Independent Review of Hereford Relief Road Technical Studies

July 2011

PARSONS BRINCKERHOFF

PB 125 YEARS

Independent Review of Hereford Relief Road Technical Studies

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SECTION 1

INTRODUCTION AND METHODOLOGY

1 INTRODUCTION AND METHODOLOGY

1.1 Introduction

1.1.1 Parsons Brinckerhoff Ltd (PB) were appointed in June 2011 by Herefordshire Council (HC) to undertake a high level independent review of the Hereford Relief Road technical studies and Core Strategy Preferred Option:Hereford. The focus of the review is the environmental topics surrounding the technical studies but does broaden into planning and transportation issues. The brief was provided to PB in a document from HC dated (June 2011). Two briefing meetings were also held with HC (6 and 14 June) at which the background to the commission was explained, the context and relationship of reports summarised and the objectives of the study discussed. PB provided a detailed proposal (16 June 2011) that summarised the methodology and approach that would be taken as part of the exercise.

1.1.2 The focus of the exercise is to confirm (or otherwise), that the conclusion reached by Amey (that the preferred route corridor for the Hereford Relief Road was an inner western route) was based on good practice and was solid. In addition, the validity of the 'East is Best' option on environmental grounds was also to be considered and the potential environmental impacts from the option summarised.

1.2 Assumptions

1.2.1 The following assumptions were agreed at the outset of this exercise:

1.2.2 No consideration of detailed engineering feasibility or cost issues have been included as part of this review.

1.2.3 We will not revisit the need for the road nor the housing figures arrived at via the Regional Spatial Strategy (RSS) and the subsequent reduction in housing numbers that is now expected to be pursued by HC.

1.2.4 Consideration of environmental impacts is restricted to route corridors rather than specific routes.

1.2.5 Our review of Amey's environmental studies has assumed that the data they present are correct; there was insufficient time to confirm this but we see no reason to suspect the data used (that is largely in the public domain) would be inaccurate.

1.2.6 All development will result in environmental impacts and regardless of which option is selected, the Hereford Relief Road will be no different. The studies conducted by Amey are considerable and time constraints in this study have been such that only significant impacts identified by Amey have been reviewed. It is considered at this stage that the exclusion of routes or the preference of one route over another on environmental grounds would largely result from:

- the presence of 'show stoppers' or environmental constraints that have considerable potential for significant impact or
- that their mitigation to a level that was deemed satisfactory (if indeed that were possible), would have considerable cost and programme implications.

1.2.7 As a consequence, this study has focussed on those *significant* issues identified by Amey which we have assumed to be correct. Our review of significant issues has

considered whether they are overstated. Consideration of whether the change in significance affects the materiality of the overall conclusion has been commented upon.

1.2.8 The northern and southern sections of the relief road are common to all route options and are included as part of the 'East is Best' alternative proposal. While therefore there would appear to be commonality between all options in this regard, where appropriate we have included comment where these sections need to be included as part of the wider context. Similarly where we believe that issues have been under or over stated for these sections, comment has been included.

1.3 Authors of this Report

1.3.1 PB is a specialist engineering consultancy company ranked by the Institute of Civil Engineers as one of the top such organisations in the UK. The company routinely undertakes road design and is retained on various framework agreements by the Highways Agency and numerous local authorities.

1.3.2 This study has been managed and delivered by the Environment group of PB. PB is a founder member of the Institute of Environmental Management and Assessments 'Quality Mark' standard for organisations undertaking environmental impact assessments. This is a new scheme launched in April 2011. PB was a founder member of the previous EIA Registered Assessor scheme operated by IEMA.

1.3.3 This study is being led by a member of staff who has over 25 years experience in EIA, has undertaken numerous studies associated with highway schemes in the UK and overseas and holds a personal EIA Practitioner accreditation (also managed and run by IEMA) at the highest grade – Principal. With the exception of heritage elements, all comment on environmental topics has been undertaken by one of the lead practitioners in each field within PB. These are senior members of staff or heads of discipline. Heritage topic issues were addressed by a senior member of staff from Oxford Archaeology – one of the largest heritage and archaeological consultancies in the UK.

1.4 Documents Reviewed

1.4.1 The following documents made available by HC have been included as part of this review.

Date	Author	Title
September 2009	Government Office for the West Midlands	West Midlands RSS Phase 2 Revision, Report of the Panel
April 2010	Amey	Stage 1 Environmental Assessment Report
August 2010	Amey	Stage 1 Assessment Report
August 2010	Amey	Study of Options Environmental Assessment Report
September 2010	Amey	Study of Options
September 2010	Amey	Stage 2 Engineering Assessment – Appendix A – Design Drawings Booklet
September 2010	Herefordshire Council	LDF Preferred Option: Hereford. Follow on Consultation

Date	Author	Title
October 2010	David Sheppard	Why East is Best (LDF Consultation response)
19 November 2010	Natural England	Response to LDF Preferred Option: Hereford consultation
March 2011	TPi	Interim Forecasting Report. Revised Eastern Route Corridors
14 March 2011	Natural England	Comment on HRA (January draft)
15 April 2011	Cresswell Associates	Habitats Regulations Assessment
13 June 2011	GL Hearn	Hereford LDF Core Strategy. Draft Revised Preferred Option Background Paper
April 2010	Mouchel	DASTS Stage 1 Assessment Table for Strategic Governance, Legislative & Fiscal Measures
October 2006	CLG	New Growth Points

1.5 Structure of the Report

1.5.1 The documents identified in Section 1.4 have been reviewed as part of this study. A detailed review has not been possible within the timescale for this study of all the environmental data that are available. However it is not considered that this represents a risk to the findings or the conclusions made; it is reiterated that this is a high level review.

1.5.2 The basis for the relief road is the need to provide transportation infrastructure to meet with the demand that will be placed on the existing road network from the additional properties that are required for the city. Comment on the relevance of the corridor options to the location of the additional housing provision from a high level planning perspective is included in Section 2.2.

1.5.3 The focus of this study has been to consider the decision making process by which Amey have reached their conclusion that the western inner route corridor is favoured over the three other route corridors. There are 2 parts to this;

- the generic approach Amey have taken correct in terms of the level of study and the mechanism by which decisions have been made and has an appropriate level of study been conducted?
- with respect to the technical elements studied (such as noise, biodiversity, water etc), have the Amey technical teams approached the studies using best practice, have the correct levels of significance been applied and have the conclusions that have been reached been applied at a proportional level when comparing the options?

1.5.4 These elements are distinctly different (though related and overlapping) and as a consequence have been addressed separately in sections 2.3 to 2.4 of this report.

1.5.5 HC received proposals for an alternative eastern option ('East is Best'), in response to the original consultation. The environmental issues associated with this option are considered in Section 2.5. Following receipt of this alternative, HC commissioned a further traffic modelling exercise from TPi; comments on this are incorporated in section 2.6.

1.5.6 An eastern link between the A438 and the A4103 is considered. Such a route would pass to the east of the Lugg Meadows but to the west of New Court. Comments on the environmental issues from such a link are included as Section 2.7.

1.5.7 Finally, conclusions are included within Section 3.

SECTION 2

REVIEW

2 REVIEW

2.1 Introduction

2.1.1 Reference is made in the following sections to the "preferred western route corridor". This is not an opinion being made by PB, as to which route is preferred, rather it is reference to the descriptor being given to the inner western route that was identified by Amey to be 'preferred'. Our use of the word 'preferred' should not be taken as an agreement (or disagreement) to Amey's conclusion. Section 3 (Conclusions) does however make comment on the conclusion reached by Amey in terms of whether the western inner route corridor is considered reasonable.

2.2 Housing/Relief Road Relationship

2.2.1 The proposed location of the Hereford Relief Road is guided by a number of considerations, the two principal ones being environmental and town planning at the strategic level. The Council's strategic town planning assessment concludes that the proposed inner route to the west of the city is the most appropriate option when considering numerous constraints and the delivery of the proposed spatial strategy which will guide significant levels of future development.

2.2.2 The emerging Core Strategy is being prepared in accordance with the Town and Country Planning (Local Development) (England) Regulations 2004 (as amended) and is currently at the Preferred Option stage having passed through two rounds of public consultation. The most recent publicly consulted document is the emerging Core Strategy's Preferred Option: Hereford (Follow on consultation) September 2010 paper, which demonstrates the strategic planning policy optioneering process undertaken by the Council to arrive at the most appropriate relief road and spatial strategy option. It references technical papers, such as the Amey Hereford Relief Road Study of Options report and Strategic Housing Land Availability Assessment, as the supporting evidence base and shows an account of stakeholder engagement. It also presents the influence of findings in the sustainability appraisal therefore highlighting the preferred option is consistent with the aims of sustainable development.

