Coventry and Warwickshire LEP
DfT Large Local Majors Bid July 2016

Appendix 2 – A46 Link Road Phase 2 Draft Technical Report

Owing to the size of the multi-disciplinary Technical Report (in excess of 230 Mb), only the body of the report is included with this bid, and large appendices have been omitted.

The full version of the report will be available from the WSP|PB Huddle file sharing facility at: https://my.huddle.net/workspace/37805408/files/#/48537649

Please contact stephen.weir@coventry.gov.uk to arrange access.

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A46 LINK ROAD PHASE 2 STAGE 1

TECHNICAL REPORT ON OPTIONS FOR A46 LINK ROAD

CONFIDENTIAL

JULY 2016

WSP | PARSONS BRINCKERHOFF

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TECHNICAL REPORT ON OPTIONS FOR A46 LINK ROAD

Coventry City Council

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1.1 BACKGROUND TO THE BRIEF

In August 2015, Coventry City Council (CCC), supported by Warwickshire County Council (WCC), requested WSP|Parsons Brinckerhoff (WSP|PB) to undertake the technical review of options for the improvement of A46 Stoneleigh Junction, known as A46 Link Road Phase 1. The output for this assessment was very well received from both client organisations, leading to the commissioning of the preliminary study for A46 Link Road Phase 2 Stage 1. The A46 Link Road Scheme has been split into three distinct phases consisting of the following:

- Phase 1 – A46/C32 Stoneleigh Junction Improvement
- Phase 2 - Providing a new link road from the A46 Stoneleigh Junction to a central location south of Westwood Heath which would include connections to the local road network. Review access options for Westwood Heath Business Park and investigate/consider improvements from Kirby Corner to Sir Henry Parkes Road.
- Phase 3 - providing a new section of carriageway linking Phase 2 with either
  - the A45 to the north,
  - Balsall Common located to the northwest with a possible connection at the (A452) Kenilworth Road (A452) / Hallmeadow Road Junction,
  - or south towards Meer End connecting with Kenilworth Road (A452) / Meer End Road (A4117) junction.

Although the commissioning of the work is for Phase 2 Stage 1, a number of elements of Phase 3 require consideration in order to undertake the opportune assessment; hence the focus of this report is on Phase 2 with certain references to Phase 3.

See Appendix A for the approach and accepted response on the matter from WSP|PB with the associated proposed programme of works.

1.2 PROJECT OBJECTIVES

The scheme objectives for A46 Link Road Phase 2 are listed below, not in any order of importance:

- **Supporting Sustainable Growth** - Provide new highway infrastructure to facilitate the timely delivery of growth within South West Coventry, both in terms of a revised masterplan for the University of Warwick and housing development to meet sub-regional needs in the short, medium and long term. Opportunities for a major public transport interchange would also be realised, thereby encouraging greater use of the bus/bus rapid transit/heavy rail for local and longer distance trips to/from the area;
- **Delivering Enhanced Business Connectivity** – Provide new highway infrastructure to maintain and enhance good strategic connectivity to existing employment facilities within South West Coventry (e.g. University of Warwick Science Park, Westwood Business Park, Network Rail Training and Conference Centre) as well as delivering improved business to business connectivity within the sub-region and wider North-South corridor;
- **Maximising the Benefits of HS2 and UK Central** – Provide a new strategic route from the A46 towards the HS2 interchange and UK Central via either the A452 or A45, to

ensure the sub-regions benefits economically from the opportunities afforded by these developments;

- **Improving Transport Efficiency** – Provide improved journey time reliability through the provision of a new strategic route which strikes a balance through its junction strategy in maximising strategic/local road access, whilst at the time minimising junction delay; and
- **Delivering Wider Network Resilience** – Provide strategic highway infrastructure of a suitable quality/level of service, which delivers an additional east-west route within the sub-regions that provides additional resilience to the wider Strategic Road Network (i.e. M6 and M40).

1.3 EXISTING LAYOUTS

This section is used to describe the context on which the proposed works are located; reference will be made to the highway network, Non-Motorised Users (NMU), public utilities, geology, geotechnical and environmental frame.

This section is based on the limited stakeholder interface which has taken place to date and information which is freely available from public sources. A list of the people and organisations with whom contact has been made (directly or indirectly) in undertaking this technical assessment of options are listed in Appendix B.

EXISTING ROAD NETWORK LAYOUT

The area of study specifically for Phase 2 is shown graphically in Drawing No. 70018890-WSP-H-A46-HE-SK-0000 contained in Appendix C, and it is located to the southwest of Coventry, limited by the A46, the proposals for High Speed 2 Ltd (HS2, see below) and the combination of Westwood Heath Road and Cromwell Lane. In terms of the future Phase 3 works, the study area would extent northwards to the A45, bounded on the eastern side by the existing urban fringe of Coventry and on the west by the existing A452. The majority of the Phase 2 study area is in Warwickshire. The exception to this is the area on Westwood Heath Road and across to the A45 via Kirby Corner Road and Sir Henry Parkes Road which lie within Coventry. Phase 3 extends further into Coventry and includes elements in Solihull and is illustrated in greater detail on the drawings within Chapter 4.

The Phase 2 study area falls predominantly within rural land, with the urban fringe of Coventry on the eastern and northern boundaries. The northern urban area consists of a number of residential developments, business estates, leisure facilities and the University of Warwick (UoW). As we move away from Coventry in a southwest direction, the area becomes more rural, with a number of farms/arable land and scattered properties. A number of watercourses, ponds and protected/ancient woodland areas fall within the rural bounds of the site. It is noted that the existing dis-used railway line (Kenilworth Green Way Project), in part to be utilised by HS2 forms the western boundary, located east of Kenilworth and passing through Burton Green.

Within the Phase 2 study area, the road network generally consists of local distributor, accesses and unclassified roads. On the south, we find the A46, a dual carriageway road subject to national speed limit which runs from the northeast towards the south. The A46 intersects the C32 Stoneleigh Road at Stoneleigh Junction, which improvement is subject of Phase 1 of this project (see separate Technical Report on this subject).

From this junction, Stoneleigh Road follows a northwest direction crossing Finham Brook and heading to the Kenilworth Road (A429) / Gibbet Hill Road junction. This distributor road consists of a single carriageway with soft, wide verges and subject to the national speed limit once clear of the exiting roundabout with Dalehouse Lane. A number of properties are present along the road on its proximity to Kenilworth Road (A429) and the railway line; from this point onwards the speed limit becomes 40 mph. The railway line and Kenilworth Road (A429) are almost parallel on a

southwest to north direction. The first one is crossed by an over-bridge whereas Kenilworth Road (A429) is intersected via a roundabout.

Kenilworth Road (A429) intersects Stoneleigh Road and runs from south to northeast. It is a single carriageway road with verges either side, and a footpath on the left (northern) side. The exact verge and footpath width is to be determined; however, it appears to be narrower from the point where the properties along the road end, going forward towards the south i.e. the Kenilworth direction. Speed limit along the road varies, being 30 mph from the north side up to the vicinity of the junction with Cryfield Grange Road, where it changes national limit from this point towards the south.

Gibbet Hill Road commences at the junction between Kenilworth Road (A429) and Stoneleigh Road and travels on a northwest direction towards the UoW. This road is a single carriageway with varied speed limit ranging from 40 mph from the south, dropping to 30 mph and 20 mph on the direct approach and through the university. The road serves as main entrance for UoW, attracting high volumes of traffic, pedestrian and cyclist movements.

East of the main Phase 2 Stage 1 study area, there is a section of local network which will be impacted upon by the proposed Phase 2 and subsequent proposed Phase 3 works. Within the northeast limit of this site, we find the A45; a dual carriageway road that provides connection between Coventry and Birmingham. Being the main link between these two locations, high volumes of traffic during the peak times are experienced. The road is subject to a variable speed limit but the restriction in the area of study is for 40 mph. The triangle formed between a small section of the A45, Charter Avenue and Sir Henry Parkes Road is subject of study due to the high volumes of traffic found during peak hours and to the limited capacity of the junctions within the area e.g.

- between between Charter Avenue and the A45;
- between Sir Henry Parkes Road and the A45;
- between Sir Henry Parkes Roads and a) Charter Avenue and b) Kirby Corner Road; and
- the Kirby Corner Roundabout between Gibbet Hill Road, Westwood Heath Road, Westwood Way and Kirby Corner Road.

Sir Henry Parkes Road heads southwest from the junction with A45; it is a single carriageway road with one lane on the southbound direction and two lanes on the northbound to ease the traffic accessing A45 during the PM peak. Charter Avenue is a dual carriageway road with two-way traffic flow and it runs on an east-west direction intersecting Sir Henry Parkes Road where a roundabout junction is provided. The east section of Charter Avenue is not highly used to access the A45 as its junction with this road only allows left turn movement on the northbound direction, leading to the Sir Henry Parkes / A45 roundabout. Users travelling to the A45 from the southwest generally access the road via Sir Henry Parkes signalised roundabout (at the Canley fire station). Along a short section between Charter Avenue / Sir Henry Parkes roundabout and Sir Henry Parkes / Kirby Corner Road roundabout, Sir Henry Parkes Road becomes a dual carriageway road.

Kirby Corner Road follows a southwest direction from Sir Henry Parkes roundabout, consisting of a two-way single carriageway with a 40 mph speed limit. It is heavily used by vehicles and NMUs as a point of access into UoW from the north. This road terminates at Kirby Corner Road / Westwood Heath Road roundabout, known as the Kirby Corner Roundabout.

Westwood Heath Road is a single carriageway road extended on an east-west direction that links the north section of UoW with Cromwell Lane. It is considered distributor road with a number of residential properties and business estates adjacent to its north side and arable land to the south. Residential properties are situated either side of the road in the proximity of the junction with Cromwell Lane. The speed limit varies from 40 mph from Kirby Corner roundabout until the junction with Bockendon Road to 30 mph from the mentioned junction onwards.

