of PROW and impacts on amenity for vulnerable users..</p> <p>Inconvenience for local vehicle travellers no longer able to access Junction 19.</p> <p>Improved recreational and utility links for vulnerable users.</p> <p>Opportunities for increased physical fitness.</p> <p>Changes in traveller care, views from the road and driver stress for long distance drivers.</p>	L	<p>CEA Sensitivity : <i>Not assessed</i> CEA Construction Effect : Vulnerable users and local vehicle travellers <i>Slight Adverse</i> Long distance vehicle travellers <i>Moderate Adverse</i> CEA Operational Effect : Vulnerable users <i>Slight Positive</i> Local vehicle travellers <i>Neutral</i> Long distance vehicle travellers <i>Large Beneficial</i></p> <ul style="list-style-type: none"> • The Preferred Route incorporates a direct local link between the villages of Swinford and Catthorpe. The CEA considered this contributed to benefits for vulnerable users compared with the existing conditions and a neutral effect for local vehicle travellers. Here disadvantages resulting in the closure of direct access to the motorway junction were balanced by improved local links between Swinford and Catthorpe. • For long distance vehicle travellers the improvement would result in improved views and less stress due to reduced congestion, fear of accidents and uncertainty of the route ahead. • The CEA will need to be reviewed in the light of detailed design and in particular by the development of a network for vulnerable users. 	*

Topic Area	Potential Impact / Risk	Level	Assessment	Key Issue
Community and Private Assets	<p><i>Construction</i> Temporary loss of land.</p> <p><i>Operation</i> Permanent loss of agricultural land including BMV.</p>	L	<p>This new topic covers similar ground to Land Use and Agriculture. Agriculture is the dominant land use and represents the main private asset directly affected by the scheme.</p> <p>CEA Sensitivity : <i>Low – Medium</i> CEA Construction Effect : <i>Slight Adverse</i> CEA Operational Effect : <i>Slight Adverse</i></p> <ul style="list-style-type: none"> • Six farms would be affected with an agricultural land take of 19.1 hectares including 13.6 hectares of BMV land. One farm which would supply approximately 45% of the likely permanent land take would be affected to a <i>Moderate Adverse</i> level. • The CEA will need to be reviewed in the light of:- <ul style="list-style-type: none"> • new farm interviews proposed for Spring 2009 • design development in terms of amendments to land take and the negotiation of accommodation works 	*
Road Drainage and the Water Environment	<p><i>Construction</i> Potential for pollution of River Avon</p> <p><i>Operation</i> Impacts on surface and groundwater quality through routine run-off or accidental spillage. Increased flooding risk.</p>	L&R	<p>CEA Sensitivity : <i>High- low</i> CEA Construction Effect : <i>Moderate Adverse</i> CEA Operational Effect : <i>Neutral</i></p> <ul style="list-style-type: none"> • Effects at construction stage are conservative given risks of a pollution incident affecting the River Avon which provides a drinking water supply and is a designated cyprinid fishery, However this risk is of short duration given early provision of proposed treatment ponds and would be controlled by a Construction Environmental Management Plan. • Proposed mitigation measures including water treatment / attenuation ponds would deal effectively with pollution and flooding risks, resulting in a <i>Neutral</i> impact overall. • The CEA will need to be reviewed in the light of detailed development of the drainage design, and amended traffic forecasts which affect pollution risks. 	*

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6. AIR QUALITY AND CLIMATE CHANGE

6.1 Introduction

6.1.1 The assessment for air quality and climate change is dealt with in detail in Volume 2 Chapter 1.

6.1.2 The objectives for the assessment are:-

- To improve local air quality in line with National Air Quality Objectives
- To reduce emissions of Carbon Dioxide

6.2 The Study Area

6.2.1 The study area is defined by predicted changes in traffic flows and speeds and includes, for example, roads where traffic flows would change by 1000 vehicles a day or 200 heavy-duty vehicles (HDV) per day. It includes all the major roads and several local roads in an area extending west to Rugby and the A426, north to Lutterworth, east to Stanford on Avon and south of Lilbourne.

6.3 Legislation and Policies

Air Quality Strategy

6.3.1 The Air Quality Strategy (AQS¹⁷) contains national air quality standards and objectives established by the Government to protect human health as defined by Table 6.1 below.

6.3.2 The pollutants commonly associated with road traffic emissions are nitrogen dioxide (NO₂), fine particulates (PM₁₀), carbon monoxide (CO), hydrocarbons from fuel including 1,3 - butadiene and benzene, as well as carbon dioxide (CO₂).

6.3.3 This air quality assessment focuses on the pollutants NO₂ and PM₁₀ as these are the least likely to meet their AQS objectives in the vicinity of roads, and CO₂ due to its role in climate change. Further details of these pollutants are provided below.

6.3.4 Table 6.1 sets out the objectives set by the AQS and the European Union (EU) Limit Values for NO₂ and PM₁₀.

Table 6.1 : AQS objectives and EU Limit Values set in regulations for England for NO₂ and PM₁₀

Pollutant	National Air Quality Objectives (England)			EU Directive	
	Air Quality Objective		Date To Be Achieved And Maintained	Limit or Target Values	Date To Be Achieved And Maintained
Concentration	Measured As				
Nitrogen dioxide	200 µg/m ³ not to be exceeded more than 18 times a year	1 hour mean	31.12.2005	Limit Value as AQS Objective	01/01/2010
	40 µg/m ³	annual mean	31.12.2005		01/01/2010
Particles (PM ₁₀) (gravimetric)	50 µg/m ³ not to be exceeded more than 35 times a year	24 hour mean	31.12.2004	Limit Value as AQS Objective	01/01/2005
	40 µg/m ³	annual mean	31.12.2004		01/01/2005

6.3.5 NO₂ is associated with adverse effects upon human health as set by the Committee on the Medical Effects of Air Pollutants (COMEAP)⁵⁷, particularly with respect to the exacerbation of symptoms associated with respiratory illness. A small proportion of nitrogen oxides (NO_x) emissions from vehicles are NO₂, however, further NO₂ is produced through the oxidation of nitrogen oxide (NO) in the atmosphere.

6.3.6 Particulate matter causes inflammation of the airways that may worsen existing lung disease and enhance the sensitivity to allergens for people with hay fever and asthma. Exposure to particulate matter may also have implications for cardiovascular health. Smaller particles have a greater likelihood of reaching the lung and causing adverse health effects. Particles smaller than 10 microns, that is one millionth of a metre in diameter, are referred to as PM₁₀.

Local Air Quality Management

6.3.7 Part IV of the Environment Act¹⁶ placed a statutory duty on local authorities to periodically review and assess the air quality within their area. This involves consideration of present and likely future air quality against the AQS objectives, prescribed within the Air Quality Regulations¹⁸. Where the results of the Review and Assessment process highlight that problems are likely to exist with respect to attainment of the AQS objectives, it is required that an Air Quality Management Area (AQMA) is declared under Section 83(1) of the 1995 Environment Act¹⁶.

6.3.8 Following the declaration of an AQMA, the authority is then required to prepare an Action Plan which sets out measures it intends to put in place in pursuit of achieving the objectives.

Construction Dust Policy and Guidance

6.3.9 Dust constitutes one of the most common forms of nuisance at construction stage and both the Environmental Protection Act 1990¹⁹ and Clean Air Act 1993²⁰ provide the statutory basis to protect residents and the natural environment, together with a raft of policy and technical guidance.

Climate Change

- 6.3.10 The Climate Change Bill was introduced into Parliament in November 2007 and became law on 26 November 2008. The Climate Change Act 2008²¹ provides a new approach to managing and responding to climate change in the UK by setting legally binding targets, taking powers to help meet targets, and establishing clear and regular accountability. The main aims of the Act are to improve carbon management, which helps to move towards a low-carbon economy, and to demonstrate international leadership in sharing responsibility for reducing global emission.
- 6.3.11 The Act sets a legally binding target of at least an 80% reduction in greenhouse gas emissions by 2050 (based on 1990 levels). A target to reduce emissions by at least 34% by 2020 is also in place. A carbon budgeting system has been put in place to track progress towards these targets as described in the UK Low Carbon Transition Plan²².
- 6.3.12 Many of the options for reducing carbon emissions from the transport sector will depend upon the strength of policy levels such as strengthening legally binding fuel efficiency limits on cars and vans, and policies and fiscal measures which encourage deeper cuts in emissions through changes to driver behaviour, modal shift and better journey planning.

6.4 Baseline Conditions

Review of Local Air Quality Management

Harborough District Council

- 6.4.1 Harborough District Council declared an AQMA in Lutterworth town centre along the A426 High Street in 2001. This was based on a first round of review and assessment that NO₂ objectives were unlikely to be met. This was confirmed by subsequent assessments and the most recent in 2009 concludes that the AQMA may need to be extended further south.

Daventry District Council

- 6.4.2 Daventry have carried out several reviews and assessments in the M1 corridor. An AQMA has not been declared in the area and the latest assessment completed in 2009 confirmed that AQS objectives are likely to be met.

Rugby Borough Council

- 6.4.3 An AQMA was declared in 2004 covering the whole urban area of Rugby west of the A5 and south of M6 based on an assessment of NO₂ exceeding the AQS objective. The latest assessment in 2009 confirmed that NO₂ levels are decreasing in the borough but that the objective level is still exceeded at some locations.

Ambient Air Quality Monitoring

- 6.4.4 Monitoring of NO₂ levels surrounding M1 Junction 19 was carried out in 2003/2004 at nine locations using a device called a diffusion tube. At this stage all the results were below the AQS objective for 2005.

6.4.5 Further monitoring has been carried out in 2009 at 10 locations identified as sensitive receptors including dwellings in Swinford, Catthorpe and Lilbourne close to the junction and on the A5. The majority of these when adjusted to 2007 levels, the baseline year for the project, were found to be well below the AQS objective except for three locations which exceed the annual mean objective for NO₂ of 40µg/m³ as follows:-

- Holywell House adjacent to the A5 - 47.9µg/m³
- 35 Yelvertoft Road Lilbourne - 43.3µg/m³
- Lilbourne Fields Farm Lilbourne - 40.3µg/m³

Background Pollutant Concentrations

6.4.6 It is also important to consider the general level of pollutants that occur as a result of natural or other activities not associated with the junction. These can be obtained from the Government’s background air pollution maps which are available in one kilometre grid squares.

6.4.7 Table 6.2 below shows the levels for NO₂, PM₁₀ and for nitrogen oxides (NO_x) for the baseline year 2007 and the opening year of 2014.

Table 6.2 : Range of Background Concentrations in Assessment Area

Year	Background Concentration Range (µg/m ³)		
	NO _x	NO ₂	PM ₁₀
2007	12.3 - 16.7	9.7 - 12.6	16.0 - 17.2
2014	10.1 - 13.3	8.1 - 10.3	15.2 - 16.3

Predicted Baseline 2007 and Do-Minimum 2014

6.4.8 Levels of NO₂ and PM₁₀ have also been calculated for 55 sensitive receptors in the study area. These include properties close to the junction, within the surrounding villages of Swinford, Shawell, Catthorpe and Lilbourne and those on roads such as the A5 and A426 where traffic changes are anticipated.

6.4.9 The calculations are based on traffic flows, using the computer model ADMS-Roads (Atmospheric Dispersion Modelling Software). These predicted results have been compared with the monitoring measurements and have been found to be in good agreement with the measurements.

6.4.10 Calculations have been carried out for the baseline year of 2007 and the opening year of 2014, but assuming the project is not built, ie. the Do-minimum.

6.4.11 No exceedances of the AQS objective were identified for PM₁₀ for either year.

6.4.12 For NO₂, levels at most locations would be well below the annual mean objective of 40µg/m³. However, the level would be exceeded at seven properties in 2007 and one, Lilbourne Fields Farm, in 2014. The reduction is consistent with tighter emissions controls and improved vehicle technology which will reduce pollution levels over time.

6.4.13 The locations are listed in Table 6.3 below.

Table 6.3 : Exceedances of NO₂ Annual mean Objective for 2007 and 2014

Location	NO ₂ Annual Mean (µg/m ³)	
	2007	2014
Lilbourne Fields Farm	48.8	41.8
Stonebank	40.7	34.2
Braywood (A5)	40.7	35.4
Holywell House (A5)	47.9	39.3
37 Yelvertoft Road, Lilbourne	42.6	35.8
21 Yelvertoft Road, Lilbourne	40.5	33.9
35 Yelvertoft Road, Lilbourne	41.5	34.8

Note: Exceedances are shown in bold type.

6.5 Mitigation

6.5.1 Measures would be taken to reduce dust during construction and controlled by the CEMP. These would include damping down exposed soils, the sheeting of vehicles transporting soils, speed limits and restriction on burning materials. The effects of exhaust emissions from construction vehicles and machinery would be limited by:-

- minimising the export and import of materials by re-use
- not permitting construction traffic through Shawell, Swinford, Catthorpe and Lilbourne
- use of well maintained plant

6.5.2 No specific measures would be included within the project to limit exhaust emissions from traffic using the junction. This is being addressed by Government policy to exercise tighter emissions controls, and improved vehicle technology.

6.6 Magnitude of Impacts and Significance of Effect

6.6.1 The impacts of the project have been considered in terms of construction and for the operation of the junction once completed. As for baseline conditions the operational impacts have been predicted by calculation, both in terms of local air quality and wider scale impacts.

Impacts During Construction

6.6.2 Dust deposition would primarily affect the few properties within 100 metres of the works. Given the control measures in place it is anticipated that the impacts on air quality would be *Negligible*. The effect of emissions from construction vehicles is considered to be *Slight Adverse* as vehicle movements overall are small compared to existing volumes of traffic on the road network as a whole.

6.6.3 Potential disruption to traffic during construction has also been considered as temporary congestion could result in an increase in emissions.

6.6.4 M1 Junction 19 already suffers from traffic delays and queuing. However traffic management would be implemented to maintain the flow of existing traffic on the M1, M6 and A14. Temporary road closures would have no significant long term impact on local air quality levels. The overall effect of potential disruption is considered to be *Neutral*.

Local Air Quality

- 6.6.5 Calculations have been carried out for the same 55 receptors described in Section 6.4 and comparisons made between the Do-something and Do-minimum for 2014.
- 6.6.6 The local air quality assessment predicted pollutant concentrations at residential properties with and without the proposed junction in 2014. Pollutant concentrations are predicted to meet the relevant AQS objectives for PM₁₀ both with and without the junction improvements in 2014.
- 6.6.7 For NO₂, one property is predicted to exceed the annual mean AQS objective in 2014, both with and without the proposed junction, at Fields Farm in Lilbourne, although there is a slight decrease predicted at the property with the proposed junction in place. However, the model over predicted concentrations in this area compared to the monitoring results. Therefore, the predicted concentrations at this receptor may be over estimated. 2014 concentrations are, however, predicted to decrease in both the Do-something and Do-minimum scenarios at this property compared to the baseline scenario, which shows that concentrations are well above the NO₂ AQS objective in 2007.
- 6.6.8 Although no exceedence was predicted at nearby properties west of the M1 in Lilbourne on Yelvertoft Road with or without the proposed junction in place in 2014, the model under predicted in that area compared to the monitoring results. Therefore, these properties may also be at risk of exceeding the AQS objective in 2014. However, modelled results show a slight decrease in predicted NO₂ concentrations at these receptors with the proposed junction in place.
- 6.6.9 Table 6.4 shows the comparison for Lilbourne Fields Farm which would exceed the annual mean objective of 40µg/m³ for 2014.

Table 6.4 : NO₂ Annual Mean, Impacts and Effects

Location	NO ₂ Annual Mean (µg/m ³)		% change	Impact	Effect
	2014 Do-Minimum	2014 Do-Something			
Lilbourne Fields Farm	41.8	41.2	-1.6	Minor	Slight Beneficial

- 6.6.10 Overall, the significance of difference in concentrations between the Do-something and Do-minimum scenarios is considered to be *Neutral*. The significance of changes in concentrations is *Neutral* at most of the properties identified in the assessment. There are a few receptors where the Do-something scenario shows *Adverse* effects along A5 Watling Street, where NO₂ concentrations slightly increase (considered as a *Minor* impact magnitude) due to a slight increase in HDVs daily flows along the A5. However, NO₂ concentration is predicted to remain below the AQS objective at these locations with the proposed junction in place.
- 6.6.11 Conversely, the impact at some receptors is *Beneficial*, especially at properties close to the M1 in Lilbourne, due to a slight decrease predicted in daily HDVs on the motorway.
- 6.6.12 On a property by property basis, the number of properties where air quality is expected to improve, due to a decrease in NO₂ or PM₁₀ concentrations, is greater than the number where air quality is expected to deteriorate with the proposed

junction. The AQS is predicted to be met at most sensitive receptors in the area, with concentrations generally predicted to be well below $30\mu\text{g}/\text{m}^3$ compared to an AQS objective of $40\mu\text{g}/\text{m}^3$.

6.6.13 Table 6.5 below confirms the number of properties.

Table 6.5 : Number of Properties at which Air Quality is Expected to Improve, Deteriorate Or Remain the Same

Pollutant	Number of Properties			
	With an Improvement	With No Changes	With a Deterioration	Total
NO ₂	685	546	379	1610
PM ₁₀	420	994	196	1610

Regional Air Quality Impacts

6.6.14 On a wider scale, regional impacts are assessed for the whole road network within the study area and predict annual emissions for the baseline year in 2007 and for the Do-minimum and Do-something in 2014. The emissions assessed are for:-

- nitrogen oxides
- PM₁₀
- carbon
- CO₂

6.6.15 The results expressed in tonnes per year are set out in Table 6.6 below which also identifies the % changes for the comparison between the Do-something in 2014 and the baseline for 2007 and Do-minimum in 2014 respectively.

Table 6.6 : Annual NO_x, PM₁₀ and Carbon Emissions

Pollutants	Scenario			Do-Something compared with	
	Baseline 2007	Do-Minimum 2014	Do-Something 2014	Baseline 2007	Do-Minimum 2014
NO _x	757	536	575	-24%	7%
PM ₁₀	24	16	20	-16%	21%
C	46,357	53,336	59,849	29%	12%
CO ₂	169,977	195,556	219,446	29%	12%

Note: Pollutants measured in Tonnes per year

6.6.16 The regional assessment of air quality impacts considers annual NO_x and PM₁₀ emissions, as well as estimated carbon and CO₂ emissions both with and without the proposed junction in place. A reduction in annual NO_x and PM₁₀ emissions is predicted to occur between 2007 and 2014 as a result of improvements in vehicle emissions technology and stricter emissions standards, which offsets the increases in traffic flows in future years. However, the annual emissions in 2014 are estimated to increase with the proposed junction compared to without due to increased traffic flows on the road network.

- 6.6.17 Similarly, emissions of carbon and CO₂ calculated from the DMRB methodology for the Do-something scenario in 2014, increase by 12%, when compared to the Do-minimum scenario, although it is difficult to determine significance due to the importance of national and global emissions overall. However, carbon and carbon dioxide emissions also increase with and without the proposed junction in place between 2007 and 2014, due to the predicted growth in traffic flows over the years, which results in greater fuel use and increased carbon emissions.
- 6.6.18 An appraisal of carbon emissions has also been carried out over a 60 year period in accordance with the Department for Transport's Transport Analysis Guidance. This also indicates that there would be increases in carbon emissions from the appraisal network with the proposed junction in place compared to the Do-minimum scenario. Over this period the comparative increase would be 0.7%.

6.7 Conclusion

- 6.7.1 Given the application of measures to control dust and emissions and traffic management to maintain the flow of traffic, the overall significance of effect for the construction phase would be *Slight Adverse*.
- 6.7.2 Changes in local air quality due to the junction improvement in terms of NO₂ and PM₁₀ would be *Minor* or *Negligible* and against a background of pollution levels reducing due to tighter emissions controls and improved vehicle technology.
- 6.7.3 Comparing the Do-minimum and Do-something for 2014 more properties would experience an improvement in air quality than a deterioration.
- 6.7.4 Pollution levels at the sensitive receptors assessed would not exceed AQS objectives in 2014, except for one property Lilbourne Fields Farm which is close to the M1. Here, levels of nitrogen oxide would exceed the AQS, with and without the junction improvement, but with concentrations slightly lower with the project than without.
- 6.7.5 In terms of wider regional impacts there would be an increase in NO_x and PM₁₀ with the project due to increased traffic flow but this would be more than off set by decreases over time. In overall terms the effect on air quality would be *Neutral*.
- 6.7.6 Carbon and CO₂ emissions increase over time with and without the proposed junction due to additional traffic but the increase would be more with the improvement in place.
- 6.7.7 Appraised over a 60 year period the comparative increase between the Do-something and the Do-minimum would be limited to 0.7%.
- 6.7.8 In terms of the objectives set out in the introduction:-
- local air quality will improve over time due to higher emissions controls and improved vehicle technology with or without the junction improvement.
 - the proposals do not meet the objective of reducing emissions of Carbon Dioxide.

7. CULTURAL HERITAGE

7.1 Introduction

7.1.1 The detailed assessment of cultural heritage is in Volume 2 Chapter 2. Cultural Heritage and includes:-

- archaeological remains
- historic buildings
- historic landscapes

7.1.2 The objective for the assessment is:-

- to minimise adverse impacts on archaeological remains, historic buildings and historic landscapes

7.2 Study Area

7.2.1 The study area includes the cultural heritage features illustrated on Figure C Environmental Resources.

7.3 Legislation and Policies

7.3.1 The Ancient Monuments and Archaeological Areas Act 1979, provides statutory protection for monuments of national importance (Scheduled Monuments or SMs). Planning Policy Guidance note (PPG16)²⁴ sets out the Secretary of State's policy on archaeological remains on land and how they should be preserved and recorded. It provides planning authorities with a staged approach to the consideration of archaeological remains that may survive on a proposed development site, and states that where there are 'nationally important archaeological remains... that are affected by a proposed development there should be a presumption in favour of their physical preservation'.

7.3.2 The principal legislation affecting historic buildings is the Planning (Listed Buildings and Conservation Areas) Act 1990²⁵, which provides statutory protection for buildings on a list compiled by the Secretary of State. Conservation Areas are identified by the Local Planning Authority as areas of special architectural or historic interest, where it is important to preserve or enhance their character or appearance. Designating a Conservation Area provides a focus for Council and private efforts to improve the environment with the following main objectives:-

- to control demolition of any building, whether it is listed or not
- to protect trees
- to strengthen control over new development, so that it must positively preserve or enhance the character or appearance of the area

7.3.3 Planning Policy Guidance (PPG15)²⁶ sets out the Secretary of State's policy for the identification and protection of historic buildings, conservation areas, and other elements of the historic environment and how they should be preserved and recorded. It provides planning authorities with a staged approach to the consideration of such remains.

7.4 Baseline Conditions

- 7.4.1 The study area comprises mainly farmland with the majority of fields either under pasture or arable. The area is bordered to the south by the River Avon valley and tributary streams. The known geology of the area indicates alluvial deposits both around the River Avon and several tributary streams that have formed terraces just north and west of the existing junction.
- 7.4.2 Settlements include the villages of Shawell, Swinford and Catthorpe which all contain Conservation Areas and Listed Buildings. Stanford Park, a (Grade II) Registered Park and Garden lies to the south of Swinford.
- 7.4.3 There are three Scheduled Monuments (SM's) in the immediate surrounding area, Lilbourne Motte and Bailey Castle and fishpond, the Motte and Bailey Castle south of Lilbourne Gorse, and the Motte Castle and associated earthworks at Shawell, though only the first would be affected by the scheme.

Archaeological Remains

- 7.4.4 There is considerable archaeological potential within the area and a number of known archaeological sites that would potentially be impacted by the road proposals. These are illustrated on Figure C.
- 7.4.5 The archaeological deposits are generally typical of river valley areas with cropmarks visible on the higher ground and little archaeological evidence within the lower areas where materials deposited by rivers and streams known as alluvium may mask any archaeological deposits.
- 7.4.6 There is substantial evidence that the area immediately around the junction was utilised during the prehistoric periods with cropmarks and artefact scatters on the rising land to the north, south and west. In addition there appears to be a Roman settlement site to the south west of the junction. Medieval (AD 400-1500) and post-medieval/modern (1500 to the present) archaeology is mainly restricted to the villages and towns away from the junction, although there are two areas containing good examples of earthworks east of the junction and north of the M6.
- 7.4.7 Baseline data has been obtained from the Historic Environmental Record (HER) Sites and Monuments Records (SMR) from Leicestershire and Northamptonshire County Councils and from field walking.
- 7.4.8 A total of 27 sites within the study area were identified as indicated on Figure C and are considered to have potential for the presence of archaeological deposits, due to cropmark, earthwork and artefact evidence. 14 of these sites might be affected by the proposed work.
- 7.4.9 In 2004 and 2005 evaluation including trial trenching and geophysical survey was carried out on sites 20 and 19 respectively and confirmed little potential for significant archaeological deposits. Further geophysical survey was carried out in 2006 for areas affected by the Blue Junction and Green LRN including:-
- part of sites 3 and 4 affected by a proposed site compound
 - parts of sites 5, 6, 8 and 10 affected by construction lay down and drainage ponds
 - parts of sites 23 and 24 affected by the Green LRN

- 7.4.8 This revealed a number of features, some of which may be agricultural, but others which may be archaeological, to be investigated further as part of mitigation proposed in advance of or during construction.

Historic Buildings

- 7.4.9 The location of listed buildings and Conservation Areas are shown on Figure C.
- 7.4.10 Catthorpe, Shawell and Swinford all contain Conservation Areas which include most of the Listed Buildings. All three villages, as well as Lilbourne are mentioned in the Domesday Book and contain Medieval buildings including their parish churches.
- 7.4.11 West of Swinford is the 17th – 18th century Registered Park and Garden and Stanford Hall.
- 7.4.12 Unlisted buildings include Catthorpe Manor which lies just outside the Catthorpe Conservation Area.

Historic Landscapes

- 7.4.13 Data from Historic Landscape Characterisations carried out by Northamptonshire and Leicestershire was obtained for the CEA¹³. The character assessed varies from planned enclosure, much of which still retains evidence of medieval ridge and furrow, to areas of larger fields developed in the post war period by the removal of hedges. Parts of the Avon valley also contain floodplain fields.

Sensitivity

- 7.4.14 The sensitivity or value of the sites has been determined using the criteria set out in Table 4.2 In general archaeological remains have been valued as *Medium / Regional* value or *Low / Local* value. The motte and bailey castles which are Scheduled Monuments are of *High / National* value.
- 7.4.15 In terms of historic buildings, Conservation Areas and Grade I listed buildings are of *High / National* value and Grade II listed buildings of *Medium / Regional* value.
- 7.4.16 The Registered Park and Garden at Stanford Hall is of *High / National* value as are historic landscapes with ridge and furrow. Other historic landscapes with old field patterns are considered to be of *Medium / Regional* value, but landscapes which have been significantly modified in the 20th Century are *Low / Local* value.

7.5 Mitigation

Archaeological Remains

- 7.5.1 Physical disturbance and destruction of the cultural heritage resource (including archaeological investigation) is irreversible. However sufficient evaluation has been undertaken to enable appropriate mitigation measures to be formulated and agreed for each site in consultation with English Heritage and the senior Planning Archaeologist for Leicestershire County Council. These measures can appropriately record the presence of any archaeological features and attempt to understand the nature of the archaeological record.

- 7.5.2 Archaeological resources are non-renewable and the primary goal of cultural resource management is physical preservation. Current government planning guidance is that in the case of nationally important remains, regardless of any designation, the presumption should be towards preservation of the remains and their setting (DMRB HA208/07)²⁷ Where there are overriding factors or where preservation *in situ* is not feasible, an acceptable alternative may be preservation by record. Generally four forms of mitigation have been proposed:-
- watching brief – where the resource value is low or where there is only a slight potential that archaeological deposits would be encountered. An archaeologist would be present during groundworks to record any archaeological deposits. Upon discovery of unexpected archaeological remains that require further work additional resources and/or time would be provided
 - survey and recording – where earthworks exist that require recording prior to destruction, written, photographic and topographical surveys would be carried out
 - strip, plan and sample – his method is a flexible approach that involves topsoil over an area being stripped under archaeological control to expose archaeological remains. Based on these results, further recording or protection measures may be required and time periods for such recording exercises have been agreed
 - further evaluation – where evaluation has not been undertaken prior to the ES, trial trenching can further help to determine the exact nature of the resource. Based on these results, further fieldwork, recording or protection measures would be undertaken
- 7.5.3 Archaeological surveys, strip, plan and sample and trial trenching need to be completed before groundworks start on the particular areas. The time required for these archaeological investigations would be allowed for within the Contractor's work programme and would be managed as part of the Construction Environmental Management Plan (CEMP).
- 7.5.4 A written scheme of investigation (WSI) would be provided for each phase of fieldwork required, and agreed by the relevant archaeological advisors before any fieldwork takes place. All work would adhere to the Institute for Archaeologist's Code of Conduct and their relevant Standards and Guidance.
- 7.5.5 Of the 27 sites identified there are 14 sites of archaeological potential that might be impacted by the development and which would then require archaeological mitigation. Impacts would result from the permanent layout of the scheme illustrated by Figure B, and by the disturbance of areas required temporarily for construction, shown on Figure G. These include eight areas with the potential for the presence of archaeological deposits (cropmark, earthwork and artefact evidence - Sites 1, 3, 4, 6, 10, 14, 20, 22) and six areas of alluvium where archaeological deposits might lie hidden (Sites 2, 8, 9, 11, 12 and 13).
- 7.5.6 The Cattothorpe Viaduct Replacement would utilise part of Site 3 for its site compound area. This will be dealt with using a strip, plan and sample of the area, prior to construction as an advance work, with time allowed to record any archaeological features uncovered.
- 7.5.7 Further investigation of some areas allocated for storage, flood compensation and ponds would need to be carried out. Sites 2 (Pond DP2a) and 10 would need to be evaluated by trial trenching as an advance work prior to construction, as would

Ponds DP3 and DP7 because of their proximity to the cropmarks and artefact scatter at Sites 6, 14 and 19.

- 7.5.8 Site 1 would be dealt with using the strip, plan and sample method prior to construction along with any extra areas of Site 3 not previously looked at during the archaeological work for the Catthorpe Viaduct Replacement.
- 7.5.9 Site 4 contains ridge and furrow, which would require recording (written, photographic and topographical survey) prior to any groundworks in this area. Although only small areas of the earthworks would be directly affected, a larger area should be recorded (e.g. entire fields containing earthworks) in order to place the earthworks within a landscape context. This would be followed by a watching brief.
- 7.5.10 The remaining sites (Sites 8, 9, 11, 12, 13, parts of 14, 20 and 22) would be adequately covered by a standard watching brief, with contingency provision for recording during the work. In addition construction areas around Sites 11, 21 and 22, the LRN west of Site 1, access tracks and upgrades to footpaths and bridleways should also be covered by a watching brief.

Historic Buildings

- 7.5.11 Six groups of historic buildings would be affected by the scheme. Mitigation planting is proposed mainly to the north and the east of the junction in some areas combined with earth mounding. Existing planting around Lilbourne, Catthorpe and Shawell would be retained to reduce the visual impacts of the scheme. Hedgerows are proposed along the line of the LRN and around the drainage ponds. The details are shown on the Environmental Master Plan, Figure B. In noise terms traffic reductions are anticipated on several local roads and would have the effect of reducing noise levels particularly in Catthorpe, Shawell and the northern part of Swinford.

Historic Landscapes

- 7.5.12 The mitigation strategy includes planting around the junction and to the north to help blend the junction into the existing landscape. The areas around drainage ponds are to be hedged to conserve the existing field pattern where possible and are also planted to screen the features. Hedgerows are to be used along the line of the LRN and small severed pockets planted to blend them in with the existing field system.

7.6 Magnitude of Impacts and Significance of Effects

- 7.6.1 The impacts described below are considered in terms of:-
- the construction phase
 - the operational phase, when the project has been completed and is in use
- 7.6.2 Although temporary in duration, most construction impacts are likely to be permanent in nature for archaeological remains due to the removal of features during ground breaking works.
- 7.6.3 There are unlikely to be any extra operational phase impacts on buried remains. However, the most significant impacts on above ground features, such as historic

buildings and landscapes, are more likely to arise from the operational impacts of the project, such as noise or visual impact, affecting their setting.

7.6.4 A summary of the impacts and significance of effects is provided by Table 7.1 below.

Table 7.1 : Summary of Impacts and Significance of Effects on Cultural Heritage

Site	Value	Impact from route	Suggested mitigation strategy	Residual Impact	Significance of Environmental Effects
ARCHAEOLOGICAL REMAINS					
1: Cropmark & artefact scatter	<i>Medium/Regional</i>	<i>Moderate Adverse</i>	Prior Evaluation (strip, plan and sample), appropriate mitigation	<i>Minor Adverse</i>	<i>Slight Adverse</i>
2: Alluvium associated with Site 1,	<i>Low/Local</i>	<i>Moderate Adverse</i>	Prior Evaluation (trial trenching of DP2a), appropriate mitigation	<i>Minor Adverse</i>	<i>Slight Adverse</i>
3: Cropmark and artefact scatter	<i>Medium/Regional</i>	<i>Major Adverse</i>	Prior Evaluation (strip, plan and sample of site compound and access roads), appropriate mitigation	<i>Moderate Adverse</i>	<i>Moderate Adverse</i>
4: Ridge & furrow & alluvium	<i>Low/Local</i>	<i>Moderate Adverse</i>	Survey of earthworks followed by watching brief.	<i>Minor Adverse</i>	<i>Slight Adverse</i>
6: Cropmark & artefact scatter, Romano-British settlement	<i>Medium/Regional</i>	<i>Minor Adverse</i>	Prior Evaluation (trial trenching), appropriate mitigation for DP7 and DP3a	<i>Minor Adverse</i>	<i>Slight Adverse</i>
8: Alluvium	<i>Medium/Regional</i>	<i>Minor Adverse</i>	Watching Brief	<i>Negligible</i>	<i>Slight Adverse</i>
9: Alluvium	<i>Low/Local</i>	<i>Minor Adverse</i>	Watching Brief	<i>Negligible</i>	<i>Slight Adverse</i>
10: Anglo Saxon finds – destroyed by borrow pit?	<i>Low/Local</i>	<i>Major Adverse</i>	Prior Evaluation (trial trenching), appropriate mitigation	<i>Moderate Adverse</i>	<i>Slight Adverse</i>
11: Alluvium	<i>Low/Local</i>	<i>Minor Adverse</i>	Watching Brief	<i>Negligible</i>	<i>Slight Adverse</i>
12: Alluvium	<i>Low/Local</i>	<i>Minor Adverse</i>	Watching Brief	<i>Negligible</i>	<i>Slight Adverse</i>
13: Alluvium	<i>Low/Local</i>	<i>Moderate Adverse</i>	Watching Brief	<i>Minor Adverse</i>	<i>Slight Adverse</i>
14: Cropmark & artefact scatter	<i>Medium/Regional</i>	<i>Minor Adverse</i>	Watching Brief	<i>Minor Adverse</i>	<i>Slight Adverse</i>
20: Possible features	<i>Low/Local</i>	<i>Major Adverse</i>	Watching Brief	<i>Minor Adverse</i>	<i>Slight Adverse</i>
22: Cropmarks	<i>Medium/Regional</i>	<i>Minor Adverse</i>	Watching Brief	<i>Minor Adverse</i>	<i>Slight Adverse</i>
25: Lilbourne Motte and Bailey castle (SM) and earthworks.	<i>High/National</i>	<i>Negligible</i>	Screening /landscaping	<i>Negligible</i>	<i>Neutral</i>
HISTORIC BUILDINGS					
Catthorpe Conservation Area and Buildings	<i>High/National</i>	<i>Moderate Adverse</i>	Landscaping and Planting	<i>Moderate Beneficial</i>	<i>Moderate Beneficial</i>
Catthorpe Towers and Old Barn Farm	<i>Low/Local</i>	<i>No Change</i>	Landscaping and Planting	<i>No Change</i>	<i>Neutral</i>
Swinford Conservation Area & Listed	<i>High/National</i>	<i>Minor Adverse</i>	Landscaping and Planting	<i>Minor Adverse</i>	<i>Slight Adverse</i>

Site	Value	Impact from route	Suggested mitigation strategy	Residual Impact	Significance of Environmental Effects
Buildings					
Swinford: Other Listed Buildings	<i>Medium/Regional</i>	<i>Minor Adverse</i>	Landscaping and Planting	<i>Minor Adverse</i>	<i>Slight Adverse</i>
Shawell Conservation Area and Listed Buildings	<i>High/National</i>	<i>No Change</i>	Landscaping and Planting	<i>Minor Beneficial</i>	<i>Slight Beneficial</i>
Shawell: Other Listed Buildings	<i>Medium/Regional</i>	<i>No Change</i>	Landscaping and Planting	<i>No Change</i>	<i>Neutral</i>
Tomley Hall Farm	<i>Low/Local</i>	<i>Moderate Adverse</i>	Landscaping and Planting	<i>Moderate Adverse</i>	<i>Slight Adverse</i>
Lilbourne Listed Buildings	<i>Medium/Regional</i>	<i>No Change</i>	None	<i>No Change</i>	<i>Neutral</i>
Lilbourne Church and Tombstones	<i>High/National</i>	<i>No Change</i>	None	<i>No Change</i>	<i>Neutral</i>
HISTORIC LANDSCAPES					
20th century Landscape	<i>Low/Local</i>	<i>No Change</i>	Landscaping and Planting	<i>No Change</i>	<i>Neutral</i>
Reorganised piecemeal enclosure and Piecemeal enclosure	<i>Medium/Regional</i>	<i>No Change</i>	Landscaping and Planting	<i>No Change</i>	<i>Neutral</i>
Planned enclosure and Planned Enclosure Containing Ridge and Furrow	<i>Medium/Regional</i>	<i>No Change</i>	Landscaping and Planting	<i>No Change</i>	<i>Neutral</i>
Miscellaneous Floodplain Fields	<i>Medium/Regional</i>	<i>No Change</i>	Landscaping and Planting	<i>No Change</i>	<i>Neutral</i>
Stanford Hall gardens	<i>High/National</i>	<i>Negligible</i>	Landscaping and Planting	<i>Negligible</i>	<i>Slight Adverse</i>
Catthorpe Towers gardens	<i>Medium/Regional</i>	<i>No Change</i>	Landscaping and Planting	<i>No Change</i>	<i>Neutral</i>
Semi-Regular Enclosure and Semi-Regular Enclosure with Ridge and Furrow	<i>High/National</i>	<i>No Change</i>	Landscaping and Planting	<i>No Change</i>	<i>Neutral</i>

Archaeological Remains

7.6.5 The assessment has identified considerable archaeological potential within the study area and that there are 14 sites that might be impacted during the construction phase. Most of the proposed road construction would avoid the identified archaeological remains, but there are potential impacts from drainage ponds and areas required temporarily during construction. These include the site compound, which will be partly affected by the Catthorpe Viaduct Replacement, as well as areas for materials storage.

7.6.6 However it is anticipated that most of the impacts would be on small parts of sites which are of *Low* or *Medium* value and can be considered to be relatively common.

7.6.7 Taking into account the proposed evaluation and mitigation set out in Section 7.5 the assessment concludes that there would be *Slight Adverse* effects for 13 sites and a *Moderate Adverse* effect for one, Site 3 which would be affected by the proposed site compound. A *Neutral* effect is recorded for the Scheduled Monument, Lilbourne motte and bailey castle as there would be no direct impact and any impacts on the setting of the site from noise or visual intrusion are considered to be *Negligible*. The overall effect for Archaeological Remains would be *Slight Adverse*.

Historic Buildings

7.6.8 There would be no direct physical impact on historic buildings during construction and little impact on their settings when the project is operational. None of the Conservation Areas would be directly affected by the proposals nor would Stanford Park.

7.6.9 Any impacts would therefore be limited to the setting of the historic buildings in terms of noise and visual intrusion. Visual effects are set out in Volume 2 Chapter 4 Landscape and are assessed as *Slight Adverse* for Swinford Conservation Area, mainly due to the extension of lighting along the A14 and *Neutral* for other Conservation Areas such as Catthorpe and Shawell and for other listed buildings. The noise assessment set out in Volume 2 Chapter 6 Noise and Vibration sets out both noise increases and decreases for Swinford. For Catthorpe and Shawell there would be some *Major* decreases in noise leading to *Beneficial* effects for both Conservation Areas in cultural heritage terms.

