Hereford Relief Road
Southern Core

Corridor Assessment Report

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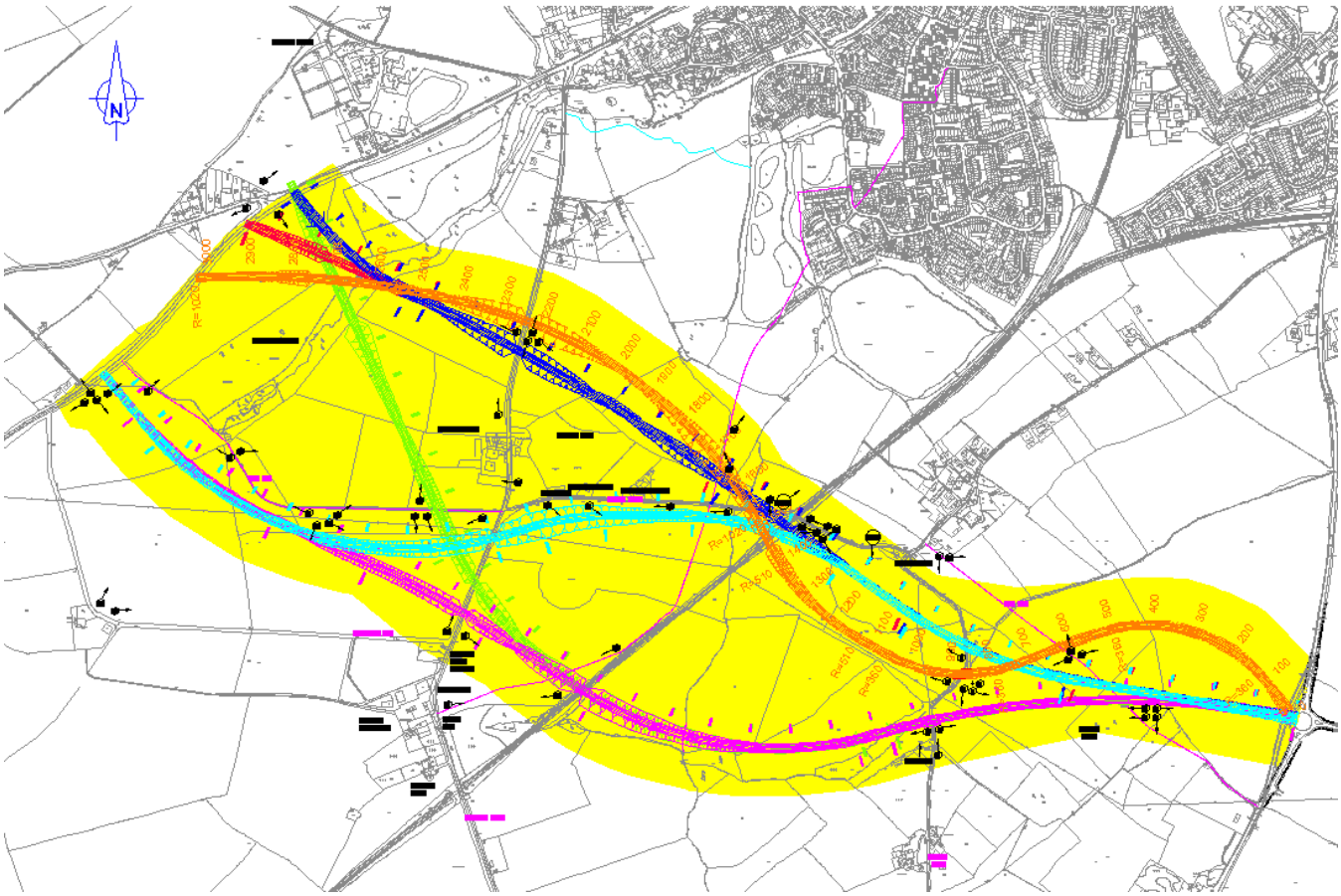

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Executive Summary

Herefordshire Council requested an assessment of options for the Southern Corridor linking the A49 with the A465, taking into account consultation responses from residents and statutory bodies. This study develops upon the work undertaken in the Hereford Relief Road (HRR) Study of Options Report (Amey, September 2010), and references previous work and routes within the Hereford Relief Road Stage 1 Assessment Report (Amey, July 2010) and the Highways Agency Hereford Bypass preferred route option (Department of Transport, 1988).

The study report includes an Engineering and Environmental Assessment of the routes considered in the HRR Study of Options, further public consultation responses in 2011, and additional routes following a review of the Department of Transport (DoT) route from the 1990s.

Following a review of Consultation responses and previously promoted routes, four additional routes have been considered resulting in six routes overall being reviewed in this study:

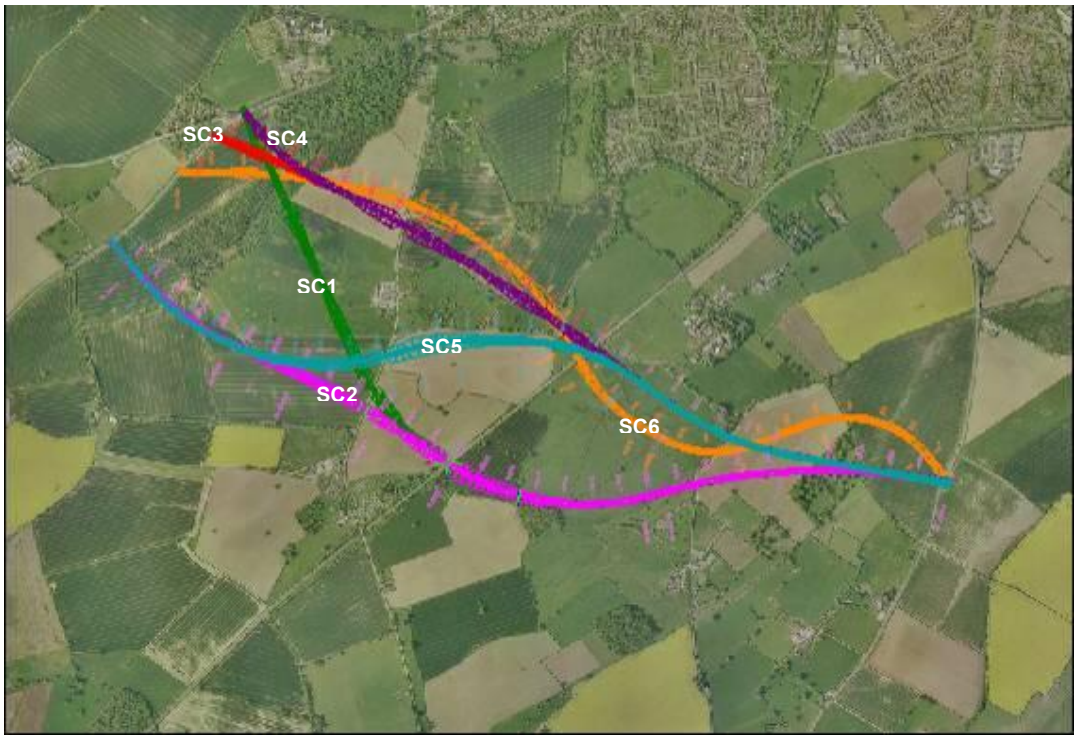

Figure ES1: Plan of Route Options Considered

- SC1 – The first of two routes considered in the 2010 Study of Options report follows a southern alignment from the A49 to cross over the Railway on a new embankment then beneath Haywood Lane in a new cutting before turning north to cut through Newton Coppice at its narrowest point to join the A465 close to Belmont Abbey.

- SC2 – The second of two routes considered in the 2010 Study of Options report follows a southerly alignment from the A49 to cross over the Railway on a new embankment then beneath Haywood Lane in a new cutting then continuing on to the south of Newton Coppice before joining the A465.
- SC3 – Follows the approximate line of the 1988 DoT route on a more northern alignment, passing below the railway and North of Merryhill Farm to pass through the narrowest section of Newton Coppice to join the A465 close to Belmont Abbey but does not allow for a continuation of a Western Relief Road.
- SC4 - Follows the approximate line of the 1988 DoT route (SC3) on a more northern alignment, passing below the railway and north of Merryhill Farm to pass through the narrowest section of Newton Coppice to join the A465 close to Belmont Abbey. The route is adjusted from SC3 to enable a continuation of the Western Relief Road past Belmont Abbey.
- SC5 – Follows the 1988 DoT Route (SC3) from the A49 to pass beneath the railway but then turning to pass south of Newton Coppice as for SC2.
- SC6 – Follows a lower standard horizontal alignment to avoid Grafton Wood and to follow the contours north of Merryhill Farm to pass beneath Haywood Lane, through the narrowest section of Newton Coppice to join the A465 to allow a continuation of the Western Relief Road South of the woodland and residential properties near Belmont Abbey.

A summary of the Engineering impacts follows in Table ES1.

Table ES1 Summary of Engineering Assessment and Favoured Routes

Criterion	Description	Favoured Route
Design Standards	All alignments are designed as 60mph single carriageway roads in accordance with the Design Manual for Roads and Bridges. SC3 and SC4 provide the most direct alignments with good forward visibility and overtaking opportunity. SC6 is the lowest standard with tighter radii and no opportunity for overtaking.	SC3, SC4
Railway Crossing	SC1 and SC2 cross over the railway requiring significant approach embankments in the vicinity of Haywood Lodge having significant visual impact upon a small number of properties in the vicinity and on the landscape as a whole with little potential for mitigation. SC3, SC4, SC5 and SC6 all pass beneath the railway at approximately the same location, reducing the visual impact.	SC3, SC4, SC5, SC6
Earthworks Balance	SC1 and SC2 do not lend themselves to a phased construction in isolation to the wider Western Relief Road Scheme as they both	SC3, SC4, SC5, SC6

	require significant embankment construction requiring material in excess of that available from cuttings. SC3, SC4, SC5 and SC6 all have a surplus of material which could be used to provide bunding and screening to reduce landscape impacts and noise. Material arising from all cutting is expected to be re-usable as general fill although may not be suitable for beneath the carriageway.	
Existing Roads and Rights of Way	All alignments will sever Grafton Lane but pass beneath Haywood Lane which would continue over a bridge structure. SC1 severs 3 footpaths with all other alignments severing 2. All routes will sever National Cycle Network 46. Mitigation of the effects of severance of public rights of way will be required in the final design.	SC2, SC3, SC4, SC5, SC6
Farmland Severance	All schemes will sever farmland such that less economically viable field shapes and areas are created. SC5 follows existing field boundaries better than the other routes minimising severance.	SC5
Utilities	All alignments will require diversion of utilities although SC1, SC2 and SC5 will have the greatest impact and require the most diversion.	SC3, SC4, SC6

An environmental assessment has been completed and, subject to further detailed studies, the significant effects of the routes determined against the Department for Transports Transport Analysis Guidance Sub Objectives are summarised in Table ES2. Figure ES2 shows the locations of the main environmental constraints in relation to the proposed route alignments, the full drawing is found in Appendix D: Environmental Assessment Report, figure 6.2.

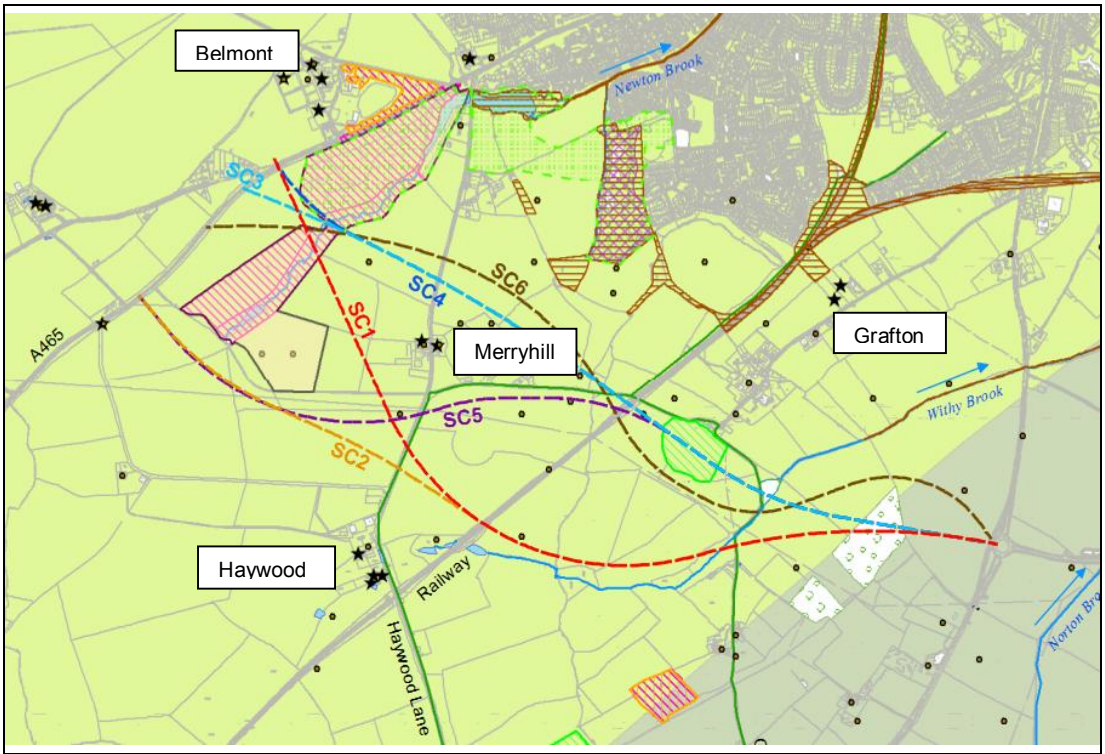

Figure ES2: Locations of Main Environmental Constraints

Table ES2 Summary of Environmental Assessment and Favoured Routes		
Noise	SC2 affects the fewest number of properties (4 within 100m and 105 within 600m) and SC6 the greatest number (None within 100m but 257 within 600m).	SC2
Local Air Quality	Assessment based on Length of Routes with SC3 and SC4 having the shortest length and SC1 has the longest length.	SC3, SC4
Greenhouse Gases	Assessment based on Length of Routes with SC3 and SC4 having the shortest length and SC1 has the longest.	SC3, SC4
Landscape	All alignments will have a negative impact upon the landscape with Alignments SC1 and SC2 having the greatest impact due to the extensive embankment to the Railway crossing. SC6 will have the least impact as it best follows the existing ground contours.	SC6
Townscape	None of the routes intrude upon Townscape Character Areas so all have a neutral impact.	None Preferred
Heritage	Routes SC1 and SC2 would impact upon the setting of listed building in the vicinity of Haywood Lodge whilst SC3, SC4 and SC6 would	SC5, SC6

	impact, although to a lesser degree, Merryhill Farm. SC1 and SC4 would have the greatest impact upon the Belmont Abbey complex, particularly in respect to a continuation of a wider Western Relief Road Scheme. Routes SC5 and SC6 avoid impacts to Haywood Lodge and Belmont Abbey.	
Biodiversity	Routes SC2 and SC5 have the least impact upon biodiversity due to the avoidance of the woodland at Newton Coppice. All other routes will sever this area. Of the other routes SC6 has the least impact as it avoids the other sites at Grafton Wood and on Grafton Lane.	SC2, SC5
Water Environment	All routes will impact upon the water environment as controlled surface water discharge to Withy Brook and Newton Brook will be necessary. Route SC2 is favoured as it is furthest from Withy Brook and Newton Brook, followed by SC5 which is furthest from Newton Brook only.	SC2, SC5
Physical Fitness	SC1 severs three footpaths with all other alignments severing two. All routes will sever National Cycle Network 46 which will reduce use if not mitigated.	None Preferred
Journey Ambience	All routes will reduce traveller stress compared with existing routes and all will provide views across the landscape at various points with SC5 favoured.	SC5

The study has assessed route options for the Southern Corridor link between the A49 and the A465 both in their own right and having regard to their role as part of a full western relief road. Should the Southern Corridor Link between the A49 and the A465 be delivered in isolation and in advance of a full Western Relief Road, then the scheme will need to be assessed in its own right but also need to consider the continuation of the route north. This assessment process should follow the staged assessment process set out in the Design Manual for Roads and Bridges and fully accorded with the Department for Transport's Transport Analysis Guidance (WebTAG) to ensure that a transparent and fair assessment is undertaken.

There are clearly preferences in relation to the routes presented within this report and the impacts upon the setting of the historic resources on Haywood Lane and at Belmont Abbey and on the natural environment at Hayleasow Wood provide the greatest constraints at this stage. In addition, significant engineering challenges are presented from the more southern routes from the requirement for significant import of earthworks material if the Southern Corridor Link is delivered in isolation to the rest of the western relief road.

At this stage it is possible to breakdown the alignments into partial sections and reassemble into further route options. For example, an alignment following the approximate route of SC6 from the A49 to the railway crossing and then SC5 from the railway to the A465 would appear to provide a good response to the constraints identified at this stage. Therefore, the recommended corridor presented in figure ES3 has been extended beyond the confines of the assessed alignments to allow for further route combinations to be considered in the WebTAG staged assessment.

Although there are significant constraints relating to routes SC1 and SC2, primarily relating to the earthworks imbalance and the impact upon the setting of the historic assets, it is recommended that the corridor is not narrowed until the staged assessment in accordance with the Design Manual for Roads and Bridges and WebTAG has been completed.

In addition, through consultation with the public and statutory consultees, it is evident that there are significant concerns relating to the crossing of Newton Coppice and the impacts of the Southern Corridor and the Western Relief Road Route on the Belmont Abbey Complex. However, it is again recommended that the corridor is not narrowed at this stage of the assessment to keep options open.

Although it will allow a full and transparent assessment, retaining a wider corridor does have disadvantages in relation to the ongoing concerns of the public and other interested parties in the vicinity of the routes. As such it is recommended that a Stage 2 Assessment is completed at the earliest opportunity to enable a preferred route to be selected to reduce the time that this uncertainty is felt. Once a preferred route is selected the designs and environmental statement, including mitigation proposals associated with a Stage 3 assessment should be completed at the earliest opportunity to allow the planning and orders process to be completed and certainty to be established for those most affected by the scheme.

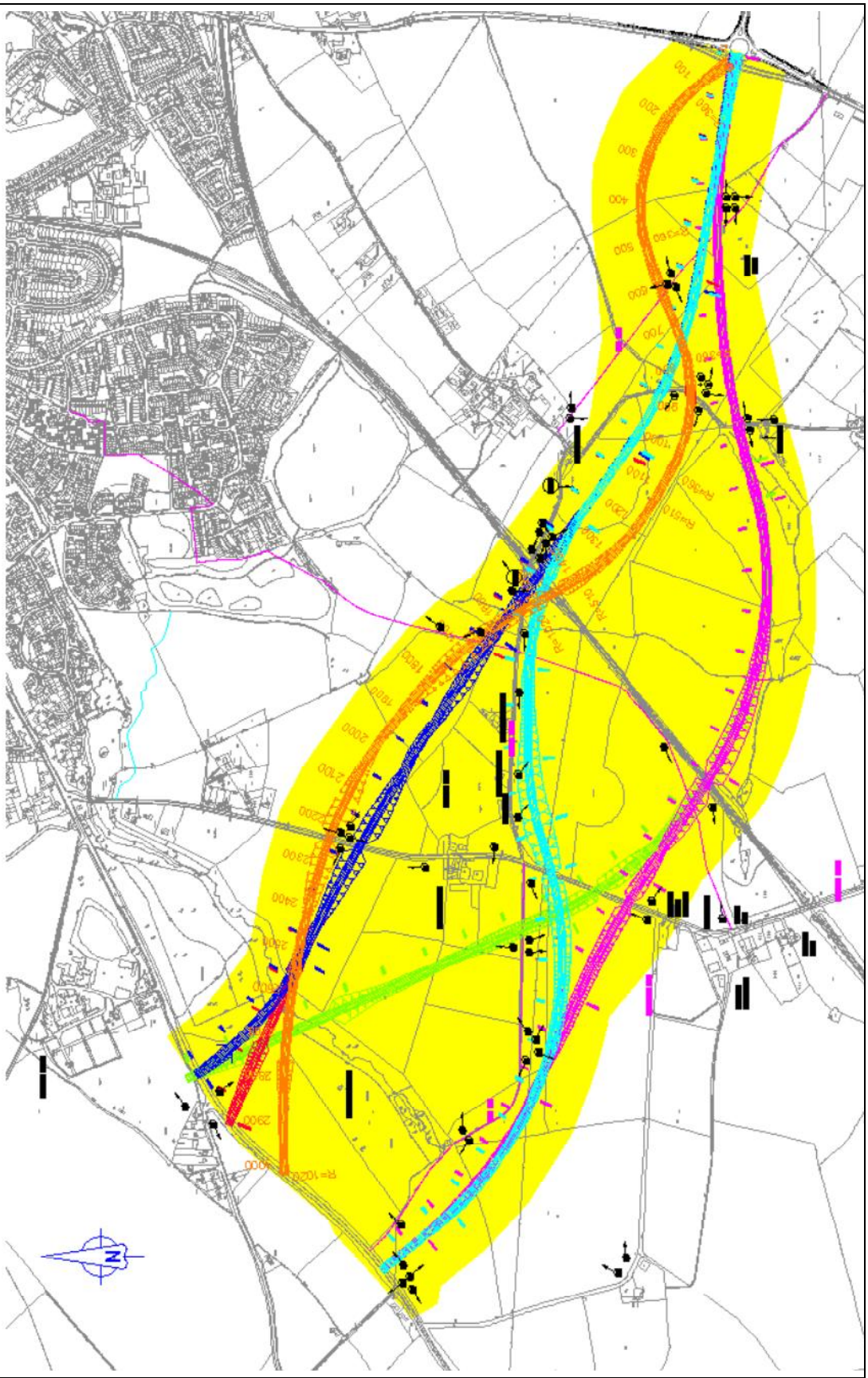

Figure ES3 Recommended Route Corridor

Contents

1. Introduction

1.1. Scope of Assessment

1.1.1. Herefordshire Council required an assessment of the preferred options for the Southern Corridor (A49 – A465) associated with the Hereford Relief Road. The study reviewed routes assessed within the HRR Study of Options Report from 2010 and assess the environmental and amenity issues associated with modifying the corridor to include a previously proposed route promoted by the Department of Transport (DoT) in the 1990s. It will also take into account recent consultation responses from residents and statutory bodies during the Core Strategy consultations in September 2010 and September 2011.

1.1.2. The study will comprise an Engineering assessment and Environmental assessment following the methodology outlined in 1.2 and 1.3 below.

1.2. Engineering Assessment

1.2.1. The HRR Study of Options report in 2010 considered 2 route options for a link between the A49 and the A465. These two routes differed to consider the impacts upon the special wildlife site and to meet the wider option for the continuation of the scheme as a full Western route around the City. They were also designed to exploit the optimum crossing locations of both the railway and minor roads.

1.2.2. The Study of Options was an independent assessment of route options and was not constrained by any previously considered routes or corridors such as the DoT bypass routes from the 1990s.

1.2.3. The responses from the Core Strategy consultation have been assessed and the two routes within the Study of Options report and the earlier DoT route have been reconsidered to mitigate public concerns. A further three variations of the routes have been considered in light of consultation responses resulting in a total of six (6) potential route options.

1.2.4. The recent traffic modelling of the revised Core Strategy option, to reduce housing growth within Hereford, referred to in this document as Housing Option Five (HO5) has been reviewed to gain link flows, and these have been used to assess the required link standard.

1.2.5. Following the consultation review, alignment review and highway standard assessment, the alignment designs have been completed using the MX software and drawings produced including plan views displaying constraints and long sections to indicate cuttings, embankments and key structures.

1.2.6. It should be noted that these designs are for the purposes of informing feasibility and cost towards recommending a corridor and should not be taken as fixed alignment designs. The 6 alignments considered in this report can be broken down into partial segments and combined again to create further options. The design of options towards a preferred alignment will follow a staged assessment later in the scheme delivery process.

1.2.7. In addition, the locations of junctions on the A465 have been considered including an assessment of the impacts on options for the full Western route.

1.2.8. The drawings and technical notes on the design standards and methodology are presented in the appendices and have been issued to the Highways Agency for comment. The Highways Agency has commented on the designs for routes SC1 to SC5 which are presented with the Consultation Responses, section 4. Route SC6 was issued to the Highways Agency separately as a later route design and at this time a response has not been received.

1.2.9. The scheme cost estimates within the 2010 Study of Options Report have been reviewed and updated and cost estimates for the new routes added.

1.3. Environmental Assessment

1.3.1. The 2010 HRR Study of Options Report, the DoT Environmental Statement and the responses from the September 2010 and September 2011 consultations have been reviewed by our environmental team.

1.3.2. The DoT consultation and site surveys were undertaken in 1987 for two routes – eastern and western bypass. The outcome of this process was the Preferred Route (eastern bypass route) which was assessed within the DoT Environmental Statement. The DoT Environmental Statement provided a high level review of available information at the time, which is now both out of date and subject to new and revised legislation and guidance.

1.3.3. The six (6) alignments consisting of the Southern Core and earlier DoT routes and associated revisions reflecting the consultation responses have been reconsidered by the environmental team. The environmental assessment includes:

- Impacts on residential amenity including properties at Haywood, Merryhill and Grafton.
- Impact on Newton Coppice / Hayleasow Wood Special Wildlife Site.
- Impact upon listed buildings.
- Implications for Belmont Haywood Country Park and 'Fields in Trust' proposal.
- Impact on landscape and contours.
- Impact on cycleways and walking routes and other Public Rights of Way.

- Other Environmental issues raised within the consultation responses.

1.3.4. A site visit has been undertaken to verify the results of the 2010 HRR Study of Options Environmental Assessment and to assess the landscape impacts of the new and revised routes.

1.3.5. The alignment drawings show all known environmental constraints and have were issued to Natural England, English Heritage, Environment Agency, and to Herefordshire Councils Conservation Team for consultation. The Consultation responses are summarised in Section 4.

1.3.6. An Environmental Assessment Report is included in Appendix D.

2. Engineering Assessment

2.1. Corridor Summary

2.1.1. The corridor links the A49 and A465 and is common to both the Western and Eastern Options reported within the Hereford Relief Road (HRR) Study of Options Report, 2010. Within report, two links were assessed between the A49 and A465, SC1 and SC2. These two links have been reassessed in light of revised traffic forecast figures and following a review of the responses from the public consultations in September 2010 and September 2011.

2.1.2. In addition to the review of SC1 and SC2 links taken from the HRR Study of Options report, a further review of an alignment proposed by the Department of Transport (DoT) route promoted in their 1988 report has been undertaken to consider whether this alignment would offer any benefits. A further 2 alignments, SC3 and SC4, have been considered which follow a route based on the DoT route with the junction onto the A49 is adjusted to meet the new Rotherwas Access Road.

2.1.3. Alignment, SC5, has also been investigated as a hybrid between the Study of options alignments of SC1 and SC2 and the DoT alignments of SC3 and SC4.

2.1.4. A final alignment SC6 has been considered to take account of proposals received within the consultation responses and to avoid some of the environmental constraints on the route.

2.1.5. All of the proposed route options are shown on Figure 1 below and then considered individually in the following paragraphs.

Figure 1: Plan of Route Options Considered

2.2. Southern Core Route SC1

2.2.1. A plan showing the route of SC1 along with the major physical and environmental constraints and its vertical profile can be seen on Drawing Number 551594-H-P-001 in Appendix A and overlaid on the aerial photograph in Figure 2.

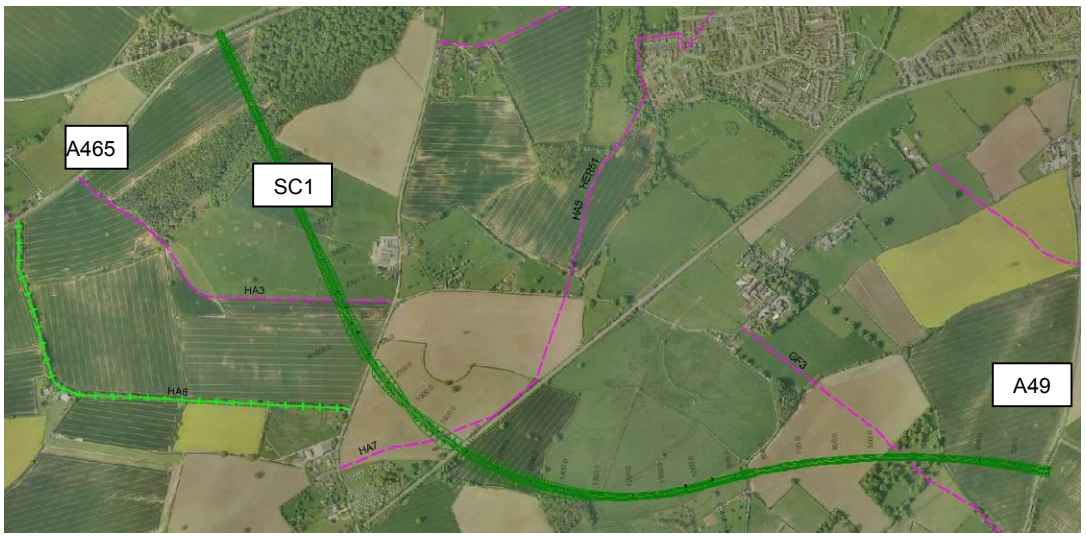

Figure 2: Plan View of SC1

2.2.2. The route commences at the A49 at the existing roundabout for the B4399, Rotherwas Access Road. The route follows the ground contours through a dip to the west of the A49 which will require consideration for drainage features such as balancing ponds to minimise the rate of discharge to Withy Brook. The balancing ponds will include hydro break systems that regulate the flow of water into the brook and ensure that there is no increased flood risk for any water course. The alignment passes through Grafton Wood shown in Figure 3, requiring a corridor approximately 20m wide and 200m long requiring the removal of several mature trees.

Figure 3: Grafton Wood with plan view inset

2.2.3. The route proceeds west, avoiding slightly higher ground to the North, avoiding a small coppice adjacent to Grafton Lane and approximately ten properties at Grafton. However the alignment crosses beneath overhead electricity cables and within 50m of an isolated property on Grafton Lane.

2.2.4. The route severs Grafton Lane and to avoid this, significant earthworks would be necessary, either on the new route or on Grafton Lane to provide a bridge. Alternatively, a junction could be provided although it would not be desirable to add this additional conflict point to a new high speed route. For the purposes of this assessment it is assumed that Grafton Lane is stopped up either side of the new route. Although this may be considered favourably by local residents as the opportunity for rat-running would be removed, there was little evidence of damage to the verges to suggest that this is currently a problem. It is more likely that the severance of the road may be detrimental to the community as the isolated property to the south is severed from the rest of the village and the City to the North.

2.2.5. The property named 'The Green', on Grafton Lane has made the following comments for alignment proposal SC1 and SC2 stating that it is on a private water supply, natural ground subsistence in this vicinity is moderate, and there are fluvial flooding issues at the point where SC1 and SC2 crosses Grafton Lane which can be identified in the local authority searches. These items would need consideration in any later, more detailed study prior to the selection of a route.

2.2.6. Grafton Lane forms part of the National Cycle Network Route 46 (NCN46) which is well used and Grafton Lane is well suited to cyclists of all abilities as an alternative to the A49 and it links in to the Great Western Way. Severing this link for walkers and cyclists would severely affect the route's attractiveness and undermine its ability to take traffic off the city's roads. The route has been designed to be as free of interruptions as possible and this severely impairs its ability to attract motorists from their cars. Ideally the route should be kept continuous but this would require some sort of underpass or pedestrian/cycle bridge structure in this location or a diversion of NCN46 onto an alternative route.

Figure 4: View from the Green towards SC1 and SC2 (crossing just before the bend) with plan view inset

2.2.7. The Route continues northeast and rises onto an embankment to cross the existing railway at an assumed clearance of 6.5m. The nuisance from increased noise and landscape impact of the scheme in this location is high due to its prominence viewed from the six properties in the vicinity of Haywood Lodge to the West (see Figure 5). These impacts would be very difficult to mitigate due to the route being on embankment and therefore environmental bunding and tree screens may not be effective and give rise to substantial Part 1 claims.