2.2.3 The proposed Hereford Relief Road is specifically identified in the Preferred Option: Hereford paper as being vital to the city's transport network and key to the delivery of future housing growth. A clear correlation should exist between the provision of the relief road and the delivery of the proposed spatial strategy which locates strategic housing and employment growth towards the western side of the city. The paper states "…*the Core Strategy will contain an inner western route for the Hereford Relief Road*" (Para. 4.26, pg 29) and goes on to refer to the Hereford Relief Road Study of Options report which confirms the planned level of growth could not be delivered without the proposed route. This rightly demonstrates an understanding of the dynamic between infrastructure provision and development delivery and thus the proposed inner western route's likely impact on feeding the necessary transportation links required to sustainably support development at the proposed growth levels.

2.2.4 The Preferred Option paper is set to undergo a round of revision in relation to housing provision in Hereford. The revision is brought about on a variety of grounds which are addressed in detail in GL Hearn's Draft Revised Preferred Option Background Paper (June 2011):

- The eventual abolition of the Regional Spatial Strategies (RSSs) and the Government's greater emphasis on the local level in the planning system;
- The impact of the recession and downturn in the housing market;
- Publication of the latest Government Household Projections (2008-based) indicating a smaller increase in the number of households likely to exist in the county than previously projected;
- Planning Policy Statement (PPS) 3: Housing indicating the need for LDF strategies to continuously deliver housing over a 15 year period from the date of adoption; and,
- Public opposition to the scale of new housing development proposed.

2.2.5 These grounds lead to a focus on the 'revised approach'.

2.2.6 Amongst other county-wide measures, the revised approach includes revising Hereford's housing target down from 8,500 to 6,500 over the plan period (proposed as 2011-2031) which would result in a reduction of urban expansion via strategic housing sites. The choice of the sites to be reduced in size or deleted altogether has been brought about by an assessment of landscape character, access issues and expressed public concern. Despite this proposed reduction, the spatial strategy would retain significant levels of growth at c.1,500 new homes, nearly 25% of the city's housing provision over the plan period, across two strategic housing sites at Holmer West and Three Elms on the western side of the city. The Revised preferred option background paper refers to the Panel Report into the Examination in Public of the RSS Phase 2 which acknowledges the need for a relief road to achieve the proposed level of growth at the 8,500 target. Although the housing figures are proposed to drop by 2,000 the paper confirms that the need for the relief road is still required to enable growth, thus indicating the need to maintain the correlation between infrastructure provision and the spatial strategy. The revised approach presented in the paper is reinforced by sufficient technical evidence and national policy guidance to soundly justify a sustainable delivery of housing growth over the proposed plan period.

2.2.7 In conclusion, it is considered that the proposed inner western route of the Hereford Relief Road and spatial strategy are justified. This is arrived at on the basis of the evidence base, including the Amey Hereford Relief Road Study of Options report, demonstrated in the Preferred Option: Hereford paper and the subsequent work conducted by GL Hearn.

2.3 The Amey Approach

General

2.3.1 Amey have carried out a Staged appraisal based on WebTAG, assessed using the DMRB Volume 11 methodology. We can confirm that Amey have used the correct overarching methodologies in their approach.

2.3.2 Our review concludes that the decision in the Options Report that a Western Route was preferred is likely to be sound but in places more technical information should be presented to provide greater clarity.

2.3.3 Greater transparancy should be provided as to how conclusions have been made in the Options Report that the Western route is preferred. This decision appears to be a

function of the international designation protecting the River Wye SAC, but there is no clear statement to this effect and no dialogue provided as to how this decision is reached. We believe it is likely that the conclusion is correct but a step is missing in the process that justifies the conclusion; the basis for the decision therefore could be open to question. It is recommended that this is either explained more fully or a weighting criteria is applied to the options to explain and confirm this decision.

2.3.4 Although the need for cumulative assessment at Stage 2 is correctly identified, no consideration has been made in the decision making process of the cumulative assessment of the Eastern and Western routes in combination with the proposed housing developments to the West of Hereford. This could have implications on the decision of the preferred route. We understand that this work has been undertaken as part of the Sustainability Appraisal undertaken by Land Use Consultants.

2.3.5 While not a material consideration to the selection of the preferred route, the description of the methodology at the front end of the Stage 1 and the Options Environmental Reports is confused by reference to the superseded DMRB Stages 1, 2 and 3, which have been replaced by Simple (mainly desk based) and Detailed (to include detailed surveys and modelling) Assessment. The description of the history of the TAG is not necessary and detracts from the report. Whilst not significant to the outcomes of the Amey report, reference to superseded guidance, such as DMRB Stages 1, 2 and 3, does not give confidence that the most up to date guidance has been used.

2.3.6 The number of Moderate and Large Adverse scores within the Appraisal Summary Tables (ASTs) gives rise to some concern as it implies that mitigation has not been considered in the scoring system. Moderate and Large adverse scores are not realistic if they do not consider mitigation as it is unlikely a scheme with such adverse impacts would be approved by the HA or DfT. The following demonstrates this; if mitigation had been included within the ASTs it is likely that there would have been a greater difference in terms of adverse scores (as mitigation would have reduced the significance of some ‘large’ to ‘moderate’) thus providing an easier and more transparent view of why the preferred route is the preferred route.

2.3.7 It should be clarified as soon as possible what the planning and consents process for the scheme is. It is understood that as the road is being proposed and funded by HC and not by the Highways Agency, it will be subject to Environmental Assessment under the Town and Country Planning Act, as well as under DMRB. However, there is no mention of this in the report. In order to be ultimately approved and used as a trunk road by the HA, the road must be designed and assessed in accordance with DMRB. It is therefore recommended that consultation with the HA from an early design stage continues if this route is ultimately going to replace the A49 Trunk road.

2.4 Review of Methodologies & Assessment

2.4.1 This element of the review considers the technical methodologies used and the conclusions made by Amey in reaching their summary that the western inner option is the preferred corridor route. As identified in the Introduction to this report, we have focussed on the key significant issues rather than addressing and reviewing every impact that could occur from each of the route corridors. This is considered a valid approach given that there is reliance by Amey upon the highly significant environmental impacts to select one route over another. It is however relevant to point out that Amey rightly conclude at several times in their reporting that no route corridor will be without considerable environmental challenges that would need to be addressed.

2.4.2 While this section refers directly to the Study of Options report prepared by Amey, this document in turn relies upon several others such as the Stage 1 Environmental Assessment report and the Study of Options Environmental Assessment Report. Our comments below include these documents are each are referred to as appropriate.

Noise

2.4.3 The correct methodology for a "scoping" assessment has been used by Amey for the noise and vibration assessment (DMRB (HA213/08)). The assessment lists the number of properties in distance bands for the various route options. Other affected buildings, such as schools and colleges are also identified. Amey have undertaken property counts in the various distance bands to demonstrate that noise impacts are likely (which is not strictly required under the DMRB methodology).

2.4.4 The assessment then suggests a rank order for options based on the number of properties within 300m of a route option, and the length of the route. This leads to a conclusion that options W2, E1 and E4 are likely to have the worst noise impacts as they have 336, 463 and 601 properties respectively. Other options have between 242 and 290 properties. Since the traffic noise effects from the existing roads cannot be not factored in at this stage (because traffic data are not available on which to base any noise calculations), or possible mitigation measures assessed, it is considered too simplistic to place a rank order based on property counts and route length alone. The rank order may therefore subject to challenge. Similarly, with this level of detail, it is too simplistic to compare East and West schemes using noise as a differentiator.

2.4.5 A clear noise impact is correctly highlighted by Amey from each of the route corridor options. However it is unclear how they arrive at the conclusion from these data that the western options are preferred. We would have expected to see some dialogue in the Noise section that provides justifications for their opinion – that their conclusion has been based on the number of priorities affected and the route length but this is not stated.

2.4.6 The AST tables in the Stage 1 Environmental Assessment report list the noise impacts of each route option as 'large adverse'. At this DMRB stage there is little guidance to help reach this conclusion, but with the introduction of a new road into a rural area (either East or West option), it is unlikely that a different view could be reached. The lack of robustness of the rank ordering process does not affect the conclusion that all of the options have the potential to have large adverse noise impacts.

2.4.7 Overall, the noise assessment has generally followed the correct guidance, and the significance of impact for each route option is proportional to the level of detail available. However, the method used to rank order the various route options is considered too simplistic, and with similar numbers of properties affected with all options, we believe that noise should not be used as a differentiator between the route options at this assessment stage. The conclusion that the Western options are the most preferable from a noise perspective is not substantiated by the available data. This can be addressed at the next stage however.