7.6.10 The overall effect for Historic Buildings would be *Slight Adverse*

Historic Landscapes

7.6.11 There would be a *Slight* adverse effect on the setting of Stanford Park and Gardens largely due to the extension of street lighting along the A14, but in general historic landscapes would not be significantly affected either during construction, or when the scheme is operational. As the scheme expands on an existing road junction, changes to the historic landscape character in general are unlikely. There may be some impact from lighting and signage, but as the area closest to the scheme is already part of a 20th century landscape, there would be little change. The mitigation strategy includes planting around the junction and to the north. The areas around the ponds are bounded on similar alignments to the fields and are also planted to screen the features. Hedgerows are to be used along the line of the LRN and small severed pockets planted to blend them in with the existing field system.

7.6.12 The overall effect for Historic Landscapes would be *Neutral*.

7.7 Conclusion

7.7.1 In overall terms the significance of effect on cultural heritage features, taking into account the mitigation measures described would be *Slight Adverse*.

7.7.2 The objective set out in the introduction, to minimise adverse impacts on cultural heritage features has been met by a combination of a project design which avoids many of the features identified and the mitigation strategy described.

8. ECOLOGY AND NATURE CONSERVATION

8.1 Introduction

8.1.1 The assessment for ecology and nature conservation is dealt with in detail in Volume 2 Chapter 3.

8.1.2 The objectives for the assessment are:-

- To minimise adverse impacts on habitats and species
- To maximise opportunities for species and the creation of new habitats

8.2 Study Area

8.2.1 Information on sites designated for their nature conservation value has been obtained for the following distances:-

- International sites : ten kilometres
- National sites including Sites of Special Scientific Interest (SSSI's) and Local Nature Reserves (LNR's) : five kilometres
- Other local sites including Local Wildlife Sites (LWS's) : two kilometres

8.2.2 Records were also obtained for species from relevant bodies for a distance of two kilometres from the improvement works.

8.2.3 Figure F Ecological Study Areas indicates the broad extent of the various ecological surveys carried out in 2008/9. It also confirms how the areas have extended during the year as the project design has developed, in particular in terms of the proposed network for public rights of way and gantry provision.

8.2.4 Otters have been surveyed for a distance of two kilometres from the project along watercourses. A general 500 metre radius was used for habitats and other species, though the actual distance varied for species with some limited to 250 metres from the works.

8.3 Legislation and Policies

8.3.1 A range of habitats and species within the UK are the subject of various protective measures resulting from International Conventions, European Directives and UK Legislation. The key legislation is summarised below.

Legislation

The Conservation (Natural Habitats etc) Regulations 1994 (as amended 2009)²⁸

8.3.2 These are also known as the Habitat Regulations and transpose the European Council Habitats Directive into UK Law. The regulations place a duty upon the Government to identify and designate sites which are of importance to the habitats and species listed in the Habitats Directive. Such sites are called Special Areas of Conservation (SAC). The Regulations also allow for the designation of sites known as Special Protection Areas (SPA) under the European Community Birds Directive. Native species protected under the Regulations include otter, great crested newt, white-clawed crayfish and all species of bats.

The Wildlife and Countryside Act (WCA) 1981²⁹

- 8.3.3 The Act complements the Regulations and protects a wider range of species. It also provides for the designation and protection of national conservation sites of value termed SSSI's.

The Countryside and Rights of Way (CRoW) Act 2000³⁰

- 8.3.4 This amends and strengthens existing wildlife legislation detailed in the Wildlife and Countryside Act. It places a duty on government departments to have regard for biodiversity.

The National Environment and Rural Communities (NERC) Act 2006³¹

- 8.3.5 Section 40 of the NERC Act places a duty upon all local authorities and public bodies to promote and enhance biodiversity in all of their functions. Section 41 lists habitats and species of principal importance to the conservation of biodiversity and which are regarded as a material consideration in the planning process.

Protection of Badgers Act

- 8.3.6 Badgers and their setts are protected under the Protection of Badgers Act 1992². The protection of Badgers Act 1992 is based primarily on the need to protect badgers from baiting and deliver ate harm or injury, NE 2007⁴. Badgers are not protected for conservation reasons. All the following are criminal offences:-

- To intentionally or recklessly interfere with a sett. Sett interference includes disturbing badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access to it
- To wilfully kill, injure, take possess or cruelly ill-treat a badger, or to attempt to do so.

National Policies and Strategies

UK Biodiversity Action Plan (UKBAP)³²

- 8.3.7 First published in 1994 and updated in 2007 this is a government initiative to conserve and enhance species and habitats. It contains a list of habitats and species of conservation concern in the UK and outlines initiatives to enhance their conservation status. The conservation of biodiversity is then addressed at County level through the production of complementary Local BAP's.

Highways Agency Biodiversity Action Plan³⁴

- 8.3.8 The Highways Agency Biodiversity Action Plan, or HABAP, is part of a long-term strategy for the conservation of habitats and species on the motorway and trunk road verges of England. The overarching aim of the HABAP is to help the Agency achieve its objectives for conserving and, where possible, enhancing biodiversity.

Planning Policy Statement 9 (PPS9)³³

- 8.3.9 PPS9 sets out the Government's national policies on protection of conservation. It acknowledges the importance of the following issues:-

- the effects of any development upon sites of regional and local biodiversity interest should be considered
- networks of natural habitats are a valuable resource and should be protected or where possible strengthened
- local planning authorities should maximise opportunities for building in beneficial biodiversity features in and around developments
- local authorities should take measures to protect the habitats of species of principal importance as set out in the CRoW Act, (which has subsequently been superseded by Section 41 of the NERC Act)

8.3.10 Table 8.1 below sets out the species and habitats relevant to the assessment for the M1 Junction 19 Improvement and their listings under the relevant legislation and BAP's as described above.

Table 8.1 : Species and Legislation

Species	Legislation										
	Habitats Directive	Birds Directive	WCA	CRoW	NERC	UK BAP	Leicestershire BAP	Northants BAP	Warwickshire BAP	HA BAP	Protection of Badgers Act
Breeding Birds		√	√	√	√	√	√		√	√	
Common Frog			√								
Common Toad			√		√	√				√	
Great Crested Newt	√		√	√	√	√			√	√	
Smooth Newt			√								
Grass Snake			√		√	√				√	
White-Clawed Crayfish	√		√	√	√	√	√		√	√	
Invertebrates General	√		√	√	√	√	√		√	√	
Badger			√								√
Bats all species	√		√	√	√	√	√		√	√	
Brown Hare				√	√	√					
Otter	√		√	√	√	√	√	√	√	√	
Water Vole			√	√	√	√	√	√	√	√	
Higher plants	√		√	√	√	√	√		√	√	
Lower plants	√		√	√	√	√				√	

Regional and Local Policies

8.3.11 Regional planning policies including the West Midlands Regional Spatial Strategy and the East Midlands Regional Plan also have policies for protecting and enhancing nature conservation.

8.3.12 Local planning authorities also have policies to protect and enhance nature conservation.

8.4 Baseline Conditions

8.4.1 Data has been obtained from a combination of:-

- Consultation and desk based study for designated nature conservation sites and biological records
- Field surveys

Designated Sites

8.4.2 Designated sites within area surrounding the junction are illustrated on Figure C, the Environmental Resources Plan in Appendix 1.

International Designations

8.4.3 No part of the site or proposed improvement works area lies within or adjacent to any internationally designated nature conservation site SAC, SPA or Ramsar. No European protected site occurs within 10km of the improvement works.

National Designation

8.4.4 No part of the site or proposed improvement works lies within or adjacent to any nationally designated nature conservation site (e.g. SSSI, National Nature Reserve (NNR)). Only three such sites occur within 5km of the proposals, i.e. Cave's Inn Pits SSSI, Misterton Marshes SSSI and Stanford Park SSSI.

8.4.5 Cave's Inn Pits SSSI is located 0.35 km north west of improvements to the LRN, it contains some of the best remaining areas of neutral marsh in Leicestershire. Stanford Park SSSI is approximately 1.25km away from the junction works and its importance is due to lichen species present. Misterton Marshes SSSI is 5km from the junction works, though closer to proposed gantries. It is one of the largest blocks of unimproved wetland habitats in Leicestershire.

Local Designations

8.4.6 There are three Local Nature Reserves within five kilometres of the works:-

- Ashlawn Cutting, 0.35km away from the junction and LRN, important for birds and invertebrates
- Swift Valley 3.6km away from the junction, important for invertebrates
- Newbold Quarry Park 4.9km away from the junction, the site is important for white-clawed crayfish and water birds.

8.4.7 There are 121 sites of other local designations within 2km of the site. The designation title varies but most are currently under review and are variously known as Local Wildlife Sites (LWS) or potential LWS (pLWS).

8.4.8 Those closest to the proposed works and indicated on Figure C are:-

- the River Avon
- a hedgerow in Shawell Lane, Catthorpe
- a marsh adjacent to Shawell Lane, now destroyed
- Tomley Hall Wood

- three field ponds, one south of Swinford, one immediately south of M6 and one north of M6 near Tomley Hall Farm
- 8.4.9 Land to the south of the River Avon in Northamptonshire on either side of the A14 is also designated as a LWS, but no information is available.
- 8.4.10 A description of all the sites identified is in Volume 2, Chapter 3.

Record Search

- 8.4.11 Species records were obtained from several bodies including Natural England (NE), County Biodiversity Records Centres, voluntary organisations and the HA Managing Agent Contractors.
- 8.4.12 Records were obtained for a wide variety of birds, amphibians including common frog, common toad and great crested newt, grass snake, butterflies, several species of bat, otter, badger and water vole.
- 8.4.13 The detailed information is set out in Volume 2 Chapter 3.

Field Surveys

- 8.4.14 Ecological surveys have been carried out at several stages in the development of the project. A full list of surveys were carried out in 2008 and 2009 to inform this EIA as follows:-
- Phase 1 Habitats survey
 - Hedgerow survey
 - Scarce arable weed survey
 - Breeding bird survey
 - Amphibian survey
 - Reptile survey
 - White-clawed crayfish survey
 - Invertebrate survey
 - Bat survey
 - Brown Hare survey
 - Otter survey
 - Water vole survey
 - Badger survey
- 8.4.15 The scope and methodology for the surveys was agreed with consultees including Natural England, local authorities and wildlife trusts as set out in Section 4.3. A full description of the methodology employed for each survey is in Volume 2 Chapter 3. The results of the surveys are summarised below under habitats and species.

Habitats

Grasslands

- 8.4.16 Much of the land outside the highway is in arable cultivation and of *Negligible* value in nature conservation terms. None of the field margins surveyed contained scarce arable weeds. There are also grasslands to the north east of A14 and between Shawell Lane and Shawell Road, but these have been 'improved' by the addition of fertiliser and herbicides and are similarly of *Negligible* value.

8.4.17 Semi-improved grassland with a higher diversity of species occur within the motorway verges. Some areas include orchids: common spotted orchid, bee orchid and pyramidal orchid. In general these areas contain nationally common and widespread species and are considered to be of *Low* value.

Hedges and Hedgerow Trees

8.4.18 Hedges and hedgerow trees are a significant feature in the local landscape. The hedgerow survey has identified two species-rich intact hedgerows which could be considered to be Important under the Hedgerow Regulations, one between M6 and Shawell Lane, the other on the south side of Rugby Road, Swinford. These are considered to be of *Medium* value. Many other hedgerows in the area are species-poor, often dominated by hawthorn are considered to be of *Low* value.

Woodland and Scrub

8.4.19 There are many areas of woodland and scrub within the study area including:-

- mature and diverse woodlands including Tomley Hall Wood pLWS, woodlands around Catthorpe Manor and along the River Avon, assessed as *Medium* value
- other woodland and scrub, including large areas planted within the existing highway boundaries, which can be described as young, with a poor ground flora and of *Low* value

Watercourses and Ponds

8.4.20 The River Avon is considered to be of *Medium* value. It supports a variety of wetland plants and provides a corridor for species movement. The water quality is very good and the corridor with numerous riparian trees overhanging branches is designated as a pLWS. The numerous tributary channels including the Swinford Lodge Brook are typical of small lowland watercourses and are therefore considered to be of *Low* value.

8.4.21 There are several ponds in the study area and those designated as pLWS are of *Medium* value. Other ponds are of a lower value.

Species

Breeding Birds

8.4.22 The area surveyed supports a range of breeding bird species, including a range of notable declining farmland bird species, several of which are listed as being species of conservation concern, including linnet, skylark, song thrush, yellow wagtail and yellowhammer. These species are considered to be of *Medium* value.

8.4.23 The arable fields were noted to be important breeding areas for skylark and yellow wagtail, which are two rapidly declining farmland bird species.

8.4.24 The main concentrations for breeding birds were primarily associated with the highway boundary features and include planted roadside screening and linear woodlands. A significant proportion of breeding bird activity was also noted within the small woodland blocks outside of the immediate zone of proposed works. Birds not listed as species of conservation concern are considered to be of *Low* value.

Amphibians

- 8.4.25 Great crested newt (GCN), smooth newt, common toad and common frog were found in various ponds and ditches across the site.
- 8.4.26 GCN were recorded in 25 of the 50 ponds and ditches surveyed. The most locations were found in the north west quadrant of the study area, that is north of M6 and west of M1. There were also GCN ponds in the north east and south east quadrants, but none to the south west. The population sizes varied between small and medium and the results were consistent with surveys carried out over previous years.
- 8.4.27 Although GCN are protected under international legislation, England is considered to be one of the GCN main strongholds in Europe. Due to the widespread nature of GCN within England and the low and medium population levels present on the site, resulting in a *Medium* importance and rarity on a regional scale, the GCN population within the study area is considered to be of *Medium* value.
- 8.4.28 Smooth newt, common toad and common frog were also found in several ponds. Common toad within the study area have been assigned a *Medium* value and common frog a *Low* value.

Reptiles

- 8.4.29 There is a low population of grass snake on the site with widespread range. Although a slow worm was found in 2005 none were found in the current survey and no further reptiles were noted, though the site in general provides a suitable habitat. Given their inclusion on the NERC lists reptiles have been given a *Medium* value.

White-Clawed Crayfish

- 8.4.30 None were found.

Invertebrates

- 8.4.31 A total of 585 land invertebrates and 49 aquatic species were captured in the surveys, of these two are regarded as nationally scarce and of conservation concern:-
- the necklace ground beetle, found in the highway and adjacent fields
 - a flower beetle, found in the River Avon corridor

Bats

- 8.4.32 A minimum of seven species of bat were found either roosting, foraging or commuting within, or immediately adjacent to, the site. These included:-
- Common pipistrelle:
 - Soprano pipistrelle
 - Nathusius' pipistrelle
 - Noctule bat
 - Brown long-eared bat
 - Natterer's bat

- Whiskered/Brandt's bat *Myotis mystacinus/brandti* (species cannot be separated from echolocation calls)
- Unidentified *Myotis* species (from echolocation calls only, these could either be the same *Myotis* species already identified or a different *Myotis* species)

8.4.33 Roosts are present in all four quadrants of the junction as follows:-

- **North west quadrant.** Roosts present at Tomley Hall Wood, Tomley Hall Farm and a cottage on Catthorpe Road. There are commuting routes and foraging areas using the mature vegetation along the M6 and along Shawell Lane / Catthorpe Road.
- **North east quadrant.** Roosts present in Swinford village, in a tree along the Swinford Lodge Brook and in a culvert adjacent to the junction. Vegetation along the A14 and the Swinford Lodge Brook are used for commuting and foraging.
- **South east quadrant.** There are roosts adjacent to and below the M1 viaduct and in a tree adjacent to the M6 southbound. The River Avon is used for foraging and the boundary of M1 acts as a commuting route.
- **South west quadrant.** There are roosts at Catthorpe Manor, Old Barn Farm and between Catthorpe village and M6. The vegetation around Catthorpe Manor provides a network of commuting routes, Shawell Lane is important for commuting and foraging.

8.4.34 In overall terms the bat assemblage recorded in the study area is considered to be of *High* value.

Badgers

8.4.35 Badgers were recorded in the area and the details are provided in a separate Confidential Badger Report which is an Addendum to Volume 2.

Brown Hare

8.4.36 There were seven sightings of brown hare. They are regarded as of *Medium* value.

Otter

8.4.37 The 2008-2009 surveys found frequent signs of otter presence, often in the form of feeding remains and spraints, with occasional laying up places on the banks of the River Avon, predominantly upstream, that is to the east of the M1 River Avon viaduct. The consistency of results between earlier surveys and the four carried out for this EIA indicate that the otters' territory extends over the entire length of the survey area and is utilised throughout the year. However no breeding dens were found and no evidence of cubs to suggest that otters are breeding in the local area. Otters are considered to be of *High* value.

Water Vole

8.4.38 No signs of water vole were found. There is evidence of American mink within the site and the two species do not generally co-exist in the same area.

8.5 Mitigation

8.5.1 Mitigation and enhancement measures for ecology and nature conservation have been outlined in Section 2.8 of this report.

Introduction

8.5.2 In accordance with the powers set out in the Highways Act 1980 these measures are designed to offset or reduce the potential adverse effects on the environment resulting from the proposed improvements. However, where appropriate, measures have been designed to secure environmental gains compared with the baseline environment:-

- by creating or improving habitats on land that is, or will be within, the highway boundary
- as an incidental benefit of measures required to mitigate adverse impacts

8.5.3 The design of the measures have also taken into account consultations held with NE, EA, local planning authorities and the County Wildlife Trusts and in particular NE's request to:-

- provide net biodiversity gain
- provide new habitats tailored to meet local BAP target
- use a local seed initiative to secure local provenance stock
- secure long term management
- enhance the corridor of the River Avon
- provide green infrastructure, or improved connectivity between habitats

8.5.4 The mitigation measures for the project outlined in this document are based upon information available at the time of writing. New information from monitoring undertaken immediately prior to construction, would be used where necessary to modify proposals. With regard to disturbing protected species such as badger, bats, otter and/or GCN, all improvement works that may affect these species would be undertaken under licence from NE. The issuing of licences is dependent on the presentation of a comprehensive analysis of the use of the location by the species concerned and on detailed mitigation and, where necessary, compensation measures being adopted. Compensation measures may include the creation of new habitats designed to replace those that may be lost and to ensure that the conservation status of the protected species is not adversely affected. These mitigation and compensation measures would therefore be incorporated into the improvement works proposals. All protection measures for any protected or notable species would be included within the Construction Environmental Management Plan (CEMP).

8.5.5 The design of the layout for the Preferred Route minimises the loss of existing habitats. As set out in the CEA¹³, the layout had the smallest footprint of the options considered and enabled the retention of more habitats adjacent to the junction, including the established woodlands to the west of the M1. However, areas would be lost, including existing vegetation within the highway and adjacent hedgerows.

8.5.6 The provision of new habitat that merely replaces the equivalent habitat lost is unlikely to amount to gains in local biodiversity. This would not be in accordance with the Government's objectives for development, as detailed in PPS9³² National & HA BAPS³⁴, and would not meet the requests of the consultees described above.

There is scope for such habitat creation within the site area. The provision of higher quality habitat over an equivalent area of land, for example the change of arable land to species-rich grassland or woodland, would produce a significant biodiversity gain.

- 8.5.7 The Environmental Master Plan Figure B illustrates the habitats being created and retained by the improvement works. These habitats are described below.

Drainage Ponds and Swales

- 8.5.8 These features are primarily provided as part of the drainage design, to attenuate road run-off and to protect receiving waters from the pollution contained in routine road run-off and from accidental spillage. Planting these areas with marginal and emergent plants, such as reeds, contributes to the pollution control function of the ponds by filtering or absorbing contaminants. In addition, such planting, in combination with permanent open water and surrounding grassland areas, would provide a diverse resource for wildlife. As agreed in consultation with the EA, smaller ponds would also be established on the edges of the main drainage ponds to provide wildlife refuges in the case of a pollution incident or when the areas were subject to major maintenance operations such as dredging.
- 8.5.9 The ponds and surrounding areas would be treated with low nutrient soils which provide the potential for a more diverse flora by discouraging the establishment of competitive agricultural weeds and grasses.

On-Site Planting

- 8.5.10 Highways can provide an important contribution to green infrastructure by providing connectivity between otherwise separate habitats. As illustrated on Figure B, the Environmental Master Plan, much of the planting in terms of woodland and boundary hedgerows is linear in character and provides links between existing woodland and hedgerows in the broader landscape.
- 8.5.11 As confirmed to NE in consultations, local provenance stock would be provided using a local seed collection initiative such as the East Midlands Seed Initiative (EMSI) currently in operation on M1 Widening Junctions 25 to 28. It is anticipated that this would require the advance growing of suitable stock, for planting out on site on the completion of construction works.

Grasslands

- 8.5.12 Both species-rich neutral grassland and marsh and wet grassland would be created on low-nutrient substrates to promote diversity and reduce competition. The establishment technique includes the use of seeds and small plants, to provide a diverse mixture of grasses and wildflowers appropriate to the locality and soil type.
- 8.5.13 As reported under baseline conditions, there are several locations where orchids are present within the highway, including an area adjacent to the M6 – M1 Southbound Link, which would be affected by the replacement of Cattothorpe Viaduct. It is proposed to move the main populations of these orchids to suitable habitats elsewhere within the site.

Wildlife Water Bodies

8.5.14 In addition to the drainage ponds described above, the opportunity has been taken to create small wildlife ponds where suitable land is available. This includes severed land adjacent to the west of the M1 at Stonebank, and a small triangle of severed land at the junction between Catthorpe Road and Shawell Lane.

River Avon Corridor

8.5.15 A series of measures have been developed for the River Avon corridor in consultation with NE and the EA.

8.5.16 The prime objective of these measures is to mitigate the potential adverse impact to otter due to disturbance from users of the proposed bridleway adjacent to the river. The measures are designed to:-

- provide visual screening to an otter resting place / holt on the opposite bank of the river
- to improve vegetated margins to the river
- to increase cover and food supply for otter
- to provide an area of wet woodland as a further otter refuge

8.5.17 At the same time the measures would have the incidental effect of enhancing the habitat of the river corridor in general.

Species

8.5.18 The following measures would be adopted for the pre-construction and construction phases of the improvement work and included in the CEMP to ensure that the conservation status in the medium and long term of the species identified was not adversely affected and that where appropriate benefits could be achieved:-

- Survey updates would continue as appropriate, including in advance of road construction, to ensure that the site status, populations and distribution of species was understood and taken into account.
- Construction operations would be timed to the appropriate season to reduce the risk of harm and disturbance at sensitive times and to enable measures such as translocation to be carried out.
- Where necessary improvement works affecting the habitat of protected species would be carried out under a licence obtained from NE.
- Measures such as translocation or moving species out of the works area would be carried out in accordance with NE published guidelines or other best practice advice.
- Temporary fencing and other protective measures such as screening would be employed during the construction period as required.
- Compensation, if required, for lost habitats used by protected species, such as terrestrial habitats used by GCN or commuting routes / foraging areas used by bats.
- Special measures to help protected species, such as hibernacula for amphibians or roosting boxes for bats or nesting boxes for birds.
- Improvements to habitats to increase the food supply or cover for protected species.
- Permanent fencing where required to prevent animals accessing the motorway during its operation.

- Monitoring of populations both during the improvement works and post completion to test the effectiveness of measures.
- Long term management of the features and habitats provided to ensure their establishment and continued performance.

8.5.19 It is not proposed to include new connections for wildlife below the motorways and the A14, for example through the provision of tunnels and ecoducts. Species have had many years to adapt to the existing network, and there are existing bridges that allow access, at least for larger animals, below the roads at:-

- Shawell Lane : below M1
- Shawell Road : over M1
- River Avon bridge : below A14
- River Avon viaduct : below M1
- Wills Lane : below M1

8.5.20 As agreed with the EA the River Avon bridge below the A14 would be improved as a crossing point for otters through the provision of a ledge above flood level on the face of the existing bridge abutment. Fencing would also be deployed to prevent otters crossing the road at this point.

Biodiversity Action Plan Targets

8.5.21 The habitat creation measures described above would increase the attractiveness of the habitat around the junction for many species, including GCN and bats. It would also potentially benefit other amphibians, reptiles, birds, invertebrates and foraging mammals. The provision of land and wetland habitat would serve to meet the targets set by the HABAP and the local BAP's. The project's positive contribution to the various BAP's is set out in detail in Volume 2, Chapter 3.

8.5.22 The habitats created by the project would be:-

- | | | |
|---------------------------|---|---|
| • Wetlands | : | 3.1 hectares (net gain : 3.1 hectares) |
| • Woodlands | : | 9.7 hectares (net gain : 3.55 hectares) |
| • Species-rich grasslands | : | 14 hectares (net gain : 6.5 hectares) |
| • Hedgerows | : | 5907 metres (net gain : 141m) |

8.5.23 Although the net increase in hedgerows is small, it should be noted that only 110 metres of species-rich hedgerow would be lost, the majority are species-poor. However all the new planting would be species-rich from local provenance sources, thereby increasing the biodiversity value overall.

Long Term Management

8.5.23 Several consultees including NE and local Wildlife Trusts have commented on the need for a long-term management strategy, to ensure the delivery and sustainability of the measures proposed.

8.5.24 The HA has a robust system in place to ensure that measures are recorded at design stage, implemented and established during construction and then handed over with sufficient supporting data to the Managing Agent Contractor (MAC) for long-term management on completion of construction. A Handover Environmental Management Plan (HEMP) would be prepared using the CEMP as a basis. This would include as-built drawings, all environmental data, commitments made and

details of a management plan for the next 25 years to ensure that design objectives are achieved and maintained.

Land Ownership

- 8.5.25 The majority of the proposed mitigation measures described in this section would be carried out either within the existing highway or on land included in the draft CPO and retained by the HA for long-term management. This includes the drainage ponds and swales, on site planting, grassland and wildlife water bodies. All are regarded as essential for the mitigation of the proposed improvement scheme.
- 8.5.26 It is however not intended to retain measures within the River Avon Corridor as permanent title by the HA, but to hand the areas back to the landowner upon completion.
- 8.5.27 These measures are also regarded as essential and would be included in the CPO as a precaution should it not be possible to secure the landowners agreement for their return. In such a case the HA would retain title.
- 8.5.28 However, long term retention by the HA is not considered as essential for the following reasons:-
- Measures to screen otters are regarded as temporary, by the completion of the aftercare period, it is anticipated that the otters would have become accustomed to the anticipated low levels of human access.
 - The river channel regrading is aimed at facilitating the development of marginal vegetation along the river by natural regeneration, initially assisted by new planting if necessary. There is no need for long-term cyclical maintenance of this feature.
 - The EA have regulatory powers to prevent amendments to the river and the channel, and to protect the flood plain, including the new compensation areas.
 - If necessary the HA can retain rights to manage the woodland planting, which is proposed for the otter refuge adjacent to the A14, without retaining title.
 - It is considered that the landowners would want to retain title to this land and their riparian rights to the river.
- 8.5.29 This approach to the use of powers to achieve essential mitigation for the River Avon Corridor has been discussed and agreed with NE and the EA. The landowners have also been consulted.

8.6 Magnitude of Impacts and Significance of Effects

- 8.6.1 Most impacts in terms of ecology and nature conservation would occur during the construction phase. Mitigation measures taken into account in the assessment would also be carried out at this stage, though would need some years to establish before they became effective. Effects due to the operation of the junction on completion would be more limited.
- 8.6.2 Table 8.2 below summarises the impacts and effects during construction and Table 8.3 the operational impacts and effects.

Table 8.2 : Construction Phase : Summary of Impacts and Effects

Receptor	Description of Feature / Attribute	Value (sensitivity)	Distance from Nearest Improvement Works	Potential Impact from Improvement Works	Mitigation/ Compensation	Magnitude of Impact	Significance of Effect
Cave's Inn Pits SSSI	Neutral marsh (primarily) and other habitats including calcareous grassland. Map Reference 2	High	350m north	None	None	No change	Neutral
Stanford Park SSSI	Old Parkland Map Reference 3	High	1050m north from gantry works. 1250m northeast from main construction works.	None	None	No change	Neutral
Misterton Marshes SSSI	Unimproved wetland. Map Reference 4	High	3350m north from gantry works. 5050m north from main construction works.	None	None	No change	Neutral
Ashlawn Cutting LNR (also known as and forms part of Great Central Walk Nature Reserve)	Disused railway line. Map Reference 1	Medium	Adjacent to gantry works. 350m west of main construction works.	None	None	No change	Neutral

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Receptor	Description of Feature / Attribute	Value (sensitivity)	Distance from Nearest Improvement Works	Potential Impact from Improvement Works	Mitigation/ Compensation	Magnitude of Impact	Significance of Effect
Swift Valley LNR	A mixture of pasture, small woods, hedgerows and landscaped wetlands bound by the River Swift to the west and a disused canal to the east.	Medium	2150m southwest of gantry works. 3625m southwest of main construction works.	None	None	No change	Neutral
Newbold Quarry Park LNR	Waterbody at old quarry site. White-clawed crayfish population.	Medium	3650m southwest from gantry works. 4900m southwest of main construction works.	None	None	No change	Neutral
Any other local wildlife sites not included here are considered to be sufficiently far away from the site not to be affected. Therefore, no mitigation would be required, magnitude of impact would be <i>No Change</i> and significance of effect would be <i>Neutral</i> .							
pLWS	River Avon Map Reference 6	Medium	Within improvement works	Bridleway crossing. Works to river banks. Potential pollution & sedimentation from construction run-off.	Works to river banks for habitat creation and riparian habitats. Pollution prevention & sediment control measures	Minor Beneficial	Slight Beneficial
pLWS	River Avon Map Reference 9	Medium	Within improvement works	Bridleway crossing. Works to river banks. Potential pollution & sedimentation from construction run-off.	Works to river banks for habitat creation and riparian habitats. Pollution prevention & sediment control measures	Minor Beneficial	Slight Beneficial

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Receptor	Description of Feature / Attribute	Value (sensitivity)	Distance from Nearest Improvement Works	Potential Impact from Improvement Works	Mitigation/ Compensation	Magnitude of Impact	Significance of Effect
pLWS	River Avon Map Reference 12	Medium	250m south	Potential for pollution or sedimentation incidences of River Avon	Pollution prevention & sediment control measures	No change	Neutral
pLWS	River Avon Map Reference 15	Medium	300m south	Potential for pollution incidences of River Avon	Pollution prevention & sediment control measures	No change	Neutral
pLWS	River Avon Map Reference 17	Medium	350m south	Potential for pollution incidences of River Avon	Pollution prevention & sediment control measures	No change	Neutral
PWS	Land to north of A14, east of River Avon Map Reference 5	Medium	Within improvement works	Bridleway Creation. Bridleway crossing. Works to river banks. Temporary Haul Route. Potential pollution from construction run-off.	Works to river banks for habitat creation and riparian habitats. Pollution prevention & sediment control measures	Minor Beneficial	Slight Beneficial
PWS	Land to south of A14, east of River Avon Map Reference 8	Medium	Adjacent to improvement works	Bridleway Creation. Bridleway crossing. Works to river banks. Temporary Haul Route. Potential pollution from construction run-off.	Works to river banks for habitat creation and riparian habitats. Pollution prevention & sediment control measures	Minor Beneficial	Slight Beneficial

Receptor	Description of Feature / Attribute	Value (sensitivity)	Distance from Nearest Improvement Works	Potential Impact from Improvement Works	Mitigation/ Compensation	Magnitude of Impact	Significance of Effect
Habitat	Arable fields	Negligible	Within improvement works	Loss of Habitat	None	Negligible Adverse	Neutral
Habitat	Amenity and Improved Grasslands	Negligible	Within improvement works	Loss of Habitat	None	Negligible Adverse	Neutral
Habitat	Semi-improved Grasslands (Neutral and/or Poor)	Low	Within improvement works including Catthorpe Viaduct replacement	Loss of Habitat	Translocation of selected orchids prior to construction of Catthorpe Viaduct. Creation of species rich grassland on low nutrient soils	Minor Beneficial	Slight Beneficial
Habitat	Important, Leicestershire LWS or Species-rich Hedgerows and Trees	Medium	Within improvement works	Loss of Habitat	Creation of new species rich hedgerows with standard trees	Minor Beneficial	Slight Beneficial
Habitat	Other Hedgerows with Trees	Low	Within improvement works	Loss of Habitat	Creation of new species rich hedgerows with standard trees	Minor Beneficial	Slight Beneficial
Habitat	Mature or Diverse Woodland	Medium	Adjacent to improvement works	None	None	No change	Neutral
Habitat	Other Woodland and Scrub	Low	Within improvement works	Loss of Habitat	Creation of new mixed woodland	Minor Beneficial	Slight Beneficial

Receptor	Description of Feature / Attribute	Value (sensitivity)	Distance from Nearest Improvement Works	Potential Impact from Improvement Works	Mitigation/ Compensation	Magnitude of Impact	Significance of Effect
Habitat	River Avon	Medium	Within improvement works	Creation of Bridleway crossing points and habitat improvement works. Potential pollution & sedimentation from construction run-off	Habitat improvement works and water quality protection	Minor Beneficial	Slight Beneficial
Habitat	Clay Coton – Yelvertoft Brook	Low	50m south west	None	None	No change	Neutral
Habitat	Swinford Lodge Brook	Low	Within improvement works	Loss of Habitat Potential pollution & sedimentation from construction run-off	Re-alignment and re-profiling of brook and water quality protection	Minor Beneficial	Slight Beneficial
Habitat	Un-named brook flowing south from M6	Low	Within improvement works	Loss of Habitat. Potential pollution & sedimentation from construction run-off	Re-alignment and re-profiling of brook and water quality protection	Minor Beneficial	Slight Beneficial
Habitat	Ponds	Low	Adjacent to Gantry Works, 100m north of main construction works	None	19 new wildlife ponds being created	Minor Beneficial	Slight Beneficial
Habitat	Ditches	Low	Within improvement works	Loss of Habitat	Creation of new ditches	Minor Beneficial	Neutral
Species	Scarce Arable Weed Communities	Negligible	Within improvement works	Loss of Habitat	None. Habitat would be recreated post-development.	Negligible Adverse	Neutral

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Receptor	Description of Feature / Attribute	Value (sensitivity)	Distance from Nearest Improvement Works	Potential Impact from Improvement Works	Mitigation/ Compensation	Magnitude of Impact	Significance of Effect
Species	Breeding birds. Red and Amber Listed Birds; - Nesting and Foraging	Medium	Within improvement works	Loss and disturbance of breeding territories.	Ecologist to inspect nesting habitat before it is removed. Implementation of a nest box scheme. Creation of suitable nesting habitats.	Minor Beneficial	Slight Beneficial
Species	Breeding birds. BAP and Other Birds (Non Red and Amber Birds); - Nesting and Foraging	Low	Within improvement works	Loss and disturbance of breeding territories.	Ecologist to inspect nesting habitat before it is removed. Implementation of a nest box scheme. Creation of suitable nesting habitats.	Minor Beneficial	Slight Beneficial
Species	GCN	Medium	Within improvement works	Loss of terrestrial foraging habitat. Fragmentation of terrestrial habitat. Risk of harm to individuals.	Exclusion and translocation from terrestrial habitat. Enough habitat is present to support the GCN during the construction phase off site. Creation of suitable amphibian habitats.	Minor Beneficial	Slight Beneficial

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Receptor	Description of Feature / Attribute	Value (sensitivity)	Distance from Nearest Improvement Works	Potential Impact from Improvement Works	Mitigation/ Compensation	Magnitude of Impact	Significance of Effect
Species	Common Toad	Medium	Within improvement works	Loss of terrestrial foraging habitat. Fragmentation of terrestrial habitat. Risk of harm to individuals.	Creation of suitable amphibian habitats.	Minor Beneficial	Slight Beneficial
Species	Smooth Newt and Common Frog	Low	Within improvement works	Loss of terrestrial foraging habitat. Fragmentation of terrestrial habitat. Risk of harm to individuals.	Creation of suitable amphibian habitats.	Minor Beneficial	Slight Beneficial
Species	Reptiles	Medium	Within improvement works	Loss of terrestrial foraging habitat. Fragmentation of terrestrial habitat. Risk of harm to individuals.	Protection from reckless killing/harm through translocation works to suitable habitat. Creation of suitable reptile habitats.	Minor Beneficial	Slight Beneficial
Species	White-clawed Crayfish	N/A, Surveys indicate not present	Suitable habitat within improvement works	Loss of suitable habitat. Potential pollution & sedimentation from construction run-off	Ensure suitable habitat created to allow future re-colonisation. Pollution prevention and sedimentation control measures	No Change	Neutral
Species	Invertebrates terrestrial	Low	Within improvement works	Loss of terrestrial habitat. Risk of harm to individuals.	Creation of a mosaic of habitats	Minor Beneficial	Slight Beneficial

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Receptor	Description of Feature / Attribute	Value (sensitivity)	Distance from Nearest Improvement Works	Potential Impact from Improvement Works	Mitigation/ Compensation	Magnitude of Impact	Significance of Effect
Species	Invertebrates aquatic	Low	Within improvement works	Alteration of aquatic habitat. Potential pollution & sedimentation from construction run-off. Risk of harm to individuals.	Protection of aquatic environment from pollution & sedimentation incidents. Creation of a mosaic of habitats	Minor Beneficial	Slight Beneficial
Species	A comb-footed spider (Achaearanea tepidariorum f. simulans)	N/A, Surveys indicate not present	N/A, Surveys indicate not present	None	None	No change	Neutral
Species	<i>Carabus monilis</i> , a ground beetle	Medium	Within improvement works	Loss of terrestrial habitat. Risk of harm to individuals.	Trapping and translocation, Habitat manipulation. Creation of a mosaic of suitable habitats	Minor Beneficial	Slight Beneficial
Species	<i>Ischnomera cyanea</i> a flower beetle	Medium	Within improvement works	Loss of terrestrial habitat. Risk of harm to individuals.	Translocation of dead wood from existing habitats to new areas. Creation of a mosaic of suitable habitats	Minor Beneficial	Slight Beneficial

Receptor	Description of Feature / Attribute	Value (sensitivity)	Distance from Nearest Improvement Works	Potential Impact from Improvement Works	Mitigation/ Compensation	Magnitude of Impact	Significance of Effect
Species	Badger	Various	Within improvement works	Loss of foraging habitat and sett disturbance/ destruction. Risk of harm to individuals.	Habitat creation would provide new foraging habitats. Sett closure under licence.	Minor Adverse	Slight Adverse
Species	Bats	High	Within improvement works	Loss/disturbance to roosts. Loss of connectivity and foraging grounds. Risk of harm to individuals.	Bat roost creation. Timings and methods of works implemented to avoid disturbance. Connectivity maintained around the site to avoid severance of bat roosts.	Minor Beneficial	Slight Beneficial
Species	Brown Hare	Medium	Within improvement works	Loss of terrestrial habitat. Risk of harm to individuals.	Ensure no dependant leverets within construction area. Habitat Creation	Minor Beneficial	Slight Beneficial

Receptor	Description of Feature / Attribute	Value (sensitivity)	Distance from Nearest Improvement Works	Potential Impact from Improvement Works	Mitigation/ Compensation	Magnitude of Impact	Significance of Effect
Species	Otter	High	Bridleway and River Avon Works Effecting Otter Habitat.	Disturbance of Otter. Bridleway Construction and River Avon Works. Potential pollution & sedimentation from construction run-off	Works to river banks for habitat creation and riparian habitats to provide cover to ensure otters are not disturbed from future bridleway use. Limit working periods to outside of peak otter activity periods to minimise otter disturbance. Pollution & sedimentation prevention measures	Minor Beneficial	Moderate Beneficial
Species	Water Vole	N/A, Surveys indicate not present	Suitable habitat within improvement works	Loss of suitable habitat. Potential pollution from construction run-off	Ensure suitable habitat created to allow future re-colonisation. Pollution & sedimentation prevention measures	No Change	Neutral

Table 8.3 : Operational Phase : Summary of Impacts and Effects

Receptor	Description of Feature / Attribute	Value (sensitivity)	Distance from Nearest Improvement Works	Potential Impact from Operational Phase.	Mitigation/ Compensation	Magnitude of Impact	Significance of Effect
Cave's Inn Pits SSSI	Neutral marsh (primarily) and other habitats including calcareous grassland. Map Reference 2	High	350m north	None	None	No change	Neutral
Stanford Park SSSI	Old Parkland Map Reference 3	High	1050m north from gantry works. 1250m northeast from main construction works.	None	None	No change	Neutral
Misterton Marshes SSSI	Unimproved wetland. Map Reference 4	High	3350m north from gantry works. 5050m north from main construction works.	None	None	No change	Neutral
Ashlawn Cutting LNR (also known as and forms part of Great Central Walk Nature Reserve)	Disused railway line. Map Reference 1	Medium	Adjacent to gantry works. 350m west of main construction works.	None	None	No change	Neutral

