PART 3 : ENVIRONMENTAL ASSESSMENT METHODS

3.1 Overall Assessment Methodology

Assessment of Impacts

3.1.1 As described in paragraph 1.3.1, the format of the ES follows guidance in the Highways Agency's Design Manual for Roads and Bridges (DMRB), Volume 11 Environmental Assessment, Section 2, Parts 1 - 7 as updated in August 2008 (however see paragraph 3.1.16 below). The EIA reported in this ES has been undertaken to meet the requirements of Section 105A of the Highways Act 1980 (England and Wales) as amended, implementing Council Directive 85/337/EEC, as amended.

3.1.2 The general assessment methodology within DMRB (HA 201/08, *DMRB Volume 11, Section 2, Part 1 General Principles and Guidance of Environmental Impact Assessment)* defines three assessment levels that may be relevant dependant on the potential environmental effects, the stage of project planning and the next project decision. The three assessment activities are consequential in that the results of one level determines what, if any, further work is required. The assessment levels are:

1. Scoping;
2. Simple Assessment; and
3. Detailed Assessment

Assessment Level – Scoping

3.1.3 Scoping is based around a desk study responding to available data and information. Likely impacts are identified that either establish the need for further assessment or exclude issues from further assessment.

3.1.4 An A453 Environmental Statement Scoping Report (Ref. A021959-REP-E-ES-021 Rev. B) was prepared by the Highways Agency (HA) in October 2006. The purpose of the report was to:

- inform key consultees of the project and route;
- determine the scope of the environmental assessment, identifying the key issues that will be addressed together with the approach to consultation, including the consultees who will be approached;
- describe and seek comment on the methodology to be employed within the assessment, including criteria for assessing the significance of any effects.

3.1.5 The scoping report was sent to the following consultees for comment:

- Natural England (formerly English Nature, the Countryside Agency and the Rural Development Service);

- English Heritage;
- Environment Agency;
- Nottinghamshire County Council;
- Leicestershire County Council;
- Nottingham City Council;
- Rushcliffe Borough Council;
- North West Leicestershire District Council;
- Government Office for the East Midlands.

3.1.6 As outlined in section 2.1 above, previous schemes for improving the A453 have been published and subject to consultations, including Public Inquiries. This has generated a considerable body of opinion amongst groups and individuals interested or affected by the proposals. This is recorded in the Inspector's Reports into the Public Inquiries and other contemporary scheme records. Account was taken of previous assessments, views and debate of environmental issues in compiling the scoping report.

3.1.7 At that stage, prior to detailed assessment by the project team (see section 3.2 below), the following summary of likely impacts was presented in the ES Scoping Report (taken from the TAG appraisal AST October 2005 as shown in Table 2 above):

- Noise levels are likely to increase, particularly in the urban section;
- Air quality is likely to deteriorate, particularly in the urban section;
- Greenhouse Gases (CO_2) will increase;
- Landscape impact is likely to be slight adverse;
- Townscape impact is likely to be moderate adverse in the urban section;
- Impact on the Heritage of historic parts of Clifton and other limited archaeological sites is likely to be slight adverse;
- Biodiversity impacts are likely to be slight adverse but could be worse if protected species are identified;
- Impact on the Water Environment should be neutral since flood compensation measures will be introduced where the River Soar flood plain is affected, and mitigation measures will address pollution control;
- Physical Fitness could benefit slightly as more walking and cycling is encouraged;
- Journey Ambience should improve moderately as stress and fear of accidents for road users decreases;
- Severance for pedestrians and cyclists will benefit from improved crossings and signalised junctions;

- The project will contribute to most Land-Use Policy objectives and Other Government Policies, with neutral or beneficial effects.

3.1.8 The ES Scoping Report also summarised the background to the project, the anticipated programme for publication of Draft Orders, possible date of a Public Inquiry (if applicable), anticipated start of construction and opening of the completed road (assuming the project is approved), and period of aftercare by the contractor prior to handover to the maintaining agent.

3.1.9 For each of the 13 environmental topics, the ES Scoping Report indicated the methodology to be followed, key guidance and legislation, consultees, the study area, baseline conditions (as existing, including summary of previous studies, proposed surveys, reports and sources of information), key receptors (environmental element likely to be adversely or beneficially affected by the project, e.g. local resident, wildlife, water body), potential impacts and mitigation measures.

