

6 Approach to the EIA

6.1 Introduction

6.1.1 This chapter provides an overview of the approach taken for the environmental impact assessment (EIA) for the A14 Cambridge to Huntingdon improvement scheme (the scheme). It sets out the legislation underpinning the process, the scope of the EIA presented in this *Environmental Statement (ES)* and an overview of the general approach to predicting potential impacts and assessing the significance of the likely significant effects.

6.2 Purpose of EIA process

6.2.1 EIA is a statutory process required for the scheme, which brings together the assessment of the likely significant effects arising from the construction and operation of the scheme.

6.2.2 During the earlier stages of a project requiring statutory EIA, the focus is on defining the scope of the environmental assessment. For this scheme this was reported in the *A14 Cambridge to Huntingdon Improvement Environmental Impact Assessment Scoping Report* (Highways Agency, March 2014).

6.2.3 To enable the public to be consulted on the scheme early in the design development process, EIA is also used to provide information about likely significant environmental effects, based on information available at that point. For this scheme, EIA findings based on preliminary information were published in order to inform the statutory public consultation exercise (*A14 Cambridge to Huntingdon improvement scheme Preliminary environmental information report* (Highways Agency, April 2014)).

6.2.4 Another key purpose of the EIA is to feed into the design process, in order to:

- facilitate the consideration of likely significant environmental effects and opportunities in the development of the design of the scheme;
- enable the avoidance or reduction of likely significant adverse environmental effects through design, and the identification of environmental mitigation measures where required; and
- identify opportunities for environmental improvements.

6.2.5 The EIA and design processes operate iteratively and in parallel. As likely environmental effects are recognised during the development of a design, the design can be adjusted to reduce the effects. Similarly, as the design evolves, the scope of environmental studies and the assessment of likely effects also evolves.

6.2.6 Once the EIA is completed it is reported in an *ES*, which ensures decision making is based on comprehensive environmental information and considers likely significant environmental effects.

6.3 Legislation and guidance

- 6.3.1 As mentioned in *Chapter 1*, the legal basis of EIA in the UK is devolved from the *Council Directive (2011/92/EU) on the assessment of the effects of certain public and private projects on the environment (codification) (EIA Directive)* (European Union, 2011). In relation to nationally significant infrastructure projects, such as the A14 Cambridge to Huntingdon improvement scheme, the EIA Directive is implemented through the relevant EIA regulations; the *Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (as amended) (EIA Regulations)*.
- 6.3.2 Reference has also been made to the recently adopted *EIA Directive (2014/52/EU)* (European Union, 2014). This has not yet been incorporated into domestic law. However, some of its requirements are based on 'best practice' and have been included as part of the EIA for this scheme. These include:
- an assessment of impacts on human health (*Appendix 18.1*);
 - co-ordination of Habitat Regulation Assessment requirements with the EIA process; and
 - the use of competent experts in the preparation of the *ES*.
- 6.3.3 In relation to the last point, the key qualifications of the authors of the *ES* are presented in *Appendix 6.1*.
- 6.3.4 The key guidance for undertaking EIA for highway projects is set out in *Volume 11 of the Design Manual for Roads and Bridges (DMRB)* (Highways Agency et al., 1993). Guidance on mitigation and environmental design for highway projects is set out in *Volume 10 of the DMRB* (Highways Agency et al., 1993). Interim Advice Notes (IANs) are published by the Highways Agency, and provide updated guidance on several environmental topics.
- 6.3.5 *Volume 11 of the DMRB* (Highways Agency et al., 1993) has been progressively updated since its publication in 1993, and is the principal guidance document for the scheme EIA. Where appropriate and agreed with the Highways Agency this has been supplemented by accepted best practices. Full details of the guidance used are provided in the individual topic assessment chapters (*Chapter 8 to 18*).
- 6.3.6 The *draft National Policy Statement for National Networks (NPSNN)* (Department for Transport, 2013) sets out the proposed policy against which the Secretary of State for Transport will make decisions on applications for nationally significant infrastructure projects on the road and rail networks. The *ES* has been drafted with reference to the requirements of the NPSNN to ensure compliance with all the guidance contained within that document. The *Case for the Scheme* (Development Consent Order (DCO) submission document number 7.1) contains a review of how the requirements of the NPSNN have been addressed.