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Receptor	Description of Feature / Attribute	Value (sensitivity)	Distance from Nearest Improvement Works	Potential Impact from Operational Phase.	Mitigation/ Compensation	Magnitude of Impact	Significance of Effect
Swift Valley LNR	A mixture of pasture, small woods, hedgerows and landscaped wetlands bound by the River Swift to the west and a disused canal to the east.	Medium	2150m southwest of gantry works. 3625m southwest of main construction works.	None	None	No change	Neutral
Newbold Quarry Park LNR	Waterbody at old quarry site. White-clawed crayfish population.	Medium	3650m southwest from gantry works. 4900m southwest of main construction works.	None	None	No change	Neutral
Any other local wildlife sites not included here are considered to be sufficiently far away from the site not to be affected. Therefore, no mitigation would be required, magnitude of impact would be <i>No Change</i> and significance of effect would be <i>Neutral</i> .							
SINC	River Avon Map Reference 6	Medium	Within improvement works	Potential for pollution of River Avon	Pollution prevention measures	Minor Beneficial	Slight Beneficial
pLWS	River Avon Map Reference 9	Medium	Within improvement works	Potential for pollution of River Avon	Pollution prevention measures	Minor Beneficial	Slight Beneficial
pLWS	River Avon Map Reference 12	Medium	250m south	Potential for pollution of River Avon	Pollution prevention measures	Minor Beneficial	Slight Beneficial
pLWS	River Avon Map Reference 15	Medium	300m south	Potential for pollution of River Avon	Pollution prevention measures	Minor Beneficial	Slight Beneficial
pLWS	River Avon Map Reference 17	Medium	350m south	Potential for pollution of River Avon	Pollution prevention measures	Minor Beneficial	Slight Beneficial

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Receptor	Description of Feature / Attribute	Value (sensitivity)	Distance from Nearest Improvement Works	Potential Impact from Operational Phase.	Mitigation/ Compensation	Magnitude of Impact	Significance of Effect
PWS	Land to north of A14, east of River Avon Map Reference 5	Medium	Within improvement works	Potential for pollution of River Avon	Pollution prevention measures	Minor Beneficial	Slight Beneficial
PWS	Land to south of A14, east of River Avon Map Reference 8	Medium	Adjacent to improvement works	Potential for pollution of River Avon	Pollution prevention measures	Minor Beneficial	Slight Beneficial
Habitat	Arable fields	Negligible	Within improvement works	None	None	No change	Neutral
Habitat	Amenity and Improved Grasslands	Negligible	Within improvement works	None	None	No change	Neutral
Habitat	Semi-improved Grasslands (Neutral and/or Poor)	Low	Within improvement works	None	None	No change	Neutral
Habitat	Important, Leicestershire LWS or Species-rich Hedgerows and Trees	Medium	Within improvement works	None	None	No change	Neutral
Habitat	Other Hedgerows with Trees	Low	Within improvement works	None	None	No change	Neutral
Habitat	Mature or Diverse Woodland	Medium	Adjacent to improvement works	None	None	No change	Neutral
Habitat	Other Woodland and Scrub	Low	Within improvement works	None	None	No change	Neutral
Habitat	River Avon	Medium	Within improvement works	Potential for pollution of River Avon	Pollution prevention measures	Minor Beneficial	Slight Beneficial
Habitat	Clay Coton – Yelvertoft Brook	Low	50m south west	Potential for pollution of River Avon	Pollution prevention measures	Minor Beneficial	Neutral

Receptor	Description of Feature / Attribute	Value (sensitivity)	Distance from Nearest Improvement Works	Potential Impact from Operational Phase.	Mitigation/ Compensation	Magnitude of Impact	Significance of Effect
Habitat	Swinford Lodge Brook	Low	Within improvement works	Potential for pollution incidences of River Avon	Pollution prevention measures	Minor Beneficial	Neutral
Habitat	Un-named brook flowing south from M6	Low	Within improvement works	Potential for pollution of River Avon	Pollution prevention measures	Minor Beneficial	Neutral
Habitat	Ponds	Low	Adjacent to improvement works	Potential for pollution of River Avon	Pollution prevention measures	No Change	Neutral
Habitat	Ditches	Low	Within improvement works	Potential for pollution of River Avon	Pollution prevention measures	Minor Beneficial	Neutral
Species	Scarce Arable Weed Communities	Negligible	Adjacent to improvement works	None	None	No change	Neutral
Species	Breeding birds. Red and Amber Listed Birds; - Nesting and Foraging	Medium	Within improvement works	Road mortality, disturbance from traffic noise and lighting	Strategic placement of nest boxes. Landscaping designed to minimise noise and lighting disturbance.	Minor Beneficial	Slight Beneficial
Species	Breeding birds. BAP and Other Birds (Non Red and Amber Birds); - Nesting and Foraging	Low	Within improvement works	Road mortality, disturbance from traffic noise and lighting	Strategic placement of nest boxes. Landscaping designed to minimise noise and lighting disturbance.	Minor Beneficial	Slight Beneficial

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Receptor	Description of Feature / Attribute	Value (sensitivity)	Distance from Nearest Improvement Works	Potential Impact from Operational Phase.	Mitigation/ Compensation	Magnitude of Impact	Significance of Effect
Species	GCN	Medium	Within improvement works	Gully pot mortality. Pollution incidents. Unsuitable habitat management	Offset gully pots. Amphibian friendly habitat management plan. Pollution prevention measures.	Minor Beneficial	Slight Beneficial
Species	Common Toad	Medium	Within improvement works	Gully pot mortality. Pollution incidents. Unsuitable habitat management	Offset gully pots. Amphibian friendly habitat management plan. Pollution prevention measures.	Minor Beneficial	Slight Beneficial
Species	Smooth Newt and Common Frog	Low	Within improvement works	Gully pot mortality. Pollution incidents. Unsuitable habitat management	Offset gully pots. Amphibian friendly habitat management plan. Pollution prevention measures.	Minor Beneficial	Slight Beneficial
Species	Reptiles	Medium	Within improvement works	Continued potential of road mortality. Potential negative effects from unsuitable habitat management	Habitats created would be established and managed in a 'reptile friendly' manner.	No change	Neutral
Species	White-clawed Crayfish	N/A, Surveys indicate not present	Suitable habitat within improvement works	None	None	No change	Neutral
Species	Invertebrates terrestrial	Low	Within improvement works	Road mortality	None	Negligible adverse	Neutral

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Receptor	Description of Feature / Attribute	Value (sensitivity)	Distance from Nearest Improvement Works	Potential Impact from Operational Phase.	Mitigation/ Compensation	Magnitude of Impact	Significance of Effect
Species	Invertebrates aquatic	Low	Within improvement works	None	None	Minor Beneficial	Slight Beneficial
Species	A comb-footed spider (Achaearanea tepidariorum f. simulans)	N/A, Surveys indicate not present	N/A, Surveys indicate not present	None	None	No change	Neutral
Species	<i>Carabus monilis</i> , a ground beetle	Medium	Within improvement works	None	None	No change	Neutral
Species	<i>Ischnomera cyanea</i> a flower beetle	Medium	Within improvement works	None	None	No change	Neutral
Species	Badger	Various	Within improvement works	Road Mortality	Badger protection fencing	Negligible Beneficial	Neutral
Species	Bats	High	Within improvement works	None	None	No change	Neutral
Species	Brown Hare	Medium	Within improvement works	None	None	No change	Neutral
Species	Otter	High	Within improvement works	Road mortality. Disturbance. Potential pollution of River Avon	Riparian habitat works to provide cover and screens from disturbance. Otter protection fencing and otter ledge to minimise road mortality potential. Pollution prevention measures.	Minor Beneficial	Moderate Beneficial
Species	Water Vole	N/A, Surveys indicate not present	Suitable habitat within improvement works	None	None	No change	Neutral

Habitats

- 8.6.3 There would be no effect on the SSSI's or LNR designated sites described in Section 8.4. There would be Slight Beneficial effects on LWS and pLWS sites associated with the River Avon as detailed in Table 8.2
- 8.6.4 The greatest disturbance would be to verges, embankments and roadside planting and plant communities where the vegetation comprises common and widespread species. The common and widespread species were of low value and sensitivity, predominantly due to their common nature and the potential to recreate these areas not being limited. These areas can be readily replaced with new compensatory planting. The proposal is illustrated on the Environmental Master Plan (Figure B) and includes substantial areas of replacement woodland planting, using native species from local provenance sources and species-rich grassland on low nutrient soils. Where vegetation would be lost, the emphasis should be on connecting new planting with existing habitat, which extends beyond the road corridor. This could re-establish some degree of habitat connectivity over time.
- 8.6.5 The design seeks to retain existing hedgerows wherever possible. Impacts due to hedgerow and woodland removal could be reduced over time by appropriate new planting, resulting in a beneficial effect. The alignments of the LRN have been designed to avoid the main mature trees and field ponds in the improved grass fields north of the M6 and Shawell Lane.
- 8.6.6 During the construction phase appropriate measures set out in a CEMP would be taken to ensure that the River Avon and its tributaries and all connecting drainage ditches are not polluted by run-off from improvement works or works compounds.
- 8.6.7 In summary, for the habitats, the improvement works would result in both the temporary and permanent loss of multiple habitats. However, the mitigation for the improvement, with higher quality habitats being replanted, would have an overall magnitude of impact of *Minor Beneficial*, with a *Slight Beneficial* significance of effect.

Species

Breeding Birds

- 8.6.8 The habitats that are to be lost or disturbed due to the construction of the project provide potential nesting habitat for a range of birds. The loss of these habitats during the construction period would temporarily reduce the size of bird territories within adjacent land and increase competition for nesting locations and food.
- 8.6.9 As mature vegetation would be removed a nest box scheme would be implemented to provide nesting locations until planted vegetation would be of sufficient height.
- 8.6.10 The local bird population would eventually benefit from the creation of new habitat such as woodland and the planting of trees, hedgerows and scrub together with new ponds. Some selected areas of new woodland, scrub and hedgerow planting would be planted with a herb layer to increase invertebrate diversity, which would in turn provide additional food for insectivorous birds.
- 8.6.11 During the operational phase breeding birds would be affected by the light levels and noise from the road. Once the landscaping works and vegetation has become established, the effect from these would be minor. The roadside screening would provide a suitable

buffer for the birds to avoid the lights. Predicted noise levels for the operational phase are not considered to be markedly different to those for the Do-minimum option. It is therefore anticipated that the birds would utilise the site in the same manner as the existing road layout. Lighting around the main junction would remain unchanged. New lighting would however be installed along the A14, to a point east of the River Avon. Illumination of this currently unlit area is likely to have a *Minor* Adverse impact upon bird species within the area. The buffer provided by the vegetation would continue to improve as the vegetation matures further throughout the operational phase.

- 8.6.12 The nest boxes utilised during the construction phase would continue to be used during the operational phase and would provide additional nesting features to the natural ones which would become available when the vegetation matures. The strategic placement of nest boxes in accordance with HA guidance (i.e. placing kestrel boxes so that the entrances point away from the roads) would reduce the potential for road traffic mortality. These nest boxes, in combination with the maturing vegetation, would have a beneficial impact.

Construction effect : *Slight Beneficial*
Operational effect : *Slight Beneficial*

Amphibians

- 8.6.13 No ponds used by GCN would be directly affected by the works, though some areas used by the species on land would be lost. During construction GCN present within the works area would be trapped and moved out of affected areas (translocated) under a licence to be obtained from NE. The conservation status of the species would not be affected by the project

- 8.6.14 Measures proposed for the project, including the creation of new ponds and areas for hibernation (hibernacula), together with the long term management of these areas would improve the habitat for GCN. This situation would be retained for the operation phase of the project.

Construction effect : *Slight Beneficial*
Operational effect : *Slight Beneficial*

- 8.6.15 Effects would be similar for other amphibians associated with the same habitat, smooth newt, common toad and common frog.

Reptiles

- 8.6.16 Areas of suitable habitat would be lost initially but replaced with a higher quality habitat including rough grassland, woodland edges with scalloped edges to create basking opportunities, hibernacula and wetlands. During construction care would be taken to translocate reptiles from any suitable habitats lost.

- 8.6.17 As for GCN a management plan would be produced for the maintenance of areas within the highway to 'reptile friendly;' standards. With such measures in place there would be a *Slight Beneficial* effect. Operation of the road would not result in any further effects.

Construction effect : *Slight Beneficial*
Operational effect : *Neutral*

White-Clawed Crayfish

8.6.18 This species is not present and no effects are anticipated.

Invertebrates

8.6.19 Habitats would be lost initially, but the proposals allow for the creation of a high quality mosaic of land and wetland habitats that would benefit invertebrates in general terms. Aquatic invertebrates would be at risk of the contamination of water courses, either during construction or operation of the project, but measures would be included to protect water courses at both stages.

8.6.20 There would be similar benefits for the two nationally scarce species identified by site survey. The Necklace Ground Beetle will be affected by habitat loss during the construction of the Catthorpe Viaduct Replacement but trapping and translocation would be carried out and the beetles moved to a similar habitat elsewhere in the highway.

8.6.21 In terms of operational effects there would be some road mortality as now, but aquatic invertebrates would benefit from improved pollution controls.

Construction effect : *Slight Beneficial*

Operational effect : *Slight Beneficial*

Badger

8.6.22 The overall effect on badgers at construction stage would be *Slight Adverse* due to the temporary loss of foraging habitat and the loss of some outlying setts.

8.6.23 During the operation of the road no further effects are anticipated.

Construction effect : *Slight Adverse*

Operational effect : *Neutral*

Bats

8.6.24 Nine bat roosts would be at risk of disturbance during construction, though no maternity roosts would need to be closed by the proposed improvement works. Two roosts would be lost, both common pipistrelle (non-maternity) summer roosts, as a result of the improvement works. One would be lost due to the replacement of a culvert and the other due to the removal of a tree.

8.6.25 Other impacts would include:-

- the removal of vegetation along commute routes, the loss of foraging vegetation, increased lighting levels
- temporary lighting during construction

8.6.26 To maintain connectivity around the site for bats during the works a bat protection strategy would be implemented, including the use of screens combined with proposed earth mounding and full cut-off lighting, to minimise excess light outside the highway and to protect commuting routes.

8.6.27 The removal of vegetation would also reduce potential roosting locations and this would be mitigated by the provision of bat boxes while replanted vegetation matures.

8.6.28 The creation of improved riparian habitats along the River Avon and the drainage ponds, prior to construction commencing, would provide an additional source of foraging for bats to use during the construction period. These would increase in value for bats as the vegetation continues to establish itself.

8.6.29 Post development monitoring would also be carried out to inform maintenance of mitigation measures.

8.6.30 Taking into account the mitigation proposed the construction effect would be *Slight Beneficial*. No further effects are anticipated during the operation of the project.

Construction effect : *Slight Beneficial*
Operational effect : *Neutral*

Brown Hare

8.6.31 Construction works would have a minimal effect on Brown Hare and better habitats proposed would benefit the species.

Construction effect : *Slight Beneficial*
Operational effect : *Neutral*

Otter

8.6.32 No breeding dens are present within the survey area and it is not anticipated that a Natural England licence would be required for works to the riverbank to create additional cover and screening, required to eliminate any disturbance to otters from the users of the proposed bridleway adjacent to the river. The measures include:-

- re-shaping of sections of river bank to allow vegetation to colonise
- fencing and shrub planting to provide screening and restrict access by dogs

8.6.33 Over time it is anticipated that otters would become used to relatively low level of human activity along the bridleway and the need for the screening would diminish.

8.6.34 The bridleway has also been designed so that it is on the opposite side of the river to the known holt. A small woodland copse would also be created to provide further long term cover for otters.

8.6.35 Contamination of the water course would have the potential to affect otters, but as previously described measures would be undertaken during construction to minimise this risk.

8.6.36 With the above measures in place it is anticipated there would be a *Moderate Beneficial* effect for the species.

8.6.37 In operational terms otter are at risk of collision with vehicles using the A14 at the River Avon crossing. As agreed with the EA a ledge would be installed below the bridge above flood level, which together with protective fencing would reduce the risk of otters being killed on the road.

8.6.38 Improved pollution controls for road drainage including the drainage ponds would benefit water quality and otters.

8.6.39 Lighting would be extended along the A14 across the River Avon. The impact of this would be reduced by the use of full cut-off lighting to minimise light spillage to the surrounding area. Proposed planting would also reduce the illumination of otter habitats in the longer term.

8.6.40 A *Moderate Beneficial* effect is anticipated at the operational stage.

Construction effect : *Moderate Beneficial*
Operational effect : *Moderate Beneficial*

8.7 Conclusion

8.7.1 In overall terms, taking into account the mitigation measures described, most effects during the construction phase on designated habitats, other habitats and species affected by the improvement works would be *Neutral* or *Slight Beneficial*. The only adverse effect anticipated is for badgers.

8.7.2 It is considered that the overall significance of effect for the project at construction would be *Slight Beneficial*.

8.7.3 At the operational stage it is not anticipated that there would be any further adverse effects and the overall significance would remain *Slight Beneficial*.

8.7.4 The proposed habitat mitigation plans would make positive contributions to the HA and local BAP's.

8.7.5 With regards to the consultees, where specific requests were received to undertake surveys for particular species (i.e. common toad and scarce arable weeds) or for certain mitigation features to be included (i.e. the provision of an otter ledge and the re-profiled banks of the River Avon to be sloped and not stepped), their comments have been addressed and the measures adopted. The mitigation provided has also met the consultees general requests to:-

- provide net biodiversity gain
- provide new habitats tailored to meet local BAP target
- use a local seed initiative to secure local provenance stock
- secure long term management
- enhance the corridor of the River Avon
- provide green infrastructure, or improved connectivity between habitats

8.7.6 The objectives of the assessment for Ecology and Nature Conservation have been met, which were to minimise the adverse impacts on habitats and species and to maximise opportunities for species and the creation of new habitats.

9. LANDSCAPE

9.1 Introduction

9.1.1 The detailed assessment of landscape is in Volume 2 Chapter 4 - Landscape and includes:-

- landscape character sensitivity
- Visual sensitivity in terms of topographical horizons and vegetation barriers, views from settlements, individual properties and other locations
- Landscape value in terms of designations, scenic value and tranquillity

9.1.2 The objective for the assessment for landscape is:-

- To protect the character of the landscape and to minimise adverse visual impacts and loss of features

9.2 Study Area

9.2.1 The study area used for the landscape and visual impact assessment will include the broad area shown on Figure C Environmental Resources Plan in Volume 1 of the ES at Appendix 1.

9.3 Legislation and Policies

International and National Policies

9.3.1 Under the European Landscape Convention³⁵ member states of the Council of Europe undertake to:-

- recognise landscapes in law as an essential component of people's surroundings, an expression of the diversity of their shared cultural and natural heritage, and a foundation of their identity
- establish and implement policies aimed at landscape protection, management and planning
- establish procedures for the participation of the general public, local and regional authorities and other interested parties in the definition and implementation of landscape policies
- integrate landscape into all policies with possible direct or indirect impact of landscape

9.3.2 No landscape designations coincide with the footprint of the proposals. Landscape planning guidance is set out in Planning Policy Statement 7 (PPS7)³⁶ Sustainable Development in Rural Areas. PPS7 requires planning authorities to ensure that the quality and character of the wider countryside is protected and where possible, enhanced. Authorities should have particular regard to any areas that have been statutorily designated for their landscape, wildlife or historic qualities

9.3.3 The Government Agency with responsibility to monitor the quality of the rural environment is Natural England. They are the Government's statutory advisor on landscape with policies aimed at conserving and enhancing the countryside and its local distinctiveness. Natural England work to ensure positive planning for rural areas, promoting development that respects the character of the landscapes and meets the needs of local communities.

Natural England's countryside character initiative is used to improve understanding of the countryside and manage change sustainably.

Regional Policies

West Midlands Regional Spatial Strategy (2008)

- 9.3.4 The Regional Spatial Strategy for the West Midlands was adopted in 2008 and includes provisions for the protection and enhancement of the Region's Landscape. This provision is in the form of policies QE1: Conserving and Enhancing the Environment, QE3: Creating a High Quality Built Environment, QE4: Greenery, Urban Greenspace and Public Spaces, QE5: Protection and Enhancement of the Historic Environment, QE6: The Conservation, Enhancement and Restoration of the Region's Landscape and QE8: Forestry and Woodlands. These policies aim to protect and enhance the character and appearance of the Region's landscape including specific features such as forest, woodland and historic features.

East Midlands Regional Plan (2009)

- 9.3.5 The East Midlands Regional Plan was adopted in 2009 and includes the provision of up to date policies which seek to protect and enhance the Region's Landscape. In particular policies 26: Protecting and Enhancing the Region's Natural and Cultural Heritage, 27: Regional Priorities for the Historic Environment, 28: Regional Priorities for Environmental and Green Infrastructure, 30: Regional Priorities for Managing and Increasing Woodland Cover and 31: Priorities for the Management and Enhancement of the Region's Landscape deal with the protection and enhancement of the Region's landscape. The aim of these policies is to protect and enhance the character and appearance of the landscape, promote green infrastructure and protect the historic environment.

Local Policies

Daventry District Council Local Plan 1997

- 9.3.6 The Daventry District Council Local Plan was adopted in 1997. In September 2007 any policies not "saved" expired. Among the saved policies dealing with landscape issues are EN10: Green Wedges, EN25: Comprehensive Landscape Schemes and EN26: Landscaping. The policies aims are to protect and enhance the landscape, green wedges and green links. There is also the requirement that detailed landscape proposals are submitted with development schemes and that these should be implemented no later than the planting season following completion of the development.
- 9.3.7 These policies are to be eventually replaced with emerging policies under the Local Development Framework (LDF). Daventry are producing a joint Core Strategy as part of the LDF which is the West Northamptonshire Joint Core Strategy (2007) which is currently at the issues and options stage. This means that any policies are currently only in draft form. As the Core Strategy is currently at Issues and Options Stage there are not yet any policies but the strategy does set out Strategic Objectives which will inform the basis of future policies. Strategic Objective 8 of the Core Strategy aims to ensure that development is sensitive to its environment.

Harborough District Council Local Plan 2001

- 9.3.8 The Harborough District Local Plan was adopted in 2001 and as mentioned above all policies that were not formally saved expired in September 2007. There are two saved

policies which related to landscape and these are EV19: Protection of Trees which seeks to protect and replace trees affected by development and EV20: Landscaping which requires that all development proposals are accompanied by detailed landscape plans.

9.3.9 Harborough are in the process of producing their Core Strategy which is currently at alternative options stage. Within this document Core Spatial Policies 3: Promoting Sustainable Development and 17: Develop and Protect the Natural and Historic Environment have relevance to Cultural Heritage. In particular Policy 17 will focus on the need to protect, enhance and restore Harborough's natural resources and character.

Rugby Borough Council Local Plan 2006

9.3.10 The Rugby Borough Local Plan was adopted in 2006 and contains a number of saved policies. Policies GP1: Appearance and Design of Development, GP2: Landscaping, GP3: Loss of Amenity, E5: Landscape and Settlement Character and E9: Development Affecting Trees, Woodlands and Hedgerows are all relevant to landscape issues. The policies require a high quality of design and landscape plans which help the proposed development form an integral part of its surroundings.

9.3.11 In addition to the saved policies in the Local Plan Rugby are also in the process of writing their Core Strategy which is currently at the preferred options stage. Within the Core Strategy, Spatial Objective 11 aims to protect and enhance the special natural and historic environment of the Borough.

North Northamptonshire Core Strategy (2008)

9.3.12 The North Northamptonshire Core Strategy was adopted in 2008 and is a joint Core Strategy covering the areas of Corby, Kettering, Wellingborough and East Northamptonshire. Within this document there are two main policies which are relevant to landscape; these are policies 5: Green Infrastructure and 13: General Sustainable Development Principles. These policies seek to protect and enhance the green assets of the area and aims to avoid any net loss of greenspace.

9.4 Baseline Conditions

9.4.1 The baseline conditions are considered under the three main strands:-

- Landscape Character sensitivity
- Visual Sensitivity
- Landscape Value

9.4.2 The study area comprises mainly farmland with the majority of fields either under pasture or arable. The area is bordered to the south by the River Avon valley and tributary streams.

Landscape Character Sensitivity

9.4.3 An area already affected and disturbed by major roads, but where the surrounding landscape and nearby communities are afforded protection by mature vegetation which integrates the junction into the surrounding landscape and provides screening. The character of the surrounding landscape is dependant upon the pattern of hedges and trees which, in some areas, such as south-west of Swinford, create a smaller scale more attractive landscape and help to screen the highways. There are some important habitat and cultural elements.

9.4.4 The overall Landscape Character sensitivity is considered to be *Medium*.

Visual Sensitivity

9.4.5 In terms of general visibility, given the gently undulating topography there are views across the landscape towards the junction from higher points such as the ridgeline to the east of Shawell, from Swinford and Catthorpe. Views are particularly extensive from the lower ground formed by the River Avon to the east. Existing vegetation helps to contain views from Swinford, where good hedgerows filter longer distance views. In particular Catthorpe Hill and its associated woodland creates a skyline to limit views to the south-west, but at the same time provides an important backdrop providing a feature that puts the junction and the potential new works in scale with its surroundings.

9.4.6 The sensitivity for general visibility is considered to be *Medium*.

Receptors

9.4.7 Within the area of general visibility there are many receptors that would be potentially affected, i.e. those with views of the existing junction including approximately 75 dwellings. There is also a network of public rights of way (PRoW) in the area and 15 separate footpaths and bridleways would be potentially affected.

9.4.8 Views from properties are considered to be of *High* sensitivity and those from other viewpoints as *Medium*.

Landscape Value

9.4.9 The area is already affected and disturbed by major roads. Although there are some areas of good landscape, particularly where a strong hedgerow pattern helps to screen longer distance views, the general sensitivity in terms of landscape value is considered to be *Low*.

Overall Landscape Sensitivity and Capacity

9.4.10 Given *Medium* visual sensitivity and *Medium* landscape character sensitivity the overall landscape sensitivity is considered to be *Medium*.

9.4.11 Taking the *Low* landscape value into consideration the Capacity of the landscape within the study area is regarded as *Medium*.

9.5 Mitigation

9.5.1 Typical measures shown on the Environmental Master Plan include:-

- Woodland and shrub planting within the highway boundary. This would be varied in character to provide visual interest and diversity and would include 'high forest' to provide landmarks, 'woodland', 'woodland edge', as well as contrasting areas of shrubs and more open scattered tree planting. The planting would consist of largely deciduous native species.
- Boundary hedgerows, to integrate with the surrounding field pattern or to provide additional protection to adjacent features such as bridleways. Hedgerows would either be planted within the motorway or subject to landowners agreement along the boundary of other roads, such as the proposed Local Road Network (LRN).

- Large areas of species rich grassland where wildflowers could be established on low fertility soils, providing visual interest and nature conservation value
- Drainage ponds designed to provide pollution and flood control for road run-off which would also provide habitat of some conservation value
- Earth mounding and shaping where appropriate to help screen views and to provide additional height to screen planting

9.5.2 Key areas of essential mitigation are as follows:-

- In the north-east quadrant dense planting augmented by mounding and earth shaping is proposed to help screen views from Swinford, outlying properties and public rights of way and to replace the loss of mature planting.
- A strip of dense planting combined with mounding, maximum height 2 metres, is proposed between the M6 – M1 Southbound Link and the LRN where they run closely parallel to the south of Tomley Hall Farm. This planting is intended to replace a well established woodland belt and also provide an appropriate separation between the highway and users of the LRN including.
- Woodland planting would also be provided for the new earthworks to the new Shawell Road overbridge, replacing the vegetation lost.

9.5.3 Where necessary land has been included in the draft Compulsory Purchase Orders for the project to ensure that this mitigation can be carried out.

9.5.4 Care has been taken in the design and alignment of the LRN to respect the character of the landscape and the existing country lanes with the width limited to 6m, and generally with 2m wide verges, including to accommodate a footway on the section between Swinford and Catthorpe through the junction. Beyond the junction a footway is proposed within the verge of the existing road to Swinford and Catthorpe respectively.

9.5.5 In addition to the planting shown on the Environmental Master Plan it would also be possible to carry out off-site planting with the agreement of landowners. It would be carried out under Section 253 of the Highways Act 1980 and could be carried out in advance of the works. As it is subject to agreement, it is not shown on the plan and is not relied upon as mitigation for the landscape assessment.

9.6 Magnitude of Impacts and Significance of Effects

Landscape Character Sensitivity

9.6.1 The impact of the proposals would be offset effectively by the presence of the existing junction and other detractors in the area. The proposed layout is in scale with the existing junction and its maximum height is similar.

9.6.2 The loss of the roadside vegetation and adjacent woodland is significant but there would be opportunities for significant new planting adding to existing stock and supporting the objectives of County landscape character assessments. The proposals would be consistent with objectives and key issues raised by the County and Harborough District Council.

9.6.3 New infrastructure would not break the skyline at Catthorpe Hill. Although gantries and new structures would provide an additional urbanising element it is not considered that the proposals, in combination with the retention of substantial areas of vegetation, would alter significantly the relationship between the junction and surrounding area. The infrastructure

would not become a more dominant feature, but before mitigation could take effect it would have a *Moderate Adverse* impact.

9.6.4 Given the importance of the setting in the local context, assessed as *Medium* capacity, the overall effect in terms of landscape character for Year 0 would be *Moderate Adverse*.

9.6.5 In the longer term, taking into account the establishment of planting, including positive additions to woodland land cover, the impact magnitude at Year 15 would be reduced resulting in an overall *Neutral* effect. This overall effect takes into account the *Slight Adverse* effect on landscape pattern due to replacement and new planting not achieving the maturity of vegetation removed by Year 15.

9.6.6 Taking into account the medium capacity of the landscape to change, the overall significance effect would be *Moderate Adverse* for Year 0 and *Neutral* for Year 15.

Visual Sensitivity

Views from Settlements and Individual Dwellings

9.6.7 In Year 0, 23 out of the 87 properties counted would experience a *Slight Adverse* impact with four *Moderate* and six *Substantial*. The greatest number would have a *Neutral* effect. That is considered to be a magnitude of *Minor Adverse*.

9.6.8 By Year 15 when planting proposals have mitigated the effects for the majority of properties, 80 out of 87 would be experiencing *Neutral* or *Slight Adverse* with only seven remaining at a *Moderate* level. This is considered to be equivalent to an overall *Negligible Adverse* magnitude.

Views from Public Rights of Way

9.6.9 There are some *Substantial* impacts associated with the project. Several impacts are *Slight* and considered to reduce to *Neutral* as planting takes effect.

9.6.10 Given that some substantial impacts have been identified, the overall magnitude of impact is considered to be *Moderate Adverse* for Year 0, reducing in time to *Minor Adverse*.

Views from Cultural Heritage Features

9.6.11 The magnitude of the impact from the descriptions above for Year 0 would be *Minor Adverse*. By Year 15 with the growth of planting the impact would reduce to *Negligible Adverse*.

Summary

9.6.12 The overall impact on visual sensitivity is considered to be *Moderate Adverse* for Year 0 and *Negligible Adverse* for Year 15. Taking into account capacity, the overall significance of effect would be *Moderate Adverse* for Year 0 and *Slight Adverse* for Year 15.

Landscape Value

9.6.13 Taking into account the designation of Stanford Park as a Registered Park and Garden, the scenic value of the study area which varies between 'ordinary' and 'good' landscape and its general lack of tranquillity, the overall magnitude of impact is considered to be *Minor Adverse* for both Years 0 and 15.

9.6.14 This would result in a significance of effect of *Slight Adverse* for Years 0 and 15.

9.7 Conclusion

9.7.1 Taking all three strands of the landscape assessment together, the overall significance of effect for the M1 Junction 19 Improvement taking CVR into account is *Moderate Adverse* for Year 0 and *Slight Adverse* for Year 15.

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10. MATERIALS

10.1 Introduction

10.1.1 The term materials is considered to include an assessment of all materials, soils and wastes, including potential contamination which may be associated with the project. The assessment is divided into:-

- geology
- made ground, that is land which has been infilled or built up above original ground level, and contaminated land
- soils, that is growing mediums for agricultural restoration or habitat creation
- construction materials

10.1.2 The assessment for materials is dealt with in Volume 2, Chapter 5.

10.1.3 The objectives of the Materials assessment are as follows:-

- To make the most efficient use of the materials present on site by reduction, reuse and recycling, setting quantitative targets where possible.
- To minimise disposal of waste to landfill, with a particular target to avoid the export offsite of bulk earthworks materials.
- To minimise adverse impacts on sites designated for their scientific value.
- To prevent the mobilisation or remobilisation of contamination which may potentially be present in soils.
- To safeguard the quality of soil for reuse.

10.2 Study Area

10.2.1 The study area directly affected by the M1 Junction 19 Improvement will consist of:-

- the construction area for M1 Junction 19, including land required for mitigation
- any areas required temporarily for the site compound, storage of materials or haul roads
- any areas considered for the supply of bulk materials, or for the deposition of waste

10.3 Legislation and Policies

International and National Policies

10.3.1 Various pieces of legislation are relevant to the M1 Junction Improvement which are discussed below, these relate to waste management, contaminated land, mineral extraction and agriculture.

10.3.2 The European Union's Landfill Directive 1999/31/EC³⁷ includes provisions on the locations of landfills and technical and engineering requirements for aspects such as water control and leachate management, protection of soil and water and methane emissions control.

10.3.3 The Mines and Quarries Act (1954) (as amended)³⁸ sets out requirements relating to abandoned and disused mines and quarries. Minerals extraction is also dealt with under the Town and Country Planning Act 1990. Planning Policy Guidance (PPG)14³⁹ explains briefly the effects of land instability on development and land use. The responsibilities of the various parties to any development are considered and the need for instability to be taken into account in the planning process is emphasised.

- 10.3.4 Waste legislation relating to the proposals is set out in a series of regulations within the Environmental Protection Act (EPA) 1990⁴⁰. Environmental Permitting (England and Wales) Regulations⁴¹ require that waste materials are disposed of at an appropriately licensed site unless exemption can be obtained from the EA. Licensing and disposal of landfills is covered by the Landfill (England and Wales) Regulations 2002.
- 10.3.5 The Environmental Protection (Duty of Care) (England) (Amendment) Regulations 2003⁴³ require that anyone who produces, handles or receives waste must supply a written description of that waste and a record of the waste transfer. The Hazardous Waste Regulations 2005⁴⁴ provide a consignment note system for the EA to monitor the movement and location of hazardous waste. The Regulations implement the requirements of the European Union's Hazardous Waste Directive 91/689/EEC⁴⁵.
- 10.3.6 The Directive's aim is "to prevent or reduce as far as possible negative effects on the environment, in particular the pollution of surface water, groundwater, soil and air, and on the global environment, including the greenhouse effect as well as any resulting risk to human health, from the landfilling of waste, during the whole life-cycle of the landfill".
- 10.3.7 Legislation on contaminated land is included within the EPA together with the Environment Act 1995. These define contaminated land and the procedures to identify and initiate remediation of such land. Contaminated Land is defined as land where due to the presence of substances it appears to the Local Authority that "Significant Harm is being caused or there is a Significant Possibility of such harm being caused or Pollution of Controlled Waters is being or is likely to be caused."
- 10.3.8 Land contamination issues have been a material consideration within the planning legislation since 1974. The Town and Country Planning Act 1990 sets out the legislative framework for the role of the Planning Authority, and its scope to control the development of the land affected by contamination through the use of planning conditions.
- 10.3.9 In terms of waste materials the scheme may require several waste exemptions to be notified under the Environmental Permitting (England and Wales) Regulations 2007⁴¹. The use of a mobile screening and crushing plant on site may also require an Environmental Permit under a Part B mobile plant.
- 10.3.10 Under the Site Waste Management Plans Regulations 2008⁴⁸ the project will require a formal, detailed SWMP:-
- describing each waste type expected to be produced in the course of the project
 - the estimated quantity of each different waste type expected to be produced
 - identifying the waste management action proposed for each different waste type including re-using, recycling, recovery and disposal.
- 10.3.11 The plan must also contain a declaration that the client, the Highways Agency and the Principal Contractor, Skanska, will ensure that all waste from the site is dealt with in accordance with the waste duty of care in Section 34 of the Environmental Protection Act (1990)⁴⁰ and the Environmental Protection (Duty of Care) Regulations⁴³. The operation of the SWMP is described in Section 10.5, Mitigation.
- 10.3.12 Government policy on the protection of agricultural and including 'best and most versatile' land is described in Section 13, Community and Private Assets.

- 10.3.13 Government planning policy on the use of agricultural land for development is set out in Planning Policy Statement 7 (PPS): Sustainable Development in Rural Areas⁴⁷. In particular PPS7 states that the presence of BMV agricultural land, defined as land in Grades 1, 2 and 3a of the Agricultural Land Classification⁴⁸, alongside other sustainability considerations including the protection of natural resources such as soil quality, should be taken into account by authorities when determining planning applications.
- 10.3.14 The Government's strategy for soils 'Safeguarding our Soils' published in September 2009⁴⁹ includes guidance on the sustainable use of soils and protection of soil resources. The 'Construction Code of Practice for the Sustainable Use of Soils on Construction Sites'⁵⁰, published at the same time aims to improve use and management of soils through all stages of the construction process including restoration of temporarily utilised areas. In developing the draft strategy, account was taken of the EU Thematic Strategy for Soil Protection published by the European Commission in September 2006 and of the accompanying proposals for an EU Soil Framework Directive. NE's Draft Position on Soil⁵¹ identifies priorities for soil protection, including within construction projects.

Regional Policies

- 10.3.15 The West Midlands Regional Spatial Strategy 2008 contains several policies relevant to materials including those on the use of alternative sources of materials, the efficient use of resources, effective waste management, the minimisation of waste and the use of recycled materials. The East Midlands Regional Plan 2009 sets regional priorities for waste management.

10.4 Baseline Conditions

Geology

- 10.4.1 The underlying geology is lias clay. In general this is covered by alluvium in the river valleys and drift material from the ice age on the higher ground.
- 10.4.2 There are no geological designations in the area including SSSI's or Regionally Important Geological Sites (RIG's), and no licenced mining activities.
- 10.4.3 At the time of writing a ground investigation (GI) is underway which will provide detailed information on ground conditions on site.
- 10.4.4 The sensitivity of geological features present is considered to be *Low*.

Made Ground and Contaminated Land

- 10.4.5 Made ground is present in the form of four borrow pits as well as engineered earthworks associated with the junction itself:-
- The Cleanaway landfill site is to the south of M6. It was then licensed to accept domestic and industrial waste and has since been capped and filled
 - Brookside Farm borrow pit is adjacent to the M6 – M1 Southbound link and is backfilled and inert clay
 - an unnamed borrow pit is located to the south of M6 adjacent to the Cleanaway landfill site. It is assumed to be filled with inert materials
 - a former construction depot at Stonebank is located to the north west of the site, local contamination may be present

- 10.4.6 Consultations with the EA have found that there are no designated areas of designated Contaminated Land or recorded significant pollution incidents within the study area, but the Cleanaway landfill site and other filled borrow pits may potentially be sources of contamination.
- 10.4.7 Preliminary records from the GI do not suggest any areas of gross contamination, however test results are yet to be assessed.
- 10.4.8 The sensitivity of made ground and contaminated land is considered to be *Low*, the potentially contaminated run-off would be *Very Highly* sensitive given the high quality of receiving water courses, set out in Section 14.

Soils

- 10.4.9 Topsoil and subsoil surveys have been carried out and are reported in detail in Volume 2, Chapter 5. The majority of the land is in arable production and agricultural grades, as defined by the Agricultural Land Classification⁴⁸ vary between 2 and 3a, which can be described as 'Best and Most Versatile' and 3b.
- 10.4.10 Survey findings indicate that agricultural soils in temporarily disturbed areas can be worked and restored in accordance with normal agricultural restoration practice. There are also subsoils available in the area that can provide the low nutrient soils required for habitat creation and wetlands.
- 10.4.11 The sensitivity of soils varies between *Medium* for those of better quality and *Low*.

Construction Materials

- 10.4.12 The current M1 Junction 19 consists of embankment and landscape fill, though to be won from the borrow pits within the study area. There are several structures of reinforced concrete such as bridges and roads with hot rolled asphalt surfaces overlying sub base materials. Geogrid reinforcement is also present within the M6 on-slip embankment. The existing drainage system consists of various pipes, culverts and granular drainage material.
- 10.4.13 Most of the existing earthworks are covered with semi-mature vegetation. Boundaries consist of timber post and four rail fencing and hedgerows. The whole junction is lit with steel lamp columns. There are also several existing signs and gantries which will include steel, aluminium and concrete.
- 10.4.14 The materials present would be considered in plans for reduction, re-use, recycling or waste disposal. There may also be some contaminants present such as asbestos in some structures or oily waste in drainage systems. In general the sensitivity of materials is *Low*, though the presence of asbestos would be of *High* sensitivity given its potential implications for health.