From the west end of Westwood Heath Road, we find Cromwell Lane, a single carriageway road running from north to south with a ribbon housing development present along both sides of it. The speed limit is established as 40 mph from the junction with Westwood Heath Road towards the south, and 30 mph towards the north. The road can be considered a major access road which crosses the Kenilworth Green Way Project in the vicinity of Burton Green. This underpass, known as the Green Tunnel, is part of an existing bridleway route and falls in the direct location where HS2 have proposals to install a cut and cover tunnel.

Further to the southwest, Cromwell Lane intersects with Red Lane, a 40 mph single carriageway road. It has a similar nature and layout to Cromwell Lane with residential properties either side of the road. It runs on a southeast direction for approximately 1.3 km then changes bearing running towards the south, where it finally links with Birmingham Road (A452), north of Kenilworth. After the junction with Red Lane, Cromwell Lane becomes Hobs Lane and carries out a long circular arc to terminate onto Windmill Lane at Catchem Corner close to Balsall Common.

The A452 travels from northwest to southeast framing the large study area on the western side. It commences at the A45 Stonebridge Island, passes through Balsall Common and Kenilworth and connects to the A46. Along the key element of interest, it is a 50 mph two-way single carriageway A-road linking Balsall Common with Kenilworth. One of the possible links between the existing network and the proposed new link road is to the southeast of Hallmeadow Road. This road diverts from the A452 roundabout located to the north of Balsall Common, heading to the southeast towards Berkswell Station. It is of recent construction, provided with a single carriageway and 30 mph speed limit.

Bockendon Road, leading into Crackley Lane, commences from a junction with Westwood Heath Road heading towards the south. They are single carriageway roads where the lack of speed signs and street lightning implies a national speed limit. The roads in this section of the site have an evident rural nature; they serve as link between various farms in the vicinity and between these farms and the urban extension surrounding. Cryfield Grange Road diverts from Crackley Lane towards the east, leaving UoW to the north and finally meeting Kenilworth Road (A429) on a regular major-minor T-junction. It is noted that the alignment of the local road network at the junction of Crackley Land and Cryfield Grange Road is due to be altered as part of the proposed HS2 proposals.

EXISTING RAIL NETWORK LAYOUT

Within the overall Phase 2 and 3 study area, there are currently two railway lines – the Coventry to Birmingham line which exist Coventry, passes east of Balsall Common and proceeds to Birmingham and the Coventry to Kenilworth line which passes to the south of the existing A429 Kenilworth Road before continuing on Warwick et al.

There is a disused heavy freight line from Kenilworth running generally northwards which is used as a non-motorised route (see below) and is scheduled, subject to its Parliamentary passage via the Hybrid Bill, to be utilised in part for HS2.

NON-MOTORISED USERS

As would be expected of a rural area close to an urban settlement, the Phase 2 study area contains a number of footpaths, being these generally in a north to south alignment and terminate (technically only) at the administration boundary between Warwickshire and Coventry. The majority of the distributor roads falling within the area of study are provided with a footway along their lengths.

In addition to the footway network, there are two bridleway routes with the first one commencing at Crackley Lane on its proximity to Kenilworth, running northwards and finishing at Featherbed Lane, to the west of Kirby Corner Roundabout. The second bridleway runs along the dismantled

railway line known as Kenilworth Green Way from its position at Crackley Lane northwards. Although the Public Rights of Way (PRoW) map from Warwickshire only shows the route commencing in Crackley Lane, Kenilworth Green Way appears as a registered route on the British Horse Society website. (http://www.bhsaccess.org.uk/ridemaps/Ridingmap.php?file=Ridemapshome)

Details of the rights of way as supplied by WCC are included in Appendix D.

A number of cycle routes have been identified from the information contained in SUSTRANS website. The National Cycle Network (NCN) route No. 523 runs along the dismantled railway line from its crossing with Cromwell Lane towards the south, terminating on its crossing with Kenilworth Road (A429). In addition, a section of the NCN No. 52 is included in the area of study. The complete route links Warwick and Coventry through Kenilworth and the UoW; however, the section within the study area commences on the crossing between Kenilworth Green Way and the track known as Connect2 Kenilworth. It continues northwards towards the UoW running through the premises and exiting the campus on Lynchgate Road. The route adopts then a west-east direction travelling along Charter Avenue to cross A45 and finally head north to Coventry City Centre.

There is a SUSTRANS Local Route present on Kenilworth Road (A429) from the crossing of tributary of Finham Brook towards Coventry City Centre, via verge provision on the north side of the road. This extends past Cryfield Grange Road and goes over the Gibbet Hill Road / Stoneleigh Road junction. Lastly, there are also a number of secondary routes connecting A429 with route No.52 on a west-east direction. Details can be checked in SUSTRANS map included in Appendix E.

The UoW development masterplan displays the existing and potential new cycling routes in the vicinity of the campus. It shows, amongst others, a possible cycle route along Gibbet Hill Road connecting with the existing pedestrian and cyclist southeast access in the proximity of the School of Life Sciences. Several new possible routes are proposed within the University premises; these connect with existing routes to ease the access into the facilities. A new route is planned along Lynchgate Road from the more southern junction with Sir William Lyons to Sir Henry Parkes / Lynchgate Road roundabout; nonetheless, this road is identified as part of NCN route No.52 in SUSTRANS website. A potential UoW cycle route masterplan is included in Appendix F.

Lastly, no additional cyclist provisions exist or are planned along Westwood Heath Road, Westwood Heath Way and Kirby Corner Road by the UoW or Local Authorities that we are aware of.

It is noted at this time that the local rights of way network will be impacted upon by the HS2 proposals on the western side of the study area. The specific arrangements which they are proposing to counteract the impacts are shown in the HS2 drawings as called up in Chapter # and contained in Appendix K.

ACCIDENT DATA

Data was requested from WCC in relation to accident records on the area of study relevant for Phase 2; this involves the area limited to the east by Dalehouse Lane, to the west by Cromwell Lane, to the north by Westwood Heath Rd and to the south by Red Lane and the dismantled railway line.

This information is contained in Appendix G and deals with the period from January 2011 to July 2015 with 12 accidents of the overall 13 occurring during daylight. There are 3 serious (ref 7, 10, and 11) and 10 slight accidents (ref 1 to 6, 8, 9,12 and 13) with no fatalities noted.

The accident data record shows a hot spot in the proximity of Dalehouse Lane and Stoneleigh Road roundabout, within a radius of approximately 200 metres. There are two accidents

registered within the junction (ref 6 and 7), two on Stoneleigh Road in the proximity of the entrance to Brook Farm (ref 2 and 13) and another two on Dalehouse Lane in front of Westley House (ref 1 and 11). From the accidents mentioned above, No. 7 and No. 11 are classified as serious. Three accidents are registered along Cromwell Lane (ref 3, 5 and 12); however, these have not occurred in close proximity to each other, making difficult to consider any point of Cromwell Lane as a hot spot.

The area around A46 / Stoneleigh Road junction will be influenced by the alignment adopted for the first section of the Phase 2 and the tie-in between Phase 1 and the local network. The layout and usage of roads located in the central area between Cromwell Lane and A429 / Crackley Lane, Bockendon Road and Cryfield Grange Road, will be altered depending on the option implemented for Phase 2. Crossing between the new link and these secondary roads may need to be provided, leaving the existing roads to only serve journeys with start or termination point in any location along them. For those journeys which use these roads as a connection element, users will modify the patterns in favour of the new link road. This will likely reduce accidents caused by the poor alignment and visibility conditions along the mentioned roads. In relation to Cromwell Lane, it will be influenced depending on the option adopted and the junction arrangement between both. Alternatively, it may be the case that these local roads are not connected to the new Link road at all.

Linked to the MNU section above, it is noted that one accident involving a pedal cycle (ref 7) took place at the existing Dalehouse Lane roundabout. A second accident involving a pedal cycle and a heavy goods vehicle (ref 12) took place in the junction between Cromwell Lane and Hodgetts Lane.

In relation to accidents in the Kirby Corner Roundabout to A45, information was sought from CCC and is recorded in the Technical Note called up in Chapter 3 and Appendix N.

PUBLIC UTILITIES

Contact has been established with various Statutory Undertaker organisations to confirm the possible presence of overhead and underground services in the area of study. Details of those approached are included in Appendix B and the key information from them is included in Appendix H. The information has been requested for Phase 2 only; further utilities enquiries will be required for Phase 3 planning.

The key apparatus identified is two fuel pipelines which travel from approximately the crossing of Stoneleigh Rd with Finham Brook towards the west, crossing the A429 where the last property on the south end is located. It thereafter heads northwest, in parallel to the dismantled railway line, roughly equidistant between this and Gibbet Hill Road. The combined route diverges into two arms in the vicinity of Crackley Lane Nursery; the first one continues to the northwest crossing Westwood Heath Road between Bockendon Road and access road to the Lodge Farm. The second arm travels on a southwest direction until it intersects with Red Lane, it then follows the road path. The presence of this pipeline adds an additional constraint to those already existing in the proximity of Kenilworth Road (A429) – the proposed alignment needs to be accommodated within the available corridor between the HS2 line and the existing properties.

There are a number of BT-Openreach apparatus within the scope, these are either overhead or underground utilities mainly placed along the roads. No apparatus have been found across a farming field.

Several low and medium pressure gas mains have been identified in the area of study; these are solely located along the roads of the network. However, a local high pressure pipe is present running on a north-south direction, crossing Dalehouse Lane in the vicinity of “The Cottage” terminating in the gas installation adjacent to Stoneleigh Road.

Severn Trent Water apparatus are present in the area of interest being predominantly water mains running along the road network. A water main has been identified running from west to east, starting from Red Lane in the vicinity of “Tree Tops”, crossing the dismantled railway line and heading to Gibbet Hill Road / Scarman Road roundabout. This will need to be investigated further as no pipe diameters are provided within the available information. The east end to this pipeline needs to be investigated further, the information supplied to date not showing where the pipeline ends.

