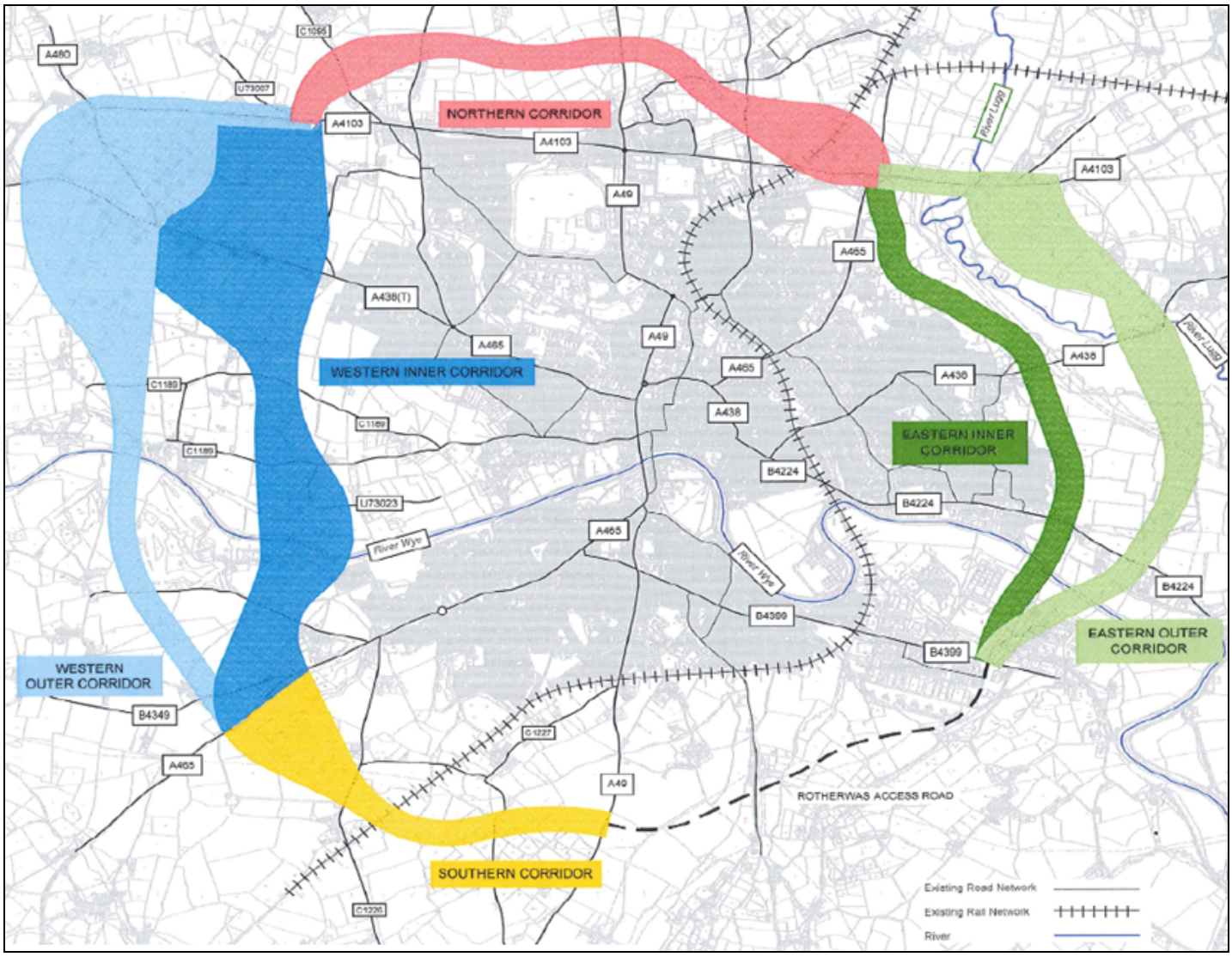
Hereford Relief Road

Study of Options

Herefordshire Council

August 2010



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Executive Summary

The Purpose of this study is to identify the engineering and environmental advantages and disadvantages associated with the relief Road Options. The traffic impact of the relief road and packages of sustainable options has also been assessed.

The methodology is set to follow the requirements of the Department for Transport (DfT) to support any future funding applications and to ensure a clear and coherent decision making process can be demonstrated. Study objectives have therefore been set to accord with the national objectives defined by DfT's New Approach to Transport Appraisal (NATA).

The transport network within Hereford City currently suffers from congestion, a problem predicted to worsen with future growth. The Hereford Multi Modal Study identified a relief road as an effective measure for reducing congestion and accommodating future growth.

The consideration of sustainable measures with no relief road (Do Minimum) improves the performance of the network. Of the sustainable options Option 1 performs best in terms of delay as the greater sustainable investment includes an overall reduction in network capacity to support the measures. The focus of the recommendations relating to the Do Minimum scenario should consider whether the sustainable packages can be achieved without a relief road. Many of the measures require the reallocation of the existing A49 road space, for example bus lanes on links and bus priority at junctions. Herefordshire Councils have a long history of negotiations with the Highways Agency and this should inform their decisions on the sustainable options in isolation of a relief road.

Both Relief Road options perform better than the Do Minimum and of the relief road options and, although considered marginal, the eastern routes perform best in terms of reducing delay within the city. Many of the overcapacity junctions are on the east side of the City and as such the eastern bypass has the greatest improvement in these areas, resulting in the overall best results.

The corridors considered within this option study are illustrated in Figure ES1 and within these corridors a number of alignment options have been assessed as shown in Figure ES2 and ES3.

These routes have been identified following a review of the existing information relating to the provision of the proposed Relief Road and the information arising from Amey's Stage 1 assessment. This study also examines a potential do minimum scenario with a view to achieving the objectives through a package of sustainable measures.

Figure ES1 – Study Corridors

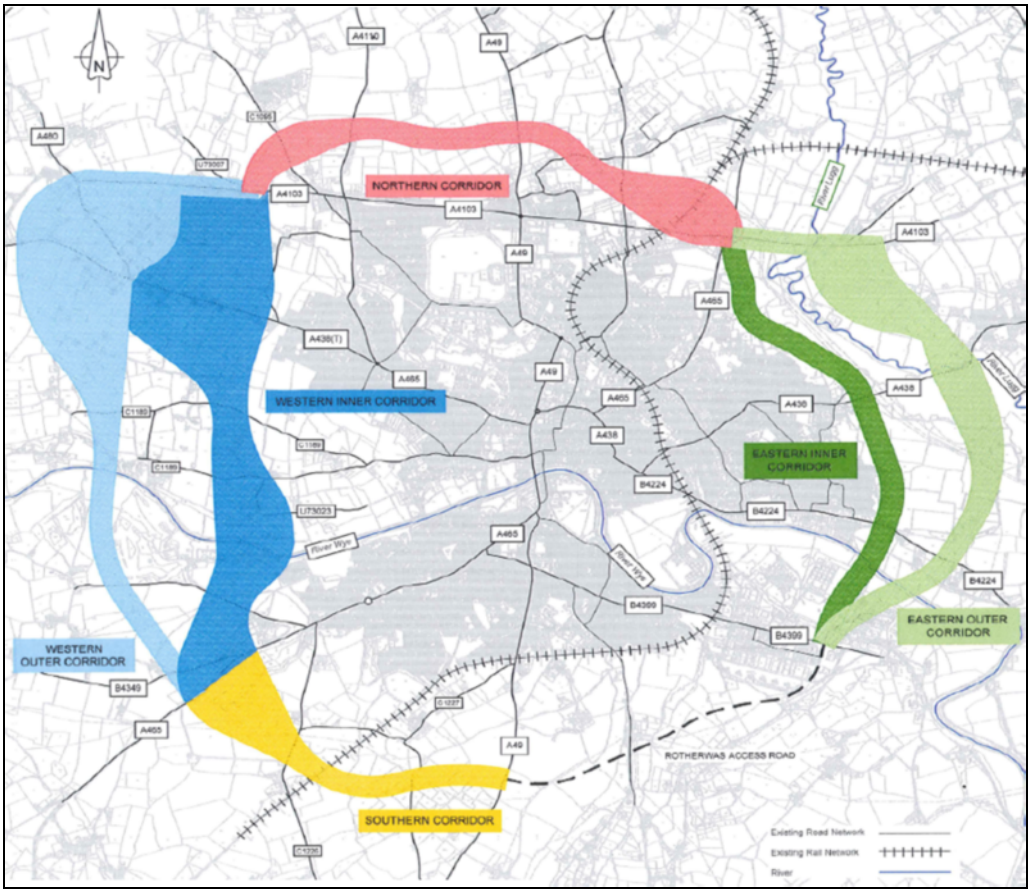


Figure ES2 –Study Alignment Western Options

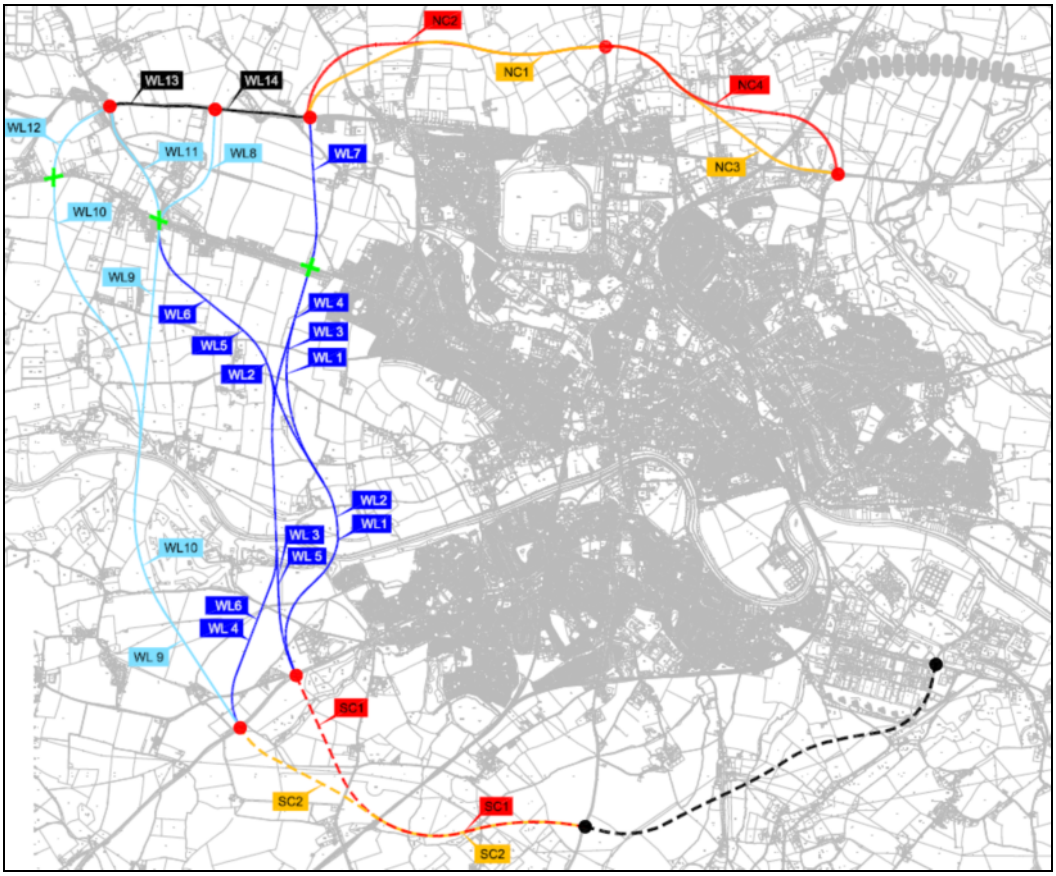
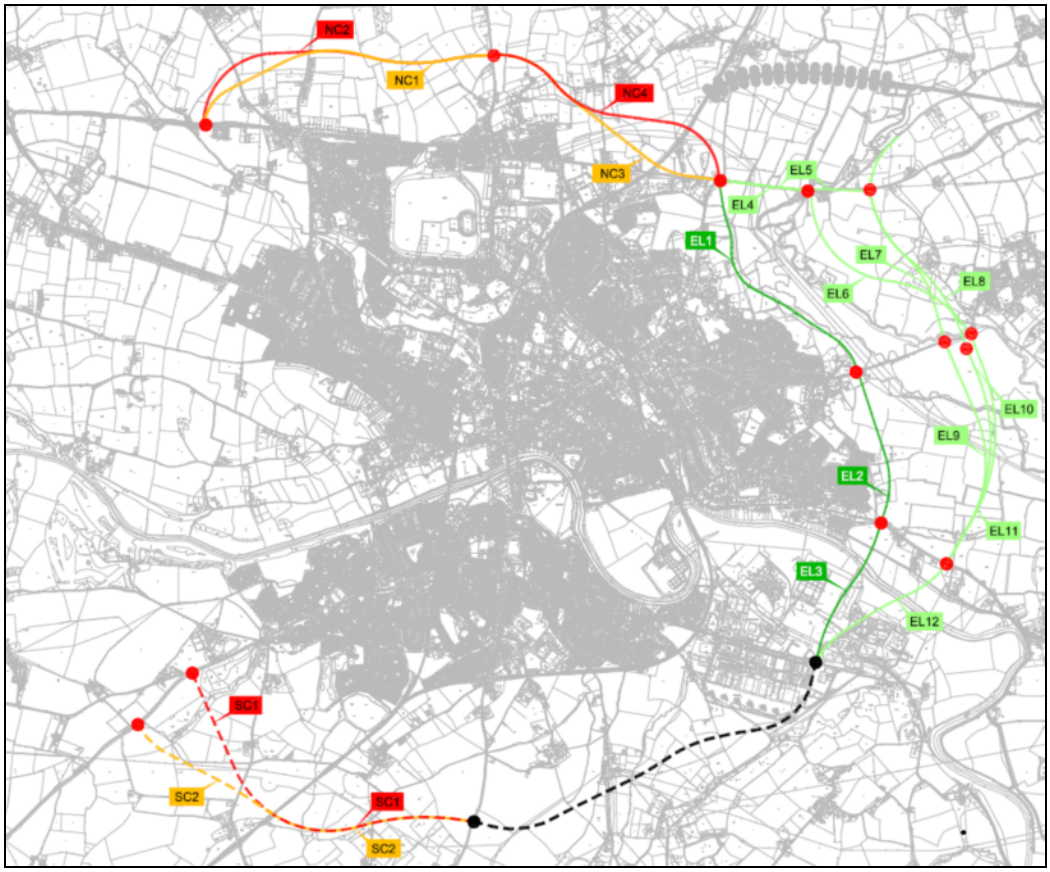


Figure ES3 –Study Alignment Eastern Options



A summary of the recommendations from the assessment of each link can be seen in Table 5.1 and more detailed constraints maps can be seen in the separately bound Design Drawings Booklet in Appendix A. The favoured corridor from the options to the West of the city is the Inner route, avoiding a longer and higher bridge structure and avoiding the golf club as well as a number of Environmental Constraints. The favoured corridor on the East of the city is the inner route avoiding the two additional river crossings, longer links and additional costs.