6.4 Scope of assessment

Scoping process

- 6.4.1 The purpose of undertaking a scoping exercise is to identify the main issues that should be focused upon within the EIA process. The aim is to ensure the *ES* is proportionate, giving due weight to the main environmental issues, but not expending too much time and resources on issues that are not likely to be significant.
- 6.4.2 A scoping exercise was undertaken between November 2013 and March 2014. The following activities were undertaken in order to determine what the likely significant effects on the environment might be and how those likely effects should be assessed:
- gathering available information about the environment and communities within the A14 corridor;
 - gathering and reviewing the previous documents prepared and data already collected to inform the previous A14 Ellington to Fen Ditton scheme, as well as additional data collected by the Highways Agency in the intervening period between the decision to withdraw that scheme and the A14 Cambridge to Huntingdon improvement scheme options consultation in autumn 2013;
 - informally consulting third parties, including statutory consultees, to find out more about the area and issues of concern and seek advice on the study area and proposed approach;
 - undertaking surveys and site visits to better understand the existing environmental conditions;
 - reviewing published guidance and methodologies;
 - undertaking some of the initial assessment steps for some topics to enable early identification of significant environmental issues;
 - reviewing the topics covered by the EIA regulations and other topics sometimes included within *ESs*, to define the topics to be scoped in and out; and
 - defining the guidance and methodologies to be used to assess the likely significant environmental effects for each of the topics to be scoped in.
- 6.4.3 The scoping exercise concluded that all main topics as referred to in Highways Agency guidance would need to be included in the EIA, but some specific subtopics were excluded from the study, including wind, microclimate and daylight, sunlight and overshadowing. This was decided because significant effects upon these issues are not typically characteristic of highway schemes.
- 6.4.4 Once the key issues, methodology and study area were determined, the proposed scope was set out in the *A14 Cambridgeshire to Huntingdon Improvement Environmental Scoping Report* (Highways Agency, March 2014). The scoping report was then issued to the Planning Inspectorate

(PINS) on behalf of the Secretary of State in support of a request for an EIA scoping opinion on 20 March 2014.

- 6.4.5 As described in more detail in *Chapter 5*, PINS issued the scoping report to prescribed consultees, as listed in *Appendix 5.1*, prior to preparing the scoping opinion on behalf of the Secretary of State.
- 6.4.6 The main body of the Secretary of State's scoping opinion, *Scoping Opinion, Proposed A14 Cambridge to Huntingdon Improvement Scheme (Scoping Opinion)* (PINS, 2014), sets out the recommendations in relation to the scope of the EIA. *Appendices 1 and 2 of the Scoping Opinion* (PINS, 2014) list the prescribed consultees and the full responses received within the statutory deadline. In addition, a number of responses were submitted late. These responses were not considered in the scoping opinion, but forwarded under separate cover for the consideration of the Highways Agency and were considered in the EIA.
- 6.4.7 Some of the consultation responses contain their own detailed scoping recommendations, but not all of these recommendations were assimilated into the Secretary of State's final recommendations. However, all scoping consultation responses were considered by the Highways Agency. *Appendix 3 of the Scoping Opinion* (PINS, 2014) sets out the Secretary of State's recommendations in relation to the presentation of the *ES*.
- 6.4.8 The scoping report and the scoping opinion are both available to view or download from the Planning Inspectorate's website via the following link:
<http://infrastructure.planningportal.gov.uk/projects/eastern/a14-cambridge-to-huntingdon-improvement-scheme/>

Scope of this *ES*

- 6.4.9 Schedule 4 of the *EIA Regulations* specifically states that an *ES* should include the following:
- "A description of the aspects of the environment likely to be significantly affected by the development, 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."*
- 6.4.10 *Table 6.1* below identifies within which sections of this *ES*, each of these topics are addressed.
- 6.4.11 The NPSNN states that *the value of nature and the range of services that ecosystems provide to society should be at the heart of any decision*. Government policy as given in the Natural Environment White Paper (NEWP) (DEFRA 2011) provides the definition of ecosystem services as *...the products of natural systems from which people derive benefits, including goods and services...* and sets out the principles that *all roles of ecosystems* are underpinned by biodiversity; the level and stability of ecosystem services generally improve with increasing levels of biodiversity. *Chapter 11* considers effects on biodiversity in detail, in keeping with NPS NN guidance. Additionally, within the various topic areas covered throughout this *ES*, impacts on environmental resources that have

an effect on ecosystem services (such as water, air and soils) are assessed, including their effects on ecosystems where applicable.