Virgin Media apparatus can be found on four different locations: along Waste Lane, along the existing railway running west to east (Coventry to Birmingham Line) (both Phase 3), , on Gibbet Hill Road and along Kenilworth Road (A429). Only the latter can be affected by the Phase 2 design.

Vodafone cables are present within the area of study; however, none of these pose a risk for the proposed design of Phase 2.

Western Power Distribution information shows different types of apparatus in the area of study. Most of the installations run along the roads within the vicinity, being 11kV or low voltage underground apparatus; however a number of elements that require attention have been identified. There is a high voltage (33kV) underground line running along Crackley Lane as well as several 11kV overheads located across the fields in the extension between A429 and Cromwell Lane. Further enquiries will be required in future stages of the project to establish the exact location and potential harm to the network.

GEOLOGY AND GEOTECHNICAL

Using the sources of information contained in Appendix B, a review has been undertaken in relation to geological and geotechnical conditions affecting Phase 2 works. A report on this has been compiled and this is contained as Appendix I of this report. Key points are as follows:

- A considerable number of ponds of unknown origin are present in the area;
- the area is underlain by Kenilworth Sandstone, Gibbet Hill Conglomerate and Tile Hill Mudstone;
- presence of alluvium areas around Finham Brook and its tributary Canley Brook;
- faults have been identified through the site, with the Princethorpe Fault present along the northern site boundary;
- historic landfill north of Cryfield Grange Farm, inactive since 1992;
- regional Unexploded Bomb Risk is categorised low to medium; and
- localised sources of contamination may include pesticides and spillage of fuels. Potential contamination caused by Coventry to Kenilworth (Leamington Branch Line) railway.

ENVIRONMENT

Using publicly available data from a variety of sources and a site walkover, an assessment of the natural environment in the site has been undertaken. A report on this has been compiled and this is contained as Appendix J of this report. The key outputs of the report are presented below:

- There are two Grade II listed buildings within the site;
- Kenilworth Road conservation area abuts the boundary of the site;
- there is a high potential of archaeological artefacts to be present in the area;
- there are three areas of woodland within the site that are determined as Ancient and Semi-Ancient Woodland;

- protected and notable species surveys should be completed for invasive species, breeding birds, bats, reptiles, great crested newts, badgers and riparian mammals; and
- three areas are within Flood Zones 2 and 3; area at the roundabout between A45 and Sir Henry Parkes Road, along the unnamed river that runs to the east of the UoW and in the area north of Cryfield Grange Farm. This is in addition to the constraints identified previously along Finham Brook

An initial qualitative environmental assessment has been completed concluding that there are potential significant environmental effects; nonetheless, it is considered that there are no 'show stoppers' and that appropriate mitigation is likely to reduce the significance of effect.

1.4 FUTURE PROPOSALS IN THE AREA

HS2

The partially completed study for A46 Link Road Phase 1 and the future Phases 2 and 3 are subject of a close interaction with the proposed works for HS2 scheme. The hyperlinks for the plans of the relevant HS2 section can be found in Appendix K

HS2 is the Government's proposal for a new high speed north-south railway. The proposal is being taken forward in two phases: Phase One will connect London with Birmingham and the West Midlands and Phase Two will extend northwards the route to Manchester, Leeds and beyond.

The interface between both phases will take place at Birmingham Interchange, in the Metropolitan Borough of Solihull. It will provide access to Birmingham Airport, the National Exhibition Centre (NEC), and Birmingham International Station. The Interchange site is located in a triangle of land to the east of the National Exhibition Centre (NEC) and the M42 that is also bounded by the A45 Coventry Road and the A452 Chester Road. This triangle of land is included into what is known as UK Central, the West Midlands' principal gateway and strongest performing economy region.

UK Central is located to the northwest of the study area, with the new A46 Link Road resulting in additional alternative of means of access to it, in addition to M6, A45, A452 and M42. This new road will also contribute to increase the resilience of the network mentioned above.

HS2 alignment generates a major constraint to the new route, providing boundary from the southwest to Phase 2 and possible intersection with Phase 3. Depending on the option finally adopted for Phase 3, HS2 line may require to be intersected on its proposed alignment in the area between south of Bourton Green and Balsall Common.

A46 EXPRESSWAY

As part of their on-going review of the motorway and trunk road network, Highways England is investigating the concept and designation of the A46 as an Expressway. An expressway is defined as being "*A-roads that can be relied upon to be as well-designed as motorways and which are able to offer the same standard of journey to users. As a minimum, this means:*

- *Largely or entirely dual carriageway roads that are safe, well-built and resilient to delay*
- *Junctions which are largely or entirely grade separated, so traffic on the main road can pass over or under roundabouts without stopping*
- *Modern safety measures and construction standards*
- *Technology to manage traffic and provide better information to drivers".*

As defined in the Road Investment Strategy: for the 2015/16 – 2019/20 Road Period as published by the Department for Transport. Whilst the Stoneleigh Junction complies with the ethos of the description above already, any suggested improvements must also comply and should seek to improve compliance with the above parameters.

A46 LINK ROAD PHASE 1 – STONELEIGH JUNCTION

As part of the works for the preliminary study of A46 Link Road, the improvement of the junction between the A46 and Stoneleigh Road was commissioned by CCC in association with WCC from WSP|PB. They undertook a study of alternatives to suggest the most adequate layout to improve the safety conditions on the existing junction. An "A46 Link Road (Phase 1) Technical Report on options for Stoneleigh Road Junction" was produced and issued to WCC and CCC in January 2016, compiling all the relevant information to make the decision. All the material included in this report remains confidential and has not been released to the public at this time.

A total of 3 main options with its variations were assessed by the WSP|PB team. Briefly described, these options were:

- **Option 1A:** Installation of two new roundabouts north and south of the existing A46 Stoneleigh Bridge, realigning the Stoneleigh Road and A46 slip roads on the approach to the new roundabouts;
- **Option 1B:** Installation of a new bridge link northeast and parallel to the existing A46/Stoneleigh Rd bridge structure with two new roundabouts either side end of these structures;
- **Option 2A:** Proposed free flowing segregated left turn lanes to merge into A46 from Stoneleigh Road and traffic signals located directly at the junction to control and separate traffic;
- **Option 2B:** Installation of a free flowing segregated left turn lane connecting the Stoneleigh Road southbound approach with the northbound A46 on-slip. Additionally, a roundabout is proposed southeast of the exiting bridge with a layout such that impedes the right turn manoeuvre into the A46 northbound;
- **Option 3A:** Major upgrade of A46/Stoneleigh Road junction to form a gyratory layout with two bridge roundabout. The measures includes the installation of a new bridge east of the existing junction, realigning the approaches to the junction and installing segregated turn lanes at the northwest and southeast section of the proposed roundabout; and
- **Option 3B:** Major upgrade of the junction as in Option 3A with the installation of the new bridge proposed to the south of the existing one instead of to the north. The measures include the realignment and the installation of segregated turn lanes at the northeast and southwest of the junction.

The assessment concluded with the recommendation of Option 3A as WSP|PB emerging preferred option; the drawing of the general arrangement for the option can be found in Appendix L.

A46 LINK ROAD PHASE 3

A46 Link Road study comprises a total of three phases. As mentioned above, assessment of Phase 1 has already been finalised and the technical report completed. Phase 2 is subject of this technical report and it consists on the section generally between Stoneleigh Road and Cromwell Lane. The last phase of the study, Phase 3, covers the section from the general Cromwell Lane area to the link with the A45 or A452. Although this phase forms part of a different commission, several elements of the study of Phase 2 will have an influence on the way of preceding with Phase 3, making it necessary the consideration of both at the same time.

At this time, the northwestern terminus of the A46 Link Road Phase 2 has not been determined in full and is the primary output from this report. The terminus will depend on a number of factors making it necessary to consider equally likely the two possible options (link to the A45 or to A452). The tipping point that most strongly influences the decision to one option or the other will be the crossing of Cromwell Lane. If Cromwell Lane and HS2 are crossed through the Green Tunnel, it would be more appropriate to consider the link road to end at A452. However, if the road is crossed in the vicinity of Westwood Heath Road, there is a bigger flexibility in terms of Phase 3 alignment; connection with A45 or A452 is equally feasible.

GENERAL DEVELOPMENTS IN THE AREA

The area enclosed by A429, Westwood Heath Road, Cromwell Lane and HS2 forms part of the land of interest of different organisations with options to development this land. Liaison details between WSP|PB, the different developers and CCC/WCC are expanded upon on Chapter 7.

CANLEY REGENERATION PROJECT

WSP|PB has been involved in the Canley Regeneration Project, participating on the preparation of an Environmental Statement accompanying a planning application submitted in 2009. WSP|PB has maintained on-going involvement in the project by supporting both the developers of parcels that have come forward (particularly with Air quality and ecology) and CCC (with landscape masterplanning).

The area includes the section of land limited to the north by the railway line between Tile Hill and Canley stations, to the southwest by Westwood Business Park and to the east by the A45. Accordingly, there is a potential for an interface with any proposed improvements to the current road network in the greater Charter Avenue area.

2 CONSIDERATIONS AND CONSTRAINTS

2.1 INTRODUCTION

This Chapter addresses overarching design concepts and the constraints identified by WSPIPB from the initial work carried out whilst investigating options.