Of these two favoured solutions, east and west, the corridor lengths are similar but the earthworks activities are greater for the west links due to a more varied topography. However, the West links have a better earthworks balance and have favourable phasing options. The cost estimates give construction cost of an inner route on the east of the city of £86M and an inner route to the west of the city of £109M. The west links can be designed to minimise the impact upon the Belmont Golf Course although effects upon the Landscape at the golf course will occur. The landscape effects are generally greater on the West links but the East links encroach upon the Special Wildlife Site, Lugg Meadows SSSI and are close enough to adversely effect the River Lugg Special Area of Conservation (SAC). It is important to note that any project should normally only proceed where it has been ascertained that it will not adversely affect the integrity of a European Site (Nature

Designation given to the River Lugg SAC). Exceptionally, where there is a negative effect, Competent Authorities may only agree to a project where there are **no alternative solutions regardless of economic considerations** and there are **imperative reasons of over-riding public interest** and that any **compensatory measures** are taken. As alternatives exist, albeit with greater landscape effects, any selected alignment will be at risk of challenge though the Conservation Regulations (2010). The River Wye SAC would be crossed with both eastern and western options.

Additional work on a Habitat Regulations Assessment (HRA) for the Hereford Relief Road is required to further inform the final decision on corridor selection for inclusion in the Area Plan. The HRA is an iterative process and, now the baseline information has been gathered, additional information is required to inform the 'appropriate assessment' required by the regulations. This should include

- Provision of information for assessment (Clause 61(2))
  - An assessment of more detailed design variations to minimise impacts
  - A review of the feasible construction processes
  - further survey work at the designated areas
- Further consultation with Natural England (Clause 61(3))
- Further consultation with the Public to ascertain an overriding public interest in a particular route. (Clause 61(4))

As an example, the impact upon the River Lug SAC could be reduced through the greater use of elevated structures to reduce the earthworks and overall scheme footprint. Impact on the Wye SAC to the west of the city could be more easily reduced through wide span crossings and no workings in the river course and on the evidence currently available would be favoured. However, following public consultation, their may be an overriding public interest in the route to the east. However, the results of recent surveys on route choice did not conclude this.

Also note, the scheme costs are estimated to increase by £9M to £95M for the whole eastern corridor as a result of providing structure along much of Link EL1 (excluding the increased whole life costs of maintaining structures). Also, structures near urban areas can attract graffiti especially if the structure low, near public walking areas and amenities.

Based on the engineering and environmental assessments completed for this report, and subject to the findings of the HRA, the corridor arising as preferred is an inner corridor to the west of the City as shown in Figure ES4.

Figure ES4 – Preferred Relief Road Corridor

This Options Study is a step towards the Stage 2 Assessment and much of the work done for this study will follow through directly into the final Stage 2 Report. However, a number of additional activities are necessary to ensure the route selection process undertaken within the Stage 2 Report is compliant with the Department for Transport (DfT) guidance. These activities are summarised below:

a. The location of major junctions has been identified within this study. However, the junction type and the design of the junctions have not been considered within this study. Therefore, for the Stage 2 Assessment, junctions require feasibility designs including a strategy for connecting the proposed development sites into the network. These proposals will need to be included within the traffic model if different from the assumptions made to date.

b. Should corridors to the east side of the city not be taken any further, then a more detailed route 'alignment' options assessment on West side should be undertaken for the Stage 2 report.

c. Arrangements for site access should be made to allow for full environmental surveys of proposed routes to be undertaken to inform the final selection of an alignment.

d. A wider consultation to include non-statutory consultees should be considered to inform the final alignment selection.

e. It is recommended that the final Stage 2 assessment report includes clear 'scheme specific' objectives set by Herefordshire Council and their delivery partners in addition to the National DfT Objectives. These objectives will define the requirements of the relief road but also the wider aspirations of the city encompassing growth and sustainable transport objectives.

1 Introduction

1.1 PURPOSE OF STUDY

1.1.1 The purpose of this study is to identify environmental and engineering issues associated with the potential Hereford Relief Road route corridors.

1.2 BACKGROUND AND STUDY CONTEXT

1.2.1 Herefordshire Council are considering options to relieve existing and future congestion and support growth to be included in the forthcoming Local Development Framework (LDF).

1.2.2 Herefordshire covers a predominantly rural area of 842 square miles and Hereford is the main service centre and largest urban area, with a population of 54,850. The A49 strategic highway passes through the City from north to south and crosses the River Wye at Greyfriars Bridge close to the historic City Centre. The pattern of main roads in the County is focussed on Hereford itself and peak hour congestion is frequently experienced on the City's highway network and river crossing.

1.2.3 Hereford is identified as a 'Settlement of Significant Development' in the West Midlands Regional Spatial Strategy (WMRSS) with an allocation of 8,500 houses for the period 2006 to 2026. This allocation is supported by Herefordshire Council, however, adequate infrastructure must be provided to support it, as this level of growth represents an increase in size of over 30% for the City.

1.2.4 Herefordshire Council's Development Plan is currently the Unitary Development Plan (UDP) with a plan period to 2011. The Council is now preparing the LDF Core Strategy to cover the same plan period as the WMRSS, i.e. 2006 to 2026.

1.2.5 The Core Strategy has been the subject of three formal rounds of public participation; an "Issues Paper" in 2007 and the "Developing Options" Paper in 2008 indicated broad public support for transport infrastructure improvements; and a "Place Shaping Paper" consultation was completed in March 2010 to establish the preferred options for the Core Strategy.

1.2.6 To inform the Core Strategy the Hereford Multi Modal Study has been completed to assess the broadly defined transport and development strategies and identifying the need for a relief road. This confirms the existing capacity problems associated with the local highway networks; predicting worsening congestion with the predicted growth scenarios.

1.2.7 The consideration of a relief road to the east or west of Hereford has a long history predating the Multi Modal Study as presented on Table 1.1.

Table 1.1 Relief Road Considerations up to 2009

Date	Study	Summary of Outcomes
1987 - 1988	DfT Route Selection Public Consultation	Two routes considered (one east and one west). DfT selected the route to the East.
1990	Funding	Financing options considered.
1991 - 1992	Public Inquiry	For the Eastern Relief Road. Inspector's recommendation that the option is rejected and an alternative Western Route be accepted. The eastern route was then withdrawn.
1993 - 1994	Public Consultation	Route options re-considered and Hereford's transport problems investigated.
1993	Hereford Traffic Conference	Traffic problems investigated and non-road and road options considered including options for Inner Relief Roads. The Inner relief roads had considerable oppositions due to the detrimental impact upon the population.
1996	Entry to Trunk Roads Programme	The Eastern Relief Road was included in the Highways Agency Trunk Road Programme. However, works stopped on the eastern route in 1997.
1998	Regional Planning Conference	Part of the Eastern Relief Road Route from A465 and A438 was protected from development by the newly formed Herefordshire Council in the Unitary Development Plan (UDP)
2001	Hereford Outer Relief Road Business Case	Economic fragility presented as justification for a relief road. Also air quality problems without a relief road presented. Conclusion that congestion will worsen as the population grows.
2001	Regional Planning Guidance and Transport Strategy.	Report to the Regional Transport Group.
2001	Local Transport Plan (LTP1)	Plan to cover 2001/2 – 2005/6 includes recognition of transport provision in Hereford to support growth and identifies an Integrated Transport Strategy focusing on an integrated and sustainable transport system.
2003	Hereford Transport Review	A review of the LTP Strategy through a Local Multi Modal Study including considerations for Growth.

Date	Study	Summary of Outcomes
2005	Highways Agency Consultation on A49 Edgar Street	Consideration given to HGV restriction with additional bus and cycle provision on a lane on Edgar Street. Scheme abandoned due to low level of public support.
2006	Local Transport Plan (LTP2)	Identified need for Herefordshire to work closer with the Highways Agency to make best use of the A49 and identifies Hereford as an Air Quality Management Area(AQMA)
2009	Hereford Multi Modal Study	Commissioned jointly by Herefordshire Council and the Highways Agency to consider future network conditions as a result of Regional Spatial Strategy growth.
2009	Delivering a Sustainable Transport System (DaSTS)	Governments agreed approach to identify transport needs from 2014 onwards. DaSTS set out a coordinated national approach to providing sustainable solutions to identified transport issues in the West Midlands. It focuses on Telford, Shrewsbury and Hereford.

1.3 STUDY METHODOLOGY

1.3.1 It is assumed that the ultimate purpose of the study process is to take the scheme towards having a fully assessed preferred route with a supporting Major Scheme Business Case. All studies therefore need to be carried out to follow the Department for Transport (DfT) Transport Analysis Guidance (WebTAG).

1.3.2 WebTAG provides guidance on conducting transport studies and on how to:

- set objectives and identify problems;
- develop potential solutions;
- create a transport model for the appraisal of the alternative solutions;
- conduct an appraisal which meets the Department's requirements.

1.3.3 The methodology is a combination of the Design Manual for Roads and Bridges (DMRB) and WebTAG and each has different aims which need to be address in the various stages of the study. Under the DMRB the aim of the assessment process is to consider all likely effects and allow all public and statutory bodies to comment to ensure the satisfactory completion of the Statutory Processes. The aim of the WebTAG assessment is to determine how well the scheme meets the national and local objectives to justify funding. It should be noted that since the formation of the new government the DfT's guidelines are under review and may change. However, the current overall study delivery stages in chronological order are:

- **Stage 0** – Preliminary Investigatory Works (Complete – Earlier Studies, Issue Paper and Developing Options Paper).
- **Stage 1** – Identify environmental, engineering, economic and traffic advantages and disadvantages associated with broadly defined strategies (Complete – Multi Modal Study and Stage 1 Engineering and Environmental Assessments (Complete)
- **Study of Options for the Hereford Relief Road (This Study)** – Identify engineering and environmental advantages and disadvantages of proposed route corridors to inform the planning strategy (This Study).
- **Stage 2** – Further inform a decision on preferred route selection through additional WebTAG compliant environmental, engineering and traffic and economic assessment (Future Study).
- **Stage 3** – Clearly identify advantages and disadvantage in environmental, engineering, economic and traffic terms of the preferred route or scheme including a full environmental statement (Future Study).
- **Major Scheme Business Case** – Presentation to the Government or funding body encapsulating the evidence of the previous stages.

1.3.4 This Report for the Study of Options for the Hereford Relief Road includes the following processes in appraising scheme options.

- Analysis of the Engineering and Environmental constraints associated with the route corridors.
- The conclusions of the Engineering and Environmental Assessments and recommendations to inform the future Stage 2 study and the planning strategy.

2 Consultation, Participation and Information

2.1.1 A well defined and inclusive consultation and participation strategy is necessary for the successful delivery of the 'Core Strategy'. Herefordshire Council have already undertaken significant consultation in defining the issues and setting the broad strategies necessary to deliver the national, regional and local objectives for growth.

2.1.2 The Issues Paper helped shape the vision and objectives for the core strategy; the Developing Options Paper sought views on the specific ways to address the issues identified; and the Place Shaping Paper aims to build upon this towards a preferred strategy.

2.1.3 The Stage 1 Assessment made reference to the earlier consultation on the Local Development Framework undertaken by Herefordshire Council through the Issues, Developing Options and Place Shaping papers. The Stage 1 assessment also identified the statutory bodies to be consulted during the Stage 2 assessment. In identifying the consultation strategy, consideration is given to the DfT guidance which suggests the following:

- Regional Partners (Regional Planning Conferences; Regional Assemblies, Regional Development Agencies, Regional Chambers);
- Local Authorities;
- Transport Providers (Highways Agency, highway authorities, Strategic Rail Authority, Network Rail, train operating companies, bus and coach operators, and car park operators);
- Representatives of business (Regional Chambers of Commerce, CBI, Freight operators);
- Transport users (rail passengers, disabled travellers, freight interests, motorists, cyclists and walkers);
- Environmental Interests (Transport 2000, CPRE, etc);
- Statutory Bodies (Countryside Agency, English Heritage, Environment Agency, English Nature)
- the general public of the study area; and
- the travelling public who would be a subset of the general public in the study area but who would also include people from outside the study area;

2.1.4 DfT also suggest a programme for Consultation and Participation which is considered against this study's delivery strategy in Table 5.1.

Table 2.1: DfT Guidance and Herefordshire Consultation Strategy

DfT Guidance on Consultation Strategy	LDF and Relief Road Strategy
Prior to the start of the study so that views can be sought on the terms of reference;	Issues Paper Consultation **Completed in 2007**
At the start of the study so that views can be sought on local and regional objectives;	
In the early stages so that current perceptions of problems on or with the transport system can be established;	
After the analysis of current transport problems so that the perceived problems can be used to validate and, if necessary, adjust the computational procedures used to identify problems;	Developing Options Paper Consultation **Completed in 2008**
After the analysis of the future transport problems so that views can be sought on the relative importance of the different kinds of problem;	
At the start of the option development step so that views can be sought on the kind of solution which should be considered;	Place Shaping Paper Consultation **Completed March 2010**
As part of the appraisal process (e.g. involvement of the statutory bodies in assessing the environmental aspects of particular options)	Started in this Study of Options for the Hereford Relief Road **Date to be Confirmed**
After the options have been tested and appraised so that views of respondents can be taken into account when making a decision about the preferred transport strategy or plan.	Public consultation to be completed following completion of the Stage 2 Assessment. **Date To Be Confirmed**

3 Options for Solutions

3.1.1 The Hereford Multi Modal Study concluded that a do minimum scenario where no relief road is introduces does not fulfil the objectives to reduce congestion or support growth. This triggered the stage 1 assessment to define potential corridors for a relief road east or west of the city.

3.1.2 Wide and broadly defined corridors were set at the beginning of the Stage 1 Assessment to reflect the work undertaken to date on the Hereford Multi Modal Study. As recommended by the study brief, both East and West corridors were considered. To ensure that the Stage 1, 2 and 3 scheme assessment process identifies the optimum corridor and then alignment, a wide study area was set for the Stage 1 assessment. Therefore, East and West and inner and outer options were considered. The inner options were corridors as close as is reasonable to the existing developed city limits. The outer options were corridors further away from the existing city but limited by what is considered to be economically sensible. A corridor too far outside of the city would not provide a short enough route to attract traffic use from through traffic or local trips.

3.1.3 Historically a number of options for a relief road around Hereford have been considered including options within the existing city boundary. These options and the outcomes of studies have been considered during this assessment. However, care was taken to ensure that the assessment took an independent view of options.

3.1.4 At Stage 1, four corridors to the east of the city and four corridors to the west were assessed creating the broad corridors for assessment shown in Figure 3.1. Note, the lines shown were not designed alignments but for the purposes of defining broad corridors only. Also, many sections assessed are common to several corridors. As such, in the detailed assessments there was a certain amount of repetition with each corridor being assessed independently.

