Geological Conservation Review (GCRs)

A5.4.3. No Geological Conservation Review sites fall within the 1km buffer zone.

Local Geological Sites (LGSs)

A5.4.4. The closest Local Geological Site to the scheme is Upper Lyde Pit at National Grid Reference (NGR) 349200, 244700. This falls within 1.8km of the northern corridor.

A5.4.5. Upper Lyde Pit has been designated due to the occurrence of the Older Drift, which is limited to hill cappings, benches and spurs. This is a glacial deposit of till and outwash gravel from a single pre-Devensian glaciation. The strata at Upper Lyde Pit include well stratified, sometimes imbricated, cobbles and gravels. The clasts are typically derived from the Old Red Sandstone and have variable sizes and degrees of sorting. Larger cobbles and gravels tend to be sandstone whilst the fine gravels tend to be calcrete (Brandon, 1989).

Geological and Geomorphological Sites of Special Scientific Importance (SSSIs)

A5.4.6. The western and eastern corridors cross the River Wye (Lower Wye) SSSI. Although not specifically a Geological SSSI, geomorphology is cited as a reason for its designation. In particular, the complex pattern of meanders along the length of the river has remained free from man-made straightening, widening and deepening (Natural England, 2010).

A5.4.7. The eastern outer corridor crosses the River Lugg SSSI. Although not specifically a Geological SSSI, geology (principally the Old Red Sandstone Group) is cited as a reason for its designation. Together with flow and substrate, variations in geology are cited as a contributory factor to the aquatic plant communities for which the site has also been designated (Natural England, 2010).

A5.5. Minerals

A5.5.1. Hereford has superficial deposits of sand and gravel with safeguarded areas around the A465, A438 and A4103 as identified in the Hereford Unitary Development Plan. These sand and gravel deposits are found along the river valleys of the Wye, Lugg and Arrow as River Terrace deposits. There are also glacial deposits to the north and west of Hereford.

A5.5.2. Government policy for aggregates provision is to ensure a regular and adequate supply of minerals. The Minerals Planning Statement 1 (MPS1) Planning and Minerals states that a landbank of protected reserves of sand and gravel should be maintained to allow for 7 years production. Development plans should;

- identify and safeguard mineral resources to ensure that appropriate levels of planned and future supplies can be maintained, including reviewing the allocations in Mineral Local Plans;
- indicate sites/areas where future mineral working would or would not be appropriate, having regard to the environmental capacity of the area and the impact on the local community;
- include policies to safeguard mineral resources from other forms of development; and
- identify and safeguard sites on the periphery of and within major urban areas for the development of integrated material supply facilities.

A5.5.3. A proposal for development in mineral safeguarded areas should ensure that minerals are extracted in so far as is economically and environmentally practicable before surface development begins. The above planning statement also requires Mineral Planning Authorities to 'identify sites, preferred areas, and/or areas of search in Local Development Documents, having taking account of environmental considerations, to provide greater certainty of where future sustainable mineral working will take place.'

A5.5.4. Policy M5, Safeguarding Mineral Reserves, within the UDP states 'Proposals which could sterilise potential future mineral workings will be resisted in order to safeguard identified mineral resources. Where such development is proposed, the applicant may be required;

- to undertake a geological assessment of the site;
- to protect the minerals in question;
- to extract all or part of the mineral reserves as part of or before the other development is permitted.

A5.5.5. In such cases mineral extraction will only be required when the need for the other development significantly outweighs the harm which extraction might cause to other matters of acknowledged importance.

A5.5.6. One such site identified in the Herefordshire Unitary Development Plan 2007 for protection is sand and gravel reserves at Lugg Bridge.

A5.5.7. The West Midlands Regional Aggregates Working Party Annual Report 2007 lists an application for new sand and gravel workings at Moreton Depot (Grid Ref SO503 473). This site lies just to the north of where the northern corridor terminates on the A49. At the time of publication of the working party report a decision was pending on whether to allow development to proceed.