Air Quality

2.4.8 The key local air quality issues for the provision of the relief road are likely to be:

a. The potential direct impact of emissions from vehicles on the new routes on sites designated for nature conservation and

b. The potential indirect effects of the proposed routes on pollutant concentrations in the Hereford AQMA

2.4.9 These issues were highlighted in the air quality section of the Study of Options Environmental Assessment Report (Section B4). The former is a potential adverse impact associated with Inner Eastern Corridor options only, whereas the latter is qualitatively assessed as being a beneficial impact for all options.

2.4.10 Amey's consultation with HC confirmed that their key area of concern was the AQMA in the centre of Hereford, in which roadside concentrations of nitrogen dioxide continue to exceed UK and EU objectives and limit values.

2.4.11 As stated in para B4.2.4 of the Options Appraisal report, it is highly unlikely that UK or EU air quality limits for the protection of human health would be exceeded alongside any relief road, whether to the East or West. Therefore, the inevitable increase in pollution alongside the selected route in relation to residential properties should be considered to be of only minor significance in the selection of a preferred route.

2.4.12 In terms of the assessment methodology conducted by Amey of air quality impacts, it has been conducted as a qualitative exercise with the exception of the simple quantification of the number of properties likely to be directly affected by each route.

2.4.13 This latter exercise appears only to have been conducted during the Stage 1 assessment. No formal update of the property counts, or indeed ASTs, was reported in the Options. We do not believe however that this would detract significantly from the conclusion. Furthermore, despite the overall impact of all proposed corridors being graded as moderate beneficial in Stage 1 (AST summaries, Stage 1 Environmental Assessment Report), the property counting exercise did not include the properties within Hereford AQMA which are likely to see an improvement in air quality i.e. the key environmental impact was not included. We believe that the conclusions from the Amey work should have noted that the positive benefits from the scheme are likely to outweigh the disadvantages.

2.4.14 Amey have repeatedly stated in both the Stage 1 and Options Study reports that there was insufficient traffic data available to make a quantitative assessment of impacts. However, SATURN traffic models for the corridors have been built and previously reported on (September 2009). These data could have been used in a screening or semi-quantitative assessment of the potential impacts of the options on the Hereford AQMA and, where appropriate, sites designated for nature conservation.

2.4.15 Existing sources of baseline air quality information such as Defra's air quality information website, the Air Pollution Information Services have not been exploited in the assessment, and the findings of the Local Air Quality Management reports of HC have been reported only at a very high level. Given the potentially high significance that will be accorded to air quality matters during any planning application, it is considered that a more detailed study of baseline air quality should and could have been undertaken either at Stage 1 or Options Appraisal.

2.4.16 The method by which the preferred routes have been selected in the Options Appraisal report in respect of air quality is not transparent, although it appears to have been based on the potential adverse impacts on the Lugg Meadows SSSI in the Inner Eastern Option.

2.4.17 On the basis of the information presented in the Stage 1 and Options Appraisal reports, it is difficult to robustly justify the selection of the preferred option on air quality grounds. In particular, it has not been explained how the benefits to human

health associated with improvements in air quality within the AQMA have been weighed against disbenefits over the designated nature conservation sites.

2.4.18 Compliance with European Directives on Air Quality is legally binding and potential reductions in pollutant concentrations in areas which exceed EU limit values, such as the AQMA, should be maximised. However, the impacts on designated sites require assessment, and whilst standards for nitrogen deposition are not legally binding, no attempt has been made to assess whether any of the routes are likely to result in an exceedence of air quality objectives/limit values for the protection of vegetation.

2.4.19 A key consideration in selection of route is the presence of the AQMA in Hereford city centre. In the event that any of the route corridor options (Including the EiB consultation response) resulted in a reduction in air quality in or on the periphery of the AQMA, this alone would be sufficient to exclude that option. As noted below (Section 2.6) in the review of traffic modelling data, the modelling exercises undertaken are preliminary and are (as all models are) approximations of reality and may not be an entirely accurate representation of traffic flows in the city centre. Theoretically therefore, potential exists for a worsening in air quality in on in the near vicinity to the AQMA from the Amey preferred option (the western inner route corridor) and this may not be determined until other studies have been conducted. We believe that this represents a risk to the scheme.

2.4.20 In selecting a preferred route, the available traffic data could have been used to:

- Rank the potential benefits of each option in respect of impacts within the AQMA
- Rank the adverse impacts over the designated sites
- Identify potential exceedences of the air quality objectives for the protection of ecosystems
- Identify any areas within Hereford which could experience an increase in traffic and which have existing pollution levels close to or above the air quality objectives for the protection of human health.

2.4.21 The proposed future work is appropriate, including the requirement to monitor air quality along the proposed routes. However, it is recommended that a detailed air quality assessment be undertaken of the proposed options at Stage 2 and not postponed until Stage 3. This would ensure that the route selected does not impact upon the AQMA to a level that would be considered a 'show stopper'. In the event that the modelling predicted air quality problems it would allow sufficient time to design required mitigation measures within Hereford. Furthermore, it is recommended that the monitoring be extended to include nitrogen oxides as well as nitrogen dioxide at a subset of the monitoring sites since this is of relevance to the assessment of ecological receptors.

<u>Water</u>

2.4.22 Impacts to the Water Environment have been assessed under the following three headings: Surface Waters, Groundwater and Flood Risk. All three elements have been assessed in line with WebTAG Unit 3.3.11 (The Water Environment Sub-Objective) and DMRB 11.3.10 (Road Drainage and the Water Environment).

- Surface Waters – all surface water crossings associated with each proposed route corridor have been identified, as well as where there are interactions with SAC and SSSI areas of the Lugg and Wye. The River Ecosystem (RE)

classification or GQA data for the stretches of the Wye or Lugg in question have not been included. This would typically be included as part of a Stage 1 Assessment.

- Groundwater – the potable abstractions within the study area have been identified and where proposed corridors cross the groundwater source protection zones (SPZ) associated with abstractions. The aquifer classification of the local superficial deposits and bedrock have been reviewed, as well as the groundwater vulnerability assigned to the area. No information is provided on any private groundwater abstractions, which is acceptable for a Stage 1 Assessment. No discussion of the importance of groundwater quantity and quality to the well being of the SAC has been included. This element should have been highlighted as part of the Stage 1 Assessment.
- Flood Risk – all proposed route corridors cross areas that are defined as at risk to flooding by the EA (although to different degrees, see below). As a consequence Flood Risk Assessments (FRA) will be required later in the design phase and that these will need to contain a Floodplain Exception Test to help justify construction.

2.4.23 The study correctly identifies that all of the proposed routes will have potential adverse impacts to the Water Environment and that mitigation will be required within the detailed design and construction planning (including FRA) in order to mitigate these impacts.

2.4.24 By way of summary, the methodologies used are appropriate and the division of the water environment sensible. With the exception of the omission regarding potential water quality effects to the SAC, identified above, other omissions are minor and the scope covered satisfactory. The cost impact of omitting the RE/GQA grades is negligible, the groundwater quality omission is more significant as this issue will require more detailed assessment in later stages

2.4.25 The ASTs correctly identify that each of the proposed route corridors involve crossing of the River Wye and that without mitigation this will result in significant adverse impacts. The AST assessment score for each of the potential routes is the same as all routes involve crossing of the Wye SAC.

2.4.26 The potential impact from each route corridor in WebTAG is of similar magnitude, however the cost of the mitigation measures required within the drainage design and construction will increase with the length of floodplain that is crossed by a given route.

- Surface Waters: Amey have concluded that the impacts to the Wye SAC will be harder and therefore more costly to mitigate given the greater length of crossing of flood zones* associated with the eastern corridor. The length of flood zone crossed (combined Zone 2 and Zone 3) varies from approximately 300m on some of the western routes to 4000m on the eastern routes. As such, cost implications would result from applying the necessary mitigation measures (drainage and water quality during construction and operation) over a larger area.
- Groundwater: Any impact to the quantity or quality of the groundwater within the SPZ associated with the potable supply boreholes would be classed as very significant by WebTAG. In our opinion, this is not made clear enough. Interaction of the western corridor with the SPZ is identified in the assessment but not explicitly discussed beyond this as the conclusions focus on the impacts to surface water and associated SAC and flood risk. Because of the greater length of flood plain crossed on the eastern option, this omission would not alter

the conclusion that the western route is preferred from a water quality perspective. Additional mitigation costs need to be included for the western options to mitigate potential groundwater effects (for example, positive drainage to prevent the release of road runoff along the length of road that crosses the SPZ).