3.1.5 At the end of the Stage 1 Assessment the corridors were redefined as shown on Figure 3.2. To avoid repetition in this assessment the links are described and assessed individually. The various options for the combination of the links to form full corridors are presented in the Appraisal Summary Tables (AST) at the end of this section.

Figure 3.1: Stage 1 Corridors Assessed

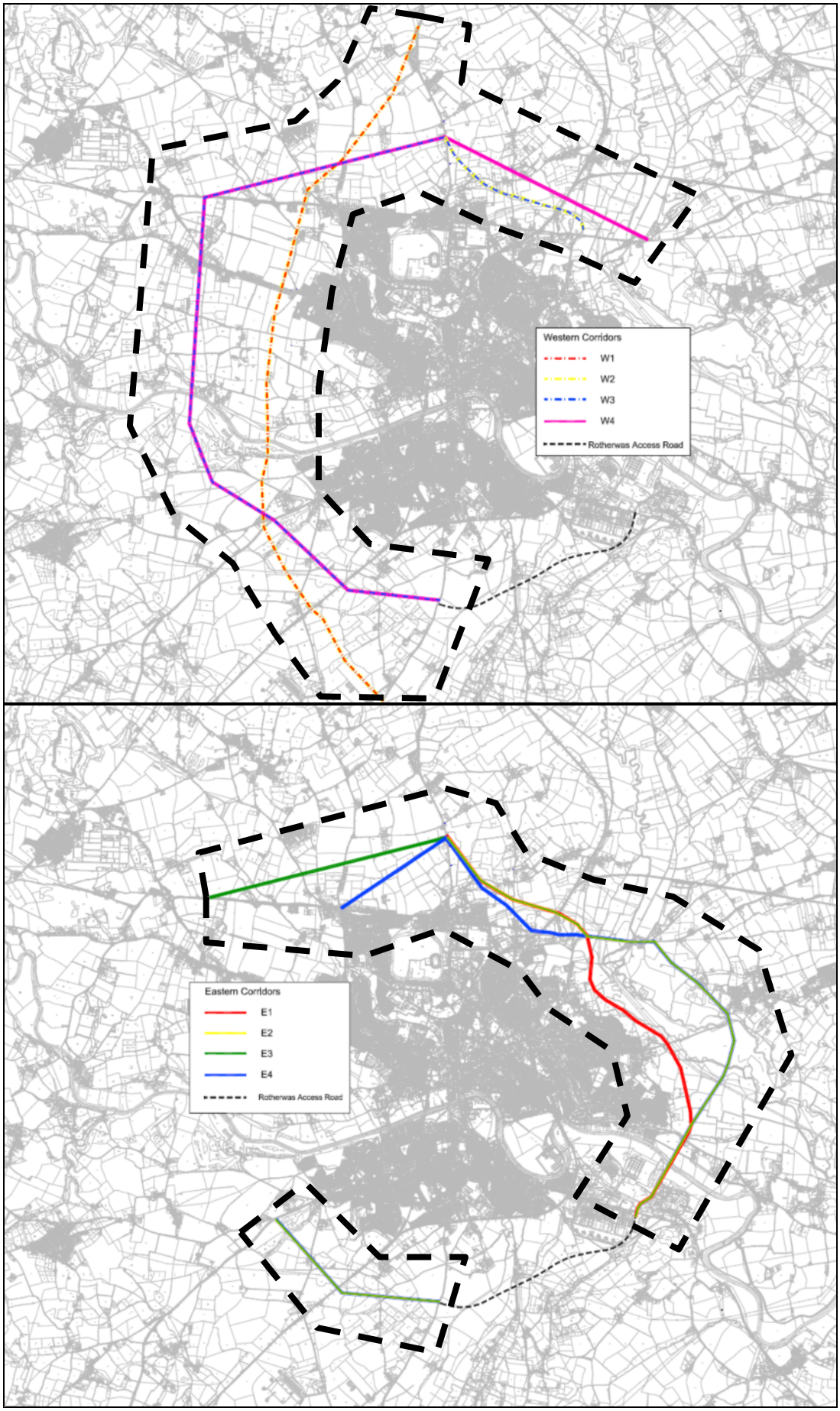
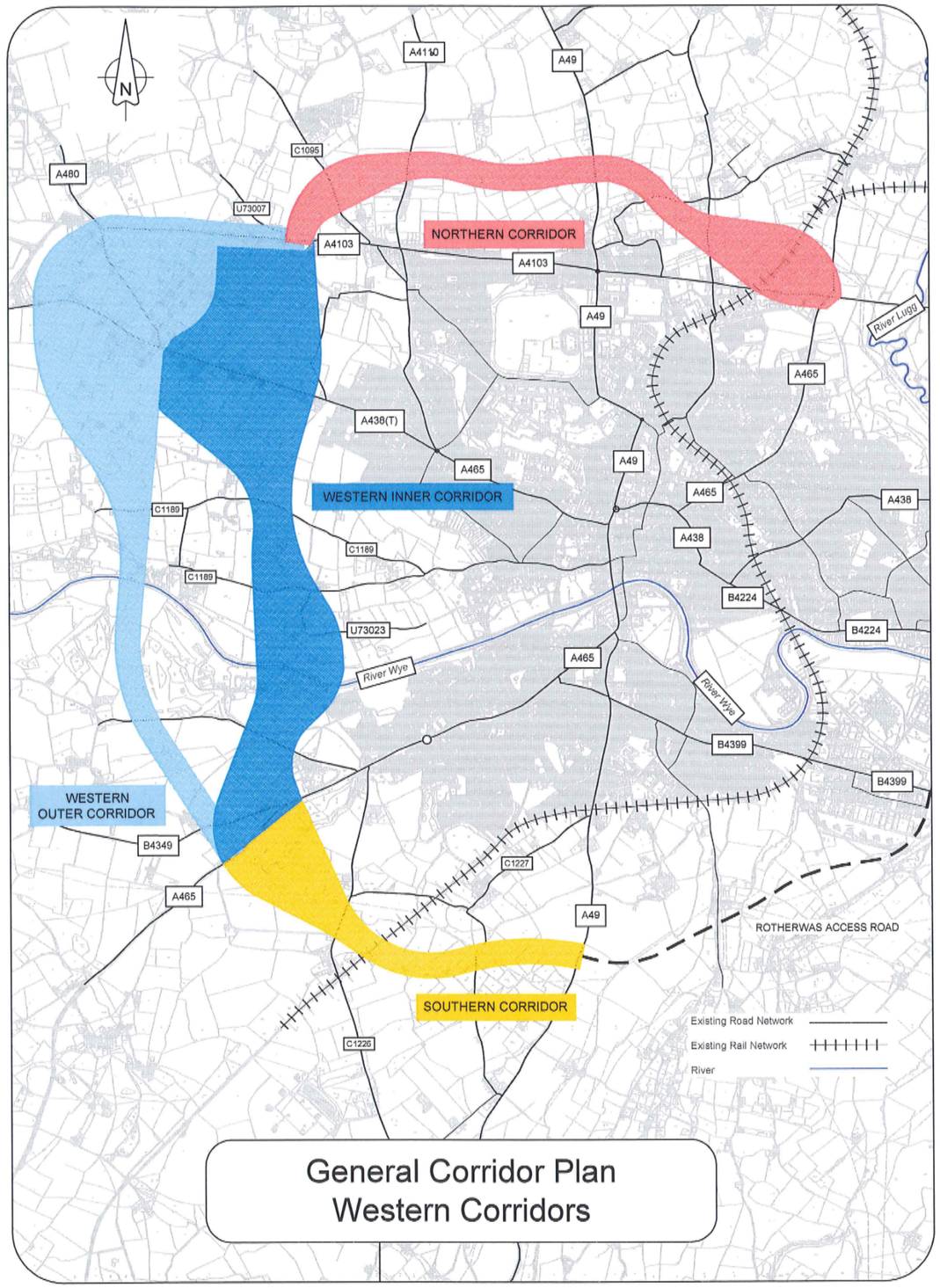
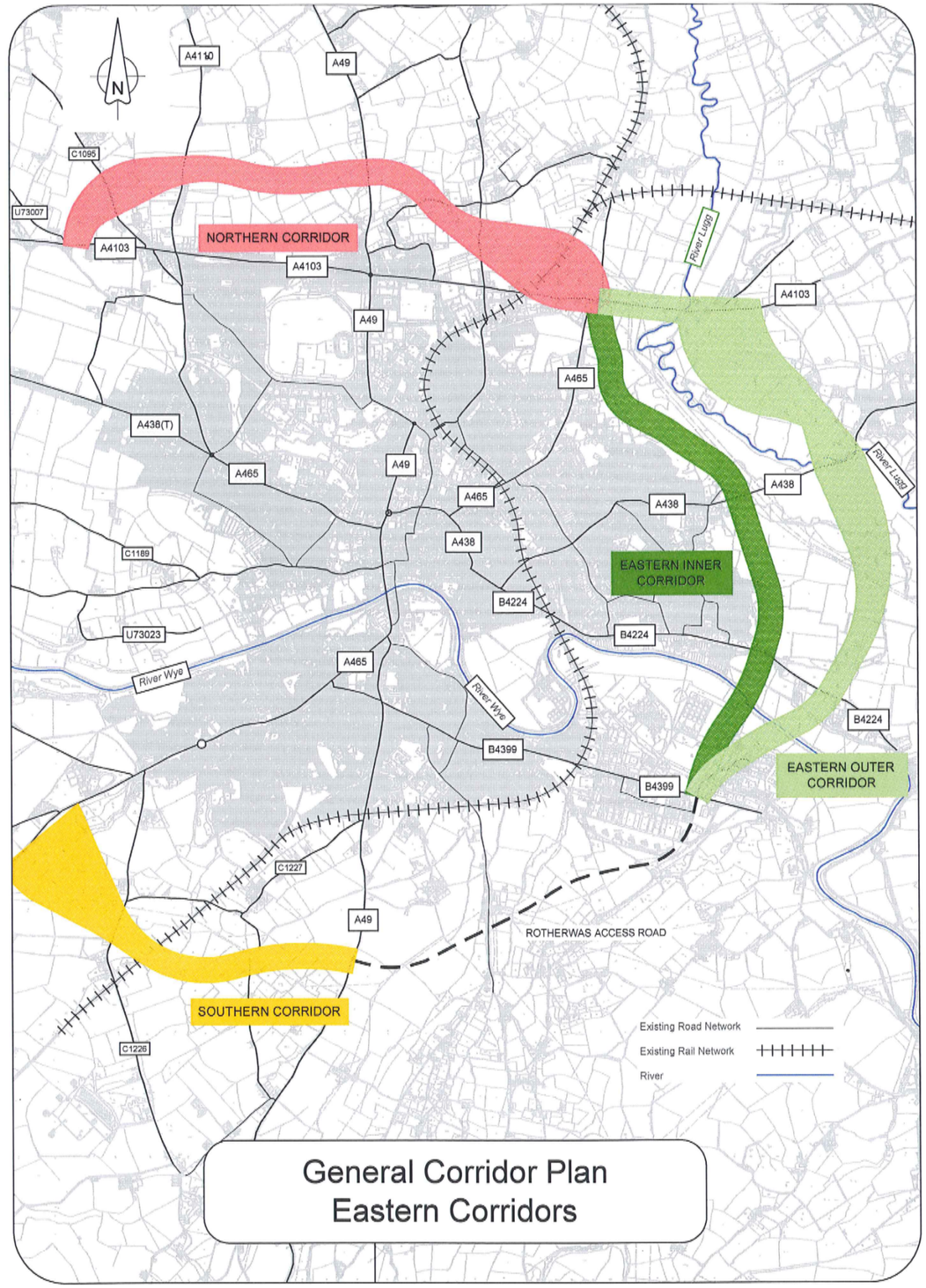


Figure 3.2: Corridors Assessed in the Study into Options





3.1.6 To date the Stage 1 Assessment and this study have identified corridors on the outside of the current city conurbation. However, opportunities may exist to provide relief to congestion within the city conurbation. These options are likely to have advantages in relation to impacts upon the landscape and ecology. However, other environmental impacts such as air quality and noise are likely to be detrimental, and their suitability to fully relieve the congestion and allow for growth in the city requires consideration.

4 Engineering and Environmental Assessment Summary

4.1.1 This section summarises the proposals assessed in detail in the Engineering Assessment Report in Appendix A and the Environmental Assessment Report in Appendix B.

4.1.2 The 'Do Something' Relief Road options are assessed as a number of individual corridor links. These are defined by the major highways assumed to be joined to the relief road by junctions. The assessment of each of these corridor links includes the consideration of a number of different alignments which are fundamental in setting the limits of the assessment corridors as summarised in Figure 4.1 on page 16 of this report.

4.1.3 It should be noted that **only the Major Constraints** are shown within this summary report. Presentation of **all known** constraints from both site surveys and extensive desk based studies can be seen in the detailed assessment reports in Appendix A and Appendix B.

4.2 DO MINIMUM (NO ROAD) AND SUSTAINABLE PACKAGES (WITH AND WITHOUT ROAD)

4.2.1 The existing Multi Modal Study Was assessed in the Hereford Relief Road Stage 1 Assessment to identify the current economic and traffic evaluation already undertaken.

4.2.2 The Hereford MMM was deemed acceptable for appraising LDF option testing and for confirming the need for a Relief Road and could be used to inform a decision on whether to choose an east or west corridor. However, the review concluded that the model in its current form was not fully WebTAG compliant and would not meet the requirements for a later business case appraisal.

4.2.3 The Stage 1 assessment concluded that there had been little inclusion of other sustainable transport initiatives in the traffic modelling work to date. The assessment recommended that the full 'package' of transport initiatives, not just the relief road be considered.

4.2.4 A further traffic assessment has therefore been completed for the Study of Options report titled 'Interim Forecasting Report – Sustainable Options Packages' and can be seen in Appendix C. The assessment considers sustainable options packages and the resulting effects on the road network with and without a relief road.

4.2.5 Three incremental sustainable options have been tested. A matrix of the measures included in each option are listed in table 4.1 and are summarised as follows:

- Option 1 – continue with the existing levels of investment. On consideration of the DaSTS Study, and a review of the measure proposed, a 10% modal shift from car to sustainable modes has been used.
- Option 2 – Increase the existing level of investment in the sustainable transport network combined with an increase in demand management measures. A further 5% shift is anticipated as a result of the extra measures and a total modal shift from cars to sustainable modes of 15% has been used.
- Option 3 – Increase the existing level of investment in the sustainable transport network combined with a substantial increase in demand management measures. A further 5% shift is anticipated over Option 2 as a result of the extra measures and a total modal shift from cars to sustainable modes of 20% has been used.