10.5 Mitigation

Geology

- 10.5.1 Construction excavations would be undertaken to maximise the re-use of geological materials and to minimise the requirements for off-site disposal or importation of off-site resources. It is anticipated that with the exception of 20,000 cubic metres of material required to construct embankments for the Catthorpe Viaduct Replacement, that there

would be a balance of earthworks with materials arising from cuttings being used to create embankments.

Made Ground and Contaminated Land

- 10.5.2 A GI has been carried out in Autumn 2009 and any potential sources of contamination will be identified and the potential risk to the environment assessed. If additional areas of unknown contamination were encountered at construction stage then an investigation and assessment would be carried out at that stage to determine the appropriate course of action, either removal of the material or its treatment in-situ.
- 10.5.3 During construction, good site practice and proper handling, treatment and if necessary disposal of any contaminated arisings would be carried out in accordance with Government guidelines. All appropriate measures would also be carried out to prevent discharge of any substances into ground or surface water as described in Section 14.
- 10.5.4 Control measures to achieve the standard of practice required would be included within the CEMP and a Site Waste Management Plan (SWMP).

Soils

- 10.5.5 As shown on Figure G the construction works would involve the temporary use of agricultural land that would be returned to agricultural use, by use of a Soil Management Plan.
- 10.5.6 Soil management operations generally would be in accordance with Defra's Good Practice Guide for Handling Soils⁵⁰ including the following measures:-
- stripping of topsoil and subsoil when weather and soil conditions are suitable
 - separate storage and management of topsoil and subsoil storage heaps
 - return of these soils to plot, also in separate layers
 - use of appropriate machinery to minimise compaction
 - relief of any compaction of restored soils
 - surface and underdrainage of restored sites
 - aftercare of restored soils, including appropriate cropping, for example a temporary grass ley if required, and associated soil nutrient requirements.
- 10.5.7 The Soil Management Plan will also deal with the stripping, storage and placement of soils required for mitigation measures including topsoils for tree and shrub planting and subsoils for habitat creation.

Construction Materials

Construction

- 10.5.8 During the M1 Junction 19 Improvement works various materials would be necessary for the construction works. The works have been designed so as to minimise the production of waste materials and to use as few new construction materials as possible by reduction, reuse and recycling of any existing materials at the junction where practical. This is to minimise the quantity of materials needing to be disposed of off-site, any additional/excessive excavation of materials for earthworks, and to minimise the import of primary materials.

- 10.5.9 As set out in Chapter 5 Section 5.2 Methodology, under the Site Waste Management Plans Regulations 2008 the project would require a formal detailed SWMP in advance of construction:-
- describing each waste type expected to be produced in the course of the project
 - estimating the quantity of each different waste type expected to be produced
 - identifying the waste management action proposed for each different waste type, including re-using, recycling, recovery and disposal.
- 10.5.10 An outline of the SWMP for the design at this stage is set out in Table 2.6 in Section 2.10, which describes the construction, operation and management of the project.
- 10.5.11 It would be necessary to import new materials to construct the scheme including concrete materials, asphalt, aggregates, metals and timber. The detailed design will be carried out to reduce the requirements for such primary materials. For example pavement design, i.e. the carriageway surfacing and its sub base will be carefully considered to minimise the requirements for importing primary material. As set out above, existing materials on site would be reused where possible. The sources of such materials will be identified and their sustainability considered.
- 10.5.12 The SWMP would also extend to the running of site offices to minimise the generation of waste and to promote the recycling of materials as set out in Table 2.6.
- 10.5.13 Disposal of waste off-site will only be carried out as a last resort where no other viable options exist. Reduction, reuse and recycling will be employed wherever possible with all the materials used or currently present on site. However, there are still likely to be limited volumes of waste produced which must be considered. All such waste would be dealt with in accordance with the waste duty of care in Section 34 of the Environmental Protection Act 1990 and the Environmental Protection (Duty of Care) Regulations 2003.

Operational Phase

- 10.5.14 During the operational phase of the M1 Junction 19 Improvement and its routine maintenance, waste materials would arise from several different sources including:-
- road sweepings and gully arisings
 - metals from replacement signs
 - green waste from landscape maintenance
 - lanterns
 - traffic debris – including tyres.
- 10.5.15 The potential impacts of these materials would be mitigated by appropriate management of the site to include regular street sweeping and collection of any motorway debris which would also be necessary to maintain safety standards of the highway to reduce the potential for future accidents. Any landscape maintenance or routine equipment maintenance will also employ the industry standards of reduction, reuse and recycling of waste prior to disposal.

10.6 Magnitude of Impacts and Significance of Effects

Geology

10.6.1 Table 10.1 below sets out the impacts and effects.

Table 10.1 : Geology – Impact Magnitude and significance of Effects

Feature	Sensitivity	Impact Magnitude	Mitigation (full list of mitigation measures can be found in section 5.5)	Significance of Effect
Above ground geological features	Negligible	No change	None	Neutral
Below ground geological deposits	Low	Minor adverse	Design to maximise reuse of materials and minimise excavation and land take requirements	Slight adverse
Mining activities-no present or planned future mining	Negligible	No change	None	Neutral
Construction activities-disturbance of geology due to cutting construction	Low	Minor adverse	Detailed design in liaison with the EA. Continued monitoring of groundwater (non-aquifer and therefore not a sensitive receptor)	Slight adverse
Construction activities-disturbance of geology due to drainage and flood compensation areas	Low	Minor adverse	Detailed design in liaison with the EA. Continued monitoring of groundwater.	Slight adverse
Construction activities-disturbance of geology due to foundation construction	Low	Negligible	None	Slight adverse

10.6.2 The overall environmental effect in terms of geology has therefore been assessed as being *Slight Adverse* for the construction phase of the works. No further impacts of effects are anticipated on Geology during the operational phase of the works.

Made Ground and Contaminated Land

10.6.3 Details of residual impacts, taking into account mitigation measures set out above, and the resulting significance of effects are summarised in Table 10.2 below.

Table 10.2 : Made Ground and Contaminated Land : Impact Magnitude and Significance of Effects

Feature	Sensitivity	Impact Magnitude	Mitigation (full list of mitigation measures can be found in section 5.5)	Significance of Effect
Release and spread of contamination - disturbance of Cleanaway Landfill site during construction	Low	Minor adverse	Detailed liaison with EA to avoid direct disturbance of landfilled area. Design proposals outside landfill boundary. Detailed Ground Investigation (GI) carried out in Autumn 2009 to establish current condition.	Slight adverse

Feature	Sensitivity	Impact Magnitude	Mitigation (full list of mitigation measures can be found in section 5.5)	Significance of Effect
Release and spread of contamination - disturbance of backfill to former borrow pits during construction	Low	Minor adverse	Detailed GI of any known potentially contaminated areas carried out, but data not available for this assessment. As necessary design of any remediation based on risk assessments.	Slight adverse
Release and spread of contamination - possible disturbance of additional unknown local contamination during construction	Low	Minor adverse	Where contamination encountered during construction risk assessment undertaken to identify any remediation required.	Slight adverse
Release and spread of potentially contaminated dust during construction	Low	Minor adverse	Use dust suppression systems especially in the area of the mobile screening and crushing plant. LAPPC consent would also be achieved.	Slight adverse
Accidental spillages on the highway during the operational phase	Low	Negligible adverse	Appropriate pollution prevention measures would be implemented during any clean up activity. Site would be covered by hardstanding which would limit migration of contamination.	Neutral
Potentially contaminated run-off from the highway during construction and operational phases	Very High to Low (see Chapter 9)	Minor adverse (construction) Negligible adverse (operation)	Appropriate mitigation measures during construction to collect any contaminated water as set out in OCEMP. Appropriate drainage to collect, treat or contain run-off during operation as set out in Chapter 9.	Slight adverse (construction) Neutral (operation)

10.6.4 The overall environmental impact in terms of Made Ground and Contaminated Land has therefore been assessed as being *Slight Adverse* for the construction phase of the works.

10.6.5 There are not considered to be any significant risks in relation to contamination at present due to the limited number of former land uses in the vicinity of the site and surrounding area.

10.6.6 The only potentially significant area of contaminated land is that of Cleanaway landfill site, which is not expected to underlie the area of the M1 Junction 19 Improvement. However, the potential areas of former borrow pits and the area of the landfill (and its boundary), are still being investigated through a ground investigation and analysis of soils. If following completion of an investigation any significant contamination or additional areas of contamination are identified, the potential risks and mitigation/remedial measures would be identified and implemented through the completion of a risk assessment, in accordance with current guidelines and best practice.

10.6.7 In terms of the operation of the road, the main potential effect is considered to be pollution of the water environment, either as a result of accidental spillage or due to routine run-off. These issues are dealt with in Volume 2 Chapter 9 Road Drainage and the Water

Environment and the *Negligible Adverse* impact and *Neutral* effect set out in Table 10.2 as reported for that assessment.

Soils

10.6.8 The impacts and effects are summarised in Table 10.3, taking into account the proposed mitigation measures.

Table 10.3 : Soils : Impact Magnitude and Significance of Effects

Feature	Sensitivity	Impact Magnitude	Mitigation (full list of mitigation measures can be found in section 5.5)	Significance of Effect
Permanent loss of soils for agriculture (Chapter 8)	Medium / Low	Low / Moderate	Layout designed to keep loss to a minimum.	Slight Adverse
Temporary loss of soils to agriculture	Medium / Low	No change	Implement Soil Management Plan to ensure restoration to agriculture	Neutral
Soils for use in landscape measures and habitat creation	Medium	No change	Implement Soil Management Plan to identify suitable soils and to control handling, storage and deployment	Neutral

Construction Materials

10.6.9 Effects for construction materials are derived from performance benchmarks set by the Contractor, Skanska, either related to this specific project or in the form of company wide key performance indicators (KPIs).

10.6.10 Table 10.4 below sets out the benchmarks and the anticipated performance.

Table 10.4 : Construction Materials : Performance Benchmarks

Benchmark	Target	Source	Anticipated Performance	Effect	Comment
Zero export of bulk earthworks materials	0%	Site Specific	0%	Neutral	Material arising from excavations can be accommodated within the project as general fill or in landscape areas
Zero import of bulk earthworks materials	0%	Site Specific	5%	Adverse	A balance of earthworks had been anticipated but constructing Catthorpe Viaduct as an advance maintenance project requires the importation of 20,000m ³ of bulk earthworks materials

Benchmark	Target	Source	Anticipated Performance	Effect	Comment
Minimise demolition waste going to landfill by reuse of materials available on site or recycling	10% of demolition materials to landfill	Site Specific	10%	Neutral	Quantities of materials are set out in Table 5.9 Site Waste Management Plan. Figure excludes bulk earthworks (above), office and canteen waste (below) and hazardous materials which cannot be quantified at this stage. Assumes demolition material from Catthorpe Viaduct is retained for use in the M1 Junction 19 project
Minimise importation of primary materials	50% of capping layer to be site won material	Site specific	50% if soil stabilisation is found to be permissible and viable. 0% if no stabilisation possible	Neutral Adverse	Capping layer is set as an example. Site won material from recycled demolition works and road planings is also likely to be used for accommodation tracks and footways.
Minimise project waste, i.e. waste from new materials brought on to site	<10% of new materials to landfill by end 2010	Skanska KPI	5%	Beneficial	Segregation of construction material processes would be instigated to promote recycling potential.
% Skanska occupied offices with proactive waste reduction plans	100% of offices by end 2010	Skanska KPI	100%	Neutral	Includes proposed site office

10.6.11 With the exception of the importation of 5% of bulk earthworks materials for the Catthorpe Viaduct Replacement and the possible scenario that soil stabilisation may not be possible, thus preventing the use of site won material as a capping layer, the anticipated effects are *Beneficial* or *Neutral*, with a *Neutral* effect overall. Even if soil stabilisation is not possible it is still considered that the overall effect would be neutral as steps would be taken to at least meet the 10% target of demolition materials going to landfill.

10.7 Conclusions

10.7.1 In overall terms no significant adverse effects are anticipated for materials. Effects of construction activities on below ground geology are regarded as *Slight Adverse*. On the basis of existing data it is not considered there are significant risks in relation to contaminated sites. The Cleanaway landfill site can be avoided and in overall terms potential effects are regarded as *Slight Adverse*.

10.7.2 Agricultural soils are dealt with in Volume 2 Chapter 8, Community and Private Assets which confirms a *Slight Adverse* effect. For this Chapter, implications have been considered for soils required for landscape measures and habitat creation. Surveys have identified that there should be no difficulty in obtaining suitable soils for the works and given the application of a Soil Management Plan and a CEMP, the risks of deterioration during handling and storage can be avoided. A *Neutral* effect overall.

10.7.3 The section on Construction Materials estimates the quantities of waste likely to arise and sets out an initial strategy for dealing with them. This process will develop further under

the SWMP as the project continues. The Chapter demonstrates that several performance targets on the use and disposal of materials can be met and improved upon and an overall view is taken that the effect of the project would be *Neutral* in this respect. Exceptionally, the import of bulk material required to replace Catthorpe Viaduct, 5% of the total bulk material handled for the scheme, is an adverse effect compared with an initial target of an earthworks balance in terms of export and import.

10.7.4 In terms of the objectives set out in the Introduction: -

- The assessment has demonstrated how materials present on site can be used efficiently taking into account waste reduction, reuse and recycling. Some quantitative targets have been set.
- Similarly disposal to landfill can be minimised and the particular target to avoid the export of bulk earthworks can be met.
- No sites designated for their scientific value are affected.
- Measures are being incorporated to prevent the mobilisation or remobilisation of contamination and the Cleanaway landfill site can be avoided.
- Measures have set out to safeguard the quality for soil for reuse.

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11. NOISE AND VIBRATION

11.1 Introduction

11.1.1 The detailed assessment of noise and vibration is in Volume 2, Chapter 6.

11.1.2 The objective for the assessment is:-

- To reduce noise levels

11.1.3 In addition a commitment was given at the 2008 Public Consultation that low noise surfacing would be provided for all new motorway and trunk road construction.

11.2 Study Area

11.2.1 The study area includes all properties and sensitive locations within 600 metres of the proposals. In addition, properties along the corridor of other roads in the wider network beyond this limit that are expected to experience changes in noise level due to significant changes in traffic flow have also been included. Significant changes in traffic flow are defined as increases greater than 25% or decreases less than 20%.

11.2.2 The overall extent of this area encompasses the communities of Shawell, Swinford, Catthorpe, Lilbourne, Stanford on Avon and Clay Coton and a section of the A5 north and south of the M6.

11.3 Legislation and Policies

Calculation of Road Traffic Noise

11.3.1 This is a summary of Chapter 6 Noise and Vibration Volume 2 of this ES.

11.3.2 Environmental noise levels, including road traffic noise, are normally measured in terms of dB(A), that is "A-weighted" decibels. The "A-weighting" is an internationally agreed frequency response generally similar to that of the human ear, so that sound levels in dB(A) correspond reasonably well with what is heard.

11.3.3 In the case of road traffic, instantaneous noise levels vary continuously and it is necessary to use an index that involves averaging over an appropriate time period to arrive at a single figure estimate of the overall noise level for appraisal purposes. The L_{10} is the sound level in dB(A) exceeded for 10% of a quoted time period and, for traffic noise, can be taken as an indication of the mean maximum noise level. The $L_{10}(18\text{-hour})$ is the average of the values of L_{10} in dB(A) for each of the 18 hours between 06:00 and midnight on a normal working day. This scale is used by the Highways Agency and other government departments as a representative measure of traffic noise exposure because a good correlation has been demonstrated between this index and residents' dissatisfaction with traffic noise over a wide range of exposures.

Protection from Traffic Noise

11.3.4 The relevant legislation for noise is The Noise Insulation Regulations (NIR) 1975 as amended in 1988⁵².

- 11.3.5 Dwellings within 300 metres of a new or altered highway can be regarded as eligible for an offer of insulation against road traffic noise if:-
- the L_{10} (18-hour) noise level is not less than 68dB(A) at the time of the highest predicted traffic flow during the 15 year period following the opening of the road to public traffic
 - there is an increase of at least 1dB(A) when comparing the future noise level with the existing noise level immediately before construction starts
 - traffic on the new road must contribute at least 1dB(A) of the overall future noise level.

Planning Policies

- 11.3.6 The West Midlands Regional Spatial Strategy 2008 requires developments to assess and minimise the impacts of noise pollution. Harborough District Council's Local Plan 2001 has a policy on the control of pollution and nuisance which aims to ensure that development does not have an adverse effect on the character of its surroundings or harm the amenity of adjacent land uses through noise or an unacceptable level of traffic.

11.4 Baseline Conditions

- 11.4.1 In order to establish the extent of the impact of traffic noise, calculations of noise levels have been carried out for all properties within the study area.
- 11.4.2 Four scenarios have been considered. These are:-
- Do-minimum (2014); the noise climate in the baseline year taken as the anticipated opening year (2014) without the proposals.
 - Do-something (2014); the predicted effects of the noise climate in the opening year (2014) with the proposals in place.
 - Do-something (2029); the predicted effects of the proposals in the design year. This is 15 years after opening, and would therefore be 2029.
 - Do-minimum (2029); the noise climate predicted for the design year (2029) if the proposals are not built.
- 11.4.3 The Do-minimum (2014) represents the baseline scenario for the assessment of a scheme of this nature.
- 11.4.4 Although noise from the major roads in this area (M1, M6 and A14) is audible throughout most of the study area it is clear that the noise level at individual properties is due, in most cases, to the traffic on the LRN adjacent to the property. The impact of noise for this scheme is therefore primarily related to the traffic noise from the LRN and the changes that would occur in the distribution of this traffic, rather than the physical alterations to the junction itself.
- 11.4.5 The calculations have determined that the majority of residential properties in the study area have L_{10} (18-hour) noise levels in the range 54 to 65dB(A).
- 11.4.6 In the Do-minimum 2014 scenario there would be 58 residential properties with noise levels of 65.5dB(A) or more and 9 of these would be exposed to levels of 71.5 dB(A) or more. At the time when the Noise Insulation Regulations were introduced, the Noise Advisory Council described 70dB(A) as being "the limit of the acceptable".
- 11.4.7 Between 2014 and 2029 there would be growth in traffic on the network that would be expected to increase noise levels by typically 1 or 2 dB(A), but this would be offset by the

introduction of a low noise surface on the main roads. There would also be some rerouting of traffic due to congestion at critical points in the network. With the Do-minimum (2029) scenario there would be similar exposure in the higher noise level bands with 72 residential properties with noise levels of 65.5 dB(A) or more and 6 exposed to 71.5 dB(A) or more.

11.5 Mitigation

Construction

11.5.1 It is inevitable that the process of constructing a highway scheme could give rise to some temporary impacts. Site management and mitigation measures during the construction period would be set out in the Construction Environmental Management Plan (CEMP) to reduce, or where possible, eliminate construction impacts. These measures would take the form of constraints on the contractor in connection with his access to the site including designated haul routes, working hours and methods. These would be discussed in more detail with the local planning authority, Harborough District Council, before work begins on site.

11.5.2 The site management and mitigation measures to reduce the exposure to noise and vibration that would be an integral part of the CEMP would include the following:

- Where noisy tasks are to be undertaken affecting residential or other occupied buildings, the occupiers would be given advance notice explaining the reason for the works, the expected time and duration, and the procedures for minimising the noise or vibration.
- Where work has to be undertaken during either the evening or night-time periods, the Contractor would advise and consult with the relevant local authority in accordance with an agreed procedure.
- All plant and equipment associated with the construction works would be properly maintained, provided with effective silencers and operated in such a manner as to avoid causing any excessive noise emission.
- Static plant would be located in areas as far as possible from sensitive receptors, including inhabited buildings, and would be screened where practicable.
- Any compressors brought on to site would be silenced or sound reduced models fitted with acoustic enclosures.
- Audible warning systems, such as vehicle reversing sirens, would normally be switched to as low a setting as is compatible with safety requirements.
- Within site compounds, where possible and beneficial, site buildings would be situated to provide additional screening between the works and other occupied premises.
- The transport of materials on or off site by road would take place during the normal daytime working period and where possible would also be routed away from sensitive receptors.
- Contractor vehicles would be prohibited from travelling through the villages of Lilbourne, Swinford, Catthorpe, Shawell and Welford.
- Potential damage to buildings from vibration has been considered using British Standard BS 7385 and it has been concluded that neither the bored or sheet piling nor any other proposed construction activity would be likely to cause any vibration issue with local commercial and residential premises.

11.5.3 With the mitigation measures described above, it is likely that noise and vibration levels would be maintained within the range agreed with the local authority. However, perceptible construction noise at any level, may still comprise a nuisance to the occupants

of residential and other sensitive properties within the area for limited periods of time. A further detailed assessment would need to be carried out in advance of construction to identify properties that may be eligible for insulation against construction noise, although, given the distances to the nearest properties, it seems unlikely that any property would be eligible.

Operational

- 11.5.4 Introducing improvements to a major junction and altering the LRN would inevitably have some impact on the noise environment of the surrounding area. Every effort has been made in the design of the Preferred Route to keep the noise impact to the minimum by keeping road elements with the highest traffic flows as low as possible and making use of cuttings where practical. There are very few residential properties that are close to the proposed alterations. Those that are will continue to be exposed to traffic noise from this important junction but would receive some benefit from the low noise surface material that would be used on the new and altered highway sections. Low noise surface is anticipated to result in a reduction of 3.5dB(A) compared with existing conventional hot rolled asphalt surface. Such benefits would also occur eventually without the junction improvement as it is policy to provide low noise surface as part of ongoing maintenance works.
- 11.5.5 No other specific noise mitigation measures are proposed because noise barriers are not a cost effective solution for providing protection to isolated properties. Although the Environmental Master Plan, Figure B in Appendix 1 to Volume 1, includes some sections of earth mounding, this is proposed for visual screening not noise reduction. Most of the properties that would be affected by changes in noise level are on road links on the local network that are affected by the redistribution of the local traffic and where noise barriers or other physical protection measures would be inappropriate or impossible to implement.
- 11.5.6 As indicated in the Legislation and Policy Framework section above, a preliminary assessment has been carried out to determine whether any dwellings might be eligible for an offer of improved sound insulation under The Noise Insulation Regulations 1975 as amended in 1988⁵². At the present stage it would appear that there are no properties that would be eligible for offers of insulation against traffic noise under The Noise Insulation Regulations 1975 as it is likely that neither the requirement for a 1 dB(A) increase in level nor the 1 dB(A) contribution from the improved highway would be achieved in this case. The study that has been carried out here should not be considered to be the final determination of eligibility but is, however, sufficiently detailed to assess the likely effects of the improvement at this stage.

11.6 Magnitude of Impacts and Significance of Effects

Construction

- 11.6.1 As set out in the Introduction, the replacement of the Catthorpe Viaduct will be carried out in advance of these proposals and a separate Noise and Vibration assessment² has been prepared. That assessment showed that the magnitude of the impact of the construction of the replacement viaduct was assessed to be *Minor Adverse*. This section sets out the impacts of the construction of the remainder of the junction including the works required to tie the new layout into the replaced viaduct.
- 11.6.2 It is inevitable that the construction of a scheme of this nature would give rise to some temporary impacts. During the construction period, increased noise levels at residential properties could result from plant, machinery and on-site construction activities. In addition there could be further impacts arising from traffic diversions. Noise and vibration

disturbance due to construction is generally a more localised phenomenon than the operational effects of the scheme after opening and is temporary in nature.

- 11.6.3 There are two areas of activity involved; the construction of the main junction improvement itself and the alterations to the LRN.
- 11.6.4 For the main junction improvement works the activities that are most likely to be the cause of disturbance to the public include:-
- site compound set up and operation
 - structures
 - earthworks
 - demolition
- 11.6.5 There are relatively few residential properties close to the proposed works. The following list identifies properties between 100 and 150 metres from the works that could potentially be at risk from construction noise:-
- 1 and 2 Catthorpe Road, Shawell, adjacent to the realignment of Catthorpe Road. It is considered there would be a *Minor Adverse* impact on these properties from the works.
 - Hill Top Farm, Swinford Road. A *Minor Adverse* impact by works which would be required to tie-in and realign the LRN to Shawell Road.
 - Tomley Hall Farm, a *Minor Adverse* impact from aspects of the main junction improvement and new LRN link.
 - Stonebank Properties consisting of three mobile homes adjacent to M1. The closest property to the works is approximately 50 metres from the proposed earthworks for the A14 to M1 northbound slip road. Assuming that all of the plant/machinery listed by Skanska for earthworks is simultaneously operating at the closest point of the site to the property, the noise level contribution from the earthworks would be 80 dB. This noise level is 3 dB higher than the noise level contribution from the road network in Do-minimum (2014) and as a result is assessed as a *Moderate Adverse* impact. The nearest structures activities to the Stonebank property, approximately 200 metres away, would create a noise level at the property of 63 dB and therefore would not contribute to the overall noise level created by the road network and the earthworks.
 - Westfield Lodge. On Rugby Road adjacent to the proposed site office compound. This property is likely to be subject to some impact from the compound due to proximity - a *Minor Adverse* impact.
 - Brookside. On Rugby Road but screened from the site compound by the Westfield Lodge complex. Unlikely to be affected by the site compound due to the screening. Noise level contributions from earthworks and structures activities on site are predicted to be 61 and 58 dB respectively. Given that the noise level contribution from the road network in Do-minimum 2014 at Brookside would be 65 dB, against the background of traffic noise from the motorways there is likely to be a *Minor Adverse* impact.
 - Old Barn Farm. Approximately 150 metres from the nearest earthworks and structures activities for the M1-M6 Northbound Link. The noise level contributions from the earthworks and structures activities are calculated to be 68 and 66 dB respectively. Given that the noise level contribution from the road network in Do-minimum (2014) at Old Barn Farm would be 70 dB, against the background of traffic noise from the motorways, there is likely to be a *Minor Adverse* impact.
 - Lambcote Hill Farm would lie just over 100m away from proposed works to reconstruct Shawell Road M1 overbridge. Although already close to existing noise

from the M1 in cutting at this location these works are likely to have a *Minor Adverse* impact on this property.

- 11.6.6 Construction activity may well be audible at other properties in the study area but it is unlikely that the levels would be high enough to present a significant impact.

Potential Impacts from Temporary Diversions

- 11.6.7 Section 2.10 sets out proposals to close the access between Swinford and Catthorpe for 12 months during construction and the short temporary closures required for construction over the strategic routes M1, M6 and A14.
- 11.6.8 In terms of the closure between Swinford and Catthorpe the temporary increases in local traffic would affect the village of Shawell.
- 11.6.9 In the absence of a detailed traffic model during the construction period, it is not possible to make accurate predictions of the changes, but some assumptions can be made on the basis of the 'Do-minimum' assessments that are available in the traffic model for the LRNs.
- 11.6.10 As a worst case scenario, it has been assumed that all of the traffic that would usually travel directly between Catthorpe and Swinford would divert through Shawell. Based on traffic flows for Do-minimum (2014), Catthorpe Road through Shawell would see an increase in traffic from 3471 vehicles per 18 hour day with 2% heavy vehicles to 6145 vehicles with 2% heavy vehicles. This is an increase of 89% which would be expected to give rise to a 3 dB increase in noise level through the village. This is assessed as a *Moderate Adverse* impact.
- 11.6.11 There would also be temporary changes in traffic flows in Swinford with reductions along Rugby Road and High Street but increases along North Street, Lutterworth Road and Shawell Road. The overall impact in Swinford, however, is likely to be *No Change*.

Overall Impacts During Construction

- 11.6.12 The noise impact during the construction period has been set out above. There is unlikely to be any significant vibration impact arising from the junction improvement works due to the relatively large distances between the works and even the closest properties.
- 11.6.13 The overall magnitude of the impact of noise and vibration during the construction period for the proposed M1 Junction 19 Improvement is considered to be *Minor Adverse*.

Operational Impacts

- 11.6.14 The assessment of the impact of the operational use of the Catthorpe Viaduct Replacement² considered that there would be *No Change* in the magnitude of the impact.
- 11.6.15 In assessing the overall noise impact of a new road it is necessary to consider both the noise levels that people would be exposed to and the changes in level that would occur. Adjectives used to describe the sound level changes are set out in Table 11.1 below.

Table 11.1 : Guide to Sound Level Changes

Band of Change in Sound Level DB(A)	Adjectives used
0	No Change
0.1 - 0.9	Negligible
1.0 - 2.9	Minor
3.0 - 4.9	Moderate
≥5.0	Major

11.6.16 The following description makes comparisons between the noise levels in the Do-minimum and Do-something scenarios in 2029. This should provide the clearest indication of the direct impact of the proposals as equivalent traffic growth and common road surface assumptions are included. Chapter 6 in Volume 2 provides a more detailed description including comparisons between the Do-minimum in the opening year (2014) and the two design year (2029) scenarios.

Lilbourne

11.6.17 Lilbourne Fields Farm is south of the limits of the Scheme and is relatively exposed to noise from the M1. It would have a level of 72 dB(A) on its western façade in the Do-something (2029), unchanged from the Do-minimum (2029).

11.6.18 The northern façades of properties along Yelvertoft Road are at the top of the M1 cutting and have Do-something (2029) noise levels that are over 70 dB(A) for those closest to the M1. These properties would have *No Change* in level compared with Do-minimum (2029) due to the introduction of the proposals.

11.6.19 The eastern façades of the properties along Station Road would have lower levels than the Yelvertoft Road properties, typically 62 to 67 dB(A), with the majority of properties having *No Change* compared with Do-minimum (2029) and some having *Minor* reductions of 1 dB. The outlying properties along the road towards Catthorpe, near to the church, would have similar noise levels and a similar pattern of change.

11.6.20 Although some of these properties have noise levels over 68 dB(A) they would not be eligible for insulation under The Noise Insulation Regulations 1975 because they do not have an increase in level from the Pre-Scheme conditions.

11.6.21 Other properties in the village that front directly onto the local roads would have *no change* in level between Do-minimum (2029) and Do-something (2029).

Catthorpe

11.6.22 In this area, Old Barn Farm is the closest property to the Junction. The south east façade is the most exposed overall. The Do-something (2029) noise levels on the south east façade would be 66 dB(A), *No Change* compared with the Do-minimum (2029) but a *Moderate* reduction compared with 2014. As with the Lilbourne properties, which are close to the M1, Old Barn Farm would not be eligible for mitigation under The Noise Insulation Regulations 1975 because it would not reach the 68 dB level in 2029 nor would it have an increase from the Pre-Scheme noise levels.

11.6.23 The Latvian Welfare Centre at Catthorpe Manor is also relatively close to the M1. The Manor building itself would have Do-something (2029) noise levels on the northeast

façade of 64 dB(A), with *No Change* from the Do-minimum in the same year. The bungalows on the northern side of this site have noise levels that range from 59 to 63 dB(A) in Do-something (2029), the same as or only a *Negligible* increase compared with the Do-minimum (2029) levels.

- 11.6.24 For the properties in the village itself there are two distinct sources of noise, the distant motorways and the local roads adjacent to the property. Depending on the orientation of the property façades and the proximity to the local road the exposure may be quite different. Manor Farm is probably typical of a number of properties along Rugby Road and Main Street. The southern façade of this property would have a *Major* reduction in level from 63 dB(A) in Do-minimum (2029) to 55 for the Do-something in the same year. This is due only to the anticipated reduction in traffic on the local road through the village. Properties set back from the local roads may be more exposed to the noise from the motorway network. The northeast façade of 1 Hermitage Close, for example, would have 58 dB(A) in Do-something (2029), *No Change* compared with the Do-minimum (2029) level.

Shawell

- 11.6.25 As with the other villages, the motorway network and the LRN are both contributors to the noise impact. The eastern façades of properties in Main Street, such as The White Swan PH, would have Do-something (2029) noise levels of 52 dB(A), 2 dB(A) lower than the Do-minimum (2029) scenario. At these sorts of distances, the change in the junction layout would not have any effect of the noise exposure. The change is due only to the traffic changes.
- 11.6.26 For Catthorpe Road, the majority of the properties are on the east side of the road. Noise levels on the eastern façades are due to the motorway network and exhibit the same pattern as the Main Street properties although levels are marginally higher, probably because of a reduction in screening by the village itself. The western façades, however, generally have lower Do-something noise levels than the eastern sides due to the traffic on the LRN that reduces with the proposals in place.
- 11.6.27 1 and 2 Catthorpe Road are isolated properties on the north side of Catthorpe Road but near to M6. In the Do-something (2029) scenario the noise level of 67 dB(A) is a *Moderate* 3 dB(A) higher than in Do-minimum 2029 as a result of traffic increases due to the introduction of the new local link road between Shawell Lane and Rugby Road Swinford.
- 11.6.28 Tomley Hall Farm is affected by both the M6 and M1 and would overlook the junction improvement. The noise levels for the Do-something (2029) scenario would be 62 dB(A), a *Minor* 1 dB(A) increase compared with the Do-minimum (2029) level of 61 dB(A).

Swinford

- 11.6.29 Although the main road network has a distant impact on Swinford as a whole and the south and west margins in particular, the majority of the noise exposure on property in Swinford is from the traffic on the local roads through the village. The noise impact, therefore, depends almost entirely on the changes in the traffic flows on these roads. Webster Farm on Lutterworth Road would have noise levels on its south façade of 59 dB(A) in the Do-something (2029) scenario, a *Major* reduction of 9 dB(A) compared with Do-minimum (2029).
- 11.6.30 Properties in the centre of the village such as those along North Street would typically have Do-something (2029) levels that range from 57 to 64 dB(A), the majority of which

have *Minor* reductions compared with the Do-minimum (2029) scenario. In High Street, The Chequers PH for example, has a Do-something (2029) noise level of 64 dB(A) which is 2 dB(A) lower than Do-minimum (2029), a *Minor* reduction.

11.6.31 The properties along Kilworth Road generally have Do-something (2029) noise levels between 54 and 64 dB(A), with *Minor* 1 to 2 dB(A) increases in noise level compared with the Do-minimum 2029. Stanford Road generally has *No Change* or *Negligible* increases in Do-something (2029) compared with Do-minimum (2029). Rugby Road would have increased traffic with the proposals in place which would give rise to *Minor* or *Moderate* increases in noise level in Do-something compared with Do-minimum in the design year (2029). Westfield Lodge is also on Rugby Road but is much closer to the junction than the rest of the village. Here the levels on the north façade of the property would increase from a Do-minimum (2029) level of 67 dB(A) to a Do-something (2029) level of 70 dB(A), a *Moderate* increase.

Stanford on Avon and Clay Coton

11.6.32 The north façades of properties along the local road through Stanford have noise levels only controlled by this road while properties with south facing façades receive some contribution from the distant A14. The north façade of Home Farm which is close to the road would have a Do-something (2029) level of 59 dB(A), a *Minor* 1 dB(A) reduction compared with the Do-minimum (2029). For the properties with south facing frontages to the local road, such as Verny Cottage, there would be a *Minor* 1 dB(A) increase in level between the Do-something (2029) and Do-minimum (2029) scenarios.

11.6.33 The pattern of exposure for properties in Clay Coton is very similar to that described above for Stanford as the road through this hamlet carries almost the same volume of traffic.

Overall Effects of Traffic Noise

11.6.34 Between 2014 and 2029 there would be growth in traffic on the network that would be expected to increase noise levels by typically 1 or 2 dB(A), but this would be offset by the introduction of low noise surface on the main roads. As confirmed in Section 11.4 Baseline conditions, without the proposals in place in 2029 there would be 72 residential properties with noise levels of 65.5 dB(A) or more and 6 exposed to 71.5 dB(A) or more. With the Preferred Route in place in 2029 the number of dwellings with levels of 65.5 dB(A) or more would reduce to 34, with 10 properties with levels of 71.5 dB(A) or more. Although the number of dwellings exposed to levels of 71.5 dB(A) or more is four more than for the Do-minimum (2029) scenario, the total number of dwellings with levels of 65.5 dB(A) or more has more than halved.

11.6.35 Comparisons can also be made between the numbers of properties experiencing noise increases or reductions. The clearest summary of the overall impact of the project is provided by a comparison between the Do-minimum and Do-something in 2029. There would be 182 dwellings exposed to an increase in noise level, with 266 receiving decreases. These changes arise from the direct impact of the revised junction layout and the re-routing of traffic on the LRN. The subsidiary effects of the growth in traffic between 2014 and 2029 and changes in road surface materials are excluded from this summary.

11.6.36 Table 11.2 sets out the *Moderate* and *Major* changes for each village for the same Do-minimum and Do-something comparison for 2029. It should be noted that all these changes are due to traffic flow changes on the local roads within the villages.

Table 11.2 : Moderate and Major Changes for each Village

Village	Moderate Increase	Major Increase	Moderate Decrease	Major Decrease
Catthorpe	--	--	3	29
Shawell	2	--	7	9
Swinford	6	--	2	6
Lilbourne	--	--	--	--
Stanford on Avon	--	--	--	--
Clay Coton	--	--	--	--
Total	8	0	12	44

11.6.37 Out of the 64 dwellings experiencing more significant noise changes it can be seen that most would be decreases in noise. Catthorpe and Shawell would have clear benefits in noise terms. In Swinford there would be more of a balance with 8 decreases in the northern part of the village and 6 increases in Rugby Road to the south. There would be no *Moderate* or *Major* changes in Lilbourne, Stanford on Avon and Clay Coton.

11.6.38 In terms of vibration, the findings of the noise assessment in terms of relief or worsening of the noise climate as set out above may be considered to be generally applicable to vibration exposure and vibration nuisance levels.

11.6.39 Overall it is considered that in terms of operational noise and vibration there would be a *Moderate Beneficial* change in impact with the introduction of the proposed M1 Junction 19 Improvement.

11.7 Conclusions

11.7.1 The objective assessment set out above has shown that implementation of the proposed M1 Junction 19 Improvement would give rise to both increases and decreases in noise level and nuisance at individual properties. However, there are more decreases in noise level than increases and the magnitudes of the decreases are greater than the increases.

11.7.2 There are very few properties close to the junction. Those that are would continue to be exposed to traffic noise but there would be very little direct change in level for these properties arising from the improvements. Most of the properties that are affected are on road links that form parts of the LRN and these changes in level are the result of redistribution of the local traffic.

11.7.3 The magnitude of the overall noise and vibration impact of the operational use of the M1 Junction 19 Improvement is assessed to be *Moderate Beneficial* and therefore, assuming that all dwellings are regarded as *High* sensitivity, the significance of the noise and vibration effect is considered to be *Moderate Beneficial*.

11.7.4 For the construction period, the magnitude of the overall noise and vibration impact is assessed as *Minor Adverse* and therefore the significance of the noise and vibration effect is considered to be *Slight Adverse*.

11.7.5 The objective for the assessment to reduce noise levels has been met.

12. EFFECTS ON ALL TRAVELLERS

12.1 Introduction

12.1.1 The detailed assessment of 'All Travellers' is at Volume 2 Chapter 7 All Travellers of the ES. 'All Travellers' consist of pedestrians, cyclists and equestrians, collectively known as 'vulnerable users' and those travelling in motorised vehicles, on both local and strategic roads. This assessment is divided between two groups into:-

- Part A - Vulnerable users and local vehicle travellers
- Part B - Long distance vehicle travellers

12.2.1 This enables local and strategic issues to be considered separately. As described below there are also different objectives and methods to be employed.

Objectives

Vulnerable Users and Local Vehicle Travellers

12.2.2 The objectives for vulnerable users and local vehicle travellers are set out in the Scoping Report¹¹ as follows:-

- To promote accessibility for pedestrians, cyclists and equestrians, to reduce severance and encourage physical fitness
- To minimise inconvenience for local traffic, travelling between the villages or accessing the strategic highway network

Long Distance Vehicle Travellers

12.2.3 The objective is:-

- To improve conditions for long distance vehicle travellers

12.2 Study Area

Vulnerable Users and Local Vehicle Travellers

12.2.1 The study area for vulnerable users consists of the network of public rights of way (PROW) shown on Figure C, the Environmental Resources Plan, in Appendix 1 to Volume 1 of the ES.

12.2.2 The area for local vehicle travellers is more widespread and includes the links between the villages, connections to local community facilities and access to the strategic road network. Here the potential study area extends west to Rugby and M6 Junction 1, north to Lutterworth and M1 Junction 20, east to A14 Junction 1 and south to Crick and M1 Junction 18.