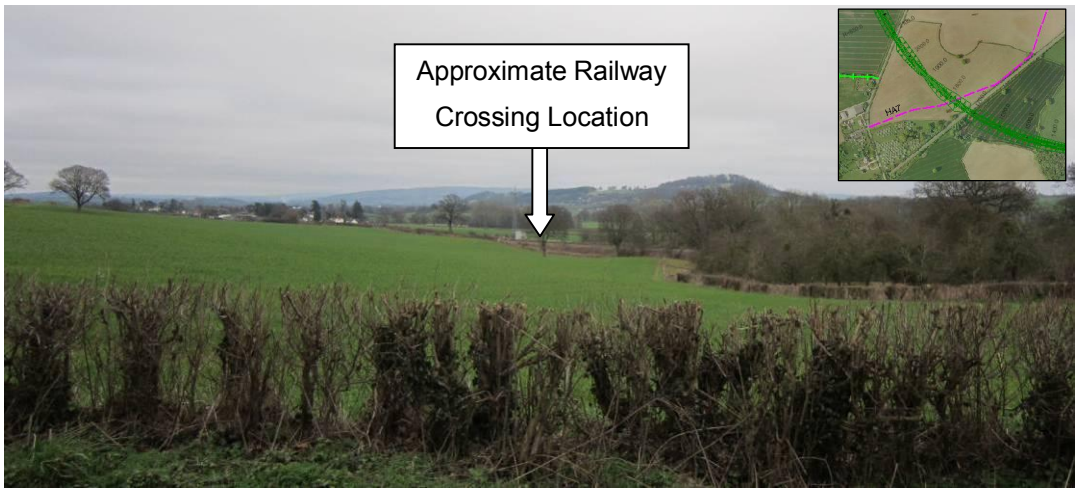

Figure 5: View from The Granary near Haywood Lodge with plan view inset

2.2.8. The scheme turns further north and enters cutting to pass beneath the existing Haywood Lane. The visual impacts are reduced by the cutting and as such the landscape impact would be mitigated at this point. However, as the route continues northwest, the cutting reduces and vehicles will become visible from the barn conversions at Merryhill Farm.

Figure 6: View from route to Barn Conversions at Merryhill Farm with plan view inset

2.2.9. The scheme continues on a straight alignment, providing overtaking opportunity through the narrowest point of the Newton Coppice Special Wildlife Site in Figure 7 and crossing over Newton Brook. The height and length of structure across this valley requires consideration to minimise severance of the habitat whilst ensuring an uninterrupted flow of the watercourse.

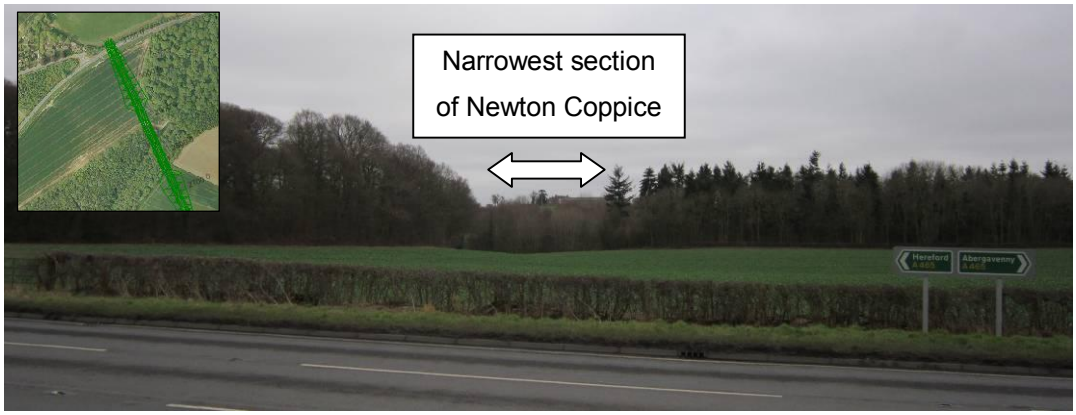

Figure 7: View to Newton Coppice from th A465 with plan view inset

2.2.10. The material which will be required to complete the construction of the embankments for this route exceeds the material which will become available from the excavation of cuttings (262,000m^3 fill and 65,000m^3 cut). It should also be noted that much of the Mudstone anticipated to be excavated from the cutting at Haywood Lane may be unsuitable for use for highway embankment construction beneath the road. It should be noted that the cut and fill is favourable if constructed as part of the full city relief road but the route does not lend itself to phased construction as a separate scheme.

2.2.11. There is also little opportunity for the construction of landscape bunds which could reduce the visual impact of parts of the route. The depth of cutting at Haywood Lane should be considered in the later design phases to optimise the cut/fill balance and provide opportunities for additional bunds to reduce the landscape impacts.

2.2.12. The impact of the severance of farmland has been considered to assess whether uneconomic field sizes or shapes are created by the new road corridor. At this stage the boundaries between farm holdings have not been assessed and this will be addressed at the later stages of assessment to minimise the effects of route choice on farming activities.

2.2.13. Figure 8 shows some of the small fields created which may not be able to be farmed economically including plots at the A465, Merryhill Farm, at the Railway crossing embankment and west of Grafton Woods. Other larger fields are also severed and, whilst they may still be of agricultural value, their value may have reduced and the likely compensation will need to be factored into later scheme cost estimates. In addition accommodation works will be necessary to reduce the severance effect of the scheme including bridges, underpasses and at grade access points.

2.2.14. The farmland severance effects of the road may have some advantages though as, whilst the parcels of land created may be of little farming value, there may be an option to include them within the area of land purchased for the road for environmental mitigation and landscaping.

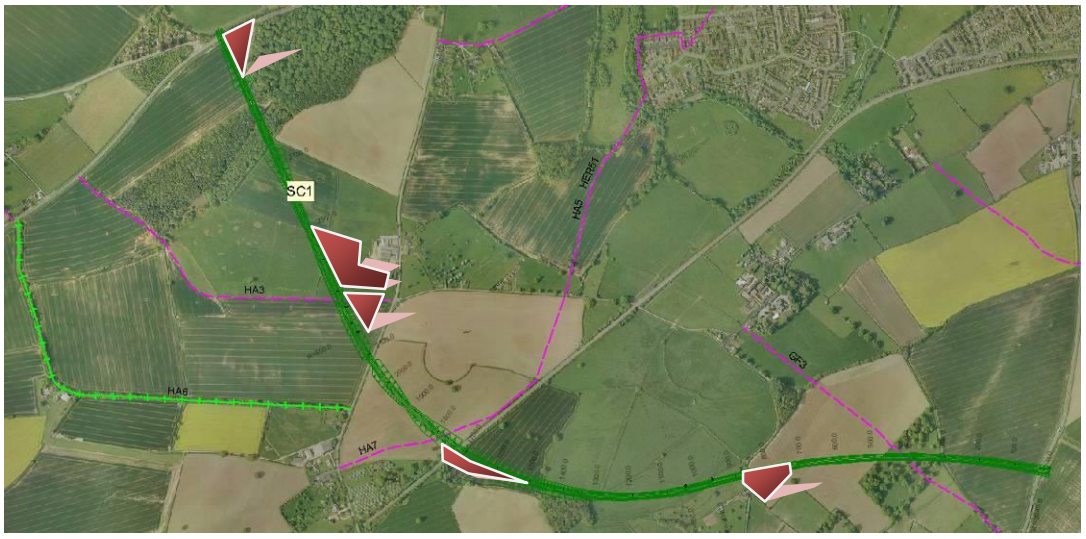

Figure 8: Farmland Severance – Example of creation of small fields

2.3. Southern Core Route SC2

2.3.1. A plan showing the route of SC2 along with the major physical and environmental constraints and its vertical profile can be seen on Drawing Number 551594-H-P-002 in Appendix A and overlaid on the aerial photograph in Figure 9.

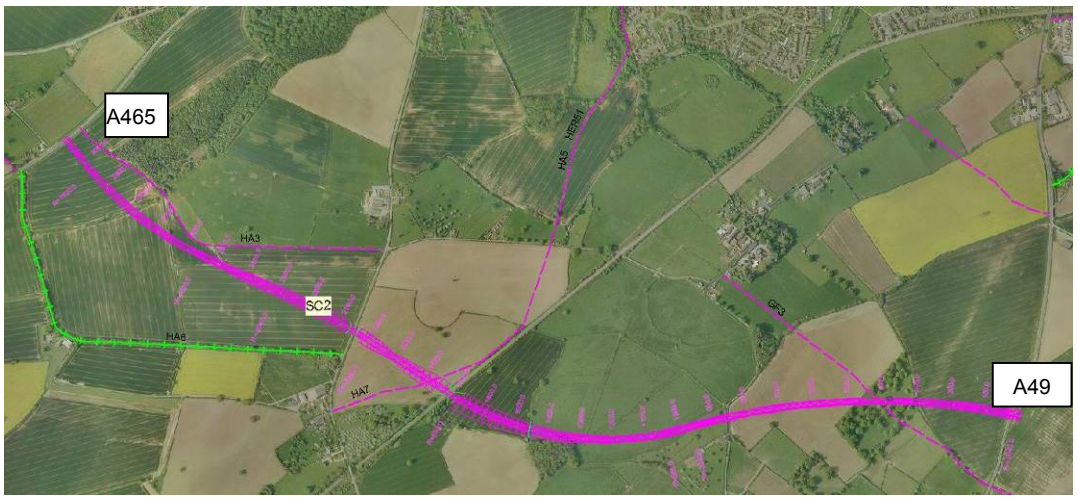

Figure 9: Plan View of SC2

2.3.2. Route SC2 follows the same alignment as SC1 from the A49 to the bridge over the railway line. Refer to paragraphs 2.2.2 and 2.2.7 above for a description of this part of the route.

2.3.3. North of the railway bridge, the route enters a cutting to pass beneath Haywood Lane. The visual impacts are reduced by the cutting and as such the landscape impact is mitigated at this point; as the route continues west, the cutting reduces. As the alignment is a greater distance from Merry Hill Farm and other properties than SC1, the visual and noise impacts will be reduced.

2.3.4. The route continues west to pass to the south of the Special Wildlife Site and joins the A465 500m to the south of approximately 15 properties and the Belmont Abbey complex but 50m north of two individual properties on the A465, see Figure 10.

Figure 10: View from SC2 proposed A465 junction to residential properties to the South with plan view inset

2.3.5. As for SC1, the material required to complete the construction of the embankments for this route exceeds the material which will become available from the excavation of cuttings (110,000m^3 fill and 60,000m^3 cut). It should also be noted that much of the Raglan Mudstone anticipated to be excavated from the cutting at Haywood Lane may be unsuitable for use for highway embankment construction beneath the road. The route does not lend itself to phased construction as a separate scheme to the wider relief road and there is minimal opportunity for the construction of landscape bunds which could reduce the visual impact of parts of the route. The depth of cutting at Haywood Lane should be considered in the later design phases to optimise the cut/fill balance and provide opportunities for additional bunds to reduce the landscape impacts.

2.3.6. The impact of the severance of farmland has been considered to assess whether uneconomic field sizes or shapes are created by the new road corridor. At this stage the boundaries between farm holdings have not been assessed and this will be assessed at the later stages of assessment to minimise the effects of route choice on farming activities.

2.3.7. Figure 11 shows some of the small fields created which may not be able to be farmed economically including plots at the A465, at the railway crossing embankment and west of Grafton Woods. Other larger fields are also severed and, whilst they may still be of agricultural value, their value may have reduced and the likely compensation will need to be factored into later scheme cost estimates. In addition accommodation works will be necessary to reduce the severance effect of the scheme including bridges, underpasses and at grade access points.

2.3.8. The farmland severance effects of the road may have some advantages though as, whilst the parcels of land created may be of little farming value, there may be an option to include them within the area of land purchased for the road for environmental mitigation and landscaping.

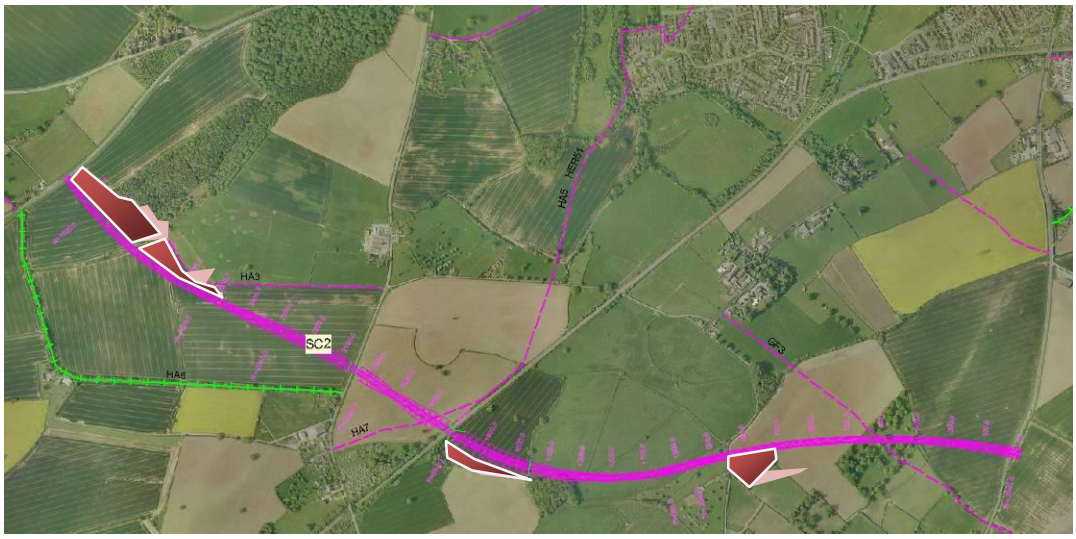

Figure 11: Farmland Severance – Example of creation of small fields

2.4. Southern Core Route SC3

2.4.1. A plan showing the route of SC3 along with the major physical and environmental constraints and its vertical profile can be seen on Drawing Number 551594-H-P-003 in Appendix A and overlaid on the aerial photograph in Figure 12.

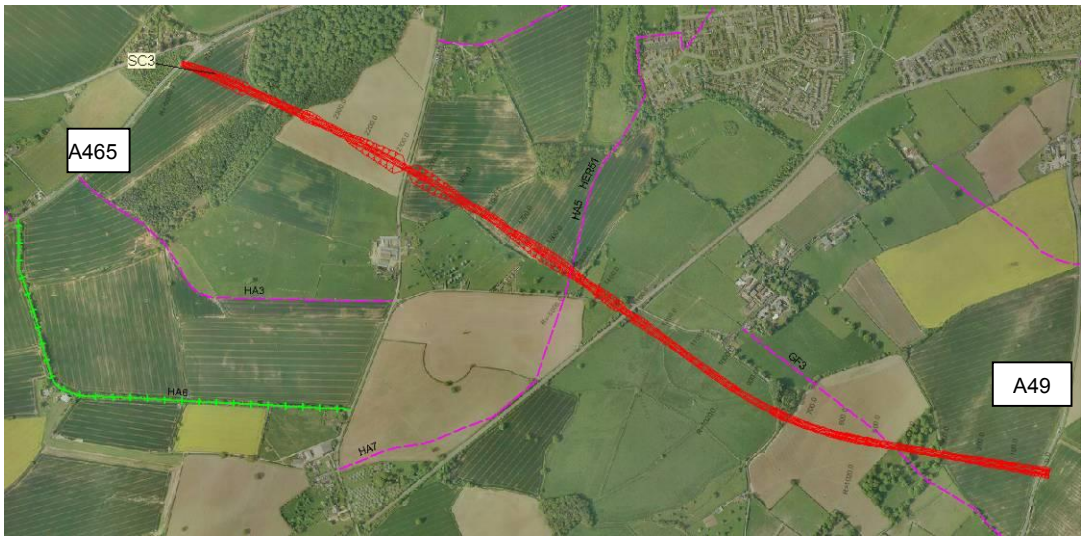

Figure 12: Plan View of SC3

2.4.2. Route SC3 follows the same alignment as SC1 and SC2 from the A49 through Grafton Wood. Refer to paragraph 2.2.2 for a description of this part of the route.

2.4.3. After Grafton Wood the alignment turns to the Northwest to cross Grafton Lane at grade, further from the property to the south ('The Green') and avoiding crossing the overhead cables. The alignment shown cuts through the small triangular wood on Grafton Lane but could be adjusted to avoid this in the detailed design. As described in paragraph 2.2.4, the route crosses Grafton Lane which is recommended to be stopped up but could cause severance to the properties in the vicinity and to NCN46.

2.4.4. The route continues northwest to pass beneath the railway and approximately 100m south of five properties at Grafton. Whilst the scheme is not in cutting at this point, the slight contours in the topography help to screen the road and further options to create landscape bunds and plant screening to reduce the impact upon the properties are feasible. To the North, the route crosses a circular field boundary which would warrant investigation as archaeologically important features are known to exist within the area.

Figure 13: View from properties on Grafton Lane looking south to SC3 Route with plan view inset

2.4.5. SC3 passes beneath the railway embankment just south of the existing unclassified road under-bridge. The topography lends itself to a crossing of the railway at this location and. the alignment currently allows the unclassified road to be retained although the final design could seek to incorporate the two structures together.

Figure 14: View of railway cutting location from the East and West and plan view

2.4.6. The route crosses the unclassified road in cutting and consideration will be required to the arrangements in this location to minimise the severance effect of the new road on the existing byway as new junctions should be avoided. With the scheme in close proximity to the railway, a bridge structure for the byway is not feasible. In this location there is also the start of the Great Western Way which is on National Cycle Network (NCN) 46 and facilities on the new road will be required to enable the continued use of the route.

Figure 15: View north along NCN 46

2.4.7. North of the Greta Western Way, SC3 continues on a relatively straight alignment passing out of cutting then into cutting as it passes through the rolling topography North of Merryhill Farm, See Figure 16.

Figure 16: View east from Haywood Lane along Route SC3

2.4.8. The route continues in cut beneath Haywood Lane which would retain its existing alignment and pass over SC3 on a new bridge. The route moves out of cutting onto embankment to pass through the narrowest section of Newton Coppice and on towards the A465.

Figure 17: View West from Haywood Lane along towards Newton Coppice

2.4.9. SC3 connects to the A465 just south of the junction with the B4349 at what would be anticipated to be a roundabout. However, this location does not lend itself to a continuation of the route to the West of the City as part of a wider relief road because it meets the A465 south-east of its junction with B4349 Clehonger Road and to continue west would present a conflict with the route requiring to go through or around the properties on this road.

2.4.10. The route would be close to the Belmont Abbey complex with the new junction in close proximity to the properties of Green Bank, although most would be screened by the existing woodland.

2.4.11. The material which will be required to complete the construction of the embankments for this route is much less than the material which will become available from the excavation of cuttings (40,000m^3 fill and 115,000m^3 cut). This presents an opportunity for the construction of additional landscape bunds which could reduce the visual impact of parts of the route. However, during detail design, the use of steeper, engineered slopes to reduce the overall cut and impact upon the landscape may be considered.

2.4.12. The impact of the severance of farmland has been considered to assess whether uneconomic field sizes or shapes are created by the new road corridor. At this stage the boundaries between farm holdings have not been assessed and this will be addressed at the later stages of assessment to minimise the effects of route choice on farming activities.

2.4.13. Figure 18 shows some of the small fields created which may not be able to be farmed economically including plots at the A465, at Merryhill Farm, at the Railway cutting and South of Grafton. Additional larger fields are also severed and, whilst they may still be of agricultural value, their value may have reduced and the likely compensation will need to be factored into later scheme cost estimates. In addition accommodation works will be necessary to reduce the severance effect of the scheme including bridges, underpasses and at grade access points.

2.4.14. The farmland severance effects of the road may have some advantages though as, whilst the parcels of land created may be of little farming value, there may be an option to include them within the area of land purchased for the road for environmental mitigation and landscaping.

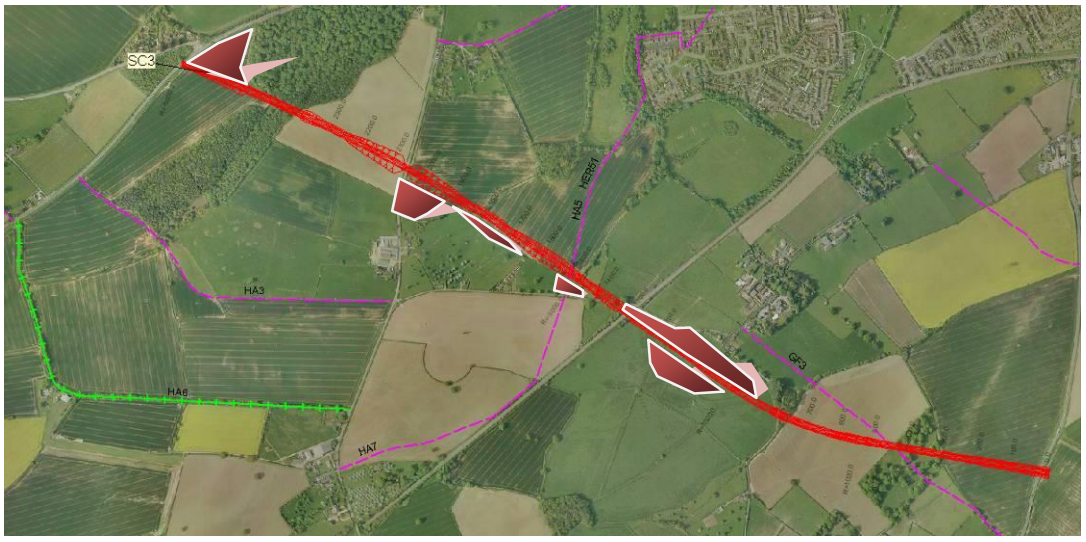

Figure 18: Farmland Severance – Example of creation of small fields

2.5. Southern Core Route SC4

2.5.1. A plan showing the route of SC4 along with the major physical and environmental constraints and its vertical profile can be seen on Drawing Number 551594-H-P-004 in Appendix A and overlaid on the aerial photograph in Figure 19.

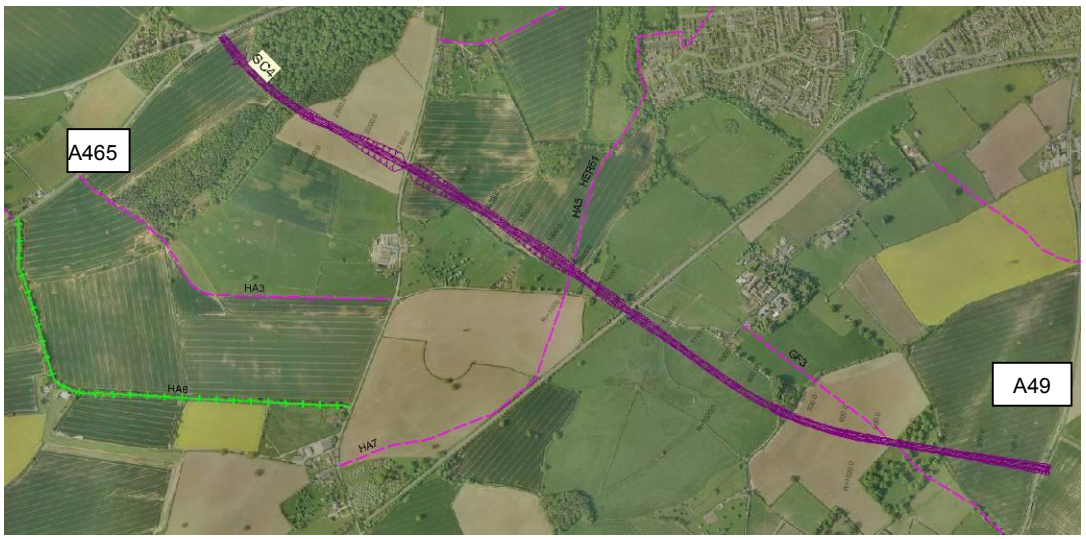

Figure 19: Plan View of SC4

2.5.2. Route SC4 follows the same alignment as SC3 from the A49 to the crossing through Newton Coppice. Refer to paragraphs 2.4.1 – 2.4.8 for a description of this part of the route.

2.5.3. SC4 turns north at Newton Coppice to connect with the A465. The impact upon the Coppice is likely to be increased as the narrowest section is harder to traverse. The scheme compliments a wider Western Relief Road however, the impact upon the residential properties at Green Bank will be greater as the existing woodland will offer less screening than for SC3.

2.5.4. SC4 should be considered with any future Western Relief Road due to the combined impact as to the proximity to Belmont Abbey.

2.5.5. The material which will be required to complete the construction of the embankments for this route is much less than the material which will become available from the excavation of cuttings (40,000m^3 fill and 115,000m^3 cut). This presents an opportunity for the construction of landscape bunds which could reduce the visual impact of parts of the route. However, during detail design, the use of steeper, engineered slopes to reduce the overall cut and impact upon the landscape may be considered.

2.5.6. The impact of the severance of farmland has been considered to assess whether uneconomic field sizes or shapes are created by the new road corridor. At this stage the boundaries between farm holdings have not been assessed and this will be assessed at the later stages of assessment to minimise the effects of route choice on farming activities.

2.5.7. Figure 20 shows some of the small fields created which may not be able to be farmed economically including plots at the A465, at Merryhill Farm, at the Railway cutting and South of Grafton. Additional larger fields are also severed and, whilst they may still be of agricultural value, their value may have reduced and the likely compensation will need to be factored into later scheme cost estimates. In addition accommodation works will be necessary to reduce the severance effect of the scheme including bridges, underpasses and at grade access points.

2.5.8. The farmland severance effects of the road may have some advantages though as, whilst the parcels of land created may be of little farming value, there may be an option to include them within the area of land purchased for the road for environmental mitigation and landscaping.

Figure 20: Farmland Severance – Example of creation of small fields

2.6. Southern Core Route SC5

2.6.1. A plan showing the route of SC5 along with the major physical and environmental constraints and its vertical profile can be seen on Drawing Number 551594-H-P-005 in Appendix A and overlaid on the aerial photograph in Figure 21.

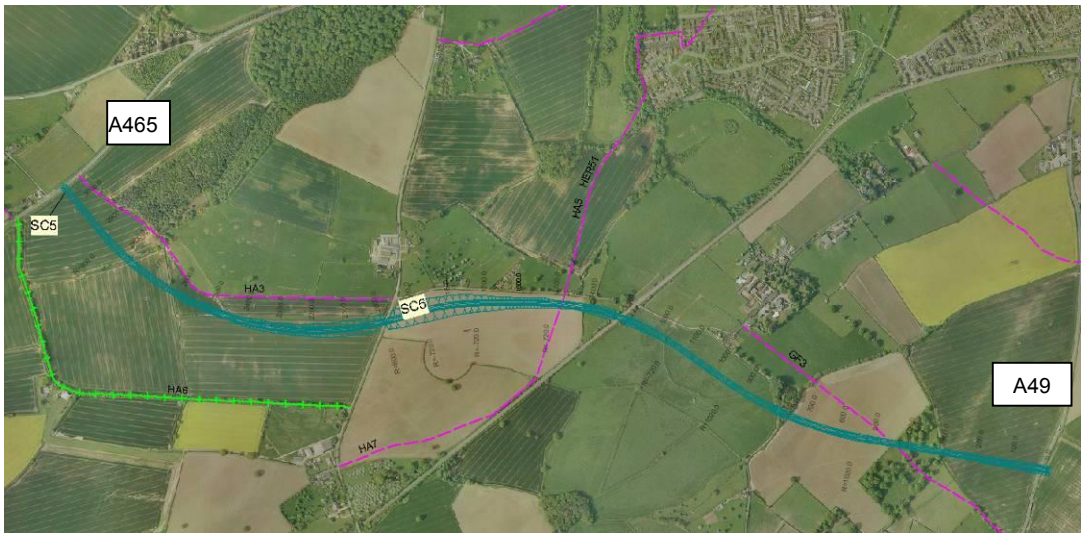

Figure 21: Plan View of SC5

2.6.2. Route SC5 follows the same alignment as SC3 and SC4 from the A49 to the crossing at the railway underpass. Refer to paragraphs 2.4.1 – 2.4.4 for a description of this part of the route.

2.6.3. SC5 continues West up a 4% grade developing deeper into cut as the hill of Beech Grove rises steeply. The alignment continues adjacent to the unclassified track passing close to individual residential properties. As the alignment is in deep cut and on the other side of the established hedgerow there would be a lesser impact to the properties.

2.6.4. Again, the circular field boundary on the hilltop at Beech Grove may be an indication that there will be archaeological finds in the area and this will require early investigation as the large cutting will remove any possibility of preserving any significant finds in-situ. Diversion of the overhead electricity cables will be necessary as the route passes over the proposed cutting as indicated in figure 22.

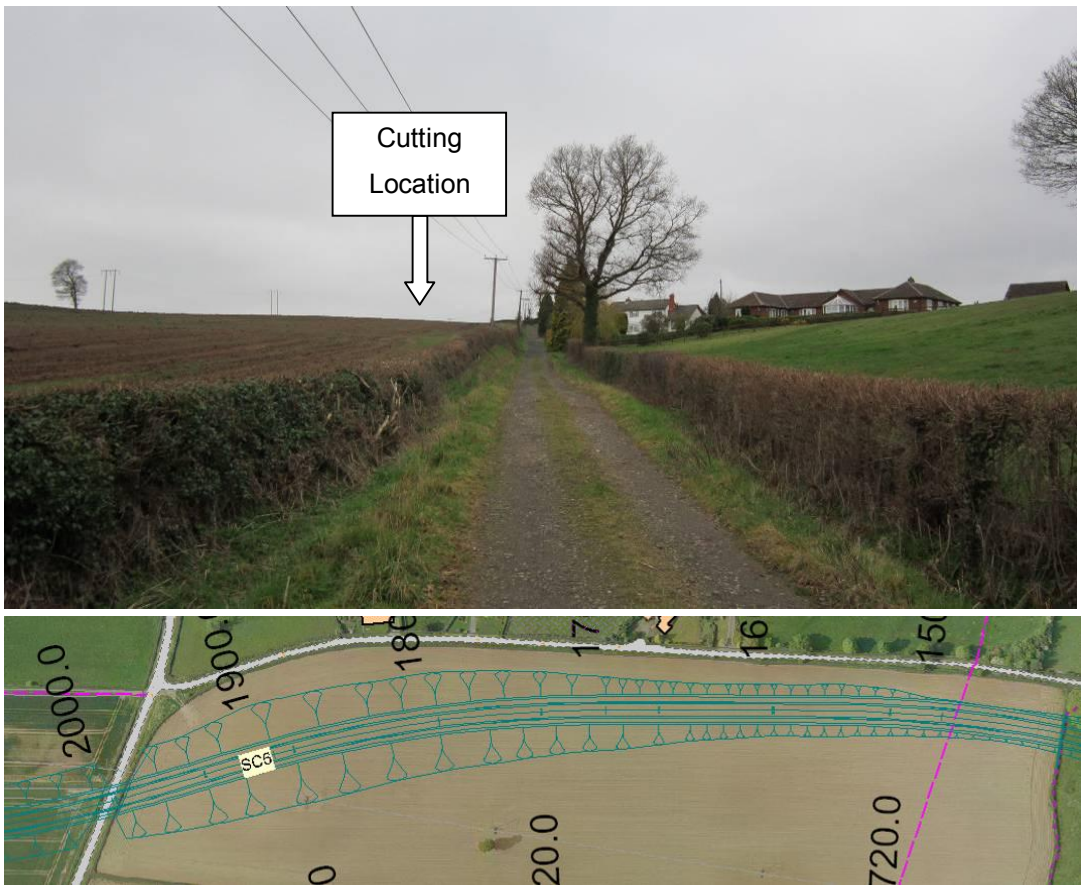

Figure 22: View west along unclassified track with plan view

2.6.5. The route passes beneath Haywood Lane which will require a new bridge structure. The route is close to the properties at Merryhill Farm but hidden within the cutting mitigating some of the potential impact of the new road on the property.

2.6.6. The route continues in cut, currently passing through relatively new farm buildings not recorded on the mapping but shown in Figure 23. The final design should seek to move this alignment, if possible, to the north to follow the long narrow field, avoiding the farm buildings and reducing the severance effect on the farmland.