- Flood Risk: The Amey conclusion is correct that all routes have the potential to exacerbate flooding risk by reducing floodplain storage and increasing runoff. The assessment score for this in the AST is the same for each of the proposed routes. The cost of mitigation, however will not be identical - this will be related to the length that each route crosses designated flood zones; hence the western routes are preferable to the eastern corridor from a flooding perspective.

2.4.27 Amey have recommended the western inner route as the preferred option, in large part based on the constraints associated with the Wye SAC. We agree with the general conclusions with respect to the Water Environment and consider that a balanced view of the surface water and flooding constraints has been presented. The potential impacts to the flood zones and associated SAC are the most significant constraint for the Water Environment. The treatment of groundwater is weaker, both in terms of the potable abstraction (and the mitigation that would be required) and the role groundwater plays within the SAC. We consider, however, that were these aspects to be been highlighted appropriately, this would not alter the conclusions regarding the recommended route corridor.

2.4.28 Along the western route, due to the shorter flood plain crossing, there may be increased potential for infiltration of collected road runoff, which could in turn help to reduce impacts to the Wye SAC from direct discharge of intercepted water.

Biodiversity

2.4.29 The field work and desk study undertaken by Amey for this stage of assessment (Study of Options Environmental Assessment) is considered to be comprehensive and appropriate for the stage at which the study is at.

2.4.30 In line with the stage of assessment, the likely key ecological resources (i.e. protected/notable sites and species) have been correctly identified within an appropriate study area and likely broad direct and indirect impacts have (in general) been identified and as appropriate, measures for avoiding or minimising these impacts have been suggested.

2.4.31 The ecological resources identified have however not been assigned a value irrespective of their legal protection and the impacts have not been provided with any context (or 'characterised' with use of parameters such as magnitude, extent, duration, confidence etc.).

2.4.32 It is recognised that it is not possible to fully characterise impacts at this stage of the assessment. However, this approach makes it difficult to verify the statements made (in relation to the River Wye SAC), that the western options are likely to result in 'less significant impacts' or 'reduced ecological impacts' than the eastern options (e.g. B9.6.8, B9.7.2). The hydrology section does not provide further clarification by differentiating between the options in terms of significance of impacts on the River Wye. Caution should be exercised and statements should be restricted to the likelihood of occurrence, or increased/decreased potential for impacts, which would be in line with the findings of the HRA.

2.4.33 Based on the evidence provided, it is agreed that there is an increased potential for impacts with the eastern options. We consider that the preferred options for biodiversity (presented in the Conclusions section of the Options Report) are logical purely based on the number and extent of potential impacts upon ecological resources. However care should be taken due to the potential for challenge under the conservation Regulations 2010. As likely Significant Effects (LSE) cannot be discounted from either option challenge is theoretically possible for both options. We believe however, that there would be greater risk of challenge for the eastern option then the western option. Impacts on the Wye SAC may not be fully mitigated as stated.

2.4.34 In line with the requirements of the Conservation of Habitats and Species Regulations (2010) (Habitats Regulations), a HRA screening exercise has been undertaken for the interest features of Natura 2000 Sites potentially affected. Screening is the first stage of the HRA process, which is undertaken to identify whether the HRR may result in Likely Significant Effects (LSE).

2.4.35 The River Wye SAC is the only Natura 2000 Site of relevance in the assessment. The River Lugg forms part of the SAC designation.

2.4.36 LSE cannot be ruled out for any of the routes presented; however in summary: the eastern options are considered more likely to give rise to LSE on SAC interest features than the western options due to greater potential for negative interactions with the River Lugg/Wye floodplain. In addition, the delivery of effective mitigation for many of the SAC interest features is less likely to be achieved with the eastern options.

2.4.37 PB are broadly in agreement with the findings of the HRA report by Creswell, which concludes that there is a greater likelihood of LSE occurring with, and increased uncertainty regarding the ability to effectively mitigate for, the eastern options. While discussion on mitigation options has not been included within the work, based on the current information available, we are of the opinion that mitigation to address LSE on a western route could be achievable; we are less certain for the eastern route.

2.4.38 Despite some technical/terminology errors that are inconsistent with this screening level of assessment, Natural England (NE) also broadly agreed with the conclusions made in the HRA report. PB is not in agreement with NE's suggestion that impacts may arise at the Wye Valley Woodlands as a result of air quality, as suggested. However, we are in agreement that there is uncertainty regarding whether LSE may occur as a result of the northern and southern routes, and generally as a result of hydrological connections.

2.4.39 NE draw the attention of the Council to Regulation 49 in their consultation response, which states that a project with an adverse impact upon the integrity of a SAC would only be able to proceed in the Interests of Over-riding Public Interest (ORPI) where no viable alternative solution exists. Regarding the uncertainty described above, PB advises that it should be borne in mind that there is some possibility that demonstrating alternatives and ORPI may be an outcome for the preferred route (regardless of whether it be an eastern or western option). This need will be established as part of the HRA for the refined options. The current HRA screening report, suggests that this is an unlikely outcome however and with further detail it will be possible to discount significant effects from the western option.

2.4.40 The guidance document on Article 6(4) for the Habitats Directive 93/43/EEC (Jan 2007) on the clarification of the concepts includes examples referring to (amongst

others) OPRI; it is our view that an eastern link road would not satisfy the necessary criteria as it would be difficult to provide a convincing argument that the public interest is overriding. We consider that if required, ORPI would be easier to demonstrate for the western option due to the closer proximity to the proposed housing development areas.

2.4.41 The significance of the SAC and its interaction with the flood plain is a key aspect for consideration within any assessment of impacts and selection of preferred route. As part of the selection it is necessary to consider the potential for LSE to occur, the potential for mitigation to ameliorate the LSE identified, whether alternative options exist that have a lesser impact and whether the option satisfies the test of there being an overriding public interest.

2.4.42 Based on the current evidence it is our considered view that an eastern option is more likely to fail these criteria than a western option. The importance of the SAC however means that the western options still presents a risk of challenge. Based on the information currently available the appropriate assessment would identify that LSE could be mitigated to a satisfactory level for the western route and thus representing the option with least environmental impact as not required to pass the test of ORPI.

Landscape

2.4.43 It is considered that the approach taken by Amey in their methodology (for the Stage 1 Environmental Assessment Report April 2010) is appropriate for level of assessment. However it is unclear from the report text and worksheets how some of the large adverse effects have been derived. For example - **Option W1**-Summary assessment score is Large adverse because of overall large adverse effect on landscape character. However, large adverse score defined in **Table 2 Landscape: Definitions of Overall Assessment Scores as follows;**

2.4.44 The proposals are very damaging to the landscape in that they:

- are at considerable variance with the landform, scale and pattern of the landscape.
- are visually intrusive and would disrupt fine and valued views of the area.
- are likely to degrade, diminish or even destroy the integrity of a range of characteristic features and elements and their setting.
- will be substantially damaging to a high quality or highly vulnerable landscape, causing it to change and be considerably diminished in quality.
- cannot be adequately mitigated for.
- are in serious conflict with government policy for the protection of nationally recognised countryside as set out in PPG7.

2.4.45 To warrant a large adverse score, at least 4 of the above criteria should apply and it is not clear/explained which.

2.4.46 Amey state that the summary assessment score of *large* adverse overall is mainly due to effects at River Wye crossing, whereas the majority of the route is identified as *moderate* adverse.

2.4.47 Whilst the baseline descriptions are very thorough it is not possible to concur with conclusions of the assessment without a more detailed knowledge/appreciation of the

study area; features, characteristics, character, and appreciation of value of receptors.

2.4.48 The methodology adopted for the Options EA Report (Aug 10) is also considered appropriate for the level of assessment. However the sequence of assessment is a little unclear; the two principal criteria determining significance are the capacity of the receptor to accept change and the magnitude of the impact or effect. The assessment combines the capacity for change of the various receptors with the assessment of the magnitude of the impact in question in order to predict the significance of the landscape impacts to give an overall assessment score as shown in table below;

Significance of Landscape Impact

		Landscape Capacity		
		Low	Medium	High
Magnitude of Change	Major	Large	Large or Moderate	Moderate or Slight
	Intermediate	Large or Moderate	Moderate or Slight	Slight
	Minor	Moderate or Slight	Slight	Slight or Neutral
	Negligible	Slight or Neutral	Neutral	Neutral

2.4.49 Whilst significance of effects are summarised in the report it is unclear how these have been derived through the above process. It would have been helpful to have had assigned value score to receptors and sensitivity score for each LCA/type.