Table 4.1: Sustainable Transport Options Summary

Measure	Improvement Scheme	Option 1	Option 2	Option 3
Smarter Choices	Developing travel plans	X	X	X
	Travel promotions	X	X	X
	Active travel information	X	X	X
	Localised branding		X	X
	Developing Rail Station travel plans		X	X
	Personalised Travel Planning			X
	Community lead travel plans			X
	Development of Park and Share and Park and Cycle Sites	X	X	X
Active Travel	Connect 2 scheme	X	X	X
	Promotion of active travel through enhancements of existing infrastructure	X	X	X
	Promotion of active travel through new infrastructure delivery	X	X	X
	Reduction in the number of school trips by car	X	X	X
	New access arrangements from strategic sites to existing highway network	X	X	X
	Substantial improvements in pedestrian facilities		X	X
	At grade crossings on A49 Victoria Street (Eign Street and Barton Road)		X	X
	Accelerated expansion of cycle routes and infrastructure		X	X
	City wide cycle hire scheme		X	X

Measure	Improvement Scheme	Option 1	Option 2	Option 3
	Maximum feasible improvements			X
Bus	Serving changing customer needs	X	X	X
	Promotion of bus use	X	X	X
	Improvements to passenger waiting facilities	X	X	X
	Easing modal interchange – Hereford Transport Hub	X	X	X
	Improved service coverage and frequency		X	X
	Expansion of concessionary travel (16 to 19 year olds)			X
	Real time information			X
Park and Ride	A49 North Park and Ride Site – 400 spaces – located north of Starting Gate roundabout	X	X	X
	A49 South Park and Ride Site – 300 spaces – located at Rotherwas Access Road roundabout	X		
	A49 South Park and Ride Site - expansion by 100 spaces to 400 spaces		X	
	A49 South Park and Ride Site - expansion by 100 spaces to 500 spaces			X
	A465 (Aylestone Park) – 300 spaces		X	X
	A4103 Cattle Market site - 200 spaces			X
Bus Priority	A49 (Holmer Road) Inbound bus lane and signal priorities		X	X
	A49 (Belmont Roundabout to Bullingham Lane Junction) 2 way bus lanes		X	X
	A465 (Commercial Road and Aylestone Hill from Folly Lane Roundabout) Inbound lane		X	X
	B4399 (A49 Ross Road to Hinton Avenue) Westbound Lane and signal priorities		X	X
	A465 The Oval to Belmont Roundabout) Inbound Lane or signal priorities)			X
	A49 (Edgar Street Roundabout to Belmont Roundabout) southbound bus lane or signal priorities			X
Rail	Infrastructure Improvements between Hereford and Malvern	X	X	X
	Support ongoing senior rail reductions	X	X	X
Car Parking	Removal of car parking within ESG site – 1,195 net spaces lost	X	X	X
	Changes to St. Martins overlay car park – conversion to long stay only – 93 spaces	X	X	X

Measure	Improvement Scheme	Option 1	Option 2	Option 3
	Changes to Bath St car park – conversion to short stay only – 77 spaces	X	X	X
	New car park on Country bus station – conversion from 100 LS to 300 LS and 200 SS	X	X	X
	New Council staff only car park at Plough Lane – 300 spaces net increase	X	X	X
	Increase city car park pricing inline with inflation	X		
	Increase city car park pricing above rate of inflation		X	
	Increase city car park pricing significantly above rate of inflation			X
	Introduction of on-street charging			X
	Expanded residential parking schemes			X
Network changes	New ESG - Link Road (A465 to A49)	X	X	X
	To optimise vehicle movements and create environments which encourage active travel	X	X	X
	Reduced highway capacity between Newmarket St and Blueschool St to single flow	X	X	X
	Restrict access over the Old Bridge - access for bus, cyclists and pedestrians only		X	X
	Restrict Broad St to access only - access for bus, cyclists and pedestrians only		X	X
	Reduction in highway capacity due to bus priorities		X	
	Significant reduction in highway capacity due to bus priorities			X
	Intelligent Transport System			X
	Freight restrictions within central Hereford (Greyfriars Bridge – Eign St – Inner Ring Road)			X
Road Safety	20mph zones in residential areas off main routes		X	X
	Car free zones at schools			X

4.2.6 Each sustainable option has been tested with No Relief Road, with an East Relief Road and then a West Relief Road. The favoured housing option with each of these scenarios has been included, these are No Relief Road with Housing Option 3, West Relief Road with Housing Option 4 and East Relief Road with housing option 3.

4.2.7 The results give a variety of statistics associated with each model run which can be analysed together to draw conclusions on the performance of the network. Delays in the network are a function of delays on links and junctions. These are shown as:

- Over Capacity Queues – Queues at over capacity junctions
- Transient Queues – short term delays on the approaches to junctions.
- Link Delays – Delays between junctions as a function of the link standard.

4.2.8 Each of these statistics on their own do not give a good indication of network performance but the average speed does demonstrate the results as a combination of these figures. However, a statistic which is easier to understand, and relates well to public perception is the Journey Time Analysis.

4.2.9 The journey times on eight key routes through the city have been assessed and are summarised in table 4.2 as a total of these times.

Table 4.2: Journey Time Assessment

	2008 Base	No Sustainable Measures	Sustainable Option 1	Sustainable Option 2	Sustainable Option 3
AM Peak					
No Relief Road	143:03	194:59	174:18	181:54	182:59
Western Relief Road		170:58	158:21	168:18	161:40
Eastern Relief Road		162:08	152:58	167:42	156:12
PM Peak					
No Relief Road	156.54	217:40	195:56	201:34	195:44
Western Relief Road		187:36	171:33	185:49	183:18
Eastern Relief Road		177:55	164:27	167:59	161:53

4.2.10 It can be seen from the total times in Table 4.2 that all modelled scenarios perform worse than the 2008 base year. The PM peak performs worse than the AM peak and so has been used in many of the conclusions drawn as the worst case.

4.2.11 In the PM peak the delays for a future year of 2026 on the eight critical routes through and around the city are predicted to cause additional delay of about one hour for a do nothing scenario.

4.2.12 The time taken to travel northbound and southbound through the city on the A49 reduces by approximately two minutes with the introduction of sustainable measures on their own. A further three minute reduction is achieved with a western relief road and four minutes with an eastern relief road.

4.2.13 The time taken to travel eastbound and westbound through the City on the Whitecross Road, Bath Street and Eign Road reduces by approximately nine minutes with the introduction of sustainable measures on their own. A further two

minute reduction is achieved with a western relief road and five minutes with an eastern relief road.

4.2.14 The eastern relief road for all sustainable options during the PM peak results in over half an hour less delay than the no relief road inclusive of sustainable options. The models also predict less delay for the west relief road as compared to the no relief road inclusive of sustainable options by between 12 and 24 minutes.

4.2.15 On consideration of the results it is clear that sustainable options in isolation result in improved performance of the network. This is not surprising due to the imposed modal shift. Of the sustainable options Option 1 performs best in terms of delay as the greater sustainable investment includes an overall reduction in network capacity to support the measures.

4.2.16 Of the relief road options, the eastern routes perform best in terms of reducing delay within the city. Many of the overcapacity junctions are on the east side of the City and as such the eastern relief road has the greatest improvement in these areas, resulting in the overall best results.

4.3 DO SOMETHING' SCENARIOS

4.3.1 The Do Something scenarios are assessed as a number of individual corridor links. Options for each corridor link are considered against the major known constraints and the preferred corridor link for each section of the relief road is given. A preferred combination of corridor links has been recommended to make up a full Eastern Route and a full Western Route. Corridors arising as preferred based on the engineering and environmental assessments completed for this report have been presented.

4.3.2 To enable a robust Engineering and Environmental Assessment to be made, route alignments have been designed. However, at this stage, a corridor only, not a route alignment is recommended by the assessment. Further study into detailed alignments along this route corridor is required through a Stage 2 assessment before a detailed alignment can be recommended.

4.3.3 The following Tables 4.2 to 4.10 summarise the possible options for each part of a proposed relief road and should be read in conjunction with viewing the maps in the separately bound Design Drawings Booklet in Appendix A. Each of the tables has a number of maps associated with it as defined Table 4.2.

Figure 4.2 –Study Alignment Western Options

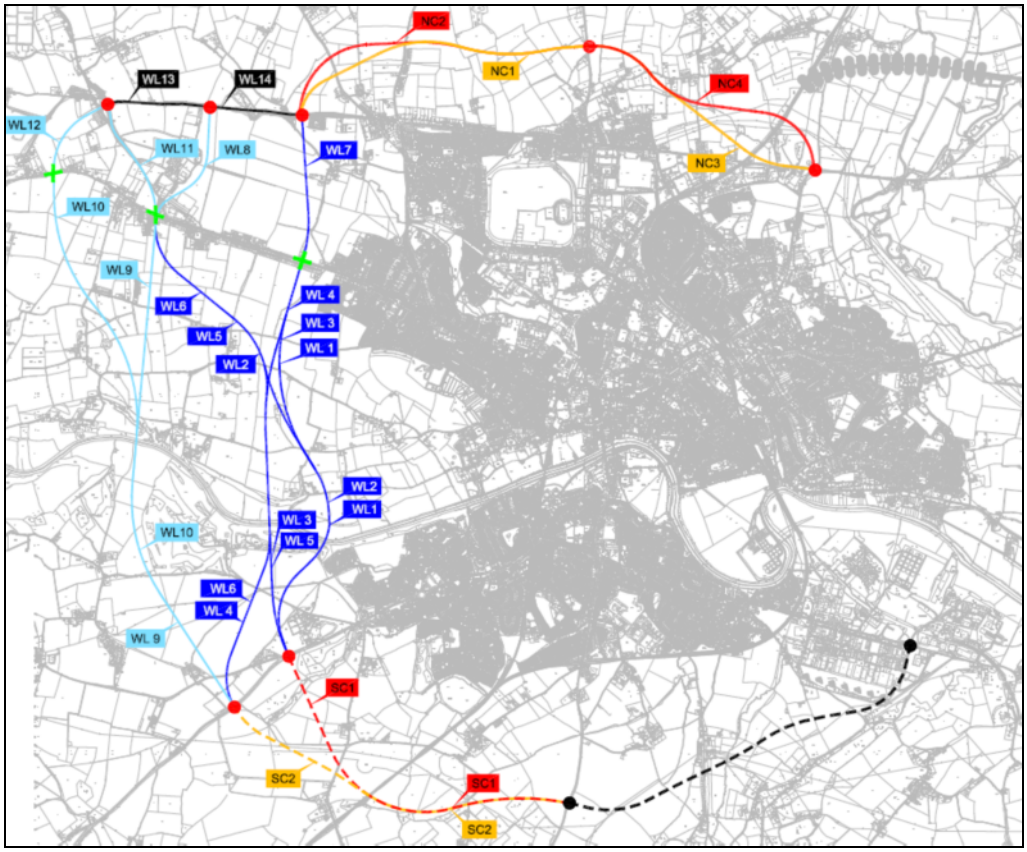


Figure 4.3 –Study Alignment Eastern Options

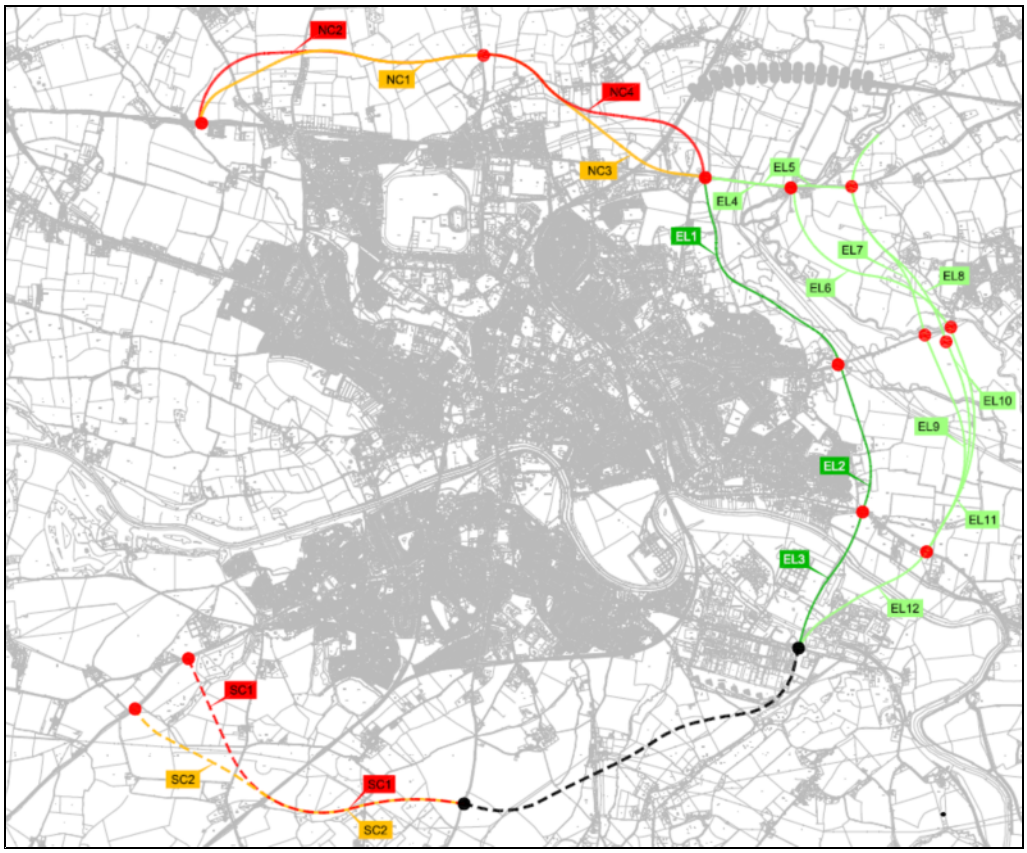


Table 4.2: Table and Map Reference Table

Table 4.3 - Southern Core (A49 to A465)	Link SC1	Map A3.01
	Link SC2	Map A3.02
Table 4.4 – Western Inner (A465 to A438)	Link WL1	Map A3.03
	Link WL2	Map A3.04
	Link WL3	Map A3.05
	Link WL4	Map A3.06
	Link WL5	Map A3.07
	Link WL6	Map A3.08
Table 4.5 – Western Outer (A465 to A438)	Link WL9	Map A3.11
	Link WL10	Map A3.12
Table 4.6 – Western (A438 to A4103)	Link WL7	Map A3.09
	Link WL8	Map A3.10
	Link WL11	Map A3.13
	Link WL12	Map A3.14
	Link WL13	Map A3.15
	Link WL14	Map A3.16
Table 4.7 – North Core (West) (A4103 to A49)	Link NC1	Map A3.17
	Link NC2	Map A3.18
Table 4.8 – North Core (East) (A49 to A4103)	Link NC3	Map A3.19
	Link NC4	Map A3.20
Table 4.9 – Eastern (A4103 to A328)	Link EL1	Map A3.21
	Link EL4	Map A3.24
	Link EL5	Map A3.25
	Link EL6	Map A3.26
	Link EL7	Map A3.27
	Link EL8	Map A3.28
Table 4.10 – Eastern (A438 to B4224)	Link EL2	Map A3.22
	Link EL9	Map A3.29
	Link EL10	Map A3.30
	Link EL11	Map A3.31
Table 4.11 – Eastern (B4224 to B4399)	EL3	Map A3.23
	EL12	Map A3.32