Table 6.1: Consideration of topics in the EIA scoping exercise

Aspect or topic required in the EIA regulations	Location within this Environmental Statement
Population	This topic is considered in various parts of the ES. Effects upon community are considered in <i>Chapter 16</i> ; likely significant effects upon people's journeys and access are considered in <i>Chapter 15</i> ; whilst <i>Chapters 8 and 14</i> consider how a population may be affected by air quality and noise impacts. In addition <i>Appendix 18.1</i> provides an assessment of links between the likely changes in the environment as a result of the scheme and human health.
Fauna and flora	Fauna and flora are considered in <i>Chapter 11</i> .
Soil	Soil is considered in <i>Chapter 12</i> , <i>Chapter 13</i> and <i>Chapter 16</i> .
Water	Various aspects of the water environment are considered in <i>Chapter 17</i> , whilst <i>Chapter 12</i> also considers water in terms of groundwater quality, vulnerability and potential pollution pathways. Water in terms of aquatic habitats is considered in <i>Chapter 11</i> .
Air	Air quality is considered in <i>Chapter 8</i> and <i>Appendix 18.1</i> .
Climatic factors	Greenhouse gases, associated with climate change, are considered in <i>Chapter 8</i> and also <i>Chapter 13</i> . Climate change is considered within topic chapters where relevant to the understanding of the baseline environment and potential impact interactions, including within <i>Chapter 17</i> .
Material assets inc. architectural and cultural heritage	The consumption of material resources is considered in <i>Chapter 13</i> . Community and private assets are considered in <i>Chapter 16</i> , whilst <i>Chapter 9</i> and <i>Chapter 10</i> both consider aspects of cultural and architectural heritage.
Landscape	Landscape and visual effects are considered in <i>Chapter 10</i> .
Interrelationship between the above factors	<i>Chapter 18</i> assesses the interrelationship between environmental factors, as well as cumulative effects. The interaction of different environmental effects on human health is considered in <i>Appendix 18.1</i> .

6.5 Study area, sensitive receptors and resources

- 6.5.1 The study area for this *ES* varies depending on the environmental topic and is therefore defined separately within *Chapters 8 to 17* according to topic guidance, the geographic scope of the potential impacts or the geographic scope of the information required to assess those impacts and the associated likely significant effects.
- 6.5.2 The EIA assesses the impacts on sensitive receptors and resources within the study area. These are environmental features that would be affected by an impact, such as the population of a protected species, a specific archaeological site or the occupants of a residential property. As such, the

receptors and resources assessed also vary between the different topics. This is also set out within *Chapters 8 to 17*. The receptors and resources not only include the existing environmental features, but also the predicted features at the time of construction and operation of the scheme, as relevant to the type of impact being assessed.

6.6 Baseline conditions, 'do-minimum' and 'do-something' scenarios

Baseline conditions and the 'do-minimum'

- 6.6.1 To identify the effects of the scheme on the environment, the nature of the environment that would be affected by the proposed works must first be established (the 'baseline conditions'). This allows the changes resulting from the scheme to be measured.
- 6.6.2 For most topics, the baseline for the measurement of environmental effects during scheme operation is the situation as it would exist immediately before the implementation of the scheme. This considers potential changes likely to occur in the absence of the scheme. This future baseline scenario is known as the 'do-minimum', i.e. it includes the minimum works that are likely to go ahead in the absence of the scheme.
- 6.6.3 The do-minimum scenario takes into account any other, independent changes that can be predicted, such as predicted growth in traffic, standard maintenance regimes or known future changes in regulations or policy. Examples of predicted changes included in the do-minimum scenario for the A14 are the Highways Agency's A14 Junction 31 to 32 Eastbound and Westbound improvements scheme and the construction of new developments, such as Alconbury Weald and Northstowe Phase 1 (since the outline planning permission for this phase was granted in April 2014). These predicted changes have been included in the transport model for the do-minimum scenarios for 2020 and 2035, as described in *Chapter 7 and the Transport Assessment* (DCO submission document number 7.2).
- 6.6.4 It is worth noting that for many environmental topics, there is little material difference between the present day baseline and the future 'do-minimum'. This is not the case however for those environmental topics based on traffic data, because traffic flows may change significantly over time and with additional developments.
- 6.6.5 On the current programme, the scheme would open to traffic in 2020, and this year is referred to as the opening year in some topic assessments, including air quality, noise and vibration.
- 6.6.6 For some topics, impacts are predicted both for the opening year and for a 'future year', also known as 'design year' (see *paragraph 6.6.8* below). A future year 'do-minimum' scenario is therefore also created.