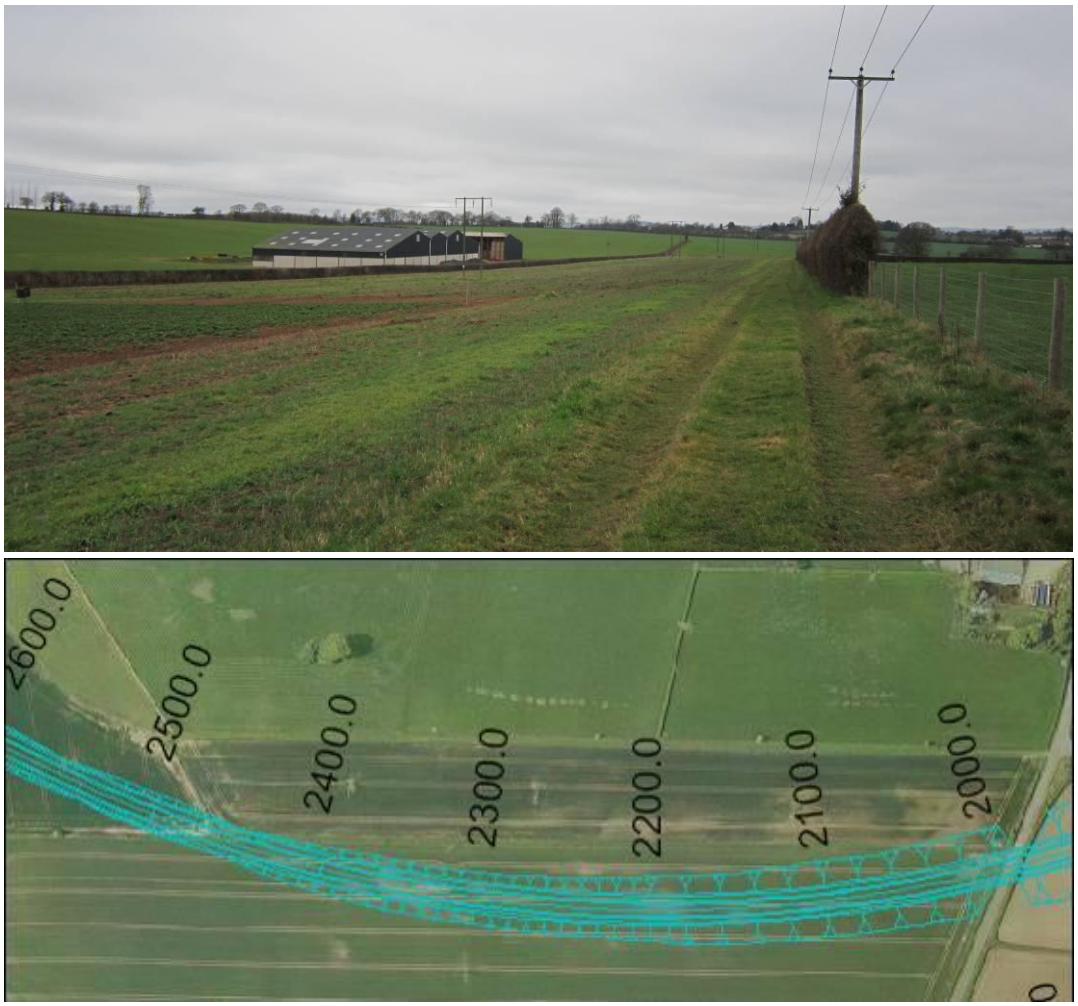

Figure 23: View West along SC5 with new farm buildings with plan view

2.6.7. The route continues west to pass to the south of the Special Wildlife Site and joins the A465 500m to the south of the properties at Belmont Abbey but 50m north of individual properties on the A465, see Figure 10 in section 2.3.4.

2.6.8. There are very few embankment sections on SC5 so material which will be required to complete the construction of the embankments is much less than the material which will become available from the excavation of cuttings (10,000m^3 Fill and 185,000m^3 cut). This presents an opportunity for the construction of landscape bunds which could reduce the visual impact of parts of the route. However, during detail design, the use of steeper, engineered slopes to reduce the overall cut and impact upon the landscape may be considered.

2.6.9. The impact of the severance of farmland has been considered to assess whether uneconomic field sizes or shapes are created by the new road corridor. At this stage the boundaries between farm holdings have not been assessed and this will be assessed at the later stages of assessment to minimise the effects of route choice on farming activities.

2.6.10. Figure 24 shows some of the small fields created which may not be able to be farmed economically including plots at the A465, at Merryhill Farm, and South of Grafton. Additional larger fields are also severed and, whilst they may still be of agricultural value, their value may have reduced and the likely compensation will need to be factored into later scheme cost estimates. In addition, accommodation works will be necessary to reduce the severance effect of the scheme including bridges, underpasses and at grade access points.

2.6.11. The farmland severance effects of the road may have some advantages though as, whilst the parcels of land created may be of little farming value, there may be an option to include them within the area of land purchased for the road for environmental mitigation and landscaping.

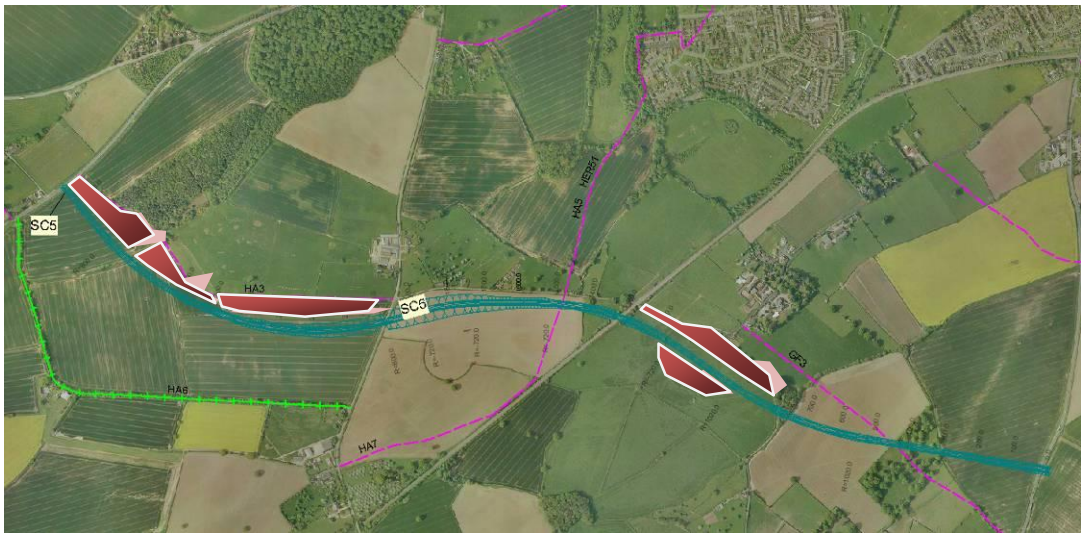

Figure 24: Farmland Severance – Example of creation of small fields

2.7. Southern Core Route SC6

2.7.1. A plan showing the route of SC6 along with the major physical and environmental constraints and its vertical profile can be seen on Drawing Number 551594-H-P-006 in Appendix A and overlaid on the aerial photograph in Figure 25.

Figure 25: Plan View of SC6

2.7.2. The route incorporates a lower standard of alignment with tighter radii to reduce impacts upon a number of constraints.

2.7.3. The route travels west form the A49 on a more northerly alignment than SC1-5 to avoid Grafton Woods. The alignment then turns south to cross Grafton Road at grade missing the triangle of woodland otherwise the impacts are very similar to SC3-5 up to Grafton Lane.

2.7.4. The alignment has been designed to avoid the circular field boundary between Grafton Lane and the railway line in case of archaeological impact and also to increase the clearance to the properties at Grafton.

2.7.5. SC6 is similar to SC4 but the tighter radius between the railway line and Haywood lane allows the alignment to follow the natural contours thereby reducing the volume of cut material.

2.7.6. Haywood Lane is kept open by means of a new over-bridge at the level of the existing road and the alignment continues west, again passing through the narrowest section of Newton Coppice.

2.7.7. The tie in to the A465 is further south which will present some challenges relating to the angle of approaches of the new road and A465, although none considered insurmountable. This location takes advantage of the screening effect of the woods to reduce the impact upon the residential properties and is located further from Belmont Abbey. A continuation of the route for a Western Relief Road could utilise the routes presented in the 2010 HRR Study of Options Report.

2.7.8. The impact of the severance of farmland has been considered to assess whether uneconomic field sizes or shapes are created by the new road corridor. At this stage the boundaries between farm holdings have not been assessed and this will be assessed at the later stages of assessment to minimise the effects of route choice on farming activities.

2.7.9. Figure 26 shows some of the small fields created which may not be able to be farmed economically including plots at the A465, at Merryhill Farm, and south of Grafton. Additional larger fields are also severed and, whilst they may still be of agricultural value, their value may have reduced and the likely compensation will need to be factored into later scheme cost estimates. In addition accommodation works will be necessary to reduce the severance effect of the scheme including bridges, underpasses and at grade access points.

2.7.10. The farmland severance effects of the road may have some advantages though as, whilst the parcels of land created may be of little farming value, there may be an option to include them within the area of land purchased for the road for environmental mitigation and landscaping.

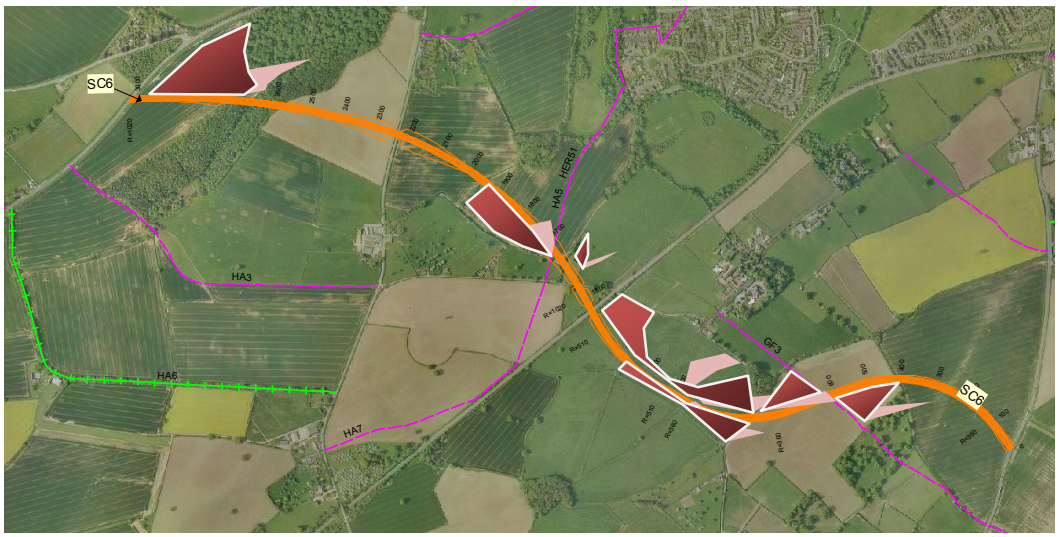

Figure 26: Farmland Severance – Example of creation of small fields

2.8. Flow Ranges for New Rural Road Links

2.8.1. At the start of the study the design team assumed an urban road carriageway standard and as such a normal single carriageway road was considered appropriate for the flows from the traffic model. However, on consideration of the location of the road, a rural standard is considered appropriate despite the likely presence of adjacent footway / cycleway.

2.8.2. The carriageway design for the Southern Corridor complies with the guidance provided in the Design Manual for Roads and Bridges for rural roads (TA 46/97). The Hereford SATURN traffic model estimates the highest two-way Annual Average Daily Total (AADT) in the 2019 opening year for the Southern Corridor to be 14,133 vehicles with a full Western Relief Road and Housing Option 5.

2.8.3. The AADT estimate includes a reduction of 20% for the implementation of a suite of sustainable transport measures in Hereford that will encourage people to travel by alternative means to private car. If these measures do not have the desired impact on travel behaviour or are not put in place then the AADT in 2019 could be as high as 16,959 vehicles.

2.8.4. TA 46/97 provides an indication of the range of traffic flows over which each carriageway standard is likely to be economically justified. The recommended opening year economic flow ranges are given in Table 1 and provide a starting point for scheme assessment. They support the decision as to which carriageway standards are most likely to be economically and operationally acceptable in normal circumstances for any given traffic flow.

Table 1: Opening Year Economic Flow Ranges

Carriageway Standard	2019 Opening Year AADT	
	Minimum	Maximum
Single 2 Lane Carriageway (S2)	Up to 13,000	
Wide Single 2 Lane Carriageway (WS2)	6,000	21,000
Dual Carriageway – Two lanes each way (D2AP)	11,000	39,000
Dual Carriageway – Three Lanes Each Way (D3AP)	23,000	54,000
Motorway – Two Lanes Each Way (D2M)	Up to 41,000	
Motorway – Two Lanes Each Way (D3M)	25,000	67,000
Motorway – Two Lanes Each Way (D4M)	52,000	90,000

2.8.5. Table 1 indicates that the design standards that should initially be considered for the Southern Corridor are either a Wide Single carriageway 10 metre (WS2) or Dual 2 Lane all-purpose (D2AP) carriageway.

2.8.6. The flow ranges given in Table 1 are determined only from the general economic assessments using COBA and QUADRO. All decisions on choice of carriageway standard should be based on the combined results of economic, operational and environmental assessments.

2.8.7. It should be noted that, at this stage of the assessment, the corridor is wide enough to accommodate single or dual carriageway options.

2.9. Junctions on A465

2.9.1. The form and location of junctions onto the A465 has strategic importance as it is likely to define the route of the wider Relief Road if this continues to the West of the City.

2.9.2. The A465 junction will be in a rural setting on a high speed road with high turning movements. The optimum junction type for this location would be a normal roundabout with capacity to add a further Westbound arm and associated additional traffic flows should the western relief road be taken forward in the future. Due to the high speed nature of the approaches, achieving adequate deflection of vehicles around the roundabout to reduce speeds will be critical and no departures from standard in this regard will be acceptable. As a result the roundabout will need to be of a reasonable size, of a similar form to the roundabout on the A49 for the B4399 Rotherwas Access Road.

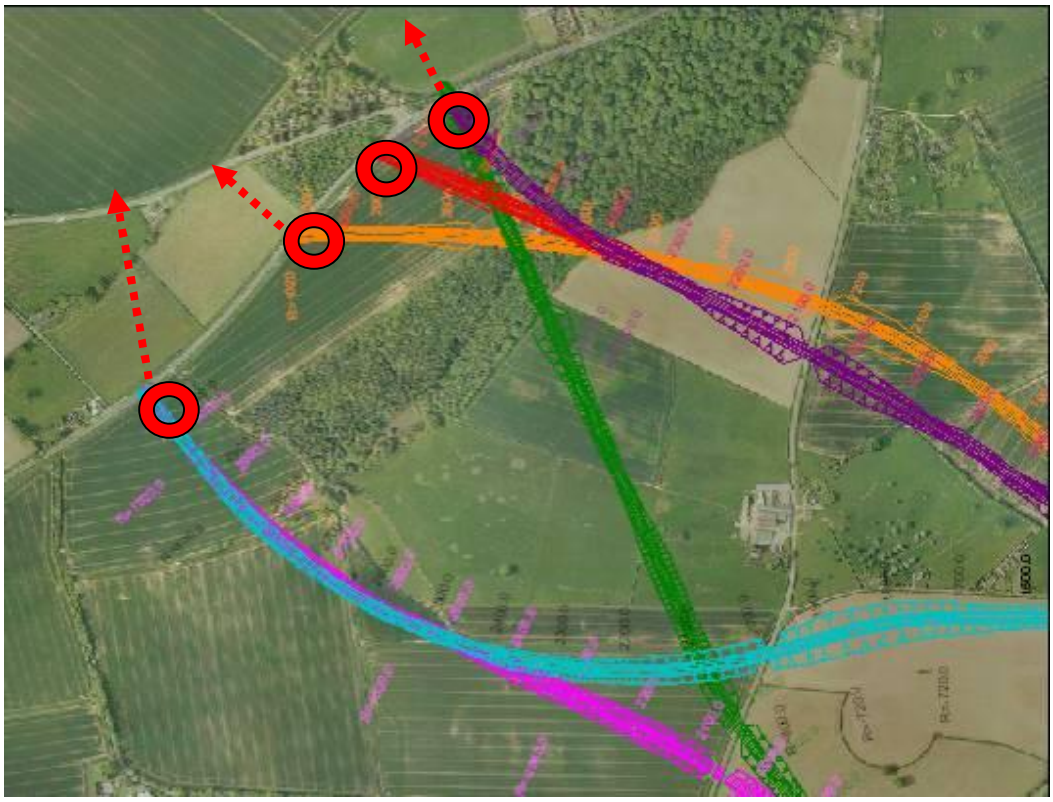

Figure 27: A465 Junction Location Options

2.9.3. The alignments SC1-6 give a selection of junction locations as shown in Figure 27, SC1 and SC4 join the A465 close to the junction with the B4349 utilising the narrowest section of the Newton Coppice Special Wildlife Site (SWS) and allowing for a continuation of the western route through the playing fields adjacent to the Belmont Abbey.

2.9.4. SC3 has a more optimum approach alignment from the East but would not favour a direct continuation of a Western Relief Road. SC6 has a less optimum crossing alignment through the Newton Coppice SWS but allows a junction on the A465 south of the residential properties and woodland, but still allowing for a continuation along a western relief road.

2.9.5. SC2 and SC5 are aligned to the South of Newton Coppice SWS, further from the residential properties, historic buildings and facilities at and near Belmont Abbey. The junction would, however, be close to individual properties which need to be considered within the overall impact.

2.9.6. An assessment of the requirements for street lighting at this junction has been made as the decision to light the junction or not will impact upon its effect upon the local landscape. The lighting consideration can be found in full in Appendix F but in summary, there are no statutory requirement to provide road lighting or to install a particular class of lighting if a decision is made to light a particular road. However, Section 97 of the Highways Act 1980 empowers a Highway Authority to provide lighting for any highway or proposed highway for which they are or will be the Highway Authority. The main purposes of road lighting are:

- to allow all road users, including operators of motor vehicles, motor cycles, pedal cycles, and animal drawn vehicles to proceed safely,
- to allow pedestrians to see hazards, orientate themselves, recognize other pedestrians, and give them a sense of security,
- to improve the day-time and night-time appearance of the environment.

The new junctions will be on high speed links and will present a significant conflict area. However, lighting will not be installed on roads outside settlement boundaries unless there is a proven and overriding safety reason which cannot be addressed by other means. This will be considered further in the detailed design, along with a more detailed assessment of wider environmental and ecological impacts. At this stage it is considered that lighting will be required at the new major junctions of a form similar to that on the new A49 roundabout for the Rotherwas Access Road.

2.10. Cost Estimates

2.10.1. The cost estimate has been developed in line with the guidelines given in HM Treasury Green Book. The Green Book provides a step by step estimation process that utilises available current construction rates.

2.10.2. In this report, the rates from cost estimates for other Authorities, the Rotherwas Access Road scheme, recently completed schemes in Herefordshire, the industry at large, and SPON's (Civil Engineering and Highway Works Price Book). Refer to Appendix C for a detailed breakdown of costs.

Table 2: Cost Estimates (£ in 2010 Prices)

Route	Construction Costs	Land Costs	Preliminaries 25%	Preparation and Supervision (17%)	Optimism Bias 44%	Total (£)
SC1	13,011,076	1,030,000	3,252,769	2,211,882	8,582,520	**28,088,248**
SC2	7,997,236	842,000	1,999,309	1,359,530	5,359,530	**17,565,229**
SC3	5,867,352	781,000	1,466,838	997,449	4,009,561	**13,122,202**
SC4	5,749,066	750,000	1,437,266	977,341	3,922,016	**12,835,691**
SC5	7,422,464	838,000	1,855,616	1,261,818	5,006,275	**16,384,175**
SC6	6,805,850	884,000	1,701,462	1,156,994	4,641,255	**15,189,562**

3. Environmental Assessment

3.1. Introduction

3.1.1. An environmental assessment has been completed and can be found in Appendix D of this report titled 'Hereford Relief Road Southern Core Corridor – Study of Options Environmental Assessment Report' (SOEAR).

3.1.2. The aim of this Environmental Assessment was to assess any environmental constraints of the six route options in the Southern Core Corridor in terms of the environmental objective for transport. It also considers the 2010 and 2011 consultations and more recently 2012 consultation responses from residents and statutory bodies.

3.1.3. The SOEAR assesses the environmental constraints of the six route options SC1 to SC6 in isolation, and not in conjunction with any other proposal for the Hereford Relief Road.

3.1.4. While it is necessary to assess all potential effects to some degree in order to determine which of them may be significant, the assessment identifies which of the effects assessed should be regarded as of enough significance to be taken into account in the decision making process. Each of the sections therefore sets out the criteria under which the significance of the effects for that topic has been assessed. Where possible this is by reference to published guidance or good practice, and Table 3 below is a general guide to how this has been carried out, based on the interaction between the sensitivity of the resource affected and the magnitude of the change to it.

Table 3: Significance of Impacts

V	**Very High**	**Very Large**	**Very Large / Large**	Large / Moderate	Slight	Neutral
A	**High**	**Very Large / Large**	Large / Moderate	Moderate / Slight	Slight	Neutral
L	**Medium**	Large / Moderate	Moderate / Slight	Slight	Slight / Neutral	Neutral
U	**Low**	Moderate / Slight	Slight	Slight / Neutral	Slight / Neutral	Neutral
E	**Negligible**	Slight	Slight / Neutral	Slight / Neutral	Neutral	Neutral
		Major	**Moderate**	**Minor**	**Negligible**	**None**
		MAGNITUDE OF IMPACT				

3.1.5. In accordance with the Department for Transport's Transport Analysis Guidance (TAG) the assessment has 10 sub-objectives that reflect the various impacts of concern:

- to reduce noise; The Noise Sub-Objective
- to improve local air quality; The Air Quality Sub-Objective
- to reduce greenhouse gases, The Greenhouse Gases Sub-Objective
- to protect and enhance the landscape; The Landscape Sub-Objective
- to protect and enhance the townscape; The Townscape Sub-Objective
- to protect the heritage of historic resources; The Heritage of Historic Resources Sub-Objective
- to support biodiversity and geodiversity; The Biodiversity Sub-Objective
- to protect the water environment ; The Water Environment Sub-Objective
- to encourage physical fitness; The Physical Fitness Sub-Objective
- to improve journey ambience; The Journey Ambience Sub-Objective

3.1.6. Tables 4 to 9 summarise the assessment findings against each of these sub-objective headings.

3.1.7. The following were consulted for information and to gain an understanding of any potential issues associated with the proposed route options:

- The Environment Agency (EA)
- Natural England
- English Heritage
- Herefordshire Council's Historic Building Team
- Herefordshire Council Archaeological Team
- Herefordshire Council's Ecology Team
- Herefordshire Council's Landscape Team
- Herefordshire Council's Environmental Health Team

3.1.8. The final version of this report will include all consultation responses received before the date of issue of the report.

Guide to symbols

✓ - Slight beneficial	× - Slight adverse	0 - Neutral
✓✓ - Slight/ Moderate beneficial	×× - Slight/Moderate adverse	
✓✓✓ - Moderate beneficial	××× - Moderate adverse	
✓✓✓✓ - Moderate/Large beneficial	×××× - Moderate/Large adverse	
✓✓✓✓✓ - Large beneficial	××××× - Large adverse	

Table 4 Route SC1 Summary of Environmental Assessment		
Sub-Objective	**Assessment Summary**	**Impact**
Noise	74 no. properties within 300m of which 2 no. are located within 100m. The majority located along or close to the existing road network consisting of local B and C class roads and two Class A roads. Large adverse impact within 300m of this route option. 84 no. properties within 300 – 600m so a total of 158 no. properties within 600m. Depending on topography, type of intervening ground surface and existing road network, properties up to 600m will potentially be impacted from this route.	××
Local Air Quality	SC1 is the longest route at a length of 3,124m, thereby resulting in slightly greater volume of emissions than the other options. Air quality will be adversely affected during construction due to dust created by earthworks and emissions caused by vehicle movements.	××
Greenhouse Gases	SC1 is the longest route at a length of 3,124m, thereby resulting in slightly greater volume of greenhouse gas emissions than the other options. There could be a reduction in greenhouse gas emissions as a result of the scheme proposals, due to vehicles travelling at optimum speeds and reduced congestion elsewhere on the road network.	×××
Landscape	Mayfield Cottage will have a clear view of the route and the uninterrupted views of the landscape the property currently has will be replaced by the new road. Veddoes Farm, The Green Cottage, New House Farm Barn and the users of Grafton Lane shall all have altered views of the route. These properties will have the uninterrupted views of the existing landscape changed due to the route. Haywood Lodge Farm, Haywood Lodge Farm House, Oak View, The Granary, Roman Byre, Haywood Lodge and No 1 and No 2 Haywood Lane Road will all be directly affected and will all have direct views of the route and experience a change in their uninterrupted view of the landscape. The loss of natural habitat through the removal of existing mature mixed species hedgerow and specimen trees will affect biodiversity and impact on the landscape character.	××
Townscape	1km south west of the Newton Farm Character Area. The intervening landscape of woodland and fields means the route will not be visually intrusive to the Character Area. Impact on the Character Area will be neutral. The intersection point with the A465 is approximately 690m west of the boundary of the Belmont Townscape Character Type along the A465. Not considered to intrude into the townscape character of the area. It is assessed that the impact of SC1 will be neutral.	✓
Heritage	Option SC1 would pass between the two clusters of listed buildings, approximately 200m from Merryhill and 350m from Haywood. Natural slopes, other buildings and stands of trees would lessen the visual impact which would be minor. At the west of the corridor is Belmont Abbey and SC1 would 'terminate' 180m from this complex. The views would be partly obscured by formal gardens and stands of mature trees, and the overall impact would be minor. SC1 would pass through the southern end of the Unregistered Historic Park/Garden of Belmont House, which is of low heritage value; the impact would be minor. Limited findings may indicate a general low level of prehistoric activity in this area. Roman pottery found within the area but full potential impact unknown. Medieval pottery found and medieval settlement, indicate southerly routes, have a lower potential impact upon this area. Overall, archaeological remains of the Post-medieval period have been assigned a low heritage value.	×××××
Biodiversity	Loss of habitat and severance at Grafton Woods and potential for this site to be used by badgers and bats. Loss and severance of hedgerows and severance of territory for badgers. The route travels through Newton Coppice but severance of the woodland could be mitigated by building a raised structure through the woodland canopy. Habitats suitable for roosting and foraging bats, dormice and great crested newts. Disturbance to the surrounding woodland during construction works, the impact is rated as large adverse. Close to the edge of a small area of woodland at Grafton Lane with loss of some of the trees with potential for nesting birds. May also impact on the watercourse (See water Environment).	×××××
Water Environment	Require of culverting Withy Brook and bridge over Newton Brook. Norton Brook 1km downstream. Norton Brook and Newton Brook discharge to the River Wye. Within 500m of one potable water abstraction and five groundwater abstractions. There is no loss of flood plain or increased flood risk resulting from route option. Drift deposits which underlie all of the route options and which overlie the Raglan Mudstone Formation are either of high or intermediate leaching potential. Potential impact to groundwater resources is of slight adverse significance during the construction.	××
Physical Fitness	Access for non-motorised users in the Southern Core Corridor on rural minor lanes such as Grafton lane to be closed. Grafton Lane is part of the alternative route Haywood Lane. Haywood Lane rat run for commuters travelling in and out of Hereford City Centre so scheme could improve the safety and encourage NMUs. HC footpath GF3, HA7 and HA3 bisected.	×
Journey Ambience	Travellers' views would be classed as open with views across the agricultural landscape south of Hereford where not in cut. It is assessed that traveller stress will be lower on the new route compared to the existing route through Hereford City centre.	✓

Table 5 Route SC2 Summary of Environmental Assessment		
Sub-Objective	**Assessment Summary**	**Impact**
Noise	23 no. properties within 300m of which 4 no. are located within 100m. The majority located along or close to the existing road network consisting of local B and C class roads and two Class A roads. Large adverse impact within 300m of this route option. 82 no. properties within 300 – 600m so a total of 105 no. properties within 600m. Overall, this route option will potentially affect the lowest number of properties.	××
Local Air Quality	Route options SC2 has a lengths of 3,093m which is average compared to the other routes. Air quality will be adversely affected during construction due to dust created by earthworks and emissions caused by vehicle movements.	×
Greenhouse Gases	Route options SC2 has a lengths of 3,093m which is average compared to the other routes. There could be a reduction in greenhouse gas emissions as a result of the scheme proposals, due to vehicles travelling at optimum speeds and reduced congestion elsewhere on the road network.	××
Landscape	Mayfield Cottage will have a clear view of the route and the uninterrupted views of the landscape the property currently has will be replaced by the new road. Veddoes Farm, The Green Cottage, New House Farm Barn and the users of Grafton Lane shall all have altered views of the route. These properties will have the uninterrupted views of the existing landscape changed due to the route. Haywood Lodge Farm, Haywood Lodge Farm House, Oak View, The Granary, Roman Byre, Haywood Lodge and No 1 and No 2 Haywood Lane Road will all be directly affected and will all have direct views of the route and experience a change in their uninterrupted view of the landscape. Golden Post House, Golden Post, Broad Meadow Farm, Broad Meadow Flying Club and users of the bridleway HA6, footpath HA3 and GF3 shall all be directly affected and have altered views with this proposal. The loss of natural habitat through the removal of existing mature mixed species hedgerow and specimen trees will affect biodiversity and impact on the landscape character.	××
Townscape	Further away from the Newton Farm Townscape Character Area and it is assessed that it will have a neutral impact. The intersection point of this route option with the A465 is located approximately 1.2km from the western boundary of the Belmont Townscape Character Area. Due to the screening effect of the woodland along the A465 in this section and the road geometry it is assessed that this route option will have a neutral impact on the Character Area.	✓
Heritage	Option SC2 would pass between the two clusters, approximately 370m from Merryhill and 270m from Haywood. At the west of the corridor is Belmont Abbey but SC2 is the furthest route from these structures. SC2 would pass within 140m of a Grade II milestone (4037), with a negligible impact. SC2 would 'terminate' approximately 480m from the Grade II barn (3992) and granary (3993) at Clehonger Court. The views from the buildings would be obscured by other buildings and stands of mature trees, and the impact would be negligible. Limited findings may indicate a general low level of prehistoric activity in this area. Roman pottery found within the area but full potential impact unknown. Medieval pottery found and medieval settlement, indicate southerly routes, have a lower potential impact upon this area. Overall, archaeological remains of the Post-medieval period have been assigned a low heritage value.	×××
Biodiversity	Loss of habitat and severance at Grafton Woods and potential for this site to be used by badgers and bats. Loss and severance of hedgerows and severance of territory for badgers. SC2 passes 50m south of Hayleasow Wood and could have impacts in terms of disturbance, pollution and road-kill. The impact of this is rated as moderate adverse. There is also mention of the native white-clawed crayfish being present in Newton Brook which runs south through the wood. As all the proposed routes cross the brook at some point this impact is rated as moderate adverse.	×××××
Water Environment	Require of culverting Withy Brook but avoids crossing Newton Brook. Norton Brook 1km downstream. Norton Brook and Newton Brook discharge to the River Wye. Within 500m of one potable water abstraction and five groundwater abstractions. There is no loss of flood plain or increased flood risk resulting from route option. Drift deposits which underlie all of the route options and which overlie the Raglan Mudstone Formation are either of high or intermediate leaching potential. Potential impact to groundwater resources is of slight adverse significance during the construction.	×
Physical Fitness	Access for non-motorised users in the Southern Core Corridor on rural minor lanes such as Grafton lane to be closed. Grafton Lane is part of the alternative route Haywood Lane. Haywood Lane rat run for commuters travelling in and out of Hereford City Centre so scheme could improve the safety and encourage NMUs. HC footpath GF3 and HA7 bisected.	××
Journey Ambience	Travellers' views would be classed as open with views across the agricultural landscape south of Hereford where not in cut. It is assessed that traveller stress will be lower on the new route compared to the existing route through Hereford City centre.	✓✓