A5.5.8. The Hereford Minerals and Waste Planning Assessment report (published 2009) lists current active and inactive sites for sand and gravel extraction around Hereford. These are:

- Lugg Bridge – inactive;
- Upper Lyde Gravel pit – not being worked at time of report publication;
- Wellington/Moreton on Lugg – active.

A5.5.9. The other main area of mineral extraction within Herefordshire is sandstone used for building. This is done on a much smaller scale and generally in response to local demand. These sites are mostly found along the Welsh border and there are none in close proximity to the proposed route corridors.

A5.5.10. In order to safeguard existing mineral areas further, Mineral Policy M3: Minerals – The Use of Alternative Sources of Minerals, encourages the use of recycled aggregates to reduce the reliance of land won primary aggregates. It also encourages construction projects to source alternative materials.

A5.6. Soils

A5.6.1. The Soil Survey of England and Wales classifies the subsoils in the country according to their suitability for agriculture in terms of soil associations.

A5.6.2. According to the records of the Soil Survey of England & Wales (1983), the Newnham Soil Association partially underlies the eastern routes, in the area west and southwest of the city. This soil association overlies river terrace deposits and typically comprises locally deep, well drained, reddish, fine and coarse loams over gravel.

A5.6.3. The Teme Soil Association partially underlies the routes in areas where they cross the River Wye. This soil association typically overlies alluvium of the River Wye and comprises deep, permeable silts, sometimes with gravelly subsoil.

A5.6.4. The Bromyard Soil Association partially underlies routes north, west and south of the city. It overlies the shales, siltstones and sandstones of the Old Red Sandstone Group and comprises well drained reddish silts, slowly permeable subsoils and well drained coarse loams. Slight seasonal waterlogging and water erosion may occur.

A5.6.5. The Escrick 1 Soil Association partially underlies routes northwest of Hereford. This soil association overlies till and comprises deep well drained reddish coarse loams, slowly permeable subsoils and slowly permeable seasonally waterlogged silts.

A5.6.6. The Hollington Soil Association partially underlies the eastern routes in the vicinity of the River Lugg, east and northeast of Hereford. It overlies and is derived from the river alluvium of the River Lugg. The soil association typically comprises deep reddish silts and clays.

A5.7. Ground Conditions

A5.7.1. The following section is a preliminary geotechnical assessment of the likely ground conditions to be encountered for each route corridor and each individual link that is being assessed. This is based primarily on a review of the geological mapping for the area and historical ground investigation information held by Herefordshire Council.

A5.7.2. It should be noted at this stage that a review of historical borehole records held by The British Geological Survey (BGS) was not undertaken during this assessment.

A5.7.3. Once a preferred corridor has been defined a further detailed assessment will review all historical boreholes held by BGS and a preliminary ground model will be produced.

Southern Corridor

A5.7.4. Two alignments SC1 and SC2 have been developed within this corridor and have a common section between Ch 0 to Ch 1900m. Both alignments commence at grade level at the existing roundabout along the A3 Rotherwas Access Road / A49 Ross Road junction and extend in a westerly, then north westerly direction generally across agricultural land to the A465 Belmont Road.

A5.7.5. From Ch 0 to 1000m the alignment generally lies at grade, and then extends on embankment to Ch 1900 up to 9m in height but generally between 1 and 5m. Alluvium is likely to be encountered around approximate Ch 200 and 900m where the route crosses tributaries of the River Wye. Previous ground investigation information indicates that silt is present between Ch 1000 and Ch 1500m.

A5.7.6. An over-bridge is required to carry the road over the railway line between Ch 1700 and 1750m. From Ch 1900m both alignments extend in different directions through cutting to depths up to 6m but generally between 3 and 5m.

A5.7.7. An underpass is required for both alignments at Haywood Lane at approximate Ch 2100m.