2.2 DESIGN CONSIDERATIONS

A number of considerations have been present in every stage throughout the project, these are listed below:

- **Objectives.** Where possible the route is to be developed to meet the underlining objectives highlighted in Chapter 1 Section 1.2 Project Objectives of this report;
- **Existing road network.** Ensure suitable connections are proposed with the existing road network taking into account the immediate and wider impact. At this stage and for modelling purposes, a connection with roads carrying higher volumes of traffic are to be prioritised. This should include a junction where the route intersects with the Kenilworth Road (A429) to improve connectivity from the east to the north. To fully understand the impact of Phase 2 ,a number of elements of Phase 3 will also need consideration in order to develop and analyse emerging options;
- **Locality**. Adoption of a sympathetic approach with the development of the proposed route corridor options is to be considered to minimise where possible the impact on the immediate locality. This will ultimately affect sections of the overall alignment; however, as the design progresses and the preferred routes established, with agreement these routes can be amended and streamlined;
- **UK Central.** Opportunity to develop a design solution that supports the objectives of UK Central (as described above), further improving the overall connectivity within the region;
- **UoW.** Develop feasible options that enhance connectivity with UoW, taking into consideration the UoW Development Master Plan. Establish and consider the objectives of the UoW Master plan allowing opportunity to develop options that are likely to be preferred or accepted and also enhance connectivity into the university. Determine the UoW general land ownership within the Phase 2 site extents and establish initial feedback or the provision of a route through the extents. Establish any route options that have been developed as part of the UOW Masterplan;
- **Developments.** Establish current and emerging developments within the vicinity to ensure that the proposed route corridors where feasible optimises development opportunity within the locality;
- **Available traffic data.** Acquire, analyse and compare existing available traffic data with the 2013 CASM Model, currently developed by WSP/PB to allow appropriate analysis of options and determine a preferred route. This includes ensuring the most up-to-date data is utilised for analysis to unsure evidence to support the scheme is robust. Single and dual carriageway are to be considered and modelled to determine their capacity. To avoid modelling a number of unnecessary option scenarios, a single route corridor option will be selected to determine how viable a two-way single carriageway performs. Please see Appendix R for further details;
- **Phase 1 output.** Establish any further design considerations following completion of Phase 1 Stoneleigh Junction to ensure compatibility and appropriate tie in arrangements are proposed. It is likely that proposals for Phase 2 will impact on the development of Phase 1; therefore, this will need to be highlighted and addressed. The Phase 1 Stage 1

A46 Stoneleigh Technical Report is to be reviewed to determine recommendations following completion of the preliminary design stage to allow co-ordination between the design phases. It is understood that Phase 1 is to be taken forward as a standalone scheme; therefore, it is imperative that co-ordination of the options at this stage is considered to avoid excessive abortive construction work and allow flexibility with tie in arrangements;

- **King's Hill connectivity.** Improved access is to be considered northwest of the Stoneleigh Junction to Kings Hill to support and enhance development opportunity within the locality;
- **HS2 – Opportunity.** Develop design solutions that can be co-ordinated with HS2 proposals, minimising the impact on the locality and reducing the overall construction costs of the scheme;
- **HS2 interchange.** Support and enhance connectivity with HS2 proposals by developing design solutions that improve the overall infrastructure network involving the planned station adjacent to Birmingham Airport;
- **Local Authority (LA) Objectives.** Determine the main LA Objectives, whilst also taking into consideration relevant design standards, constraints and development proposals within the extents of the scheme;
- **Rights of Way.** A number of PRoW are affected by HS2 proposals which will need to be considered during the development stages of the scheme. During the design development stages, these routes where feasibly possible are to be diverted or alternative route provided; however, this cannot be fully addressed at this stage of the design;
- **Environmental.** Options are to be developed with due regard of the environment also taking into consideration existing available data and information highlighted within the Environmental Constraints Report;
- **Geotechnics.** As above, options are to be developed with consideration to the information supplied with the A46 Phase 2 Stage 1 Geotechnical Desk study;
- **Design standards.** The Design Manuals for Roads and Bridges (DMRB) in particularly TD 9/93 Highway Link Design will be consulted during the development of the purposes of the development of this scheme. It is realised that the design stages will take place over a number of year prior to construction; therefore, it should be taken into account that amendments may take place over the course of this time;
- **Cross section.** Relevant design standards are to be consulted to determine appropriate cross section and design standards to be adopted, these standards include DMRB, TA 46/97 Economic Assessment and Recommended Flow Ranges for New Rural Links, Table 2.1 Opening Year Economic Flow Ranges, and also TD 27 Cross Sections and Headrooms. At this stage initial flow rate assessments indicate D2AP carriageway standard will be suitable but this matter is further addressed in the Traffic Chapter below;
- **Junction strategy.** The strategy is linked inexplicitly to the standard that will be adopted for the road, bearing in mind that each junction will introduce delays (the magnitude being lessened by the provision of grade separation). Junctions will cause disruption to the flow of traffic along the overall link and so an excessive number would be detrimental to its performance in terms of user delays. Grade separation is likely to require more land and will be more expensive to construct although it may be required by traffic predictions;
- **Speed.** Major constraints and junctions within the study area will dictate the ultimate speed limit that can be achieved along the proposed route corridor options. Where possible the trial alignments are to consist of elements that will allow a flexible speed limit to be applied e.g. fall no lower than three steps below the desirable minimum radius for a 70 mph as indicated within the DMRB, TD 9/93 Highway Link, Table 3, but are also suitable for the parameters indicated for a 50 or 60 mph speed limit. If the route is to be made a high speed single carriageway, say 60 mph, there must be the ability to overtake

between junctions on at least some of the length of the overall link/scheme. This requirement is laid down in TD 9/93 Chapter 7 Clause 7.20; and

- **Statutory enquiries**. Statutory undertaker's enquiries are to be progressed to establish apparatus that are likely to impact the development of the scheme. Route corridor options are to be developed in such a way to minimise the impact on any major plant within the vicinity.

2.3 DESIGN CONSTRAINTS

There are a number of constraints associated to the proposal alignment of Phase 2 which should be considered in conjunction with constraints for Phase 1 and 3. These main constraints are listed below:

- Layout adopted for Phase 1 is likely to be delivered as a standalone scheme, which may reduce the flexibility of the Phase 2 tie-in arrangement. This includes arrangements for the existing roundabout at the junction of Dalehouse Lane and Stoneleigh Road where its possible removal will be reliant on diversion routes or provisions proposed within the Phase 2 layout;
- Iintersection between Phase 2 route and existing highway network. This includes the existing bridge over Finham Brook, crossing of Finham Brook from the road emerging from Dalehouse Lane, location of new roundabout between Dalehouse Lane and Stoneleigh Road (included within Phase 1 proposals), intersection between Phase 2 and Cromwell Lane and intersection between Phase 2 and Red Lane. Proposed layouts will intersect with Kenilworth Road which also falls within a conservation area;
- Phase 3 option adopted and its connection with the existing road network. Similarly for Phase 1, tie in arrangement with Phase 2 may restrict how the link is developed;
- Pinch point that exists between a number of residential properties adjacent to Kenilworth Road and also the HS2 land take boundary. The existing, elevated railway line also exists approximately 200 metres to the southwest of this pinch point; therefore, the ability to tie in with Kenilworth Road will be further restricted;
- Items highlighted within the Environmental Constraints Report which include ancient woodlands, listed buildings, special areas of conservation, flood risk areas, a number of ponds falling within the vicinity, the site is located within a green belt area and also in proximity to a conservation area, etc. Please see Appendix J for further details;
- Intersection between Phases 2 or 3 and the HS2 alignment and are they likely to object to any preferred proposals developed;
- Programme dependency between HS2 and A46 Link Road e.g. is Phase 2 to be taken over the Green Tunnel or opportunity to develop routes that cross underneath the proposed new track and will be reliant on the construction taking place prior to HS2 works;
- Interface with existing railway network. This includes the elevated railway line that exists approximately 200 metres to the southwest of the HS2/Kenilworth Road pinch point. It is understood that proposals exist to electrify the track; therefore, appropriate clearances will be required and further constrain the site. There is also understood to be potential Park and Ride facilities at a new station located east of the proposed HS2 alignment;
- CEG, Crest Nicholson developments in the area of works and other emerging development proposals not initially fully identified;
- Elevated traffic volumes experienced in the network;
- General locality including the topography of the ground, existing residential estates and business premises;
- New development under construction to the west end of UoW land and the requirement of an improved access arrangement into the premises;

- Cables and other apparatus falling within the vicinity and the ability to avoid and divert. This includes the existing oil pipelines travelling roughly in parallel to the proposed Phase 2 route; this pipeline intersects the A429 at the pinch point referred to above and so further restricts the route for the Phase 2/A429 junction;
- Preferences of the Client, Developers and ability to deliver a scheme that satisfies current standards whilst also satisfying the criteria;
- Likely construction processes required and co-ordination of traffic management to minimise the disruption to an acceptable limit during the Phase 2 works due to the possible implication on HS2 key performance indicators; and
- The ability and ease to acquire land through negotiation or Compulsory Purchase by identifying land ownership of the farms in the area and maintaining the current good working relationship with organisations with land options.

3 OTHER ASSOCIATED LOCAL IMPROVEMENTS

3.1 INTRODUCTION

In association with the main line proposal, WSP|PB has been requested to study other improvements in the area, required to guarantee an adequate level of service of the network post Phase 2 and 3 opening. The new link road will cause changes in the traffic patterns attracting journeys from/to developments in the area freed up by its provision. This will increase the level of stress on the existing network which is already, at certain locations and times, overloaded.

3.2 WESTWOOD BUSINESS PARK ACCESS IMPROVEMENT

WSP|PB has assessed the options for improving the access into Westwood Business Park. The elevated volumes of traffic experienced during the AM and PM peak on Kirby Corner Road, Gibbet Hill Road, Westwood Heath Road, Westwood Way and the roundabout formed with the intersection of these four roads, led the client to consider possible means to improve the access into Business Park, assuming the business estate aggravated the bad operation of the close network. Different elements of the access issues have analysed such as the volumes of traffic, the likely movements of the vehicles, available space to construct new roads, nature of the surroundings, etc. The technical note produced for the purpose of assessing improved access options is contained in Appendix M.

After studying the traffic figures provided by the 2013 CASM model and a site walkover to observe the operation of the junction and roads in real time, it has been concluded that the capacity problems are not being caused by the movements in and out of the business park but by the journeys with the UoW as origin or destination. It has been consequently highlighted that, due to the maturity of the site and its little opportunity to expand, no significant increases of traffic volumes are expected in the immediate future. Accordingly, rather that providing a new means of access, junction improvement schemes should take priority in terms of the use of the client funds.This would include the Kirby Corner Roundabout (see below) or the junction of Mitchell Avenue and Charter Avenue.