Table 6 Route SC3 Summary of Environmental Assessment		
Sub-Objective	**Assessment Summary**	**Impact**
Noise	65 no. properties within 300m of which 9 no. are located within 100m, the highest of all routes. The majority located along or close to the existing road network consisting of local B and C class roads and two Class A roads. Large adverse impact within 300m of this route option. 122 no. properties within 300 – 600m so a total of 187 no. properties within 600m. Depending on topography, type of intervening ground surface and existing road network, properties up to 600m will potentially be impacted from this route. Property counts for all distance bands are above average in comparison to the other routes.	×××
Local Air Quality	The shortest routes are SC3 and SC4 with the same proposed length of 2,775m resulting in the least emissions. Air quality will be adversely affected during construction due to dust created by earthworks and emissions caused by vehicle movements.	×
Greenhouse Gases	The shortest routes are SC3 and SC4 with the same proposed length of 2,775m resulting in the least emissions. There could be a reduction in greenhouse gas emissions as a result of the scheme proposals, due to vehicles travelling at optimum speeds and reduced congestion elsewhere on the road network.	×
Landscape	Mayfield Cottage, Woodside Gardens, St Michael Court, Merryhill House, The Uplands, Merryhill Villa, Merryhill Terrace No 1-8, Merryhill Farm, Merryhill Park, Vine Cottage, Merryhill Cottage, Beechwood, users of Belmont Country Park Newton Coppice, users of footpath HA5, users of the public right of way, Ashley Cottage, Merry Cottage, Graftonbury Cottage, Garlands Cottage, Cedar Folly, Ashley Farm, Grafton Court, Graftonbury Rise, Woodlands, Graftonbury Garden Hotel, Glendale, users of Grafton Lane will all be affected by this route and properties situated to the edge of the proposed route shall, be impacted the through the change in the landscape. The loss of natural habitat will have an impact on biodiversity through the removal of existing mixed species hedgerows and possible requirement to remove specimen trees.	××
Townscape	500m south west of the southern boundary of Newton Farm Townscape Character Area. As with route options SC1 and SC2 the intervening topography and vegetation means that the route will not intrude visually to the Character Area. It is assessed that the impact of the route will be neutral. The intersection point of this route option is located approximately 870m south west of the Belmont Townscape Character Area. It is assessed that the impact of the route will be neutral.	✓
Heritage	Options SC3 would pass approximately 150m north of Merryhill. At the west of the corridor is Belmont Abbey and options SC3 is within 300m.The views would be partly obscured by formal gardens and stands of mature trees, and the overall impact would be minor. SC3 would pass through the southern end of the Unregistered Historic Park/Garden of Belmont House, which is of low heritage value; the impact would be minor. Limited findings may indicate a general low level of prehistoric activity in this area. Roman pottery found within the area but full potential impact unknown. Medieval pottery found and medieval settlement, indicate southerly routes, have a lower potential impact upon this area. Overall, archaeological remains of the Post-medieval period have been assigned a low heritage value.	×××××
Biodiversity	Loss of habitat and severance at Grafton Woods and potential for this site to be used by badgers and bats. Loss and severance of hedgerows and severance of territory for badgers. There are records of dormice along the railway line approximately 370m north east of where this route option intersects with the railway. It is assessed that the impact on dormouse habitat will be slight adverse. There are records of reptiles from Grafton House Orchard SINC. During construction works, precautions would have to be taken to ensure that these animals are protected from any clearance and construction works with suitable reptile fencing in place and possible trapping prior to commencement of works. The route travels through Newton Coppice but severance of the woodland be mitigated by building a raised structure through the woodland canopy. Habitats suitable for roosting and foraging bats, dormice and great crested newts. Disturbance to the surrounding woodland during construction works, the impact is rated as large adverse. Close to small area of woodland at Grafton Lane with loss of some of the trees with potential for nesting birds. May also impact on the watercourse (See water Environment).	×××××
Water Environment	Require of culverting Withy Brook and bridge over Newton Brook. Norton Brook 1km downstream. Norton Brook and Newton Brook discharge to the River Wye. Within 500m of one potable water abstraction and five groundwater abstractions. There is no loss of flood plain or increased flood risk resulting from route option. Drift deposits which underlie all of the route options and which overlie the Raglan Mudstone Formation are either of high or intermediate leaching potential. Potential impact to groundwater resources is of slight adverse significance during the construction.	×
Physical Fitness	Access for non-motorised users in the Southern Core Corridor on rural minor lanes such as Grafton lane to be closed. Grafton Lane is part of the alternative route Haywood Lane. Haywood Lane rat run for commuters travelling in and out of Hereford City Centre so scheme could improve the safety and encourage NMUs. HC footpath GF3 and HA5 bisected.	××
Journey Ambience	Travellers' views would be classed as open with views across the agricultural landscape south of Hereford where not in cut. It is assessed that traveller stress will be lower on the new route compared to the existing route through Hereford City centre.	✓✓

Table 7 Route SC4 Summary of Environmental Assessment		
Sub-Objective	**Assessment Summary**	**Impact**
Noise	82 no. properties within 300m of which 3 no. are located within 100m. The majority located along or close to the existing road network consisting of local B and C class roads and two Class A roads. Large adverse impact within 300m of this route option. 101 no. properties within 300 – 600m so a total of 183 no. properties within 600m. Depending on topography, type of intervening ground surface and existing road network, properties up to 600m will potentially be impacted from this route.	×××
Local Air Quality	The shortest routes are SC3 and SC4 with the same proposed length of 2,775m resulting in the least emissions. Air quality will be adversely affected during construction due to dust created by earthworks and emissions caused by vehicle movements.	×
Greenhouse Gases	The shortest routes are SC3 and SC4 with the same proposed length of 2,775m resulting in the least emissions. There could be a reduction in greenhouse gas emissions as a result of the scheme proposals, due to vehicles travelling at optimum speeds and reduced congestion elsewhere on the road network.	×
Landscape	Mayfield Cottage, Woodside Gardens, St Michael Court, Merryhill House, Merryhill Villa, The Uplands, Merryhill Farm, Beechwood, Merryhill Cottage, Vine Cottage, users of footpath HA5, Ashley Cottage, Merry Cottage, Graftonbury Cottage, Garlands Cottage, Cedar Folly, Ashley Farm, Grafton Court, Graftonbury Rise, Woodlands, Graftonbury Garden Hotel, The Green, users of the byway, the users of Haywood Lane and footpath GF3. These properties will all be directly affected by the change in the views that will occur due to the close proximity of this proposed route. The changes in the landscape required for the alignment will alter these properties views as the requirement for this route to cross the railway will alter the landscape in such a way that mitigation may not be possible. Properties directly adjacent will be impacted more than the properties set back from the route. There will be a requirement to remove existing mixed species hedgerow and possible specimen trees.	××
Townscape	500m south west of the southern boundary of Newton Farm Townscape Character Area. As with route options SC1 and SC2 the intervening topography and vegetation means that the route will not intrude visually to the Character Area. It is assessed that the impact of the route will be neutral. The intersection point of this route option is located approximately 870m south west of the Belmont Townscape Character Area. It is assessed that the impact of the route will be neutral.	✓
Heritage	Options SC4 would pass approximately 150m north of Merryhill. At the west of the corridor is Belmont Abbey and option SC4 is within 300m.The views would be partly obscured by formal gardens and stands of mature trees, and the overall impact would be minor. SC4 would pass through the southern end of the Unregistered Historic Park/Garden of Belmont House, which is of low heritage value; the impact would be minor. Limited findings may indicate a general low level of prehistoric activity in this area. Roman pottery found within the area but full potential impact unknown. Medieval pottery found and medieval settlement	×××××
Biodiversity	Loss of habitat and severance at Grafton Woods and potential for this site to be used by badgers and bats. Loss and severance of hedgerows and severance of territory for badgers. There are records of dormice along the railway line approximately 370m north east of where this route option intersects with the railway. It is assessed that the impact on dormouse habitat will be slight adverse. There are records of reptiles from Grafton House Orchard SINC. During construction works, precautions would have to be taken to ensure that these animals are protected from any clearance and construction works with suitable reptile fencing in place and possible trapping prior to commencement of works. The route travels through Newton Coppice but severance of the woodland be mitigated by building a raised structure through the woodland canopy. Habitats suitable for roosting and foraging bats, dormice and great crested newts. Disturbance to the surrounding woodland during construction works, the impact is rated as large adverse. Close to small area of woodland at Grafton Lane with loss of some of the trees with potential for nesting birds. May also impact on the watercourse (See water Environment).	×××××
Water Environment	Require of culverting Withy Brook and bridge over Newton Brook. Norton Brook 1km downstream. Norton Brook and Newton Brook discharge to the River Wye. Within 500m of one potable water abstraction and five groundwater abstractions. There is no loss of flood plain or increased flood risk resulting from route option. Drift deposits which underlie all of the route options and which overlie the Raglan Mudstone Formation are either of high or intermediate leaching potential. Potential impact to groundwater resources is of slight adverse significance during the construction.	×
Physical Fitness	Access for non-motorised users in the Southern Core Corridor on rural minor lanes such as Grafton lane to be closed. Grafton Lane is part of the alternative route Haywood Lane. Haywood Lane rat run for commuters travelling in and out of Hereford City Centre so scheme could improve the safety and encourage NMUs. HC footpath GF3 and HA5 bisected.	××
Journey Ambience	Travellers' views would be classed as open with views across the agricultural landscape south of Hereford where not in cut. It is assessed that traveller stress will be lower on the new route compared to the existing route through Hereford City centre.	✓✓

Table 8 Route SC5 Summary of Environmental Assessment		
Sub-Objective	**Assessment Summary**	**Impact**
Noise	44 no. properties within 300m of which 7 no. are located within 100m. which is about average for the routes. The majority located along or close to the existing road network consisting of local B and C class roads and two Class A roads. Large adverse impact within 300m of this route option. 68 no. properties within 300 – 600m so a total of 112 no. properties within 600m. Depending on topography, type of intervening ground surface and existing road network, properties up to 600m will potentially be impacted from this route. It has the second lowest property count in comparison to the other route options.	××
Local Air Quality	SC5 has a length of 3,093m which is average when compared to other routes, Air quality will be adversely affected during construction due to dust created by earthworks and emissions caused by vehicle movements.	×
Greenhouse Gases	SC5 has a length of 3,093m which is average when compared to other routes. There could be a reduction in greenhouse gas emissions as a result of the scheme proposals, due to vehicles travelling at optimum speeds and reduced congestion elsewhere on the road network.	××
Landscape	Broad Meadow Farm, Broad Meadow Flying Club, bridleway HA6, Golden Post House, Golden Post, users of footpath HA3, Merryhill Farm, Beechwood, Merryhill Cottage, Vine Cottage, users of footpath HA5, Ashley Cottage, Merry Cottage, Graftonbury Cottage, Garlands Cottage, Cedar Folly, Ashley Farm, Grafton Court, Graftonbury Rise, Woodlands, Graftonbury Garden Hotel, The Green, users of the byway footpath GF3, No 1 and No 2 Haywood Lane, Haywood Lodge Farm, Haywood Lodge Farm House, Oak View, The Grannary, Roman Byre, Haywood Lodge, the users of Haywood Lane and The Green. These properties will be directly affected by this proposed route due to the change in the views experienced by these receptors. The loss of natural habitat by the removal of existing mixed species hedgerow and possible removal of specimen trees will affect biodiversity and change the landscape character.	××
Townscape	630m south west of the Newton Farm Townscape Character Area and it is assessed that it will have a neutral impact on the Character Area. The intersection point of SC5 with the A465 is located approximately 1.2km from Belmont Townscape Character Area and it is assessed that impacts will be neutral.	✓
Heritage	Option SC5 would pass between the two clusters, approximately 200m from Merryhill and 400m from Haywood. Natural slopes, other buildings and stands of trees would lessen the visual impact which would be minor. At the west of the corridor is Belmont Abbey but SC2 is the furthest route from these structures. SC5 would pass within 140m of a Grade II milestone (4037), with a negligible impact. SC5 would 'terminate' approximately 480m from the Grade II barn (3992) and granary (3993) at Clehonger Court. The views from the buildings would be obscured by other buildings and stands of mature trees, and the impact would be negligible. Limited findings may indicate a general low level of prehistoric activity in this area. Roman pottery found within the area but full potential impact unknown. Medieval pottery found and medieval settlement, indicate southerly routes, have a lower potential impact upon this area. Overall, archaeological remains of the Post-medieval period have been assigned a low heritage value.	×××××
Biodiversity	Loss of habitat and severance at Grafton Woods and potential for this site to be used by badgers and bats. Loss and severance of hedgerows and severance of territory for badgers. SC2 passes 50m south of Hayleasow Wood and could have impacts in terms of disturbance, pollution and road-kill. The impact of this is rated as moderate adverse. There is also mention of the native white-clawed crayfish being present in Newton Brook which runs south through the wood. As all the proposed routes cross the brook at some point this impact is rated as moderate adverse.	××××
Water Environment	Require of culverting Withy Brook but avoids crossing Newton Brook. Norton Brook 1km downstream. Norton Brook and Newton Brook discharge to the River Wye. Within 500m of one potable water abstraction and five groundwater abstractions. There is no loss of flood plain or increased flood risk resulting from route option. Drift deposits which underlie all of the route options and which overlie the Raglan Mudstone Formation are either of high or intermediate leaching potential. Potential impact to groundwater resources is of slight adverse significance during the construction.	0
Physical Fitness	Access for non-motorised users in the Southern Core Corridor on rural minor lanes such as Grafton lane to be closed. Grafton Lane is part of the alternative route Haywood Lane. Haywood Lane rat run for commuters travelling in and out of Hereford City Centre so scheme could improve the safety and encourage NMUs. HC footpath GF3 and HA7 bisected.	×
Journey Ambience	Travellers' views would be classed as open with views across the agricultural landscape south of Hereford where not in cut. It is assessed that traveller stress will be lower on the new route compared to the existing route through Hereford City centre.	✓✓✓✓

Table 9 Route SC6 Summary of Environmental Assessment		
Sub-Objective	**Assessment Summary**	**Impact**
Noise	53 no. properties within 300m of which none. are located within 100m. The majority located along or close to the existing road network consisting of local B and C class roads and two Class A roads. Large adverse impact within 300m of this route option. 204 no. properties within 300 – 600m so a total of 257 no. properties within 600m. Depending on topography, type of intervening ground surface and existing road network, properties up to 600m will potentially be impacted from this route. Has the potential to adversely impact the greatest number of properties within 600m of the scheme extent.	×××
Local Air Quality	SC6 has a length of 3,021m which is average when compared to other routes. Air quality will be adversely affected during construction due to dust created by earthworks and emissions caused by vehicle movements.	×
Greenhouse Gases	SC6 has a length of 3,021m which is average when compared to other routes. There could be a reduction in greenhouse gas emissions as a result of the scheme proposals, due to vehicles travelling at optimum speeds and reduced congestion elsewhere on the road network.	××
Landscape	The users of footpath GF3 and byway, users of footpath HA5, Vine Cottage, Merryhill Cottage, Beechwood, Merryhill Farm, The Uplands, Merryhill Villa, Merryhill House, St Michael Court, Mayfield and Golden Post House. These properties will see a change in the views they experience at the moment through the loss of existing mixed species hedgerow and possible specimen trees. The loss of hedgerow will affect biodiversity as it is a natural habitat and contributes to the landscape character. The possible occurrence of visual intrusion to the receptors is greatly reduced as although these properties will be affected they are over 100m away from this proposed route. The increase in intrusion is less dramatic as the receptors are located at a further distance away than the other proposed routes. This route affects fewer properties and is the preferred option in terms of landscape and visual. The ability to contour the landscape in such a way that the route is less intrusive to the existing landscape character and to screen the route with additional planting would assist in mitigating against the removal of existing hedgerow and specimen trees and increase biodiversity.	×
Townscape	The closest of the southern core route options to the Townscape Character Area of Newton Farm is SC6. This passes within 500m of the south western edge of the Character Area. It is assessed that the impact on it will be neutral. At the intersection point on the A465, this route is approximately 970m south west of the Belmont Townscape and it is assessed that impacts will be neutral.	✓
Heritage	SC6 would pass approximately 150m north of Merryhill. At the west of the corridor is Belmont Abbey and SC6 is within 300m of this complex. The views would be partly obscured by formal gardens and stands of mature trees, and the overall impact would be minor. Limited findings may indicate a general low level of prehistoric activity in this area. Roman pottery found within the area but full potential impact unknown. Medieval pottery found and medieval settlement, indicate southerly routes, have a lower potential impact upon this area. Overall, archaeological remains of the Post-medieval period have been assigned a low heritage value.	×××××
Biodiversity	The only option of the southern core routes that doesn't cut through Grafton Wood. Impacts on these wooded areas will be slight. Severance of field boundary hedgerows and loss of habitat and severance of badger territories. Closest to the Newton Farm SINC sites impacting upon the recorded bat roosts evaluated as large adverse impact. Crosses the railway line close to the site of the dormice records, although impacts are assessed to be slight adverse. Cross Newton Coppice. but severance mitigated by building a raised structure though the woodland canopy. This woodland contains habitats suitable for roosting and foraging bats, dormice and great crested newts. Disturbance during construction works impact is large adverse. There are records of reptiles from Grafton House Orchard SINC. Close to the edge of a small area of woodland at Grafton Lane with loss of some of the trees with potential for nesting birds. May also impact on the watercourse (See water Environment).	×××
Water Environment	Require of culverting Withy Brook and bridge over Newton Brook. Norton Brook 1km downstream. Norton Brook and Newton Brook discharge to the River Wye. Within 500m of one potable water abstraction and five groundwater abstractions. There is no loss of flood plain or increased flood risk resulting from route option. Drift deposits which underlie all of the route options and which overlie the Raglan Mudstone Formation are either of high or intermediate leaching potential. Potential impact to groundwater resources is of slight adverse significance during the construction.	×
Physical Fitness	Access for non-motorised users in the Southern Core Corridor on rural minor lanes such as Grafton lane to be closed. Grafton Lane is part of the alternative route Haywood Lane. Haywood Lane rat run for commuters travelling in and out of Hereford City Centre so scheme could improve the safety and encourage NMUs. HC footpath GF3 and HA5 bisected.	×
Journey Ambience	Travellers' views would be classed as open with views across the agricultural landscape south of Hereford where not in cut. It is assessed that traveller stress will be lower on the new route compared to the existing route through Hereford City centre.	✓

4. Consultation Responses

4.1. 2010 and 2011 Public Consultation

4.1.1. Since the 2010 HRR Study of Options Report, the Southern Corridor A465 to A49 link road has been included in two public consultations as part of the Local Development Framework process.

4.1.2. Within the two consultations a number of points were raised and the main points that are within the context of this report are acknowledged below and addressed throughout the report.

4.1.3. The first consultation in September 2010 is considered within this report as the responses to the "Preferred options: Hereford" consultation. Below are the main points summarised from the consultation:

- Effect on residential amenity – air pollution, noise, light
- No relationship with 2002 Unitary Development Plan bypass route
- Bypass route – lower height profile, less visual impact
- Houses purchased on the basis of bypass safeguarding
- Need to widen road corridor to include alternatives
- Effect on private water supply
- Flooding in the area
- Effect of construction work on residential property
- Original bypass route showed up in searches
- Sever Grafton Lane and divide community
- Effect on Route 48
- Road will divide fields from working farm
- Route close to Grade II* listed building
- Alternative route alignment suggested
- Heritage issues not included within Amey Study
- Bypass route follows more natural contours
- Effect on Beech Grove
- No explanation for abandoned bypass route
- Proposed southern route is unsound
- English Heritage have not been involved in the process

4.1.4. Following the consultation, the southern corridor was amended to allow consideration of the former bypass route and further consultation took place in September 2011.

4.1.5. There were 81 individual responses, a paper petition with 50 residents' signatures, an e-petition with 110 residents' signatures and a petition letter from Grafton, Haywood, Merryhill and Belmont residents with 57 signatures.

4.1.6. The main points of this consultation are ranked in order of most concern to the public in table 10, including the points raised in the responses of the petitions.

Table 10 Summary of Public Consultation Responses

Rank	Objection	Comment
1	Effect on ancient wood / Hayleasow wood	SC1, SC4 and SC6 will have a major impact on the wood with alignments requiring removal of a section of the wood. SC2 and SC5 will have a lesser impact with the alignment skirting to the south of the wood.
2	Lack of general consultation	No Comment in this study
3	The influence small no residents	No Comment in this study
4	Effect on Sustrans route 46	All route alignments will have a severance impact on NCN 46, detailed design will establish mitigation measures for the route.
5	Effect on Belmont Abbey, Abbey Farm, Merryhill Terrace and Graftonbury	All route alignments will affect the views from Graftonbury Gardens; SC3, SC4 and SC6 will have the greater effect on Merryhill Terrace; SC1 and SC4 will have the greater effect on Belmont Abbey; Abbey Fm
6	Amended route affects more residents than original 'Amey Route'	SC3, SC4, SC5 and SC6 are closer to Grafton; SC3, SC4 and SC6 are closer to the outskirts of Hereford
7	Support alignment SC2	Support for SC2
8	Effect on Abbey Fields	SC1 and SC4 will affect Abbey fields if the road is extended for the Western Relief Road.
9	Relied on information in local search	Local searches reflect protected routes only when these have been confirmed through the planning process.
10	Residential amenity: noise, light and air pollution	The effect of pollution on local receptors will be calculated in the detailed design phases and mitigated as far as possible
11	Effect on Belmont Haywood Country Park and pools	SC1, SC3, SC4 and SC6 will have an effect on Belmont Haywood Country Park along the southern edge of Newton Coppice. All routes may reduce the amount of traffic on Haywood Lane and allow easier and safer travel between the pools
12	Detrimental effect on local landscape	Mitigation process at design stage will look to reduce the impact of the new road on local landscape
13	Effect on Woodfield Gardens	SC1 and SC4 will affect Woodfield Gardens if the road is extended for the Western Relief Road.
14	Effect on wildlife / nature conservation	The effect will be calculated in the detailed design phases and mitigated as far as possible
15	Detrimental effect on	Permanent effects on property values will be through claims following scheme

Table 10 Summary of Public Consultation Responses

Rank	Objection	Comment
	property values	delivery. Included in scheme costings.
16	Information and maps are difficult to understand	Comments taken on board and mapping revised accordingly
17	Effect on St Michaels Court	SC1 and SC4 will affect St Michaels Court if the road is extended for the Western Relief Road.
18	Effect on Belmont Golf Course	Southern Corridor has no impact on Belmont Golf Course; it will only affect the Golf Course if the road is extended for the Western Relief Road. Recommended Western Inner Relief Road options have the lowest impacts.
19	No planning grounds for change to route for consultation in 2011	Support for SC1 and SC2
20	Support original bypass	SC1 and SC2 will have the greatest impact on Haywood Lodge. Additional alignments suggested and considered in this study.
21	No environmental assessments undertaken	Further environmental assessments have been completed including consultation with environmental public bodies
22	No indication of protection of heritage assets	A further heritage assessment has been completed although still only desk based at this stage of assessment.
23	Bypass route follows contours better	Support for SC3, SC4 and SC6
24	Rationale of Amey study ignored	No comment in this study
25	Effect on Haywood Lodge	SC1 and SC2 will have greatest impact on Haywood Lodge. Additional Alignments considered in Study.
26	Effect on listed builds on Belmont Abbey Estate	SC1 and SC4 will affect Belmont Abbey Estate if the road is extended for the Western Relief Road.
27	Effect on bridleways	All routes will sever public rights of way, mitigation at design stage will consider how to minimise the disruption to the network
28	Effect on Henley Lodge	SC1 and SC4 will effect if the road is extended for the Western Relief Road.
29	Effect on Beech Grove	SC1, SC2 and SC5 are adjacent to Beech Grove
30	Conflict of interest (Bloors)	No comment in this study
31	Greater engineering costs (railway line)	Both over-bridge and under-bridge options for railway crossings are feasible and both are presented in this study.
32	Effect on businesses in Belmont	The road would increase access to the network, this may increase the potential for competition from other parts of Hereford
33	Effect on The Green, Ashley Cottage and Merry Cottage of original route	SC1 and SC2 will have greatest impact on The Green, SC3, SC4 and SC5 will have greatest impact on Ashley Cottage and Merry Cottage. SC6 is the most neutral option
34	Object to SC1 / 2	Additional routes considered in this study
35	Prefer outer corridor	Support for SC2, and possibly SC1
36	Support revisions	Additional routes considered in this study
37	Effect on Grafton wood	SC1 to SC5 all impact on Grafton Wood, SC6 avoids the wood

Table 10 Summary of Public Consultation Responses		
Rank	Objection	Comment
38	English heritage not involved	English Heritage has now been consulted and response included in Study.
39	Alternative route suggested	Additional routes considered in this study.
40	Grafton village so distance from routes	SC1 and SC2 are furthest from Grafton village
41	Effect on Merry Hill farmhouse	SC1, SC3, SC4 and SC6 will have a visual impact on Merryhill Farmhouse
42	Loss of agricultural land (Grade 1)	Incidence of field severance is reduced with later alignment options

4.1.7. The rank is only to give an indication of the level of public feeling. The position of an objection within the ranked list does not impact on the importance of each objection received and therefore each objection will be considered individually within the report.

4.1.8. These objections are further analysed to categorise the type of complaint received.

a.	Environmental concerns	29%
b.	Housing / property concerns	29%
c.	Economic Performance	1%
d.	Route Preference	5%
e.	Planning Process	36%
		100%

4.1.9. This report can only address concerns that are based on environmental, economic, and housing matters as it is concerned purely with the assessment of the six proposed route alignment options and the identification of a route corridor for the purposes of the plan making process.

4.2. Sustrans Cycle Network

4.2.1. The NCN 46 Route shown in figure 28 originates from Hereford Cathedral and utilises the Great Western Way and was recently extended with a new section to a green lane with byway status just outside Grafton. The route then proceeds along Grafton Lane and turns right just before the lane reaches the A49, using lightly trafficked roads towards Tram Inn and beyond to Abergavenny.

4.2.2. Concerns were raised in public consultation on the effect of a new link road on this pedestrian and cyclist friendly route, with the fear that the link road would sever the route and prove too difficult to negotiate for pedestrians and less experienced cyclists.

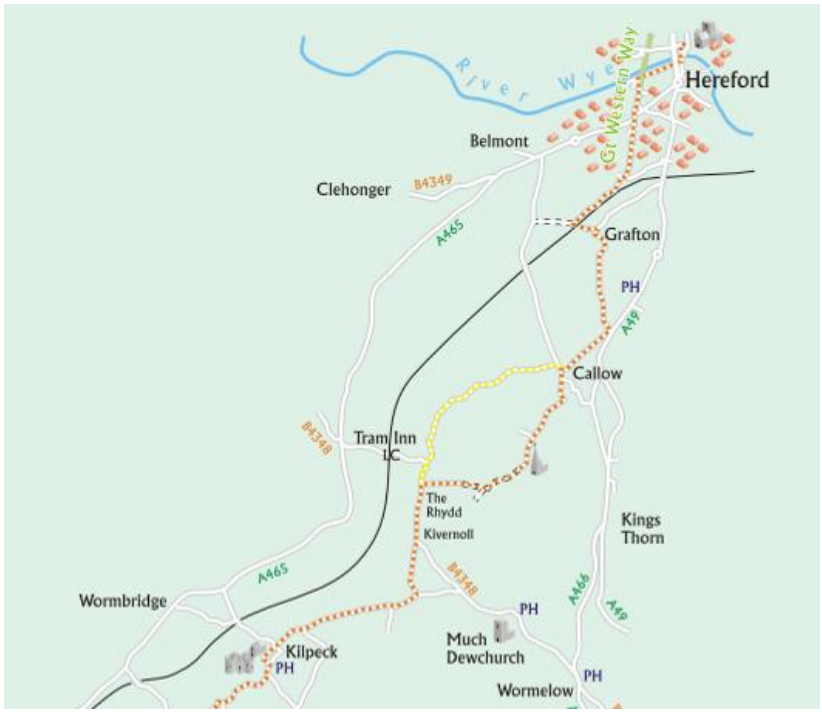

Figure 28: Cycle Route NCN 46 Hereford to Abergavenny

4.2.3. The Integrated Transport Officer at Herefordshire Council commented that severing this link for walkers and cyclists would severely affect the route's attractiveness and undermine its ability to take traffic off the city's roads. The route has been designed to be as free of interruptions as possible to maximise its ability to attract motorists from their cars. Route selection should consider route 46, maintaining it as continuous as possible for walkers and cyclists.

4.3. Highways Agency

4.3.1. The Highways Agency has been consulted on the design of the 6 routes and their response for Routes SC1 to SC5 highlighted some concerns relating to bridge clearances on Haywood Lane and at the railway. Concerns over longfall and crossfall on the road to ensure adequate drainage and additional comments relating to vertical alignments and details on the long sections were also made. The full response can be seen in Appendix E. Route SC6 was issued to the Highways Agency in a later letter and a response has not been received at this time.

4.3.2. It should be noted that alignments at this stage are for feasibility purposes only and based on a very approximate digital terrain model (DTM) rather than surveyed data. Regarding the level discrepancies on Haywood Lane, this is due to there being OS level data on the road which is assumed to be more accurate than the DTM and therefore the clearance stated is different from that on the long section. In any case, Haywood Lane and the new road are not particularly constrained at this point and a feasible design can prevail once accurate topographical survey is completed and the design progressed in earnest. There is little value in undertaking designs to a greater accuracy than DTM at this stage of assessment.

4.3.3. Longfall can be an issue for drainage but can be mitigated through either changing the vertical alignment in the later design stage, or providing appropriate channel drainage systems such as kerb drains if kerbs are needed, or if hardstrips are used then filter drains or swales should be adequate. As long as there is appropriate crossfall there should be no issue of standing water. As such, it is only where the crossfall switches over to super-elevation on bends that there is an issue and this will be mitigated in the detailed design by steepening at key points as appropriate following a detailed analysis of flatspots. Again, it is not recommend this level of detail is necessary at this stage and it does not compromise the feasibility of the routes.

4.3.4. At the time of the consultation with the Highways Agency, route SC6 had not been developed. A response to the Highways Agency comments and additional consultation relating to SC6 has been sent to the Highways Agency and further comments are awaited. The further stages of the assessment should take into account any further comments received from the Highways Agency.

4.4. Natural England

4.4.1. Natural England have been consulted on the proposals and have highlighted the features of:

- Newton Farm – Local Wildlife Site
- Newton Coppice – Ancient Semi-Natural Woodland / Replanted ASNW
- Veddoes Coppice – Ancient Semi-Natural Woodland
- Grafton Wood – Broadleaved woodland, Priority Habitat
- Numerous Watercourses.

4.4.2. Natural England suggest that SC5 appears to be the least damaging as it is aligned to avoid Newton Coppice and they would welcome any route which avoided this area, although it is noted that all routes will have some negative impact upon the natural environment. Natural England's detailed response can be seen in Appendix E.

4.5. English Heritage

4.5.1. English Heritage raised concerns about the complexity of the assessment process and the technical nature of the presentation and communication and reiterated that the study should be fully transparent and include the impacts of the full western corridor. This is important to ensure the impacts on Belmont Abbey are fully considered.

4.5.2. English Heritage would like further investigation into the setting of historic assets in accordance with their guidance documents and for this to be applied to designated and undesignated heritage assets. More information on the mapping is necessary to inform the assessments in relation to data from the Historic Environment Record and archaeological potential in the area. English Heritage's full response can be seen in Appendix E.

4.5.3. Their comments are acknowledged and will be included in the strategy for the staged assessment process which will be necessary in accordance with the Department for Transport - Transport Analysis Guidance (WebTAG) towards preferred route selection and detailed design.

4.6. Environment Agency

4.6.1. The Environment Agency has been consulted but no response has been received to date.

4.7. Herefordshire Council Conservation Team

4.7.1. The Herefordshire Council Conservation Team was consulted and a response received in relation to Heritage and Archaeology. The comments mirror those from English Heritage in relation to the assessment of designated sites only. Their response highlights 'find spots' on the routes and the 'peculiar' field boundaries at Grafton, avoided by the alignment of SC6.

4.7.2. Herefordshire Councils comments are acknowledged and will be included in the strategy for the staged assessment process which will be necessary in accordance with the Department for Transport, Transport Assessment Guidance (WebTAG) towards preferred route selection and detailed design.

5. Conclusions

5.1.1. The engineering and environmental constraints together with the consultation responses have been considered for routes SC1 and SC2 from the 2010 HRR Study of Options Report and for the four additional alignments developed to mitigate some of the engineering and environmental impacts raised following the 2010 report and to address the consultation responses received.

5.1.2. Routes SC1 and SC2 compliment a Western Relief Road by enabling the extensive earthworks arising from the cutting on the approach to the River Wye to be reused locally within the Southern Corridor alignments which require significant embankment construction on the approaches to the railway bridge. However, delivered in isolation to the rest of the Western Relief Road or as a phased delivery, alignments SC1 and SC2 will require a significant imported material (200,000m^3 for SC1 and 50,000m^3 for SC2).

5.1.3. The remaining four route options generally produce a surplus of earthworks material which can be designed into bunds adjacent to the scheme to reduce the landscape impact.