A5.7.8. Alignment SC1 extends from Ch 2650 to Ch 3213m on embankment up to depths of 8m before tying in at grade level to the A465 Belmont Road, whilst a structure is required over Newtown Brook from Ch 2750 to 2950m. Exposed bedrock consisting of mudstone is evident along the banks of this river.

A5.7.9. SC2 extends from Ch 2740 to the A465 Belmont Road generally at grade level.

A5.7.10. Shallow bedrock is located throughout the length of both alignments. This will form a suitable founding stratum for the proposed structures and embankments. In areas of cut, rock head consisting of mudstone or sandstone is expected at shallow depths. Depending on the strength of this material some form of ripping will be required. It is anticipated that this material will be suitable for re-use.

A5.7.11. Where both alignments tie in at grade level to the A465, these will be founded on Glacial Till, locally expected to be around 4m deep and consisting of sandy tills, gravels and clays.

A5.7.12. Considering the extent of earthworks balance, length of link and number of structures for both alignments, SC2 emerges as the geotechnically preferred alignment within this corridor.

A5.7.13. The volume of material required for earthworks based on a 1 in 3 slope for each link within this corridor are shown in Table A5.2 below:

Table A5.2: Earthworks Volumes for Southern Corridor

Route Link Chainages		Cut volume (m^3)	Fill volume (m^3)	Difference (m^3)
Link	Chainage (m)			
SC1	0 - 3213	150,901	233,327	-82,726
SC2	0 – 3093	147,697	147,189	+508

A5.7.14. Map A0.03 in Appendix A indicates the individual links within the southern corridor. Fig A5.1 on the following page highlights the underlying geology below the southern corridor links.