2.4.50 There are several points in the report (Options EA Report -Aug 10) where comparisons and contrasts between corridors are made (e.g. B6.6.17 p. 84 ……*though effects on the river crossing would be less than those for the western corridors).* Each corridor/route should be assessed and conclusions recorded (worksheets populated and qualitative impacts and assessment score from worksheets input into ASTs) separately as an integral part of the appraisal process. Qualitative language comparing one with another is not strictly part of the methodology that should be followed and the ASTs should have been completed incorporating mitigations.

2.4.51 It is possible to conclude that the process made is largely rigorous and the omissions or deviations from process that have been followed are not likely to result in a significant change in the conclusions made.

Heritage

2.4.52 The Stage 1 Environmental Assessment Report is a standard WebTag assessment. The assessment of significance of environmental effect is based heavily/solely upon effect upon key designated sites (mainly Scheduled Monuments) so that although a clear distinction is evident between alternative routes, the potential impact of some of the routes (primarily western) routes which are given a score of Slight Adverse (in comparison to the Large or Medium Adverse for the eastern route) is judged to be potentially too low.

2.4.53 Analysis of the basis for this (clear) distinction suggests that it is based upon the likely effect of the routes upon a number of Scheduled Monuments (SM) with E1 directly affecting one SM (and therefore categorised as a Moderate Adverse effect) and E2-4 affecting two Monuments. None of the Western routes affect any SMs, which (it would appear) is the basis for Amey defining them as having a Slight Adverse effect.

2.4.54 Whilst the effects upon on the SMs should form a material consideration in the decision-making process (and might ultimately provide a clear reason why a western route is preferred to an eastern route) to use it as the sole arbiter risks both ignoring other potential key receptors and also potentially presenting a situation where a minor change in route alignment would drastically reduce the likely effect of the scheme

2.4.55 An assessment method which looked also at length of new road (which equates to likely impact upon archaeological resource), likely historic landscape effects and effect upon significant although undesignated local resources (such as Unregistered Parks and Gardens which the western corridors have a greater density of) may have produced a more equivalent assessment of the likely Heritage effects of the scheme.

2.4.56 The Environmental Assessment Report (August 2010) represents a second stage assessment examining the now defined Eastern and Western Inner and Outer corridors. The methodology is firmly based upon DMRB. Reference is made to the production of WebTAG worksheets but these have not been located in the available material associated with this report and it is not clear whether this refers to the worksheets produced for the April 2010 report

2.4.57 Without the worksheets the evidence for the decision making/ justification for Effects scores is limited. Section B8.5 provides baseline data and assessment of the significance of the features (as well as some discussion of the potential impact) whilst B8.6 provides summary assessment of the level of effects (minor adverse effect on a Scheduled Monument and so forth) but the evidence of correlation between value and impact and therefore level of effect is lacking.

2.4.58 The Stage 1 Environmental Assessment Report (April 2010) shows a clear preference on Heritage grounds for the Western routes scoring the four western routes as having a Slight Adverse effect with three (E2-4) of the four Eastern routes having a Large Adverse effect and E1 having a Moderate adverse effect. E1 corresponds fairly closely to the current line of the Eastern Inner corridor. Analysis of the basis for this (clear) distinction suggests that it is based upon the likely effect of the routes upon a number of SM with E1 directly affecting one SM (and therefore categorised as a Moderate Adverse effect) and E2-4 affecting two Monuments. None of the Western routes affect any SMs, which (it would appear) is the basis for their definition as having a Slight Adverse effect.

2.4.59 Our review of the schemes and identified impacts/distribution of sites affected/length of schemes suggests that the clear distinction between eastern and western routes (with one being Large or Moderate Adverse and the other routinely Slight Adverse) may be overly simplistic. Schemes of this length with large land take in undeveloped areas will potentially have a Large Adverse effect upon the Historic Environment simply due to their length.

2.4.60 The Stage 1 Assessment Report (August 2010) reflects the results of the WebTag analysis with its (perhaps over-defined) clear distinction between Slight Adverse for all western schemes and Moderate Adverse for (Inner) Eastern route and Large Adverse for outer route.

2.4.61 None of the option appraisal summary scores consider the potential effect of the scheme upon the archaeological resource or the Historic landscape. Although the effect upon these is discussed in the body of the TAG worksheets and generally described as being significant (even for the western schemes) the eventual score appears simply based upon the direct effects upon the SMs. Thus the western schemes, which will affect large areas of historic landscape and potentially a large quantity of un-located archaeological sites, are described as having a slight adverse effect which would seem potentially too low for a scheme of this size and with its potential for significant impacts.

2.4.62 The Study of Options document synthesises the results of the previous surveys and comes ultimately to the conclusion that the Western Routes are preferable on the grounds that they leave the scheme less open to potential environmental challenge than either of the Eastern Schemes (which would affect River Lugg SACs and Lugg Meadows SSSI) and then assesses that the Western inner route is preferable on the grounds of its shorter route which would have less landscape effects and have a lower construction cost.

2.4.63 The contribution of Heritage to this conclusion is relatively limited (although the Heritage assessment does note that the Lugg Meadows also have a High Heritage value). The general decision to promote the shorter of the two Western routes is preferable on purely archaeological grounds where (in the absence of known significant sites which should be bypassed) the simple equation is that greater land take involves greater loss of archaeological sites and that therefore shorter land take is preferable.

2.4.64 Decisions about the potential effects of the scheme upon the Historic Landscape are less easy in the absence of a more focused assessment (in any of the previous documents) of the potential value of the Historic landscape as a whole rather than as a series of individual Historic Landscape parcels. This assessment therefore omits to indicate which of the routes will have proportionately the greater overall effect upon the Historic Landscape although it is noted that the Eastern Inner route might have a lesser effect on the Landscape than either of the Western routes.

2.4.65 In summary, if we accept the general conclusion that impacts upon individual heritage features are roughly the same for all options (Moderate Adverse) then the preferment of an inner route which would have a lesser land take is to be preferred. The decision to promote the western rather than eastern inner route would appear to be based upon non-Heritage grounds and without further analysis of the potential value of the overall Historic Landscape rather than its component parts the information is not available to question this decision; in theory this represents a risk to the decision making process thus far.

2.5 'East is Best'

2.5.1 The East is Best (EiB) proposal provides an alternative approach to the relief road options considered by Amey and is prepared based on a number of goals. The authors of the EiB proposal conclude that 'much more work remains to be done' (on the Eastern approach) but the EiB option does include sections of other corridor options considered by Amey and as such, considerable data are available for much of the route corridor. The northern and southern sections are common to all corridor options considered by Amey and this is also the case for the EiB proposal.

2.5.2 The EiB proposals have not been reviewed in their entirety; no comment is made here as to the accuracy or veracity of statements made where they do not have a direct environmental component.

2.5.3 The approach of the EiB proposal is to propose 5 key goals (traffic relief, responsive housing, funding flexibility, practicability and fairness) and compare the preferred western inner route corridor and the EiB route against these.

- **Traffic relief** – the EiB consultation response states that the chosen scheme should relieve traffic congestion within the city. It is our understanding that this is not the function of the relief road, rather that it is to ensure that congestion does not worsen when the additional housing has become occupied.
- **Practicability** - the EiB consultation response states that the chosen scheme should be practicable, i.e. have a fair chance to achieve its stated objective.

  At this stage there is little comment in the EiB consultation response to the environmental issues facing from the proposal. It is quite clear from the Amey reports that environmental issues represent a significant obstacle to the selection of a preferred route. This therefore represents an omission from the EiB consultation response.

  Exclusion of any reference to the likely opposition to the scheme from the environment regulators (as exhibited in their response to any development in proximity to the SAC and SSSI) is an omission in the EiB consultation response. The level of opposition is likely to be significant as a result of their statutory responsibility to protect international and nationally designated sites; the absence of reference to such issues from the consultation response as part of the consideration of 'Practicability' is significant.

2.5.4 The EiB proposal is significantly different to the corridor options considered by Amey in that it does not include a complete link around Hereford joining up with the A49 to the north and south of the city; a gap exists between the A438 with the A4103. While traffic implications of this proposal are assessed in the TPi study (March 2011) environmental (and engineering) impacts in respect of the local highway have not been assessed; as part of the preliminary assessment undertaken here, it has been assumed that no significant improvements to the local highway network would be incorporated.