5.1.4. The alignments are designed to a standard 7.3m width single carriageway with a one metre hard strip and 2.5m footway on one side and 3m footway / cycleway to the other side. The proposed AADT, taken from the Hereford SATURN transport model for Housing Option 5, is within the economic flow range for wide single carriageway and dual 2 lane all-purpose carriageway. However, this is before consideration of the wider economic, operational and environmental assessments which will impact on the final design choice.

5.1.5. The engineering and environmental impact of the routes on Newton Coppice is mitigated by routes SC2 and SC5.

5.1.6. Other engineering considerations are of less significance than the earthworks balance and Newton Coppice structure and can be further mitigated during detail design. This includes over and under bridge options for the railway crossing as well as sustainable drainage solutions to store runoff and minimise the rate of discharge for all routes. Diversions to Statutory Undertakers Apparatus is common to all routes and will be necessary.

5.1.7. All routes will impact upon National Cycle Network 46 and engineering solutions to minimise severance of this route and other public rights of way should be considered a priority of the later design phases.

5.1.8. In line with the Natural England's Green Infrastructure Guidance, the proposed Southern Corridor Link needs to be accompanied with a green infrastructure proposal. In this area landscape parkland is a key feature that needs to be considered. Further detail on the proposal will be available at a later stage in the process; however at this stage the requirement for a proposal is noted. Considering the existing environment within the Southern Corridor it is proposed that landscape parkland, community gardens, allotments or formal gardens will work well.

5.1.9. Left unmitigated environmental impacts of all routes would be significant however, as alluded to within the report, many can be mitigated and will be subject to further assessment in line with the Department for Transport, Transport Assessment Guidance (WebTAG). There are however a number of impacts which will be difficult to mitigate and which are likely to remain for certain routes as follows:

- **Biodiversity:** the severance impacts of routes SC1, SC3, SC4 and SC6 on Newton Coppice will be significant even with mitigation from the construction of a stilted structure. The avoidance of this crossing through the selection of a route to the south of the woodland will provide the best solution. Other habitats impacted upon by the scheme can be avoided, but at the expense of design standards and this will need to be balanced through the routes development processes.
- **Landscape:** impacts will be significant, particularly for properties which currently enjoy views over open countryside. The impacts of the more northern routes upon properties in the Grafton Area, Merryhill Farm and on the southern limits of the City can be partially mitigated through landscaped bunds utilising the surplus earthworks material. Impacts of the southern routes upon properties in the vicinity of Haywood Lodge are less easily mitigated due to the nature of the embankments and the lack of material to construct landscaped bunds.
- **Heritage:** impacts are very similar to the landscape impacts above with the current known impacts being upon the setting of a number of listed structures. Buried archaeology is less certain and could be discovered on all routes. In addition the impacts upon the Belmont Abbey complex would be significant for the northern routes connecting to the A465. This is partially mitigated by SC6 which steers away from the Abbey and more fully by SC2 and SC5 which terminate much further south. All routes could still form part of a Western Relief Road although Route SC2 and SC6 would have the least impact.

5.1.10. All routes are considered feasible although, delivered in isolation to a Western Relief Road, SC1 and SC2 are less favourable due to earthworks imbalance. Routes which avoid crossing Newton Coppice are favoured from an environmental perspective and those further from Haywood Lodge and Belmont Abbey are best from the point of view of Landscape and Heritage impact.

5.1.11. Consultation responses from the Highways Agency requested additional information, in particular relating to clearances at structures and the surface drainage strategy to avoid flatspots. This will be produced through the later stages of assessment as more accurate site data is gathered and the detailed design progresses ensuring that design standards are met.

5.1.12. Route SC6 had not been developed prior to the original consultation with the Highways Agency. A response to the Highways Agency's original comments with respect to SC1 – SC5 has been sent to the Highways Agency together with further detail to allow comment of SC6 to be provided. The further stages of the assessment should take into account any further comments received from the Highways Agency as at the time of writing, no comments have been received for SC6.

5.1.13. English Heritage has responded to the consultation to list the areas of priority to minimise the impact upon the natural environment and have commented on their concerns relating to schemes which cross Newton Coppice.

5.1.14. Both English Heritage and Herefordshire Councils Conservation Teams have expressed concern about the lack of assessment of undesignated sites within the assessment and that an assessment of the setting of historic assets is necessary to inform any preferred route.

5.1.15. A number of the comments from the 2010 and 2011 public consultations have been considered in the design and assessment of the additional routes within this report.

Table 11 Summary of Environmental Assessment

Sub-Objective	Summary of Conclusions	Preferred
Noise	All six route options have the potential to result in large adverse impacts on the ambient noise environment of the existing area and in particular at a number of sensitive receptors. A full appraisal cannot be undertaken at this stage of the assessment process, however a qualitative comparison of potential impact in terms of property counts can. Route options SC1, SC3, SC4 and SC6 have the potential to have large adverse impacts on a significant number of properties. It has been assessed that in comparison route options SC2 and SC5 have the potential for moderate adverse impacts.	SC2 / SC5
Local Air Quality	The properties within 200m of the proposed route would experience an increase in levels of air pollution but concentrations are expected to remain well below Air Quality Objective levels. The proposed route options likely to improve air quality in the AQMA due to the diversion of a proportion of the traffic from the City Centre. This will improve air quality in Hereford City Centre through reduced traffic emissions in areas of high population density, which in turn will contribute to improved health of the population, from a reduction of the area of exceedance and the number of people living within the area of exceedance. Air quality is likely to be adversely affected locally due to vehicle emissions for all route options. Some adverse impacts on air quality from construction dust and disruption are envisaged during the construction phase. At this stage, there is not enough information to determine any significant difference in impact for the route options. Route option SC1 is located within 200m of the highest number of receptors and is the longest route, therefore this will potentially result in slightly greater air quality impact than the other route options.	SC2 / SC3 / SC4 / SC5 / SC6
Greenhouse Gases	The greenhouse gas assessment is limited due to lack of available traffic modelling data for the Southern Core at this stage. Therefore, quantification of greenhouse gas emissions in TAG cannot be undertaken and will be determined at a later stage in the assessment process. The impact of the Southern Core scheme needs to be incorporated within the cost benefit analysis of the greenhouse gas emissions in a consistent and transparent way, through the TAG assessment. Generally the longer the route the greater the carbon emissions will be because of the extra distance travelled. This means the route option SC1 will have slightly greater greenhouse impact than the other routes, with route options SC3 and SC4 having the least impact. The remaining three route options have similar impact.	SC3 / SC4
Landscape	All route options will result in change to the landscape character of the study area. In terms of visual impacts for local receptors, route option SC6 affects fewer properties and is the preferred option.	SC6
Townscape	The Southern Core route options will have a beneficial impact on the townscape in Hereford by diverting traffic away from the historic City centre. Impacts will be neutral from all route options on the local Townscape Character Areas of Newton Farm and Belmont. Therefore there is no preferred route in terms of impacts on Townscape.	All
Heritage	Routes SC1 and SC2 would impact upon the setting of listed building in the vicinity of Haywood Lodge whilst SC3, SC4 and SC6 would impact, although to a lesser degree, Merryhill Farm. SC1 and SC4 would have the greatest impact upon the Belmont Abbey complex, particularly in respect to a continuation of a wider Western Relief Road Scheme. Routes SC5 and SC6 avoids impact on Haywood Lodge and Belmont Abbey.	SC5, SC6
Biodiversity	Of all the options presented for routing the Southern Core Corridor, SC1, SC3 and SC4 would have large direct adverse impacts upon biodiversity and they would not be recommended. Of the remaining options, SC2 and SC5 are equally preferred. Although SC2 avoids the woodland at Grafton Lane, it would impact on a small section of woodland in the vicinity of Chainage 1300 and passes close to Withy Brook flowing though the woodland. SC5 would impact on the woodland at Grafton Lane. Route SC6 would have the least impact on woodland sites as it avoids Grafton Wood. In terms of impacts on biodiversity, route option SC6 is preferred overall, as it has the potential for the least adverse impacts. However, it is considered that all the route options under consideration will have adverse impacts on biodiversity and extensive mitigation will be required to minimise impacts or compensation/enhancement measures used to replace lost habitat.	SC2 / SC5 / SC6
Water Environment	An assessment of the potential ecological impact from surface water runoff from the scheme has not been determined from HAWRAT at this stage, due to lack of traffic model data. The assessment was based on a desk-top review of available information on groundwater resources, surface water quality and flood risk. All six route options have the potential to have adverse impacts on the water environment. All six route options require Withy Brook to be culverted. Route option SC1 and SC2 have the potential for slight/moderate adverse impacts, mainly due to the proximity of a section of the route to Withy Brook and a spring, and potential surface water runoff from the carriageway into Newton Brook. All other route options are assessed as having slight adverse impacts apart from route option SC5.	SC5
Physical Fitness	In summary, based on the information available at the time of writing all route options will result in potential impact on non-motorised users. It is envisaged that route options SC3 and SC4 will result in moderate adverse impact, mainly due to the stopping up of Grafton Lane twice.	SC1 / SC2 / SC5 / SC6
Journey Ambience	Overall route options SC3 and SC4 are marginally preferred over the other route options, taking into consideration all the factors of journey ambience.	SC1 / SC2 / SC5 / SC6

6. Recommendations

6.1. This report has assessed route options for the Southern Corridor Link between the A49 and the A465 both in their own right and having regard to their role as part of a full western relief road. If a transport or economic regeneration need for the Southern Corridor Link between the A49 and the A465 is identified and he link delivered in isolation and in advance of a full Western Relief Road, then the scheme will need to be assessed in its own right. This assessment process should follow the staged assessment process set out in the Design Manual for Roads and Bridges and fully accord with the Department for Transport's Transport Analysis Guidance (WebTAG) to ensure that a transparent and fair assessment is undertaken.

6.2. There are clearly preferences in relation to the routes presented within this study including

- The impacts upon the setting of the historic resources on Grafton, Haywood Lane and at Belmont Abbey.
- The impact upon the natural environment at Newton Coppice.
- Significant engineering challenges are presented from the more southern routes from the requirement for significant import of earthworks material if the Southern Corridor Link is delivered in isolation to the rest of the western relief road.

The recommended further scheme assessment would assess all impacts quantitatively and qualitatively against each other towards a preferred route being selected.

6.3. Six alignments options for a link road between the A49 and A465 have been presented in this report; however, it should be considered that sections within the alignment options presented can be combined differently to allow for more flexibility in overall route options.

6.4. For example, an alignment following the approximate route of SC6 from the A49 to the railway crossing but then SC5 from the railway to the A465 would appear to provide the best avoidance of the constraints at this stage but with compromises to alignment standards. Therefore, the recommended corridor presented in figure 29 has been extended beyond the confines of the assessed route to allow for these alternative route options to be considered in the later stages of assessment.

6.5. The Design Manual for Roads and Bridges (DMRB) provides mandatory standards, advice notes and other guidance relating to the design, assessment and operation of trunk roads and motorways in the United Kingdom. WebTAG is the Department for Transport's website providing guidance on the conduct of transport studies. This guidance should be seen as a requirement for all projects/studies that require government approval. For projects/studies that do not require government approval TAG should serve as a best practice guide and should form the basis of all future studies.

6.6. Although there are clearly significant topographical constraints relating to routes SC1 and SC2, primarily relating to the earthworks imbalance and the impact upon the setting of the historic assets, it is recommended that the corridor is not narrowed until the staged assessment in accordance with the DMRB and WebTAG has been completed.

6.7. In addition, there are significant concerns relating to the crossing of Newton Coppice and the impacts of the Southern Corridor and the proposed Western Relief Road Route on the Belmont Abbey Complex. However, it is again recommended that the corridor is not narrowed at this stage of the assessment to allow consideration of all options.

6.8. Retaining a wider corridor has disadvantages in relation to the ongoing concerns of the public and other interested parties in the vicinity of the routes. As such it is recommended that a Stage 2 Assessment is completed at the earliest opportunity to enable a preferred route to be selected and reduce the time that this uncertainty is felt. Once a preferred route is selected, the designs and environmental statement, including mitigation proposals associated with a Stage 3 assessment should be completed at the to allow the planning and orders process to commence and certainty to be established for those most affected by the scheme.

6.9. At this stage of assessment it is recommended that a corridor, as defined in Figure 29 is taken forward.

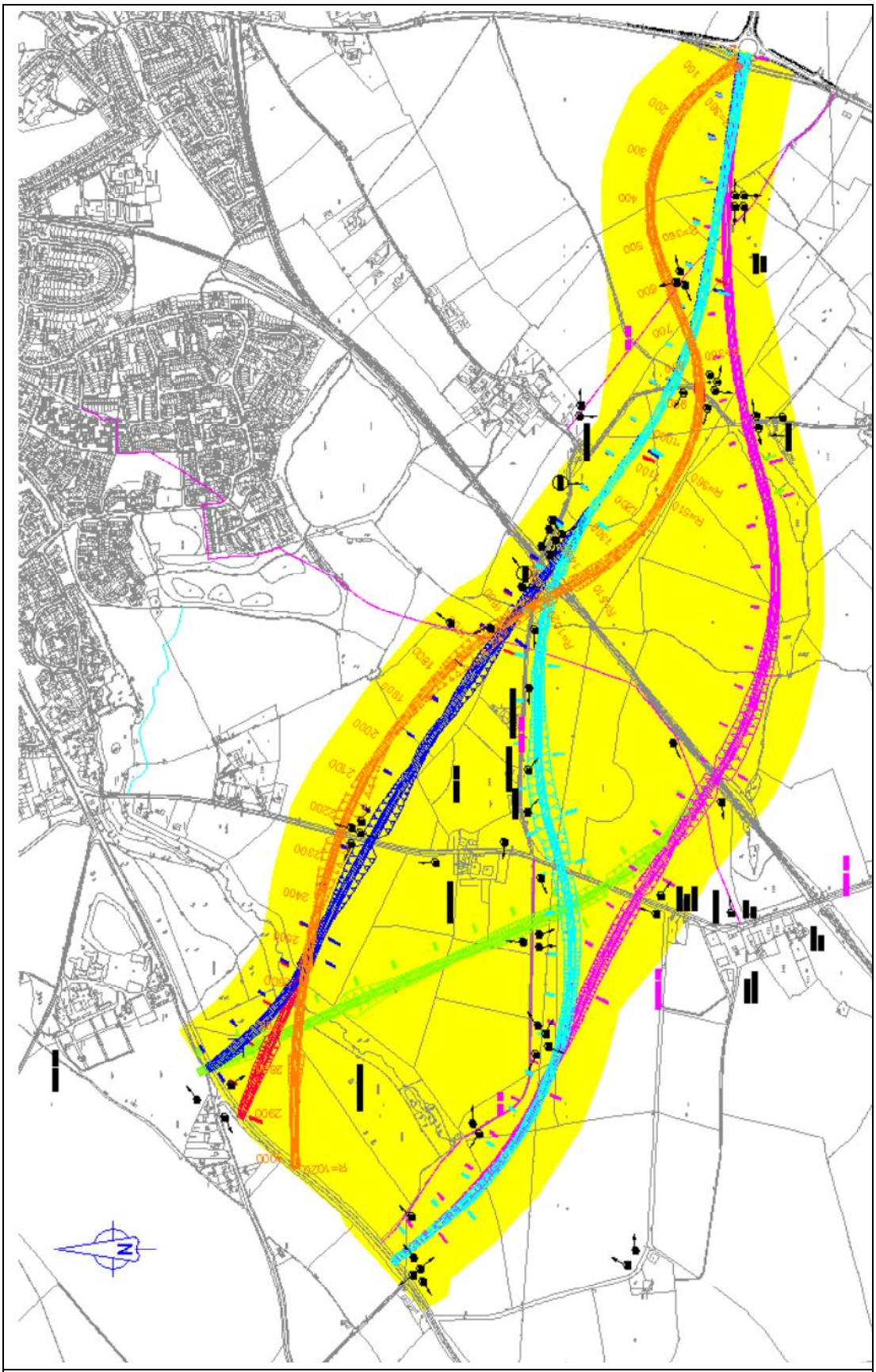

Figure 29: Recommended Route Corridor

Appendix A

Route Options Drawings

551594-H-P-001A	SC1 Design
551594-H-P-002A	SC2 Design
551594-H-P-003A	SC3 Design
551594-H-P-004A	SC4 Design
551594-H-P-005A	SC5 Design
551594-H-P-005	SC5 Design

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CROSS-SECTION
SC2

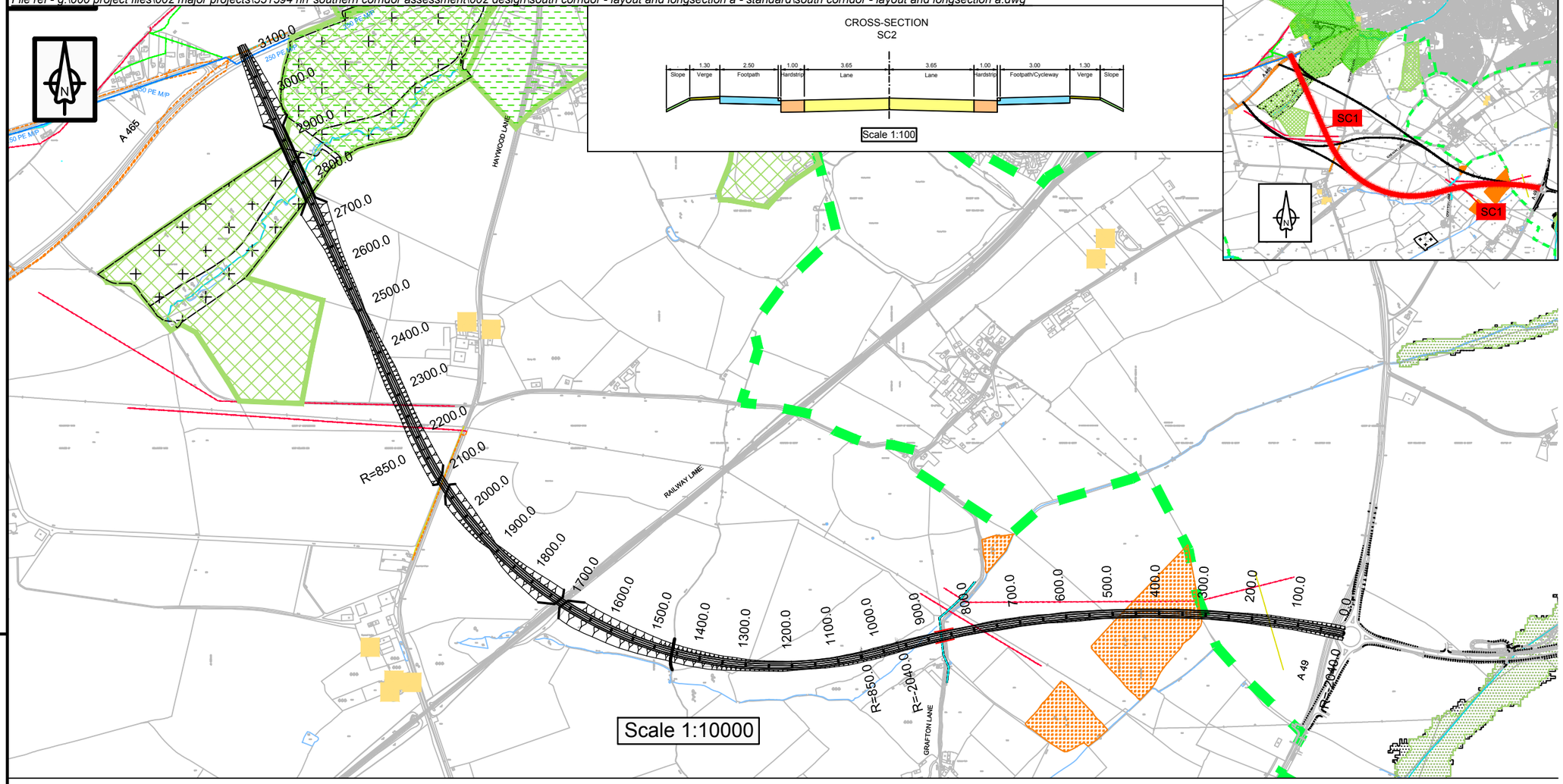
Scale 1:100

NOTES

- Woodland
- Surface Water Course (with flow direction)

Other designations

- Ancient Woodland
- Special Wildlife Site (SWS)
- Roundabout
- Severance
- Bridge
- Culvert
- Proposed Traffic Signals
- Unregistered Historic Parks and Gardens
- Registered Historic Parks and Gardens
- Listed building
- E-On 11kv PVC Cable
- E-On 66kv Overhead Cable
- E-On LV Overhead Cable
- Gas - LHP Mains
- Gas - LP Mains
- Gas - MP Mains
- BT Underground
- WW - Combined Sewerage
- WW - Existing Trunk Water Main
- WW - Existing Water Main
- WW - Foul Sewerage
- WW - Pumped Foul Sewerage
- BT Overhead



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A	HA Comments	SD	AP	Apr 2012

Drawn: JJ		Preliminary	✓
Design: JJ		For comment	
Chkd: SD		For tender	
Appd: AP		For construction	
Date: January 2012		As constructed	
		Other	

amey

Client

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Herefordshire Council

Brockington, 35 Hafod Road, Hereford, HR1 1SH Tel: (01432) 260000 Fax: (01432) 260286

Project Name

Hereford Relief Road

Drawing Title

HIGHWAYS

SC 1 Design

Original Drawing Size :	A3
Scale : 1:10,000	Dimensions : Metre

Drawing No	Map No	Rev
551594-H-P-001	000	A

File ref - g:\000 project files\002 major projects\551594 hrr southern corridor assessment\002 design\south corridor - layout and longsection a - standard\south corridor - layout and longsection a.dwg

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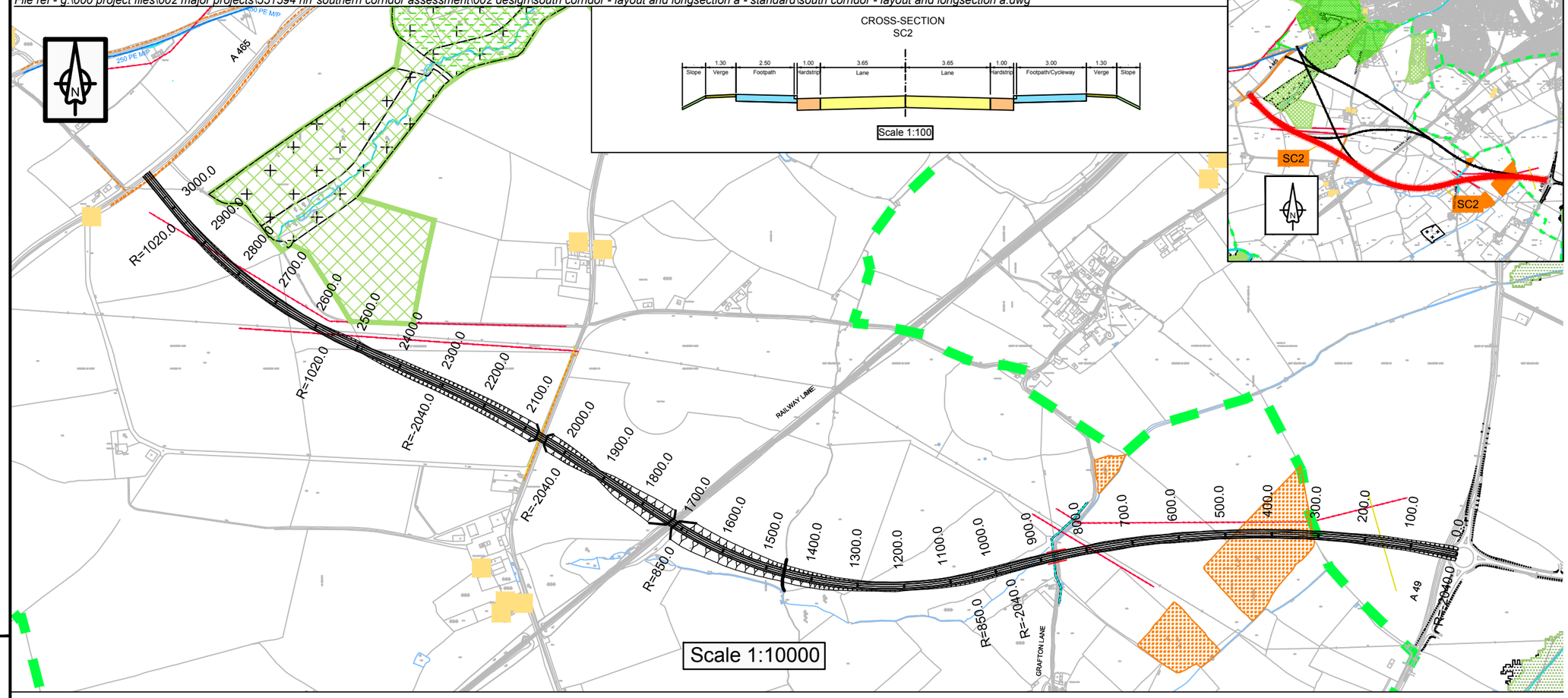
CROSS-SECTION
SC2

Scale 1:100



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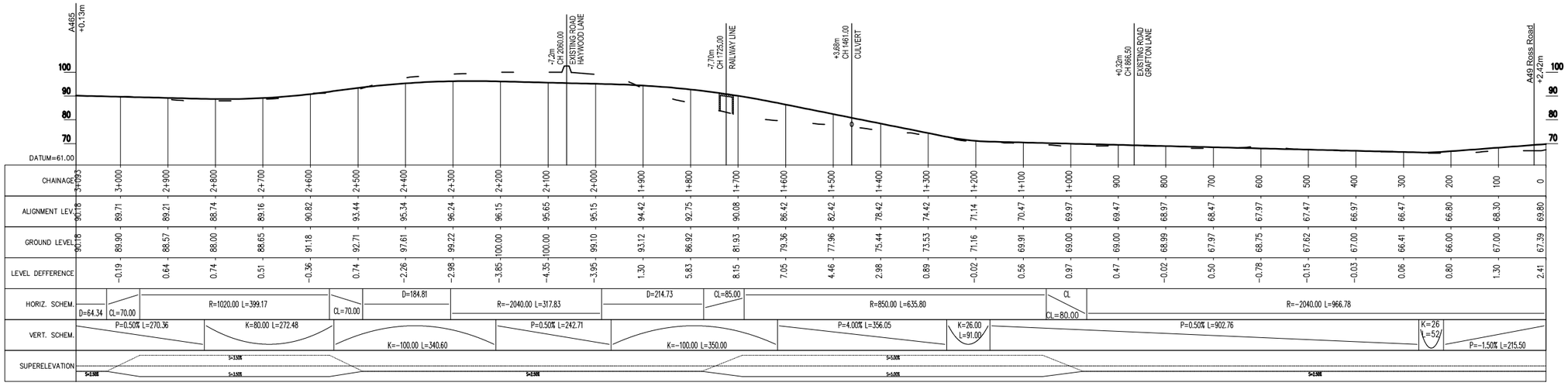

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Drawn: JJ
Design: JJ
Chkd: SD
Appd: AP
Date: January 2012

Preliminary	✓
For comment	
For tender	
For construction	
As constructed	
Other	

amey

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Project Name
Hereford Relief Road

Drawing Title
HIGHWAYS
SC 2 Design

Original Drawing Size :	A3
Scale : 1:10,000	Dimensions : Metre

Drawing No	Map No	Rev
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SC2

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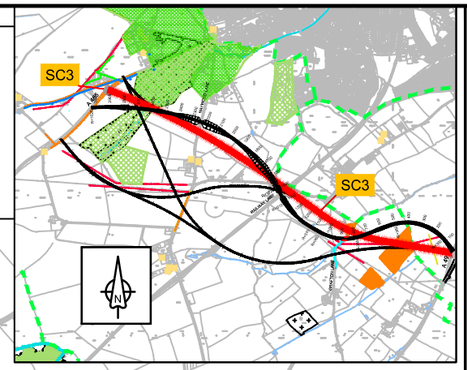

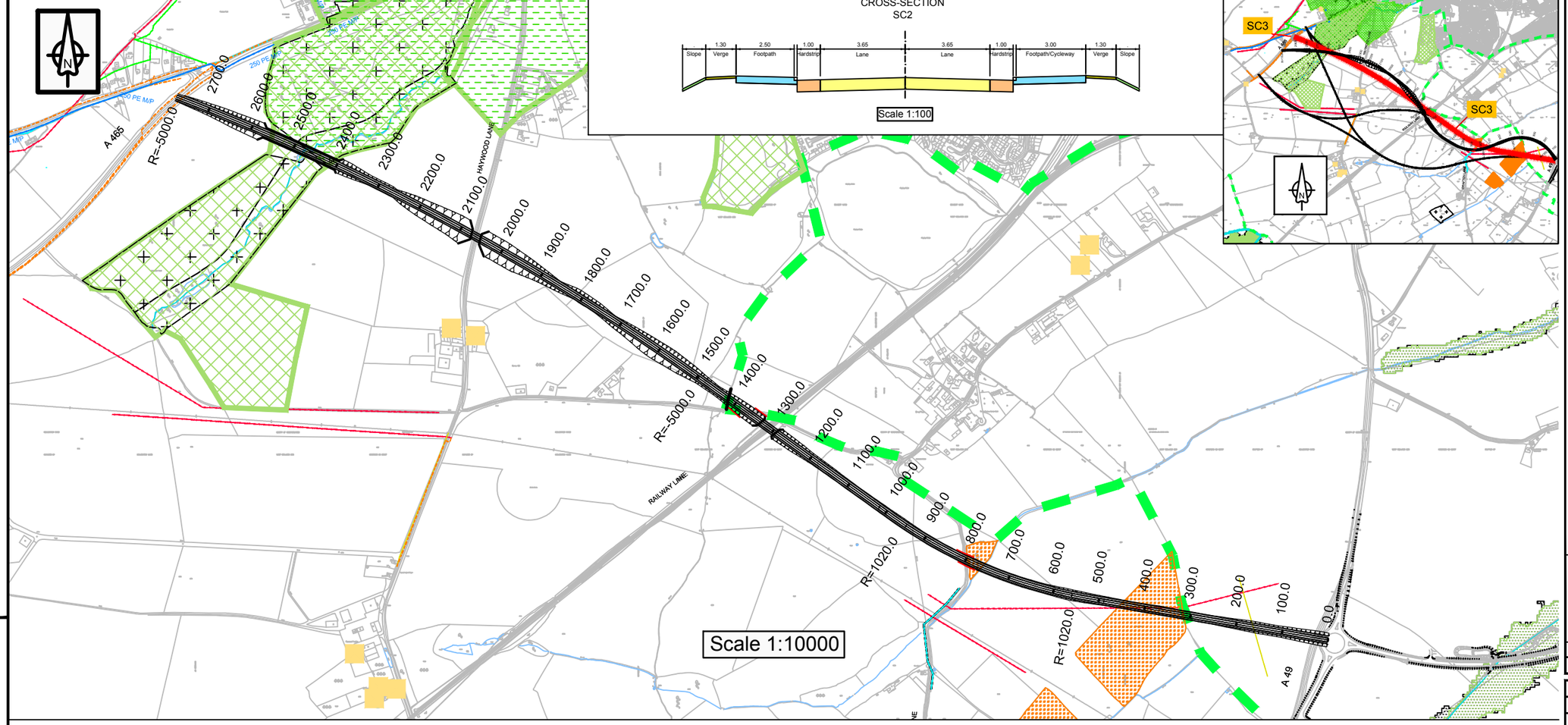

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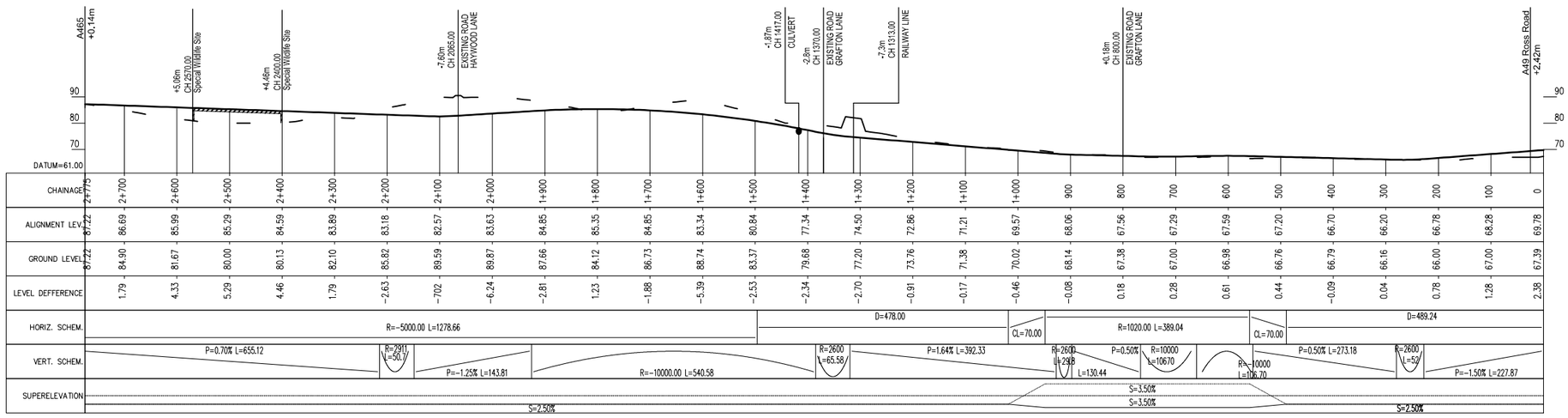
- WW - Existing Water Main
- WW - Foul Sewerage
- WW - Pumped Foul Sewerage
- BT Overhead