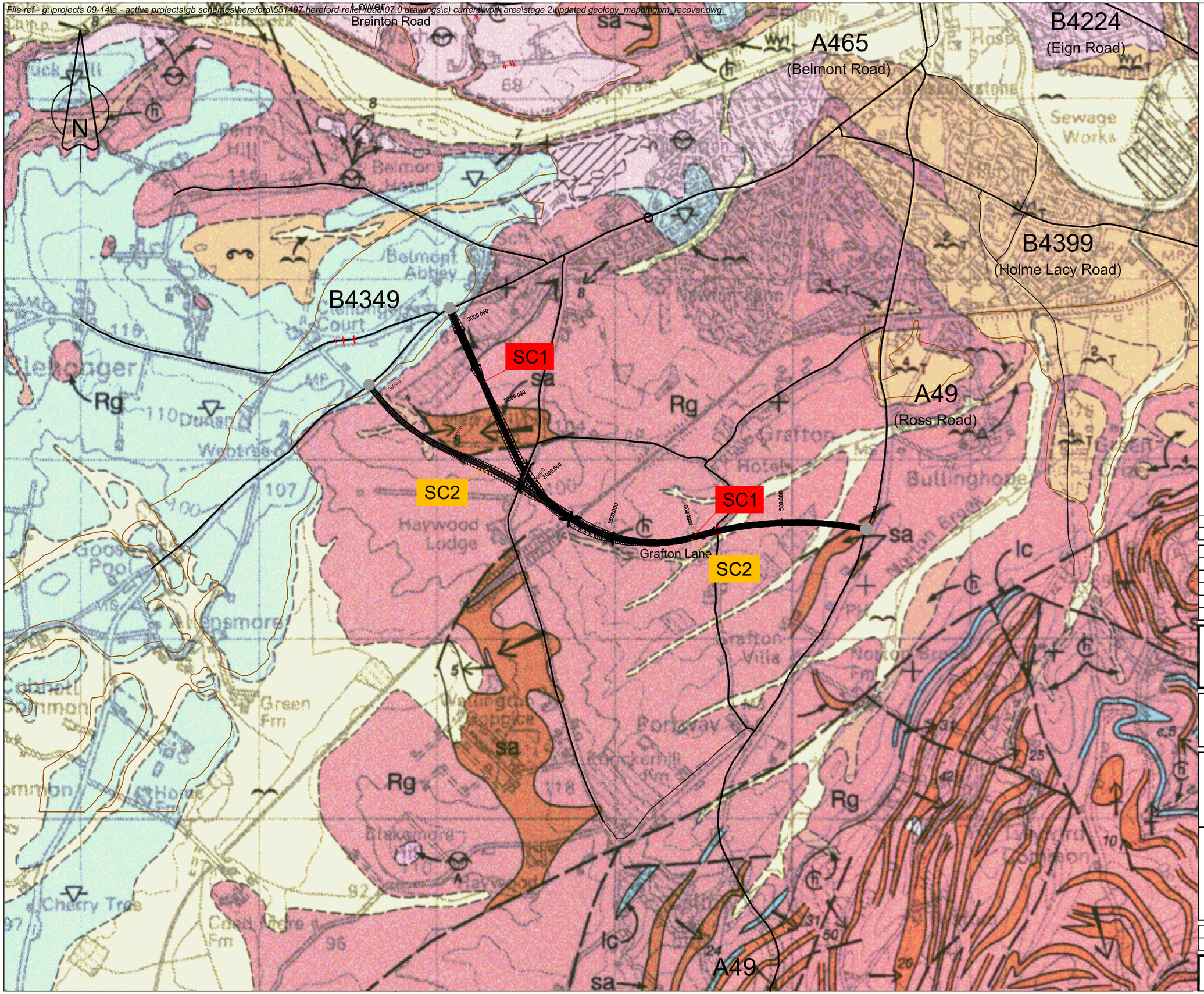
Western Inner Corridor

A5.7.15. In total seven alignments have been developed within this corridor all of which have common sections to another. Links WL1 to WL7 extend from one of two locations as a roundabout from the A465 Belmont Road and generally crosses agricultural land to tie in with A438 Kings Acre Road at one of three proposed junctions.

A5.7.16. Link WL7 is located within the northern portion of the corridor and extends from the A438 Kings Acre Road to the A4103 Roman Road.

A5.7.17. The following descriptions provide an over view of the potential ground conditions and earthworks for each link. It should be noted that all link chainages commence at 0m.

File ref - g:\projects 09-14\a - active projects\gb schemes\hereford\551497 hereford relief road\07.0 drawings\c) current work area\stage 2\updated geology_mapping\pm_recover.dwg



LEGEND

Drift Deposits

- Alluvium
- First and Second Terrace River Deposits of River Wye
- Head Deposits
- Fluvio- Glacial Sand and Gravel
- Glacial Deposits
- Morainic Deposits
- 2nd 3rd & 4th terrace deposits of River Lugg and Proto - Wye

Solid Geology

- Rg — Raglan Mudstone Formation
- SMg — St Maughan's Sandstone Formation

Rev	Revision details	Chkd	Appd	Date
P1	Text	.	.	.

Drawn: PMcN	
Design: ES	
Chkd: SMcK	
Appd: RM	
Date: July 2010	

Preliminary	✓
For comment	
For tender	
For construction	
As constructed	
Other	

amey

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Project Name
Hereford Relief Road

Drawing Title
Geological Mapping - Southern Corridor

Original Drawing Size :	A3
Scale : 1:20000	Dimensions :

Figure No	Rev
A5.1	

A5.7.18. The volume of material for earthworks and length of each link are shown in Table A5.3 at the end of this section.

A5.7.19. Map A0.03 in Appendix A indicates the individual links within the western corridors. Fig A5.2 highlights the underlying geology below the southern corridor links.

Western Inner WL1

A5.7.20. This link lies within the eastern edge of the corridor and commences at grade and extends between Ch 0 to Ch 700m through a small cutting and across an embankment up to 6.5m high. An overpass is required to carry the alignment over Ruckhall Lane at Ch 490m.

A5.7.21. The ground conditions throughout this section of the route consist of glacial till up to depths of around 13.5m, underlain by mudstone and sandstone. Soft deposits consisting of lacustrine alluvium are likely to be encountered around Ch 350m. These may require treatment or removal depending on their extent and depth.