Table 4.3: Engineering and Environmental Assessment Summary – Southern Core (A49 to A465)

The corridor links A49 and A465 and is common to both Western and Eastern options and is referred to as the Southern Core (SC). Two links (SC1 and SC2) have been investigated and are described and assessed in detail in the **Engineering Assessment in Appendix A and the Environmental Assessment in Appendix B**. Maps A3.01 and A3.02 in the separately bound Design Drawings Booklet in Appendix A show the links set within the context of the major constraints associated with this link.		
	SC1 (See Map A3.01)	**SC2 (See Map A3.02)**
Link Length	3,123m	3,093m
Horizontal Alignment	Both alignments tie into the existing roundabout on A49 and are designed to avoid higher ground to the north and south as well as existing buildings and structures. Properties located to the north and south of both alignments include listed buildings. No departures from standard are necessary and a stopping sight distance of 215m for a 60mph road is achieved throughout.	
	SC1 crosses a Special Wildlife Site and Ancient woodland although at its narrowest point.	SC2 avoids the Special Wildlife Site and Ancient Woodland as it is aligned further to the West.
Vertical Alignment	A substantial area of fill is required for both alignments to raise the proposed road to allow for an assumed 6.5m clearance over railway lines. The elevated sections will increase the impact of the route on the landscape. However, in doing so a reasonable cut/fill balance is achieved for the section reducing haulage to and from other sections during construction.	
	No departures from standard required and 215m Stopping sight distance achieved.	215m Stopping sight distance not achieved. Minimum 103m forward visibility requiring a departure.
Earthworks	Cut = 150,000m^3 Fill = 230,000m^3	Cut = 150,000m^3 Fill = 150,000m^3
Costs (2010)	£27.0M	£19.8M
Conclusion	Link SC2 is favoured due to the reduced impact upon the ancient woodland and special wildlife site. SC2 also has a more favourable local earthworks balance. The earthworks balance will need to be assessed in combination with the rest of the route; however, SC2 could be better delivered as an individual phase of the Relief Road. SC1 has a greater severance effect on the properties in the vicinity of Abbey Farm with greater impact on noise and air quality for those residential properties close to any proposed junction.	

Table 4.4: Engineering and Environmental Assessment Summary – Western Inner (A465 to A438)

<table>
<tr><td colspan="7">The corridor links the A465 to the A438, crossing the River Wye, and forms part of the Western Relief Road only (WL). Two separate broad corridors have been considered to the West of the City, an inner corridor and an outer corridor. This table considers the inner corridors only and six links (WL1, WL2, WL3, WL4, WL5 and WL6) have been investigated and are described and assessed in detail in the Engineering Assessment in Appendix A and the Environmental Assessment in Appendix B. Maps A3.03 A3.04, A3.05, A3.06, A3.07 and A3.08 in the separately bound Design Drawings Booklet in Appendix A show the links set within the context of the major constraints associated with this link.</td></tr>
<tr><td></td><td>WL1 (See Map A3.03)</td><td>WL2 (See Map A3.04)</td><td>WL3 (See Map A3.05)</td><td>WL4 (See Map A3.06)</td><td>WL5 (See Map A3.07)</td><td>WL6 (See Map A3.08)</td></tr>
<tr><td>Link Length</td><td>3,573m</td><td>4,346m</td><td>3,353m</td><td>3,887m</td><td>4,058m</td><td>4,596m</td></tr>
<tr><td rowspan="4">Horizontal Alignment</td><td colspan="3">WL1, Wl2, WL3 and WL5 commence from the proposed roundabout just east of the junction on the A465 with the B4349. The links sever the residential properties in the village crossing the playing fields as the alignment moves North.</td><td>WL4 and WL6 commence from the proposed roundabout on the A465 west of B4349 junction.</td><td>See WL1, WL2 and WL3</td><td>See WL4</td></tr>
<tr><td colspan="2" rowspan="2">WL1 and WL2 cross the River Wye in a location designed to avoid the Belmont golf course requiring radii of 510m and 610m (relaxation from standards).</td><td colspan="4">WL3, WL4, WL5 and WL6 all cross the Belmont golf course to cross the river and run west of Warham House.</td></tr>
<tr><td>No departure or relaxations required.</td><td>510m horizontal radius requiring relation to standards.</td><td>720m and 500m radii requiring relaxation to standards.</td><td>Two 510m radii requiring relaxation to standards.</td></tr>
<tr><td>See WL3 and WL4</td><td>See WL5 and WL6</td><td colspan="2">WL1, WL3 and WL4 continue north to connect with the A438 Kings Acre Road utilising a narrow gap between residential properties (a minimum of 2 Residential properties will require demolition.</td><td colspan="2">WL2, WL5 and WL6 turn west as they continue north intersecting the A438 Kings Acre Road at its junction with the A480. Residential properties will require demolition.</td></tr>
<tr><td rowspan="4">Vertical Alignment</td><td colspan="6">The vertical alignment is designed to minimise cut on the River Wye gorge whilst reducing the height of the viaduct structure. The viaduct height for all Inner Western alignments is approximately 10m.</td></tr>
<tr><td colspan="2">Maximum Cutting Depth for WL1 and WL2 is 10m on the south bank of the river through the parkland and special wildlife site.</td><td colspan="4">Maximum Cutting Depth for WL3, WL4 WL5 and WL6 is up to 20m on the South bank of the river through the Parkland and Special Wildlife Site</td></tr>
<tr><td colspan="2">The Viaduct Length for W1 and WL2 is 300m.</td><td colspan="4">The viaduct Length for W3, W4, W5 and W6 is 350m.</td></tr>
<tr><td colspan="2">Desirable minimum 215m stopping sight distance achieved</td><td colspan="4">Desirable minimum stopping sight distance not achieved. Minimum 160m forward visibility.</td></tr>
<tr><td>Earthworks</td><td>Cut = 285,000m^3
Fill = 115,000m^3</td><td>Cut = 240,000m^3
Fill = 130,000m^3</td><td>Cut = 330,000m^3
Fill = 70,000m^3</td><td>Cut = 420,000m^3
Fill = 5,000m^3</td><td>Cut = 240,000m^3
Fill = 145,000m^3</td><td>Cut = 400,000m^3
Fill = 15,000m^3</td></tr>
<tr><td>Costs (2010)</td><td>£43.0M</td><td>£44.3M</td><td>£52.6M</td><td>£61.6M</td><td>£54.1M</td><td>£60.8M</td></tr>
<tr><td>Conclusion</td><td colspan="6">The links W1 and W2 to the east of the golf course are favourable due to the land costs associated with the permanent disruptions to the golf club operations. Also W1 and W2 have reduced cutting depths in comparison to W3, W4, W5 and W6, minimising the impact upon the parkland and Special Wildlife Site. They also have a 50m shorter viaduct length. All links have an excess of cut material, however, this is not necessarily of concern as much of the alignment is at existing ground level to the north of the river and as such, an excess of earthworks material could be utilised in bunds to screen the road and reduce noise and visual impacts. However, the larger the surplus the greater the haulage costs during construction. Links W4 and W6 have a reduced severance effect on the residential properties and avoid the removal of the amenity land near Abbey Farm as their junctions with the A465 are further West. On evaluation of all known constraints, alignments preferred but with an alteration to the tie in on the A465 further west to meet the preferred link of SC2 (See Table 4.2).</td></tr>
</table>

Table 4.5: Engineering and Environmental Assessment Summary – Western Outer (A465 to A438)

The corridor links the A465 to the A438, crossing the River Wye and forms part of the Western Relief Road options (WL). Two separate broad corridors have been considered to the West of the City, an inner corridor and an outer corridor. This table considers the outer corridors only and two links (WL9 and WL10) have been investigated and are described and assessed in detail in the **Engineering Assessment in Appendix A and the Environmental Assessment in Appendix B**. Maps A3.11 and A3.12 in the separately bound Design Drawings Booklet in Appendix A show the links set within the context of the major constraints.		
	WL9 (Map A3.11)	**WL10 (Map A3.12)**
Link Length	4,360m	4,900m
Horizontal Alignment	Both alignments tie into the proposed roundabout on the A465 to the west of its junction with the B4349 before commencing in a northerly direction aligned to the West of the Belmont Golf Course. The alignments cross the river before passing through an area of National Parks and Gardens to the north of the river and towards the villages of Breinton. No relaxations or departures from standard are necessary and a stopping sight distance of 215m for a 60mph road is achieved for both alignments.	
	WL9 continues due north to meet the A465 at its junction with the A480. Residential properties will require demolition.	WL10 turns Northwest after crossing the river at Upper Breinton running closer to the Manor House to cross the A438 at a location to avoid the demolition of residential properties.
Vertical Alignment	Between the A465 and Perry Hill, the topography necessitates an 800m length of road on embankment of approximately 10 in height increasing the visual impact of the alignments on the landscape. The Alignments then enter a 12m cutting before crossing the river on a 550m long viaduct structure at a height of up to 17m. The alignments are at existing ground levels through Upper Breinton to the A465.	
	No relaxations or departures from standard are necessary and a stopping sight distance of 215m for a 60mph road is achieved for both alignments.	
Earthworks	Cut = 285,000 m^3 Fill = 255,000 m^3	Cut = 295,000 m^3 Fill = 245,000 m^3
Costs (2010)	£67.2M	£69.1M
Conclusion	There is a reasonable earthworks balance with some excess for use in bunding to visually screen the road in both links. However, WL9 is a shorter length, closer to the city and has a lesser impact upon the Manor House at Upper Breinton whilst WL10 has a reduced direct effect on residential properties. The Environmental Assessment in Appendix B does not make any significant distinction between the inner and outer corridors to the West of the City and recommends both are taken forward to Stage 2 for further assessment. However, neither WL9 nor WL10 are considered to be as favourable as WL1 (recommended as the favoured inner western alignment in Table 4.4) as the embankment height, cutting depth and bridge height and length significantly increase the cost of the road (WL1=£43.0M).	

Table 4.6: Engineering and Environmental Assessment Summary – Western (A438 to A4103)

The corridor links the A438 and the A4103 and its selection is mainly based on the link option selected from the A465 to the A438 considered in Tables 4.4 and 4.5. Six separate links are identified, WL7, WL8, WL11, WL12, WL13 and WL14. The links are used in the combinations described in this table. This table considers these links and are described and assessed in detail in the **Engineering Assessment in Appendix A and the Environmental Assessment in Appendix B**. Maps A3.09, A3.10, A3.13, A3.14, A3.15 and A3.16 in the separately bound Design Drawings Booklet in Appendix A show the links set within the context of the major constraints.				
	WL7 (Map A3.09)	**WL8 (Map A3.10) and WL14 (Map A3.16)**	**WL11 (Map A3.13), WL13 (Map A3.15) and WL14 (Map A3.16)**	**WL12 (Map A3.14), WL13 (Map A3.15) and WL14 (Map A3.16)**
Link Length	1,234m	1,851m	2,662m	2380m
Horizontal Alignment	WL7 is a relatively straight alignment directly from the A438 just west of the junction with Huntington Lane, continuing on the West side of Huntington to the A4103 at the Yazor Brook Culvert. The Route is necessary as a continuation of WL1, WL3 and WL4.	WL8 traverses the commercial nurseries and runs adjacent to the proposed livestock market site. WL14 follows the A4103 Roman Road to the Yazor Brook Culvert.	WL11 follows the line of the existing A480 to the existing roundabout on the A4103. WL13 and WL14 follow the A4103 Roman Road to the Yazor Brook Culvert.	WL 12 runs from the proposed junction on the A438 associated with WL10 to the existing roundabout on the A4103.
		WL8 with WL14 and WL11 with WL13 and WL14 are options for use with WL2, WL5, WL6 and WL9.		WL12 with WL13 and WL14 are options for use with WL10.
Vertical Alignment	The vertical alignment follows the existing ground with the only major constraint being the crossing of the Yazor Brook and associated Floodplain.	The vertical Alignment follows the existing ground.	The vertical alignment follows the existing A480 which was improved by the recent Roman Road improvement scheme.	The vertical alignment follows the existing ground which drops from the A438 to the A4103.
		The route follows the existing Alignment of the A4103 and does not require a new crossing of the Yazor Brook.		
Earthworks	Cut = 30,000m^3 Fill = 0m^3	Cut = 15,000m^3 Fill = 5,000m^3	Cut = 30,000m^3 Fill = 5,000m^3	Cut = 20,000m^3 Fill = 10,000m^3
Costs	£6.3M	£5.9M + £7.3M = £13.2M	£7.0 + £3.6M + £7.3M = £17.9M	£4.7 + £3.6M + £7.3M = £15.6M
Conclusion	The choice of link is dependent upon the selected link from the A465 to the A438. A variation of WL1 preferred in Table 4.3 and as such WL7 is recommended to link from the A438 to the A4103 despite the other alignments not requiring a new crossing of Yazor Brook.			

Table 4.7: Engineering and Environmental Assessment Summary – Northern Core (West) (A4103 to A49)

The corridor links A4103 and A49 and is common to both Western and Eastern options and is referred to as the Northern Core (NC). Two links (NC1 and NC2) have been investigated and are described and assessed in detail in the **Engineering Assessment in Appendix A and the Environmental Assessment in Appendix B**. Maps A3.17 and A3.18 in the separately bound Design Drawings Booklet in Appendix A show the links set within the context of the major constraints.		
	NC1 (Map A3.17)	**NC2 (Map A3.18)**
Link Length	2,642m	2,753m
Horizontal Alignment	Both alignments tie in to a proposed roundabout on the A4103 Roman Road and turn Northeast to cross Tillington Road and Canon Pyon Road. Properties located to the south of both alignments are avoided but in close proximity to the road. 215m minimum desirable stopping sight distance is achieved for a 60mph road and no departures or relaxations required.	
	120m minimum desirable stopping sight distance is achieved for a 60mph road and no departures or relaxations required.	215m minimum desirable stopping sight distance is achieved for a 60mph road and no departures or relaxations required.
	NC1 avoids the National Parks and Gardens but has a tighter alignment onto the proposed junction on the A4103.	NC2 has an improved alignment on the Approach to the A4103 but has an increased negative effect on the National Parks and Gardens.
Vertical Alignment	Both alignments require embankment on the approach to an overbridge over Tillington Road. The alignments then utilises existing levels to pass beneath the Canon Pyon Road in cutting, also having the advantage of hiding the road from nearby properties to the south. The existing ground levels are followed between the Canon Pyon Road and the A49. The vertical alignment of both options have a stopping sight distance of 90m, one step below the desirable minimum, requiring a relaxation from standards.	
Earthworks	Cut = 180,000 m^3 Fill = 50,000m^3	Cut = 150,000m^3 Fill = 55,000m^3
Costs (2010)	£17.5M	£18.9M
Conclusion	Both links have an excess of earthworks which could be used for bunding to screen the road from nearby properties. There is no a significant difference between the links and therefore the favoured alignment is NC1 which has a tighter alignment but a lesser impact on the Historic Parks and Gardens associated with the former hospital grounds to the North.	