3.3 KIRBY CORNER TO SIR HENRY PARKES IMPROVEMENTS

WSP|PB has been requested to undertake an assessment to identify potential improvements to the section of network between Kirby Corner Road / Gibbett Hill Road Roundabout (the Kirby Corner Roundabout) and Sir Henry Parkes Road. The assessment also includes the eastern section of Charter Avenue and its junction with the A45 Westbound. There are a number of issues that have been identified along the route and its junctions, which are mostly associated with capacity, layout and provision for pedestrians and cyclists.

The full report is available in Appendix N. The information utilised to build the recommendations is from different sources such as publically available data, data supplied by UoW, traffic data, site walkover, etc. The appendix highlights options which we consider appropriate to be taken forward for further consideration by CCC to address capacity issues which are current and will worsen in the interim when Phase 2 in particular is implemented before Phase 3 is constructed.

3.4 WESTWOOD HEATH ROAD WIDENING

During the meeting held with Crest Nicholson, discussions with regard to a possible route with an online widening of Westwood Heath Road took place. Upon client's request, WSP|PB undertook an assessment to study the feasibility of such option. The proposed route would join Westwood Heath Road in the vicinity of the junction with Roughknowles Road, widening the section of Westwood Heath Road from this point to the junction with Cromwell Lane. A new junction would be formed between both roads, from where the A46 Link Road would continue towards the west or north.

With full details of the assessment present in Appendix O, the solution assessed consisted on a dual carriageway with cross section according to DMRB TD27/05. The total width of the footprint was assessed as being some 34.9m, allowing for the proposed dual carriageway, a collector/distributor road for the retained properties, footways and environmental mitigation. It would involve land and properties acquisition along the extent of the widening. It was recommended that, due to purchase cost and negative impact on the public, the option should not be taken into further consideration for the overall Phase 2/3 options described in the subsequent chapter.

4 OPTIONS ASSESSED

4.1 INTRODUCTION

With due regard to the existing constraints and future needs, WSP|PB has reviewed options for the provision of an alignment for Phase 2 and 3 of the A46 Link Road. These are detailed and discussed individually, then in relation to each other below and are included in graphical form in Appendix P. This section aims to outline the design assumptions made during the development of feasible options as well as underline each option's advantages and disadvantages.

4.2 DESIGN CONSIDERATIONS

SPEED LIMIT AND CROSS SECTION – DESIGN CRITERIA

It has been agreed with both WCC and CCC that the design criteria adopted for the proposal of the options will be a design speed of 70 mph and a cross section of a dual carriageway. A single carriageway with a lower speed limit yet to be established will be applied for access roads associated with the main line e.g. into UoW, Dalehouse Lane, conncetion to Westwood Heath Road if required, etc.

The alignments of the different options have all been design complying with DMRB – TD 9/93 Link Road. It is also proposed that for future stages of design the cross section shall be defined in accordance to TD27/05 Cross-sections and headrooms. Whilst the options are shown as thin lines on the drawings, it is the intention that they be regarded a s a route corridor, based around the alignment shown.

JUNCTION STRATEGY

In most of the locations where the proposed route crosses a distributor or major access road, a roundabout junction has been assumed. This will nevertheless have to be studied in future stages of the project, ensuring that an optimum junction arrangement is provided for each case.

Where the route crosses a minor access road, e.g. Crackley Lane, no junction strategy has been specified at this stage of the design. It is understood this will be considered in the future as part of the next stages of the design.

SIDE ROADS

At this time, the junction strategy devised has included for the interaction with roads that are important in the local network. In the case of Phase 2 work, junctions with Dalehouse Lane/Stoneleigh Road, A429 Kenilworth Road and connections to either Westwood Heath Road or Cromwell Lane are proposed.

Until further details are available as to the manner in which the proposed development address Cryfield Grange Road and Crackley Lane (connecting to Bockendon Road), no specific provision for these local roads is being recommended at this time. It may be the case in the short term that they are stopped up and hammer head turnings are supplied with appropriate compensation for land owners who access land off the current network which would be severed. It is noted that disruption to their operations would occur in the short term and that farm vehicles would need to use the proposed junctions on the Link Road in the short term also until the agricultural use is superseded by the planned developments.

It is noted that this aspect of work would need to be coordinated with the HS2 provision regarding

- Local roads which currently involved a localised diversion of the western end of Cryfield Grange Road and a new bridging provision over the new railway for Crackley Lane; and
- Their maintenance access requirements off that local road network.

STRUCTURES

The structural elements associated with Phase 2 specifically is limited owing to the use of at-grade. On a typical option, the following would be required:

- A new large culvert associated with Finham Brook in the current Dalehouse Lane area;
- A bridge over the Coventry to Kenilworth railway which would need to take future electrification and dualling into account;
- Protective slabs to be placed over large service facilities including fuel pipe lines;
- Medium sized culverts to cater for watercourses traversed; and
- The likely provision of a footbridge to accommodate the bridleway in the middle of the study area in association with diversion of other footpaths to this crossing point.

Other provision over the proposed dual carriageway and associated additional local road provision would be a matter of further discussion with WCC (as Local Highway Authority), the representatives from the non-motorised user groups and the developers who would be involved in the master planning of the general area from Cromwell Road/Westwood Heath Road to Stoneleigh Road in Phase 1.

Structural content within the subsequent Phase 3 works will vary depending on which route option is taken forward and may require the following, in combinations depending on the corridor chosen:

- A jacked underpass beneath HS2;
- New bridges built over HS2;
- New bridges on the A45 dual carriageway;
- A bridge over the Coventry to Birmingham Line
- Side road overbridges;
- Public rights of way bridges for footpath connectivity provision;
- culvers for watercourse; and
- Accommodation bridges.

Full details would be determined when further work on the optimum Phase 3 element of the overall A46 Link road corridor is completed.

4.3 COMMENTS PRECEDING THE OPTION DESCRIPTION.

For ease of describing the options, due to the alignment length and the different elements creating, the layouts have been sectioned into a number of elements. These elements are listed below:

- Phase 1 – A46/C32 Stoneleigh Junction.
- Phase 2, Element 1 – A46/C32 Junction to Kenilworth Road/A429.

- Phase 2, Element 2 – Kenilworth Road/A429 Junction to a central junction located south of Westwood Heath Road.
- Phase 2, Element 3 – Central junction to Cromwell Lane.
- Phase 3 – Cromwell Lane to either A45 or A452, north or south of Balsall Common.

Where an element of the alignment is identical to other of an option described previously, a description reading “as Option X” has been provided in order to alleviate the extension of the descriptions.

The routes will be described from east to west. This aligns with the arrangement of the different phases of the study, being Phase 1 the most easterly one and moving forwards to the west as the rest of the phases appear. Thus, the alignment can be described in the same direction that the phases increase.

4.4 OPTION 1

DESCRIPTION

Phase 1 – A46/C32 Stoneleigh Junction: consists of a major upgrade of the A46 / C32 Stoneleigh Junction to form a gyratory layout with a two bridge roundabout. Measures include the installation of a new bridge east of the existing junction, realigning all the approaches to the junction and installation of segregated free flowing lanes at the northeast and southwest section of the proposed new roundabout. The upgrade of the existing drainage lighting, signing and lining system will be required to conform to the new junction layout. It is illustrated in Drawing No. 70014607/DR/101/3A contained within Appendix L.

Phase 2, Element 1 – Stoneleigh Junction to Kenilworth Road (A429): from the proposed A46/C32 Stoneleigh Roundabout, the new A46 Link swings to the southwest where a new at grade junction is proposed to allow connection between Dalehouse Lane, Stoneleigh Road and the new Link Road. The new junction will consist of a roundabout with a four arm approach and an Inscribed Circle Diameter of some 70 metres. The link road then continues towards the southwest for 1.3km, intersecting with Kenilworth Road (A429) at a location approximately 130 metres southwards of the most southern dwelling present on this road. The presence of oil pipeline and the HS2 proposlas leave a very narrow window for the location of the roundabout. This would agained be sized at 70 metres ICD

Phase 2, Element 2 – Kenilworth Road (A429) Junction to a central junction located south of Westwood Heath Road: the route adopts a northwest direction crossing the tributary of Finham Brook between Oak Tree Cottage and Cryfield Grange Farm. It continues leaving Whitfield Coppice and UoW on the right to finally reach a point roughly equidistant between UoW, Westwood Heath Road and Crackley Lane, where the central junction is proposed to be located.

The central junction is reached by four arms; two main arms that are part of the link road, entering the roundabout from the southeast and exiting towards the northwest, and two single carriageway roads that serve as link with the UoW and Westwood Heath Road respectively. The UoW is intended to be entered from the southwest, with a road running between the residential premises and Whitfield Coppice and intersecting Scarman Road bend on its outer side. On the other hand, the link with Westwood Heath Road will join the road at a location between Featherbed Lane and Bockendon Road, with the exact point yet to be determined. It is noted that this junction location would now not be influenced by potential a new means of access to the Westwood Business Park but rather more so by the CEG proposals for their development.

Phase 2, Element 3 – Central junction to Cromwell Lane: from the central junction, the link road will adopt a west direction, crossing Bockendon Road at a point approximately 300 metres south of Weswood Heath Road. It will continue south of Lodge Farm to intersect with Cromwell Lane at a location to the south of Peeping Tom Public House, forming an at grade junction. The proposal would be that the road and this junction would be the terminus for the Phase 2 works. Crossing of Cromwell Lane has been considered to be a critical element throughout the study, hence a technical note for assessment of the different available options was produced at a very early stage, it can found on Appendix Q.