A5.7.22. From Ch 700m to around Ch 1000m the alignment extends as a cutting up to depths of around 9m to facilitate the construction of a proposed viaduct to span the River Wye and its associated floodplain from Ch 1000 to Ch 1300m. Soft deposits of alluvium will be encountered around the river and any structure at this location will require piled foundations. Outcrops of bedrock are also evident along the banks of the river. Where the alignment crosses the southern river bank historical maps indicate a council refuse tip and a series of gravel pits to the immediate east, which have now been filled in and would present a potential contamination risk.

A5.7.23. From Ch 1300m to 1500m the alignment extends as a cut up to 4m deep. From Ch 1550m to Ch 2200m it then extends as a shallow embankment up to 4m high, whilst an over bridge is required at Ch 1960m, Lower Breinton Road at Ch 1960m. Deposits of sand and gravel will be encountered from around Ch 1250 to Ch 2000m with smaller deposits of sandy, pebbly clay and shallow outcrops of bedrock also present.

A5.7.24. Founding material for this structure is anticipated to be sands and gravels underlain by mudstone or sandstone located at a depth of between 2m and 4m. This structure is therefore unlikely to require piled foundations.

A5.7.25. Shallow bedrock will be encountered from Ch 2000 to Ch 3250. At Ch 2000m, bedrock lies at a depth of between 1 and 2m.

A5.7.26. From Ch 2200 to 3100m the alignment continues as a cutting up to depths of 10m, with an underpass required to carry the alignment below Hill Road at Ch 2625m. Shallow bedrock will be located throughout this cut with approximately 70 -80% likely to be suitable for re-use.

A5.7.27. From Ch 3100 to Ch 3573 the alignment predominantly continues as a shallow cut underlain by Glacial Till, likely to be between 2 and 5m deep.

A5.7.28. The earthworks balance for this link indicates a large quantity of surplus material, in the region of 240,000m3 .

Western Inner WL2

A5.7.29. This link is located within 100m of the eastern edge of this corridor before crossing to meet the western outer corridor along A438 King's Acre Road. This link follows the same alignment as WL1 up to approximate Ch 2000m.

A5.7.30. From this point up to 2400m the alignment predominantly extends as embankment up to heights of 6m, but generally between 2 and 3m.

A5.7.31. From Ch 2400m to the end of the link the alignment predominantly continues as a series of cuttings up to depths of 8m, with an underpass required to carry the alignment below Hill Road at Ch 2700m.

A5.7.32. Shallow bedrock will be located throughout these cuttings, with glacial till being encountered over the last 500-600m, underlain by bedrock. The glacial till will consist of a silty loam with cobbles also present.

A5.7.33. The earthworks balance for this link indicates a much lesser quantity of surplus material, in the region of 42,000m3, although it is 773m greater in length than WL1.

Western Inner WL3

A5.7.34. This link is located along the western edge of the corridor. From Ch 0 to 650m the alignment extends on embankment up to heights of around 7m with the ground conditions likely to consist of glacial till up to depths of around 2m, underlain by mudstone and sandstone. An over bridge is required to carry the road over Ruckhall Lane at Ch 500m. Soft deposits consisting of lacustrine alluvium are likely to be encountered around Ch 650m. These may require treatment or removal depending on their extent and depth.

A5.7.35. From Ch 650m to Ch 950m the alignment extends through a deep cutting up to a depth of 15m to facilitate the construction of a proposed viaduct to span the River Wye and its associated floodplain from Ch 950 to Ch 1300. Soft deposits of deep alluvium will be encountered around the river and any structure at this location will require piled foundations.

A5.7.36. From Ch 1300 to Ch 2850m the alignment extends as cut up to 8m deep. Deposits of sand and gravel are likely to be encountered from around Ch 1300 to Ch 1750m with smaller deposits of sandy, pebbly clay and possibly shallow outcrops of bedrock also being present. Shallow bedrock is likely to be encountered from Ch 1750 to Ch 3000.