Long Distance Vehicle Travellers

12.2.3 The assessment for long distance vehicle travellers is applied to all vehicle journeys through the junction using M6, M1 and A14.

PART A - VULNERABLE USERS AND LOCAL VEHICLE TRAVELLERS

12.3 Legislation and Policies

National Policies

- 12.3.1 Planning Policy Guidance 17⁵³ – Open Space and Sport and Recreation Provision identifies the long-term aim to create networks of accessible, high quality open spaces and sport and recreation facilities, in both urban and rural areas. These are intended to meet the needs of residents and visitors, be fit for purpose and be both economically and environmentally sustainable. It also identifies a necessity to achieve an appropriate balance between new development and the enhancement of existing provision.
- 12.3.2 Planning Policy Guidance 21⁵⁴ – Tourism outlines the aim both to maximise the economic and employment benefits that tourism can bring, whilst simultaneously safeguarding the environment. It notes that there are benefits gained through the promotion of a variety of linkages including footpaths, cycleways and equestrian provisions which encourage tourists to use the countryside in general, as opposed to specific resorts or attractions.
- 12.3.3 The Countryside and Rights of Way Act (The CROW Act) 2000³⁰ is divided into four categories: 1. Access to Open Countryside; 2. Public Rights of Way; 3. Nature Conservation; and 4. Management of Areas of Outstanding Natural Beauty.
- 12.3.4 The initial two categories are relevant to the assessment of impacts on accessibility. The CROW Act entrusts local authorities through ‘Local Access Forums’ and other specific bodies with responsibilities and powers to enhance the PROW network. The Act has its foundations in the National Parks and Access to the Countryside Act, 1949, with an aim to acquire increasing amounts of open land for open public access. It includes a variety of strict byelaws and powers to ensure land is acquired, routes are well maintained, access is easily available to a wider variety of users and amenity is not degraded through development.

Regional Policies

West Midlands Regional Spatial Strategy (2008)

- 12.3.5 The Regional Spatial Strategy for the West Midlands was adopted in 2008 and includes policies covering transport and VU's. These policies include CC1: Climate Change, T1: Developing Accessibility and Mobility Within the Region to Support the Spatial Strategy, T2: Reducing the Need to Travel, and T3: Walking and Cycling. These policies aim to improve accessibility across the region, reduce the need to travel, especially by car, and provide greater opportunities for walking and cycling.

East Midlands Regional Plan (2009)

- 12.3.6 The East Midlands Regional Plan was adopted in 2009 and includes the provision of up to date policies for transport; such as policies 44: Sub-Area Transport Objectives, 45: Regional Approach to Traffic Growth and Reduction and 54: Regional Major Highway Priorities. These policies aim to improve accessibility, reduce travel by car and promote a behavioural change towards transport choice. Policy 54 looks at Major Highway Priorities which include ensuring that highway capacity is managed effectively to reduce congestion and improve safety.

Milton Keynes and South Midlands Sub-Regional Strategy 2005

- 12.3.7 The Milton Keynes and South Midlands Sub-Regional Strategy was adopted in 2005 and provides amendments and additional information to that provided in the regional spatial strategies for the East of England, the East Midlands and the South East of England. Within this document there are two policies relevant to all travellers which are Strategic Policy 2: The Spatial Framework – Strategic Transport Infrastructure, and Northamptonshire Policy 4: Corby, Kettering and Wellingborough.
- 12.3.8 Strategic Policy 2 covers improvements to the A14, including its junction with the M1. Northamptonshire Policy 4 covers the growth areas of Corby, Kettering and Wellingborough and seeks to ensure that their infrastructure requirements consider approved schemes within the region.

Local Policies

Warwickshire Local Transport Plan 2006-2011 (2006)

- 12.3.9 The Warwickshire Local Transport Plan (LTP) was adopted in 2006 and is the second transport plan produced for Warwickshire. The LTP contains three Core Strategies which are relevant to all travellers. These Core Strategies are not policies but set out the aims of Warwickshire regarding certain aspects of transport planning. These strategies include the Accessibility Strategy, Road Safety Strategy and Congestion Strategy.

Northamptonshire Local Transport Plan 2006-2011

- 12.3.10 The Northamptonshire LTP was adopted in 2006 and sets out strategic aims rather than individual policies. Among these key aims are the reduction of congestion and the improvement of accessibility. In conjunction with the LTP Northamptonshire have also produced a sister document called Northamptonshire Transport Strategy for Growth (2007). This document contains specific policies that are relevant to All Travellers. These policies are WA1: Walking Audits, WA2: Walking Master Plans, WA3: Future Opportunities for Routes, CY1: Cycle Master Plans and CY2: Future Opportunities for Routes. These policies cover issues regarding modal shift and encouraging other forms of transport through the improvement of walking and cycling routes among others. In addition to these policies the strategy also lists the M1 Junction 19 Improvement as a prioritised strategic link.

Daventry District Council Local Plan 1997

- 12.3.11 The Daventry District Council Local Plan was adopted in 1997. In September 2007 any policies not “saved” expired, there is only one relevant policy which was saved and that is policy CM8: Cyclists and Pedestrians. This policy states that large scale developments are dependant on the retention and provision of safe and convenient cyclist and pedestrian routes.
- 12.3.12 These policies are to be eventually replaced with emerging policies under the Local Development Framework (LDF). Daventry are producing a joint Core Strategy as part of the LDF which is the West Northamptonshire Joint Core Strategy (2007) which is currently at the issues and options stage. This means that any policies are currently only in draft form. As the Core Strategy is currently at Issues and Options Stage there are not yet any policies but the strategy does set out Strategic Objectives which will inform the basis of future policies. Strategic Objective 8 of the Core Strategy aims to ensure that development is sensitive to its environment.

Harborough District Council Local Plan 2001

12.3.13 The Harborough District Local Plan was adopted in 2001 and as mentioned above all policies that were not formally saved expired in September 2007. There are no saved policies which are relevant to all travellers. Harborough are in the process of producing their Core Strategy which is currently at alternative options stage. Within this document Core Spatial Policy 3: Promoting Sustainable Development and Core Spatial Policy 4: Options for Improving Transport in Market Harborough are relevant.

Rugby Borough Council Local Plan 2006

12.3.14 The Rugby Borough Local Plan was adopted in 2006 and contains a number of saved policies. Of these saved policies GP7: Public Rights of Way Network and T4: Cycle and Pedestrian Facilities are relevant to all travellers. Policy GP7 seeks to protect the existing public rights of way network and Policy T4 requires development to include facilities for pedestrians and cyclists.

12.3.15 In addition to the saved policies in the Local Plan, Rugby are also in the process of writing their Core Strategy which is currently at the preferred options stage. Within the Core Strategy, there are no specific policies which relate to all travellers.

North Northamptonshire Core Strategy (2008)

12.3.16 The North Northamptonshire Core Strategy was adopted in 2008 and is a joint Core Strategy covering the areas of Corby, Kettering, Wellingborough and East Northamptonshire. Within this document there is only one policy which is relevant to all travellers and this is Policy 13: General Sustainable Development Principles. The policy aims to improve accessibility and promote the transport hierarchy of pedestrian-cyclist-public transport-private car.

12.4 Baseline Conditions

12.4.1 In general routes radiate from the settlements of Shawell, Catthorpe and Swinford and are illustrated on Figure C Environmental Resources. Several routes were diverted following the construction of the M1 and this has resulted in a disjointed network, especially in the immediate vicinity of M1 Junction 19. It should be noted that the motorways and the junction represent both a physical and psychological barrier to movement between these settlements for Local Vehicle Travellers (LVT's) and Vulnerable users (VU's)

12.4.2 Surveys of VU movements have been undertaken within the area in 2003, 2004 and 2005. The results show that use is at a very low level and suggests that changes are not likely to have an adverse effect on many users. Several routes that terminate at the junction are immediately adjacent to major roads or cross them at grade and therefore the amenity values are considered to be *Poor*.

12.4.3 At present LVT's can access the junction directly via Rugby Road (from Swinford) and Swinford Road (from Catthorpe) and the same route can be used as a link between the villages. The ability to access the strategic network from the LRN would be removed as part of the project, although the link between the villages would be maintained and should improve in amenity.

12.4.4 A baseline assessment was carried out for VU's and LVT's to establish existing journey lengths and times, amenity value, degree of severance and potential for physical fitness using identified routes. A summary of findings is below:-

- Shawell to Swinford – For VU's amenity generally considered to be *Fair* to *Good*, with *Slight* severance and *Significant* health benefits for pedestrians, *Minor* for cyclists. For LVTs amenity is considered to be *Good* with no severance.
- Swinford to Catthorpe – For VU's amenity generally considered to be *Poor* to *Fair* with *Severe* severance and *Significant* health benefits for pedestrians, *Minor* for cyclists. For LVT's amenity is considered to be *Poor* with *Moderate* severance
- Catthorpe to Shawell – For VU's amenity generally considered to be *Fair* with *Slight* severance and *Significant* health benefits for pedestrians, *Minor* for cyclists. For LVT's amenity is considered to be *Good* with no severance.

12.4.5 For LVT's only a wider area is considered as follows:-

- *Shawell and Wider Area* – *Good* amenity and no severance
- *Swinford and Wider Area* – *Fair* amenity and *Slight* severance
- *Catthorpe and Wider Area* - For the routes with *Good* amenity, severance is considered to be *None*. For the routes with *Fair* amenity, severance of these routes is considered to be *Slight*.

12.5 Mitigation

A Strategy for Vulnerable Users

12.5.1 A strategy for VU's has been developed in consultation with the user groups with the following key issues identified for incorporation into the project. All the links are illustrated in Chapter 7 Figure 7.4 Proposals for Vulnerable Users and in Figure Q Proposed Strategy for Vulnerable Users and Local Vehicle Travellers in Appendix 1 of this Volume:-

- a two tier network should be provided including 'utility' to provide functional links from place to place and recreation for more informal access
- the recreation network should provide the opportunity for a bridleway circuit
- a direct utility link between Swinford and Catthorpe is of particular importance and given the placement of community facilities could encourage for example, journeys to school
- some 'rationalisation' (i.e. closure) of existing routes is acceptable, but only within the context of an overall improvement
- where VU routes are shared with the LRN, the safety of VU's needs to be considered

12.5.2 An improved, direct link for all users (R-03) would be provided between the villages of Swinford and Catthorpe utilising the existing verges of Rugby Road, Swinford, and Swinford Road, Catthorpe, and the new Local Road Network (LRN). A 4m verge consisting of 2.5m grass and 1.5m paved footway to accommodate equestrians and pedestrians respectively would be provided within the extents of the works. New structures have been designed to be as open as possible to suit the widened verges.

12.5.3 For route R-04 between Swinford and Catthorpe, bridleway X12 would be replaced by an upgrading of footpaths FC5 and X6 to the south of Swinford to bridleway, and a new section of bridleway adjacent to the River Avon between the A14 and M1 viaduct. This route would then join existing bridleway X13 to reach Catthorpe. The new route would require two new bridleway bridges of the River Avon and would utilise the existing PROW beneath the A14 and M1.

- 12.5.4 For route R-05 between Swinford and Catthorpe, footpaths X7 and X8 would be diverted for pedestrians only, initially adjacent to A14, then across the field to join X6 at the proposed bridleway bridge across the River Avon. Thereafter R-04 and R-05 share a common alignment.
- 12.5.5 The new local link road west towards the A5, to the north of the M6 would also include provision for VU's with a widened verge on the north side of 3.0m metres, connected to PROW, footpaths X19, X21b, X21c, X21a and bridleways X14 and X13. As above cyclists would be able to use the local road. Equestrians would have the choice to use the verge on either side or the road.

A Strategy for LVT's

- 12.5.6 The Orange LRN selected as part of the Preferred Route announced in February 2009 contains two components:-
- a direct route below the junction between Swinford and Catthorpe (R-09)
 - a new local link road connecting Rugby Road Swinford to the A5 initially running immediately north of the M6, then improving existing sections of Shawell Lane and Catthorpe Road
- 12.5.7 A common standard of a six metre wide carriageway has been adopted for the LRN to ensure that it would fit in with the existing local roads in the area.

Mitigation of Potential Construction Impacts

- 12.5.8 Throughout the construction works, access along PROW would be maintained where practicable. Appropriate diversionary routes utilising existing PROW or local roads would be clearly demarked and segregated from strategic traffic and construction activities where this is not possible.

Mitigation of Potential Operational Impacts

- 12.5.9 It is considered that, where applicable, the removal of conflicts between VU's and strategic traffic at the junction is likely to improve conditions in terms of severance and amenity and to increase opportunities for physical fitness.
- 12.5.10 It is considered likely that separation of local traffic and strategic network traffic would also improve severance and amenity for local LVT movements. However, it is considered likely that severance and journey time would be increased for those wishing to access the strategic network from the local area, due to the loss of direct access to the junction. The proposals for the LRN are intended to reduce such impacts as far as possible.

12.6 Magnitude of Impact and Significance of Effects

Vulnerable Users Construction Impacts

Shawell and Swinford

- 12.6.1 The main impact on the R-01 utility link for all users would be the construction of the new Shawell Road bridge over the M1. However, construction would be offline and the link would remain open while the new bridge is being constructed. The link would have increased traffic flow following the closure of the dumbbell roundabout and prior to

opening the new LRN, however, traffic flows would remain low, so this impact would be *Negligible*.

12.6.2 There would be no impact on the recreational route for pedestrians R-02 following footpath X10.

12.6.3 Sections of PROW to the north of the M6, X21c, X21a and X13 would be closed to allow for construction works and local severance for these infrequently used paths would be *Severe* until construction works were complete and the new link introduced.

Swinford and Catthorpe

12.6.4 The utility link through the junction would be severed for a period of approximately 12 months before the new LRN can be completed. Given the *Low* number of travellers likely to be affected, the impact is considered to be *Slight Adverse*. The diversion would be likely to deter use but, given the nature of the existing junction, baseline severance is already considered to be *Severe* and no change is anticipated.

12.6.5 The proposed closure of Bridleway X12 and Footpaths X7 and X8 would affect recreational routes R-04 and R-05 although it is likely that existing routes can remain open until the replacement links are provided. In these terms there would be no specific impacts due to construction, impacts would be as for the operational scenario as described below.

12.6.6 Routes R-11 and R-12 would be affected by the replacement of the Shawell Road bridge and lengthening of the Shawell Lane bridge below M6. It is anticipated that the links would remain open at all times during construction, although there would be some temporary reduction in amenity due to the close proximity of construction works. There would also be a temporary increase in traffic on Shawell Road, though this would have a *Negligible* impact.

Catthorpe and Shawell

12.6.7 The main impact on this link would be the widening of the M6 over Shawell Lane bridge. The route would remain open with segregation of users from construction, though with some loss of amenity. The link would have increased traffic flow following the closure of the dumbbell roundabout and prior to opening of the new LRN, however, traffic flows would remain low, so this impact would be *Negligible*.

Other Recreational Routes

12.6.8 The site area around M1 Junction 19 would be fenced off to prevent public access into it, and this would impact on a number of the footpaths and bridleways that form recreational routes and circuits that are not covered by the above links. In addition, the haul roads around the perimeter of the site would also impact on the PROW network. Amenity value would be likely to decline where public footpaths and other routes come close to or intersect the works, as a result of construction noise, dust and visual intrusion. However, traffic flows would remain low, so this impact would be *Negligible*.

Local Vehicle Travellers Construction Impacts

Shawell and Swinford

12.6.9 The main impacts on LVT's for this link would be due to the reconstruction of Shawell Road bridge over the M1. As described above, the new bridge would be constructed offline, enabling the existing road to remain open, as such any delays would be minimal.

Swinford and Catthorpe

12.6.10 Route R-09 would be severed for a period of approximately 12 months. This would result in a *Small* change in journey time, using the alternative of the existing LRN to Shawell, for a *Low* number of travellers, resulting in a *Neutral* impact.

Catthorpe and Shawell

12.6.11 The main impacts would be due to the works required to extend the bridge carrying the M6 over Shawell Lane and to the on-line improvements to Shawell Lane between the bridge and Catthorpe Road. Traffic management would be put in place, allowing the route to stay open, but there would be some *Small* delays for a *Low* number of travellers for a temporary period, resulting in a *Neutral* impact.

Shawell, Catthorpe and Wider Area

12.6.12 For Shawell and Catthorpe access to the wider area network would have no specific impacts resulting from the construction activities.

Swinford and Wider Area

12.6.13 Following closure of access to the junction, the main impact would be on journey times. This would affect a *Low* number of travellers, and is considered to have a *Neutral* impact for the construction period. Once the LRN was completed there would be alternative routes to the west via the new link and Catthorpe village.

Vulnerable Users Operational Impacts

12.6.14 The *Small* changes in journey time for what is anticipated to be a *Low* number of travellers would result in a *Neutral* effect with the exception of route R-05 where the diversion resulting from the closure of footpaths X7 and X8 would result in a *Slight Adverse* impact. By contrast, the new route for R-04 replacing bridleway X12 with an upgraded X6 and new section adjacent to the River Avon would only result in a *Small* change in journey time.

Amenity

12.6.15 In terms of amenity impacts are assessed as follows:-

- Shawell and Swinford – two routes (R-01 and R-02) would be *No Change* and the new route R-13 is assessed as *Fair* amenity all for a *Low* number of users
- Swinford and Catthorpe:-
 - Route R-03 - *Some Improvement* in amenity from *Poor* to *Fair* for a *Low* number of VU's
 - Route R-04 – *Large Improvement* in amenity from *Poor* to *Good* for a *Low* number of VU's. The revised route utilises existing Footpath X6 which would be

- upgraded to a bridleway as part of the scheme and although it has some exposure to the M1 and A14, for the most part it would provide an attractive route between the villages
- Route R-05– *Some Improvement* in amenity from *Poor* to *Fair* for a *Low* number of VU's
 - Routes R-11 and R12 – *No Change* to existing *Fair* amenity for a *Low* number of VU's.
- Catthorpe and Shawell:-
 - Route R-06 – *Some Improvement* in existing *Fair* amenity for a *Low* number of VU's, but remaining *Fair*.
 - Route R-07 – *No Change* to existing *Fair* amenity for a *Low* number of VU's.

Severance

12.6.16 In terms of Severance impacts are assessed as follows:-

- Shawell and Swinford :-
 - Route R-01 -The change to routes between these villages would be negligible, and so severance would remain *Slight*.
- Swinford and Catthorpe:-
 - Route R-03 –The proposals provide a direct and safer route removing existing conflicts with strategic traffic and with a negligible change in journey time. The severance would improve from *Severe* to *None*.
- Catthorpe and Shawell:-
 - Route R-06 -The change to routes between these villages would be negligible, and so severance would remain *Slight*.

Physical Fitness

12.6.17 In terms of Physical Fitness impacts are assessed as follows:-

- Shawell and Swinford:-
 - Routes R-01, R-02 health benefits offered by this link would be *Largely Unchanged*
 - R-13 (new route) This link offers *Significant* health benefits for pedestrians and some *Minor* health benefits for cyclists.
- Swinford and Catthorpe:-
 - For all routes, R-03, R-04, R-05, R-11, R-12 the health benefits would be *Largely Unchanged*
- Catthorpe and Shawell:-
 - For Routes R-06 and R-07- The health benefits offered by the links would be *Largely Unchanged*

Local Vehicle Travellers Operational Impacts

Journey Times

12.6.18 The changes in journey times would result in a *Neutral* effect on all journeys.

Amenity

12.6.19 In terms of Amenity impacts are assessed as follows:-

- Shawell and Swinford:-
 - Route R-08 – *No Change* to existing *Good* amenity for a *Low* number of users.
- Swinford and Catthorpe:-
 - Route R-09 – *An Improvement* in amenity from *Poor* to *Fair* for a *Low* number of users. The route would be as Route R-03. The removal of the dumbbell roundabout and *Low* predicted traffic flows would make the route safer for LVT's.
- Catthorpe and Shawell:-
 - Route R-10 – *Some Improvement* in amenity, this route would be safer for LVT's, with the removal of tight bends and increased visibility at junctions. The amenity of this route would remain *Good*.
- Shawell and Wider Area:-
 - *No Change* to existing *Good* amenity for a *Low* number of LVT's for routes to key community facilities in the wider area.
 - *No Change* in existing *Fair* amenity for a *Low* number of LVT's for access to the strategic road network.
- Swinford and Wider Area:-
 - *No Change* to the existing *Fair* amenity for a *Low* number of LVT's for routes to key community facilities in the wider area.
 - *No Change* in existing *Fair* amenity for a *Low* number of LVT's for access to the strategic road network.
- Catthorpe and Wider Area:-
 - *No Change* to existing *Good* amenity for a *Low* number of LVT's for routes to wider area facilities.
 - *No Change* in existing *Fair* amenity for a *Low* number of LVT's for access to the strategic road network.

Severance

12.6.20 In terms of Severance impacts are assessed as follows:-

- Shawell and Swinford:-
 - The link between these villages would remain direct with a *Good* amenity for *Low* number of LVT's. The severance of this link would remain *None*.
- Swinford and Catthorpe:-
 - The link between these villages would have an *Improvement* in amenity for a *Low* number of LVT's. The severance would reduce from *Moderate* to *None*.

- Catthorpe and Shawell:-
 - This link would retain a *Good* amenity with minimal journey time changes, for a *Low* number of LVT's. The severance would remain *None*.

- Shawell and Wider Area:-
 - For access to key community facilities in the wider area there would be *No Change* in amenity with minimal journey time changes. It is considered that severance would remain *None* for access to the wider area.
 - For access to the strategic road network, there would be a *Small* increase in journey time. The severance of these routes would increase to *Slight*.

- Swinford, Catthorpe and Wider Area:-
 - For access to key community facilities in the wider area there would be a *Moderate* increase in journey time for some of the routes, although the deterrent of congestion at the dumbbell roundabout would be removed. Therefore it is considered severance would remain *Slight*.
 - For access to the strategic road network, there would be a *Small/Moderate* increase in journey time. The severance of these routes would increase to *Moderate*.

Implications for Planning Policies

12.6.21 It is considered that overall the proposed Junction improvement would have a *Beneficial Impact* on Regional and Local policy objectives.

12.6.22 Taking into account the baseline assessment and magnitude of impact as described above the overall assessment is summarised at Table 12.1 below.

Table 12.1 : Assessment of Significance

Link	Significance Criteria							
	Change in Journey Time		Change in Amenity		Change in Severance		Change in Physical Fitness	
	VU's	LVT's	VU's	LVT's	VU's	LVT's	VU's	LVT's
Shawell and Swinford	Neutral	Neutral	No Change	No Change	None	None	Significant Benefits	N/A
Swinford and Catthorpe	Slight Negative	Neutral	Improvement	Improvement	Large Positive	Moderate Positive	Minor Benefits	N/A
Catthorpe and Shawell	Neutral	Neutral	Improvement	Improvement	None	None	Largely Unchanged	N/A
Shawell and Wider Area (Key Facilities/Strategic Road Network)	N/A	Neutral/Neutral	N/A	No Change	N/A	None/Slight Negative	N/A	N/A
Swinford and Wider Area (Key Facilities/Strategic Road Network)	N/A	Neutral/Neutral	N/A	No Change	N/A	None/Slight Negative	N/A	N/A
Catthorpe and Wider Area (Key Facilities/Strategic Road Network)	N/A	Neutral/Neutral	N/A	No Change	N/A	None/Slight Negative	N/A	N/A
Overall Assessment Score	Slight Negative	Neutral	Improvement	Improvement	Large Positive	Neutral	Moderate Benefits	N/A

Journey Times

12.6.23 The project offers a *Slight Negative* change for VU's with regard to journey times based on the small increase in journey time for route R-05 between Swinford and Catthorpe. However, this increase also represents a *Minor Benefit* for physical fitness, which considering route R-05 is a recreational route, may be considered more relevant. As all other routes have a *Neutral* outcome the overall changes to journey times for VU's would not be considered significant.

12.6.24 The effect on LVT's with regard to journey times is *Neutral* and not considered significant.

Amenity

12.6.25 There would be *Improvements* in amenity for VU's, on Route R-03, the utility route between Swinford and Catthorpe and particularly on Route R-04, the recreational route between the villages which follows the line of the River Avon.

12.6.26 For LVT's there would again be *Improvements* between Swinford and Catthorpe due to the new direct link between the villages, which avoids traffic conflicts associated with the existing junction. There would also be some *Improvements* to amenity due to better visibility along the local road between Catthorpe and Shawell.

Severance

12.6.27 The project offers a *Large Positive* change for VU's for the relief of severance between the local communities. This is considered to be a significant change as it addresses a number of the key concerns brought up during the consultations and meets the objectives set out for the scheme.

12.6.28 The project also offers a *Moderate Positive* change for LVT's for the relief of severance between the local communities in Swinford and Catthorpe but this is offset by the *Slight Negative* change for all villages by removing access to the strategic network. However, the overall *Neutral* score is significant as it shows the key objectives to remove severance and improve safety in the local area can be achieved whilst maintaining an overall *Neutral* impact on LVT's.

Physical Fitness

12.6.29 The project offers *Moderate Benefits* for health due to the addition of recreational route R-13.

12.7 Conclusions

12.7.1 The results from this assessment show that the objectives for both VU's and LVT's can be met in terms of:-

- promoting accessibility for pedestrians, cyclists and equestrians, reducing severance and encouraging physical fitness
- minimising inconvenience for local traffic travelling between the villages, or accessing the strategic highway network

12.7.2 It is also considered that by removing conflicts with strategic traffic safety, in addition to amenity and severance, has been improved for VU's and LVT's.

- 12.7.3 The separation of strategic traffic from the LRN combined with VU provisions on the new Local Link Road and the improved sections of Swinford Road and Rugby Road would have a *positive* impact on amenity for a number of routes and a *large positive* impact on severance between Swinford and Catthorpe.
- 12.7.4 In addition, the verge and footway provided by the Local Link Road would connect a number of existing footpaths and bridleways together, creating numerous recreational routes and circuits which are not assessed within this report and would provide additional positive benefits to the community.
- 12.7.5 The objective to encourage physical fitness is shown to be achieved with a *Moderate Benefit* following the implementation of the scheme. However, this is based on journey times and does not take into account those who are currently discouraged from using the existing routes. It is considered that with improved amenity and reduced severance VU's would be further encouraged to use the utility and recreational networks resulting in a greater number of users walking or cycling. This would provide additional positive changes that are not shown by the assessment based on journey time.
- 12.7.6 For LVT's travelling to/from the wider area there would be some inconvenience due to removal of access to the strategic road network at M1 Junction 19, however, the resultant effect has been shown to be *Neutral* and is offset by the positive changes to safety and amenity for the links between the villages.

PART B - LONG DISTANCE TRAVELLERS

12.8 Introduction

12.8.1 The assessment of vehicle travellers addresses the following areas:-

- the view from the road
- driver stress

12.8.2 TAG Unit 3.3.13, which deals with journey ambience, also addresses these sub-topics in the context of impact on travellers as a whole. The factors presented in TAG are:-

- traveller care
- traveller views
- traveller stress

12.9 Legislation

12.9.1 No legislation specifically sets out standards required for traveller care, travellers' views or traveller stress. Standards of highway design are regularly updated by the Department for Transport, and are based on the principles set out in the DMRB.

12.10 Baseline Conditions

Traveller Views

12.10.1 Existing views for travellers, using the free flow-links between the M1 and M6 and along the M1, and those travelling along the A14 are reasonably attractive. These include views over the Avon Valley and sections of the established native tree planting that has developed in the last 30 years, particularly along the links and on the northbound section of the M1.

12.10.2 For travellers making the connection between the A14 and the motorways, and vice versa, the visual amenity is very poor. Heavily congested traffic, including a high number of heavy goods vehicles (HGV's) is required to negotiate a system of small roundabouts and under-bridges that are cluttered with an array of hazard warning signs, traffic lights, lighting poles and direction signs. The sudden change of visual scale from the large one expected within the motorway and high speed road network to the small visual scale experienced approaching the dumbbell roundabout is confusing and disorientating to any driver unfamiliar with the junction.

Traveller Stress

12.10.3 In terms of traveller stress the experience is similar. The existing junction causes travellers stress in a number of ways. There are often long delays, high traffic volumes converging upon a restricted junction, resulting in queues and numerous accidents. These lead to increased traveller frustration, annoyance and discomfort. Mixing users of the local traffic network with vehicles travelling along the strategic motorway and trunk road network further exacerbates these problems.

12.10.4 Fear of potential accidents is primarily due to queuing on the A14 and on the exit slip roads on the M6 and M1, where high speeds are unexpectedly interrupted. There have been several serious accidents, including fatalities, associated with queuing on the M6 approaching the junction from the west. Fear of accidents at the dumbbell roundabout is due primarily to the high numbers of vehicles (including large articulated lorries and small cars) and confusing layout.

Traveller Care

12.10.5 There are no toilets or roadside services available at present close to the existing junction, except for lay-bys on both sides of the A14 as it approaches the M1.

12.10.6 There are proposals for a trunk road service area with an access from the eastbound carriageway of the A14 to the east of Junction 19.

12.11 Mitigation

12.11.1 The driver's view is always considered in overall design terms to ensure the journey remains a reasonably pleasant experience, with sufficient interest and visual stimulation to maintain the driver's concentration.

12.11.2 Mitigation for impacts on driver stress during the period of construction and roadworks is an effective traffic management plan as noted in the Outline Construction Environmental Management Plan (OCEMP) for the project. During operation, effective signage and traffic information services, together with free-flowing traffic from the improved junction should minimise driver stress. A public relations plan would be drawn up to ensure traffic management proposals received wide publicity

12.12 Magnitude of Impacts and Significance of Effects

Construction

12.12.1 Traffic management would be sequenced to minimise disruption to road users as described above. However, it would not be possible to entirely avoid adverse effects on travellers. There would be no toilets, service areas or other facilities affected during the construction period. Two laybys would be lost on the A14 initially during construction, but

also into the long term. A small unofficial layby along Rugby Road, Swinford, would also be lost during construction.

- 12.12.2 The provision of advance signage and public information on alternative routes should help to reduce the potential inconvenience to travellers using the route, by removing some long distance traffic from the potential works areas.
- 12.12.3 The effect on views from the road is closely related to landscape and visual impact. Travellers may not be as sensitive to these impacts as people living in the area, but some features, such as compounds, storage heaps, temporary earthworks and haul roads, may be considered unattractive from any perspective. The loss of existing vegetation and general greenery would represent an immediate deterioration in the view.
- 12.12.4 Overall, the balance of impact on travellers' views during construction is considered to be *Worse*.
- 12.12.5 During construction, any congestion, traffic management, speed restrictions and the requirement to negotiate a temporary road layout would all contribute to driver stress. The potential effect would be minimised by an efficient construction sequence and traffic management plan as proposed.
- 12.12.6 The overall impact of construction on driver stress, however, is considered to be *Worse*.
- 12.12.7 Overall the construction works would have a temporary *Worse* impact on travellers than the existing situation.

Operation

Travellers Views

12.12.8 In summary:-

- Views from the new A14 to M1 Northbound Link and along M6 - A14 link would be *Better* than through the current dumbbell roundabout
- Views would open up to the north and east due to the initial loss of roadside vegetation. These views would be initially contained by mounding and eventually become as screened as existing and it is considered therefore that there would be no change
- Travelling within the junction arrangement from all aspects, with the exception of the potential barrier described above, would be *Better* than the current situation

12.12.9 In overall terms traveller views would be *Better* for the Preferred Route.

Traveller Stress

12.12.10 The Preferred Route would not provide turning movements between the M6 and M1 north of the junction. It would also not provide, as with the existing junction, movements between the A14 and M1 south of the junction, in both directions. However, there are many alternative routes for travellers and the traffic model forecasts that there would be low demand for the above turning movements. It is also noted that there would be clear, well designed, advance signage approaching the junction. It is therefore considered that these omissions would not result in increased traveller stress. The key traffic movements between the M6 and the M1 south of the junction (in both directions) and the M6 to the A14 (both directions) and the M1 north of the junction to A14 (both directions) would be

direct and free-flow. This would be a significant improvement over the existing situation for movements between the motorways and the A14, resulting in reduced traveller stress.

12.12.11 The main anxiety for vehicle travellers would be over selecting the correct traffic lane. However, this would be managed by the provision of clear motorway standard signage through the junction. It is possible that traffic speeds would remain high through the junction, which may increase driver fear. However, an increased perception of danger is likely to be more than offset by the reduction in actual danger resulting from the removal of queuing on motorway slip roads, avoiding the dumbbell roundabout and the superior design and construction standards required for the Preferred Route. Driver stress in terms of frustration and fear of accidents across the junction would therefore be considerably *Better*.

12.12.12 Overall it is considered that, given the operational improvements, Traveller Stress would be *Better*.

Traveller Care

12.12.13 Proposals for the junction would include gantry mounted road signs and variable message signs to provide drivers with current, accurate information about road conditions ahead to the latest standards. This enhanced communication would improve traveller care for strategic road users. The overall assessment therefore, is *Better*.

12.12.14 Lay-bys (on trunk roads and other roads below motorway standard) and service areas are provided at regular intervals along the strategic road network to meet the needs of travellers. There are no new lay-bys proposed and the layout of the Preferred Route would involve the loss of two lay-bys located on the A14 eastbound and westbound.

12.12.15 Retention of these two lay-bys, or replacement at a similar location, is not compatible with the proposed improvement as the westbound lay-by would fall within the new extent of the M6 motorway and the eastbound lay-by would conflict with a new junction with an interchange link. Provision of new lay-bys further to the east is not considered necessary as existing lay-bys are present within 2.5km of the proposed termination of the A14 (the frequency recommended by TD 69/07, the applicable standard). In addition, the minimum interval required between lay-bys and the interchange link junctions proposed would result in any new lay-bys being provided at an interval as low as 600m from the adjacent existing lay-bys.

12.12.16 Despite the existing nearby alternative provision, as the lay-bys to be lost are well used, their removal represents a definite loss of facilities, resulting in a *Worse* impact.

12.12.17 Provision of the service area with or without the junction improvement would be a benefit to travellers using A14 eastbound compared with the current baseline.

12.12.18 In overall terms, if the service area goes ahead, or is not provided for reasons unconnected with the junction improvement, the effect on traveller care is balanced between the lost laybys and enhanced driver information. In this scenario the overall impact on traveller care for the Preferred Route would be *Better* given improvements in driver information.

12.12.19 Given the 200,900 vehicles predicted to be using the improved junction in the opening year with the project in place, the overall significance of effect for long distance travellers is considered to be *Large Beneficial*.

12.12.20 In considering the overall balance for this scenario, it should be noted that Travellers Views and Traveller Stress would be *Better* and an important element of Traveller Care, driver information, would also be *Better*. These benefits would be shared by all travellers using the junction each day. In comparison the use of a service area would be limited to a relatively small number of travellers using the A14 eastbound. There are also several other service facilities available to long distance travellers, elsewhere on the M1, M6 and A14.

12.12.21 In these terms it is considered the overall balance for all travellers would be *Better* and result in a *Large Beneficial* significance of effect.

12.13 Conclusion

12.13.1 Overall, taking into account the potential impact on the service area development, the assessment of impact on long distance vehicle travellers is *Better*. The objective to improve conditions for vehicle travellers would be met, although there would be some temporary worsening during the construction period.

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13. COMMUNITY AND PRIVATE ASSETS

13.1 Introduction

13.1.1 The detailed assessment of community and private assets is in Volume 2 Chapter 8 Community and Private Assets and includes:-

- The demolition of private property, i.e. the demolition of property or any associated loss of land which may result in the loss of facilities, quality of life, services or employment
- The loss of land used by the community, i.e. the land used by the public that is town or village green, a public park or land used for public and private recreation amenity
- The effects on development land, i.e. future land-use changes that are likely to occur independently of the proposed road improvement, including land covered by land use planning designations and any planning proposals lodged with the planning authorities
- The effects on agricultural land and farms, including agricultural land take, type of husbandry, severance of agricultural holdings, access, water supply and drainage

13.1.2 The objectives of the assessment for community and private assets are:-

- To minimise the adverse impact on farms
- To conserve best and most versatile (BMV) land and soils wherever possible

13.2 Study Area

13.2.1 For the purposes of the assessment, properties and land immediately adjacent to or within 1km of the proposals were considered and impacts on them were assessed. The study area for the assessment was confined to the farm holdings and other community and private assets directly affected by the proposals.

13.3 Legislation and Policies

National Policies

13.3.1 Junction 19 of the M1 lies entirely within open countryside and the land take for the Preferred Route for the improvement is predominantly of agricultural land. Government planning policy on the use of agricultural land for development is set out in Planning Policy Statement 7 (PPS7): Sustainable Development in Rural Areas³⁵.

13.3.2 PPS7 states that the presence of BMV agricultural land, defined as land in Grades 1, 2 and 3a of the ALC, alongside other sustainability considerations including the protection of natural resources such as soil quality, should be taken into account by authorities when determining planning applications. The implications of PPS7 policy regarding BMV land affected by the proposals are considered under 'Permanent Loss of Agricultural Land' in Section 13.6.

13.3.3 The Government's strategy for soils 'Safeguarding our Soils' published in September 2009⁴⁹ includes guidance on the sustainable use of soils and protection of soil resources. The 'Construction Code of Practice for the Sustainable Use of Soils on Construction Sites'⁵⁰, published at the same time aims to improve use and management of soils through all stages of the construction process including restoration of temporarily utilised areas. In developing the draft strategy, account was taken of the EU Thematic Strategy for Soil Protection published by the European Commission in September 2006 and of the

accompanying proposals for an EU Soil Framework Directive . Natural England's Draft Position on Soil⁵¹ identifies priorities for soil protection, including within construction projects.

- 13.3.4 Environmental 'cross compliance' requirements of the Single Payment Scheme (SPS)⁵⁵, which is the principal agricultural support scheme in the European Union, call for farmers and landowners to manage their land to relevant agricultural and environmental standards. The key activities are record keeping, soil management, cultivation and ploughing, spraying and spreading, harvesting, keeping livestock and maintenance of landscapes and protection of habitats. Anyone in receipt of support under the SPS must meet the Good Agricultural and Environmental Condition (GAEC) standards for soil management and protection, including the production of a risk-based Soil Protection Review (SPR). This will have relevance where for instance soils are temporarily disturbed during construction works. The SPR process involves:-
- Identifying soil issues
 - Deciding on measures to manage and protect soils
 - Reviewing actions
- 13.3.5 Some of the land affected by the scheme is held under formal agricultural leases, which have been taken into account in the assessment. These tenancies are governed by:-
- Agricultural Holdings Act 1986 (AHA, for pre 1995 tenancies)
 - Agricultural Tenancies Act 1995 (for post 1995 Farm Business Tenancies (FBT))
- 13.3.6 Other areas noted in the survey are used by farmers under private licences from landowners for grazing by livestock and hay/silage making.
- 13.3.7 There is extensive legislation on compulsory purchase and associated compensation provisions which is not relevant to this environmental assessment.

Regional Policies

West Midlands Regional Spatial Strategy (2008)

- 13.3.8 The Regional Spatial Strategy for the West Midlands was adopted in 2008 and includes policies covering community and private assets. These policies include CC1: Climate Change and QE8: Forestry and Woodlands. These policies aim to protect areas open to the community.

East Midlands Regional Plan (2009)

- 13.3.9 The East Midlands Regional Plan was adopted in 2009 and includes the provision of up to date regional policies. There are no policies in the East Midlands Regional Plan which are relevant to community and private assets.

Local Policies

Daventry District Council Local Plan 1997

- 13.3.10 The Daventry District Council Local Plan was adopted in 1997. In September 2007 any policies not saved, expired, there are two saved policies that are relevant to community and private assets which are EN10: Green Wedges and RC2: Retention of Open Space. Policy EN10 seeks to ensure that development does not compromise agricultural

operations and Policy RC2 seeks to protect areas of open space, recreation and amenity areas.

- 13.3.11 These policies are to be eventually replaced with emerging policies under the Local Development Framework (LDF). Daventry are producing a joint Core Strategy as part of the LDF which is the West Northamptonshire Joint Core Strategy (2007) and is currently at the issues and options stage. This means that any policies are currently only in draft form. As the Core Strategy is currently at the Issues and Options Stage there are not yet any policies, but the strategy does set out Strategic Objectives which will inform the basis of future policies. Strategic Objective 8 of the Core Strategy aims to ensure that development is sensitive to its environment.

Harborough District Council Local Plan 2001

- 13.3.12 The Harborough District Local Plan was adopted in 2001 and as mentioned above, all policies that were not formally saved expired in September 2007. There are no saved policies which are relevant to community and private assets. Harborough are in the process of producing their Core Strategy which is currently at alternative options stage. Within this document Core Spatial Policy 3: Promoting Sustainable Development is relevant to community and private assets.