3.1.10 Comments on the ES Scoping Report were received from Natural England, English Heritage, the Environment Agency and Nottinghamshire County Council. These are summarised in Appendix E. These issues have all been addressed in the ES.

3.1.11 Following the scoping assessment, latest HA guidance within IAN 76/06 suggests that where it is apparent that the project would have no change against certain environmental topics or other topics may have only negligible change and very insignificant effects, further assessment may not be necessary. With such conditions it may be possible to simply apply established good design solutions to ensure the protection and enhancement of the environmental resource or receptor. This is not the case with the A453 Widening project, and further assessment of environmental impacts on each of the 13 topics has been undertaken.

Assessment Level – Simple

3.1.12 This level of assessment is based on the assembly of data and information beyond that which is readily available. Such additional information is typically gained through exploratory consultations with statutory environmental bodies, simple analysis, reconnaissance surveys or investigation. Simple assessment is sufficient if it confidently established that the forecast environmental effect would not be a fundamental issue in the decision making process. In that case there would be no need for detailed assessment.

3.1.13 This latest HA guidance within HA 201/08 was published in August 2008, after detailed assessment following previous guidance in DMRB Volume 11 Section 3 had begun. It was therefore decided that detailed level of assessment, rather than a simple assessment level, should be continued for each of the 13 environmental topics.

Assessment Level – Detailed

3.1.14 Detailed assessments are required where there is the potential to cause significant environmental effects. Detailed field surveys and/or quantified modelling techniques

are likely to be required as part of a detailed assessment. The objective is to gain an in-depth appreciation of the beneficial and adverse consequences of the project and to inform project decisions, since they are likely to be key issues in whether the project proceeds as proposed.

3.1.15 Further guidance on the detailed level of assessment is provided in the following updated DMRB Volume 11 Section 3 guidance documents:

- Part 1 Air Quality, HA 207/07, May 2007
- Part 2 Cultural Heritage, HA 208/07, August 2007
- Part 10 Road Drainage and the Water Environment, HA 216/06, May 2007

This updated guidance has been followed within the ES for the assessment of impacts on these three environmental topics.

3.1.16 DMRB Volume 11, Section 3, Part 7 guidance on Noise and Vibration assessment was updated in August 2008 (HA 213/08) after the A453 noise assessment was largely complete. The EIA reported in Section 2 Part 7 of this ES follows earlier guidance within DMRB. Further updates of DMRB Volume 11 Section 3 *Environmental Assessment Techniques* are anticipated for the remaining topics, but at the time of writing these had not been issued.

Mitigation/Enhancement and Monitoring

3.1.17 DMRB advice on mitigation/enhancement measures is that these may be undertaken on projects where no further assessment has been necessary following scoping, or where a simple or detailed assessment has been undertaken. It involves the iterative design, assessment and identification of measures that could be taken to avoid, reduce and offset adverse effects or enhance the positive environmental performance of the project.

3.1.18 Within this ES environmental impacts are assessed with proposed mitigation / enhancement measures in place.

3.1.19 Follow-up will monitor and evaluate the effectiveness of the measures to meet the requirements of legislation, guidance or to learn how to do things better in the future.

Consultation

3.1.20 Consultations have been carried out as part of the EIA process following earlier consultation on the ES Scoping Report as outlined above. This has included relevant stakeholder and statutory environmental body consultations on the findings of the baseline evaluation of current conditions (following surveys where appropriate), potential impacts, proposed mitigation measures and likely significant effects, during the project development process.

3.1.21 Consultations undertaken are detailed in Section 2 for each of the environmental topics.

Significance of Effects - DMRB Volume 11, Section 2, Part 5 (HA 205/08)

3.1.22 Updated DMRB guidance within HA 205/08 (August 2008) provides advice on criteria for arriving at the significance of environmental effects following a consistent formulaic approach. This is a function of the value or sensitivity of environmental resources or receptors together with a scale of magnitude of impacts (change as a result of the project).

3.1.23 Updated DMRB guidance (at the time or writing limited to Parts 1, 2 and 10 as detailed in paragraph 3.1.15 above) includes criteria for ranking value/sensitivity in accordance with the following scale:

- Very High
- High
- Medium
- Low
- Negligible

3.1.24 Typical descriptors or criteria for the environmental value/sensitivity of an environmental resource are given in **Table 1.3.1** below. Not all the environmental topics use all the following value categories:

Table 1.3.1 : Environmental Value (or Sensitivity) and Typical Descriptors

Value (sensitivity)	Typical criteria descriptors
Very High	Very high importance and rarity, international scale and very 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 and limited potential for substitution.
Low (or Lower)	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale.