A5.7.37. An underpass will be required below Lower Breinton Road at approximate Ch 1700m and at Ch 2420m at Hill Road. Founding material for these structures is anticipated to be sand and gravel underlain by bedrock consisting of mudstone or sandstone. Piles are unlikely be required for the founding stratum for either structure.

A5.7.38. From Ch 2850m to the end of the link the alignment predominantly continues as a low embankment and shallow cut. Glacial till will be encountered over the last 300m. It is anticipated that approximately 70-80% of this material will be suitable for re-use.

A5.7.39. The earthworks balance for this link indicates a large quantity of surplus material, in the region of 341,000m3.

Western Inner WL4

A5.7.40. This link is located within the western edge of this corridor. From Ch 0 to 1500m the alignment extends as cutting up to depths of around 18m to facilitate the construction of a proposed viaduct to span the River Wye and its associated flood plain from Ch 1500 to Ch 1850m. An over bridge is also required to carry the road over Ruckhall Lane at Ch 1080m.

A5.7.41. The ground conditions throughout this length of proposed route will consist of glacial till and shallow bedrock. Soft deposits consisting of alluvium will be encountered around Ch 750 and along the River Wye. The proposed structure at this location will require piled foundations.

A5.7.42. Once this alignment crosses the River Wye it follows the same alignment as WL3 and also has a poor earthworks balance of 633,000m3 of surplus material.

Western Inner WL5

A5.7.43. This link is located within 100m of the western edge of this corridor before crossing to meet the western outer corridor before terminating along the A438 King's Acre Road. This link follows the same alignment as WL3 up to approximately Ch 2000m.

A5.7.44. From this location to Ch 2500m the alignment extends as a cut up to 6m deep, whilst an underpass is required to carry the road below Hill Lane at Ch 2420m.

A5.7.45. From Ch 2500 the alignment then follows the same route as WL2.

A5.7.46. The earthworks balance for this link indicates a large quantity of surplus material, in the region of 248,000m3.

Western Inner WL6

A5.7.47. This link is located within 100m of the western edge of this corridor before crossing to meet the western outer corridor before terminating at a proposed junction along the A438 King's Acre Road. Throughout the entirety of this link it has common sections to links WL2 and WL4. From Ch 0 to approximate Ch 2500 it follows the same alignment as WL4 before following the same route as WL2 from Ch 2500m.

A5.7.48. The earthworks balance for this link indicates a large quantity of surplus material, in the region of 651,000m3 .

Western Inner WL7

A5.7.49. This link is located within the northern section of the corridor and extends predominantly as a shallow cutting. It is anticipated that Glacial Till will be encountered throughout the length of this link, with historical borehole logs indicating depths up to 12m. The cuttings along this section are quite shallow and should be excavated to less than 1m depending on the ground conditions locally.

A5.7.50. A culvert is proposed to carry the new road over Yazor Brook, at approximate Ch 1070m. Localised pockets of alluvium will be encountered at this location.

A5.7.51. The earthworks balance for this link indicates 5,000m3 of surplus material.

Preliminary Earthworks Summary for Western Inner Corridor

A5.7.52. The volume of material required for earthworks based on a 1 in 3 slope for each link are shown in Table A5.3 below:

Table A5.3: Earthworks Volumes for Western Inner Corridor

Route Link Chainages		Cut volume (m^3)	Fill volume (m^3)	Difference (m^3)
Link	Chainage (m)			
WL1	0 - 3573	391,700	152,010	+239,690
WL2	0 – 4346	290,312	248,541	+41,771
WL3	0 - 3353	488,300	147,073	+341,227
WL4	0 - 3887	637,261	3,925	+633,336
WL5	0 - 4058	503,418	255,558	+247,860
WL6	0 - 4596	656,186	4542	+651,644

Table A5.3: Earthworks Volumes for Western Inner Corridor				
Route Link Chainages		Cut volume (m^3)	Fill volume (m^3)	Difference (m^3)
Link	Chainage (m)			
WL7	0 - 1234	14,926	9,698	+5,228

A5.7.53. Based on the information available and considering the extent of earthworks balance, length of link, number of structures, and the impact upon contaminated sites, WL1 emerges as the geotechnically preferred alignment within this corridor between the A465 Belmont Road and A438 Kings Acre Road, although further investigation is required at the location of the area which is potentially contaminated as this may have implications both financially and technically during construction.