Rugby Borough Council Local Plan 2006

- 13.3.13 The Rugby Borough Local Plan was adopted in 2006 and contains a number of saved policies. Of these saved policies, E4: Development Involving Agricultural Land and LR4: Safeguarding Open Space are relevant to community and private assets. Policy E4 seeks to prevent the loss of best and most versatile land and LR4 aims to protect open space from development.
- 13.3.14 In addition to the saved policies in the Local Plan, Rugby are also in the process of writing their Core Strategy which is currently at the preferred options stage. Within the Core Strategy, Spatial Objective 10 covers the delivery of a green infrastructure network.

North Northamptonshire Core Strategy (2008)

- 13.3.15 The North Northamptonshire Core Strategy was adopted in 2008 and is a joint Core Strategy covering the areas of Corby, Kettering, Wellingborough and East Northamptonshire. Within this document there is only one policy which is relevant to community and private assets and this is Policy 13: General Sustainable Development Principles which seeks to avoid the net loss of community facilities.

13.4 Baseline Conditions

Private Assets

Residential

- 13.4.1 There are no permanent residential properties located on the land required for the proposals. However, six residential properties lie near to M1 Junction 19 including:-
- Old Barn Farmhouse, approximately 100m to the southwest of the northbound M6-motorway boundary, which would be retained.

- Lambcote Hill Farmhouse lies approximately 250m east of the existing M1 southbound motorway boundary, and 230m east of the proposed motorway boundary.
- Westfield Lodge lies approximately 280m northeast of the existing dumbbell roundabout at the termination of the A14 Trunk Road.
- The private property known as Stonebank and previously used as an animal sanctuary includes three residential caravans, all sited close to the M1 on the west side, north of the M6.

13.4.2 The residential properties including the caravans are considered to be of *Medium* sensitivity to land-use effects.

Commercial

13.4.3 At Old Barn Farm there are traditional buildings redundant from agriculture which are let for commercial storage uses together with adjoining portacabin offices. Access for this use is via a track from Swinford Road and there is understood to be a planning restriction such that all commercial traffic must access the site via the existing M1 Junction 19 and not go via Catthorpe Village.

13.4.4 The agricultural engineering business located at Westfield Lodge currently utilises M1 Junction 19 for access by suppliers and customers.

13.4.5 An agricultural contracting business is operated from Lambcote Hill Farm and currently uses the M1 Junction 19 and the A14 Trunk Road for access to customer's land.

13.4.6 The commercial enterprises are considered to be of *Medium* sensitivity to land-use effects.

Land Used by the Community

13.4.7 Apart from the existing roads and public rights of way described and assessed in Chapter 7 (Effects on All Travellers), there is no land used by the community in the immediate vicinity of M1 Junction 19.

Development Land

13.4.8 No land in the immediate vicinity of M1 Junction 19 is covered by any of the local authorities' future development land use designations as indicated in the adopted and emerging development plans.

13.4.9 It is understood that in their responses to consultations on behalf of the Highways Agency, the local authorities have not identified any extant planning permissions or outstanding applications affecting land adjacent to the Preferred Route, except for the roadside service area discussed below.

13.4.10 As set out in the introduction and detailed below there is an area of farmland, Plot 7 as outlined on Figure 8.1, which continues to be held by a developer for a Roadside Service Area (RSA). This land would be directly affected.

13.4.11 Two planning applications were submitted to Harborough District Council in relation to the proposed RSA development:-

- Outline planning permission 99/00749/OUT (applied 16/07/1999; approved 6/07/2000)
- Approval of Reserved Matters 03/01026/REM (applied 3/07/2003; approved 12/11/2003)

- 13.4.12 Planning permission was granted for the erection of a fuel filling station, restaurant and lodge with associated lorry, coach and car parking with reserved matters and conditions.
- 13.4.13 At this stage there is uncertainty about the future of this site, and the status of the planning consent is unclear. Given the time that has elapsed since the consent, it is possible that conditions attached have not been discharged within the appropriate time limit.
- 13.4.14 The proposals have an impact on the land included in the applications and upon the location of the access.
- 13.4.15 This assessment therefore considers the land under two alternative scenarios, as agricultural land and as development land.
- 13.4.16 As development land the site is considered to be of *Medium* sensitivity to land-use effects.

Land Used by the Community

- 13.4.17 Apart from the existing roads and public rights of way described and assessed in Chapter 7 (Effects on All Travellers), there is no land used by the community in the immediate vicinity of M1 Junction 19.

Development Land

- 13.4.18 No land in the immediate vicinity of M1 Junction 19 is covered by any of the local authorities' future development land use designations as indicated in the adopted and emerging development plans.
- 13.4.19 As set out in the introduction and detailed below there is an area of farmland adjacent to the A14 outlined on Figure 8.1, which continues to be held by a developer for a Roadside Service Area (RSA). This land would be directly affected.
- 13.4.20 As development land the site is considered to be of *Medium* sensitivity to land-use effects.

Agricultural Land Quality

- 13.4.21 The area is level to gently sloping and gradients do not limit land quality. In the south and southeast, the proposals affect the River Avon floodplain and it is understood that flooding is a regular occurrence. The floods tend to be occasional to frequent and short term, making the heavy textured soils difficult to work; consequently the land cannot be graded higher than Sub-grade 3b. The area immediately surrounding M1 Junction 19 has been assessed as a mixture of Grades 2, 3a and 3b land. The land further east is a restored landfill site utilised for sheep grazing and estimated as Grade 4.
- 13.4.22 The M1 and M6 corridors are underlain by Lower Lias Clays. The higher land around Tomley Hall Farm and Old Barn Farm is mapped as boulder clay of glacial origin overlying the Lower Lias Clays. The lower lying land in the Avon floodplain is alluvium, with terrace gravel in the area between the A14 and M1, north of the river.

- 13.4.23 The majority of the land is in arable production, mainly down to oilseed rape or cereals, with some potatoes. The land to the north of the A14, and on the restored land fill site west of the Swinford Road, south of the M6, is predominantly down to grazed pasture for sheep, cattle and horses.
- 13.4.24 The agricultural land quality around M1 Junction 19 is considered to be of *Medium/Low* sensitivity to land use effects.

Farm Structure

- 13.4.25 There are nine agricultural holdings and businesses potentially affected by the proposals. Two other land holdings have been included because, although not active farm businesses, their land is currently used for farming purposes. The farm boundaries of all identified land holdings in the area around the junction are shown on Figure 8.1 in Chapter 8.
- 13.4.26 No land is within an Environmentally Sensitive Area or other agricultural designation, although most farms are entered into the Entry Level Stewardship (ELS) Scheme and some have entered land in the Countryside Stewardship Scheme (CSS) or its successor, the Higher Level Scheme (HLS - e.g. Manor Farm, Plot no. 4).
- 13.4.27 Land held for future development as a roadside service area (Plot no. 7) and a former landfill site (Plot no. 12) are used by local farmers for summer grazing. Stonebank (Plot no. 13) houses three residential caravans and grazes several horses/ponies
- 13.4.28 Farming is mainly arable, beef and sheep rearing. There are no dairy units in the area investigated. One business (Manor Farm, Plot no. 4) grows soft fruit and vegetables for sale through 'Pick Your Own' (PYO) and a farm shop and tea room. Farm size varies from 44ha to 400ha. Most of the affected farms are full time units and are operated as family businesses with land tenure predominantly owner occupied.
- 13.4.29 In terms of sensitivity, one holding (Manor Farm) is considered to be of *Medium* sensitivity given its size, diversification and the fact that it has land within three quadrants of the junction. All other land holdings are considered to be more peripheral to the junction and potentially affected along one edge, resulting in *Low* sensitivity in relative terms.

13.5 Mitigation

Construction

- 13.5.1 The effects of disruption during construction on residential private property would be minimised or avoided through measures to be adopted in the Construction Environmental Management Plan (CEMP). These would potentially include restrictions on the routes to be taken by construction traffic, and measures to minimise dust and noise activity from the works.
- 13.5.2 Commercial activities at Old Barn Farm and Westfield Lodge would need to be given to alternative means of access during the construction period in liaison with the owner and Harborough District Council.
- 13.5.3 One of the residential caravans at Stonebank would need to be moved slightly to the west to avoid the permanent works.

- 13.5.4 The agricultural areas affected temporarily by loss of land required during construction, where applicable, would be returned to agriculture or an environmental end use on completion.
- 13.5.5 Soil management operations generally would be in accordance with Defra's "Good Practice Guide for Handling Soils"⁵⁶ and a Soil Management Plan would be prepared to detail, for example, effective deployment and restoration of land to end use.
- 13.5.6 Wherever possible flood compensation areas have been identified within areas proposed for other environmental measures. When this is not possible the proposal is to return them to agricultural use, following regrading.
- 13.5.7 Access to farmed land during the works would be maintained to minimise disruption through measures to be adopted in the CEMP. These could include restrictions on the routes to be taken by construction traffic, and careful design and timing of temporary road closures or diversions.

Operation

- 13.5.8 No land use mitigation measures would be required in respect of impacts on permanent residential property. Appropriate measures to deal with impacts such as noise and visual intrusion including land required for mitigation are dealt with in Chapter 6 Noise and Vibration and Chapter 4 Landscape of this ES. One of the residential caravans at Stonebank would be moved slightly west to avoid the permanent land take and mitigation would include a new hedgerow to the highway boundary, to replace the existing.
- 13.5.9 No specific mitigation measures would be required in respect of impacts on commercial enterprises during operation.
- 13.5.10 There are no mitigation measures proposed to reduce the impact of the loss of land and trunk road access on the RSA development site.
- 13.5.11 The permanent loss of BMV land and the impact on individual farm holdings due to loss of land, has been minimised compared to the other options considered at public consultation by the selection of the Red Junction and Orange Local Road Network as the Preferred Route.
- 13.5.12 Mitigation measures to minimise the impact on farm operation would include:-
- Suitable access points to farmland
 - Suitable outlets for existing field drainage systems
 - Continuity of water and other utility supplies
 - Appropriate boundary treatments i.e. new hedgerows or fencing as required

13.6 Magnitude of Impacts and Significance of Effects

- 13.6.1 No impacts are anticipated on land used by the community.

Construction

Impacts on Private Assets

- 13.6.2 The land use impacts on residential and commercial properties during construction would mainly be confined to diversions due to temporary road closures. It is anticipated that local

access would be disrupted for a period of approximately 12 months, between the closure of access to the existing junction and completion of the Local Road Network. This would result in some inconvenience for commercial businesses at Westfield Lodge, Old Barn Farm and Lambcote Hill Farm.

- 13.6.3 On the assumption that access can be maintained the temporary impact is considered to be *Minor Adverse*. Other construction impacts on residences such as noise are considered elsewhere in this ES.
- 13.6.4 The relocation of one of the caravans at Stonebank in land use terms is considered as *Minor Adverse* impact.

Impacts on Agricultural Land

- 13.6.5 Areas affected by temporary uses would be out of production during the working period but would be progressively returned to agriculture on completion of the works. The impact in general is considered to be *Minor Adverse*.

Impacts on Farm Businesses

- 13.6.6 All farms subject to land take would suffer short term *Minor Adverse* impacts through temporary effects. Several farms would be affected by other temporary works for the creation of the proposed new public footpath and bridleway links. There would be specific impacts for temporary uses for Tomley Hall Farm, Manor Farm, Lambcote Hill Farm

Operation

Impacts on Private Assets

- 13.6.7 Impacts due to noise or visual impact on residential properties are considered elsewhere in the ES.
- 13.6.8 For Old Barn Farm and Westfield Lodge under both residential and commercial uses, land use impacts are considered *No Change*. For Lambcote Hill Farm the land use impact is considered *Negligible Adverse* in terms of residential use and *No Change* in terms of the commercial operation.
- 13.6.9 There would be a *Negligible Adverse* land use impact on Stonebank.

Impacts on Development Land

- 13.6.10 For the land south of Rugby Road, Swinford, and north of the A14 Trunk Road on the assumption that it has planning consent for a Roadside Service Area (RSA) the impact would be *Major Adverse*. Should consent for a similar development at this location with an amended area and access be approved the impact could be reduced or avoided.

Permanent Loss of Agricultural Land

- 13.6.11 The loss of agricultural land would be kept to the minimum necessitated by the scheme design. There is no practical alternative to taking the BMV land and the overall importance of this on a national scale is considered to be *Low*. The impact of the loss of 13.22 hectares of BMV land is considered to be *Low*, verging upon *Moderate*. The *Moderate/Minor Adverse* impact on a *Medium/Low* sensitivity factor indicates this loss may be considered to be of *Slight Adverse* overall significance.

Impact on Farm Businesses

13.6.12 The operational impacts for individual farm businesses are summarised below in Table 13.1.

Table 13.1 : Operational Impacts for Farm Businesses

Receptor	Receptor Type	Sensitivity	Magnitude of Impact
Farm businesses			
Plot 1 - Land at Shawell	Farm	Low	Negligible Adverse
Plot 2 - Grange Farm	Licensed farmland	Low	Minor Adverse
Plot 3 - Tomley Hall Farm	Farm	Low	Moderate Adverse
Plot 4 - Manor Farm	Diverse farm business	Medium	Moderate Adverse
Plot 5 - Lambcote Hill Farm	Farm	Low	Minor Adverse
Plot 6 - Westfield Lodge land	Licensed farmland	Low	Negligible Adverse
Plot 7- Land at Rugby Road, Swinford (Agricultural scenario)	Licensed farmland	Low	Negligible Adverse
Plot 8 - Starmore Farm	Let farmland	Low	No Change
Plot 9 - Avon Valley Farm	Farm	Low	No Change
Plot 10 - Lilbourne Lodge Farm	Farm	Low	Negligible Adverse
Plot 11 - Whitehouse Farm	Farm	Low	No Change
Plot 12 - Land at Swinford Road, Catthorpe	Licensed farmland	Negligible	No Change

Implications for Planning Policies

13.6.13 The proposed improvement of M1 Junction 19 would not result in the loss of any publicly accessible land, amenity open space or land used by the community. There would therefore be a *Neutral Impact* on policies RC2 of the Daventry District Local Plan, LR4 of the Rugby Borough Council Local Plan and Policy 13 of the North Northamptonshire Core Strategy.

13.6.14 Overall it is considered that there would be a *Moderate Adverse Impact* on local policy objectives.

Significance of Effects

13.6.15 The identification and assessment of operational impacts and their significance, taking into account mitigation, is summarised in Table 13.2.

Table 13.2 : Summary Magnitude of Impacts and Significance of Effect for all Receptors

Receptor	Receptor Type	Sensitivity	Magnitude of Impact	Significance of Effect
Private assets				
Old Barn Farm house	Residential	Medium	No Change	Neutral
Westfield Lodge house	Residential	Medium	No Change	Neutral
Lambcote Hill Farm house	Residential	Medium	Negligible Adverse	Slight Adverse
Stonebank - three caravans and associated land	Residential / Grazing	Medium	Negligible Adverse	Slight Adverse
Old Barn Farm buildings	Commercial storage	Medium	No Change	Neutral
Westfield Lodge buildings	Commercial contracting	Medium	No Change	Neutral
Lambcote Hill Farm	Commercial contracting	Medium	No change	Neutral
Development Land				
Plot 7 - Land at Rugby Road, Swinford (Development scenario)	Roadside Service Area site as currently proposed	Medium	Major Adverse	Large Adverse
Agricultural Land				
BMV agricultural land	Finite resource	Medium	Minor Adverse	Slight Adverse
Farm businesses				
Plot 1 - Land at Shawell	Farm	Low	Negligible Adverse	Slight Adverse
Plot 2 - Grange Farm	Licensed farmland	Low	Minor Adverse	Slight Adverse
Plot 3 - Tomley Hall Farm	Farm	Low	Moderate Adverse	Slight Adverse
Plot 4 - Manor Farm	Diverse farm business	Medium	Moderate Adverse	Moderate Adverse
Plot 5 - Lambcote Hill Farm	Farm	Low	Minor Adverse	Slight Adverse

Receptor	Receptor Type	Sensitivity	Magnitude of Impact	Significance of Effect
Plot 6 - Westfield Lodge land	Licensed farmland	Low	Negligible Adverse	Slight Adverse
Plot 7- Land at Rugby Road, Swinford (Agricultural scenario)	Licensed farmland	Low	Negligible Adverse	Slight Adverse
Plot 8 - Starmore Farm	Let farmland	Low	No Change	Neutral
Plot 9 - Avon Valley Farm	Farm	Low	No Change	Neutral
Plot 10 - Lilbourne Lodge Farm	Farm	Low	Negligible Adverse	Slight Adverse
Plot 11 - Whitehouse Farm	Farm	Low	No Change	Neutral
Plot 12 - Land at Swinford Road, Catthorpe	Licensed farmland	Negligible	No Change	Neutral

13.6.16 The Preferred Route of the M1 Junction 19 Improvement would require 23.71ha of land take from some of the farms around the existing junction. Just over half (52%) of this land area is identified as best and most versatile quality. The CEA¹³ demonstrated that the Preferred Route would take the least amount of agricultural land compared to the other improvement options considered.

13.6.17 During construction, a further 6.42ha of agricultural land would be disturbed for temporary works. Measures are proposed to sustainably manage the temporary uses of land so that these areas are returned to agricultural use, to meet the objective of conserving BMV land and soils where possible.

13.6.18 The proposals would have a direct impact on three residential caravans, one of which would have to be relocated resulting in a *Moderate Adverse* effect.

13.6.19 On the assumption that the planning consent remains valid, the potential effect on the development site for a RSA as currently proposed would be *Large Adverse*.

13.6.20 There would also be an indirect impact on farm houses, commercial enterprises and farm properties in the vicinity through loss of land and changes to access.

13.6.21 One farm would suffer a *Moderate Adverse* significance of effect but all others would be *Neutral* or *Slight Adverse*. This demonstrates that the objective of minimising the adverse impact on farms set out in the introduction to this chapter has been met.

13.7 Conclusion

13.7.1 Taking into account the above assessment, the overall significance of effects for the proposals in terms of community and private assets is considered to be:-

Construction Effect : *Slight Adverse*

Operational Effect : *Slight Adverse*

14. ROAD DRAINAGE AND THE WATER ENVIRONMENT

14.1 Introduction

14.1.1 The detailed assessment of road drainage and the water environment is at Volume 2 Chapter 9 Road Drainage and the Water Environment

Objectives

14.1.2 The objectives for the road drainage and water environment assessment are:-

- To protect the water environment
- To reduce the risk of pollution and flooding

14.2 Study Area

14.2.1 The Study Area consists of all of the surface water and groundwater resources likely to be directly or indirectly affected including, in particular, the River Avon and its tributaries.

14.3 Legislation and Policy Framework

UK and EC Legislation

14.3.1 Relevant legislation comprises UK Acts and Regulations (many of the latter represent the incorporation of specific EC Directives into UK law), EC Directives and regulatory guidance. These are listed below in Table 14.1. The Environment Agency (EA) as statutory / regulatory authority applies these various forms of legislation to support the EA's role to maintain and improve the water environment within England and Wales.

Table 14.1 : Relevant UK and EC Legislation

Title	Water Feature	Summary
Water Resources Act 1991	All waters, but specifically main rivers and groundwater abstraction	Consolidates previous water legislation in respect of both the quality and quantity of water resources. Sets statutory objectives, giving the Government and the EA a legal duty to ensure that they are achieved. Gives EA power to grant licences for groundwater abstraction. Covers works in, over or under main river, control of pollution of waters, including discharge consents.
UK Town and Country Planning Act 1990	Flood Protection	Enables local authorities to enter into agreements with developers about how their land and flood defences should be managed.
Land Drainage Act 1991	Ordinary (i.e. not main) Rivers	Gives local authorities powers to undertake flood defence works on watercourses which have not been designated as "main" and which are not within internal drainage board areas. Covers works within the river channel including discharge consents
Environment Act 1995	Main Rivers	Establishment of the EA, and introduction of measures to enhance protection of the environment, including further powers for the prevention and remediation of water pollution.

Title	Water Feature	Summary
Control of Pollution Act 1974	Surface waters and groundwater	Makes it an offence for anyone to cause or knowingly permit any poisonous, noxious or polluting matter to enter any stream or controlled waters or any specified underground waters.
The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003, and EC Water Framework Directive 2000 (2000/60/EC)	Integrated river basin management of all surface waters, transitional waters and coastal waters in England and Wales	The directive sets out environmental objectives for water status based on parameters of monitoring and assessment strategies, and sets a Programme of Measures in order to meet the objectives. The Regulations transpose the directive and deal with the responsibility and timescales for setting up River Basin Districts, characterisation, economic analysis of water use, bodies of water used for abstraction for drinking water, register of protected areas etc. leading to the development of River Basin Management Plans
The Surface Water (River Ecosystem) Regulations 1994		Sets out River Ecosystem Classification system used as River Quality Objectives by the EA.
The Groundwater Regulations 1998 and EC Groundwater Directive 1980 (80/68/EEC)	Groundwater	Gives the EA powers to issue notices to control activities other than licensed disposal, where these are likely to result in an indirect or direct discharge of a listed substance to groundwater.
Surface Waters (Dangerous Substances) Regulations 1992, 1997 and 1998 and Surface Water (Classification) Regulations 1989 and EC Dangerous Substances Directive (76/464/EEC)	Surface Waters	Addresses specific hazardous substances such as mercury, cadmium and chloroform that may be discharged into surface waters and sets limit values for discharges and Environmental Quality Objectives (EQOs) for receiving waters.
The Surface Waters (Abstraction for Drinking Water) (Classification) Regulations 1996, and EC Surface Water Abstraction Directive (75/440/EEC)	Potable Abstraction from surface waters	Sets quality objectives for the surface water sources from which drinking water is taken

Title	Water Feature	Summary
The Surface Waters (Fishlife) (Classification) Regulations 1997, the Surface Waters (Fishlife) (Classification) (Amendment) Regulations 2003 and EC Freshwater Fish Directive 2006(2006/44/EC)	Fisheries	Protection of the health of freshwater fish and shellfish populations, by designating waters in need of protection and setting quality standards for those waters.
Salmon and Freshwater Fisheries Act 1975 ²¹	Fisheries	In England and Wales, it aims to prevent the spread of fish diseases and to minimise damage to fisheries or their habitat.

Environment Agency Pollution Prevention Guidelines

14.3.2 The proposed scheme would also need to take note of the EA's Pollution Prevention Guidelines (PPGs), which provide advice on statutory responsibilities and good environmental practice. The following EA PPGs are considered to be relevant to the scheme:-

- PPG1 – General guide to the prevention of pollution of controlled waters
- PPG3 – The use and design of oil separators
- PPG5 – Works in, near or liable to affect watercourses
- PPG6 – Working at construction or demolition sites
- PPG8 – Safe storage and disposal of used oils
- PPG21 – Pollution incident response planning
- PPG22 – Dealing with spillages on highways

UK Planning Policy Guidance

14.3.3 The Department for Communities and Local Government (DCLG) provides guidance in the form of Planning Policy Statements (PPSs) and Planning Policy Guidance Notes (PPGs). Relevant DCLG PPSs and PPGs are as follows:-

- PPS 25 Development and Flood Risk, 2006. This provides guidance on the protection of development to ensure public safety and prevent damage to property as a result of flooding. A Flood Risk Assessment carried out in accordance with PPS25 is at Appendix C.
- PPS23 Planning and Pollution Control, 2004. This provides guidance on the protection of the environment and humans from pollution from development in England.
- PPG13 Transport, 2001. This provides guidance to local authorities and others on transport and land use planning.

Regional Planning Policy

*West Midlands Regional Spatial Strategy (2008)*²⁶

14.3.4 The Regional Spatial Strategy for the West Midlands was adopted in 2008 and includes provisions for the protection and improvement of water quality and the reduction of flood

risk. These aims can be found in policies CC1: Climate Change and QE9: The Water Environment.

East Midlands Regional Plan (2009)

14.3.5 The East Midlands Regional Plan was adopted in 2009 and includes the provision of up-to-date policies which cover drainage and the water environment. In particular policy 32: A Regional Approach to Water Resources and Water Quality covers the protection and improvement of water quality and seeks to ensure that development does not increase the risk of pollution to vulnerable water resources. Policy 35: A Regional Approach to Managing Flood Risk aims to ensure that development does not increase the risk of flooding.

Local Authority Planning Policy

Daventry District Council Local Plan (1997)

14.3.6 The Daventry District Council Local Plan was adopted in 1997. In September 2007 any policies not “saved” expired, among these expired policies were all policies relating to drainage and the water environment.

14.3.7 These policies are to be eventually replaced with emerging policies under the Local Development Framework (LDF). Daventry are producing a joint Core Strategy as part of the LDF which is the West Northamptonshire Joint Core Strategy (2007)²⁹ which is currently at the Issues and Options Stage. This means that any policies are currently only in draft form. As the Core Strategy is currently at Issues and Options Stage there are not yet any policies, but the strategy does set out Strategic Objectives which will inform the basis of future policies. Strategic Objective 8 of the Core Strategy aims to ensure that development is sensitive to its environment.

Harborough District Council Local Plan (2001)

14.3.8 The Harborough District Local Plan was adopted in 2001 and all policies that were not formally saved expired in September 2007. There are no saved policies which relate to drainage and the water environment.

14.3.9 Harborough are in the process of producing their Core Strategy which is currently at the Final Draft stage. Within this document (2009), Potential Strategy ST1 states that all development must help mitigate and adapt to climate change and that development in areas liable to be at risk of flooding will therefore be avoided.

Rugby Borough Council Local Plan (2006)

14.3.10 The Rugby Borough Local Plan was adopted in 2006 and contains a number of saved policies. Policies GP10: Flooding and Surface Water Drainage and GP11: Pollution Control of the local plan cover issues relating to drainage and the water environment. Policy GP10 aims to ensure that development does not increase the risk of flooding and that all developments should incorporate sustainable drainage systems. Policy GP11 requires development proposals to show that there would not be any resulting pollution to surface or ground water.

14.3.11 In addition to the saved policies in the Local Plan, the emerging Core Strategy for Rugby is currently at the Proposed Submission Draft Stage. Within the Draft Submission Core Strategy Document (2009), there are no specific policies which relate to drainage or the water environment.

North Northamptonshire Core Strategy (2008)

14.3.12 The North Northamptonshire Core Strategy was adopted in 2008 and is a joint Core Strategy covering the areas of Corby, Kettering, Wellingborough and East Northamptonshire. Within this document Policy 13: General Sustainable Development Principles covers issues relating to the protection of ground water and surface water from pollution, as well as ensuring that the development does not increase flood risk. In addition to these requirements it also states that development should incorporate sustainable drainage systems.

14.4 Baseline Conditions

Surface Water

- 14.4.1 Junction 19 of the M1 lies within the upper catchment of the River Avon. The River Avon flows in a broadly south-westerly direction; it is crossed by the eastern extent of the A14 Trunk Road within the study area, and is also crossed further downstream by the southern extent of the M1 within the study area.
- 14.4.2 There are a number of tributaries in the vicinity of the junction which predominantly flow southwards / south-westwards / south-eastwards to the River Avon. These include the Swinford Lodge Brook, which is located to the north east of the junction and flows beneath the eastern extent of the A14 Trunk Road. Another tributary, the Clay Coton Yelvertoft Brook, is located to the south east of the junction and flows westwards, converging with the River Avon adjacent to and east of the M1.
- 14.4.3 The River Avon and Clay Coton Yelvertoft Brook are classified as 'main' rivers. All others are 'ordinary' watercourses.
- 14.4.4 A network of drains and ditches currently collects highway runoff from the M1, M6 and A14 Trunk Road, which is then discharged at some 11 locations to the adjacent watercourses. Water courses are currently culverted at three locations within the scheme area, beneath the M1, M6 and A14 Trunk Road. There are two bridges over the River Avon.
- 14.4.5 A number of ponds exist within the vicinity of the junction, of which some 16 are within 100 metres of the highway edge. These vary in size from small field ponds to an ornamental lake within the grounds of Catthorpe Manor. Ponds are described in more detail in Chapter 3 Ecology and Nature Conservation.
- 14.4.6 There are three surface water abstractions, licensed by the EA, within 1km of the proposed junction improvement. These abstractions are from an un-named brook to the north west of the junction, and are for general farming and domestic purposes. There are no licensed surface water abstractions within 500 metres of the proposed scheme. Severn Trent Water Ltd. abstracts water from the River Avon for public supply some 7km downstream of the junction, at Brownsover Mill, Rugby.
- 14.4.7 The EA has stated that the River Avon at Ryton (some 17km west-south-west of Junction 19) and the stretch of the River Avon downstream of Rugby (some 5km south-west of Junction 19) to Tewkesbury are considered important river coarse fisheries with a number of designated cyprinid fisheries.
- 14.4.8 From EA sampling of the River Avon, water quality was found to be generally good, varying between Grade A (very good) at Welford, 11 kilometres from the junction to

Grades B and C (good and fairly good) at the confluence with Clifton Brook, approximately seven kilometres downstream of Junction 19 to Grade B and D (fair at Clay Coton, Yelvertoft Brook immediately before its confluence with the Avon. Nitrate and phosphate levels were found to be low at Welford and very high at Clay Coton.

- 14.4.9 The existing highway drainage undergoes little treatment prior to discharge and, in addition, these receiving watercourses are very vulnerable to pollution incidents.
- 14.4.10 There are a number of consented discharges to the various watercourses in the area. The majority comprise treated sewage / storm effluent from both water companies and private residences. There are also a few site drainage trade effluent discharges.

Groundwater

- 14.4.11 The site is underlain by a mixture of non-aquifer and minor aquifers. The distribution of the latter are associated with the location of the various surface watercourses
- 14.4.12 There are some areas of made ground (described in more detail in Volume 2 Chapter 5 Materials), mainly associated with borrow pits from various earlier phases of road construction, which appear to have been infilled with 'inert' construction waste. There is a former Cleanaway landfill site (Cathorpe Landfill, NGR SP 553 787) located adjacent to the south of the M6, which was licensed between 1977 and 1986 to receive domestic and industrial wastes.
- 14.4.13 There is one private well (NGR SP 5610 7775) within 1km radius of the proposed scheme, two abstractions from groundwater within 500 metres for general farming and domestic use. In addition, there are 26 abstractions from groundwater between 500m and 1km from the site. Of these, 21 are for mineral washing / mineral products at Gibbett Quarry in Shawell, to the north west of the Junction, and six are for general farming and domestic use at other locations.
- 14.4.14 No groundwater source protection zones (SPZs) are shown on the EA website records within 1km of the proposed scheme. The nearest SPZs are approximately 7km to the north east, near to Welford and North Kilworth.

Surface Water Flows and Flood Risk

- 14.4.15 The floodplain of the River Avon and the Clay Coton Yelvertoft Brook is crossed by the A14 Trunk Road to the east of the junction and the M1 to the south. The indicative floodplain illustrated in Figure C Environmental Resources is interpreted as the flood risk area based on an event with a 1% chance of occurring in any given year, otherwise described as a 1 in 100 year flood event. Figure C also indicates the floodplain with a 0.1% chance of occurrence in any given year, i.e. a 1 in 1,000 year flood event.

Sensitivity Assessment of Receptors

- 14.4.16 Table 14.2 summarises the importance of the various features using the criteria set out in Table 9.1 of Chapter 9.

Table 14.2 : Water Environment Features Summary

Feature & Attribute / Service	Quality Indicator	Scale ^A , Details and Grading	Importance
Surface Water			
River: Water supply Transport & dilution of waste products	Chemical water quality	Regional / Local: River Avon RE1	Very High
		Regional / Local: Clay Coton Yelvertoft Brook RE2	High
		Local: Status of other water courses not recorded	(assumed) Medium - Low
	Non potable abstraction	Local: No abstractions within 2 km downstream:	Low
	Drinking water supply	National / Regional: River Avon drinking water supply downstream of development.	High
River: Biodiversity ^B	Biological water quality	Regional / Local: River Avon GQA C (monitored downstream of site)	Medium
		Local: Status of other water courses not recorded	(assumed) Medium
	Fisheries quality	Regional: River Avon designated cyprinid fishery	High
		Local: Status of other watercourses not recorded, assumed undesignated / non fishery	Medium
River: Conveyance of flow and material	Nature of watercourses	Regional / Local: River Avon and Clay Coton Yelvertoft Brook both main rivers assumed <10m wide	Medium
		Local: Swinford Lodge Brook and other ordinary rivers assumed <5m wide, and other water courses	Low
Still Waters: Biodiversity		Local: A number of ponds within close vicinity to proposed route. Some of ecological importance (see Chapter 3 Ecology and Nature Conservation)	Low

Feature & Attribute / Service	Quality Indicator	Scale ^A , Details and Grading	Importance
Groundwater			
Groundwater: Water supply Transport and dilution of waste products	Non potable abstraction	Local: Two licensed abstractions within 500 metres of the Junction include agricultural use. Other abstractions up to 1km away, but assumed to be outside of zone of influence	Low
	Drinking water supply	National / Regional: No public supplies	Low
		Local: Two licensed abstractions within 500 metres of the Junction and five licensed abstractions up to 1km away include domestic use. Private water supply at Station House, Lilbourne, assumed to be <math><10\text{m}^3/\text{d}</math>	Medium
	Vulnerability	National / Regional: No source protection zones & no major aquifers	Low
		Local: Minor alluvial & river terrace gravel deposits aquifer with low leaching soils	Low
		Local: Non aquifer Lower Lias Group strata & Glacial Till	Low
	Flood Risk		
Floodplain: Conveyance of flood flows	Surface waters	Regional / Local: Proposed Development within River Avon and Clay Coton Yelvertoft Brook 1:100 year indicative floodplain	Medium
	Groundwater	Local: Alluvial and river terrace gravel deposits with water table in places below 1m	Medium
		Local: Clay soils	Low

^A The majority of features are deemed to be of 'local' scale. Regional / national status has been afforded to important main rivers, public water supplies, major aquifers etc.

^B Conservation value is not included; this is covered within Chapter 3 Ecology and Nature Conservation

14.5 Mitigation

14.5.1 During the construction and subsequent operation of the junction improvement, there would be a number of activities which have the potential to impact upon controlled waters, as described below.

Potential Impacts

Construction

14.5.2 The following potential impacts could occur during construction:-

- Generation of surface runoff containing high suspended solids arising from various activities including soil stripping and landscaping, demolition, excavation, infilling, embankments, importation and exportation of soil or fill material, storage and stockpiling, dust suppression, wheel washes, etc.
- Spillages of oil, fuel or other construction chemicals
- Piling for any of the larger structures
- Watercourse crossings and diversions
- Works within the floodplain
- Disturbance of contaminated land, such as the former landfill
- Dewatering
- Creation and removal of ponds, diversion and culverting of existing watercourses
- Development within the floodplain

Operation

14.5.3 The operational phase covers the use of the junction once construction has been completed. The following potential impacts could occur over the long term:-

- Highway runoff discharges including spillages of predominantly oil/fuel and de-icing
- Piled foundations providing pathways for migration
- Changes to land drainage, surface runoff and water quality

Construction Environmental Management Plan

14.5.4 A Construction Environmental Management Plan (CEMP) is being developed for the junction improvement. An outline CEMP has been prepared and is summarised at section 16. The outline CEMP sets out the key measures that would be implemented on the site to manage water resources on the site throughout the construction works and minimise risks to the water environment.

Permanent Drainage

14.5.5 The permanent solution for the drainage of the M1 Junction 19 Improvement would maintain the existing drainage patterns, with improved pollution control and reduced overall discharge rates compared with the existing situation. The proposed drainage arrangements include mitigation measures for 'normal' runoff and pollution incidents for the main road network.

14.5.6 Water quality treatment and pollution incident control would be provided by ponds designed to attenuate or reduce the flow of highway run-off, to provide pollution control in the event of a spillage and to treat the water by removing pollutants. Actual outlines are illustrated on Figure B, the Environmental Master Plan. The ponds would be lined so that there would be no discharges to groundwater. In terms of run-off discharge rates, the ponds have been designed in accordance with EA requirements, and in accordance with PPS 25, to allow for the effect of climate change.

- 14.5.7 Some catchments would be retained without any modifications to the existing highway drainage network, where existing drainage flows would not change or only increase slightly.
- 14.5.8 Drainage from the local road network is not included in these arrangements. Over-the-edge drainage into adjacent ditches is the general proposal for the local road network.

Flood Compensation

- 14.5.9 Proposed works to widen the A14 embankments would displace part of the floodplain of the River Avon, and thereby reduce flood storage capacity. In addition, two bridleway bridges would be built in the floodplain, and would also reduce the capacity. To mitigate these impacts, several flood compensation areas would be excavated to provide additional flood storage capacity equivalent to that lost. Some of the proposed compensation areas would be returned to agricultural use. Others have been sited to coincide with proposals for habitat creation and these are described in detail in Chapter 3 Ecology and Nature Conservation.

River Channel Regrading

- 14.5.10 Sections of the river bank between the A14 and M1 would be graded to a shallower profile. The objective of these works is not hydrological but ecological, and the measure is described in more detail in Chapter 3 Ecology and Nature Conservation. Enlarging the channel would not provide any direct flood compensation.
- 14.5.11 The existing line of brook Swinford Lodge Brook, a tributary of the River Avon would be affected by the works to the A14 and a new section replicating a narrow meandering channel is proposed, integrated with flood compensation and habitat creation.

14.6 Magnitude of Impact and Significance of Effects

- 14.6.1 Tables 14.3 and 14.4 summarise the magnitude of impacts and significance of effects for the drainage and water environment within the study area.

Surface Waters

Construction

- 14.6.2 Leaks and spills of hydrocarbons or other pollutants or discharge of runoff containing high concentrations of suspended solids could cause pollution of surface waters. The surface waters which flow through the study area are of good quality, and such pollution incidents would have serious effects on water quality downstream, if they were allowed to occur. These can be reduced through good site practice and management in line with the CEMP.
- 14.6.3 The effects of spillage events associated with construction are likely to be temporary. By definition, any such occurrence would be accidental, and its precise nature and scale could not be precisely predicted.
- 14.6.4 During construction there would be a number of temporary haulage road crossings required across various watercourses resulting in a short-to-medium term change to the form of the river channel and temporary smothering of small sections of the water course bed. There would also be modification of existing culverts, together with decommissioning of others. Such works could potentially cause deterioration in water quality due to

sediment mobilisation from the disturbance of the river banks and riverbed. Precautions and procedures would be followed.

- 14.6.5 Existing ponds in the vicinity of the junction improvement are not expected to be affected by runoff or spillages, as runoff would be collected within the surface water management system and disposed of as appropriate.
- 14.6.6 Water levels in all rivers, except very locally in the River Avon, are not predicted to change during the works.

Operation

- 14.6.7 The main risk to surface waters is from runoff discharges and accidental spillages with the potential impact(s) as described for the construction works.
- 14.6.8 The probability of pollution from an accidental spillage reaching a receiving watercourse has been assessed for the proposed junction improvement, and the calculations that the risk of pollution can be assessed as being acceptable. The initial calculations do not take into account the mitigation measures of the proposed treatment and attenuation ponds, which according to DMRB guidance can reduce the pollution incident risk by 50%.

Groundwater

- 14.6.9 Groundwater resources can be affected by changes in groundwater elevations / flows or quality. Changes in quality and flows can affect abstractions.

Construction

- 14.6.10 Leaks and spills of hydrocarbons or other pollutants could cause localised pollution of groundwater anywhere within the extent of the works where such incidents could occur. Although much of the study area is underlain by a minor aquifer, it is designated of low vulnerability and therefore groundwater should not be particularly susceptible to pollution.
- 14.6.11 The majority of the proposed drainage ponds, and the flood compensation areas, would be located over the minor aquifer. It is not expected that the excavation of these structures would be below the water table and therefore there should be no requirement for dewatering.
- 14.6.12 The risk of encountering groundwater during the construction of both the Swinford Road Cutting and the M6-A14 Link is considered to be high, although the volume of groundwater seepage into the cuttings is likely to be slow.
- 14.6.13 Foundations for some of the larger structures, such as the overbridges, may require deeper excavations and therefore there may be localised areas where dewatering operations may be required.
- 14.6.14 Another source of potential contamination is remobilisation of contaminated land. The only known source on site is the area of the former Cleanaway landfill site. However, the junction improvement has been designed to avoid the area. Thus the risk of groundwater pollution by disturbance is negligible. Volume 2 Chapter 5, Materials, deals with this issue in more detail.