Phase 3 – Cromwell Lane to A45: from the Cromwell Lane Junction, the road bends and changes direction to head northwards. It crosses the railway line and Duggins Lane at approximately 420 metres north of Cromwell Lane, running then on a north direction for approximately 3 km and travelling adjacent to the western edge of the Coventry conurbation with its residential development. From the crossing with Broad Lane, the road bends to the northwest, intersecting Birmingham Road/Meriden Hill between Showell Lane and Church Lane. It then continues north to finally meet the A45 between Showell Lane overbridge and Eaves Green Lane underpass.

ADVANTAGES

The following advantages have been identified:

- The proposed route is situated further to the north; therefore, the interface with HS2 route is minimal with only one interface at the junction with Kenilworth Road;
- the UoW is currently developing the west section of the campus and a new access directly at this location would allow further opportunity to enhance the area as it is possible to develop either side of the proposed new access;
- route will allow ease of connection with the UoW and Westwood Heath Road;
- it has a minimal number of intersection with existing roads/routes; therefore, junction requirements and delays have been minimised;
- connection from the A46 with the A45 will be improved giving opportunity to reduce traffic flow along the A45 to the east from Allesley to Festival Island;
- the proposed alignment will also allow an alternative route from the A45 to Westwood Business Park, UoW and Stoneleigh Park; and
- the proposed alignment generally hogs the Hockley residential estate outline, also following existing land boundaries, allowing a more sympathetic land take requirement.

DISADVANTAGES

The following disadvantages have been identified:

- The route runs in close proximity and parallel to the existing BPA oil pipeline, this may result in diversionary works. This could place a significant cost and programme constraint on works;
- the overall footprint of the scheme is likely to be considerably greater than other proposed routes assessed due to its length;
- elements of the route will impact on a number of watercourses present within the vicinity;
- the acquisition of a number of properties, including parts of the Peeping Tom public house (now a hickory flavour-based restaurant) will be required where the proposed route intersects with Cromwell Lane. Works are also proposed where the proposed HS2 route crosses Cromwell lane; therefore, therefore this proposal will further impact on the general locality;

- the overall footprint of the route runs parallel and in close proximity to a number of properties and this may impact on residents e.g. noise from construction and from vehicles when the route is in operation. It is possible to mitigate this which will attract a cost and visual intrusion to counteract expected resident objections; and
- this phase of the route is considerable lengthy and the costs to construct will be expected to be significantly higher compared to other possible connections with the existing road network.

OPTION VARIATIONS

There are two proposed variations of this main option, Option 1A and Option 1B. The first one comprises two alterations; one in the central junction location and arrangement, and another on the point where the route links with the A45. The second variant maintains the central junction as Option 1 but adopts a more westerly alignment after Cromwell Lane. The rest of the elements of the alignment remain the same as main Option 1. Further details are provided below:

OPTION 1A

Phase 1 – A46/C32 Stoneleigh Junction: as Option 1.

Phase 2, Eelement 1 – A46/C32 Junction to Kenilworth Road (A429): as Option 1.

Phase 2, Element 2 – Kenilworth Road (A429) Junction to a central junction located south of Westwood Heath Road: the route follows the same alignment as Option 1; it crosses the tributary of Finham Brook between Oak Tree Cottage and Cryfield Grange Farm, continues leaving Whitfield Coppice and UoW on the right and reaches area of the central junction.

On this variation, there are two roundabouts in the central area; the first one is located in the section of road that falls below the eastern edge of Whitfield Coppice, the second one is situated on the same point as the central junction for Option 1. The access to UoW is provided by a road travelling on a south-north direction that links the first roundabout with Scaram Road at a point to the west of Cryfield House. Connection between the new Link Road and Westwood Heath is provided by a road that joins the second roundabout and Westwood Heath Road, running on a south-north direction. Both roundabouts are located approximately 1km apart.

Phase 2, Element 3 – Central junction to Cromwell Lane: as Option 1.

Phase 3 – Cromwell Lane to A45: from Cromwell Lane Junction, the road bends and changes direction to head northwards. The road crosses the railway line and Duggins Lane at approximately 420 metres of Cromwell Lane, running then on a northerly direction for approximately 3 km and travelling adjacent to the west of the residential development. From the crossing with Broad Lane, the road bends towards the northeast, it intersects with Pickford Green Lane and ends on the A45 some 350 metres to the west of Windmill Industrial Estates.

The advantage of this route is that it hugs the Coventry City boundary and could help with the provision of proposed hosung in the northwest of the city, south of the A45.

OPTION 1B

Phase 1 – A46/C32 Stoneleigh Junction: as Option 1.

Phase 2, Element 1– A46/C32 Junction to Kenilworth Road (A429): as Option 1.

Phase 2, Element 2 – Kenilworth Road (A429) Junction to a central junction located south of Westwood Heath Road: as Option 1.

Phase 2, Element 3 – Central junction to Cromwell Lane: as Option 1.

Phase 3 – Cromwell Lane to A45: from Cromwell Lane Junction, the road bends and changes direction to head northwards. The road crosses the railway line and Duggins Lane at approximately 800 m north of Cromwell Lane, running then on a north direction for approximately 3 km. It crosses Tanners' Lane and runs between Glebe Farm and the sub- station, crossing the Scout Campsite and intersecting with Broad Lane. From the crossing with Broad Lane, the road bends slightly to the northwest, intersecting Birmingham Road/Meriden Hill between Showell Lane and Church Lane. It then continues north to finally meet the A45 between Showell Lane overbridge and Eaves Green Lane underpass i.e. a terminus location as per Option 1 but with a more westerly alignment.

The advantage of this route over Option 1 is the distance between the proposed road and the edge of the urban fringe, offering significant mitigation opportunities.

4.5 OPTION 2

DESCRIPTION

Phase 1 – A46/C32 Stoneleigh Junction: as Option 1

Phase 2, Element 1 – A46/C32 Junction to Kenilworth Road (A429): as Option 1.

Phase 2, Element 2 – Kenilworth Road (A429) Junction to a central junction located south of Westwood Heath Road: the route adopts a northwest direction crossing the tributary of Finham Brook between Oak Tree Cottage and Cryfield Grange Farm. It continues leaving Whitfield Coppice and UoW on the right to reach the area of the central junction.

The proposed central junction arrangement for this option is two roundabouts situated approximately 450 metres apart on the A46 Link Road mainline. The first roundabout is located between UoW and Hurst Farm, 250 metres to the west of Whitfield Coppice, and it provides entrance to the University campus. The second junction can be found to the northwest of the first one, providing access to Westwood Heath Road at a point between Featherbed Lane and Bockendon Road.

Phase 2, Element 3 – Central junction to Cromwell Lane: as Option 1.

Phase 3 – Cromwell Lane to A452: from the Cromwell Lane junction, the route continues on a westerly direction crossing Hodgetts Lane and the dismantled railway line, where HS2 is planned to run, at the location of the current crossing of the NMU route at Waste Lane. From this point, the route runs parallel to and west of the dismantled line, reaching Station Road / Hallmeadow Road roundabout from the southeast. The section of Hallmeadow Road between the mentioned roundabout and the A452 will be upgraded on line to a dual carriageway.

ADVANTAGES

This option has been assessed and the following advantages have been found:

- → This option is similar to Option 1 in terms of improving access/connection with the UoW to the east and Westwood Business Park to the north;

- similarly to Option 1, the proposed access into UoW would allow further opportunity to enhance the area; however, Whitfield Coppice Wood falls directly to the south and opportunity to develop is likely to be restricted;
- allows a relatively short, direct connection with Westwood Heath Road and UoW compared with a route that closely follows the HS2 boundary;
- the proposed alignment provides a straightforward route from the A46 to Balsall Common and the A452. In comparison with Option 1, this route results in a reduced number of intersections with existing roads/routes;
- the cost to provide a connection with the A452 is likely to be considerable less than connecting the proposed alignment with the A45 as indicated in Option 1 due to length alone; and
- existing sections of highway are utilised in the option although these will require upgrading. This option will have a reduced footprint, minimising land take requirements and environmental impact compared to other options at this time due to length. Although there will be disruption to residents and through traffic in the near locality, this can be minimised with appropriate Traffic Management and phasing of the works.

DISADVANTAGES

The following disadvantages have been identified:

- Elements of the route will impact on a number of watercourses within the vicinity of the proposed route;
- this centralized route is in close proximity to ancient woodland and is further restricted by the BPA Oil pipe lines; therefore, care will need to be taken to reduce the overall footprint and environmental impact in the locality and also avoid costly diversionary works;
- the acquisition of a number of properties, including parts of the Peeping Tom public house, will be required where the proposed route intersects with Cromwell Lane;
- the existing northwest section of the route will require upgrading; this will likely require Statutory Undertakers Diversionary Works to be progressed as well as it will cause disruption to nearby residents for the duration of the work; and
- this section of the work is likely to be more costly and time consuming than taking the route through greenfield; however, there will be a significant reduction of the environmental impact on the overall site.

OPTION VARIATIONS

Two No. variations are proposed alongside with this main option, namely Option 2A and Option 2B. Option 2A retains the layout of the alignment from the start to the junction with Cromwell Lane, but it joins the A452 on a different point. Option 2B proposes the same layout and termination point; however, it suggests one roundabout as central area junction instead of two. Further details are provided below:

OPTION 2A

Phase 1 – A46/C32 Stoneleigh Junction: as Option 1

Phase 2,Eelement 1 – A46/C32 Junction to Kenilworth Road (A429): as Option 1.

Phase 2, Element 2 – Kenilworth Road (A429) Junction to a central junction located south of Westwood Heath Road: as Option 2.

Phase 2, Element 3 – Central junction to Cromwell Lane: as Option 1.

Phase 3 – Cromwell Lane to A452: from Cromwell Lane junction, the route continues on a southerly direction, crossing Hodgett's Lane and HS2 alignment at a location approximately 500 metres west of Cromwell Lane. The route continues towards the southwest, crossing Hob Lane between Moat Farm and Hob Farm, ending at the A452/A4177 existing roundabout. This junction will require upgrading works to accommodate the amended layout.

The advantage of this option is a shorter length of construction but it would have the disadvantage of attracting more traffic to the A452 through Balsall Common without providing any incraese in capacity.