2.5.5 It is difficult to compare the findings of the EiB consultation response directly with the preferred western option due to the absence of information. While it is acknowledged that all the sections of the proposed EiB route are included within the Amey reports (i.e the northern and southern sections are common to all options whilst the southern end of the inner eastern route is but a shortened section of the full eastern inner route), the eastern inner route is assessed as a *complete* link joining the existing Rotherwas link with the proposed northern link. The inner eastern link in its full extent has been reviewed as part of Section 2.4 above and as appropriate comments have been made as to the environmental impacts likely; some of these are of course relevant for the southern part of the eastern inner corridor (EiB).

2.5.6 What is omitted however is any consideration of any different (or additional) environmental issues that would result from the absence of a link between the A438 and the A4103. While it would be unrealistic to have expected a full WebTAG or DMRB study to have been conducted (and indeed inappropriate at this stage for the authors to have invested in such a study), some form of consideration or

acknowledgement of the impacts should be made in order for the document (and therefore the routes) to be fairly compared.

2.5.7 The Highways Agency would not recognise EiB as a solution providing a continuous route option, and therefore would not de-trunk the A49 through Hereford. The EiB proposal is likely to create rat runs in minor rural roads such as Lumber Lane and Cott's Lane. For the most part, these are single carriageway roads with passing places, and therefore would not cope with the increased traffic or the size of the vehicles (HGVs) that would use them. Local residents in Lugwardine (a conservation area) and Hagley are therefore likely to object strongly to this proposal. Alternatively, traffic would use the A438 and A465 through Hereford, where it is likely to add to congestion in these residential areas, including conservation areas, and to that which may already exist past the Folly Lane colleges. .

2.5.8 Specific environmental impacts likely to result from the EiB proposal are summarised below.

Transportation

2.5.9 A key aspect to the EiB consultation response is the absence of a link between the A438 and the A4103. As the main aim of the relief road is to assist with the traffic movement around the city centre, HC commissioned a traffic survey by TPi to model the traffic flow. While this is a key part of the EiB proposal, comment on this aspect has been included in Section 2.6 below rather than here.

Biodiversity

2.5.10 The crossing of the River Wye SAC would result in the potential for LSE (as for any of the options). This has been addressed as Section 2.4.

2.5.11 The avoidance of any construction within the River Lugg SSSI would represent a considerable improvement (over a scheme that is built in the protected area) and represents the main basis for exclusion of this link in the EiB consultation response.

2.5.12 It is considered that both Natural England and the Environment Agency would be highly wary of EiB as a viable option due to the potential for the "gap" over the Lugg floodplain to be constructed in future years. Initial indications are that they would consider the EiB route as effectively the Eastern corridor by 'stealth' and thus be opposed. This represents a risk to the long term functionality of the road and is addressed further below in terms of the reputational issues that this may present to HC. Similarly, both organisations are likely to oppose the route (without this potential link), on various ecological, conservation and water issues; these are discussed below.

2.5.13 As noted above in section 2.4, the eastern corridor routes are likely to be excluded on the grounds that they do not meet an ORPI. Potential also exists for opposition by the statutory bodies because alternatives exist with a lesser impact than for the EiB option. Impacts on the SAC potentially could occur and given that the EiB route has been promoted having short term advantages, potential exists for it to fall at the failure to satisfy the long term interest criteria (as required by the European Directive). Whether this is the case would rest on the traffic predictions for the long term; common sense suggests that it will not be viable in the long-term.

Water

2.5.14 The Lugg Meadows could be potentially impacted at the southern most end of the northern section and the northern most part of the southern section, where the Meadows meet the EiB route. Compared to the originally proposed eastern corridor, these impacts would be easier and cheaper to mitigate due to the relatively limited spatial interaction between the EiB route and the Lugg Meadows.

2.5.15 The EiB route reduces the extent of the adverse impacts associated with an eastern bypass by reducing the length of travel within the floodplain (and SAC crossing). Adverse impacts could still result, however, due to the increase in traffic on the existing link roads and the associated increase in pollutant concentrations in road runoff. In addition any subsequent requirement to widen existing infrastructure or to complete the bypass (which seems logical) would have the potential to result in additional adverse impacts.

2.5.16 The links included within the EiB route would still generate adverse impacts to the water environment that would require mitigation, particularly with respect to flooding and water quality due to the proximity of the flood plains associated with the Wye and Lugg so while the extent of the impacts are reduced there would still be adverse impacts that will need to be mitigated in the design process.

Heritage

2.5.17 The primary advantage of the EiB route (when judged against the preferred Western Inner Route) on heritage grounds would appear to be its reduced length which, is likely to be advantageous on both purely archaeological grounds and also on its reduced Landscape effect.

2.5.18 The scheme will have some Heritage effects (on the assumption that it, like the Eastern Inner corridor that it follows avoids a direct effect upon the Scheduled Monument at Rotherwas House) although none of these would appear to be potentially significant. In comparison to the Eastern Inner route, the line of which it follows for its southern half, it will not affect the Lugg Meadow common meadows (being of High Heritage Value).

2.5.19 The key (Heritage) disadvantage of the scheme would appear to be the possibility that in not joining up to the Northern corridor it will push eastward traffic onto the A438 and thereby increase traffic flows through the Lugwardine Conservation Area and across the Grade II 17th century Lugwardine Bridge. Without traffic data it is difficult at this stage to gauge the significance of these effects. Any such effects would potentially be increased by any subsequent need to widen or strengthen the bridge at Lugwardine should increased traffic flows require this. It is however worth noting that the assessment of the engineering implications of the Proposed Northern route suggests that use of this option would certainly require widening or strengthening of the medieval Lugg Bridge on the A4103 (to the north of the Lugg Meadows). This bridge is both a Grade II Listed Building and a Scheduled Monument.

Air Quality

2.5.20 As noted above in section 2.4 air quality issues are of most relevance in relation to their potential impact in the vicinity of the AQMA in the city centre and with reference to the potential impact on the Lugg Meadows SSSI. Commentary is included in the review of the Amey report on air quality issues in Section 2.4 above for those route

corridor sections that are either consistent for all options or are part of the inner eastern route option.

2.5.21 The EiB consultation response makes no specific reference to air quality issues for the section of road missing between the A438 with the A4103. The TPi traffic modelling exercise undertaken has identified that traffic levels for the EiB option (without improvement) results in a slight worsening of the traffic levels on the network generally. While modelling of the precise impact would be necessary to confirm the situation, there would be an inevitable increase in air pollution alongside the rat runs that would be created by the absence of the Lugg Meadows link.

2.5.22 It is envisaged at this stage that while there would be a decrease in air quality along side such routes, the level of significance is likely to vary; where traffic takes the western routes towards the eastern outskirts of the city centre, this represents the outer fringes of the AQMA where potential increases in NO2 could be of considerable significance with regards to the feasibility of the EiB route. Should traffic take more easterly options using Lumber Lane for example, there would be worsening in air quality as a result. While this is not likely to be significant itself, it would represent a deterioration in air quality due to the increase in traffic using these roads where traffic levels are currently low.

2.5.23 Impacts on the ecological resources from additional emissions from vehicles using these routes is difficult to predict and further study would be required to ascertain the extent of any impact and its significance.

Landscape

2.5.24 Consideration of landscape issues are not made as part of the EiB consultation response. Increased traffic on minor roads is a likely outcome of the EiB option, because of the 'gap' between the A465 and the A4103. This has the potential for an increase in urbanisation in the rural lane network which in turn could have impact on local landscape character of the area. This in turn has the potential to lead to potential indirect adverse landscape and visual effects. The scale of any impact would require study in order to understand the potential implications. It is worth restating that the approach taken in the review of the EiB option is that no significant route improvements are made between the A465 and the A4103; in the event that route improvements were made, this would add considerably to the potential for impacts described above.

Noise

2.5.25 The scale of noise impact from the EiB consultation response has not been predicted. As for air quality, noise levels will be a function of traffic numbers, type and vehicle speed, while the impacts will be dependant upon these factors and the proximity of sensitive properties to the roads being used. The absence of a link between the A438 and the A4103 means that traffic will be diverted onto a number of different roads – some into the city centre to the west of the Lugg Meadows and some to the east of the meadows – through Lugwardine and Hagley for example (Cotts Lane and Lumber Lane). Without precise details of likely traffic flows (the reservations stated concerning traffic numbers in the air quality section are also relevant for noise), impacts are difficult to predict.

2.5.26 It is possible that noise levels may not increase appreciably where the traffic takes the western routes through the eastern periphery of the city centre as vehicle speeds will fall due to congestion and thus noise levels may not be a concern. Where the traffic

heads onto one of the eastern routes however, noise levels are likely to increase and impacts may therefore result. The level of significance will vary depending on vehicle numbers, proximity to noise source and the sensitivity of the receiver; it is noted for example that St Mary's Roman Catholic School is located in Lugwardine and the impact on this sensitive receiver would need to be considered.