Do-something scenarios

- 6.6.7 The do-something scenario takes into account all of the predicted changes considered in the do-minimum scenario, as well as the changes that would occur if the scheme had been built, in relation to the opening year and the future year (see below) respectively. A development is planned at Northstowe near Longstanton, to the north of the A14. Phase 1 of the

development, for 1,500 households, currently has planning permission and hence this level of Northstowe development is considered in all future year 'Do-Minimum' (without the A14 scheme) and 'Do-Something' (with the A14 scheme) scenarios as default.

- 6.6.8 A planning application for Phase 2 has recently been submitted to South Cambridgeshire District Council by the Homes and Communities Agency (HCA). Phase 2, which comprises an additional 3,500 households and development of the town centre. However, further expansion of the Northstowe development beyond Phase 1 is dependent on improvement of the highway network, including the A14.
- 6.6.9 Consequently, Phase 2 has only been included in the future year 'Do-Something' with scheme' scenario (with the A14 scheme) scenario., to inform the scheme design, operational and environmental assessments.
- 6.6.10 For some topics, impacts are predicted both for the opening year (2020) and for a 'future year', also known as 'design year' in some cases. The future year is typically 15 years after opening (2035) since this is the year when mitigation measures are likely to have achieved a significant effect by, or the worst year in the first 15 years of operation, in accordance with *DMRB, Volume 11 Section 2, Part 5, HA 205/08 - Assessment and Management of Environmental Effects (DMRB HA 205/08)* (Highways Agency et al., 2008a). In some cases, the worst year in the first 15 years after opening could be the opening year. In this case, it may not be necessary to undertake a separate future year prediction, unless it was necessary to undertake the future year, year 15, prediction in order to determine whether it is worse than the opening year. This is the case for air quality, for instance, where the worst year has been assessed to be the opening year (2020), but a prediction of year 15 (2035) has been undertaken since this is the year of maximum projected traffic flow within 15 years of opening and in order to determine whether the opening year or year 15 is the worst year. Where relevant, the future year is defined separately for each topic in *Chapters 8 to 17*.
- 6.6.11 The methodology for each topic chapter (*Chapters 8 to 17*) follows best practice guidance in relation to baseline, opening year and future year assessment, and clearly sets out the years used for each of these scenarios.

Construction impacts

- 6.6.12 For the purposes of this assessment, it is assumed that construction would start in 2016. As such, the baseline year for construction impacts is 2016. The assessment of construction impacts of all sections of the scheme uses this baseline/do-minimum scenario, including the phased demolition of the Huntingdon A14 Viaduct. It is possible that some minor works, such as habitat establishment, may be undertaken in advance of 2016, but this would not affect the findings reported in this ES.
- 6.6.13 The assumptions used to form the basis of the 2016 construction baseline are set out in *Appendix 3.2*. While this appendix sets out an envisaged phased construction programme, some of the topic assessments of construction impacts have assumed that construction would take place

concurrently across the scheme to represent a worst case scenario, since the phased implementation is only an envisaged scenario. The topic specific approach to the construction assessment is set out in *Chapters 8 to 17*.