Table 4.8: Engineering and Environmental Assessment Summary – Northern Core (East) (A49 to A4103)

The corridor links the A49 North of the City with the A4103 at Aylestone Hill. It is common to both Western and Eastern options and is referred to as the Northern Core (NC). Two links (NC3 and NC4) have been investigated and are described and assessed in detail in the **Engineering Assessment in Appendix A and the Environmental Assessment in Appendix B**. Maps A3.19 and A3.20 in the separately bound Design Drawings Booklet in Appendix A show the links set within the context of the major constraints.		
	NC3 (Map A3.19)	**NC4 (Map A3.20)**
Link Length	2,330m	2,330m
Horizontal Alignment	Both alignments tie in to a proposed roundabout on the A49 to the North of the City and continue southeast, crossing over Codwell Road. Properties are located to the North and the south of the road defining the alignment corridor available. 120m minimum desirable stopping sight distance is achieved for a 40mph road and no departures or relaxations required.	
	215m minimum desirable stopping sight distance is achieved for a 60mph road and no departures or relaxations required.	120m minimum desirable stopping sight distance is achieved for a 60mph road and no departures or relaxations required.
	NC3 crosses Munstone Road which is to be stopped up just north of the proposed development site before crossing beneath the high voltage overhead cables, over the railway and over the disused canal close to residential properties to meet the A4103 West of the existing roundabout.	NC4 crosses Munstone Road which is to be stopped up just north of the proposed development then turns east, following the line of the high voltage electricity cables, crossing over the railway and disused canal, further from residential properties than NC3, before turning south to the A4103 at the existing Roundabout.
Vertical Alignment	Both alignments require significant embankments and areas of fill on the approaches to Codwell Road and the railway. One step relaxations in the stopping sight distance to 90m is required in two locations on both alignments.	
Earthworks	Cut = 15,000m^3 Fill = 175,000m^3	Cut = 20,000m^3 Fill = 250,000m^3
Costs (2010)	£14.1M	£22.6M
Conclusion	NC3 is the lower cost partially due to reduced earthworks. However, additional cut could be generated on NC4 by lowering the alignment close to the A49 and, as other sections of the relief road have surplus material, the requirement for this embankment fill may be an advantage depending on the Relief Road phasing. Costs are also influenced by the requirements for additional structures in NC4. NC4 has a reduced severance effect on the residential properties and reduced interference with the existing A4103. NC4 also allows for additional development land in the on of the Key development Zones identified by the LDF development work. The selection of a favoured route is therefore likely to relate to the allocation of development land and as such this report does not make a recommendation and suggests both routes are taken forward for further consideration. For the purposes of the cost estimates, NC4 has been selected as a worst case.	

Table 4.9: Engineering and Environmental Assessment Summary – Eastern (A4103 to A438)

<table>
<tr><td colspan="5">The corridor links the A4103 Near Aylestone Hill with the A438 Ledbury Road. Six separate links are identified, EL1, EL4, EL5, EL6, EL7 and EL8. The links are used in the combinations described in this table. This table considers these links which are described and assessed in detail in the Engineering Assessment in Appendix A and the Environmental Assessment in Appendix B. Maps A3.21, A3.24, A3.25, A3.26, A3.27 and A3.28 in the separately bound Design Drawings Booklet in Appendix A show the links set within the context of the major constraints associated with this link.</td></tr>
<tr><td></td><td>EL1 (Map A3.21)</td><td>EL6 (Map A3.26) and EL4 (Map A3.24)</td><td>EL7 (Map A3.27) and EL5 (Map A3.25)</td><td>EL8 (Map A3.28) and EL5 Map A3.25)</td></tr>
<tr><td>Link Length</td><td>2,114m</td><td>1,669m</td><td>2,694m</td><td>2,820m</td></tr>
<tr><td rowspan="3">Horizontal Alignment</td><td rowspan="2">The alignment commences from the existing roundabout on the A4103 (a Conservation Area) and is designed to avoid the higher ground to the west, minimise encroachment onto the Historic Parks and Gardens, the floodplain and the Special Area of Conservation around the River Lugg. The alignment then passes between listed buildings where it meets the A438.</td><td>EL4 follows the A4103 on its existing alignment for a distance of 730m to cross the River Lugg and associated floodplain. The road would require widening, impacting upon the flood culverts, ancient river bridge and associated listed building.</td><td colspan="2">EL4 follows the A4103 on its existing alignment for a distance of 1240m to cross the River Lugg and associated floodplain. The road would require widening, impacting upon the flood culverts, ancient river bridge and associated listed building, although to a lesser degree to EL4 as the larger roundabout junction is remote to these features. A new Link from the A465 Bromyard Road will be necessary to be incorporated into the roundabout.</td></tr>
<tr><td>EL6 extends from a proposed roundabout on the A4103 and is designed to avoid the River Lugg floodplain but is required to cut through the national parks and gardens of Lugwardine to meet the A438 at another ancient bridge over the Lugg.</td><td>EL7 extends from the proposed roundabout on the A4103 running south through the Historic Parks and Gardens of Lugwardine and crossing the Lugg to the West of and avoiding the ancient bridge on the A438.</td><td>EL8 extends from the proposed roundabout on the A4103 running south through the Historic Parks and Gardens of Lugwardine and crossing the Lugg to the West of and avoiding the ancient bridge on the A438. The alignment extends further south so that a roundabout junction can minimise impact upon the Lugg.</td></tr>
<tr><td colspan="4">No relaxations or departures from standard are required.</td></tr>
<tr><td rowspan="2">Vertical Alignment</td><td>Substantial areas of fill are required to raise the alignment above the floodplain.</td><td colspan="3">The vertical alignment follows the existing ground levels with levels set by the culverts and bridges on the route.</td></tr>
<tr><td>One step relaxation to standard required reducing the safe stopping distance to 90m.</td><td colspan="3">No relaxations or departures from standard are required and desirable minimum stopping sight distance achieved.</td></tr>
<tr><td>Earthworks</td><td>Cut = 45,000m^3 Fill = 240,000m^3</td><td>Cut = 0m^3 Fill = 225,000m^3</td><td>Cut = 5,000m^3 Fill = 320,000m^3</td><td>Cut = 10,000m^3 Fill = 330,000m^3</td></tr>
<tr><td>Costs (2010)</td><td>£19.5M</td><td>£12.5M + 7.0M = £19.5M</td><td>£10.9M + £10.0M = £20.9M</td><td>£11.8M + £10.0M = £21.8M</td></tr>
<tr><td>Conclusions</td><td colspan="4">EL1 is the favoured link for the following reasons despite running close to the floodplain and protected areas. Preliminary traffic flow figures indicate that the road would require widening to a dual carriageway standard, the benefits of using the existing A4103 bridge would be cancelled out by the significant earthworks, culvert lengthening and impacts on historic structures and buildings. Also, the alternative links promote a corridor which is required to cross the Lugg twice having a detrimental impact on the highly protected and important wildlife sites. The additional lengths and the junction on the A4103 required for those corridors would increase emissions, accident rates and the risk of a spillage and pollution incident.</td></tr>
</table>

Table 4.10: Engineering and Environmental Assessment Summary –Eastern (A438 to B4224)

The corridor links the A438 Ledbury Road with B4224 Hampton Park Road. Four separate links are identified, EL2, EL9, EL10 and EL11. Each link follows links identified in table 4.9. This table considers these links which are described and assessed in detail in the **Engineering Assessment in Appendix A and the Environmental Assessment in Appendix B**. Maps A3.22, A3.29, A3.30, and A3.31 in the separately bound Design Drawings Booklet in Appendix A show the Links set within the context of the major constraints associated with this section.				
	EL2 (Map A3.22)	**EL9 (Map A3.29)**	**EL10 (Map A3.30)**	**EL11 (Map A3.31)**
Link Length	1,296m	1,982m	1,887m	2,011m
Horizontal Alignment	The alignment follows EL1 commencing at the proposed roundabout on the A438 and running south through farmland and orchards to meet the B4224 just inside the conservation area.	The alignment follows EL7, commencing from a proposed roundabout on the line of the A438 Ledbury Road, west of the Lugg Bridge. The alignment avoids the area designated as a scheduled ancient monument before turning east to meet the B4224.	The alignment follows EL8, commencing from a proposed roundabout to the south of the A438. The alignment avoids the area designated as a scheduled ancient monument before turning east to meet the B4224.	The alignment follows EL6, commencing from a proposed roundabout close to the existing Lugg bridge on the A438. The alignment avoids the area designated as a scheduled ancient monument before turning east to meet the B4224.
	No relaxations or departures from standard are required.			
Vertical Alignment	The vertical alignment follows the existing ground levels, over a small rise in ground before meeting the B4224.	The vertical alignment is elevated above the floodplain and follows a relatively flat profile.		
	No relaxations or departures from standard are required and desirable minimum stopping sight distance achieve.			
Earthworks	Cut = 30,000m^3 Fill = 5,000m^3	Cut = 20,000m^3 Fill = 80,000m^3	Cut = 15,000m^3 Fill = 85,000m^3	Cut = 15,000m^3 Fill = 25,000m^3
Costs (2010)	£7.8M	£13.3M	£13.2M	£11.7M
Conclusion	EL2 is favoured as it avoids the Lugg crossing and extensive floodplain. It also follows the favoured link EL1 (See Table 4.9) which avoids the two crossings of the Lugg.			

Table 4.11: Engineering and Environmental Assessment Summary – Eastern (B4224 to B4399)

The corridor links the B4224 Hampton Park Road with the B4399 Holme Lacy Road. Two separate links are identified, EL3 and EL12. Each link follows links identified in table 4.10. This table considers these links which are described and assessed in detail in the **Engineering Assessment in Appendix A and the Environmental Assessment in Appendix B**. Maps A3.23 and A3.32 in the separately bound Design Drawings Booklet in Appendix A show the links set within the context of the major constraints associated with this section.		
	EL3	**EL12**
Link Length	1,293m	1,381m
Horizontal Alignment	The alignment follows EL2 commencing at the proposed roundabout on the B4224 and crossing the River Wye and floodplain and passing just south of the scheduled ancient monument (Rotherwas Chapel).	The alignment follows alignments EL9, EL10 and EL11, commencing from a proposed roundabout on the B4224 and crossing the river passing just east of the scheduled ancient monument (Rotherwas Chapel).
	No relaxations or departures from standard are required.	
Vertical Alignment	The Vertical Alignment is defined by the clearance required over the River Wye and associated floodplain. A 200m long structure is proposed, however this will require further analysis of flood flows to define the required aperture.	
	No relaxations or departures from standard are required and desirable minimum stopping sight distance achieve.	A one step relaxation in stopping sight distance is required to the vertical alignment to achieve the clearance of the river and the tie in with Chapel Road
Earthworks	Cut = 5,000m^3 Fill = 55,000m^3	Cut = 0m^3 Fill = 110,000m^3
Costs (2010)	£16.2M	£18.2M
Conclusion	EL3 is favoured due to its shorter length with reduced earthworks. EL3 also follows the favoured routes EL1 and EL2.	

Table 4.12: Assessment of Favoured Western Alignment and Favoured Eastern Alignment

	Favoured Western Corridor (Inner)	**Favoured Eastern Corridor (Inner)**
Link Length	12,872m	12,768m
Route Description	SC2 - From the existing roundabout on the A49 south of the City east over the railway turning northeast to the A465 to the west of the woodland and Special Wildlife site. WL1 – From the A465 avoiding the golf course, over the River Wye and connecting to the A438. (Slight variation from WL1 tie into SC2) WL7 – A north / south straight link between new junctions on the A438 and the A4103. NC1 – From the A4103 to the A49 avoiding the Historic Parks and Gardens of the former hospital. NC4 – From the A49 to the A4103, crossing the railway and maximising clearance to residential properties tying into the existing roundabout at Aylestone Hill.	NC4 – From the A49 to the A4103, crossing the railway and maximising clearance to residential properties tying into the existing roundabout at Aylestone Hill. EL1 – From the existing roundabout at Ayestone Hill, around the existing City Limits aligned to minimise encroachment on the flood plain, SSSI, SAC and wildlife Sites tying into the A438. EL2 – From the A438 south to the B4224 just within the conservation area. EL3 – From the B4224 across the river and west of the Rotherwas Chapel onto the existing roundabout on the B4399. SC2 - From the existing roundabout on the A49 south of the City east over the railway turning northeast to the A465 to the west of the woodland and Special Wildlife site.
Constraints	Newtown Brook Special Wildlife Site and Ancient Woodland – Avoided Playing Fields and residential properties – Severance avoided Belmont Lodge Parkland – 10m Cutting through parkland Special Wildlife Site (River Wye South Bank) – Cutting and Bridge abutments through site Belmont Golf Course – Avoided River Wye Floodplain, SAC, SSSI – Bridge Viaduct Structure (Shortest of all West Options) River Wye Landscape Character – Significant adverse affects at river gorge Special Wildlife Site (River Wye North Bank) – Avoided Residential Properties on Kings Acre Road – Demolition required for at least 2 properties. Source Protection Zone 2 – Crossed at grade Parkland at Former Hospital – Avoided Residential Properties North of the City – Severance minimised	Parkland at Former Hospital – Avoided Residential Properties North of the City – Severance minimised River Wye Landscape Character –Adverse affects around Wye and Lugg minimised Special Wildlife Sites adjacent to Lugg – Encroachment necessary for road footprint. Lugg SSSI and SAC – Avoided but in close proximity to road Lugg Floodplain – Encroachment necessary for road footprint. Ancient Monument Between A438 and B4224 – Avoided Lugg River Crossings – Avoided River Wye Floodplain, SAC, SSSI – Bridge Viaduct Structure Rotherwas Chapel Scheduled Ancient Monument – Avoided but in close proximity to road.