Operation

- 14.6.15 A system of ditches and filter drains exists to intercept and divert groundwater at the existing highway boundary, and it is proposed to maintain and supplement this system as appropriate to control groundwater levels as necessary along the highway. Filter drains would be used at the base of embankments. Minor levels of infiltration to groundwater may occur. However, no significant change to groundwater levels or discharges is likely to arise from the operation of any of the junction options.
- 14.6.16 Carriageway runoff would be collected in drainage ponds and discharged to surface water. It is proposed that the ponds would be lined to prevent potentially contaminated water migrating down to the underlying groundwater.
- 14.6.17 Some works, such as bridges, would involve piled foundations through areas of the minor aquifer. These piled foundations may cause localised changes to groundwater flow and provide a potential downward migration pathway. 'Contaminated' land should not be piled through, and the type of pile may also be chosen to restrict downward migration. There is no piling proposed in the vicinity of the former Cleanaway landfill site.

Flood Risk

- 14.6.18 The A14 part of the site is situated in Flood Zone 3a High Probability, as defined by Planning Policy Statement 25 (PPS 25). The widening of the A14 would displace the existing floodplain, and would be mitigated by introducing floodplain compensation areas. With the compensation in place, there would be no increase in flood risk. A Flood Risk Assessment⁴⁸ has been carried out in accordance with PPS 25.
- 14.6.19 Two bridleway crossings over the River Avon would be constructed within the 1 in 100 year floodplain. These structures would be at risk of flooding, and would not be passable during flood events. They have been allowed for in assessing the flood compensation required.
- 14.6.20 The increased highway area would result in a net increase in highway runoff and a system of attenuation ponds has been designed to ensure that there is no increase in runoff to the surface watercourses.
- 14.6.21 To mitigate against the risk of groundwater seepage in cuttings, filter drains and slope drainage would be used.
- 14.6.22 In summary, all flood risks associated with the junction improvement could be successfully managed.

Implications for Planning Policies

- 14.6.23 Overall, it is not considered that the proposed improvement to Junction 19 would negatively impact on Regional or Local policy principles and objectives, providing that sustainable measures such as Sustainable Drainage techniques and other mitigation measures to minimise the potential for pollution and flooding are implemented where possible throughout the scheme.

Significance of effects

- 14.6.24 The main potential impact of the proposed junction improvement is pollution of surface waters. Mitigation measures have been proposed within this chapter to reduce the potential for pollution and other impacts to surface waters.
- 14.6.25 With respect to groundwater, the potential impacts are more minor in comparison and therefore fewer mitigation measures have been proposed.

Construction

- 14.6.26 Summary Assessment: *Moderate Adverse* effect.
- 14.6.27 The effect is conservative due to two *Moderate/Large Adverse* effects relating to potential pollution of the River Avon drinking water supply and designated fishery which is of *Very High* importance. However, the risk associated with these impacts is temporary and of very short potential duration as the treatment ponds would be constructed early, providing mitigation for accidental spillage.

Operation

- 14.6.28 Summary Assessment: *Slight Beneficial* effect
- 14.6.29 There would be beneficial effects associated with improvements in water quality as a result of the treatment provided by the drainage ponds, and by penstocks and oil interceptors and improved signing of these systems for emergency personnel. In most cases, these beneficial effects would be *Slight*, although there would be a *Moderate Beneficial* effect on chemical water quality in the River Avon. There would be a *Slight Adverse* effect on the nature of the watercourses due to the addition of permanent structures in and over them. All other effects would be *Neutral*.

14.7 Conclusion

Overall Effect

- 14.7.1 Summary Assessment: *Neutral*
- 14.7.2 The construction impacts would be of limited duration compared with the operation, and the negative scoring for the construction reflects the risk of incidents occurring prior to implementation of mitigation measures. During operation, the effective operation of the highway drainage system and emergency procedures should ensure that there would be a *Slight Beneficial* effect on the water environment.

Table 14.3 : M1 Junction 19 Water Environment Features Summary: Construction Effects

Feature & Attribute / Service	Quality Indicator	Scale ¹ , Details and Grading	Importance	Potential Impact	Magnitude without Mitigation	Magnitude with Mitigation	Significance of Effect	
Surface Water								
River: Water supply Transport & dilution of waste products	Chemical water quality	Regional / Local: River Avon RE1	Very High	Pollution: Local works in, over and in the vicinity of watercourses	Unknown	Minor adverse	Moderate / Large adverse	
		Regional / Local: Clay Coton Yelvertoft Brook RE2	High			Minor adverse	Slight / Moderate adverse	
		Local: Status of other water courses not recorded	(assumed) Medium - Low			Minor adverse	Neutral	
	Non potable abstraction	Local: No abstractions within 2 km downstream:	Low	None		(Negligible)	Neutral	
	Drinking water supply	National / Regional: River Avon drinking water supply downstream of development	High	Pollution: Local works in, over and in the vicinity of watercourses		Moderate adverse	Moderate / Large adverse	
River: Biodiversity	Biological water quality	Regional / Local: River Avon GQA C (monitored downstream of site)	Medium	Pollution: Local works in, over and in the vicinity of watercourses	Unknown	Minor adverse	Slight adverse	
		Local: Status of other water courses not recorded	(assumed) Medium			Minor adverse	Neutral	
	Fisheries quality	Regional: River Avon designated cyprinid fishery	High	Pollution: Local works in, over and in the vicinity of watercourses		Unknown	Moderate adverse	Moderate / Large adverse
		Local: Status of other watercourses not recorded, assumed undesignated / non fishery	Medium				Minor adverse	Slight adverse

Feature & Attribute / Service	Quality Indicator	Scale ¹ , Details and Grading	Importance	Potential Impact	Magnitude without Mitigation	Magnitude with Mitigation	Significance of Effect
River: Conveyance of flow and material	Nature of watercourses	Regional / Local: River Avon and Clay Coton Yelvertoft Brook both main rivers assumed <10m wide	Medium	Disruption: Local works in, over and in the vicinity of water courses (but of short duration)	Unknown	Minor adverse	Slight adverse
		Local: Swinford Lodge Brook and other ordinary rivers assumed <5m wide, and other water courses	Low			Minor adverse	Neutral
Still Waters: Biodiversity		Local: A number of ponds within close vicinity to proposed route. Some of ecological importance (see Chapter 4 Ecology and Nature Conservation)	Low	Pollution and loss of water in ponds unlikely: minimal impact with respect to water resources	Unknown	Minor adverse / negligible	Neutral

Feature & Attribute / Service	Quality Indicator	Scale ¹ , Details and Grading	Importance	Potential Impact	Magnitude without Mitigation	Magnitude with Mitigation	Significance of Effect
Groundwater							
Groundwater: Water supply Transport and dilution of waste products	Non potable abstraction	Local: Two licensed abstractions within 500 metres of the Junction include agricultural use. Other abstractions up to 1km away, but assumed to be outside of zone of influence	Low	Cuttings may intercept groundwater and require dewatering, leading to lowering of the water table. Potential reduction in quality or supply	Negligible	Negligible	Neutral
	Drinking water supply	National / Regional: No public supplies	Low	None	Negligible	Negligible	Neutral
		Local: Two licensed abstractions within 500 metres of the Junction and five licensed abstractions up to 1km away include domestic use. Private water supply at Station House, Lilbourne, assumed to be <10m ³ /d	Medium	Cuttings may intercept groundwater and require dewatering, leading to lowering of the water table. Potential reduction in quality or supply	Negligible	Negligible	Neutral
	Vulnerability	National / Regional: No source protection zones & no major aquifers	Low	None	(Negligible)	(Negligible)	(Neutral)
		Local: Minor alluvial & river terrace gravel deposits aquifer with low leaching soils	Low	Pollution	Unknown	Minor adverse	Neutral
		Local: Non aquifer Lower Lias Group strata & Glacial Till	Low	Pollution	Unknown	Negligible / minor adverse	Neutral

Feature & Attribute / Service	Quality Indicator	Scale ¹ , Details and Grading	Importance	Potential Impact	Magnitude without Mitigation	Magnitude with Mitigation	Significance of Effect
Flood Risk							
Floodplain: Conveyance of flood flows	Surface waters	Regional / Local: Proposed Development within River Avon and Clay Coton Yelvertoft Brook 1:100 year indicative floodplain	Medium	Works within floodplain (but flood compensation provided at early stage)	Minor adverse	Minor adverse / negligible	Slight adverse
	Groundwater	Local: Alluvial and river terrace gravel deposits with water table in places below 1m	Medium	Some works but minimal loss of deposits	Negligible	Negligible	Neutral
		Local: Clay soils	Low	None	(Negligible)	(Negligible)	(Neutral)

¹ Assume that quality and rarity of the same grading and that all features of limited substitutability

Table 14.4 : M1 Junction 19 Water Environment Features Summary: Operation Effects

Feature & Attribute / Service	Quality Indicator	Scale ¹ , Details and Grading	Importance	Potential Impact	Magnitude without Mitigation	Magnitude with Mitigation	Significance of Effect
Surface Water							
River: Water supply Transport & dilution of waste products	Chemical water quality	Regional / Local: River Avon RE1	Very High	Increased routine runoff to watercourses. Pollutant concentrations within acceptable limits. Slight increase in pollution incident risk. The introduction of treatment ponds and other pollution prevention measures offer an improvement in the quality of discharges to receiving waters, compared with the do minimum scenario.	Negligible	Minor beneficial	Moderate beneficial
		Regional / Local: Clay Coton Yelvertoft Brook RE2	High		Negligible	Minor beneficial	Slight beneficial
		Local: Status of other water courses not recorded	(assumed) Medium - Low		Negligible	Minor beneficial	Slight beneficial
Non potable abstraction		Local: No abstractions within 2 km downstream:	Low	None	(Negligible)	(Negligible)	(Neutral)
Drinking water supply		National / Regional: River Avon drinking water supply downstream of development, assumed DW3 and within critical travel time	High	Increased routine runoff to watercourses. Pollutant concentrations within acceptable limits. Slight increase in pollution incident risk. The introduction of treatment ponds and other pollution prevention measures offer an improvement in the quality of discharges to receiving waters, compared with the do minimum scenario.	Negligible	Minor beneficial	Slight beneficial

Feature & Attribute / Service	Quality Indicator	Scale¹, Details and Grading	Importance	Potential Impact	Magnitude without Mitigation	Magnitude with Mitigation	Significance of Effect
River: Biodiversity	Biological water quality	Regional / Local: River Avon GQA C (monitored downstream of site)	Medium	Increased routine runoff to watercourses. Pollutant concentrations within acceptable limits. Slight increase in pollution incident risk. The introduction of treatment ponds and other pollution prevention measures offer an improvement in the quality of discharges to receiving waters, compared with the do minimum scenario.	Negligible	Minor beneficial	Slight beneficial
		Local: Status of other water courses not recorded	(assumed) Medium		Negligible	Minor beneficial	Slight beneficial
	Fisheries quality	Regional: River Avon designated cyprinid fishery	High		Negligible	Minor beneficial	Slight beneficial
		Local: Status of other watercourses not recorded, assumed undesignated / non fishery	Medium		Negligible	Minor beneficial	Slight beneficial
River: Conveyance of flow and material	Nature of watercourses	Regional / Local: River Avon and Clay Coton Yelvertoft Brook both main rivers assumed <10m wide	Medium	Disruption: Local minor additional permanent structures in and over watercourses	Minor adverse / negligible	Minor adverse / negligible	Slight adverse

Feature & Attribute / Service	Quality Indicator	Scale¹, Details and Grading	Importance	Potential Impact	Magnitude without Mitigation	Magnitude with Mitigation	Significance of Effect
		Local: Swinford Lodge Brook and other ordinary rivers assumed <5m wide, and other water courses	Low		Minor adverse / negligible	Minor adverse / negligible	Neutral
Still Waters: Biodiversity		Local: A number of ponds within close vicinity to proposed route. Some of ecological importance (see Chapter 4 Ecology and Nature Conservation)	Low	No impact during operation	(Negligible)	(Negligible)	(Neutral)

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Feature & Attribute / Service	Quality Indicator	Scale ¹ , Details and Grading	Importance	Potential Impact	Magnitude without Mitigation	Magnitude with Mitigation	Significance of Effect
Groundwater							
Groundwater: Water supply Transport and dilution of waste products	Non potable abstraction	Local: Two licensed abstractions within 500 metres of the Junction include agricultural use. Other abstractions up to 1km away, but assumed to be outside of zone of influence	Low	Potential slight loss in recharge, but unlikely reduction in supply; Quality unaffected.	Negligible	Negligible	Neutral
	Drinking water supply	National / Regional: No public supplies	Low	None	(Negligible)	(Negligible)	(Neutral)
		Local: Two licensed abstractions within 500 metres of the Junction and five licensed abstractions up to 1km away include domestic use. Private water supply at Station House, Lilbourne, assumed to be <math><10\text{m}^3/\text{d}</math>	Medium	Potential slight loss in recharge, but unlikely reduction in supply; Quality unaffected.	Negligible	Negligible	Neutral
	Vulnerability	National / Regional: No source protection zones & no major aquifers	Low	None	(Negligible)	(Negligible)	(Neutral)
		Local: Minor alluvial & river terrace gravel deposits aquifer with low leaching soils	Low	None: quality unaffected	(Negligible)	(Negligible)	(Neutral)

Feature & Attribute / Service	Quality Indicator	Scale ¹ , Details and Grading	Importance	Potential Impact	Magnitude without Mitigation	Magnitude with Mitigation	Significance of Effect
		Local: Non aquifer Lower Lias Group strata & Glacial Till	Low	None: quality unaffected	(Negligible)	(Negligible)	(Neutral)
Flood Risk							
Floodplain: Conveyance of flood flows	Surface waters	Regional / Local: Proposed Development within River Avon and Clay Coton Yelvertoft Brook 1:100 year indicative floodplain	Medium	Potential increase in flood peak due to construction within flood plain	Minor adverse	(Negligible)	(Neutral)
				Change in road runoff rates	Minor adverse	Minor beneficial	Slight beneficial
	Groundwater	Local: Alluvial and river terrace gravel deposits with water table in places below 1m	Medium	Residual loss of deposits during construction phase	Negligible	Negligible	Neutral
				Local: Clay soils	Low	None	(Negligible)

¹ Assume that quality and rarity of the same grading and that all features of limited substitutability

15. ASSESSMENT OF CUMULATIVE EFFECTS

15.1 Introduction

15.1.1 This section considers the potential cumulative impacts for the project. These fall into two types:-

- cumulative effects arising from within the project itself where impacts of different types arising under different topics can combine to potentially increase effects on a single receptor or environmental resource. For example, people in their homes may be affected by adverse effects in terms of noise, air quality and visual impact combined.
- cumulative effects from other reasonably foreseeable projects in combination with the project being assessed. Such projects may include other nearby highway projects or development projects. These could include multiple impacts of the same type acting on a single receptor or environmental resource.

15.1.2 Volume II of the DMRB⁵ interprets ‘reasonably foreseeable’ to include other projects that are committed. These should include, but not necessarily be limited to:-

- Trunk road and motorway projects which have been confirmed, that is they have gone through the statutory processes
- Development projects with valid planning permissions as granted by the Local Planning Authority, and for which formal EIA is a requirement, or for which non-statutory environmental impact assessment has been undertaken.

15.1.3 The approach to determining whether cumulative effects are likely to be significant are set out in Section 4.8, with Table 4.6 setting out criteria to define significance.

15.2 Potential Cumulative Effects Arising from within the Project

15.2.1 Table 15.1 below illustrates the potential for interaction between the various topics.

Table 15.1 : Interactions Between the Various Topic Areas

	Air Quality	Cultural Heritage	Ecology	Landscape	Materials	Noise	All Travellers	Comm'ty & Private Assets	Road Drainage & Water
Air Quality									
Cultural Heritage									
Ecology									
Landscape									
Materials									
Noise									
All Travellers									
Community & Private Assets									
Road Drainage & Water									

15.2.2 Typical interactions affecting single receptors to be considered by the EIA are as follows:-

- Noise and air quality changes and visual impacts can combine for dwellings, particularly those closest to the scheme such as Old Barn Farm, Tomley Hall Farm, Lambcote Hill Farm and Westfield Lodge. Such combined impacts could occur both during the construction and operational phases of the scheme.
- The River Avon and its wildlife including otters may be affected by risks of pollution and disturbance due to construction processes or the use of a proposed bridleway adjacent to the river.
- Agricultural resources may be affected by temporary and permanent landtake, by dust arising during construction, by proposals for PROW, by access issues, materials handling including soil restoration and by proposals such as landscaping or drainage ponds required to mitigate other environmental effects.
- The setting of cultural heritage features can be impacted by a combination of visual and noise impact.

15.2.3 Many of these interactions have been dealt with under the respective topics in any event. For example the assessment of community and private assets does take into account all the varied land requirements for the various land holdings, whether temporary or permanent. The assessment of cultural heritage takes into account the effects of noise and visual impact upon the setting of historic buildings in reaching its conclusions.

15.2.4 The River Avon is regarded as highly sensitive in terms of its combined water equality and biodiversity value and both topics acknowledge the risks of pollution incident on the whole environment of the river.

15.2.5 However individual impacts on dwellings and their occupants are not drawn together in the respective assessments on air quality, visual intrusion and noise.

15.2.6 Table 15.2 below combines the data available for some of the properties most exposed to the impacts of the project.

Table 15.2 : Noise, Air Quality and Visual Impact Interactions for Properties

Location	Traffic Noise	Construction Noise	Air Quality	Visual Impact	Comment
Tomley Hall Farm	Minor increase	Minor Adverse	NO ₂ 2.2% increase Minor Adverse PM ₁₀ 0.8% increase Negligible	Substantial	Minor noise change is from 61 – 62 dB(A). These are not high levels compared to the properties below. Increases in NO ₂ and PM ₁₀ are relative to overall reductions without the project between 2007 and 2014 of 19.9% and 5.4%. However there would be a substantial visual impact initially due to the opening up of views.
Stonebank	Minor increase	Moderate Adverse	NO ₂ 4.5% reduction Minor Beneficial PM ₁₀ 0.6% increase Negligible	Substantial	Minor noise change is from 73 – 75 dB(A) which can be regarded as very high levels, experienced with minor variations by 3 residents. This location is immediately adjacent to construction activity. There would be some improvement in NO ₂ levels. Substantial visual impact due to proximity and loss of vegetation.
Westfield Lodge	Moderate increase	Minor Adverse	NO ₂ 2.5% reduction Minor Beneficial PM ₁₀ 0.8% increase Negligible	Substantial	Moderate noise increase is from 67 – 70 dB(A). Construction noise from adjacent site compound. Changes in air quality would be an improvement in NO ₂ levels and a <i>Negligible</i> change for PM ₁₀ . Substantial visual impact due to proximity of 8m high embankment and bridge over Rugby Road.
Lambcote Hill Farm	Moderate reduction	Minor Adverse	NO ₂ 3.3% decrease Minor Beneficial PM ₁₀ 0.5% increase Negligible	Moderate	Moderate reduction in noise levels from 65 – 62 dB(A) due to traffic reductions on Shawell Road. Construction noise from replacement of Shawell Road overbridge. An improvement in NO ₂ levels and <i>Negligible</i> change for PM ₁₀ . Moderate visual impact due to clear views of the junction. Temporary views of site compound.
Old Barn Farm	No Change	Minor Adverse	NO ₂ 0.0% Negligible PM ₁₀ 0.5% increase Negligible	Moderate	No change to 66dB(A) noise level. This is one of the closest properties to M1, but it would not qualify for noise insulation. Changes in Air quality would be <i>Negligible</i> . Moderate visual impact results from loss of vegetation.
35 Yelvertoft Road Lilbourne	No change	None	NO ₂ 1.2% reduction Minor Beneficial PM ₁₀ 0.3% reduction Negligible	None	This property is close to M1 and has high noise levels of 71 dB(A) but there would be no change due to the project and it would not qualify for noise insulation No visual impact. NO ₂ levels are also high but just below the threshold.
	Comparing 2029 DM/DS		Comparing 2014 DM/DS	Comparing 2014 DM/DS	

- 15.2.7 The data entered is to present the worse case scenario for each of the issues covered:-
- traffic levels would be higher in 2029 for the noise assessment
 - air quality levels would reduce after 2014 due to tighter emissions controls
 - visual impact would be higher in 2014 before proposed planting has had time to take effect
- 15.2.8 The table demonstrates that those properties close to the motorway already have relatively high noise levels but that any further increases due to the project would be generally *Minor*. Changes in air quality would also be *Negligible* or *Minor*. Given their proximity to the junction initial visual impact would be *Substantial* to *Moderate* but as planting became effective these impacts would reduce.
- 15.2.9 It is considered that the effects are locally significant and in terms of the criteria set out in Table 4.6 would represent a *Minor Adverse* cumulative effect overall.
- 15.2.10 The remainder of this section goes on to consider cumulative effects from different projects. Figure O in Appendix 1 illustrates the local projects.

15.3 Catthorpe Viaduct Replacement

- 15.3.1 As set out in the introduction Catthorpe Viaduct which carries the M6 – M1 Southbound link over the M1 is being replaced as a maintenance project. The scope of this work includes the replacement of the bridge on a new alignment immediately to the south west of the existing. It also requires the creation of new approach embankments either side of the M1. The work is programmed to begin in June 2010 for completion in November 2011, and its extent is shown on Figure O.
- 15.3.2 A separate environmental assessment² has been carried out for the bridge replacement as a standalone maintenance project.
- 15.3.3 This EIA for the M1 Junction 19 Improvement takes into account the new bridge both:-
- As part of the existing junction assuming the M1 Junction 19 Improvement is not built, the 'Do-minimum' scenario
 - As part of the completed M1 Junction 19 Improvement, the 'Do-something' scenario
- 15.3.4 Where appropriate references have been made to the impacts that the Catthorpe Viaduct Replacement would have on its own account, for example the importation of 20,000 cubic metres of materials required to construct the embankments on either side of the bridge. A further example would be the need to translocate a nationally scarce beetle from the motorway verges directly affected by the viaduct replacement works.
- 15.3.5 However in general terms, the separate non statutory environmental assessment² carried out for the viaduct replacement alone concludes that there are no likely significant environmental effects.
- 15.3.6 The majority of impacts and effects are confined to the temporary construction phase of the project and all but one of the effects listed are confined to *Neutral*, *Slight Adverse* or *Slight Beneficial*.

- 15.3.7 Only one effect is assessed as *Moderate Adverse*. This is related to the potential risk of an impact resulting from a pollution incident from accidental spillage or discharge of suspended solids affecting the surface waters of the River Avon. As defined in this ES, the value / sensitivity of the River Avon is *Very High*.
- 15.3.8 However this effect is considered to be a risk, that is, if a pollution incident were to occur despite the measures included in the CEMP to protect water courses the impact would be *Moderate Adverse*. However it is not considered that this effect is likely to occur as such incidents can be reduced through good site practice and management in line with the CEMP. A similar impact has been identified for the junction improvement.
- 15.3.9 The relevant issue in cumulative terms is that total length of construction activities would be 18 months in addition to the construction period for the junction improvement.
- 15.3.10 In combination the two projects would extend the potential risk to the River Avon.
- 15.3.11 However this effect has already been taken into account in the EIA for the junction improvement which assumes the Catthorpe Viaduct as part of the Do-something.
- 15.3.12 In the same way effects resulting from visual impact, and the loss of environmental resources such as vegetation, habitats and cultural features have all included the works to the Catthorpe Viaduct.
- 15.3.13 There is then no further cumulative effect to report.

15.4 Development Policies

Background

- 15.4.1 In general terms the proposal to improve M1 Junction 19 would have been taken into account by all tiers responsible for preparing land use plans, at Regional and Local Level.
- 15.4.2 Section 2.4 sets out the background of relevant policies and plans including:-
- Regional Spatial Strategy for the West Midlands : January 2008
 - East Midlands Regional Plan : March 2009
 - Milton Keynes and South Midlands Sub-Regional Strategy 2005
 - Warwickshire Local Transport Plan 2006 – 2011
 - Northamptonshire Local Transport Plan 2006 – 2011
- 15.4.3 The assessment concludes that in general the scheme would be supportive of those planning policies, including those which promote accessibility, regeneration priorities and better linkages to support sustainable growth of the regional economy.
- 15.4.4 It is then likely that improvement of the M1 Junction 19 would contribute to further development within the East Midlands Region, but development which is planned, sustainable and subject to its own environmental safeguards. It is beyond the scope of the EIA for M1 Junction 19 to consider the impacts of such planned development in detail.

Impact of Development on Traffic Forecasts

- 15.4.5 It is necessary to consider the potential impact of planned developments upon the junction proposals as they would influence the potential traffic use of the junction. This in turn influences the design and scale of the proposals, and the environmental impact resulting from the traffic, in particular noise and air quality impacts which are directly related to traffic volumes.
- 15.4.6 The traffic forecasts take into account all allocations for residential and employment development as set by the adopted strategic and local plans up to 2029, which is the design year for the project.
- 15.4.7 The allocations are set out in Table 15.3 below. As they are reflected in the traffic flows for the proposals, the developments proposed have been taken into account in the environmental assessment.

Table 15.3 : Summary of Allocated Developments

Authority / Development	2008 – 2014	2014 – 2021	2021 – 2029
	Allocated Developments	Allocated Developments	Allocated Developments
Rugby			
Residential (Dwellings)	360	420	--
Employment (Hectares)	106.6	--	--
Northampton			
Residential (Dwellings)	9000	12250	--
Employment (Hectares)	--	--	--
Daventry			
Residential (Dwellings)	2070	6418	--
Employment (Hectares)	18.1	3.62	--
Daventry International Freight Terminal			
Residential (Dwellings)	--	--	--
Employment (Hectares)	25.86	30.17	8.53
Corby			
Residential (Dwellings)	6078	8297	--
Employment (Hectares)	--	--	--
Kettering			
Residential (Dwellings)	4248	5213	--
Employment (Hectares)	--	--	--
Wellingborough			
Residential (Dwellings)	4341	6083	--
Employment (Hectares)	--	--	--
Harborough			
Residential (Dwellings)	2220	2590	--
Employment (Hectares)	--	--	--
Harborough Magna Park			
Residential (Dwellings)	--	--	--
Employment (Hectares)	13.5	--	--

- 15.4.8 It is important to note that further potential development based upon emerging regional documents and plans are not taken into account in the traffic flows used for the environmental assessment.

15.4.9 The traffic modelling has also taken into account other committed transport projects which could interact with the project and influence flows. These are:-

- M1 widening Junctions 6a – 10
- M1 widening Junctions 10 – 13
- West coast Mainline Rail Modernisation
- A428 West Haddon Bypass Northamptonshire

15.5 Roadside Service Area

15.5.1 There are proposals for a road side service area (RSA) accessed from the eastbound carriageway of the A14. The location is indicated on Figure O in Appendix 1.

15.5.2 Two planning applications were submitted to Harborough District Council in relation to the proposed RSA development:-

- Outline planning permission 99/00749/OUT (applied 16/07/1999; approved 6/07/2000)
- Approval of Reserved Matters 03/01026/REM (applied 3/07/2003; approved 12/11/2003)

15.5.3 Planning permission was granted for the erection of a fuel filling station, restaurant and lodge with associated lorry, coach and car parking with reserved matters and conditions.

15.5.4 The proposals have an impact on the land included in the applications and upon the location of the access.

15.5.5 There is some uncertainty at this stage as to whether the development will proceed in advance of the Junction Improvement. The EIA and in particular Volume 2 Chapter 8 Community and Private Assets has considered effects on the land under two alternative scenarios, as agricultural land and as development land.

15.5.6 This section considers the cumulative effect of the Junction Improvement and RSA in combination, though it should be noted that for this to take place with the current proposals for Junction 19 amendments would need to be made to the RSA layout and access arrangements included in the original application.

15.5.7 In cumulative terms a proposal in a similar location would add to the impacts identified for the junction proposals in this ES:-

- **Landscape.** It is likely that there would be some loss of existing trees and hedges. The development would be within areas of view from the western edges of Swinford, as well as outlying properties at Swinford Lodge, Lambcote Hill Farm, Westfield Lodge and Brookside, which also have views of the Junction Improvement. It is likely that parts of the RSA, lights and buildings would be seen in addition to the proposed junction, though the junction would be more clearly visible. At the same time it is also possible that any planting included in the RSA to screen views from the village, could add to that proposed for the junction.
- **Ecology and Nature Conservation.** The service area development would add to the loss of hedgerows and trees including those identified as potential bat roosts.

- **Cultural Heritage.** Increased risk of affecting unknown archaeology in an area of alluvium.
- **Water.** Increased risk of pollution to small tributary stream.
- **Agriculture and Soils.** Additional permanent loss of agricultural land.
- **Travellers.** Better traveller care and facilities.

15.5.8 It is clear from the report to Harborough's Planning and Regulatory Committee in November 2003 that the interaction between the RSA and motorway junction had been considered in permitting the development.

15.5.9 At this stage a Preferred Improvement Scheme (the Blue Junction) had been announced by the Secretary of State and incorporated into the Government's Targeted Programme for Improvements (TPI).

15.5.10 The committee report considered that:-

"An appropriate low scale design of buildings / parking and associated structures would not, it is considered appear visually dominant to the landscape, particularly bearing in mind the proximity of the elevated motorways. It is thus considered that the character and appearance of the locality would not be demonstrably harmed"

15.5.11 The implications of an accumulation of RSA and Junction Improvement have therefore already been taken into account by the District Council in giving planning permission. In the same way it would be the Council's responsibility to resolve any environmental issues relating to the application through appropriate conditions.

15.5.12 In terms of the significance criteria set out in Table 4.6 any cumulative effects with the RSA are likely to be only locally significant and considered to be *Minor Adverse*.

15.6 Proposed Wind Farms

Planning Applications

15.6.1 There have been three recent planning applications submitted for wind turbines in the area surrounding the M1 Junction 19 Improvement.

15.6.2 The location of the proposed windfarms are illustrated in Figure O and the proposals are described below.

Yelvertoft

15.6.3 Yelvertoft Wind Farm (planning application No. DA/2009/0350) was submitted to Daventry District Council for planning on 15th May 2009 by Yelvertoft Wind Farm Limited in associated with Your Energy. The proposal is for 8 turbines plus an associated 80m high mast, access tracks and control building. The site is on land adjacent to Glebe Farm between the M1 and Yelvertoft village. Daventry District Council refused planning permission on 25th November 2009. The application was refused on the grounds that the turbines would have an adverse impact on the views form the Registered Park of Stanford Hall. No appeal has yet been made.

Lilbourne

15.6.4 Lilbourne Wind Farm (planning application No. DA/2009/0731) was submitted to Daventry District Council for planning on 15th October 2009 by Hemex LLP in

association with Cetis. The proposal is for 8 turbines plus an associated 80m high mast, access tracks and control building,. The site is on land one kilometre from Lilbourne and two kilometres from Yelvertoft, south of M1 Junction 19, between the motorway and A14. Daventry District Council has yet to announce a decision.

Swinford

- 15.6.5 Swinford Wind Farm (planning application No. 08/00506/FUL) was submitted to Harborough District Council for planning on 8th April 2009 by Nuon UK Limited in associated with Entec UK Limited. The proposal is for 11 turbines plus an associated 80m high mast, access tracks and control building. The site is on land east of the M1 and north of the A14, between the villages of Swinford and Walcote. The application went to public inquiry in July 2009 and the Secretary of State announced on 3rd December 23009 that planning permission should be granted.
- 15.6.6 As the first two sites do not have planning consent and are not regarded as committed, a cumulative assessment for M1 Junction 19 is not required.
- 15.6.7 An assessment of the cumulative effects of Swinford Wind Farm and M1 Junction 19 is required. The location is shown in Figure O.

Swinford Wind Farm

- 15.6.8 Environmental receptors that would be affected by both Swinford wind Farm and the M1 Junction 19 Improvement have been identified from a review of the Swinford Wind Farm Environmental Statement published by Nuon UK Limited.
- 15.6.9 The effects on such receptors, as defined by the wind farm ES, have been recorded and are entered in Table 15.4 below, together with the effects on the same receptors assessed for the junction improvement.
- 15.6.10 The cumulative effect for each receptor has been assessed using the criteria set out in Table 4.6.
- 15.6.11 Here it should be noted, as set out in Section 4.8 that the cumulative effect reported is not the sum of the effects for each project. A potential cumulative effect arises when the effect of the whole may be considered to be greater than the sum of the two parts, where the two considered in combination may result in an effect of greater significance. The cumulative assessment defines this additional effect.
- 15.6.12 As set out in the criteria in Table 4.6, where the additional effect is *Major* or *Severe*, taking into account the capacity of the environment to accommodate both projects, it could influence the decision making process for the project. If *Moderate*, further work may be required in the future to reduce the cumulative effect, as the project progresses. A *Minor* effect is still considered to be of significance for the local area, it does not imply that the effects for each project considered separately are *Minor*.

Table 15.4 : Cumulative Effects with Swinford Wind Farm

Receptor	Impact from Wind Farm	Significance of Effect	Impact from M1 Junction 19	Significance of Effect	Cumulative Effect
Air Quality and Local Climate Change					
Rose Cottage on A426 Rugby Road	Construction traffic will pass by this receptor (via M1 J20, A426 then Swinford Road to wind farm site) so potential dust and increase in PM ₁₀ concentrations although likely to be low given forecast traffic flows	Not assessed – Assumed Neutral with CEMP in place	Slight decrease in concentrations – 25.1µg/m ³ NO ₂ annual mean in Do-Something 2014 (-1.1 µg/m ³ compared with Do-Minimum 2014) due to lower traffic flows	Neutral	Not Significant
Cultural Heritage					
Archaeological Remains:					
SM 13658: Lilbourne motte & bailey castle & fishpond	Will form part of the backdrop in views towards the River Avon. Separated by natural and anthropological features and screened by vegetation: Low	Minor	There would be no direct physical impact on the SM at Lilbourne. The only impact on setting is likely to be temporary from work during construction: <i>Negligible</i>	Neutral	Not Significant
SM13657: Motte & bailey castle south of Lilbourne Gorse	Views of turbines likely to be prevented by Lilbourne Gorse: <i>Negligible</i>	Not Significant	No impact from M1 J19 works: <i>No change</i>	Neutral	Not Significant
Historic Buildings:					
Catthorpe Conservation Area & Listed Buildings	There will be views of turbines but over some distance with the motorway between: <i>Low</i>	Minor - Not Significant	Visual impacts on Catthorpe Conservation Area would be minor and views from the extension covering Catthorpe Manor would remain screened by retained vegetation. Reduction in traffic levels through the village resulting from the LRN would result in noise decreases for the Conservation Area: <i>Moderate Beneficial</i>	Moderate Beneficial	Not Significant
Swinford Conservation Area & Listed	Built development in village & mature trees will prevent most views of turbines. Some turbine	Minor - Not Significant	Mostly unaffected by visual impact. The setting around the edge of the conservation area would be affected by	Slight Adverse	Minor Adverse

Receptor	Impact from Wind Farm	Significance of Effect	Impact from M1 Junction 19	Significance of Effect	Cumulative Effect
Buildings	views from rear of buildings on edge of village: <i>Low - Negligible</i>		views of the proposed A14 embankment and lighting. The northern part of the village would have noise decreases but parts of Rugby Road would experience noise increases: <i>Minor Adverse</i>		
Swinford Lodge (Grade II)	Turbines visible from the margins towards Swinford although over 1km away: <i>Low</i>	Minor - Not Significant	There would be some minor visual impacts for Swinford Lodge but no noise impacts: <i>Minor Adverse</i>	Slight Adverse	Minor Adverse
Shawell Conservation Area & Listed Buildings	Views mostly screened by vegetation & topography. There will be some views of turbines but over some distance and there is considerable screening from vegetation: <i>Low</i>	Minor - Not Significant	The village is screened by rising topography and vegetation and there would be no visual impact on its setting. Parts of the Conservation Area would benefit from noise decreases: <i>No Change</i>	Neutral	Not Significant
Historic Landscapes:					
General historic Landscapes	Although the turbines would introduce a new element there would be little effect on the boundaries and patterns of the landscape. They will not obscure views or prevent the understanding of the development: <i>Negligible</i>	Not Significant	The impact would be limited by the fact that the landscape already surrounds a large road junction. There may be some temporary impacts from construction and from lighting and signage of the junction and gantry sites, but as the area closest to the scheme is already part of a 20th century landscape, there would be little change: <i>No Change</i>	Neutral	Not Significant
Stanford Hall Park & Gardens (Grade II) & Listed Buildings (Grade I, II* & II)	Views from inner park & vicinity of Stanford Hall will be heavily screened by trees & the Rookery & New Gravel Hill Spinney. No designated sight lines or vistas will be affected: <i>Low</i>	Minor	There may be a minor impact Stanford Park and Gardens due to additional street lighting to the south of Swinford: <i>Negligible</i>	Slight Adverse	Minor Adverse
Ecology and Nature Conservation					
Swinford Lodge Brook	Potential reduction in surface water quality and disturbance of	Not Significant	Loss of habitat potential pollution and sedimentation from construction run-off	Slight Beneficial	Not Significant

Receptor	Impact from Wind Farm	Significance of Effect	Impact from M1 Junction 19	Significance of Effect	Cumulative Effect
	vegetation				
Bats	Potential collision of bats with turbines and loss of hedgerow	Not Significant	Loss/disturbance to roosts, loss of connectivity and foraging grounds, risk of harm to individuals.	Slight Beneficial	Not Significant
Breeding Birds (Buzzard)	Potential disturbance to nesting birds resulting in decreased productivity	Not Significant	Loss and disturbance of breeding territories	Slight Beneficial	Not Significant
Landscape					
Visual Sensitivity					
Shawell	Turbines form a semi-regular array of medium scale elements in any open eastern views available to residents at the northern and eastern sides of the village.	Moderate adverse	Views from the village towards the existing motorway network are screened by the shallow valley location (with land rising to a series of local ridges in the east) combined with mature hedgerows or trees.	Neutral	Not Significant
Catthorpe	Views of the turbines restricted to most residents by Catthorpe Interchange, M1, M6 and intervening vegetation.	Moderate adverse	Mitigation planting would more effectively filter views towards traffic than is achieved by existing planting. Tops of gantries would remain visible.	Neutral	Not Significant
Swinford	North and east sides - Views of the turbines from the north side of the village will be seen above 60 degrees of the northern horizon with closer turbines appearing well above any intervening tree however, tree cover will provide substantial screening to more distant turbines.	Moderate / Substantial adverse	No views of M1 Junction 19 from the north of the village.	None	Not Significant Minor adverse

Receptor	Impact from Wind Farm	Significance of Effect	Impact from M1 Junction 19	Significance of Effect	Cumulative Effect
	South and west sides – The majority of the village’s residents would share this view with far fewer views of the turbines from these sides of the village. Some upper floor views to the north may provide partial views of the turbine array.	Moderate adverse	False cuttings and mitigation planting would reduce impact of traffic and junction improvements. Lighting and top of A14 gantry signage would remain visible.	Neutral / Slight adverse	
Individual Properties and Public Rights of Way	Views with a slight to moderate adverse visual impact due to M1 Junction 19 Improvement works are generally in a south-east / south-west direction and are unaffected by the wind farm. Joint visual receptors with slight to large adverse views of the Wind Farm development are in a north-east direction and are only affected by the view of the M1 Junction 19 works to a neutral or slight degree. The cumulative effect for these receptors is therefore considered to be <i>Not Significant</i> to <i>Minor</i> as detailed below. Not Significant: Tomley Hall Farm, Stonebank, Lambcote Hill Farm, Swinford Lodge, Westfield Lodge, Old Barn Farm, Lutterworth Road Lodge, Bungalow adjacent to Denyer’s Barn access, Hill Farm, Spinney Farm, X6 footpath, X14 bridleway, X20 footpath, X21a/b/c footpaths, X17 footpath, X6 footpath, X14 bridleway. Minor Adverse: Brookside, X7 footpath, X8 footpath, X9 footpath, X10 footpath, X11 footpath, X13 bridleway.				
Landscape Character Sensitivity					
Landcover	Introduction of large scale structures whose scale is not comparable to other existing landscape elements.	Considerable adverse	Establishment of proposed planting and habitat creation would balance loss of land and vegetation during construction.	Moderate beneficial	Not Significant
Pattern	Turbine scale and movement will introduce a new landscape pattern, superimposed upon the existing patterns at ground level.	Moderate adverse	After 15 years, new planting would not have maturity of vegetation removed at construction stage and large elements within the junction would remain visible.	Slight adverse	Minor Adverse
Character	Prominence of turbines in southern parts of Lower Lutterworth and Laughton Hills LCAs with smaller scale changes to the setting of	Moderate adverse	It is not considered that the effect of the works, in combination with the retention of substantial areas of vegetation and establishment of mitigation planting,	Neutral	Not Significant

Receptor	Impact from Wind Farm	Significance of Effect	Impact from M1 Junction 19	Significance of Effect	Cumulative Effect
	parts of the Vale of Rugby and High Cross Plateau – Open Plateau LCAs.		would significantly alter the scale of the relationship of the junction and the surrounding LCAs.		
Topic: Materials					
Geological resources	Negligible – wind farm remote from site, unlikely to impact on geological receptors at M1 scheme.	Neutral	There would be <i>No Change</i> for above ground geological features, but <i>Minor Adverse</i> to <i>Negligible</i> impacts for below ground geological deposits due to construction works	Neutral to Slight Adverse	Not Significant
Contaminated Land					
Contaminated land	Negligible – wind farm ES scopes topic out	Neutral	Potential for the release and spread of contamination due to disturbance of made ground. <i>Minor Adverse</i> . There is also a risk of contamination during construction and operation of the scheme arising from accidental spillages or road run-off. <i>Negligible</i> to <i>Minor Adverse</i> .	Slight Adverse to Neutral	Not Significant
Soils					
BMV land	Permanent loss of 4.5 ha of farmland	Not Significant	Permanent loss of 12.33 ha of BMV land	Slight Adverse	Not Significant
Noise and Vibration					
Penfoland	At least 12 dB below derived noise limit	Neutral	Minor increase in traffic noise in 2029 along Kilworth Road	Slight Adverse	Not Significant
Kilworth Rd Properties	At least 14 dB below derived noise limit	Neutral	Minor increase in traffic noise in 2029 along Kilworth Road	Slight Adverse	Not Significant
Swinford Lodge	At least 15 dB below derived noise limit	Neutral	No Change in Traffic Noise in 2009	Neutral	Not Significant
All Travellers – Local Roads					
A426, Rugby Road &	Severance – temporary nature of construction and low levels of	Not Significant	Severance reduced from “Moderate” prior to construction to “None” following	Slight Beneficial	Not Significant

Receptor	Impact from Wind Farm	Significance of Effect	Impact from M1 Junction 19	Significance of Effect	Cumulative Effect
Swinford Road	pedestrian activity along named routes		construction as a result of improved amenity for <i>Low</i> number of LVT's		
A426, Rugby Road & Swinford Road	Driver Delay – potential for delays during 11 days of concrete delivery. However, if necessary a TMP will be agreed with planning & highway authorities.	Not significant	Driver delay – <i>Small</i> change in journey time, for a <i>Low</i> number of travellers, resulting in a <i>Neutral</i> impact.	Neutral	Not Significant
A426, Rugby Road & Swinford Road	Pedestrian Amenity – low number of HGV movements per hour as part of works (<6). Any major movements would be mitigated by TMP.	Not Significant	Improvement in amenity from “Poor” to “Fair” for a <i>Low</i> number of users.	Slight Beneficial	Not Significant
Footpaths	No reference to footpaths made in the ES for the wind farm. As such, no associated impacts derived.				
Community and Private Assets					
Plot 5 - Lambcote Hill Farm	1. Permanent loss of unspecified (small) area to turbine sites and access tracks and localised short term restrictions on farming activity; offset by 2. Income from landowner agreement	Not significant	Permanent loss of 3.59 ha (0.9% of holding total area) farmland including CSS land; some temporary loss of use of farm land	Slight Adverse	Not Significant
Plot 8 - Starmore Farm	1. Permanent loss of unspecified (small) area to turbine sites and access tracks and localised restrictions on farming activity; offset by 2. Income from landowner agreement	Not significant	Temporary loss of use of let farmland - 189 sq m	Neutral	Not Significant
The Water Environment					
Non-aquifer	Groundwater Quality: Chemical spillages during re-fuelling / maintenance of plant (construction and operation)	Minor	Pollution during construction	Neutral	Not Significant
			Groundwater quality unaffected during operation		

Receptor	Impact from Wind Farm	Significance of Effect	Impact from M1 Junction 19	Significance of Effect	Cumulative Effect
Non-aquifer	Groundwater Recharge: Drainage around foundations (construction and operation)	Not significant	Cuttings may intercept groundwater and require dewatering, leading to lowering of the water table.	Neutral	Not Significant
			Potential slight loss in recharge but unlikely reduction in supply	Neutral	
Swinford Lodge Brook and other tributaries of River Avon	Flood risk: Creation of temporary compound and permanent tracks, leading to increased run-off rates (construction and operation)	Not significant	Construction works within floodplain of River Avon	Slight adverse	Not Significant
			Potential increase in flood peak	Neutral	
			Change in road run-off rates	Slight beneficial	
Swinford Lodge Brook and other tributaries of River Avon	Fisheries: Sediment run-off during construction and from tracks during heavy rain (construction and operation)	Not significant	Pollution: Local works in, over and in the vicinity of watercourses during construction	Slight adverse	Not Significant
			Introduction of treatment ponds and other pollution prevention measures	Slight beneficial	
Swinford Lodge Brook and other tributaries of River Avon	Surface water abstractions: Sediment run-off during construction and from tracks during heavy rain (construction and operation)	Not significant	Pollution: Local works in, over and in the vicinity of watercourses during construction	Moderate / large adverse	Not Significant
			Introduction of treatment ponds and other pollution prevention measures	Slight beneficial	

Notes:

The landscape cumulative assessment has taken account of the significance of effect of both developments in the M1 Junction 19 Design Year 15 when it is considered that mitigation planting has reasonably established.