6.7 Information gathering

6.7.1 For each topic, information was gathered from a number of sources during previous phases of scheme development and the scoping exercise. Additional or updated information from these sources, as well as from new sources, was gathered during the EIA phase following the scoping exercise, to inform the preparation of this *ES* and the design development. The data gathering work undertaken is defined in each topic chapter (*Chapters 8 to 17*), but generally comprises the following elements:

- consultation of third-party organisations to obtain information;
- desk-based studies; and
- field surveys either carried out for the EIA itself or for other aspects of the project.

6.7.2 For some topics (air quality, noise, road drainage and the water environment, and effects on all travellers), a key source of information is predicted flows of traffic. *Chapter 7 of this ES* provides more explanation about the methods and assumptions behind the prediction of traffic flows.

6.8 Predicting impacts – direct, indirect and cumulative

6.8.1 The *DMRB Volume 11, Section 2, Part 7, HA 218/28 - Glossary of terms used in DMRB Volume 11, Sections 1 and 2* defines environmental impacts as “a change that is caused by an action” (*DMRB HA 218/28*) (Highways Agency et al., 2008b).

6.8.2 As an initial step, potential impacts are identified through review of the baseline environment, the characteristics of the scheme and initial assessment. It informs the need for mitigation and, for most topics, provides an illustration of potential impacts in the absence of mitigation, reported in this *ES* under the heading of Potential Impacts. Information and opinions provided through consultation are also considered, including comments raised by members of the public during the public exhibitions and other events associated with the scheme, as described in *Chapter 5*.

6.8.3 The EIA considers both direct and indirect impacts and effects. Indirect impacts in this context are defined in *DMRB HA 205/08, paragraph 1.50 i. and ii.* (Highways Agency et al., 2008a) as:

“those that alter the character, behaviour or functioning of the affected environment because of the knock-on impacts over a wider area or timescale”; or

“the impacts related to pressure as a result of project-induced change.”

6.8.4 The assessment of direct and indirect effects is discussed below in significance of effects.

6.9 Significance of effects

- 6.9.1 The *DMRB HA 205/08 paragraph 2.2* (Highways Agency et al., 2008a) defines the significance of the effect “as a function of the receptor or resource environmental value (or sensitivity) and the magnitude of project impact (change). In other words, significance criteria are used to report the effect of the impact.” This could for instance be the decline (effect) of a breeding bird population (receptor) as a result of the removal of hedgerows and trees (impact).
- 6.9.2 A typical generic set of terminology and criteria which covers a description of both the sensitivity and magnitude, is also provided in *DMRB HA 205/08* (Highways Agency et al., 2008a). However, the more detailed guidance for individual topics set out in other parts of *Volume 11 of DMRB* (Highways Agency et al., 1993) necessarily differs between topics with regard to scales, terminology and criteria, and the overall approach.
- 6.9.3 For most topics, assessment has been based on detailed guidance and/or assessment criteria available in Highways Agency guidance and which are in line with emerging best practice. As a minimum, all impacts are defined according to the following broad descriptors:
- adverse or beneficial (i.e. they are undesirable effects, or they represent an improvement over the baseline situation);
 - short-term or long-term (i.e. they are experienced for less than 15 years, or they will still be felt 15 years after construction and beyond);
 - construction or operational (i.e. caused by the construction of the scheme, or by the operation of the scheme after opening); and
 - significant or not significant.
- 6.9.4 Where detailed guidance/assessment criteria are not available in Highways Agency guidance, bespoke assessment criteria have been developed and agreed with the relevant department of the Highways Agency and the relevant environmental bodies. This is described in the topic chapters (*Chapters 8 to 17*).
- 6.9.5 For certain topics, such as air quality and noise, the impacts can be quantified against thresholds defined using numerical values. This quantification is done through calculations or computer modelling.
- 6.9.6 For those topics where the environmental impacts do not lend themselves to quantification, professional judgement can be applied by suitably qualified and experienced specialists (as listed in *Appendix 6.1*) to determine the significance of effect on a graduated scale. This is done by grading both the value/sensitivity of the receptor and the magnitude of impact on separate graduated scales. A matrix is then used with the sensitivity of the affected receptor on one axis and the magnitude of the impact on the other axis. A typical matrix for this purpose is provided in the *DMRB HA 205/08* (Highways Agency et al., 2008a), and reproduced as *Table 6.2*, showing typical terminology for sensitivity of a receptor, magnitude of impact and significance of effect. Some topics use this matrix

unmodified in combination with specific tables of criteria for defining value/sensitivity and magnitude of impact. Other topics use modified versions of the matrix, a combination of the matrix and calculations, or professional judgement to assess the magnitude of impact and significance of effect.