Rev	Revision details	Chkd	Appd	Date
A	HA Comments	SD	AP	Apr 2012

Drawn: JJ		Preliminary	✓
Design: JJ		For comment	
Chkd: SD		For tender	
Appd: AP		For construction	
Date: January 2012		As constructed	
		Other	



Scale 1:10000/2000

Client

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Herefordshire Council

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Project Name

Hereford Relief Road

Drawing Title

HIGHWAYS

SC 3 Design

Original Drawing Size :	A3
Scale : 1:10,000	Dimensions : Metre

Drawing No	Map No	Rev
551594-H-P-003	000	A

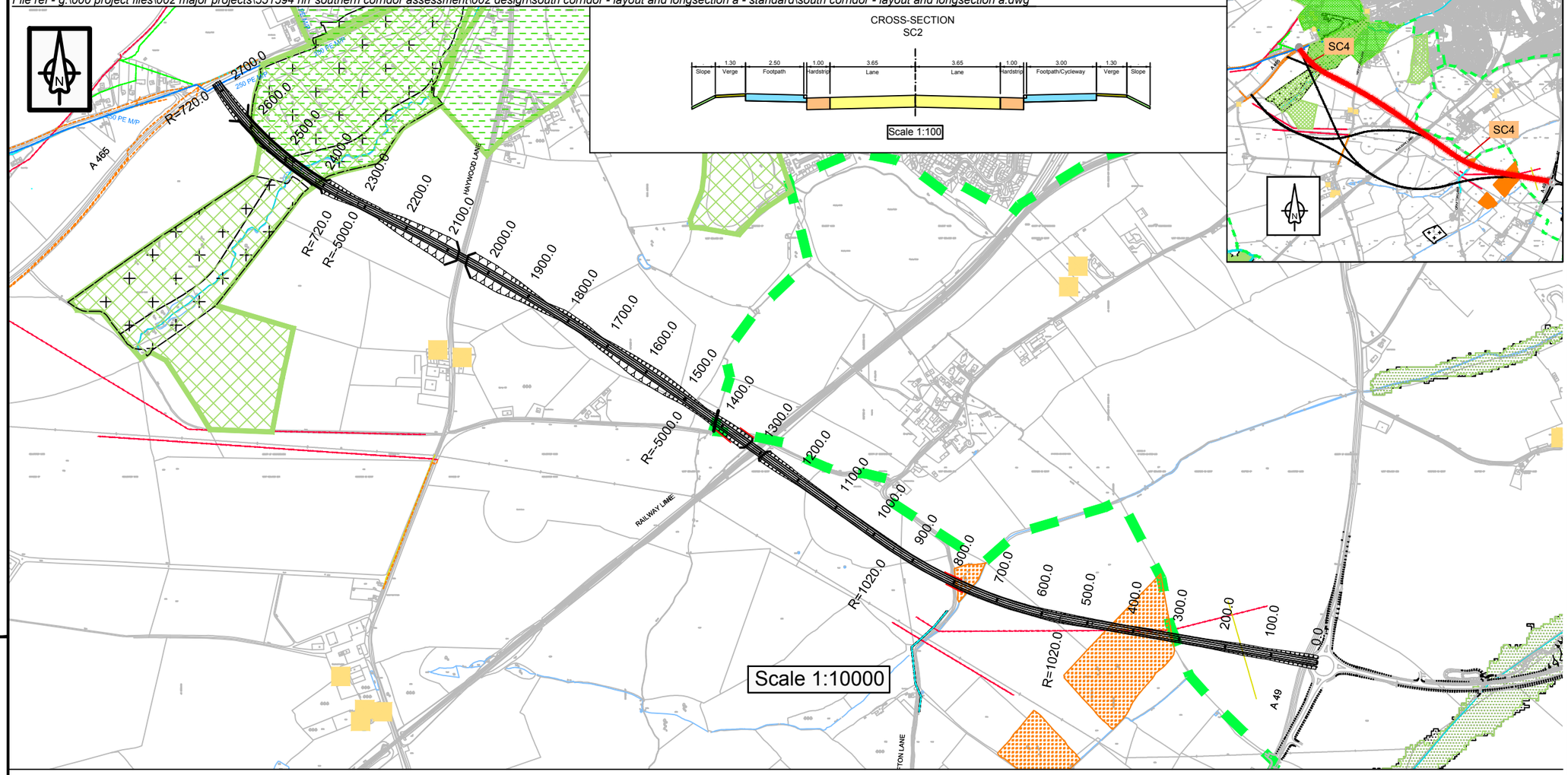
File ref - g:\000 project files\002 major projects\551594 hrr southern corridor assessment\002 design\south corridor - layout and longsection a - standard\south corridor - layout and longsection a.dwg

0 100

CROSS-SECTION
SC2

Slope	1.30 Verge	2.50 Footpath	1.00 Hardstrip	3.65 Lane	3.65 Lane	1.00 Hardstrip	3.00 Footpath/Cycleway	1.30 Verge	Slope

Scale 1:100



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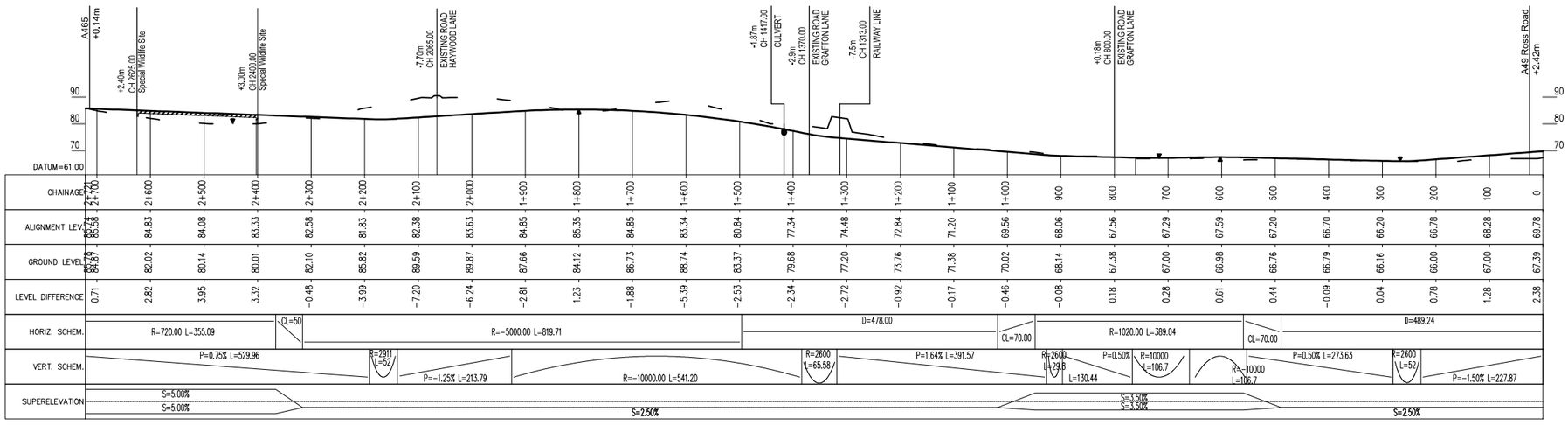

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NOTES

- Woodland
- Surface Water Course (with flow direction)

Other designations

- Ancient Woodland
- Special Wildlife Site (SWS)
- Roundabout
- Severance
- Bridge
- Culvert
- Proposed Traffic Signals
- Unregistered Historic Parks and Gardens
- Registered Historic Parks and Gardens
- Listed building
- E-On 11kv PVC Cable
- E-On 66kv Overhead Cable
- E-On LV Overhead Cable
- Gas - LHP Mains
- Gas - LP Mains
- Gas - MP Mains
- BT Underground
- WW - Combined Sewerage
- WW - Existing Trunk Water Main
- WW - Existing Water Main
- WW - Foul Sewerage
- WW - Pumped Foul Sewerage
- BT Overhead

Rev	Revision details	Chkd	Appd	Date
A	HA Comments	SD	AP	APR 2012

Drawn: JJ		Preliminary	✓
Design: JJ		For comment	
Chkd: SD		For tender	
Appd: AP		For construction	
Date: January 2012		As constructed	
		Other	

amey

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Project Name
Hereford Relief Road

Drawing Title
HIGHWAYS
SC 4 Design

Original Drawing Size :	A3
Scale : 1:10,000	Dimensions : Metre

Drawing No	Map No	Rev
551594-H-P-004	000	A

File ref - g:\000 project files\002 major projects\551594 hrr southern corridor assessment\002 design\south corridor - layout and longsection a - standard\south corridor - layout and longsection a.dwg

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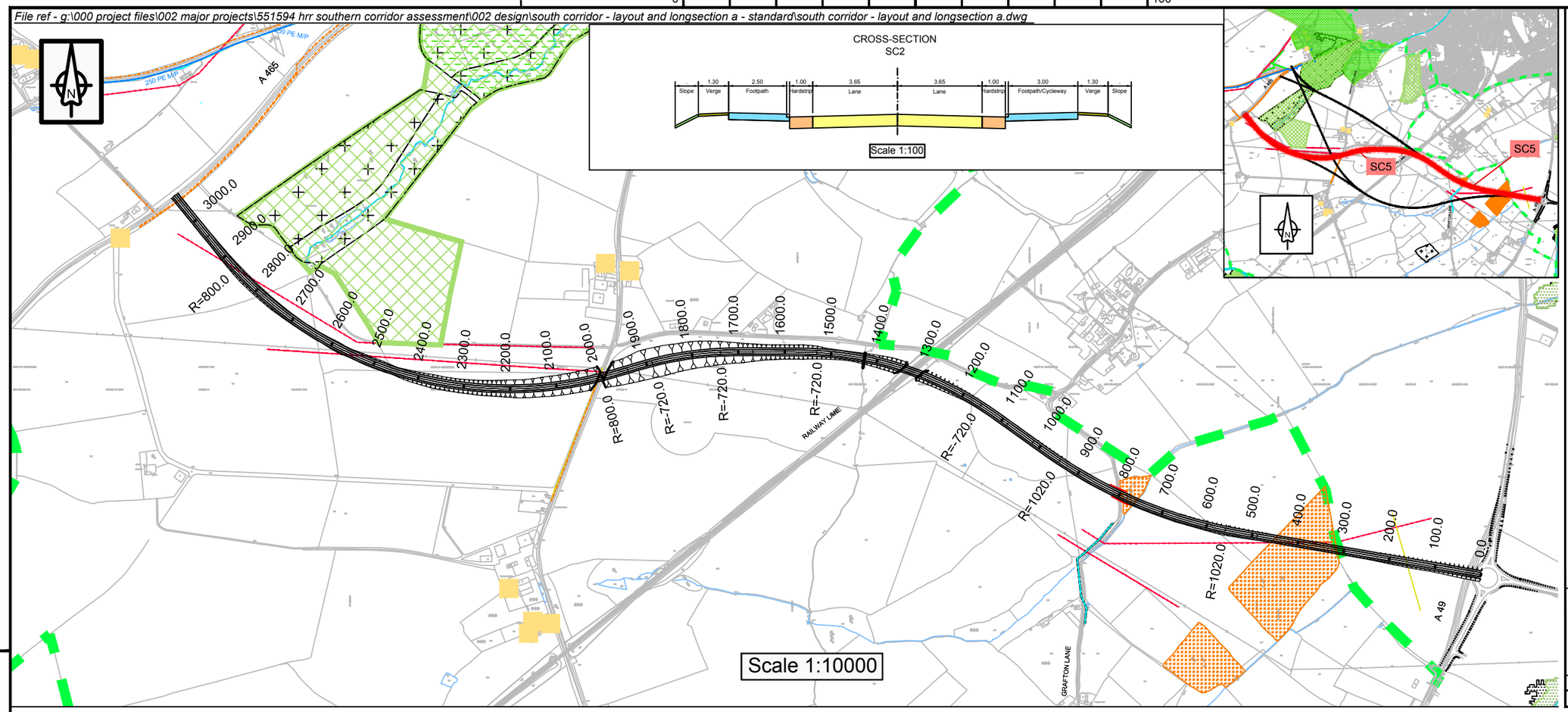


Scale 1:10000

CROSS-SECTION
SC2

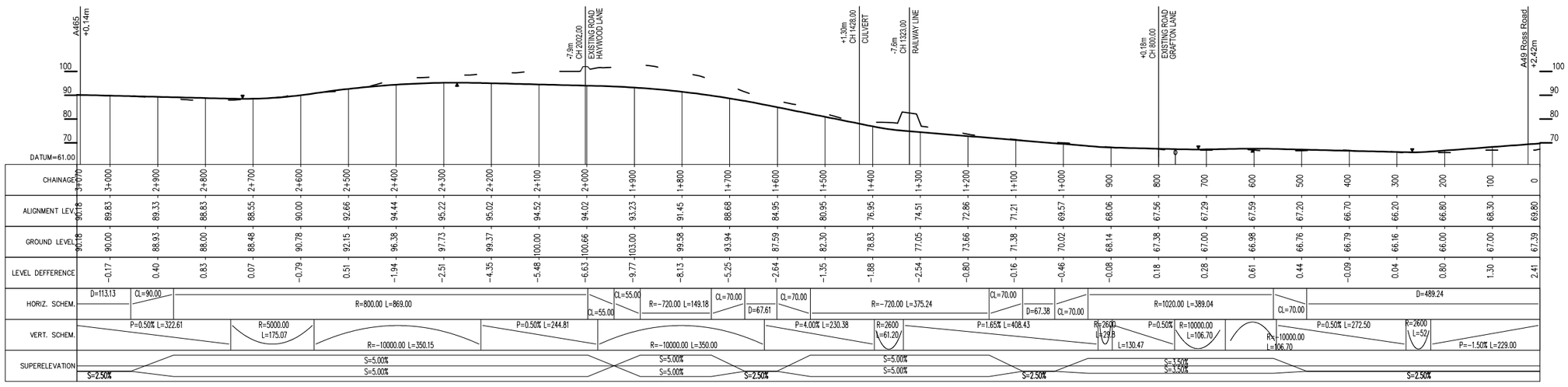
Scale 1:100

NOTES

- Woodland
- Surface Water Course (with flow direction)

Other designations

- Ancient Woodland
- Special Wildlife Site (SWS)
- Roundabout
- Severance
- Bridge
- Culvert
- Proposed Traffic Signals
- Unregistered Historic Parks and Gardens
- Registered Historic Parks and Gardens
- Listed building
- E-On 11kv PVC Cable
- E-On 66kv Overhead Cable
- E-On LV Overhead Cable
- Gas - LHP Mains
- Gas - LP Mains
- Gas - MP Mains
- BT Underground
- WW - Combined Sewerage
- WW - Existing Trunk Water Main
- WW - Existing Water Main
- WW - Foul Sewerage
- WW - Pumped Foul Sewerage
- BT Overhead



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Rev	Revision details	Chkd	Appd	Date
A	HA Comments	SD	AP	Apr 2012

Drawn: JJ		Preliminary	✓
Design: JJ		For comment	
Chkd: SD		For tender	
Appd: AP		For construction	
Date: January 2012		As constructed	
		Other	

amey

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Project Name

Hereford Relief Road

Drawing Title

HIGHWAYS

SC 5 Design

Original Drawing Size :	A3
Scale : 1:10,000	Dimensions : Metre

Drawing No	Map No	Rev
551594-H-P-005	000	A

File ref - g:\000 project files\002 major projects\551594 hrr southern corridor assessment\002 design\south corridor - layout and longsection a - standard\south corridor - layout and longsection a.dwg

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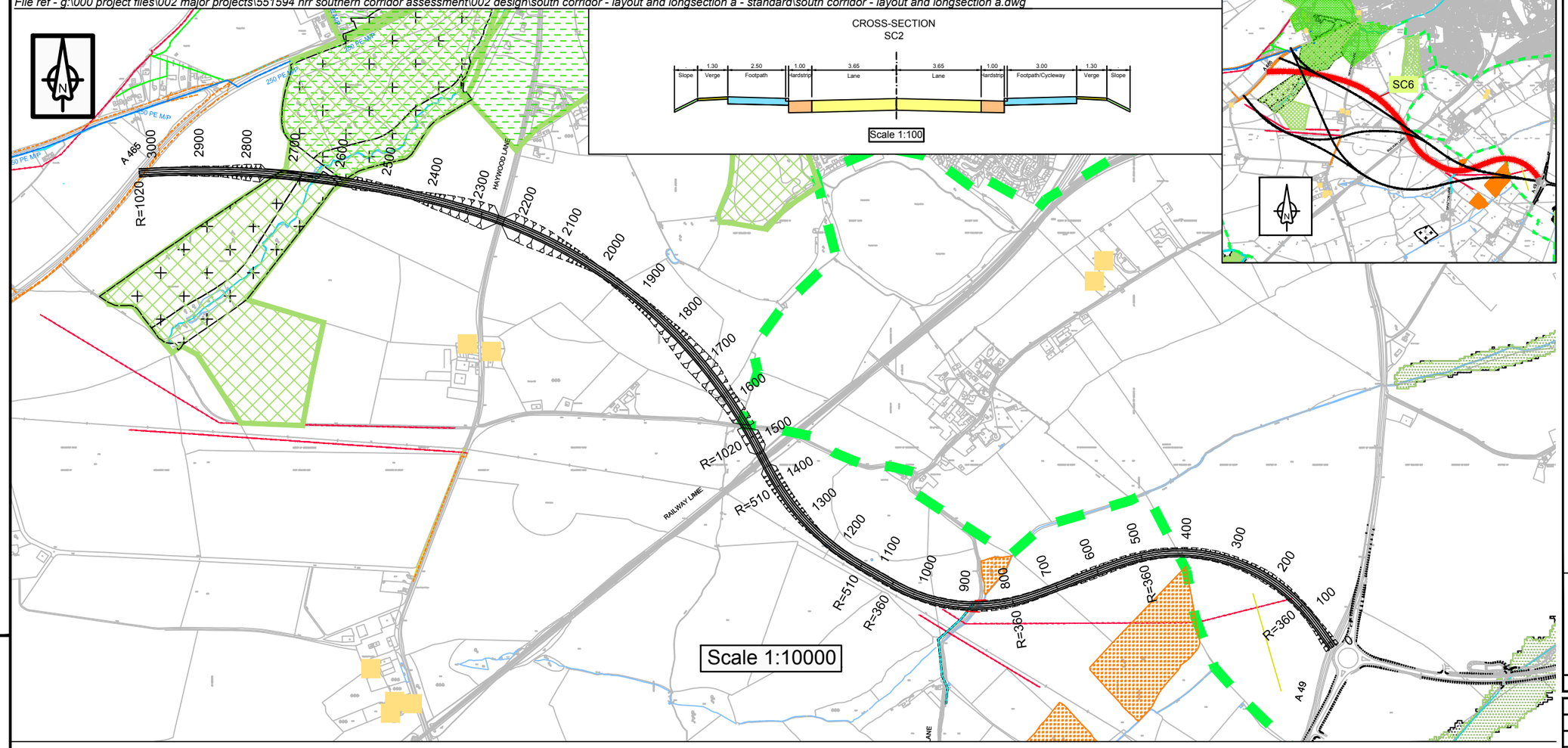
CROSS-SECTION
SC2

Scale 1:100



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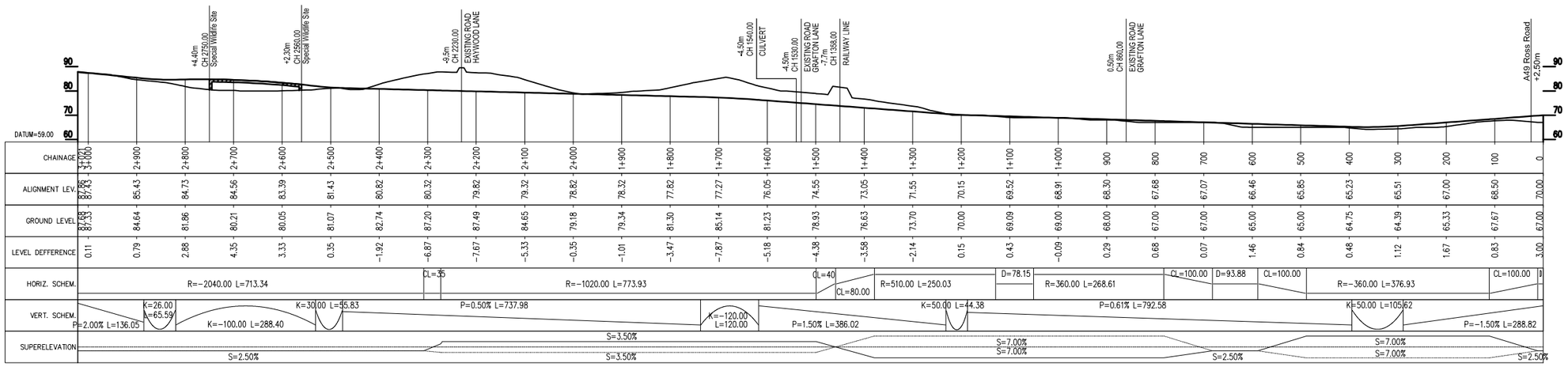

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NOTES

- Woodland
- Surface Water Course (with flow direction)

Other designations

- Ancient Woodland
- Special Wildlife Site (SWS)
- Roundabout
- Severance
- Bridge
- Culvert
- Proposed Traffic Signals
- Unregistered Historic Parks and Gardens
- Registered Historic Parks and Gardens
- Listed building
- E-On 11kv PVC Cable
- E-On 66kv Overhead Cable
- E-On LV Overhead Cable
- Gas - LHP Mains
- Gas - LP Mains
- Gas - MP Mains
- BT Underground
- WW - Combined Sewerage
- WW - Existing Trunk Water Main
- WW - Existing Water Main
- WW - Foul Sewerage
- WW - Pumped Foul Sewerage
- BT Overhead

Rev	Revision details	Chkd	Appd	Date

Drawn: JJ	Preliminary ✓
Design: JJ	For comment
Chkd: SD	For tender
Appd: AP	For construction
Date: February 2012	As constructed
	Other

amey

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Project Name

Hereford Relief Road

Drawing Title

HIGHWAYS

SC 6 Design

Original Drawing Size :	A3
Scale : 1:10,000	Dimensions : Metre

Drawing No	Map No	Rev
551594-H-P-006	000	-

Appendix B

Route Options Design Technical Design Notes

Southern Corridor – SC1
Southern Corridor – SC2
Southern Corridor – SC3
Southern Corridor – SC4
Southern Corridor – SC5
Southern Corridor – SC6

Southern Corridor - SC1

SC1 has a total length of 3,124m and extends from the existing roundabout at the western end of the Rotherwas access road to a proposed junction where it is to connect with the A465 (on the East of existing junction with B4349)

According with:

- Hereford Multi-Modal Model, Forecasting Report, table 5.5 'Select Link Flows – ODR West-PM peak – pcu per hour ' (Link 33)
- TA 79/99 Table 2 'Capacity of Urban Roads, One-way hourly flows in each direction'

for the purposes of this design it was assumed that the standard carriageway cross-section would be a Single Carriageway (S2) layout as per TD27/05 'Cross-sections and Headrooms' (DMRB 6.1.2).

Constraints

- Location to the south dictated by the existing roundabout located at the end of the Rotherwas Access Road to relieve city centre of HGV and other fright vehicles
- A structure is required to clear existing railway lines which the link intersects.
- Properties located to the north and south including listed buildings
- Special wildlife site and ancient woodland, near A465.
- Topography.

Feature	Start Chainage	End Chainage	Details
Special Wildlife Site	2710	2930	Structure required
Ancient Woodland	2710	2930	Structure required

Horizontal Alignment

- Horizontal alignment avoids high topography to the north and south as well as existing buildings and structures
- No departures or relaxations a requisite
- SSD desirable minimum achieved (215m)
- Tie in at existing strategic junctions

Vertical Alignment

- Substantial area of fill required to raise the proposed road level to allow for clearance over existing railway lines.
- Cutting required to pass under exiting minor road.
- No departures or relaxations required
- SSD desirable minimum achieved (215m)

Cut and Fill

Feature	Start Chainage	End Chainage	Cut	Fill
At Grade	0	1200	5627	8602
Embankment	1200	1900	87	102802
Cutting	1900	2500	60800	154
Embankment	2500	3124	125	120493
		Total	66640	262050

Structure Summary

Feature	Start Chainage	End Chainage	Details
Existing Roundabout	0	---	---
Grafton Lane	866.5	---	Stopped Up
Culvert	1461	---	Length = 35m, Skew = 4°
Railway Overpass	1725	---	Clearance = 7.74m
Haywood Lane Underpass	2085	---	Clearance = 7.2m
Special Wildlife Site Overpass	2710	2930	Clearance = 6.9m – 8.1m
Proposed Roundabout	3124	---	---

Southern Corridor – SC2

South core 2 has a total length of 3093m and extends from the existing roundabout at the western end of the Rotherwas access road to a proposed junction where it is to connect with the A465 (600m on the West form existing junction with B4349).

For the purposes of this design it was assumed that the standard carriageway cross-section would be a Single Carriageway (S2) layout as per TD27/05 'Cross-sections and Headrooms' (DMRB 6.1.2).

Constraints

- Location to the south dictated by the existing roundabout located at the end of the Rotherwas Access Road on the A49, which aims to carry HGV traffic from Industrial Estate away from the City Centre.
- A structure required to clear existing railway lines.
- Properties located to the north and south, including listed buildings.
- Special wildlife site and ancient woodland, near A465.
- Topography.

Feature	Start Chainage	End Chainage	Details
Special Wildlife Site	2400	3000	Alignment Avoids Feature Minimum 30m Sideways Clearance
Ancient Woodland	2400	3000	Alignment Avoids Feature Minimum 30m Sideways Clearance

Horizontal Alignment

- Horizontal alignment avoids high topography to the north and south as well as existing buildings and structures
- No departures or relaxations considered in alignment
- SSD desirable minimum achieved (215m)

Vertical Alignment

- Substantial areas of fill required to raise the proposed road level to allow suitable clearance over existing railway lines.
- Cutting required to pass under exiting minor road.
- No departures or relaxations required
- SSD desirable minimum achieved (215m)

Cut and Fill

Feature	Start Chainage	End Chainage	Cut (m^3)	Fill (m^3)
At Grade	0	1200	5619	8744
Embankment	1200	1900	267	96707
Cutting	1900	2500	50280	290
At Grade	2500	3093	2143	2992
		Total	58209	108733

Structure Summary

Feature	Start Chainage	End Chainage	Details
Existing Roundabout	0	---	---
Grafton Lane	866.5	---	Stopped Up
Culvert	1461	---	Length = 30m, Skew = 0°
Railway Overpass	1725	---	Clearance = 7.7m
Minor Road Underpass	2060	---	Clearance = 6.5m
Proposed Roundabout	3093	---	---

Southern Corridor – SC3

South core 3 has a total length of 2775m and extends from the existing roundabout at the western end of the Rotherwas access road to a proposed junction where it is to connect with the A465 (on the West of existing junction with B4349 - option Dept. of Transport)

According with:

- Hereford Multi-Modal Model, Forecasting Report, table 5.5 'Select Link Flows – ODR West-PM peak – pcu per hour ' (Link 33)
- TA 79/99 Table 2 'Capacity of Urban Roads, One-way hourly flows in each direction'

for the purposes of this design it was assumed that the standard carriageway cross-section would be a Single Carriageway (S2) layout as per TD27/05 'Cross-sections and Headrooms' (DMRB 6.1.2).

Constraints

- Location to the south dictated by the existing roundabout located at the end of the Rotherwas Access Road on the A49, which aims to carry HGV traffic from Industrial Estate away from the City Centre.
- A structure required to clear existing railway lines.
- Properties located to the north and south, including listed buildings.
- Special wildlife site and ancient woodland, near A465.
- Topography.

Feature	Start Chainage	End Chainage	Details
Special Wildlife Site	2400	2570	Structure required
Ancient Woodland	2400	2570	Structure required

Horizontal Alignment

- Horizontal alignment avoids high topography to the north and south as well as existing buildings and structures
- No departures or relaxations considered in alignment
- SSD desirable minimum achieved (215m)

Vertical Alignment

- Cutting required to pass under existing Railway Line.
- Cutting required to pass under exiting Haywood Lane.
- No departures or relaxations required
- SSD desirable minimum achieved (215m)

Cut and Fill

Feature	Start Chainage	End Chainage	Cut (m^3)	Fill (m^3)
At Grade	0	1150	6604	7318
Cutting	1150	2300	110174	1425
Embankment	2300	2775	263	31820
		Total	117041	40563

Structure Summary

Feature	Start Chainage	End Chainage	Details
Existing Roundabout	0	---	---
Grafton Lane	800	---	Stopped Up
Railway Overpass	1313	---	Clearance = 7.3m
Grafton Lane	1370	---	Stopped Up
Culvert	1417	---	Length = 26m, Skew = 25°
Haywood Lane Underpass	2065	---	Clearance = 7.6m
Special Wildlife Site Overpass	2400	2570	Clearance = 4.46m – 5.06m
Proposed Roundabout	2775	---	---

Southern Corridor – SC4

South core 4 has a total length of 2721m and extends from the existing roundabout at the western end of the Rotherwas access road to a proposed junction where it is to connect with the A465 (on the East of existing junction with B4349)

According with:

- Hereford Multi-Modal Model, Forecasting Report, table 5.5 'Select Link Flows – ODR West-PM peak – pcu per hour ' (Link 33)
- TA 79/99 Table 2 'Capacity of Urban Roads, One-way hourly flows in each direction'

for the purposes of this design it was assumed that the standard carriageway cross-section would be a Single Carriageway (S2) layout as per TD27/05 'Cross-sections and Headrooms' (DMRB 6.1.2).

Constraints

- Location to the south dictated by the existing roundabout located at the end of the Rotherwas Access Road on the A49, which aims to carry HGV traffic from Industrial Estate away from the City Centre.
- A structure required to clear existing railway lines.
- Properties located to the north and south, including listed buildings.
- Special wildlife site and ancient woodland, near A465.
- Topography.

Feature	Start Chainage	End Chainage	Details
Special Wildlife Site	2400	2600	Structure required
Ancient Woodland	2400	2600	Structure required

Horizontal Alignment

- Horizontal alignment avoids high topography to the north and south as well as existing buildings and structures
- No departures or relaxations considered in alignment
- SSD desirable minimum achieved (215m)

Vertical Alignment

- Cutting required to pass under existing Railway Lines.
- Cutting required to pass under exiting Haywood Lane.
- No departures or relaxations required
- SSD desirable minimum achieved (215m)

Cut and Fill

Feature	Start Chainage	End Chainage	Cut (m^3)	Fill (m^3)
At Grade	0	1150	6604	7318
Cutting	1150	2300	110174	1425
Embankment	2300	2775	263	31820
		Total	117041	40563

Structure Summary

Feature	Start Chainage	End Chainage	Details
Existing Roundabout	0	---	---
Grafton Lane	800	---	Stopped Up
Railway Overpass	1313	---	Clearance = 7.5m
Grafton Lane	1370	---	Stopped Up
Culvert	1417	---	Length = 25m, Skew = 25°
Haywood Lane Underpass	2065	---	Clearance = 7.7m
Special Wildlife Site Overpass	2400	2625	Clearance = 3.0m
Proposed Roundabout	2721	---	---

Southern Corridor – SC5

South core 5 has a total length of 3071m and extends from the existing roundabout at the western end of the Rotherwas access road to a proposed junction where it is to connect with the A465 (600m on the East of existing junction with B4349).