A5.7.54. A summary of the key geotechnical issues affecting each individual link is provided in Table A5.4 below.

Table A5.4: Geotechnical Issues affecting the Western Inner Corridor							
Issue	Link						
	WL 1	WL 2	WL 3	WL 4	WL 5	WL 6	WL 7
Volume of earthworks	××	×	×××	×××	×××	×××	-
Fill re-usability	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓✓
Amount of Rock Excavation	×	×	×	×	×	×	✓
Alluvium / Soft ground	×	×	×	×	×	×	-
Contaminated Sites	×	×	-	-	-	-	-
No. of Structures	4	4	4	4	4	4	0
Structure foundation problems	×	×	×	×	×	×	-

Key

✓✓✓ / ✓✓ / ✓ / - / × / ×× / ×××

Positive neutral negative

Western Outer Corridor

A5.7.55. In total seven alignments have been developed within this corridor. Two links, WL9 and WL10 follow the same alignment for the first 2750m. They extend from a proposed roundabout on the A465 Belmont Road and tie in with A438 Kings Acre Road.

A5.7.56. One shorter link, WL8 is located within the north eastern portion of the corridor and extends from a proposed junction on the A438 Kings Acre Road to the A4103 Roman Road. Two other shorter links, WL11 and WL12 also extend between A438 Kings Acre Road to the same location on the A4103 Roman Road.

A5.7.57. Two links, WL13 and WL14 have also been developed along the Roman Road to include for localised widening of the existing road. Both will extend between roundabouts as shown on

A5.7.58. The following descriptions provide an over view of the potential ground conditions and earthworks for each link. It should be noted that all link chainages commence at 0m.

A5.7.59. The volume of material for earthworks and length of each link are shown in Table A5.5 at the end of this section.

Western Outer WL8

A5.7.60. This link is predominantly carried as a shallow cutting from the A438 Kings Acre Road generally in a north easterly, then northerly direction across Glacial Till which is likely to be encountered to depths of around 12m.

A5.7.61. The earthworks balance for this link indicates approximately 11,000m^3 of surplus material.

Western Outer WL9

A5.7.62. This link is located along the eastern edge of the Western Outer corridor. From Ch 0 to 1300m the alignment predominantly extends on embankment up to heights of 11m with the ground conditions likely to consist of Glacial Till, potentially soft deposits of Lacustrine Alluvium and possibly shallow bedrock from around Ch 1000 to Ch 1300m. These soft deposits may require treatment or removal depending on their extent and depth.

A5.7.63. The shallow bedrock will form a suitable founding stratum for the embankment which is at its highest at this location. Differential settlement issues may arise where the embankment extends across ground conditions where soft alluvium meets shallow rock head.

A5.7.64. Between Ch 1300m and Ch 2100m the link extends though cut between 2 and 13m high, before extending as a proposed viaduct spanning the River Wye

and its associated floodplain from Ch 2100 to Ch 2650m. Ground conditions throughout the cut are expected to consist of shallow bedrock, which will be suitable for reuse. Founding materials across the span of the structure are variable and will consist of Glacial Till, shallow bedrock in places, river terrace deposits consisting of sand and gravel and alluvium along the River Wye. A structure at this location will require piled foundations.