Table 6.2: Typical matrix for the assessment of significance of effects

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

6.9.7 For the purposes of this EIA an effect is considered to be significant if it is moderate or greater. For those boxes with more than one level of significance, professional judgement of suitably qualified specialists is applied to select the appropriate level. The specific methods used for determining significance, including any deviations from methodology, which have been agreed with the overseeing authority and stakeholders as appropriate, are set out in the methodology section of each assessment chapter (*Chapters 8 to 18*).

6.9.8 The EIA process also considers cumulative effects. These are effects that result from the incremental impact of an action when added to other past, present or reasonably foreseeable actions, or from the combined impacts of the scheme on a particular resource or receptor. *Chapter 18* provides the assessment of the likely significant cumulative effects predicted to occur from the scheme itself and in combination with other reasonably foreseeable developments within the vicinity of the A14 Cambridge to Huntingdon scheme.

6.10 Mitigation measures and enhancements

6.10.1 Mitigation measures to avoid, reduce, remedy or compensate for potential impacts will be required where significant adverse effects are predicted.

Mitigation through engineering design

6.10.2 The first preference in the mitigation hierarchy is to seek engineering design measures that would entirely avoid or eliminate the impact. Where this is not possible, the mitigation should then seek to reduce the magnitude of the impact. For example, impacts could be avoided or reduced by changing the horizontal or vertical alignment of the scheme,

junction strategy or other aspects of the scheme layout, or by utilising alternative methods and/or materials during construction.

- 6.10.3 Any mitigation measures involving changes to the horizontal or vertical alignment, junction strategy or layout of the scheme, have been identified and implemented prior to preparation of the *ES* as part of the environmental input to the design process. These measures are therefore already reflected in the scheme as described in *Chapter 3*. Such measures are therefore not proposed or reported in this *ES* as mitigation.

Other forms of mitigation

- 6.10.4 Where avoidance of an impact through engineering design measures is not possible, or is only partly effective, further mitigation measures may be required. Such measures fall into three broad categories:

- Measures that do not remove an impact but make it less significant. Typical examples are environmental design features such as an earth mound or planting trees to screen views of a road where it is visually intrusive.
- The like-for-like replacement of a feature that would be lost. For example, this could include creating a new pond designed to provide habitat similar to that in a pond that is on the scheme alignment and cannot be avoided.
- The provision of a beneficial effect that is related to the impact, but is not a like-for-like replacement of the feature to be lost. A typical example would be the construction of a bridge to replace an existing culvert, allowing associated watercourse re-naturalisation and improving the wildlife corridor function.

- 6.10.5 The mitigation measures identified in the topic assessments in this *ES* are summarised in the *Register of environmental actions and commitments (REAC)* in *Appendix 20.1*, included on the outline environmental design illustrated on *Figure 3.2* and described in the relevant topic chapters (*Chapters 8 to 18*).

Construction code of practice

- 6.10.6 The mitigation strategy described above addresses impacts where occurrence, timing and location can be predicted in advance and are intrinsic to the design of the scheme. However, there are also potential impacts to the environment that would occur as a result of the construction process including accidental occurrences during construction. The timing and location of these impacts cannot be accurately predicted at this stage. An example would include accidental spillages of fuels, oils or other chemicals.
- 6.10.7 As the occurrence of such impacts is not certain at this stage, they are better described as 'risks' rather than 'impacts'. The likelihood of occurrence and the severity of any such incidents can be reduced through good construction site management practices. To help ensure adequate consideration of risks identified during the EIA which would relate to the construction period, and to set out and codify mitigation measures to manage those risks, a construction code of practice (CoCP) has been

prepared. This sets out detail on construction stage mitigation and certain requirements for the contractors, including a requirement to develop local environmental management plans (LEMP) which would set out the environmental protection measures within each relevant local authority area. A construction environmental management plan (CEMP) would also be prepared to set out how the mitigation would be implemented by detailing the roles and responsibilities, control measures, training and briefing procedures, risk assessments and monitoring systems to be employed during planning and construction for all relevant environmental topic areas. Both the CoCP and associated environmental management plans are covered in more detail in *Chapter 20*.