3.1.25 Updated DMRB guidance includes criteria for ranking the magnitude of impact (degree of change) according to the following scale:

- Major
- Moderate
- Minor
- Negligible
- No change

3.1.26 Typical descriptors or criteria for the impact of the project are listed in **Table 1.3.2** below. The greater the change the more major the impact. Change can be either beneficial or adverse.

Table 1.3.2 : Magnitude of Impact and Typical Descriptors

Magnitude of impact	Typical criteria descriptors
Major	• Loss of resource and/or quality and integrity of resource; 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	• 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	• Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (or maybe more) key characteristics, features or elements (Adverse). • Minor benefit to, or addition of, one (or maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial).
Negligible	• 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	• No loss or alteration of characteristics, features or elements; no observable impact in either direction.

3.1.27 The approach in developing the topic criteria and to assigning significance relies on reasoned argument, professional judgement and taking on board the advice and views of appropriate organisations. Assigning each effect to one of the five significance categories enables different topic issues to be placed upon the same scale, i.e. the importance of the decision-making process at whatever stage the project is at within that process. These five significance categories or project descriptors are set out in Table 1.3.3 below:

Table 1.3.3 : Descriptions 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 local 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 factors may influence decision-making if they lead 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.

3.1.28 Significance categories are required for positive as well as negative effects. The five significance categories give rise to eight potential outcomes. Applying the formula, the greater the environmental value the more significant the effect. The consequences of a highly valued environmental resource suffering a major detrimental impact would be a very significant adverse effect. The typical significance categories presented in Table 1.3.4 below have been prepared specifically for decision-making on trunk road projects:

Table 1.3.4 : Arriving at the Significance

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
		No Change	Negligible	Minor	Moderate	Major
		MAGNITUDE OF IMPACT (DEGREE OF CHANGE)				

3.1.29 The significance is assigned after consideration of the effectiveness of the design and committed mitigation measures, in line with the Highways Agency's requirements. That is, significance is assigned with mitigation measures in place allowing for the positive contribution of all mitigation that is deliverable and committed.

3.1.30 Significance in cumulative effects is descriptive rather than formulaic, and has been determined by their forecast magnitude and the extent to which the impacts can be accommodated by the resource/receptor. The questions in Table 1.3.5 below have been considered in arriving at the significance of cumulative effects:

Table 1.3.5 : Questions to Aid the Description of Significance of Cumulative Effects

Is there an incremental contribution of effects from the project under assessment?	Where the effects of an action are quite small relative to the effects of other development, then the cumulative effects of that action are likely to be negligible, however, a small change may cause a threshold to be exceeded.
Is there an increase in effects due to the combined influence of the project with the effects of other development?	Does the combined effect change the individual significance of each effect in terms of overall relevance to decision-makers?
Is the resulting effect unacceptable?	Does the combined effect exceed a threshold or make the resource un-sustainable?
Are critical thresholds or assimilative capacities exceeded?	If the effect exceeds a threshold then the effect is usually considered significant.
Is there a balancing of effects?	Where there is a genuine compensatory effect, adverse impacts on some resources may be balanced by beneficial impacts on others. These should be genuine substitutions; such balancing should err on the side of caution.

3.1.31 The above significance criteria have generally been adopted within the ES, but where subject-specific assessment guidance within DMRB Volume 11 Section 3 has not been updated, significance criteria from the Department for Transport's Transport Analysis Guidance (TAG) and best practice guidance issued by professional environmental institutions, such as the Institute of Ecology and Environmental Management (IEEM) for example, has been adopted as appropriate. Where this is the case, the significance criteria adopted is described in the relevant environmental topic within Section 2.

Traffic Data

3.1.32 Table 1.2.1 indicates total forecast traffic flows for the year that the road would be open for use (winter 2012), both with the project in place (the 'Do-something' (DS) situation) and if the road wasn't built (the 'Do-minimum' (DM) situation). Forecast traffic flows are also shown for the year that the road has been designed to (2027). The period between the opening year 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 the design process, economic cost-benefit analysis and for the assessment of environmental impacts on air quality, traffic noise and vibration, and road drainage and the water environment.