According with:

- Hereford Multi-Modal Model, Forecasting Report, table 5.5 'Select Link Flows – ODR West-PM peak – pcu per hour ' (Link 33)
- TA 79/99 Table 2 'Capacity of Urban Roads, One-way hourly flows in each direction'

for the purposes of this design it was assumed that the standard carriageway cross-section would be a Single Carriageway (S2) layout as per TD27/05 'Cross-sections and Headrooms' (DMRB 6.1.2).

Constraints

- Location to the south dictated by the existing roundabout located at the end of the Rotherwas Access Road on the A49, which aims to carry HGV traffic from Industrial Estate away from the City Centre.
- A structure required to clear existing railway lines.
- Properties located to the north and south, including listed buildings.
- Special wildlife site and ancient woodland, near A465.
- Topography.

Feature	Start Chainage	End Chainage	Details
Special Wildlife Site	2400	2600	Alignment Avoids Feature Minimum 30m Sideways Clearance
Ancient Woodland	2400	2600	Alignment Avoids Feature Minimum 30m Sideways Clearance

Horizontal Alignment

- Horizontal alignment avoids high topography to the north and south as well as existing buildings and structures
- No departures or relaxations considered in alignment
- SSD desirable minimum achieved (215m)

Vertical Alignment

- Cutting required to pass under existing Railway Line.
- Cutting required to pass under exiting Haywood Lane.
- No departures or relaxations required
- SSD desirable minimum achieved (215m) (with verge widening in the cut)

Cut and Fill

Feature	Start Chainage	End Chainage	Cut (m^3)	Fill (m^3)
At Grade	0	1200	7177	7445
Cutting	1200	2450	173533	6
At grade	2450	3071	3461	2035
		Total	184171	9486

Structure Summary

Feature	Start Chainage	End Chainage	Details
Existing Roundabout	0	---	---
Grafton Lane	800	---	Stopped Up
Railway Overpass	1323	---	Clearance = 7.6
Culvert	1428	---	Length = 20m, Skew = 3°
Haywood Lane Underpass	2002	---	Clearance = 7.9m
Proposed Roundabout	3071	---	---

Southern Corridor – SC6

South core 6 has a total length of 3021m and extends from the existing roundabout at the western end of the Rotherwas access road to a proposed junction where it is to connect with the A465 (on the East of existing junction with B4349)

According with:

- Hereford Multi-Modal Model, Forecasting Report, table 5.5 'Select Link Flows – ODR West-PM peak – pcu per hour ' (Link 33)
- TA 79/99 Table 2 'Capacity of Urban Roads, One-way hourly flows in each direction'

for the purposes of this design it was assumed that the standard carriageway cross-section would be a Single Carriageway (S2) layout as per TD27/05 'Cross-sections and Headrooms' (DMRB 6.1.2).

Constraints

- Location to the south dictated by the existing roundabout located at the end of the Rotherwas Access Road on the A49, which aims to carry HGV traffic from Industrial Estate away from the City Centre.
- A structure required to clear existing railway lines.
- Properties located to the north and south, including listed buildings.
- Special wildlife site and ancient woodland, near A465.
- Topography.

Feature	Start Chainage	End Chainage	Details
Special Wildlife Site	2560	2750	Structure required
Ancient Woodland	2560	2750	Structure required

Horizontal Alignment

- Horizontal alignment avoids high topography to the north and south as well as existing buildings and structures
- No departures or relaxations considered in alignment - three relaxations required:

Radius	Start Chainage	End Chainage	Superelevation	Relaxation
360m	111.41	488.341	7%	Two Steps below Desirable Min R
360m	782.217	1050.827	7%	Two Steps below Desirable Min R
510m	1128.976	1379.005	7%	One Step below Desirable Min R

- SSD desirable minimum achieved (215m) with verge widening

Vertical Alignment

- Cutting required to pass under existing Railway Line.
- Cutting required to pass under exiting Haywood Lane.
- SSD desirable minimum achieved (215m)

Cut and Fill

Feature	Start Chainage	End Chainage	Cut (m^3)	Fill (m^3)
Embankment	0	700	520	11600
At Grade	700	1200	1975	1820
Cutting	1200	2450	162865	225
Embankment	2450	2850	295	26275
At Grade	2850	3021	735	530
		Total	166390	40450

Structure Summary

Feature	Start Chainage	End Chainage	Details
Existing Roundabout	0	---	---
Grafton Lane	860	---	Stopped Up
Railway Overpass	1450	---	Clearance = 7.7m
Grafton Lane	1530	---	Stopped Up
Culvert	1540	---	Length = 35m, Skew = 25°
Haywood Lane Underpass	2230	---	Clearance = 9.5m
Special Wildlife Site Overpass	2560	2750	Clearance = 2.3m – 4.4m
Proposed Roundabout	3021	---	---

Appendix C

Route Cost Estimates

Hereford Relief Road
CONSTRUCTION COST ESTIMATES - SC1

Item Description	Unit	Rate	Quantity	Total
OUTLINE BILL OF QUANTITIES				
ROAD WORKS GENERAL				
Series 100: Preliminaries				
Preliminaries	Item	SUM	1	£3,252,769.00
Series 200: Site Clearance				
General Site Clearance	ha	£5,000.00	10.3	£51,500.00
Series 300: Fencing				
Temporary fencing	m	£2.50	6,200	£15,500.00
Timber post & rail fencing	m	£25.00	6,200	£155,000.00
Series 400: Road Restraint Systems				
Safety Barrier N2 W2 - Driven / Augered	m	£45.00	2300	£103,500.00
High Containment Aluminium Parapet Railing	m	£180.00	500	£90,000.00
16m Transitions & Connections	no.	£2,500.00	12	£30,000.00
P4 End Terminals	no.	£2,500.00	12	£30,000.00
P1 End Terminals	no.	£675.00	0	£0.00
Series 500: Drainage				
Carriageway carrier storm drain ave 450mm Dia at 2.0m Depths	m	£50.00	4,300	£215,000.00
Gullies incl. frames (20m spacing)	no	£150.00	220	£33,000.00
Manholes (90m spacing)	no	£500.00	70	£35,000.00
Connections	no	£50.00	220	£11,000.00
Culverts (ave ∅900mm)	m	£500.00	60	£30,000.00
Culverts Head Walls & Wing Walls	no	£2,500.00	6	£15,000.00
Retention ponds	ha	£150,000.00	4.00	£600,000.00
Series 600: Earthworks				
Excavation of Acceptable Material Class 5A	m3	£4.50	25,900	£116,550.00
Excavation of Acceptable Material excluding Class 5A (50%)	m3	£5.00	33,319	£166,595.00
Excavation of Unacceptable Material Class U1A (50%)	m3	£8.00	33,319	£266,552.00
Deposition of Acceptable Material in embankments and other areas of fill	m3	£2.00	33,319	£66,638.00
Disposal of unacceptable material U1A	m3	£10.00	33,319	£333,190.00
Imported Acceptable material	m3	£18.00	198,731	£3,577,158.00
Compaction of suitable material; embankments and other areas of fill	m3	£0.50	233,050	£116,525.00

Completion of formation	m2	£0.30	45,000	£13,500.00
Completion of sub-formation	m2	£0.30	45,000	£13,500.00
Topsoiling 150mm thick	m2	£1.50	20,000	£30,000.00
Grass seeding to roadside verges and embankments	m2	£0.40	20,000	£8,000.00
Series 700: Pavements				
Granular Sub-Base Type 3 (350mm thk)	m3	£17.00	10,353	£176,001.00
Importing Capping Layer 6F2 (300mm thk)	m3	£17.00	20,705	£351,985.00
Regulating Course	t	£60.00	100	£6,000.00
AC Base 220mm thick	m2	£15.00	51,840	£777,600.00
Rolled Asphalt Basecourse (60mm thk)	m2	£7.50	51,840	£388,800.00
Rolled Asphalt Wearing Course (40mm thk)	m2	£7.50	51,840	£388,800.00
Cold Milling (Planing)	m2	£2.50	1,000	£2,500.00
Series 1100: Kerbs, Footways & Paved Areas				
Footpath Area	m2	£23.00	17180	£395,140.00
Precast concrete kerb HB2	m	£11.00	6,500	£71,500.00
Flat top edging kerb EF	m	£7.50	6,500	£48,750.00
Series 1200: Traffic Signs and Road Markings				
Edge of Road markings	m	£2.00	12,500	£25,000.00
Segregation on shared cycle/pedestrian path	m	£1.50	3,100	£4,650.00
Traffic Lane Markings	m	£2.00	6,246	£12,492.00
Signage (not exceeding 1200mm height)	no	£500.00	15	£7,500.00
Road Studs	no	£25.00	350	£8,750.00
Series 3000: Landscape and Ecology				
Planting etc	m	£12.00	6,200	£74,400.00
Proposed Junctions				
Roundabout - 1No.	item	£700,000.00	1	£700,000.00
STRUCTURES				
Type A - 1No. At 15m span (Road Bridge)	m2	£2,400.00	215	£516,000.00
Type B - 1No. At 25m span (Rail Bridge)	m2	£1,750.00	360	£630,000.00
Type D - 1No. At 100m crossing with 2 piers (Haywood Forest)	m2	£1,350.00	1,430	£1,930,500.00
600Dia CFA piles at 20m depths at 30m spans	no.	£1,500.00	0	£0.00
Type E - 2 No.	no.	£12,000.00		£0.00
WORKS FOR STATUTORY BODIES				
WORKS FOR STATUTORY BODIES	m	£120.00	3,100	£372,000.00
CONSTRUCTION COSTS				**£13,011,076.00**
LAND COSTS	ha	£100,000.00	10.3	£1,030,000.00
PRELIMINARIES		25%		£3,252,769.00
PREPARATION & SUPERVISION (10% + 7%)		17%		£2,211,882.92
SUB-TOTAL				**£19,505,727.92**
OPTIMISM BIAS (UPPER BOUND)		**44%**		£8,582,520.28
TOTAL 2010 Prices				**£28,088,248.20**
WITH INFLATION (over 7 Years at 2.7%)		2.7%	**7**	**£33,846,811.24**

Hereford Relief Road
CONSTRUCTION COST ESTIMATES - SC2

Item Description	Unit	Rate	Quantity	Total
OUTLINE BILL OF QUANTITIES				
ROAD WORKS GENERAL				
Series 100: Preliminaries				
Preliminaries	Item	SUM	1	£1,999,309.13
Series 200: Site Clearance				
General Site Clearance	ha	£5,000.00	8.42	£42,100.00
Series 300: Fencing				
Temporary fencing	m	£2.50	6,100	£15,250.00
Timber post & rail fencing	m	£25.00	6,100	£152,500.00
Series 400: Road Restraint Systems				
Safety Barrier N2 W2 - Driven / Augered	m	£45.00	1500	£67,500.00
High Containment Aluminium Parapet Railing	m	£180.00	80	£14,400.00
16m Transitions & Connections	no.	£2,500.00	6	£15,000.00
P4 End Terminals	no.	£2,500.00	8	£20,000.00
P1 End Terminals	no.	£675.00	0	£0.00
Series 500: Drainage				
Carriageway carrier storm drain ave 450mm Dia at 2.0m Depths	m	£50.00	4,000	£200,000.00
Gullies incl. frames (20m spacing)	no	£150.00	220	£33,000.00
Manholes (90m spacing)	no	£500.00	40	£20,000.00
Connections	no	£50.00	220	£11,000.00
Culverts (ave ∅900mm)	m	£500.00	60	£30,000.00
Culverts Head Walls & Wing Walls	no	£2,500.00	4	£10,000.00
Retention ponds	ha	£150,000.00	0.42	£63,000.00
Series 600: Earthworks				
Excavation of Acceptable Material Class 5A	m3	£4.50	19,074	£85,833.00
Excavation of Acceptable Material excluding Class 5A (50%)	m3	£5.00	29,154	£145,770.00
Excavation of Unacceptable Material Class U1A (50%)	m3	£8.00	29,154	£233,232.00
Deposition of Acceptable Material in embankments and other areas of fill	m3	£2.00	29,154	£58,308.00
Disposal of unacceptable material U1A	m3	£10.00	29,154	£291,540.00
Imported Acceptable material	m3	£18.00	79,578	£1,432,404.00
Compaction of suitable material; embankments and other areas of fill	m3	£0.50	108,733	£54,366.50

Completion of formation	m2	£0.30	68,355	£20,506.50
Completion of sub-formation	m2	£0.30	68,355	£20,506.50
Topsoiling 150mm thick	m2	£1.50	20,000	£30,000.00
Grass seeding to roadside verges and embankments	m2	£0.40	20,000	£8,000.00
Series 700: Pavements				
Granular Sub-Base Type 3 (350mm thk)	m3	£17.00	10,100	£171,700.00
Importing Capping Layer 6F2 (300mm thk)	m3	£17.00	20,510	£348,670.00
Regulating Course	t	£60.00	100	£6,000.00
AC Base 220mm thick	m2	£15.00	51,340	£770,100.00
Rolled Asphalt Basecourse (60mm thick)	m2	£7.50	51,340	£385,050.00
Rolled Asphalt Wearing Course (40mm thick)	m2	£7.50	51,340	£385,050.00
Cold Milling (Planing)	m2	£2.50	1,000	£2,500.00
Series 1100: Kerbs, Footways & Paved Areas				
Footpath Area	m2	£23.00	17000	£391,000.00
Precast concrete kerb HB2	m	£11.00	6,500	£71,500.00
Flat top edging kerb EF	m	£7.50	6,500	£48,750.00
Series 1200: Traffic Signs and Road Markings				
Edge of Road markings	m	£2.00	12,300	£24,600.00
Segregation on shared cycle/pedestrian path	m	£1.50	3,000	£4,500.00
Traffic Lane Markings	m	£2.00	6,150	£12,300.00
Signage (not exceeding 1200mm height)	no	£500.00	15	£7,500.00
Road Studs	no	£25.00	340	£8,500.00
Series 3000: Landscape and Ecology				
Planting etc	m	£12.00	6,150	£73,800.00
Proposed Junctions				
Roundabout - 1 No.	item	£700,000.00	1	£700,000.00
STRUCTURES				
Type A - 1No. At 15m span	m2	£2,400.00	215	£516,000.00
Type B - 1No. At 25m span	m2	£1,750.00	358	£626,500.00
Type D - 1No. At 100m span with 2 piers	m2	£1,350.00		£0.00
64 No. 600Dia CFA piles at 20m depths	no.	£1,500.00		£0.00
Type E - 2 No.	no.	£12,000.00		£0.00
WORKS FOR STATUTORY BODIES				
WORKS FOR STATUTORY BODIES	m	£120.00	3,075	£369,000.00
CONSTRUCTION COSTS				**£7,997,236.50**
LAND COSTS	ha	£100,000.00	8.42	£842,000.00
PRELIMINARIES		25%		£1,999,309.13
PREPARATION & SUPERVISION (10% + 7%)		17%		£1,359,530.21
SUB-TOTAL				**£12,198,075.83**
OPTIMISM BIAS (UPPER BOUND)		**44%**		£5,367,153.37
TOTAL 2010 PRICES				**£17,565,229.20**
WITH INFLATION (over 7 Years at 2.7%)		2.7%	**7**	**£21,166,396.44**

Hereford Relief Road
CONSTRUCTION COST ESTIMATES - SC3

Item Description	Unit	Rate	Quantity	Total
OUTLINE BILL OF QUANTITIES				
ROAD WORKS GENERAL				
Series 100: Preliminaries				
Preliminaries	Item	SUM		£1,466,838.13
Series 200: Site Clearance				
General Site Clearance	ha	£5,000.00	7.81	£39,050.00
Series 300: Fencing				
Temporary fencing	m	£2.50	5,550	£13,875.00
Timber post & rail fencing	m	£25.00	5,550	£138,750.00
Series 400: Road Restraint Systems				
Safety Barrier N2 W2 - Driven / Augered	m	£45.00	1400	£63,000.00
High Containment Aluminium Parapet Railing	m	£180.00	80	£14,400.00
16m Transitions & Connections	no.	£2,500.00	8	£20,000.00
P4 End Terminals	no.	£2,500.00	12	£30,000.00
P1 End Terminals	no.	£675.00		£0.00
Series 500: Drainage				
Carriageway carrier storm drain ave 450mm Dia at 2.0m Depths	m	£50.00	5,000	£250,000.00
Gullies incl. frames (20m spacing)	no	£150.00	140	£21,000.00
Manholes (90m spacing)	no	£500.00	62	£31,000.00
Connections	no	£50.00	140	£7,000.00
Culverts (ave ∅900mm)	m	£500.00	70	£35,000.00
Culverts Head Walls & Wing Walls	no	£2,500.00	4	£10,000.00
Retention ponds	ha	£150,000.00		£0.00
Series 600: Earthworks				
Excavation of Acceptable Material Class 5A	m3	£4.50	49,108	£220,986.00
Excavation of Acceptable Material excluding Class 5A (50%)	m3	£5.00	58,520	£292,600.00
Excavation of Unacceptable Material Class U1A (50%)	m3	£8.00	58,520	£468,160.00
Deposition of Acceptable Material in embankments and other areas of fill	m3	£2.00	40,563	£81,126.00
Disposal of unacceptable material U1A	m3	£10.00	58,520	£585,200.00
Disposal of acceptable material	m3	£10.00	17,957	£179,570.00
Compaction of suitable material; embankments and other areas of fill	m3	£0.50	40,563	£20,281.50

Completion of formation	m2	£0.30	22,469	£6,740.70
Completion of sub-formation	m2	£0.30	22,469	£6,740.70
Topsoiling 150mm thick	m2	£1.50	22,469	£33,703.50
Grass seeding to roadside verges and embankments	m2	£0.40	22,469	£8,987.60
Series 700: Pavements				
Granular Sub-Base Type 3 (350mm thk)	m3	£17.00	7,090	£120,530.00
Importing Capping Layer 6F2 (300mm thk)	m3	£17.00	5,064	£86,088.00
Regulating Course	t	£60.00		£0.00
AC Base 220mm thick	m2	£15.00	20,257	£303,855.00
Rolled Asphalt Basecourse (60mm thick)	m2	£7.50	20,257	£151,927.50
Rolled Asphalt Wearing Course (40mm thick)	m2	£7.50	20,257	£151,927.50
Cold Milling (Planing)	m2	£2.50	20,257	£50,642.50
Series 1100: Kerbs, Footways & Paved Areas				
Footpath Area	m2	£23.00	6382	£146,786.00
Precast concrete kerb HB2	m	£11.00	5,550	£61,050.00
Flat top edging kerb EF	m	£7.50		£0.00
Series 1200: Traffic Signs and Road Markings				
Edge of Road markings	m	£2.00	8,325	£16,650.00
Segregation on shared cycle/pedestrian path	m	£1.50		£0.00
Traffic Lane Markings	m	£2.00	2,775	£5,550.00
Signage (not exceeding 1200mm height)	no	£500.00		£0.00
Road Studs	no	£25.00	155	£3,875.00
Series 3000: Landscape and Ecology				
Planting etc	m	£12.00	5,525	£66,300.00
Proposed Junctions				
Roundabout - 2 No.	item	£700,000.00	1	£700,000.00
STRUCTURES				
Type A - 1No. At 15m span	m2	£2,400.00	215	£516,000.00
Type B - 1No. At 25m span	m2	£1,500.00	358	£537,000.00
Type D - 1No. At 100m span with 2 piers	m2	£1,200.00		£0.00
64 No. 600Dia CFA piles at 20m depths	no.	£1,500.00		£0.00
Type E - 2 No.	no.	£12,000.00		£0.00
WORKS FOR STATUTORY BODIES				
WORKS FOR STATUTORY BODIES	m	£120.00	3,100	£372,000.00
CONSTRUCTION COSTS				**£5,867,352.50**
LAND COSTS	ha	£100,000.00	7.81	£781,000.00
PRELIMINARIES		25%		£1,466,838.13
PREPARATION & SUPERVISION (10% + 7%)		17%		£997,449.93
SUB-TOTAL				**£9,112,640.55**
OPTIMISM BIAS (UPPER BOUND)		**44%**		£4,009,561.84
TOTAL				**£13,122,202.39**
WITH INFLATION (over 7 Years at 2.7%)		2.7%	**7**	**£15,812,474.46**

Hereford Relief Road
CONSTRUCTION COST ESTIMATES - SC4

Item Description	Unit	Rate	Quantity	Total
OUTLINE BILL OF QUANTITIES				
ROAD WORKS GENERAL				
Series 100: Preliminaries				
Preliminaries	Item	SUM		£1,437,266.63
Series 200: Site Clearance				
General Site Clearance	ha	£5,000.00	7.5	£37,500.00
Series 300: Fencing				
Temporary fencing	m	£2.50	5,900	£14,750.00
Timber post & rail fencing	m	£25.00	5,900	£147,500.00
Series 400: Road Restraint Systems				
Safety Barrier N2 W2 - Driven / Augered	m	£45.00	1935	£87,075.00
High Containment Aluminium Parapet Railing	m	£180.00	80	£14,400.00
16m Transitions & Connections	no.	£2,500.00	12	£30,000.00
P4 End Terminals	no.	£2,500.00	14	£35,000.00
P1 End Terminals	no.	£675.00		£0.00
Series 500: Drainage				
Carriageway carrier storm drain ave 450mm Dia at 2.0m Depths	m	£50.00	5,442	£272,100.00
Gullies incl. frames (20m spacing)	no	£150.00	273	£40,950.00
Manholes (90m spacing)	no	£500.00	61	£30,500.00
Connections	no	£50.00	273	£13,650.00
Culverts (ave ∅900mm)	m	£500.00	80	£40,000.00
Culverts Head Walls & Wing Walls	no	£2,500.00	6	£15,000.00
Retention ponds	ha	£150,000.00		£0.00
Series 600: Earthworks				
Excavation of Acceptable Material Class 5A	m3	£4.50	48,169	£216,760.50
Excavation of Acceptable Material excluding Class 5A (50%)	m3	£5.00	58,052	£290,260.00
Excavation of Unacceptable Material Class U1A (50%)	m3	£8.00	58,052	£464,416.00
Deposition of Acceptable Material in embankments and other areas of fill	m3	£2.00	34,044	£68,088.00
Disposal of unacceptable material U1A	m3	£10.00	58,052	£580,520.00
Disposal of acceptable material	m3	£10.00	24,008	£240,080.00
Compaction of suitable material; embankments and other areas of fill	m3	£0.50	34,044	£17,022.00

Completion of formation	m2	£0.30	22,047	£6,614.10
Completion of sub-formation	m2	£0.30	22,047	£6,614.10
Topsoiling 150mm thick	m2	£1.50	22,047	£33,070.50
Grass seeding to roadside verges and embankments	m2	£0.40	22,047	£8,818.80
Series 700: Pavements				
Granular Sub-Base Type 3 (350mm thk)	m3	£17.00	6,952	£118,184.00
Importing Capping Layer 6F2 (300mm thk)	m3	£17.00	4,966	£84,422.00
Regulating Course	t	£60.00	4,767	£286,020.00
AC Base 220mm thick	m2	£15.00	4,369	£65,535.00
Rolled Asphalt Basecourse (60mm thick)	m2	£7.50	1,192	£8,940.00
Rolled Asphalt Wearing Course (40mm thick)	m2	£7.50	794	£5,955.00
Cold Milling (Planing)	m2	£2.50	19,863	£49,657.50
Series 1100: Kerbs, Footways & Paved Areas				
Footpath Area	m2	£23.00	6258	£143,934.00
Precast concrete kerb HB2	m	£11.00	5,442	£59,862.00
Flat top edging kerb EF	m	£7.50		£0.00
Series 1200: Traffic Signs and Road Markings				
Edge of Road markings	m	£2.00	8,166	£16,332.00
Segregation on shared cycle/pedestrian path	m	£1.50		£0.00
Traffic Lane Markings	m	£2.00	2,722	£5,444.00
Signage (not exceeding 1200mm height)	no	£500.00		£0.00
Road Studs	no	£25.00	152	£3,800.00
Series 3000: Landscape and Ecology				
Planting etc	m	£12.00	5,441	£65,292.00
Proposed Junctions				
Roundabout - 2 No.	item	£700,000.00	1	£700,000.00
STRUCTURES				
Type A - 1No. At 15m span	m2	£2,400.00	215	£516,000.00
Type B - 1No. At 25m span	m2	£1,500.00	358	£537,000.00
Type D - 1No. At 100m span with 2 piers	m2	£1,200.00		£0.00
64 No. 600Dia CFA piles at 20m depths	no.	£1,500.00		£0.00
Type E - 2 No.	no.	£12,000.00		£0.00
WORKS FOR STATUTORY BODIES				
WORKS FOR STATUTORY BODIES	m	£120.00	3,100	£372,000.00
CONSTRUCTION COSTS				**£5,749,066.50**
LAND COSTS	ha	£100,000.00	7.5	£750,000.00
PRELIMINARIES		25%		£1,437,266.63
PREPARATION & SUPERVISION (10% + 7%)		17%		£977,341.31
SUB-TOTAL				**£8,913,674.43**
OPTIMISM BIAS (UPPER BOUND)		**44%**		£3,922,016.75
TOTAL				**£12,835,691.18**
WITH INFLATION (over 7 Years at 2.7%)		2.7%	**7**	**£15,467,223.63**

Hereford Relief Road
CONSTRUCTION COST ESTIMATES - SC5

Item Description	Unit	Rate	Quantity	Total
OUTLINE BILL OF QUANTITIES				
ROAD WORKS GENERAL				
Series 100: Preliminaries				
Preliminaries	Item	SUM		£1,855,616.13
Series 200: Site Clearance				
General Site Clearance	ha	£5,000.00	8.38	£41,900.00
Series 300: Fencing				
Temporary fencing	m	£2.50	7,400	£18,500.00
Timber post & rail fencing	m	£25.00	7,400	£185,000.00
Series 400: Road Restraint Systems				
Safety Barrier N2 W2 - Driven / Augered	m	£45.00	1900	£85,500.00
High Containment Aluminium Parapet Railing	m	£180.00	80	£14,400.00
16m Transitions & Connections	no.	£2,500.00	4	£10,000.00
P4 End Terminals	no.	£2,500.00	10	£25,000.00
P1 End Terminals	no.	£675.00		£0.00
Series 500: Drainage				
Carriageway carrier storm drain ave 450mm Dia at 2.0m Depths	m	£50.00	4,350	£217,500.00
Gullies incl. frames (20m spacing)	no	£150.00	310	£46,500.00
Manholes (90m spacing)	no	£500.00	68	£34,000.00
Connections	no	£50.00	310	£15,500.00
Culverts (ave ∅900mm)	m	£500.00	60	£30,000.00
Culverts Head Walls & Wing Walls	no	£2,500.00	4	£10,000.00
Retention ponds	ha	£150,000.00		£0.00
Series 600: Earthworks				
Excavation of Acceptable Material Class 5A	m3	£4.50	54,341	£244,534.50
Excavation of Acceptable Material excluding Class 5A (50%)	m3	£5.00	92,085	£460,425.00
Excavation of Unacceptable Material Class U1A (50%)	m3	£8.00	92,085	£736,680.00
Deposition of Acceptable Material in embankments and other areas of fill	m3	£2.00	9,486	£18,972.00
Disposal of unacceptable material U1A	m3	£10.00	92,085	£920,850.00
Disposal of acceptable material	m3	£10.00	82,599	£825,990.00
Compaction of suitable material; embankments and other areas of fill	m3	£0.50	9,486	£4,743.00

Completion of formation	m2	£0.30	24,871	£7,461.30
Completion of sub-formation	m2	£0.30	24,871	£7,461.30
Topsoiling 150mm thick	m2	£1.50	24,871	£37,306.50
Grass seeding to roadside verges and embankments	m2	£0.40	24,871	£9,948.40
Series 700: Pavements				
Granular Sub-Base Type 3 (350mm thk)	m3	£17.00	7,843	£133,331.00
Importing Capping Layer 6F2 (300mm thk)	m3	£17.00	5,602	£95,234.00
Regulating Course	t	£60.00		£0.00
AC Base 220mm thick	m2	£15.00	22,409	£336,135.00
Rolled Asphalt Basecourse (60mm thick)	m2	£7.50	22,409	£168,067.50
Rolled Asphalt Wearing Course (40mm thick)	m2	£7.50	22,409	£168,067.50
Cold Milling (Planing)	m2	£2.50	22,409	£56,022.50
Series 1100: Kerbs, Footways & Paved Areas				
Footpath Area	m2	£23.00	7061	£162,403.00
Precast concrete kerb HB2	m	£11.00	6,139	£67,529.00
Flat top edging kerb EF	m	£7.50		£0.00
Series 1200: Traffic Signs and Road Markings				
Edge of Road markings	m	£2.00	9,210	£18,420.00
Segregation on shared cycle/pedestrian path	m	£1.50		£0.00
Traffic Lane Markings	m	£2.00	3,070	£6,140.00
Signage (not exceeding 1200mm height)	no	£500.00		£0.00
Road Studs	no	£25.00	171	£4,275.00
Series 3000: Landscape and Ecology				
Planting etc	m	£12.00	6,139	£73,668.00
Proposed Junctions				
Roundabout - 2 No.	item	£700,000.00	1	£700,000.00
STRUCTURES				
Type A - 1No. At 15m span	m2	£2,400.00	215	£516,000.00
Type B - 1No. At 25m span	m2	£1,500.00	358	£537,000.00
Type D - 1No. At 100m span with 2 piers	m2	£1,200.00		£0.00
64 No. 600Dia CFA piles at 20m depths	no.	£1,500.00		£0.00
Type E - 2 No.	no.	£12,000.00		£0.00
WORKS FOR STATUTORY BODIES				
WORKS FOR STATUTORY BODIES	m	£120.00	3,100	£372,000.00
CONSTRUCTION COSTS				**£7,422,464.50**
LAND COSTS	ha	£100,000.00	8.38	£838,000.00
PRELIMINARIES		25%		£1,855,616.13
PREPARATION & SUPERVISION (10% + 7%)		17%		£1,261,818.97
SUB-TOTAL				**£11,377,899.59**
OPTIMISM BIAS (UPPER BOUND)		**44%**		£5,006,275.82
TOTAL				**£16,384,175.41**
WITH INFLATION (over 7 Years at 2.7%)		2.7%	**7**	**£19,743,206.78**

Hereford Relief Road
CONSTRUCTION COST ESTIMATES - SC6

Item Description	Unit	Rate	Quantity	Total
OUTLINE BILL OF QUANTITIES				
ROAD WORKS GENERAL				
Series 100: Preliminaries				
Preliminaries	Item	SUM		£1,701,462.50
Series 200: Site Clearance				
General Site Clearance	ha	£5,000.00	8.84	£44,200.00
Series 300: Fencing				
Temporary fencing	m	£2.50	6,043	£15,107.50
Timber post & rail fencing	m	£25.00	6,043	£151,075.00
Series 400: Road Restraint Systems				
Safety Barrier N2 W2 - Driven / Augered	m	£45.00	1460	£65,700.00
High Containment Aluminium Parapet Railing	m	£180.00	80	£14,400.00
16m Transitions & Connections	no.	£2,500.00	8	£20,000.00
P4 End Terminals	no.	£2,500.00	14	£35,000.00
P1 End Terminals	no.	£675.00		£0.00
Series 500: Drainage				
Carriageway carrier storm drain ave 450mm Dia at 2.0m Depths	m	£50.00	4,000	£200,000.00
Gullies incl. frames (20m spacing)	no	£150.00	300	£45,000.00
Manholes (90m spacing)	no	£500.00	67	£33,500.00
Connections	no	£50.00	300	£15,000.00
Culverts (ave ∅900mm)	m	£500.00	60	£30,000.00
Culverts Head Walls & Wing Walls	no	£2,500.00	4	£10,000.00
Retention ponds	ha	£150,000.00		£0.00
Series 600: Earthworks				
Excavation of Acceptable Material Class 5A	m3	£4.50	53,490	£240,705.00
Excavation of Acceptable Material excluding Class 5A (50%)	m3	£5.00	83,188	£415,940.00
Excavation of Unacceptable Material Class U1A (50%)	m3	£8.00	83,188	£665,504.00
Deposition of Acceptable Material in embankments and other areas of fill	m3	£2.00	40,371	£80,742.00
Disposal of unacceptable material U1A	m3	£10.00	83,188	£831,880.00
Disposal of acceptable material	m3	£10.00	43,819	£438,190.00
Compaction of suitable material; embankments and other areas of fill	m3	£0.50	40,371	£20,185.50

Completion of formation	m2	£0.30	24,486	£7,345.80
Completion of sub-formation	m2	£0.30	24,486	£7,345.80
Topsoiling 150mm thick	m2	£1.50	24,486	£36,729.00
Grass seeding to roadside verges and embankments	m2	£0.40	24,486	£9,794.40
Series 700: Pavements				
Granular Sub-Base Type 3 (350mm thk)	m3	£17.00	7,719	£131,223.00
Importing Capping Layer 6F2 (300mm thk)	m3	£17.00	5,514	£93,738.00
Regulating Course	t	£60.00		£0.00
AC Base 220mm thick	m2	£15.00	22,054	£330,810.00
Rolled Asphalt Basecourse (60mm thick)	m2	£7.50	22,054	£165,405.00
Rolled Asphalt Wearing Course (40mm thick)	m2	£7.50	22,054	£165,405.00
Cold Milling (Planing)	m2	£2.50	22,054	£55,135.00
Series 1100: Kerbs, Footways & Paved Areas				
Footpath Area	m2	£23.00	6948	£159,804.00
Precast concrete kerb HB2	m	£11.00	6,042	£66,462.00
Flat top edging kerb EF	m	£7.50		£0.00
Series 1200: Traffic Signs and Road Markings				
Edge of Road markings	m	£2.00	9,063	£18,126.00
Segregation on shared cycle/pedestrian path	m	£1.50		£0.00
Traffic Lane Markings	m	£2.00	3,021	£6,042.00
Signage (not exceeding 1200mm height)	no	£500.00		£0.00
Road Studs	no	£25.00	168	£4,200.00
Series 3000: Landscape and Ecology				
Planting etc	m	£12.00	4,263	£51,156.00
Proposed Junctions				
Roundabout - 2 No.	item	£700,000.00	1	£700,000.00
STRUCTURES				
Type A - 1No. At 15m span	m2	£2,400.00	215	£516,000.00
Type B - 1No. At 25m span	m2	£1,500.00	358	£537,000.00
Type D - 1No. At 100m span with 2 piers	m2	£1,200.00		£0.00
64 No. 600Dia CFA piles at 20m depths	no.	£1,500.00		£0.00
Type E - 2 No.	no.	£12,000.00		£0.00
WORKS FOR STATUTORY BODIES				
WORKS FOR STATUTORY BODIES	m	£120.00	3,100	£372,000.00
CONSTRUCTION COSTS				**£6,805,850.00**
LAND COSTS	ha	£100,000.00	8.84	£884,000.00
PRELIMINARIES		25%		£1,701,462.50
PREPARATION & SUPERVISION (10% + 7%)		17%		£1,156,994.50
SUB-TOTAL				**£10,548,307.00**
OPTIMISM BIAS (UPPER BOUND)		**44%**		£4,641,255.08
TOTAL				**£15,189,562.08**
WITH INFLATION (over 7 Years at 2.7%)		2.7%	**7**	**£18,303,677.64**

Appendix D

Environmental Assessment Report

Hereford Relief Road
Southern Core Corridor

Study of Options Environmental Assessment Report

Document reference: 551594/Final SOEAR

Revision: Final

Issued: April 2012

Document Control Sheet

Project Name:	Hereford Relief Road Southern Core Corridor
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(Enter Details of Amendment)	Name: (print) Signature: Date:	Name: (print) Signature: Date:	Name: (print) Signature: Date:

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1. Introduction

1.1. Background to this Study of Options has been discussed in detail in the main section of this Report (see Section 3). In summary, this study will assess the advantages and disadvantages of each of the six route options in the Southern Core Corridor (SC1 to SC6), in terms of the Government's objectives for transport: accessibility, economy, environment, integration and safety.