Implementation and enforcement of mitigation

- 6.10.8 Mitigation will be secured by way of requirements in the DCO that the scheme is undertaken in accordance with:
- the CoCP (which includes detailed provision on mitigation of construction impacts);
 - specific mitigation obligations in key topic areas such as landscaping, drainage and contaminated land; and
 - the scheme design shown on the plans submitted with the DCO.
- 6.10.9 Parallel with this, the Highways Agency will place a contractual responsibility on detailed design and construction contractors to comply with the DCO requirements. Discharge of these requirements would be by consent from the Secretary of State, generally following consultation with the relevant planning or environmental authority.
- 6.10.10 The Highways Agency will also place a more detailed contractual responsibility on detailed design and construction contractors to design and construct the project providing the same level of mitigation as the environmental design in *Figure 3.2* of the *ES* and the Register of Environmental Actions and Commitments (*Appendix 20.1*).

Enhancements

- 6.10.11 Where practicable the scheme would seek to provide environmental enhancements as part of the detailed design. These could include features such as enhanced flood protection or local agricultural improvements, using surplus topsoil. While environmental enhancements are not assessed within this *ES*, they would be considered at the detailed design stage.

6.11 Residual effects

- 6.11.1 Environmental effects that would remain after the mitigation measures are taken into account are referred to as 'residual' effects. To identify the residual effects, only mitigation which is a firm commitment, as described above is considered. In addition, where there is any doubt about the effectiveness of the mitigation, a worst case scenario has been assumed and taken into account in the assessment of residual effects.

- 6.11.2 The residual effects are described in each topic chapter (*Chapters 8 to 17*), clearly identifying where a worst case scenario has been assessed due to doubt over the effectiveness of the mitigation.
- 6.11.3 Some measures that are designed to mitigate an adverse impact may also result in an environmental improvement. In these instances, the residual effect is recorded as 'beneficial'.
- 6.11.4 Conversely, some measures that are designed to mitigate an adverse impact for a topic may result in an adverse impact for another topic area. Such impact interactions are covered in *Chapter 18*.

6.12 Dealing with uncertainty

- 6.12.1 The DCO application allows for the scheme to be constructed within certain limits of deviation. This includes vertical deviation, up to a maximum of 0.5 metres and horizontal deviation within the limits of the DCO boundary. As a result, there is some flexibility as to the exact scheme detail, which in turn results in the potential for uncertainty as to its impacts and likely significant effects.
- 6.12.2 In assessing the effects of the scheme, the principle of the 'Rochdale Envelope' has therefore been applied, in accordance with Advice note nine: Rochdale Envelope (*PINS, 2012*). For the purposes of this assessment, what has been assumed for each impact in terms of the detail of the scheme, is the realistic worst case within those specified limits of deviation. Each chapter sets out the assumptions used to form the worst case scenario assessed in the individual topic (*Chapters 8 to 17*).
- 6.12.3 The worst case scenario in relation to any particular design element is not necessarily the same for all topics. As such there is some variation between the assumptions that form the basis of assessment of some topics, although these do form a coherent scheme. An example of this is assessment relating to the floodplain compensation areas, where the assessment for nature conservation could not assume that new habitat would be created, but the community and private assets assessment could equally not assume that the land would be restored to the previous land use.
- 6.12.4 At the current stage in the design process, absolute certainty about construction timing, phasing and methodology is not possible. To address this uncertainty a set of informed assumptions set out in *Appendix 3.2* has been used for the assessment of construction impacts. This includes some contingency in its assumptions. For example, there is a degree of uncertainty about material volumes and their sources. In order to ensure the assessment of likely significant effects from the likely worst case scenario during construction, all material volumes quoted include a contingency of 10%. In addition, most of the topic assessments of construction impacts have assumed that construction would take place concurrently across the scheme, rather than via a phased programme, to represent a likely worst case scenario. The specific approaches to uncertainty in the assessment of construction impacts is set out in *Chapters 8 to 17*.

6.13 Bibliography

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