3.1.33 In considering the traffic changes over time, a computer model has been used which takes into account the Government forecasts for future traffic growth as well

as local committed developments i.e. new housing or employment proposals which have planning permission (see sections 1.3.5 and 1.3.6).

3.1.34 The area in the draft Regional Plan (Draft RSS8) for the sustainable urban extension to the south of Clifton has not been explicitly modelled because there are no committed development proposals. It has been taken into account within the region-wide traffic growth forecast. We will be undertaking sensitivity tests at a later date on the Three Cities Sub-Area as identified in the Three Cities Sub-Regional Strategy (the SRS).

Programme

3.1.35 In considering the programme and delivery of the scheme, the assessment considers the baseline condition at 2006, and assumes that the works would be undertaken in accordance with the following programme:

- Publication of ES and Draft Orders — January 2009
- Public Inquiry — Autumn / Winter 2009
- Start of construction — Autumn / Winter 2010
- Road open to traffic — Winter 2012/13
- Aftercare and management of environmental landscape works and planting — 5 years following completion of construction

3.1.36 In addition to the 2006 baseline year, the assessment has assumed the following scenarios:

- Opening Year 'Do-Minimum' (without the project) — 2012
- Opening Year 'Do-Something' (with the project) — 2012
- Design Year 'Do-Minimum' (without the project) — 2027
- Design Year 'Do-Something' (with the project) — 2027

3.2 The Team Preparing the Environmental Statement

3.2.1 Laing O'Rourke Infrastructure (LOR) was appointed by the Highways Agency on 6th March 2006 as contractor to build the A453 Widening scheme. White Young Green (WYG) has been appointed as Principal Design Consultant by LOR. WYG has undertaken the preliminary design and other work necessary to promote the project through the statutory process on behalf of the Highways Agency. This has included preparation of the various Draft Line, Side Roads and Compulsory Purchase Orders (as listed in paragraph 1.2.5) and submission of the Environmental Statement.

3.2.2 White Young Green's environmental team, co-ordinated by the Project Environmental Co-ordinator Anthony Brown of David Tyldesley & Associates (DTA), have been responsible for most of the reviewing of earlier EIA work, carrying out further work when required and for reporting the EIA in this ES. Specialist

consultancies undertook the assessment of impacts on cultural heritage, landscape and agricultural land use. The specialist team leaders for the ES are as follows:

- Air Quality – Matthew Holford, WYG Environmental;
- Cultural Heritage – Vicki Score, University of Leicester Archaeological Services;
- Disruption due to Construction – Anthony Brown, DTA with LOR;
- Ecology and Nature Conservation – Ryan Mellor, WYG Environmental;
- Landscape Effects – Jonathan Buckley, Golder Associates;
- Land Use : Non-agricultural – Ian Briggs, WYG;
- Land Use : Agricultural – Ben Wills, Brown & Co.;
- Traffic Noise & Vibration - Nigel Mann, WYG Environmental;
- Pedestrians, Cyclists, Equestrians and Community Effects - Anthony Brown, DTA;
- Vehicle Travellers - Anthony Brown, DTA;
- Road Drainage and the Water Environment – Chris Rowlands, WYG Environmental;
- Geology – Simon Croxford, WYG Environmental;
- Soils – Neil Humphries, WYG Environmental;
- Impact on Policies and Plans - Ian Briggs, WYG.

3.3 Difficulties Encountered in the EIA

3.3.1 There were no significant difficulties encountered in carrying out the assessment for the ES. A review of previous environmental assessment work identified some gaps in information, partly because of no formal reporting to DMRB Stage 2 level due to programme constraints, although a number of key surveys had been undertaken as mentioned in paragraph 2.1.9 above. The scope of further work, including surveys, needed to bring the EIA up to DMRB Stage 3 level of reporting was agreed with the Highways Agency (reference to different stages in environmental assessment has now been superseded by new advice in DMRB Volume 11, Section 2, Part 1, HA 201/08, August 2008).

3.3.2 Difficulty in gaining access to one area of farmland created some limitations for survey work for cultural heritage, and this is noted in Section 2 Part 2.

3.3.3 Some areas not entered directly for the purposes of ecological survey work due to lack of access on to private land were either recorded and mapped from adjacent land and/or were at sufficient distance from the project such that a lower level of survey did not affect the quality of data available for the assessment of likely significant effects. This is noted within Section Part 4.

Page left intentionally blank