	Favoured Western Corridor (Inner)	**Favoured Eastern Corridor (Inner)**
Earthworks	Total Cut = 665,000m^3 Total Fill = 565,000m^3 An overall earthworks balance with the 100,000m^3 surplus used in bunding is achieved if the scheme is delivered as a single contract.	Total Cut = 430,000m^3 Total Fill = 750,000m^3 An overall requirement for 400,000 m^3 if the scheme is delivered as a single contract.
	If the scheme is delivered in phases the following earthworks balance would be achieved for the phases suggested: Phase 1 – SC2 Cut = 150,000m^3 Fill = 150,000m^3 Phase 2 – WL1 & WL7 Cut = 315,000m^3 Fill = 115,000m^3 Phase 3 – NC1 & NC4 Cut = 200,000m^3 Fill = 300,000m^3 Assuming the above Phasing of construction, and that this phasing is unconnected in relation to earthworks balancing, then there will be a requirement for 100,000m^3 of fill material for NC1 and NC4. The 200,000m^3 surplus cut from WL1 and WL7 could be utilised in environmental bunding to screen the road through Breinton. There is therefore a detrimental effect on the earthworks balance by a phased delivery.	If the scheme is delivered in phases the following earthworks balance would be achieved for the phases suggested: Phase 1 – SC1 Cut = 150,000m^3 Fill = 150,000m^3 Phase 2 – EL1, EL2 & EL3 Cut = 80,000m^3 Fill = 300,000m^3 Phase 3 – NC1 & NC4 Cut = 200,000m^3 Fill = 300,000m^3 Assuming the above Phasing of construction, and that this phasing is unconnected in relation to earthworks balancing, then there will still be a requirement for 400,000m^3 as all phases have a shortage of material. There is therefore no detrimental effect on the earthworks balance by a phased delivery.
Costs (2010)	£109.2M	£86.0M
Conclusion	The link lengths are similar, east or west, but the earthworks activities are greater for the west links due to a more varied topography. However, the West links have a better earthworks balance and have favourable phasing options. The landscape effects are greater on the West links but the East links encroach upon the special wildlife site and are close enough to adversely effect the River Lugg Special Area of Conservation (SAC). It is important to note that any project should normally only proceed where it has been ascertained that it will not adversely affect the integrity of a European Site (Nature Designation given to the River Lugg SAC). Exceptionally, where there is a negative effect, Competent Authorities may only agree to a project where there are **no alternative solutions regardless of economic considerations** and there are **imperative reasons of over-riding public interest** and that any **compensatory measures** are taken. As alternatives exist, albeit with greater landscape effects, any alignment to the east will be at risk of challenge though the Conservation Regulations 2010. The River Wye SAC would be crossed with both eastern and western options. Impact on the Wye SAC can be mitigated through wide span crossings and no workings in the river course. **The corridor arising as preferred based on the engineering and environmental assessments completed for this report is for an inner corridor to the west of the City.**	

4.4 COSTS

4.4.1 The tables in Appendix A have been compiled in accordance with the methodology Appendix D.

4.4.2 Table 6 gives the total cost for each link proposed. To enable a comparison of total relief road costs, the Inner East and Inner West costs are presented in Table 7. Note all costs are given in **2010 prices**.

4.4.3 The construction costs are based on the construction of A Dual All Purpose (D2AP) road. As a comparison, the costs could be reduced from those shown by approximately 25% for a Wide Single Carriageway (WS2) road.

Table 4.13: Total Costs by Link

Link	Sub Total	Part1 Claims	Total
SC1	£26,959,243	£25,000	£26,984,243
SC2	£19,818,810	£25,000	£19,843,810
NC1	£17,367,493	£100,000	£17,467,493
NC2	£18,738,340	£165,000	£18,903,340
NC3	£13,890,060	£200,000	£14,090,060
NC4	£22,436,803	£150,000	£22,586,803
WL1	£42,863,811	£150,000	£43,013,811
WL2	£44,295,762	£25,000	£44,320,762
WL3	£52,545,522	£100,000	£52,645,522
WL4	£61,317,947	£260,000	£61,577,947
WL5	£54,066,782	£40,000	£54,106,782
WL6	£60,782,680	£25,000	£60,807,680
WL7	£6,241,709	£75,000	£6,316,709
WL8	£5,775,781	£75,000	£5,850,781
WL9	£67,043,096	£175,000	£67,218,096
WL10	£68,911,099	£150,000	£69,061,099
WL11	£6,939,363	£50,000	£6,989,363
WL12	£4,611,296	£60,000	£4,671,296
WL13	£3,588,440	£20,000	£3,608,440
WL14	£7,265,608	£20,000	£7,285,608
EL1	£18,790,876	£750,000	£19,540,876
EL2	£7,344,869	£500,000	£7,844,869
EL3	£16,065,656	£125,000	£16,190,656
EL4	£6,998,677	£15,000	£7,013,677
EL5	£9,928,819	£35,000	£9,963,819
EL6	£12,477,049	£10,000	£12,487,049
EL7	£10,697,588	£250,000	£10,947,588
EL8	£11,557,492	£250,000	£11,807,492
EL9	£13,264,326	£20,000	£13,284,326
EL10	£13,191,720	£10,000	£13,201,720
EL11	£11,715,887	£10,000	£11,725,887
EL12	£18,172,729	£25,000	£18,197,729

Table 4.14: Total Costs for Inner East and Inner West Combinations

Western Inner	**SC2**	**WL1**	**WL7**	**NC1**	**NC4**
Construction Costs	£7,809,236	£19,688,525	£2,226,026	£6,904,802	£9,892,965
Land Costs	£3,161,046	£3,651,606	£1,261,148	£2,700,124	£2,381,260
Land Inflation Allowance	£648,014	£748,579	£258,535	£553,525	£488,158
Works for Statutory Bodies	£780,924	£1,968,853	£222,603	£690,480	£989,297
Preliminaries	£780,924	£1,968,853	£222,603	£690,480	£989,297
Preparation and Supervision	£780,924	£1,968,853	£222,603	£690,480	£989,297
Optimism Bias	£5,857,743	£12,868,543	£1,828,192	£5,137,601	£6,706,530
Sub-Total	£19,818,810	£42,863,811	£6,241,709	£17,367,493	£22,436,803
Part1 Claims	£25,000	£150,000	£75,000	£100,000	£150,000
Total	£19,843,810	£43,013,811	£6,316,709	£17,467,493	£22,586,803
				Total	**£109,228,627**

Eastern Inner	**NC4**	**EL1**	**EL2**	**EL3**	**SC2**
Construction Costs	£9,892,965	£8,138,440	£2,756,048	£7,414,588	£7,809,236
Land Costs	£2,381,260	£2,161,530	£1,328,600	£1,328,600	£3,161,046
Land Inflation Allowance	£488,158	£443,114	£272,363	£272,363	£648,014
Works for Statutory Bodies	£989,297	£813,844	£275,605	£741,459	£780,924
Preliminaries	£989,297	£813,844	£275,605	£741,459	£780,924
Preparation and Supervision	£989,297	£813,844	£275,605	£741,459	£780,924
Optimism Bias	£6,706,530	£5,606,261	£2,161,043	£4,825,728	£5,857,743
Sub-Total	£22,436,803	£18,790,876	£7,344,869	£16,065,656	£19,818,810
Part1 Claims	£150,000	£750,000	£500,000	£125,000	£25,000
Total	£22,586,803	£19,540,876	£7,844,869	£16,190,656	£19,843,810
				Total	**£86,007,014**

5 Summary of Recommendations

5.1 OPTIONS STUDY RECOMMENDATION

5.1.1 The consideration of sustainable measures with no relief road (Do Minimum) clearly improves the performance of the network. However, this is not surprising due to the imposed modal shift. Of the sustainable options Option 1 performs best in terms of delay as the greater sustainable investment includes an overall reduction in network capacity to support the measures. The focus of the recommendations relating to the Do Minimum scenario should consider whether the sustainable packages can be achieved without a relief road. Many of the measures require the reallocation of the existing A49 road space, for example bus lanes on links and bus priority at junctions. Herefordshire Councils have a long history of negotiations with the Highways Agency and this should inform their decisions on the sustainable options in isolation of a relief road.

5.1.2 Both Relief Road options perform better than the Do Minimum and of the relief road options and, although considered marginal, the eastern routes perform best in terms of reducing delay within the city. Many of the overcapacity junctions are on the east side of the City and as such the eastern relief road has the greatest improvement in these areas, resulting in the overall best results.

5.1.3 The Relief Road corridors considered within this option study are illustrated in Figure 5.1. Within these corridors a number of alignment options have been assessed as shown in Figure 5.2 and 5.3.

Figure 5.1 – Study Corridors

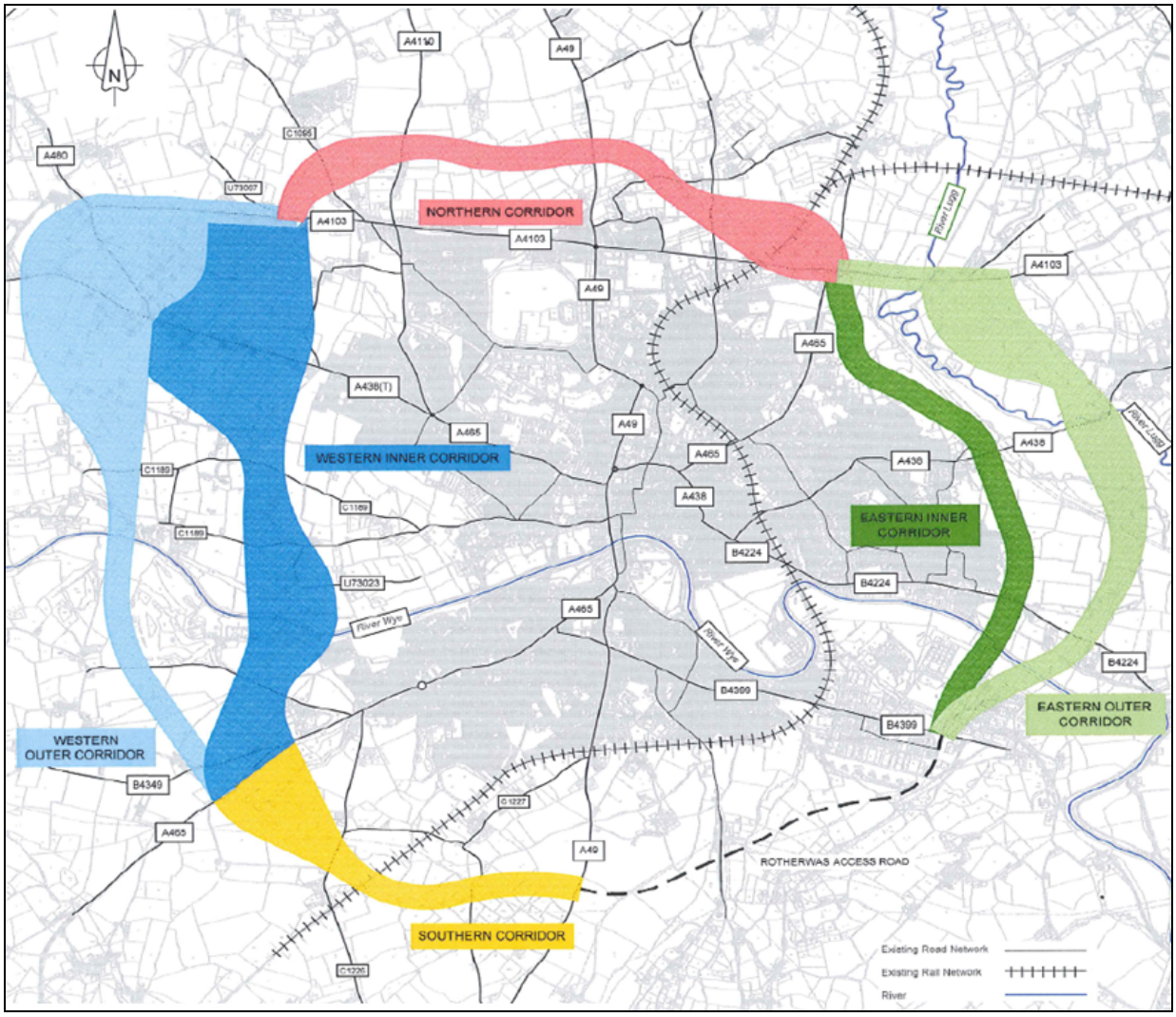


Figure 5.2 –Study Alignment Western Options

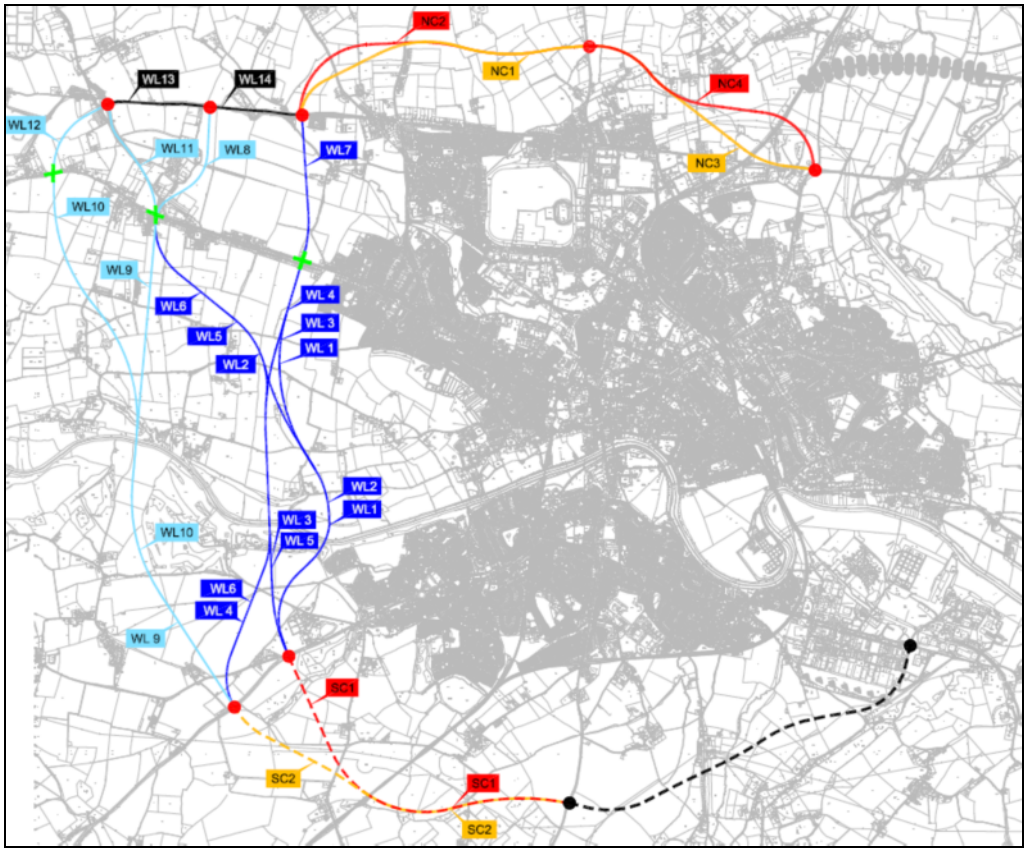
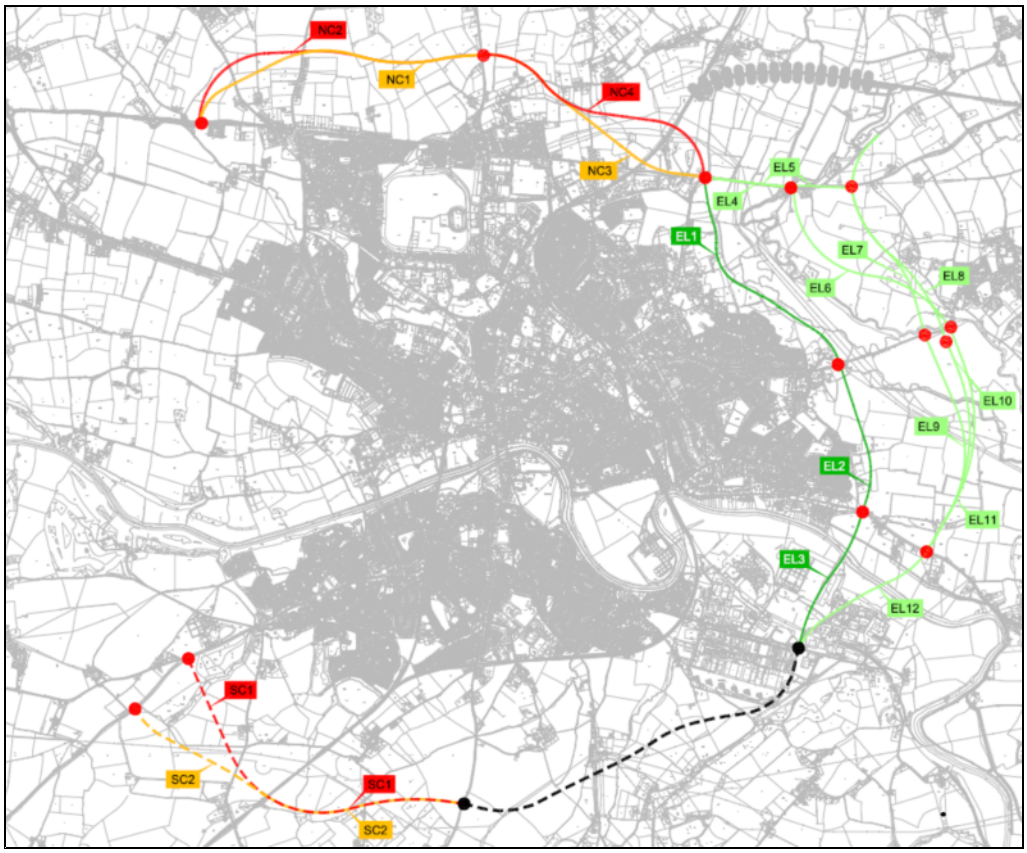