1.2. The purpose of the study is to take the scheme a step closer towards having a preferred and fully assessed route to support a Major Scheme Business Case and as such, it is important that all studies, including this particular assessment, leading to the selection of a preferred option, will result in a scheme delivered in accordance with the Department for Transport's, Transport Appraisal Guidance (TAG). The Government's five objectives for transport are assessed through TAG, as discussed in Section 2 of this Study of Options Environmental Assessment Report (SOEAR).

1.3. The aim of this SOEAR is to assess any environmental constraints of the six route options in the Southern Core Corridor in terms of the environmental objective for transport. The Southern Core Corridor has been expanded to include a previously proposed route promoted by the Department of Transport in the 1990s. It will also take into account recent consultation responses from residents and statutory bodies.

1.4. This SOEAR will assess any environmental constraints of the six route options SC1 to SC6 in isolation, and not in conjunction with any other proposal for the Hereford Relief Road. Figure 1, Appendix B provides an overview of all six route options.

1.5. The environmental assessment for the six route options in the Southern Core Corridor comprised mainly of desk-based study along with consultation with the main statutory bodies. Further detail on the methodology of this environmental assessment is provided below.

2. Methodology

2.1. General

2.1.1. The purpose of this SOEAR is therefore to provide the appropriate level of environmental assessment for the scheme, which at the Study of Options stage is sufficient assessment to identify the land take related impacts related to the proposed route options.

2.2. Design Manual for Roads and Bridges (DMRB)

2.2.1. The "Design Manual for Roads and Bridges" (DMRB) was introduced in 1992 in England and Wales, and is updated regularly by the Highways Agency. It provides a comprehensive manual system which accommodates current Standards, Advice Notes and other published documents relating to all works associated with Trunk Roads, including assessment, design, construction, operation, maintenance and demolition. To this effect, the DMRB shall be used as the basis for this environmental assessment of the six route options.

2.2.2. The appraisal against the TAG environmental objectives is informed by environmental assessment methodology in DMRB Volume 11. DMRB Volume 11 specifies a three-stage approach to the selection of route options, as follows:

- Stage 1 – Sufficient assessment to identify the environmental advantages, disadvantages and constraints associated with broadly defined route corridors.
- Stage 2 – sufficient assessment to identify the factors and effects to be taken into account in choosing the route options and to identify the environmental advantages, disadvantages and constraints associated with those routes.
- Stage 3 – Detailed assessment on the environmental effects of the selected route option.

2.2.3. For environmental assessment this overall approach has been modified, with the publication of HA 201/08. The three levels are 'Scoping', 'Simple' and 'Detailed'. The level of environmental assessment at each stage of the project is determined according to what is appropriate and necessary in order to establish the likely level of environmental effects which may inform a project decision, and that this level of assessment may vary between topics.

2.2.4. The assessment will focus on the likely significant effects on the environment. While it is necessary to assess all potential effects to some degree in order to determine which of them may be significant, the assessment will identify which of the effects assessed should be regarded as of enough significance to be taken into account in the decision making process. Each of the following sections therefore sets out the criteria under which the significance of the effects for that topic has been assessed. Where possible this is by reference to published guidance or good practice, and Table 2.1 below is a general guide to how this has been carried out, based on the interaction between the sensitivity of the resource affected and the magnitude of the change to it.

Table 2.1: Significance of Impacts in line with DMRB						
V	**Very High**	**Very Large**	**Very Large / Large**	Large / Moderate	Slight	Neutral
A	**High**	**Very Large / Large**	Large / Moderate	Moderate / Slight	Slight	Neutral
L	**Medium**	Large / Moderate	Moderate / Slight	Slight	Slight / Neutral	Neutral
U	**Low**	Moderate / Slight	Slight	Slight / Neutral	Slight / Neutral	Neutral
E	**Negligible**	Slight	Slight / Neutral	Slight / Neutral	Neutral	Neutral
		Major	**Moderate**	**Minor**	**Negligible**	**None**
		MAGNITUDE OF IMPACT				

2.2.5. While this environmental assessment will be undertaken in accordance with the guidance set out in Volume 11 of the DMRB, the format of the report will be in accordance with the Department for Transport's TAG. For some topics, where the current DMRB Volume 11 guidance is somewhat out of date, some aspects of the TAG guidance will also be followed for the assessment, and for each topic the TAG data requirements will be reviewed to ensure that the outputs of the assessment are in accordance with TAG.

2.3. Transport Analysis Guidance (TAG)

2.3.1. The Environment Objective 3.3 aims to protect the built and natural environment. This includes reducing the direct and indirect impacts of transport facilities and their use on the environment of both users and non-users. The environmental impacts of concern include noise, atmospheric pollution of differing kinds, vibration, formal intrusion, severance, and impacts on the countryside and wildlife, ancient monuments and historic buildings and so on. While some of these can be readily quantified, others such as severance are much more difficult to define and analyse. More recently, the Environment Objective has been defined more widely to include reduction of the impact of transport on the global environment, particularly through emission of carbon dioxide, but also by consumption of scarce and non-renewable resources.

2.3.2. The Environment Objective has 10 sub-objectives that reflect the various impacts of concern:

- to reduce noise; The Noise Sub-Objective
- to improve local air quality; The Air Quality Sub-Objective
- to reduce greenhouse gases, The Greenhouse Gases Sub-Objective
- to protect and enhance the landscape; The Landscape Sub-Objective
- to protect and enhance the townscape; The Townscape Sub-Objective

- to protect the heritage of historic resources; The Heritage of Historic Resources Sub-Objective
- to support biodiversity and geodiversity; The Biodiversity Sub-Objective
- to protect the water environment ; The Water Environment Sub-Objective
- to encourage physical fitness; The Physical Fitness Sub-Objective
- to improve journey ambience; The Journey Ambience Sub-Objective

2.3.3. Stage 2 is sufficient stage to identify the factors and effects to be taken into account in choosing the route options and to identify the environmental advantages, disadvantages and constraints associated with those routes. This SOEAR identifies the significant environmental constraints with each route option identified during a desk-based study, allowing a comparison of the proposed route options. The assessment at Stage 2 includes Scoping of route changes, and Simple or Detailed Assessment as required following selection of preferred routes and route alignment changes.

2.3.4. The aim of the Stage 2 Scheme Assessment Report is to safeguard a route for the Local Development Framework (LDF) Core Strategy. Additional traffic modelling was not undertaken as part of this assessment, therefore it was decided that a Study of Options report would be produced to provide the evidence base for land take related impacts, for the safeguarding of a route corridor for the LDF. Further assessment would then be undertaken in the form of a Stage 2 Report when the traffic modelling was available. For this SOEAR not all the chapters are complete, as generally only land take type impacts are known, but will be revised with the traffic type impacts when the final Stage 2 Report is produced. Table 2.2 provides an overview of how each environmental section is assessed in terms of land take and traffic type impact.

Table 2.2: Broad Categories of Environmental Impact (Source: Department for Transport TAG website)

Environmental Objective	Land take Type Impact	Traffic Type Impact
Noise	-	✓
Local Air Quality	-	✓
Greenhouse Gases	-	✓
Landscape	✓	✓
Townscape	✓	✓
Biodiversity	✓	✓
Heritage	✓	✓
Water Environment	✓	✓
Physical Fitness	-	✓
Journey Ambience	-	✓

2.4. As outlined, this SOEAR was developed based on mainly desk-based study. A number of sources of information were used to carry out the study. These include the Herefordshire Council LDF Evidence Base, Green Infrastructure GIS database, online MAGIC maps, Natural England's 'Nature on the Map' website, the Environment Agency website and national, regional and local policies and plans.

2.4.1. The only site gathered information was undertaken by an experienced landscape architect, and with access to private land not agreed at this stage the walkover consisted of stopping along public paths and access points. In addition, consultation with the main statutory bodies was undertaken as an integral part of the assessment process. Further detail on this consultation process is provided below.

2.5. Consultation Process

2.5.1. The following were consulted for information and to gain an understanding of any potential issues associated with the proposed route options:

- The Environment Agency (EA)
- Natural England
- English Heritage
- Herefordshire Council's Historic Building Team
- Herefordshire Council's Ecology Team
- Herefordshire Council Archaeological Team
- Herefordshire Council's Landscape Team
- Herefordshire Council's Environmental Health Team

2.5.2. A copy of all consultation responses is included in Appendix A. The relevance and content of each consultation response is addressed in the appropriate section of this SOEAR.

2.5.3. Further consultation of the scheme design and assessment will take place at later stage in the assessment process. Once the Study of Options Report for the Southern Core Corridor has been approved by Herefordshire Council, it will be circulated to the statutory environmental bodies (The Environment Agency, Natural England and English Heritage) for information and comment on the proposed scope of assessment.

3. The Noise Sub-Objective

3.1. Introduction

3.1.1. This chapter assesses the potential impacts of the route options on noise and vibration. DMRB HD 213/11 Noise and Vibration and TAG unit 3.3.2 The Noise Sub-Objective sets out the procedure for assessing impact of noise and vibration from highway schemes.

3.2. Legislative Background

3.2.1. An overview of the relevant legislation and planning policy in the context of noise assessment and control of the noise environment is provided below.

Land Compensation Act 1973

3.2.2. Part I of the Land Compensation Act provides a means by which compensation can be paid to owners of land or property which has experienced a loss in value caused by the use of public works, such as new or improved roads. Noise and vibration are two of the factors which would be considered in any claims for compensation, but the claim must consider all changes and effects, including betterment. Claims can be made under Part I of the Act from 1 to 7 years after the opening of a road project. However, consideration of the likely extent of claims may be made during detailed design following the completion of statutory processes.

The Noise Insulation Regulations 1975 (as amended 1988)

3.2.3. The Noise Insulation Regulations were made under Part II of the Land Compensation Act 1973. Regulation 3 imposes a duty on authorities to provide, or make a grant towards the installation of, noise insulation at eligible buildings. This is subject to meeting certain criteria given in the relevant Regulations. Regulation 4 provides authorities with discretionary powers to provide noise insulation at other buildings, in situations where existing carriageways are altered, such as additional lanes provided. Advice on the use of this discretionary power should be sought from the Overseeing Organisation.

The Highways Noise Payments and Movable Homes (England) Regulations 2000

3.2.4. These regulations provide highway authorities with a discretionary power to provide a noise payment where new roads are to be constructed or existing ones altered. The relevant regulations set out the criteria which should be applied in assessing eligibility for making such payments. Advice on the use of this discretionary power should be sought from the Overseeing Organisation.

The Control of Pollution Act 1974

3.2.5. Sections 60 and 61 of the Control of Pollution Act generally relate to construction and demolition work, road works and maintenance works and are often used in conjunction with other standards such as BS 5228 (see below). These sections relate to control of noise on construction sites and prior consent for work on construction sites respectively.

Environmental Protection Act 1990

3.2.6. Under Part III of the Environmental Protection Act 1990 local authorities have a duty to investigate noise complaints from premises (land and buildings) and vehicles, machinery or equipment in the street. It does not apply to road traffic noise but may be applicable to some construction activities. The Noise and Statutory Nuisance Act 1993 amended Part III of the Environmental Protection Act 1990 by placing additional definitions in the list of statutory nuisances in Section 79 of the Environmental Protection Act. The definitions relate to nuisance caused by vehicles, machinery and equipment in the road. If a local authority's Environmental Health Officer is satisfied that a complaint amounts to a statutory nuisance then the authority must serve an abatement notice on the person responsible or in certain cases the owner or occupier of the property. The notice could require that the noise or nuisance must be stopped altogether or limited to certain times of the day.

3.2.7. BS 5228:2009 Code of practice for noise and vibration control on construction and open sites (Part 1: Noise, Part 2: Vibration and Part 4: Code of practice for noise and vibration control applicable to piling operations). BS5228:2009 describes a method for predicting noise levels from construction activities. It provides typical source noise levels and takes account of the different types of activity that can occur in predicting the consequential noise level. The method takes account of the distance between sources and receptors, the durations of activities, and the effect of natural or purpose-built barriers and screens.

World Health Organisation Guidelines

3.2.8. WHO guidelines state "general daytime outdoor noise levels of less than LAeq 55dB are desirable to prevent any significant community annoyance". An aspirational target was also set for dwellings of LAeq 50dB for day and LAeq 45dB for night.

Planning Policy Guidance (PPG) 24 – Planning and Noise

3.2.9. PPG 24 gives guidance to local authorities in England on the use of planning powers to minimise the impact of noise. PPG 24 states that a change of 3dB(A) is the minimum perceptible under normal conditions and a change of 10dB(A) corresponds roughly to the halving or doubling the loudness of a sound. From this it can be considered that the perceived benefit or dis-benefit arising from a 1dB(A) change is dependent on non-acoustic factors such as a visible change in traffic flow. Paragraph 10 states "*Much of the development which is necessary for the creation of jobs and the construction and improvement of essential infrastructure will generate noise. The planning system should not place unjustifiable obstacles in the way of such development. Nevertheless, local planning authorities must ensure that development does not cause an unacceptable degree of disturbance. They should also bear in mind that a subsequent intensification or change of use may result in greater intrusion and they may wish to consider the use of appropriate conditions".*

Herefordshire Council UDP- Policy DR13 Noise

3.2.10. Development with the potential for generating significant levels of noise or for exposing a noise sensitive use to an existing noise source will be required to include appropriate measures within the proposal to mitigate the noise impact to an acceptable level.

Development which, after taking account of mitigation measures proposed, would still have an unacceptable noise impact or result in unacceptable exposure to noise will not be permitted. Development which would adversely affect the quiet enjoyment or the special interest of designated areas will not be permitted. The quiet enjoyment and tranquillity of the wider countryside, landscape and wildlife areas and historic features will also be considered.

3.3. Consultation

3.3.1. Previous consultation as part of a Stage 1 assessment for Hereford Relief Road stated that HC Environmental Health Department stated that they are not aware of any existing sources of noise or complaints about traffic noise in the study area, which included the Southern Core.

3.4. Methodology

3.4.1. The assessment follows methodology in DMRB HD 213/11 which provides the procedure for assessing the impact of noise from road schemes. Traffic flows for the proposed scheme are not available at this stage; therefore a full Stage 2 assessment has not been undertaken. The assessment methodology therefore follows in line with HD 213/11 as much as practicable considering this.

3.4.2. Noise sensitive receptors have been identified within 2Km of each of the route options, and include mainly residential housing, with smaller numbers of commercial and industrial units, schools, nursing homes, village halls, doctors surgeries, listed buildings, day nurseries and places of worship. Other sensitive receptors such as community facilities and Rights of Way were identified for the Physical Fitness Sub-Objective and are discussed in Section 11.

3.4.3. The largest noise impacts will be within 300m and in accordance with HD 213/11 quantitative assessment is required up to 600m from the edge of the carriageway of the proposed scheme. This will be required for a Detailed Assessment in line with HD 213/11. Beyond this, qualitative assessment will be conducted within the 2Km buffer. The majority of the properties to the north of the scheme within the 2 km buffer are within Hereford itself and the noise from the proposed scheme is unlikely to be heard over current road and urban noise in the city.

3.4.4. This assessment has identified sensitive receptors within 600m of each route option using Ordnance Survey (OS) mapping and Geographical Information Systems (GIS) analysis (Figure 2.1 to 2.6, Appendix B). Information was provided by the GIS team of Herefordshire Council on the location and use of each building within 600m of each route option.

3.4.5. In terms of designated sites the River Wye Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC) is within 2Km of the proposed scheme. The impact of noise on these ecological sites will be investigated at a later stage in the assessment process.

3.4.6. Vibration sensitive receptors are likely to be within 40m of the route options and vibration sensitive receptors will be considered further with the refinement of route options. Heritage sites, archaeological sites and ecological sites can be adversely affected by vibration and particular attention will need to be given to the location of the route. Ideally no sites that can be adversely affected by vibration should be within 40 m of the relief road options. When detailed route alignments are produced the potential impact of vibration will be investigated further in the assessment process.

3.5. Baseline Environment

3.5.1. The study area currently experiences low levels of background noise, being dominated by the local road network and villages around the southern outskirts of Hereford.

3.6. Impact Assessment

3.6.1. All six route options are located in an area where currently background noise levels are low. As predicted traffic flows, speed data and percentage of Heavy Goods Vehicles (HGV) are not available for this stage of the assessment process and the route options are indicative only, detailed assessment of the existing noise environment and predicted noise environment has not been undertaken. A qualitative assessment can be made for each of the route options.

3.6.2. New areas of housing are proposed for Hereford, however the exact location of the housing is not known. Once more detail is known on the proposed housing the impact can be accounted for from predicted traffic flows. Thus, any predicted impact from the scheme on the housing can be assessed as the project progresses.

3.6.3. Table 3.1 summarises the property counts for each of the six route options up to 600m from the edge of the carriageway. Figures 2.1 to 2.6 show the location of each property within the distance bands and provides a breakdown of the use of each building.

Table 3.1: Property Counts within Distance Bands for SC1 to SC6

Distance bands	Number of receptors by route option					
	SC1	SC2	SC3	SC4	SC5	SC6
0 – 50	0	0	0	0	0	0
50 – 100	2	4	9	3	7	0
100 - 200	26	5	18	20	11	16
200 – 300	46	14	38	59	26	37
300 – 600	84	82	122	101	68	204
Total	**158**	**105**	**187**	**183**	**112**	**257**

Route Option SC1

3.6.4. A total of 74 no. properties are located within 300m of route option SC1, of which only 2 no. are located within 100m. The majority of these properties are located along or close to the existing road network consisting of local B and C class roads and two Class A roads (A49 and A465). Enough information is not known at this stage on traffic flows on the local road network

to predict noise levels in the vicinity of the local roads. Therefore, a worst-case scenario has been made predicting large adverse impact within 300m of this route option.

3.6.5. There are 84 no. properties within 300 – 600m of the route option, resulting in a total of 158 no. properties within 600m. Depending on a number of factors including topography, type of intervening ground surface and existing road network, properties up to 600m will potentially be impacted from this route.

Route Option SC2

3.6.6. There are 23 no. properties located within 300m of route option SC2, with 4 no. located within 100m. Similar to route option SC1 these properties within 300m of SC2 will potentially experience large adverse impact to the ambient noise environment. This option will potentially result in large adverse impacts on the least number of properties in comparison to the other five route options.

3.6.7. There are 82 no. properties within 300 – 600m of the route option, resulting in a total of 105 no. properties within 600m. Overall, this route option will potentially affect the lowest number of properties.

Route Option SC3

3.6.8. There are 65 no. properties located within 300m of route option SC3, with 9 no. located within 100m. This route option has the highest number of properties within 100m thus potentially resulting in large adverse impacts. The number of properties within 300m is average in comparison to the other route options.

3.6.9. There are 122 no. properties located within 300 – 600m, giving rise to a total of 187 no. properties within 600m of route option SC3. Property counts for all distance bands are above average in comparison to the other route options.

Route Option SC4

3.6.10. There are 82 no. properties located within 300m of route option SC4, with 3 no. located within 100m. This route option has the highest number of properties within 300m thus potentially resulting in large adverse impacts to the greatest number in comparison to the other route options.

3.6.11. There are 101 no. properties located within 300 – 600m, giving rise to a total of 183 no. properties within 600m of route option SC4.

Route Option SC5

3.6.12. There are 44 no. properties located within 300m of route option SC5, with 7 no. located within 100m. The number of properties within 300m is below average in comparison to the other route options.

3.6.13. There are 68 no. properties located within 300 – 600m, giving rise to a total of 112 no. properties within 600m of route option SC5. Overall, it has the second lowest property count in comparison to the other route options.

Route Option SC6

3.6.14. There are 53 no. properties located within 300m of route option SC6, with none located within 100m. The number of properties within 300m is average in comparison to the other route options, however the property count within 100m is the lowest for all route options.

3.6.15. There are 204 no. properties located within 300 – 600m, giving rise to a total of 257 no. properties within 600m of route option SC6. Overall, route option SC6 has the potential to adversely impact the greatest number of properties within 600m of the scheme extent.

3.7. Conclusion

3.7.1. In summary, all six route options have the potential to result in large adverse impacts on the ambient noise environment of the existing area and in particular at a number of sensitive receptors. A full appraisal cannot be undertaken at this stage of the assessment process, however a qualitative comparison of potential impact in terms of property counts can. Route options SC1, SC3, SC4 and SC6 have the potential to have large adverse impacts on a significant number of properties. It has been assessed that in comparison route options SC2 and SC5 have the potential for moderate adverse impacts.

4. The Air Quality Sub-Objective

4.1. Introduction

4.1.1. This chapter assesses the potential impacts of the route options on air quality. DMRB HA207/07 Air Quality and TAG unit 3.3.3 The Air Quality Sub-Objective sets out the procedure for assessing impact on air quality from highway schemes.

4.2. Legislative Background

EU Air Quality Directive (Directive 2008/50/EC)

4.2.1. This Directive consolidates existing air quality legislation (apart from the 4th Daughter Directive13) and provides a new regulatory framework for PM2.5. It also makes provision for Member States to postpone attainment deadlines. The obligation to meet the requirements of the Directive falls primarily upon the Secretary of State for the Environment in England, and appropriate Ministers in the Devolved Administrations, who are designated as the appropriate "competent authority".

National Air Quality Strategy

4.2.2. The Strategy was last updated in 2007 and continues to provide the framework for local government to assess ambient air quality in their locality against specific health-based standards for nine pollutants (nitrogen dioxide, PM10, sulphur dioxide, benzene, lead, 1,3-butadiene, carbon monoxide, PAH and ozone). Seven of which (excluding ozone and PAH) are regulated through the Air Quality Regulations 1997 (HM Government 1998), 2000 (HM Government 2000), Air Quality (England) (Amendment) Regulations 2002 (HM Government 2002) and 2007 (OPSI 2007). The National Objectives are shown below in Table 4.1.

Table 4.1: Summary of Current Air Quality Objectives (AQOs) for Protection of Human Health

Pollutant	Objective		Date to be Achieved By
	Concentration	Measured as	
Benzene	16.25 µg/m^3	Running annual mean.	31 December 2003
	3.25 µg/m^3	Annual mean.	31 December 2010
Carbon Monoxide.	10 mg/m^3	Maximum daily running 8-hour mean.	31 December 2003.
Lead (Pb).	0.25 µg/m^3	Annual mean.	31 December 2008.
Sulphur dioxide (SO_2).	266 µg/m^3 not to be exceeded more than 35 times a year.	15 minute mean.	31 December 2005.
	350 µg/m^3 not to be exceeded more than 24 times per year.	1 hour mean.	31 December 2004.

Table 4.1: Summary of Current Air Quality Objectives (AQOs) for Protection of Human Health			
Pollutant	**Objective**		**Date to be Achieved By**
	Concentration	**Measured as**	
	125 µg/m^3 not to be exceeded more than 3 times a year.	24 hour mean.	31 December 2004.
Nitrogen dioxide (NO_2).	200 µg/m^3 not to be exceeded more than 18 times a year.	1-hour mean.	31 December 2005.
	40 µg/m^3	Annual mean.	31 December 2005.
PM_{10}	50 µg/m^3 not to be exceeded more than 35 times a year	24 hour mean	31 December 2004
	40 µg/m^3	Annual mean	31 December 2004

Local Air Quality Management: Technical Guidance 09 (LAQM.TG09)

4.2.3. TG09 is designed to support local authorities in carrying out their duties under the Environment Act 1995. These duties require local authorities to review and assess air quality in their area. These Review and Assessments form the cornerstone of the system of Local Air Quality Management (LAQM). LAQM itself forms a key part in the UK Government's strategies to achieve the Air Quality Objectives.

Herefordshire and Worcestershire Air Quality Planning Protocol

4.2.4. This protocol ensures that air quality is considered as a material planning consideration within development control planning processes of the Councils, through the implementation of the Supplementary Planning Document for Herefordshire and Worcestershire. Where deteriorations in air quality due to a development (or developments) are predicted, the following measures to mitigate the effects are put in place;

- Require modelling and/ or monitoring to be undertaken to accurately assess the impacts of proposed development on local air quality;
- Ensuring that air quality is properly considered within planning policy processes, in particular within the LDF process, with the inclusion of a specific air quality policy where applicable.

Herefordshire and Worcestershire Air Quality Strategy 2009

4.2.5. This Strategy supports the achievement of Air Quality Objectives and aims to raise air quality as an issue for consideration within a wide range of local government and regional planning frameworks.

UDP Policy DR9

4.2.6. This policy states that development proposals which could contribute to the deterioration of air quality below acceptable levels, either locally or on a more widespread basis, will not be permitted unless adequate air quality enhancements or mitigation measures can be accommodated and demonstrated as part of the development. In assessing schemes regard will be had to both their operational impacts and to associated traffic generation. Where developments are sensitive to air quality are proposed, regard will be had to local air quality as a material consideration.

Development Control: Planning for Air Quality EPUK 2010

4.2.7. This guidance aims to ensure that air quality is properly accounted for in the Development Control and Local Development Framework processes. The guidance clarifies when an air quality assessment is required and what it should contain. It sets out how impacts should be described and assessed. Importantly it sets out a recommended approach that can be used to assess the significance of the air quality impacts, taking account of the advice issued by the Institute of Air Quality Management. An important focus of this guidance is on minimising the air quality impacts of all developments

4.2.8. This guidance defines a number of criteria that can trigger the requirement for an air quality assessment;

- Proposals that will generate or increase traffic congestion, where 'congestion' manifests itself as an increase in periods with stop start driving;
- Proposals that will give rise to a significant change in either traffic volumes, typically a change in annual average daily traffic (AADT) or peak traffic flows of greater than ±5% or ±10%, depending on local circumstances (a change of ±5% will be appropriate for traffic flows within an AQMA), or in vehicle speed (typically of more than ±10 kph), or both, usually on a road with more than 10,000 AADT (5,000 if 'narrow and congested').

4.3. Consultation

4.3.1. Previous consultation as part of a Stage 1 assessment for Hereford Relief Road stated that HC Environmental Health Department stated that they are not aware of any existing sources of air quality.

4.4. Methodology

4.4.1. The assessment follows methodology in DMRB HA 207/07 Air Quality, however as no traffic flow data is available at the time of writing only limited assessment can be undertaken. This limited assessment involves identifying properties and designated sites within 200m of roads affected by the scheme. Affected roads are defined as those for which:

- Road alignment will change by 5m or more;

- Daily traffic flows will change by 1000 AADT or more;
- Heavy duty vehicle flows will change by 200 AADT or more;
- Daily average speed will change by 10km/h or more;
- Peak hour speed will change by 20km/h or more.

4.4.2. As no traffic model is available for the scheme affected roads cannot yet be identified at this stage. Once the traffic model is available at a later stage in the assessment process a full assessment in line with DMRB HA 207/07 can be made.

4.4.3. For this SOEAR, an overview of baseline air quality environment will be provided in addition to the identification of properties and designated sites within 200m of each route option. An overview of each route option and a high-level review of any potential impact on local air quality will be provided.

4.5. Baseline Environment

4.5.1. The study area is located in a rural environment, dominated by the local road network and villages around the southern outskirts of Hereford City Centre. There are a number of locally designated nature conservation sites within the study area that could potentially be impacted from the route options. More detail on the sites is provided in Section 9 Biodiversity Sub-Objective.

4.5.2. The nearest continuous monitoring station is located within the Air Quality Management Area (AQMA) on Edgar Street in Hereford City Centre. Hereford City AQMA has been designated within the City of Hereford, covering the A49 from Blackmarstone to Widemarsh and part of the A438 joining the A49. The AQMA is linked to road traffic emissions and is for exceedance of the annual mean Nitrogen dioxide (NO_2) objective. The area of the AQMA is shown in Figure 3.1 Appendix B, though Herefordshire Council report that the AQMA is likely to be extended soon as a result of diffusion tube monitoring showing exceedance of the annual mean NO_2 objective along the A438.

4.5.1. Herefordshire Council have 80 no. NO_2 diffusion tubes placed at various locations around the City Centre, the location of each tube is shown in Figure 3.1. Most diffusion tubes are located at house facades to correspond to relative public exposure, however some are adjacent to the roadside.

4.5.1. The nearest diffusion tube monitoring site for NO_2 to the scheme is within the southern suburbs of Hereford (Figure 3.1). NO_2 diffusion tube site no. 17 and no. 64 are both located around 1.2Km north of the scheme and the NO_2 concentration for 2010 (annual mean) was measured as 57.58µgm^3 and 31.33µgm^3, respectively. Figure 3.1 also provides a summary of the annual mean NO_2 results for the 2010 monitoring round, the results of these tubes have been adjusted for bias using a national correction factor derived from UWE of 0.92.

4.5.1. The UK Air Quality Archive shows background NO_2 concentrations to be between 7.32 and 8.41 µgm-3 over the extent of the route options (http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html). NO_2 levels within the study area are as expected relatively low compared to Hereford City Centre.