A5.7.65. Beyond Ch 2650 the alignment predominantly extends as a series of shallow cuttings and embankments, with the most significant being a 5m cut around Ch 2900m before tying in at grade level to the A438 King's Acre Road. Ground conditions throughout this area will consist of glacial till with shallow bedrock likely to be located around Ch 3000m.

A5.7.66. The earthworks balance for this longer link is more balanced indicating approximately 33,000m3 of surplus material.

Western Outer WL10

A5.7.67. This link is located along the western edge of the corridor and follows the same route as WL9 from Ch 0 to around Ch 2750m. From this common section for both WL9 and WL10 the alignment then proceeds northwest then north before tying in at a proposed signalised junction along the A438 King's Acre Road at Ch 4960m.

A5.7.68. From Ch 2750m to the end of the link the alignment predominantly extends across a series of shallow cuttings and low embankments, with the maximum cut being around 4m deep with the highest embankment being less than 1m. Ground conditions throughout this area will consist of glacial till which will be around 1m thick underlain by bedrock.

A5.7.69. The earthworks balance for this link indicates approximately 48,000m3 of surplus material.

Western Outer WL11 & WL12

A5.7.70. Each link extends from one of two locations along the A438 Kings Acre Road and ties in at the same location on the Roman Road. It is anticipated that Glacial Till will be encountered throughout the length of each link, with historical borehole logs indicating depths up to 12m. The earthworks along each alignment are minimal consisting either of shallow cutting less than 1m and low embankment less than 1.5m.

A5.7.71. Localised pockets of alluvium can be expected at a minor watercourse crossing at Ch 730m for WL11 where an existing culvert is located.

Western Outer WL13 & WL14

A5.7.72. The ground conditions underlying both alignments will consist of glacial till expected to be between 5 and 12 m deep. WL14 will encounter alluvium where the road crosses Yazor Brook.

Preliminary Earthworks Summary for Western Outer Corridor

A5.7.73. The volume of material required for earthworks for each link based on a 1 in 3 slope for each link are shown in Table A5.5 below:

Table A5.5: Earthworks Volumes for Western Outer Corridor

Route Link Chainages		Cut volume (m^3)	Fill volume (m^3)	Difference (m^3)
Link	Chainage (m)			
WL8	0 - 1093	15,326	4,595	+10,731
WL9	0 – 4360	286,400	253,072	+33,328
WL10	0 - 4900	295,691	247,540	+48,151
WL11	0 – 1037	19,119	1,696	+17,423
WL12	0 - 755	4,850	8,954	-4,104
WL13	0 - 867	12,155	1,327	+10,828
WL14	0 - 758	8,525	1,893	+6,632

A5.7.74. Based on the information available and considering the extent of earthworks balance, length of link, number of structures, WL9 emerges as the geotechnically preferred alignment within this corridor between the A465 Belmont Road and A438 Kings Acre Road. Although WL9 has two structures whilst WL10 has only one structure, WL10 is 540m longer in length.

A5.7.75. For the shorter length links between the A438 Kings Acre Road and the A4103 Roman Road, WL12 would be the preferred option, although for practical reasons WL8 could also be the preferred option between WL8 and WL11 as it extends from the termination point of WL9.

A5.7.76. A summary of the key geotechnical issues affecting each individual link is provided in Table A5.6 below.

Table A5.6: Geotechnical Issues affecting the Western Outer Corridor							
Issue	**Link**						
	WL 8	**WL 9**	**WL 10**	**WL 11**	**WL 12**	**WL 13**	**WL 14**
Volume of earthworks	-	x	x	x	x	x	x
Fill re-usability	✓	✓✓	✓✓	✓✓	x	x	✓
Amount of Rock Excavation	✓	x	X	✓	✓	x	✓
Alluvium / Soft ground	-	x	x	-	-	-	-
Contaminated Sites	-	-	-	-	-	-	-
No. of Structures	0	2	1	0	0	0	0
Structure foundation problems	-	x	x	-	-	-	-

Key

✓✓✓ / ✓✓ / ✓ / - / x / xx / xxx

Positive neutral negative