OPTION 2B

Phase 1 – A46/C32 Stoneleigh Junction: as Option 1

Phase 2, Element 1 – A46/C32 Junction to Kenilworth Road (A429): as Option 1.

Phase 2, Element 2 – Kenilworth Road (A429) Junction to a central junction located south of Westwood Heath Road: as Option 1.

Phase 2, Element 3 – Central junction to Cromwell Lane: as Option 1.

Phase 3 – Cromwell Lane to A452: as Option 2A.

The advantage of this option would be less junction delays in the central area but issues with Balsall Coomon traffic would remain as per Option 2A above.

4.6 OPTION 3

DESCRIPTION

Phase 1 – A46/C32 Stoneleigh Junction: as Option 1.

Phase 2, Element 1 – A46/C32 Junction to Kenilworth Road (A429): as Option 1.

Phase 2, Element 2 – Kenilworth Road (A429) Junction to a central junction located south of Westwood Heath Road: from the junction with A429, the route follows an east-west direction, adhering to the north edge of the HS2 as much as practically possible. It crosses Finham Brook's tributary to the south of Oak Tree Cottage, continues towards the west and crosses Cryfield Grange Lane and Crackley Lane through Roughknowles Wood. A variation is proposed where the route travels north of the woodland to avoid its disruption. A roundabout with two arms is proposed at this location; the first arm approaches from the east, whereas the second one provides a change of direction and exits the junction towards the north. Approximately 700 metres to the north of the first roundabout and to the southwest of UoW, we find a three arm roundabout. Two of the arms are part of the Link Road and a third one that provides access into UoW between Whitfield Coppice and the accommodation premises. The route changes direction again, heading west and leading to a third roundabout located 500 metres to the northwest of the second one. It consists of three arms; two of them are part of the main road, the third one serves as linkage between the new road and Westwood Heath Road, intersecting with this road at a point between Bockendon Road and Featherbed Lane.

Phase 2, Element 3 – Central junction to Cromwell Lane: as Option 1.

Phase 3 – Cromwell Lane to A45: as Option 1.

ADVANTAGES

This option has been assessed and the following advantages have been found:

- In the initial part of Phase 2, the alignment follows the proposed HS2 boundary relatively close; therefore, undeveloped land situated to the north remains open for future development;
- no properties have been identified as been affected between the A429 and immediately prior to Cromwell Lane as part of the Phase 2 works;
- connection from the A46 with the A45 will be improved giving opportunity to reduce traffic flow along the A45 to the east from Eaves Green to Festival Island;
- similarly to Option 1, this proposed alignment generally hugs the Hockley residential estate boundary, allowing a more sympathetic land take requirement at this location;
- an alternative route from the A45 to Westwood Business Park, UoW and Stoneleigh Park is also provided;
- the proposed connection point is reasonable central with the A45 Stonebridge and A45 Allesley Junction; and
- the route directly crosses the BPA pipe line at four locations and sufficient clearance is generally obtained; therefore diversionary works are not expected.

DISADVANTAGES

The following disadvantages have been identified:

- the overall footprint of the scheme is considerably greater than other proposed routes, increasing the environmental impact, land take requirements and overall cost of the scheme;
- a section of woodland is affected; however, there is opportunity to adjust/shift the alignment to the north to minimize the impact;
- connection to the South of the UoW is less favourable, as the main alignment is further to the south and a longer section of road will be required to connect;
- the route from the A46 to the A45 is not as direct as other proposed routes and the close spacing of the junctions suggested for the Phase 2 are likely to impact the efficiency of the route;
- the acquisition of a number of properties, including parts of the Peeping Tom (Public House) will be required where the proposed route intersects with Cromwell Lane as part of the Phase 3 works;
- a number of junctions will be required along the proposed Phase 3 route, which is likely to impact on through capacity, speed and journey time of vehicles;
- the overall footprint of the Phase 3 route runs parallel and in close proximity to a number of properties and this may impact on residents, e.g. noise from construction and from vehicles when the route is in operation. It is possible to mitigate this with appropriate phasing of the works;
- the alignment in the central area is not optimised for the desire line; and

- the route is considerably lengthy and the costs to construct will be significantly higher compared to other possible connections with the existing road network.

4.7 OPTION 4

DESCRIPTION

Phase 1 – A46/C32 Stoneleigh Junction: as Option 1.

Phase 2, Element 1– A46/C32 Junction to Kenilworth Road (A429): as Option 1.

Phase 2,Eelement 2 – Kenilworth Road (A429) Junction to a central junction located south of Westwood Heath Road: from the junction with Kenilworth Road (A429), the route follows an east-west direction, adhering to the north edge of the HS2 as much as practically possible. It crosses Finham Brook's tributary to the south of Oak Tree Cottage, continues towards the west and crosses Cryfield Grange Lane and Crackley Lane through Roughknowles Wood. A variation is proposed where the route travels north of the woodland to avoid its disruption. A first roundabout is located to the west of Roughknowles Wood, serving as central junction, and providing connection with a second roundabout located 700 metres to the north. The northern junction distributes the traffic heading towards the UoW and Westwood Heath Road through two arms travelling east and north respectively.

Phase 2, Element 3 – Central junction to Cromwell Lane: after the central roundabout, the link road continues towards the west adhering to the HS2 north edge. It crosses Broadwells Wood on its narrower section, runs to the south of Bockendon Grange Farm and finally intersects with Cromwell Lane via a roundabout at the location known as The Green Tunnel. This point is the proposed location for the crossing between HS2 and Cromwell Lane, requiring particular attention. The intention would be to utilise the Green Tunnel as the means of crossing the proposed HS2, although additional impact in inevitable on the Burton Green community.

Phase 3 – Cromwell Lane to A452: following from the Green Tunnel, the road adopts an east-west direction, running parallel to the HS2 line and joining Hallmeadow Road/Station Road roundabout from the southeast. The section of Hallmeadow Road between the mentioned roundabout and the A452 will be upgraded to a dual carriageway. The northern most sction of this part of Phase 3 would be similar to Option 2.

ADVANTAGES

This option has been assessed and the following advantages have been found:

- A direct connection is provided between the A46 and Balsall Common resulting in a reduced land take requirement, intrusion and environmental impact compared to other schemes assessed;
- the route runs parallel/ adjacent to HS2, maximizing available land to the north for future development. Similarly to Option 3, opportunity exists to improve the main alignment by shifting a section of Phase 2 to the north where it crosses with Roughknowles Woods and impacts on Hurst Farm;
- major crossing proposed within Cromwell Lane where HS2 are likely to acquire properties as part of their works; therefore, this has the potential to greatly reduce the number of properties affected within the locality, e.g. acquiring further properties to the north to incorporate a junction or over/under pass. This option has the potential to allow a cost saving and also reduce the overall impact on the village as proposed works will be concentrated in one area. Careful planning and phasing of the works with HS2 operations will be essential for the benefits of this proposal to take effect;

- this section of the route is reasonably direct and from Cromwell lane to Balsall Common it is possible to provide an uninterrupted section of road; however, currently this route will affect a number of properties within the near vicinity and require the acquisition of land; and
- sufficient clearances are achieved to the BPA oil pipe line; therefore, diversionary works are not anticipated for this apparatus.

DISADVANTAGES

The following disadvantages have been identified:

- Alignment in close proximity to Hurst Farm, which is a listed building. Clearance will need to be assessed further to minimize impact;
- not much flexibility for the University access entrance from the east of Whitefield Coppice. It would require a lengthier route to connect with the local road network via Westwood Heath Road;
- HS2 crossing at green tunnel would means a dependency on their programme;
- crossing of Crackley Lane at three points in short proximity. To mitigate this, the alignment should be shifted to the north to reduce the impact and allow a tie in at the proposed roundabout and as indicated as a dashed line;
- the option is laikley to attract strong opposition from the Burton Green community which has aleday been mobilised to object to the HS2 proposals in the area; and
- Broadwells Woods is crossed at its narrowest section to avoid swinging the alignment out to the north, effecting additional properties and running along the location of the oil pipe.

A pinch point exists on the approach and at the proposed Cromwell Lane junction between Cromwell Wood and the proposed HS2 boundary. Further liaison will be required with the HS2 to reduce the impact on the wood and manage the interface between the schemes. Whilst there is opportunity to reduce costs at this location, this must be carefully managed.

OPTION VARIATIONS

One No. variation that keeps the same alignment from Phase 1 to the crossing with Cromwell Lane is proposed. The difference in found in the point where the route meets A452.

Phase 1 – A46/C32 Stoneleigh Junction: as Option 1.

Phase 2, Element 1 – A46/C32 Junction to Kenilworth Road (A429): as Option 1.

Phase 2, Element 2 – Kenilworth Road (A429) Junction to a central junction located south of Westwood Heath Road: as Option 4.

Phase 2, Element 3 – Central junction to Cromwell Lane: as Option 4.

Phase 3 – Cromwell Lane to A452: from the junction with Cromwell Lane, the route heads southeast, reaching the A452 at its junction with A4177. The road crosses Hob Lane to the right of Hob Farm and arrives at the A452/A4177 roundabout from the east. The existing junction would require modifications to accommodate the new dual carriageway.

The advantage of this variation is a reduce length and hence cost but it does not mitigate the Burton Green impact or those likely to occur in Balsall Common owing to attracted traffic.

4.8 OPTION 5

DESCRIPTION

Phase 1 – A46/C32 Stoneleigh Junction: as Option 1.

Phase 2, Element 1 – A46/C32 Junction to Kenilworth Road (A429): as Option 1.

Phase 2, Element 2 – Kenilworth Road (A429) Junction to a central junction located south of Westwood Heath Road: as Option 3.

Phase 2, Element 3 – Central junction to Cromwell Lane: as Option 1.

Phase 3 – Cromwell Lane to A452: as Option 2A.