Figure 5.3 –Study Alignment Eastern Options



5.1.4 A summary of the recommendations from the assessment of each link can be seen in Table 5.1 and more detailed constraints maps can be seen in the separately bound Design Drawings Booklet in Appendix A. The favoured corridor from the options to the West of the city is the Inner route, avoiding a longer and higher bridge structure and avoiding the golf club as well as a number of Environmental Constraints. The favoured corridor on the East of the city is the inner route avoiding the two additional river crossings, longer links and additional costs.

5.1.5 Of these two favoured solutions, east and west, the corridor lengths are similar but the earthworks activities are greater for the west links due to a more varied topography. However, the West links have a better earthworks balance and have favourable phasing options. The cost estimates give construction cost of an inner route on the east of the city of £86M and an inner route to the west of the city of £109M. The west links can be designed to minimise the impact upon the Belmont Golf Course although effects upon the Landscape at the golf course will occur. The landscape effects are generally greater on the West links but the East links encroach upon the Special Wildlife Site, Lugg Meadows SSSI and are close enough to adversely effect the River Lugg Special Area of Conservation (SAC). It is important to note that any project should normally only proceed where it has been ascertained that it will not adversely affect the integrity of a European Site (Nature Designation given to the River Lugg SAC). Exceptionally, where there is a negative effect, Competent Authorities may only agree to a project where there are **no alternative solutions regardless of economic considerations** and there are **imperative reasons of over-riding public interest** and that any **compensatory measures** are taken. As alternatives exist, albeit with greater landscape effects, any selected alignment will be at risk of challenge though the Conservation Regulations (2010). The River Wye SAC would be crossed with both eastern and western options.

5.1.6 Additional work on a Habitat Regulations Assessment (HRA) for the Hereford Relief Road is required to further inform the final decision on corridor selection for inclusion in the Area Plan. The HRA is an iterative process and, now the baseline information has been gathered, additional information is required to inform the 'appropriate assessment' required by the regulations. This should include

- Provision of information for assessment (Clause 61(2))
  - An assessment of more detailed design variations to minimise impacts
  - A review of the feasible construction processes
  - further survey work at the designated areas

- Further consultation with Natural England (Clause 61(3))
- Further consultation with the Public to ascertain an overriding public interest in a particular route. (Clause 61(4))

5.1.7 As an example, the impact upon the River Lug SAC could be reduced through the greater use of elevated structures to reduce the earthworks and overall scheme footprint. Impact on the Wye SAC to the west of the city could be more easily reduced through wide span crossings and no workings in the river course and on the evidence currently available would be favoured. However, following public consultation, their may be an overriding public interest in the route to the east. However, the results of recent surveys on route choice did not conclude this.

5.1.8 Also note, the scheme costs are estimated to increase by £9M to £95M for the whole eastern corridor as a result of providing structure along much of Link EL1 (excluding the increased whole life costs of maintaining structures). Also, structures near urban areas can attract graffiti especially if the structure low, near public walking areas and amenities.

5.1.9 Based on the engineering and environmental assessments completed for this report, and subject to the findings of the HRA, the corridor arising as preferred is an inner corridor to the west of the City as shown in Figure 5.4.

Figure 5.4 – Preferred Relief Road Corridor

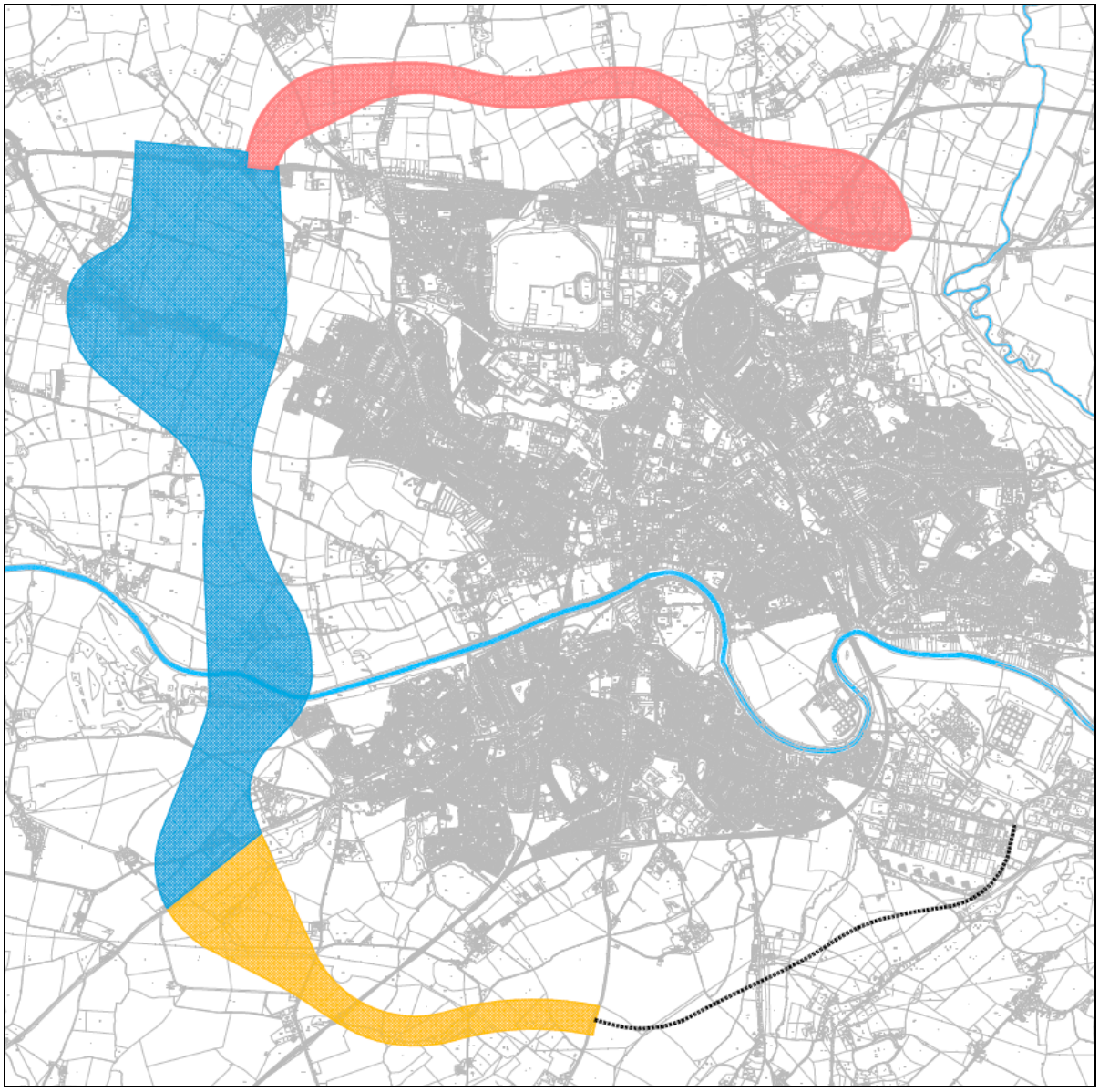


Table 5.1 – Summary of Link and Alignment Assessment Recommendations

Link	Alignment Options	Summery of Assessment
Southern Core A49 to A465	SC1	Link SC2 is favoured due to the reduced impact upon the ancient woodland and Special Wildlife Site. SC2 also has a more favourable local earthworks balance. The earthworks balance will need to be assessed in combination with other links. However, SC2 could be better delivered as an individual phase of the Relief Road than SC1. SC1 also has a greater severance effect on the properties in the vicinity of Abbey Farm with greater impact on noise and air quality for those residential properties close to any proposed junction.
	SC2	
Western (Inner) A465 to A4103	W1 - WL7	The links W1 and W2 run to the south of the golf course and are favourable due to the land costs associated with the permanent disruptions to the golf club operations. Also W1 and W2 have reduced cutting depths in comparison to W3, W4, W5 and W6, minimising the impact upon the Parkland and Special Wildlife Site. They also have a 50m shorter viaduct length. All links have an excess of cut material, however, this is not necessarily of concern as much of the alignment is at existing ground level to the north of the river and as such, an excess of earthworks material could be utilised in bunds to screen the road and reduce noise and visual impacts. However, the large surplus will require greater the haulage costs during construction. Alignments W4 and W6 have a reduced severance effect on the residential properties and avoid the removal of the amenity land near Abbey Farm as their junctions with the A465 are further West. On evaluation of all known constraints, link W1 is recommended but with an alteration to the tie in on the A465 further west to meet the recommended link of SC2.
	W2 – WL8* – WL14	
	W3 – WL7	
	W4 – WL7	
	W5 – WL8* – WL14	
	W6 – WL8* – WL14	
Western (Outer) A465 to A4103	W9 – WL8* – WL14	There is a reasonable earthworks balance with some excess for use in bunding to visually screen the road in both links. However, WL9 is a shorter length, closer to the city and has a lesser impact upon the Manor House at Upper Breinton whilst WL10 has a reduced direct effect on residential properties. The Environmental Assessment in Appendix B does not make any significant distinction between the inner and outer corridors to the West of the City and recommends both are taken forward to Stage 2 for further assessment. However, neither WL9 nor WL10 are considered to be as favourable as WL1 (recommended as the favoured inner western alignment in Table 4.4) as the embankment height, cutting depth and bridge height and length significantly increase the cost of the road.
	W10 – WL13 – WL14	
Northern Core (West) A4103 to A49	NC1	Both alignments have an excess of earthworks which could be used for bunding to screen the road from nearby properties. There is no a significant difference between the alignments and therefore the favoured link is NC1 which has a tighter alignment but a reduce impact on the National Parks and Gardens associated with the former hospital grounds to the North.
	NC2	
Northern Core (East) A49 to A4103	NC3	NC3 is the lower cost partially due to reduced earthworks. However, additional cut could be generated on NC4 by lowering the alignment close to the A49 and, as other sections of the relief road have surplus material, the requirement for this embankment fill may be an advantage depending on the Relief Road phasing. Costs are also influenced by the requirements for additional structures in NC4. NC4 has a reduced severance effect on the residential properties and reduced interference with the existing A4103. NC4 also allows for additional development land in the on of the Key development Zones identified by the LDF development work. The selection of a favoured route is therefore likely to relate to the allocation of development land and as such this report does not make a recommendation and suggests both routes are taken forward for further consideration. For the purposes of the cost estimates, NC4 has been selected as a worst case.
	NC4	
Eastern (All)	EL1 EL2 EL3	EL1 – EL2 – EL3 is the favoured link for the following reasons despite running close to the floodplain and protected areas. As the road would require widening to a dual carriageway standard, the benefits of using the ‘outer’ links using the existing A4103 bridge would be cancelled out by the significant earthworks, culvert lengthening and impacts on historic structures and buildings. Also, these ‘outer’ links cross the Lugg twice having a detrimental impact on the highly protected and important wildlife sites. The additional lengths and the junction on the A4103 required would increase emissions, accident rates and the risk of a spillage and pollution incident.
	EL6 – EL4 – EL11 – EL12	
	EL7 – EL5 – EL9 – EL12	
	EL8 – EL5 – EL10 – EL12	

* Alternatives have also been assessed using WL11 and WL13 which utilises the existing A480

5.2 RECOMMENDATIONS FOR STAGE 2 ASSESSMENT

5.2.1 This Options Study is a step towards the Stage 2 Assessment and much of the work done for this study will follow through directly into the final Stage 2 Report. However, a number of additional activities are necessary to ensure the route selection process undertaken within the Stage 2 Report is compliant with the Department for Transport (DfT) guidance. These activities are summarised below:

f. The location of major junctions has been identified within this study. However, the junction type and the design of the junctions has not been considered within this study. Therefore, for the Stage 2 Assessment, junctions require feasibility designs including a strategy for connecting the proposed development sites into the network. These proposals will need to be included within the traffic model if different from the assumptions made to date.

g. Should corridors to the east side of the city not be taken any further, then a more detailed route 'alignment' options assessment on West side should be undertaken for the Stage 2 report.

h. Arrangements for site access should be made to allow for full environmental surveys of proposed routes to be undertaken to inform the final selection of an alignment.

i. A wider consultation to include non-statutory consultees should be considered to inform the final alignment selection.

j. It is recommended that the final Stage 2 assessment report includes clear 'scheme specific' objectives set by Herefordshire Council and their delivery partners in addition to the National DfT Objectives. These objectives will define the requirements of the relief road but also the wider aspirations of the city encompassing growth and sustainable transport objectives.

Appendix A: Engineering Assessment Report

Appendix B: Environmental Assessment Report

Appendix C: Interim Forecasting Report
Sustainable Options Packages

Appendix D: Scheme Cost Estimates