Common Sense

2.5.27 We would question the conclusion to the EiB consultation response that's states that the proposed Eastern approach [sic] is clearly superior to the proposed western by-pass on….. *common sense* (our italics) criteria. The proposal of an option that relies upon traffic wanting to travel north or south on the eastern side of the city that needs to find its way either through the city centre or through 'c' class roads does not appear to be representing best common sense.

2.5.28 HC should also be aware of the reputational issues that may come with the support of such an option. Given that successful de-trunking of the A49 would not be permitted with the EiB option, this would mean that the council's ability to implement more sustainable travel solutions on the existing A49 would be limited and as such could be seen as compromising the ability of HC to deal with its readily acknowledged transport problems.

2.6 Transportation Studies

2.6.1 As part of the review of the appropriateness of the traffic assessment for the schemes being considered by Amey (and including the EiB consultation response that proposes an alternative eastern option), three studies have been reviewed:

- Hereford Multi-modal Model Forecasting Report (JMP, September 2009),
- Hereford Relief Road Interim Forecasting Report Sustainable Option Packages FINAL (TPi, August 2010) and
- Hereford Relief Road Interim Forecasting Report Revised Eastern Route Options (TPi, March 2011).

2.6.2 Overall, the methodology to determine the impact of the different highway options and housing / employment options is consistent between the reports and with common practice within the transport planning profession. The basic building blocks are industry standard software and data sources. The use of these complies with guidance issued by the Department for Transport.

2.6.3 The multi-modal study compares the four alternative housing strategies (DS1 to DS4) against a Do Minimum (DM) strategy. Each DS includes a specific distribution of 6509 houses in Hereford and further housing development outside the city but within the county. The DM only includes 2,480 houses within Hereford but no provision outside the city. We consider that the DM should include the housing outside the city, as it would occur "in any event" and is not dependent upon a scheme in Hereford. However, this does not invalidate the comparisons between scheme options, merely reduces the value of being able to compare against the DM.

2.6.4 The first TPi study takes the best performing options from the multi-modal report and adds further sustainable transport schemes into the analysis to examine whether these would have the potential to further improve the performance of the highway network.

2.6.5 The second TPi study considers how the preferred option from Report 1 (Western Inner) performs in comparison to four scenarios that remove the Lugg Meadows link from the inner eastern alignment. These options are to

- remove the link,
- remove the link BUT upgrade Lumber Lane,
- remove the link AND reduce the housing allocation,
- remove the link BUT upgrade Lumber Lane AND reduce the housing numbers.

2.6.6 All three reports use outputs from the highway model to consider the performance of alternative scenarios using outputs at the network level, for particular routes and at specific junctions. All the reports ranked each attribute (hours of transient queuing, hours of over capacity queuing, link delays, average speed within the whole network, average journey time on specific routes, number of junctions that are operating with demand in excess of capacity and total generalised cost of travel), for each specific combination of highway scheme and housing development and summed these ranks to provide a final score.

2.6.7 It is relevant to note here that the attributes are not necessarily independent of one another. This is true of factors such as over capacity junctions and overall network delay – a scenario with a high number of over capacity junctions will automatically have a high level of delay. The reports use both of these attributes in separate ranking exercises and then add the scores together which effectively double counts the result; an inherent weakness in the modelling used is that it amplifies the difference between options and potentially distorts the results, especially if the scores are summed over several attributes.

2.6.8 A further weakness of the approach, as applied in the reports, is the ranks are based on the absolute outputs from the traffic model, which in reality are too small to differentiate between. For example, Report 3 Table 8.7 ranks Scenario 4 in first place for average network speed of 38 kph and its Scenario 1 in fifth place for an average network speed of 36.4 kph. The marginal difference of 1.6kph would not be perceptible within an urban trip so the ranking becomes arbitrary. Another example where this approach to ranking can be misleading is Table 8.8 for transient queues, first placed scenario 4 records 727 hours, second placed scenario 3 has 732 hours a gap of 5 hours. Whereas the gap between fourth and fifth places is 82 hours – clearly a much greater absolute difference. However, the number of trips in these scenarios does make the difference between the best and worst performing extremely small. Option 4 with 727 hours of transient queues translates to 131 seconds per vehicle, whereas the preferred western corridor with 832 hours implies 146 seconds per vehicle. It is unlikely that the average trip maker would be able to discern this difference. As a consequence, while preference of route is ranked, the ranking could be misleading in terms of actual real benefit.

2.6.9 In terms of conclusions that can be drawn from the work, the general sentiments are that a relief road provides a general betterment to the network when compared to the situation without the road. The inner eastern route provides the best performance as it is a shorter route then the western options. When the eastern routes is severed, the overall network performance is worse than the inner western route. However, reducing the housing, improving Lumber Lane and both reducing the housing and improving Lumber Lane would all perform better than the inner western route.

2.6.10 It was stated at the outset of this report however that improvements to Lumber Lane (or others) will not be taken into account. It is understood that this is because of the difficulty in doing so. As a consequence 2 of the scenarios modelled – the 2 best performing scenarios - become irrelevant.

2.6.11 The modelling simplification used is that all vehicles can use the whole network without any impedance from the physical layout of the network. HGVs are assumed as equivalent of 2 cars, to estimate the time they would take to negotiate a junction or the delay they impose on traffic flowing on a link. However, the HGVs would be assumed to be able to freely use Lumber Lane in its existing form.

2.6.12 We have identified that such an approach is not feasible. It is likely to be the case that Lumber Lane would not be suitable as an unimproved route for all vehicles. As the traffic model used cannot distinguish between vehicle sizes, this further weakens the argument in favour of the EiB route option as the traffic modelling does not represent a realistic scenario.

2.6.13 The reports do not incorporate much discussion about the impacts on the route through the city centre. The significance of this omission is that there is no importance placed upon the impact on the city centre of any particular option. The ranking does not allow the reader to easily discern whether an option has a beneficial or detrimental impact in the centre as the only differentiators are network wide. Some commentary that considered (and ranked) attributes such as traffic volume in the city centre would have been extremely useful (especially with regard to the potential air quality issues addressed above). At the moment, the scoring says that a difference of 15 seconds between Option 4 and the Western Bypass is more important than the impact on traffic volume in the city centre as one attribute is marked and the other is not. Selection of an option that does not result in a worsening of congestion in the city centre is important and this represents a current weakness.

2.6.14 Our overall conclusion is that from the information presented there is very little difference between the alternatives shown. The ranking system used does highlight some differences, but from our experience the approach has some significant deficiencies. This presents a conundrum in that the traffic data should be able to show where there are differences. This would suggest that there are more specific questions that need to be articulated and explored to be able to draw out more definitive conclusions.

2.6.15 Based on the data there does not appear to be a compelling case for either route when compared to the alternative route, although there are clear differences between the “with” and the “without” scenarios. As such, the traffic information cannot be used to robustly choose between the east or west options.

2.7 Eastern Link

2.7.1 As part of the Brief, PB were also asked to consider the feasibility (from an environmental point of view), of an eastern route between the A438 and the A4103. This route would run east of the River Lugg and west of the property known as New Court in a broadly N-S direction between these 2 roads. As noted several times in the review of the work undertaken by Amey, environmental impacts from a range of topics are likely from any new road during both the construction and operational phases. This link would be no different in that impacts would occur during construction and operation but our review here has focussed on the main environmental issues based on site specific environmental constraints.

2.7.2 As part of the Stage 1 Assessment undertaken by Amey, this section of the outer eastern corridor was considered (as route EL6, EL7 and EL8). The Stage 1 Environmental Assessment correctly identified the presence of the SAC and the SSSI and concludes:

"The impact upon the floodplains is most evident with the outer eastern corridor……will impact upon floodplain storage and river conveyance without significant mitigation works. Significant bridge and culvert structures will be required to cross ….. the Lugg floodplains…".

2.7.3 The concern over the outer eastern corridor is due to the impacts that may accrue from the whole of its length; there would be a long length of flood plain running as well as direct impacts on the SAC. If the southern sections of the outer eastern route are excluded and focus is on the shorter section between the A438 and the A4103, direct environmental impacts are still likely to occur but they will be less extensive.

2.7.4 Each of the routes considered as part of this northern shorter section would involve a length of flood plain running and even though the routes mostly avoid the SAC and the SSSI (apart from a small length when they cross the Lugg at the southern end and potentially for one of the variants at the northern end), potential exists for impacts on the SAC and SSSI. Potential still exists for LSE to occur on the SAC (both directly and indirectly) and the identified scale of potential impact and as a consequence opposition from Natural England and the Environment Agency is likely. In order to achieve approval under the Conservation Regulations it would still be necessary to demonstrate

a. a better alternative did not exist and

b. imperative reasons of overriding public interest.