15.6.13 As set out in the table the majority of cumulative effects for the receptors identified have been assessed as *Not Significant*. The exception is for effects associated with the visibility of the wind farm, in terms of the setting of cultural heritage features and the landscape:-

- **Cultural Heritage.** There would be views of both the wind farm and the M1 Junction 19 Improvement from parts of Swinford Conservation Area, Swinford Lodge listed building and Stanford Hall Park and Gardens. Separate impacts for both projects are relatively minor, but the additional effect of the combined view is considered to have local significance and has been recorded as *Minor Adverse*.
- **Landscape.** As for cultural heritage above there would be views of both projects from southern and western parts of Swinford and from parts of the public rights of way network, which are considered to have local significance and have been recorded as *Minor Adverse*. In terms of landscape character sensitivity, it is recognised that after 15 years there would be some residual *Slight Adverse* effect remaining from the junction improvement as replacement planting would not have the maturity of vegetation lost at construction. In combination with the wind farm which would continue to be prominent in the landscape, this is considered to have local significance as a cumulative effect and is recorded as *Minor Adverse*.

15.6.14 In overall terms the cumulative effects with the wind farm, given the combined impacts in the Swinford area for cultural heritage and landscape are considered to be *Minor Adverse*.

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16. OUTLINE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

16.1 Introduction

16.1.1 Environmental management during the construction of the M1 Junction 19 Improvement project would be delivered through the development of a Construction Environmental Management Plan (CEMP). The CEMP would describe how construction and contract maintenance activities would be undertaken and managed in accordance with:-

- environmental commitments and requirements identified during the planning and design stages
- contractual and legislative requirements
- objectives identified and agreed for the scheme

16.1.2 The CEMP would include the following information:-

- details, including timescales and duration, of construction and maintenance activities associated with the project
- a register of commitments made to date (an Environmental Commitments Register)
- an environmental management framework including: -
 - key environmental issues, aspects, potential impacts and mitigation as recorded in a Register of Environmental Aspects and Impacts
 - environmental management procedures including assigned responsibilities for actions
 - emergency preparedness in the event of an incident which could lead to environmental damage
- a register of relevant environmental legislation and regulatory consents
- a training and communication plan
- procedures to ensure compliance with the CEMP including monitoring, inspections auditing and review
- a complaints procedure

16.1.3 The likely contents of the CEMP are described below.

16.1.4 Skanska, the contractor for the project, operates an Environmental Management System (EMS) that has been certified to the International Standard ISO 14001. The system offers demonstrable evidence of consideration and control of environmental impacts, and the commitment to continual improvement. The system is audited regularly, both internally and externally through British Standards Institute (BSI).

16.1.5 An outline CEMP^{ADD REF} (OCEMP) has been prepared for the project as the initial stage in the development of the scheme specific CEMP and this is a summary of that document. It takes into account the requirements of the Skanska Civil Engineering EMS¹ and IAN 84/07 (Highways Agency Environmental Information System (EnvIS) July 2007)².

16.1.6 The contents and details of the OCEMP would be updated through the outline design, Environmental Impact Assessment (EIA), Statutory Orders and detailed design process to reflect the latest scheme position. In particular it would be developed to take account of:-

- Engineering Design

- Drainage Design
- Archaeological Design
- Ecological Design
- Landscape Design

16.1.7 The Environmental Commitments Register, discussed in more detail at section 16.3 below, would be reviewed and updated to take account of ongoing consultations and issues arising from a Public Inquiry. The contents of the OCEMP would then be carried forward to the CEMP.

16.1.8 The CEMP is a working document and would be developed by Skanska as the scheme progresses through detailed design into construction and maintenance. At handover of the project into long term management, relevant information would be passed from the CEMP to form the basis of the Handover and Environmental Management Plan (HEMP), including the requirements for any long term monitoring.

16.2 Environmental Policy

16.2.1 A project specific Environmental Policy Statement would be agreed for the project, based on those contained in Skanska's EMS¹ and would include:-

- acknowledgement of environmental responsibilities
- adherence to the requirements of environmental legislation
- commitment to mitigate construction environmental impacts
- commitment to construction best practice and environmental performance including sustainability

16.2.2 The Policy Statement would confirm the commitment of the Project Team to ensure all environmental aspects are effectively managed as stated.

16.3 Environmental Management Framework

Environmental Commitments Register

16.3.1 The Environmental Commitments Register for the project would include all commitments made to all parties from early planning stages of the project to the preparation of the OCEMP, including those made to private individuals and statutory authorities. The register identifies:-

- the nature of the commitment
- the party the commitment has been given to
- the action required
- fulfilment status
- document reference

16.3.2 New commitments would be added as they arise.

The Environmental Aspects and Impacts Register

16.3.3 The Environmental Aspects and Impacts Register would consider construction activities against environmental aspects and potential impacts, in the topic order used for the EIA. The Register describes the activity, sensitive receptor, potential impact and proposed control or mitigation. Controls may include the development of

a specific environmental management procedure as described below. The Register would be updated as the project moves forward.

Environmental Management Procedures

16.3.4 Specific management procedures or plans, including method statements would detail measures required to reduce any potential impact on sensitive environmental features and provide control procedures to all staff.

16.3.5 Plans or procedures are currently envisaged for the following topics for this project, given the potential construction impacts reported in this ES:-

- ecology (to cover licensing issues for protected species, or seasonal constraints)
- management plans for waste, water, noise and vibration, dust, cultural heritage (e.g. protecting known sites or features) soil
- training
- traffic management

Legal and Regulatory Requirements

16.3.6 The contractor would maintain a register of applicable legal and other requirements and would be responsible for reviewing the register to ensure that legislative requirements are met on this project. The legislation, planning policy and other guidance relevant to the project includes:-

- The Air Quality Strategy⁷
- The Air Quality Standard Regulations 2007⁸
- The Environment Act 1995⁹
- Ancient Monuments and Archaeological Areas Act 1979¹⁰
- Planning (Listed Buildings and Conservation Areas) Act 1990¹¹
- Wildlife and Countryside Act 1981 (WCA)¹²
- Countryside and Rights of Way Act 2000 (CRoW)¹³
- Natural Environment and Rural Communities Act 2006 (NERC)¹⁴
- Conservation (Natural Habitats, etc.) Regulations 1994 (as amended), (or Northern Ireland, 1995) (the Habitats Regulations)¹⁵
- Berne Convention¹⁶
- Habitats Directive¹⁷
- Protection of Badgers Act 1992¹⁸
- European Habitats Directive¹⁹
- European Union's Landfill Directive 1999/31/EC²⁰
- The Town and Country Planning Act 1990²¹
- The Environmental Protection Act (EPA) 1990²²
- The Environmental Protection (Duty of Care) (England) (Amendment) Regulations 2003²³
- The Hazardous Waste Regulations 2005²⁴
- The Environmental Permitting (England and Wales) Regulations 2007²⁵ which combines Pollution Prevention and Control (PPC) and Waste Management Licensing (WML)
- Site Waste Management Plans Regulations 2008²⁶
- The Noise Insulation Regulations (NIR) 1975 as amended in 1988²⁷
- Planning Policy Statement 7 : Sustainable Development in Rural Areas⁴³
- DEFRA Soil Strategy (2008)/Soil Action Plan (2004-2006)²⁸

- Single Payment Scheme²⁹
- Mineral Planning Guidance Notes³⁰
- Good Practice Guide for Handling Soils (2001)³¹
- Water Resources Act 1991³²
- Land Drainage Act 1991³³
- Control of Pollution Act 1974³⁴
- EC Water Framework Directive 2000/60/EC and the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003³⁵
- The Surface Water (River Ecosystem) Regulations 1994³⁶
- The Groundwater Regulations 1998 and EC Groundwater Directive 1980 (80/68/EEC)³⁷
- EC Freshwater Fisheries Directive (78/659/EEC)³⁸
- Environment Agency's Pollution Prevention Guidelines (PPG)³⁹
- Planning Policy Statement 25 Development and Flood Risk⁴⁰
- Planning Policy Statement 23 Planning and Pollution Control⁴¹
- Planning Policy Guidance Note 15 : Planning and Historic Environment⁴²
- Planning Policy Guidance Note 16 : Archaeology and Planning⁴³
- Planning Policy Statement 9 : Biodiversity and Geological Conservation⁴⁴
- Planning Policy Statement 7 : Sustainable Development in Rural Areas⁴⁵
- Planning Policy Guidance 17 : Open Space and Sport and Recreation Provision⁴⁶
- Planning Policy Guidance 21: Tourism⁴⁷

Project Team Roles, Responsibilities and Authority

16.3.7 The CEMP would clearly define the responsibilities and accountability of the Protect Team from senior management level through to individual subcontractors. The Contractor would identify and describe the specific roles required to ensure the correct implementation and application of the CEMP in line with the Skanska EMS.

16.3.8 Key roles include:-

ECI Project Manager

16.3.9 It is the responsibility of the ECI Project Manager to ensure that adequate resources are made available to the Project Team so that environmental policy is effectively implemented during the construction and maintenance phases and including any long term monitoring requirements. The ECI Project Manager would assist with drawing up and would then sign the project specific environmental policy statement.

Environmental Coordinator

16.3.10 The Environmental Coordinator is responsible for taking the scheme through the environmental aspects of the statutory process, preparing the ES and Environmental Master Plan and developing the detailed design and OCEMP in liaison with the specialist advisors.

16.3.11 During the construction phase the Environmental Coordinator would transfer the OCEMP, Commitments Register and Environmental Aspects and Impacts Register to the Environmental Manager and would provide such advice as necessary throughout construction, maintenance and long term monitoring, to ensure implementation of the detailed environmental design and compliance with the ES.

16.3.12 The Environmental Coordinator would also assist in the preparation of the HEMP to ensure all data required for long term management was carried through and passed on to the relevant management authority.

Environmental Manager

16.3.13 The Environmental Manager would ensure all environmental standards and commitments are adhered to throughout the planning and design, construction maintenance and monitoring period for the scheme. He would also be responsible for:-

- developing and reviewing the CEMP and all associated commitments, method statements, procedures and consents
- liaison with environmental specialists and Public Liaison Officer (PLO) for the project
- facilitating environmental training and inductions to the work force as required
- monitoring compliance of construction activities with the CEMP and all other environmental legislation and requirements and maintaining a record of progress

Environmental Clerk of Works

16.3.14 The Environmental Clerk of Works would be responsible for recording and reporting all environmental activities on the project at construction stage. He would monitor and supervise construction activities where appropriate, maintain auditable environmental records and conduct audits as required by the CEMP and would offer a full time presence on site throughout the construction period.

Environmental Specialists

16.3.15 The team of specialists responsible for the environmental assessment and design of the scheme, under the direction of the Environmental Coordinator, would support the project team on specific issues as required at construction stage. They would undertake preconstruction surveys, apply for applicable consents (such as protected species licences) carry out watching briefs and oversee implementation of mitigation throughout the construction, maintenance and monitoring periods as necessary.

16.3.16 Specialists required for this project would include:-

Landscape Architect

16.3.17 The landscape architect would be responsible for developing the Existing Vegetation and Landscape Design, in coordination with the Ecological Design, monitoring the provenance, quality and supply of plant stock and implementation of landscape works during construction and maintenance phases.

Ecologist

16.3.18 The Ecologist would be responsible for carrying out preconstruction surveys as required, developing the Ecological Design, including ecological mitigation proposals and method statements, legislative compliance including applying for licenses and consents e.g. for the disturbance of protected species and monitoring

the implementation of the works throughout the construction, maintenance and in to long term management where required by license conditions.

Archaeologist

16.3.19 The Archaeologist would be responsible for developing the Archaeological Design in liaison with English Heritage and the County Archaeologists. The archaeologist would oversee archaeological mitigation works pre construction and during the construction phase as required and for any post excavation works and reporting.

Noise and Vibration / Air Quality Specialist

16.3.20 The specialists would provide input and advice as required to the Project Team including liaison with the local planning authority Environmental Health Officers, the overseeing of noise, vibration or air quality during construction, as required. The Noise Specialist will assess the eligibility of properties to be insulated against traffic or construction noise under the Noise Insulation Regulations (NIR)²⁷.

Agricultural/Land Use/Soils Specialist

16.3.21 The specialist would provide input into a Soil Management Plan to ensure the correct handling, storage and deployment of materials to achieve the project objectives for habitat creation and restoration of land to agricultural use, and monitor the implementation of the plan as required. The specialist would also provide advice to the Project Team or landowner as required.

Waste Specialist

16.3.22 The specialist would be responsible for legislative compliance, including applying for appropriate licences and consents, developing and overseeing the enforcement of the Site Waste management Plan (SMWP) to meet project objectives. This would include methods for effective identification and management of hazardous and non hazardous materials, storage and segregation of waste prior to reuse, recycling or disposal

Competence Training and Awareness

16.3.23 Raising of environmental awareness and understanding amongst the Project Team and all staff associated with the works is essential to ensure the commitments set out in this OCEMP and the CEMP are met.

16.3.24 A Training Plan would be developed for the project to be included in the CEMP at construction stage, which would set out competency requirements for all personnel with environmental responsibilities. It would then identify a programme of training required to achieve the competence level specified for each role or individual, and records of competence and training would be maintained. Training topics would be identified based on the project Environmental Aspects and Impacts Register.

16.3.25 The Training Plan would also consider the needs of other site personnel who may come into close contact with key environmental features during the course of their work, such as protected areas or species. All staff would undergo pre-start induction training in environmental issues specific to the project, with general and aspect specific tool box talks at regular intervals throughout the construction phase.

16.3.26 Additional training may also be required following any incident or near miss, which could have led to environmental damage.

16.3.27 In addition general environmental awareness would be achieved by the use of guidance notes, site notices and posters, regular briefing on method statements and procedures, informal briefings during site inspections.

Emergency Preparedness and Response

16.3.28 The CEMP would detail specific procedures to be followed in the event of an emergency during construction or maintenance. Such events are defined as:-

- an environmental incident – an event , activity or condition that causes or has potential to cause harm to people, damage to property or the environment
- pollution – any harmful impact on the local atmospheric, aquatic or land environment caused by release of hazardous or nuisance causing substances or excessive noise and vibration
- consent infringement – any event where the limits set as conditions of consents or licences are exceeded or where methods of operation are not in accordance with procedures or conditions set by the regulatory authority

16.3.29 Where necessary, for example where there could be implications for features or species with legal protection or status, or for operations requiring consent, formal approval for a specific emergency procedure would be sought from the relevant Statutory Authority.

16.3.30 The procedures would include:-

- the names and 24 hour contact detail of all emergency personnel and emergency services
- personnel responsibilities during an emergency incident
- the location of on site information on hazardous materials and spill containment materials
- details of incident or pollution controls
- the procedures for reporting and documenting an emergency incident, particularly with a view to identifying trends and reducing further incidents

Monitoring and Reporting

16.3.31 A programme of environmental monitoring during the contract period would be established, including checks against any consent requirements and project specific environmental objectives and targets.

16.3.32 Daily inspections of all construction sites and activities would be undertaken against a scheme specific checklist and findings logged. Any incidents would be reported by managing construction personnel to the Environmental Clerk of Works for record and action as required.

16.3.33 The Environmental Manager would undertake monthly inspections and complete an assessment of environmental performance against environmental standards, relevant legislation and CEMP targets and objectives. The Environmental Manager would also review records for any monitoring required to demonstrate compliance with consent requirements e.g. noise monitoring data.

- 16.3.34 He would produce a monthly report detailing environmental performance for review as required by the Project Team.
- 16.3.35 A project specific Quality Management System would be in operation for document control and the Environmental Manager would maintain copies of all environmental monitoring and review reports as well as relevant reports, consents and licences.

Subcontractor Requirements

- 16.3.36 To ensure compliance and appropriate competence levels the CEMP would describe job specific subcontractor requirements and the procedure for the management of sub contractors.
- 16.3.37 Subcontractors would be required to provide the following details before they could be considered for appointment:-
- staff experience, skills, CVs and competencies
 - the company environmental policy
 - records of previous environmental incidents
 - details of current working practices
 - health and safety records
 - references from previous employers
- 16.3.38 The information would be assessed for suitability in achieving the requirements of the CEMP and then against other interested subcontractors to ensure the most suitable company is selected for the appointment.

16.4 Non-Conformance and Corrective and Preventative Action

- 16.4.1 Non-conformance would be considered to have taken place when an environmental incident occurs, for non compliance with environmental legislation or when work is not carried out in accordance with the requirements of the CEMP or Environmental Design.
- 16.4.2 Procedures would be in place to report and record non-conformance and also to put in place the required corrective or preventative action within a defined time period.
- 16.4.3 Any deficiency identified within working practices, methodology or systems for construction during inspection would also be addressed by a corrective or preventative action procedure.

16.5 Communication of the CEMP

- 16.5.1 The CEMP would be distributed to all members of the Project Team, including suppliers and subcontractors as necessary to ensure that environmental requirements are effectively communicated.
- 16.5.2 The contents of the CEMP would be communicated by the following means:-
- Method statements or detailed procedures, including for those mitigation, emergency response and legal consents would be explained in briefing sessions before each task
 - Training would be given to ensure that all staff are environmentally aware

- Progress meetings would include discussion and review of environmental issues
- A monthly environmental report would be distributed to the Project Team to review performance against targets

16.5.3 Where appropriate, the environmental specialists would liaise with external parties including Statutory Bodies such as the Environment Agency, Natural England, English Heritage, Local Planning Authorities and non-statutory authorities and interest groups

16.5.4 The PLO appointed for the project would liaise with local communities and residents affected by the works and provide regularly updated information on construction programming and activities. A 24 hour contact number would be made available to deal with any issues arising from the works.

16.6 Complaints

16.6.1 All complaints received from the public or any other interested party regarding the construction of the scheme would be recorded. This would provide a valuable feedback mechanism that could help minimise potential impacts on sensitive receptors or features and allow construction practices to be refined and improved.

16.6.2 The CEMP would contain a complaints procedure by which the Project Team could receive and act upon complaints. It is likely that all queries or complaints would be directed to the PLO in the first instance who would then pass the issue over to the relevant manager to resolve.

16.6.3 All complaints would be recorded and reviewed and a non-conformance raised to ensure the corrective action is carried out and prevent a recurrence.

16.6.4 A monitoring system would be implemented to ensure that all complaints have been logged, addressed and a satisfactory outcome reached for all parties.

16.7 Review

16.7.1 The CEMP would be reviewed at appropriate stages within the project control framework (at least every 12 months) to ensure it remains effective and up to date.

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17. CONCLUSIONS

Topic	Key Issue	Mitigation Measure	Effect
Air Quality	<p>Dust and emissions from Contractor's vehicles during construction.</p> <p>Pollutants from traffic in particular Nitrogen Dioxide (NO₂) and small particulates (PM₁₀)</p>	<p>Construction impacts would be controlled.</p> <p>Traffic emissions are reducing over time due to improvements in technology and tighter controls.</p>	<p>Given measures to control dust and emissions, effects during construction would not be significant. Changes in local air quality due to the junction improvement, assessed for the proposed opening year of 2014, would be <i>Minor</i> or <i>Negligible</i> against a background of reductions in levels due to tighter emissions controls. The nitrogen dioxide level at one property close to the M1 would exceed targets set by the Government's Air Quality Strategy with and without the junction improvement.</p> <p>Overall effect: <i>Neutral</i></p>
Climate Change	<p>Emissions of greenhouse gases, in particular Carbon Dioxide (CO₂).</p>	<p>No scheme specific measures.</p>	<p>Carbon emissions from traffic will increase over time with or without the proposals. The increase would be more with the improvement in place.</p> <p>Overall effect: <i>Adverse</i></p>
Cultural Heritage	<p>Impact on archaeological remains, historic buildings and historic landscapes. There are many heritage features in the area including prehistoric cropmarks, a possible Roman settlement, Scheduled Monuments, historic buildings in the villages and ridge and furrow.</p>	<p>Archaeological investigations would be carried out in advance of construction and any features discovered would be recorded. Proposed landscape measures would protect the setting of historic buildings and landscapes.</p>	<p>There would be a <i>Moderate Adverse</i> effect at construction stage on one archaeological site but most effects on archaeological sites would be <i>Slight Adverse</i>. Completion of the improvement would benefit the setting of historic buildings in Catthorpe and Shawell due to a reduction in traffic noise, but <i>Slight Adverse</i> visual effects would remain for historic buildings in Swinford and for the historic landscape at Stanford Park. The effect on Lilbourne motte and bailey castle, the only Scheduled Monument potentially affected, would be <i>Neutral</i>.</p> <p>Overall effect: <i>Slight Adverse</i></p>
Ecology and Nature Conservation	<p>Impacts on habitats, species and sites of local value. Much of the habitat affected is relatively low value, but features such as the River Avon, ponds, hedgerows and trees are known to support protected species such as otter, bats and great crested newt.</p>	<p>Steps would be taken during construction to prevent harm to all species potentially affected. New habitats including a net gain of 3.1 hectares of wetlands, 6.5 hectares of species-rich grasslands and 3.6 hectares of woodland would provide enhancements for wildlife. Habitat improvements and pollution controls are proposed for the River Avon.</p>	<p>There would be some initial adverse effects at construction stage, but as new habitats establish these would reduce and by 2029, 15 years after completion, there would be a net gain for biodiversity. New habitats created would be of higher value than those lost and there would be improvements for the River Avon, with a <i>Slight Beneficial</i> effect. There would be some <i>Slight Adverse</i> effects for badgers, but most species would benefit from the improved habitats with a <i>Slight Beneficial</i> effect.</p> <p>Overall effect: <i>Slight Beneficial</i></p>

Topic	Key Issue	Mitigation Measure	Effect
Landscape	Impact on landscape and views from properties and public rights of way. Established planting helps to protect the setting of the villages, but the existing junction is already a major feature.	The proposed junction improvement keeps the potential impact to a minimum, its height would be similar to the existing and it enables the retention of surrounding vegetation. New woodland and hedgerow planting would be carried out, combined with mounding in some areas.	The loss of some 6.15 hectares of existing planting at construction and the introduction of new structures would have some <i>Adverse</i> effects. There would be an initial visual impact for 33 properties, reducing to 7 by 2029, 15 years after completion, as new tree and shrub planting establishes. By 2029 established planting would also reduce effects on the character and value of the wider landscape to <i>Slight Adverse</i> . Overall effect: <i>Slight Adverse</i>
Materials	Re-use of excavated or demolition materials as far as possible to minimise waste and impact of materials. Avoidance of contamination and conservation of soil resources.	A site waste management plan has been developed to promote re-use and recycling of materials. Earthworks have been balanced to avoid large scale export or import of soils. The main area of known contamination has been avoided. Agricultural soils would be conserved for re-use.	There would be a risk of <i>Slight Adverse</i> effects in terms of contaminated land, but given proposals in place for re-use, effects on materials in general would be <i>Neutral</i> . Overall effect: <i>Neutral</i>
Noise and Vibration	Increased noise during construction. Changes in noise for nearby properties, reductions or increases resulting from changes in traffic flows.	Measures would be undertaken to control noise during construction. The junction improvement would result in traffic reductions on some local roads. A low noise surface would be used for the new sections of motorway and trunk road, but these benefits would occur eventually without the junction improvement as existing surfacing was replaced.	The effect of construction noise would be <i>Slight Adverse</i> . The most noticeable changes would be for dwellings affected by local traffic through the villages with decreases in noise for 308 houses and increases for 224 houses, as assessed for 2029. The few dwellings close to the junction would continue to be affected by traffic noise, but would receive some benefit from the introduction of a low noise surface. Overall effect: <i>Moderate Beneficial</i>
Pedestrians, Cyclists and Horse Riders	Severance or diversion of public rights of way, impacts on amenity for users. There is a network of footpaths and bridleways, but it is disrupted by the existing junction and there is a project objective to improve conditions.	The proposals include the provision of new public rights of way to replace those which would be closed to accommodate the junction. There would be a direct link between Swinford and Catthorpe adjacent to the local road.	The proposed network would improve safety, increase amenity and reduce severance. Overall effect: <i>Beneficial</i>
Local Vehicle Travellers	Temporary loss of access during construction. Removal of direct access to the motorway/ trunk road junction.	Diversions would be put in place during the construction period. The proposals include a new direct link between Swinford and Catthorpe and an improved route to the A5 trunk road.	During construction there would be some inconvenience due to the removal of access to Junction 19 and temporary local road diversions. The loss of access to the junction would be permanent, but on completion of the works this effect would be offset by improved links between the villages and to the A5. Overall effect: <i>Neutral</i>

Topic	Key Issue	Mitigation Measure	Effect
Long Distance Vehicle Travellers	Traveller stress due to congestion, fear of accidents and confusing layout.	Improved junction layout would reduce congestion and accidents.	Traveller stress would be reduced for a large number of road users. Overall effect: <i>Large Beneficial</i>
Community and Private Assets	Potential impacts for community land, property, development land, agricultural land, including best and most versatile, and farms. Agriculture is the main land-use. There are proposals for a roadside service area on the A14, but it is uncertain whether the development will proceed in advance of the scheme.	The proposed junction improvement takes less land than other options considered. Temporarily used agricultural land, for example for the site compound and storage areas would be restored on completion. Access would be maintained for commercial and agricultural businesses.	The temporary use of land during construction would result in some disruption for the landowners affected. Approximately 25 hectares of agricultural land would be required permanently, just over half described as 'best and most versatile'. One farm would be affected to a <i>Moderate Adverse</i> level, but all others would be affected to a <i>Neutral</i> or <i>Slight Adverse</i> level. There would be a <i>Large Adverse</i> effect on proposals for the roadside service area. No community land would be affected. Overall effect: <i>Slight Adverse</i>
Water Environment	Pollution risks for surface water and ground water during the construction and operation of the junction improvement. Water quality in the River Avon is very good. Flood risks from surface run-off and loss of flood plain.	Measures would be put in place to reduce the risk of pollution during construction. The permanent proposals include five drainage ponds to treat highway run-off and prevent flooding. Flood plain compensation would be provided.	There would be a risk of a <i>Moderate Adverse</i> effect during construction but this would be short term and measures would be in place to reduce the risk. Drainage proposals would improve the existing condition with a <i>Slight Beneficial</i> effect for water quality and flood risk. Overall effect: <i>Neutral</i>

Page Not Used

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19. GLOSSARY OF TERMS

Alternative Options	Different design possibilities and considered during project development that have potential to fulfil the Project Objectives.
'A' Weighting	Noise 'A' weighting is commonly used for the assessment of the risk of damage to hearing due to noise. The application of this weighting is indicated by suffixing the decibel unit with A, as follows dB (A).
Abstraction	Removal of water from a groundwater or surface water body- usually by means of a pump. Groundwater is water that is contained in porous rocks underground.
Agricultural Land Classification (ALC)	A relative measure of agricultural land quality in England and Wales. In practice, the ALC grades are defined by reference to the land's physical characteristics. The most productive and flexible land falls into Grades 1 & 2 and Subgrade, 3a and collectively comprises about one-third of the agricultural land in England and Wales. About half the land is of moderate quality in Subgrade 3b or poor quality in Grade 4. The remainder is very poor quality land in Grade 5, which mostly occurs in the uplands.
Alluvium	Soil sediments deposited by the action of rivers.
Ambient noise	Background noise from transport, industry and a wide range of other sources.
Appraisal	A process (with methodologies that differ to those of environmental impact assessment) that looks at the worth of a course of action.
Aquifer	A porous body of rock capable of holding quantities of water that can be abstracted for human use.
Assessment	A process by which information about effects of a proposed plan, project or intervention is collected, assessed and used to inform decision making.
Attenuation	Reduction. The term is used in drainage design to indicate a reduction in the rate of flow or flooding risk, for example by means of a pond to hold back water.
Baseline Conditions	The environment as it appears (or would appear) immediately prior to the implementation of the project together with any known or foreseeable future changes that will take place before completion of the project.
Best and most versatile	An official categorisation for soils that are particularly productive for agriculture. It is an objective of government policy to limit the loss of such soils.
Biodiversity	Biological diversity The variety of life forms in a given area includes all species of plants and animals, their genetic variation and the complex ecosystems of which they are part.
Borrow Pit	An area of land used to excavate and remove materials, for example to construct a road embankment.
Carcinogenic	Causing or tending to cause cancer
Contaminated Land	Defined in Section 78 2A of the Environmental Protection Act 1990 as "any land which appears to the local Authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that- a) significant harm is being caused or there is a significant

	possibility of such harm being caused; or b) pollution of controlled waters is being, or is likely to be caused.”
Controlled strip	Removal of topsoil under the supervision of an archaeologist to ensure features can be investigated and recorded
Cropmark	As in archaeology. Evidence of underground features shown up in variations in crops. Most apparent from the air.
Cumulative Impact	The following definition is widely accepted “ <i>impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project</i> ”, For the purposes of the DMRB Volume II guidance, a cumulative impact may arise as the result of a) the combined impact of a number of different environmental topic-specific impacts form a single environmental impact assessment project on a single receptor resource and b) the combined impact of a number of different projects within the vicinity (in combination with the environmental impact assessment project) on a single receptor resource.
Cutting	The excavated area created where it is necessary for a highway to run below the level of the surrounding land.
Decibel (dB)	Measurement of noise on a logarithmic scale. The range of audible sound pressures is approximately 0 dB to 140 dB.
Design Manual for Roads and Bridges (DMRB)	A set of documents that provide a comprehensive manual system which accommodates all current standards, advice notes and other published documents relating to the design, assessment and operation of trunk roads (including motorways).
Detailed Assessment	Method applied to gain an in-depth appreciation of the beneficial and adverse consequences of the project and to inform project decisions. Detailed Assessments are likely to require detailed field surveys and/or quantified modelling techniques.
Determination Decision	Formal judgement as to whether a project requires statutory Environmental Impact Assessment or not.
Do something	Future situation with the scheme provided
Do-Minimum Scenario	The conditions that would persist in the absence of the implementation of a construction or improvement project, but given that maintenance is ongoing.
Ecology	The environment as it relates to living organisms
Effect	Term used to express the consequence of an impact (expressed as the ‘significance of effect’), which is determined by correlating the magnitude of the impact to the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria. For example, land clearing during construction results in habitat loss (impact), the effect of which is the significance of the habitat loss on the ecological resource.

EIA Directive	Used to refer to EC Directive 85/337/EEC as amended by EC Directive 97/11/EC and the Public Participation Directive 2003/35/EC.
EIA Regulations	<i>"A collective name for the various statutory instruments through which the EC Council Directive on Environmental Assessment (Directive 85/337/EEC as amended by Directive 97/11/EC" and the Public Participation Directive 2003/35/EC) "has been implemented in the UK."</i> ²
Enhancement	A measure that is over and above what is required to mitigate the adverse effects of a project.
Environmental Impact Assessment (EIA)	statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. Involves the collection and consideration of environmental information, which fulfills the assessment requirements of Directive 85/337/EEC (as amended), including the publication of an Environmental Statement.
Environmental Statement (ES)	A document produced in accordance with the EIA Directive as transposed into UK law by the EIA Regulations.
Essential mitigation	Mitigation which the Overseeing Organisation has the statutory power to achieve.
Flood Compensation	An extension to the existing floodplain which involves lowering the ground level to compensate for areas of floodplain lost to development.
Flood Plain	Area of land prone to flooding and protected against development.
Grade Separated	Junctions which involve the separation of different traffic flows at different levels
Ground Investigation	Survey incorporating boreholes and pits to investigate the nature and strength of soils below the ground.
Groundwater	Water held underground within porous rocks.
Habitat	The environment in which an animal and/or plant population lives and grows.
Hibernacula	Structures created to form places where animals such as newts, toads or reptiles can hibernate during the winter to save energy.
Impact	Change that is caused by an action; for example, land clearing (action) during construction which results in habitat loss (impact).
In-situ	Original position.
Invertebrate	An animal without a skeletal structure including insects and worms
L _{A10} (T)	Noise The sound level decibels (dB(A)) exceeded for 10% of a specified time period, usually 18 hours.
Land-take	Acquired land which is necessary for the construction of the project and to undertake the required mitigation measures.
L _{eq} (T)	Noise The equivalent continuous sound level. It is the

	continuous sound level which would produce the equivalent sound energy as a variable sound level over the same time period.
Lias	A period of geological time towards the end of the Early Jurassic, ie. from about 195 – 180 million years ago.
Listed Building	Building or structure listed by the Secretary of State as being of 'special architectural or historic interest'.
Low Noise Surface	A material used as a wearing course for roads designed to reduce tyre noise over conventional surfacing
Made Ground	Land which has been infilled or built up above original ground level.
Mean	As in mathematics - a value that is intermediate between other values, for example an average or expected value.
Mitigation	Measures intended to avoid, reduce and, where possible, remedy significant adverse environmental effects.
Monitoring	A continuing assessment of the performance of the project, including mitigation measures. This determines if effects occur as predicted or if operations remain within acceptable limits, and if mitigation measures are as effective as predicted.
Noise	Usually defined as an unwanted sound.
Non-statutory environmental impact assessment	Identifying, predicting and evaluating the environmental effects (both negative and positive) of projects for which statutory EIA is not mandatory.
Non-Technical Summary (NTS)	Information for the non-specialist reader to enable them to understand the main predicted environmental effects of the proposal without reference to the main Environmental Statement.
Operational	The functioning of a project on completion of construction.
Planning Policy Guidance (PPG)	A series of government documents that provide guidance, principally to Local Planning Authorities, about various aspects of government policy in relation to the planning system.
Preferred option	The chosen design option that most successfully achieves the project objectives and becomes subject to further design and assessment.
Receptor	A defined individual environmental feature usually associated with population, fauna and flora that has potential to be affected by a project.
Resource	A defined but generally collective environmental feature usually associated with soil, water, air, climatic factors, landscape, material assets, including the architectural and archaeological heritage, that has potential to be affected by a project.
Ridge and Furrow	Medieval system of field cultivation evidenced by parallel

	ridge patterns across fields
Run-off	Water which is not absorbed by the soil and flows to lower ground, eventually draining into a stream, river, or other body of water.
SAC	Special Area of Conservation. European designated wildlife site.
Scoping	The process of identifying the issues to be addressed by the environmental impact assessment process. It is a method of ensuring that an assessment focuses on the important issues and avoids those that are considered to be not significant.
Screening	The formal process undertaken to determine whether it is necessary to carry out a statutory Environmental Impact Assessment and publish an Environmental Statement in accordance with the EIA Regulations.
Significance of effect	A measure of the importance or gravity of the environmental effect, defined by significance criteria specific to the environmental topic.
Source Protection Zones (SPZ)	A defined zone surrounding a groundwater abstraction point (e.g. a well or a spring), within which certain activities are restricted to prevent contamination of the groundwater.
SPA	Special Protection Area. European designated wildlife site.
Species	A class of plants or animals having common attributes and designated by a common name
Study Area	The spatial area within which environmental effects are assessed (i.e. extending a distance from the project footprint in which significant environmental effects are anticipated to occur). This may vary between the topic areas.
Surface Water	Watercourses that run or lie on the surface of the land
Topography	The relief features of the Earth's surface, above and below sea level.
Topsoil	The layer of soil on the surface.
Trial Trenching	Use of sample trenches to investigate and evaluate possible archaeological features
Visual Envelope	The extent of visibility to and from a point on a site.
Watching brief	Monitoring of construction work by archaeologist to ensure that archaeological features are identified and recorded.
Wildlife Corridor	A linear habitat along which animals and plants can move from one area to another.

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