2.7.5 As noted in our review of the Amey conclusion (to propose firstly, preference of the inner eastern corridor over the outer eastern corridor and then subsequently to prefer the inner western corridor over the inner eastern corridor), the basis for selection is not entirely clear but is based heavily on the LSE on the SAC that may occur from the eastern route. Therefore, consideration of a route that involved crossing the flood plain that is hydro-geologically connected to the SAC would present difficulties. As such, Amey preferred an inner route and we believe that this is the correct decision.

2.7.6 From an air quality perspective, impacts on the SAC may also exist as a result of nitrogen deposition from vehicle emissions – this would occur not only from the link itself but also at the point where the A4103 crosses the River Lugg; while this is an existing road, additional traffic would use this section in order to access the eastern link and as a consequence the impacts would need to be considered as part of any further study and as part of the HRA that would be required. It is not possible at this stage to comment whether LSE on the SAC from emissions to air from vehicles using the link would occur.

2.7.7 Air quality is also an issue for the city centre. As noted previously in the discussions with regard to the EiB option, in the event that the link results in worsening air quality in or in the near vicinity to the AQMA, it is likely that such a link would be prevented without mitigation measures to prevent the reduction in air quality in the city centre.

2.7.8 Heritage issues would also be impacted upon for this section of the eastern option. There are two Listed Buildings at the point where the northern route crosses/joins the 4103: namely Lugg Bridge (Grade II Listed Building and Scheduled Monument) and to

its east (and on the south side of the A4103/facing onto the A4103) is the Grade II Lugg Farmhouse.

2.7.9 Lugwardine Bridge (grade II listed) is on the A438 at the point where it crosses the River Lugg. The Grade II building to the north of this is Lower Lugg Court, an early 19th century lodge to Lugwardine Court (unregistered park and garden) which lies to the east of the route and south-east of the lodge. The Grade II* building within the route (roughly equidistant from the A4103 and the A438) is New Court (see below).

2.7.10 The unregistered park and garden is New Court. The Amey August 2010a report suggests that it may be 16th century in origin but is first mapped in the early/mid 19th century. It is associated with the Grade II* New Court house.

2.7.11 There are two large blocks of SMR features just south of the A4103: the first is a cropmark site of a rectilinear single ditched enclosure with internal pits(prehistoric or roman?). The larger site further to the south is also a cropmark site with (possibly an Iron Age settlement and a possible ring ditch (Prehistoric burial mound).

2.7.12 Impacts on these heritage elements would occur depending on which variant of the route were to be selected. At this stage should a route have to go through this area we would suggest that the impacts upon the two archaeological sites would be easier to mitigate (through excavation and analysis) than the impact upon the Listed Buildings.

SECTION 3

SUMMARY OF FINDINGS AND CONCLUSIONS

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3.1 Selection of the Western Inner Route as the preferred option

3.1.1 Amey have undertaken a thorough review of environmental issues associated with a large number of road links that comprise 4 different route corridors. Their generic approach to the process has followed the expected & required staged appraisal process. Our review has concluded that the work undertaken by Amey is logical and appropriate and we concur with their conclusion that the western inner route has the least impacts and is preferred on environmental grounds.

3.1.2 Amey also concludes (and we agree entirely), that all routes will be subjected to environmental challenges; indeed they state ' *there is no clear best environmental option as each route corridor performs differently to the different sub-objectives*'. It should be stressed that regardless of which option is selected, significant further work and studies will be required to firstly confirm the extent of likely environmental impact and secondly to identify the level of success of mitigation measures that will be required to ameliorate the significance of some of the impacts.

3.1.3 The basis for the selection of the western inner corridor route has been considered in this report and while we believe that the conclusion based on the data is broadly correct, there are a number of procedural elements that could be improved upon:

- Greater comment is required to confirm that significant impacts on air quality in the city centre will not occur.
- The conclusion that a western route is preferred requires greater transparency to demonstrate how the decision was arrived at.
- Mitigation has not been taken into account in the Appraisal Summary Tables; differentiation between alternative route options is likely to be easier had it been.

3.1.4 A review of the relationship between the planned housing required to maintain the economic sustainability of Hereford and the relief road was undertaken and concluded that the western inner route corridor option represented a justified approach, even with a reduced number of houses.

3.1.5 We doubt that a different conclusion would be drawn once the above elements have been addressed; the potential for LSE on the SAC from the eastern route will dominate the realities of whether such an option is viable. Comments on the technical approach and findings are presented below.

3.1.6 With regards to **Noise**, the methodology does not allow the conclusion that western options will have a lower level of noise impact to be drawn. We believe that at this stage, noise should not be used as a differentiator to the selection of options.

3.1.7 The impact on the **Air Quality** of Hereford city centre is a key issue that needs to be confirmed. In the event that a reduction in air quality is predicted from any of the options, this would be sufficient to exclude that option from consideration. It is therefore essential that this assessment is carried out before the next stage.

3.1.8 Consideration of the **Water** sub-objective includes surface and ground water as well as flood risk. We agree with the general conclusion that the western inner route is the preferred option, largely because of the constraints associated with the River Wye

SAC. More comment on water quality issues is likely to strengthen the argument further that the western route would impact less.

3.1.9 **Biodiversity** is inextricably linked to the Water sub-objective because of the association with the River Wye SAC and the Lugg Meadows SSSI. All route options cross the Wye and therefore have the potential for LSE and as such would be open to challenge under the Conservation Regulations 2010. We are however in agreement that the potential for LSE to occur for the western route is less than for the eastern route. The potential of a challenge to any route exists; there is however, potential for less opposition for a western route.

3.1.10 **Landscape is**sues are addressed comprehensively but in places gaps exist as to the means by which conclusions are drawn and as a consequence it is not possible to concur with the conclusions of the report without a more detailed appreciation of the study area. Whilst this caveat is provided, we believe it likely that with this understanding the conclusions would be confirmed.

3.1.11 The comparison of corridor routes from a **Heritage** point of view rests almost entirely on the number of scheduled monuments that would be impacted upon by each route corridor. While this is a very important consideration, to use it as the sole arbiter risks ignoring other potentially key receptors.

3.2 East is Best

3.2.1 The EiB consultation response is largely silent on the likely environmental impacts that would result from the scheme. This makes it difficult to compare with the other route options. As part of the route is however the same as the inner eastern corridor route, comments have been drawn that have been presented in this Report.

3.2.2 The EiB document is based on comparison with a number of Key Goals established by the authors. The absence of any environmental criteria is an omission. The authors have wrongly stated that the purpose of the Relief Road is to relieve traffic congestion in the city centre. The purpose of the relief road is to prevent worsening congestion once the additional residential developments have been constructed.

3.2.3 A key issue is the absence of any consideration of the potential environmental impacts that may result from the missing link between the A465 and the A4103. The absence of a link would have a significant effect on the ability of HC to implement sustainable traffic measures in the city centre as the existing A49 could not be de-trunked.

3.2.4 Opposition to the route would come from the Environment Agency and Natural England as a crossing of the SAC would be required and LSE may result (though it is noted that this would be the case for all routes considered by Amey as well). However their level of opposition may be slightly less due to the ability to mitigate some of the impacts as the Lugg Meadows would not be impacted upon directly. However, potential exists for them to oppose the route in principle as they may perceive it as the eastern corridor by ‘stealth’.

3.2.5 On heritage grounds there is potential for EiB to have less impact on the grounds that it is a shorter length of highway and therefore likely to have proportionally less impact. It would also have a reduced effect on the High Heritage Value of the Lugg Meadows. However there would be detrimental impacts through the pushing of traffic into the Lugwardine Conservation Area and across the Grade II listed Lugwardine Bridge which is also a scheduled Monument.

3.2.6 Impacts from traffic directed to both the narrow lanes to the east of the Lugg Meadows and the residential streets on the east of the city would impact on the air quality and noise levels for properties adjacent to those routes that would be used. The ability of the roads to handle the level of traffic that the TPi model assumes is not feasible and as a consequence traffic impacts would occur. The scale of these impacts and their significance is however not possible to predict at this stage.

3.3 Eastern Link

3.3.1 An eastern link west of New Court and to the east of the Lugg Meadows would also generate impacts that could be of concern.

3.3.2 Whilst the scale of impact would be less than a full eastern option, the need to cross the River Lugg and the River Wye (as well as the flood plains of both) would generate the potential for LSE on the SIC and it's component parts.