ADVANTAGES

This option has been assessed and the following advantages have been found:

- In the initial parts of Phase 2, the alignment follows the proposed HS2 boundary relatively close; this leaves large open spaces of land to the north free for future development;
- no properties have been identified as been affected between the A429 and prior to Cromwell Lane; and
- an alternative route from the A45 to Westwood Business Park, UoW and Stoneleigh Park is also provided.

DISADVANTAGES

The following disadvantages have been identified:

- The route directly crosses the BPA pipe line at four locations;
- the overall footprint of the scheme is considerably greater than other proposed routes, increasing the environmental impact land take requirements and overall cost of the scheme;
- a section of woodland within Roughknowles Wood is affected; however, there is opportunity to adjust/shift the alignment to the north to minimize the impact;
- connection to the south of the UoW is less favourable, as the main alignment is further to the south and a longer section of road will be required;
- the route from the A46 to the A45 is not as direct as other routes proposed and the close spacing of the junctions are likely to impact the efficiency of the route;
- the overall footprint of the route runs parallel and in close proximity to a number of properties and this may impact on residents e.g. noise from construction and from vehicles when the route is in operation. It is possible to mitigate this with appropriate phasing of the works and barriers; and
- this option for Pgase 2 and 3 is lengthy and the costs to construct will be significantly higher compared to other possible connections with the existing road network.

4.9 OPTION 6

DESCRIPTION

Phase 2, Element 1 – A46/C32 Junction to Kenilworth Road (A429): as Option 1.

Phase 2, Element 2 – Kenilworth Road (A429) Junction to a central junction located south of Westwood Heath Road: from the A429, the alignment continues on a northwest direction in parallel to the HS2; however, it is not kept as adjacent to the edge of HS2 as Option 4, resulting in a less bendy alignment. The road crosses Finham Brook's tributary to the south of Oak Tree Cottage, intersects Cryfield Grange Road to finally end at a roundabout located to the northwest of Roughknowles Wood. This roundabout serves as central junction and provides connection between the Link Road and a second roundabout located 400 metres to the north. This second junction distributes the traffic heading towards the UoW and Westwood Heath Road through two arms travelling east and north respectively.

Phase 2 Element 3 – Central junction to Cromwell Lane: this would not be required under this option.

Phase 3 – Central junction to A452: after the central roundabout described in Element 2 above, the route follows a southwest direction, through Broadwell Wood. It then continues on the same direction to cross under the HS2 line, the greenway and Red Lane immediately after, via

- a proposed pipe jacked structure for the first and last structures; and
- a standard underbridge built on line fr the right of way which would be diverted locally during construction

The alignment then follows a right hand bend to finally converge with the A452/A4177 roundabout, entering the junction from the east. As with other options which connect o this A452/A4177 junction, the existing layout would need to be modified.

ADVANTAGES

This option has been assessed and the following advantages have been found:

- → The greenfield area south of Westwood Heath has a reduced impact compared to other schemes that cross Cromwell Lane. The proposed new connection to Westwood Heath Road and the UoW will give opportunity to develop this area of land further, in line with Crest Nicholson, CEG and UoW desires;
- → reduced number of intersections with the oil pipe line compared to other options assessed;
- → low number of crossings with existing roads; and
- → this overall footprint is considerably smaller than other assessed options; therefore, this proposed highway alignment is likely to have the lowest impact on the locality and lower costs to construct and maintain.

DISADVANTAGES

The following disadvantages have been identified:

- → To minimise the impact on woodland and properties, the proposed new highway alignment will cross the HS2 at skew;

- the topography on the south side of the proposed HS2 boundary falls to the south and it is likely that this will increase the volume of earthworks required on the approaches to the proposed new crossing unless longitudinal gradients are increased;
- the acquisition of a number of residential properties along Red Lane may be required although this is mitigated by the jacked structure solution priced;
- the option will impact Broadwells Wood area; however, this allows the length of the overall alignment to be reduced;
- pipe jacking under a potentially live HS2 may be problematic but this matter is addressed further in the section below and it attracts a cost premium as a result; and
- this option is likely to increase volumes of traffic along Kenilworth Road (A452) and through Balsall Common without providing any capacity improvements.

OPTION VARIATION

A variation of this alignment for this alignment is proposed which consist in retaining the main layout for Phases 1 and 2 but prolonging the route towards a second intersection point with A452.

Phase 1 – A46/C32 Stoneleigh Junction: as Option 1.

Phase 2, Element 1 – A46/C32 Junction to Kenilworth Road (A429): as Option 1.

Phase 2, Element 2 – Kenilworth Road (A429) Junction to a central junction located south of Westwood Heath Road: as Option 6.

Phase 3 – Central junction to A452: after the central roundabout, the route follows a southwest direction, trough Broadwell Wood. It then continues on the same direction to cross the HS2 line and Red Lane immediately after, via a proposed new tunnel running under both. The alignment will adopt right hand bend arriving to a proposed roundabout located 450m northeast of the A452/A4177 junction. A local link road will provide connection between the A46 Link Road and the A452/A4177 junction. From this intermediate roundabout, the route will continue bending towards the north intersecting Hob Lane and Waste Lane. On the last section of the route, the road will follow parallel to the HS2 line to finally meet Hallmeadow Road/Station Road roundabout. The section of route along Hallmeadow Road until it reaches the A452 will be upgraded to a dual carriageway road.

The advantage of this option over Option 6 is that it provides a bypass of Balsall Common which addresses the issue of capacity to deal with the attracted traffic from the A45 further to the north.

4.10 HS2 INTERFACES

At this time, the route of those options which are positioned in the western side of the Phase 2 study area are deliberately located away from the HS2 footprint. This is on the basis that if the route were to be contained within those areas, HS2 would be unable to provide the agreed mitigation for their infrastructure and so could be deemed to be in breach of the Hybrid Bill under whose powers the rail scheme would be constructed. For those options which do specifically interface with HS2 and its planned mitigation, every effort would have to be made to ensure that mitigation can be re-established/be bettered as part of the highway scheme to retain the status quo. It is noted that this may include graded earthworks, planting, non-motorised diversion provisions and environmental fencing. It is further noted that depending on relative timings of the rail and road infrastructure programmes, opportunities will exit for common use of haul road footprints.

Research carried out by WSP|PB indicates the existence of a document entitled “Network Rail (High Speed) Outside Parties Development Handbook – Construction work on or near the High Speed 1 Railway” date December 2015, whose purpose is to “provides guidance to developers carrying out work on, under, over or adjacent to High Speed 1.” It is available at http://www.networkrail.co.uk/network-interface-high-speed-1/ . Accordingly, we are minded that the same situation will be possible under HS2, as in the case of Option 6A.

The replacement village hall provision in Burton Green (on a plot off Red Lane close to its junction with Hob Lane/Cromwell Lane as per Addition Provision No. 4) is not affected by the options presented here.

4.11 CONCLUSIONS FROM THE ABOVE ASSESSMENT

A number of feasible corridors have been identified, each of them with its advantages and disadvantages. The selection of the preferred alignments will however require the input from other elements of the study. These elements, such as traffic analysis, stakeholder preferences, costs, etc. will be elaborated in further chapters of this report. Therefore, the reflections around the selection of the preferred option/options will be included in Chapter 11.

5 TRAFFIC ASSESSMENT OF OPTIONS

5.1 INTRODUCTION

This section of the report outlines the A46 link road traffic modelling work that has been undertaken using the Coventry Area Strategic Model (CASM) Highway Assignment Model (HAM). The CASM HAM is a strategic transport model developed in the PTV software VISUM. It was developed in partnership between Coventry City Council (CCC) and Highways England as a tool to assess both highway and land use proposals within the Coventry area. Documentation on the development and performance of the CASM model is available at request and is currently being finalised following review by Highways England and their consultants.

A range of forecast years were developed in line with guidance from the DfT and for the assessment of the A46 Link Road options described above it was agreed that the use of the 2034 CASM HAM in both the AM peak (8:00-9:00) and PM peak (17:00-18:00) time periods.

This chapter will outline the methodology which has been adopted to undertake this work, summarises the key assumptions and provides an overview of the performance of the options regarding travel times, reduction in traffic on existing roads and volumes of traffic attracted to the new option proposal.

5.2 METHODOLOGY AND ASSUMPTIONS

The 2034 CASM HAM was used to assess the following A46 options in both the AM and PM peak time periods:

- Do Minimum: Without any A46 link road options;
- Option 1 both Single carriageway and Dual carriageway option;
- Option 2: Dual carriageway;
- Option 3: Dual carriageway;
- Option 4: Dual carriageway;
- Option 5: Dual carriageway;
- Option 6: Dual carriageway; and
- Option 6A: Dual carriageway

In all options the speed limit on the new link road was assumed to be 60mph. All proposed junctions along the route were represented as roundabouts without any signalised control. The performance of these roundabouts, specifically the new Stoneleigh junction, Dalehouse Lane and Kenilworth Road roundabouts will be assessed within individual junction models to ensure they operate effectively with the traffic flows from the CASM HAM. This work is not reported upon here.

The developments which have been included in the 2034 CASM HAM are in line with guidance from the DfT, with their status having to be More Than Likely or Near Certain as defined below:

- Near Certain: The outcome will happen or there is a high probability that it will happen.
- More Than Likely: The outcome is likely to happen but there is some uncertainty

This means that there are some future developments that are not included within the 2034 CASM HAM including the following:

- University of Warwick Masterplan from 2018 onwards;
- HS2;
- UK Central;
- Kings Hill development;
- Eastern Green development;
- Crest Homes proposal located between Cromwell Lane/ Westwood Heath Road;
- Commercial Estates Group proposal located between the Crest Homes proposal and the University of Warwick land boundary; and
- Burrow Hill Nursery at Burton Green.

All proposed access links from the new road to the existing highway network were incorporated and, apart from the access to the University of Warwick, all were accessible for all vehicles. The University of Warwick encompasses several CASM zones, however, the new road connection with the University of Warwick would only be used by vehicles to or from the zone shown in Figure 5.1 As the design process evolves assumptions around this access point can be refined in line with the latest strategies.

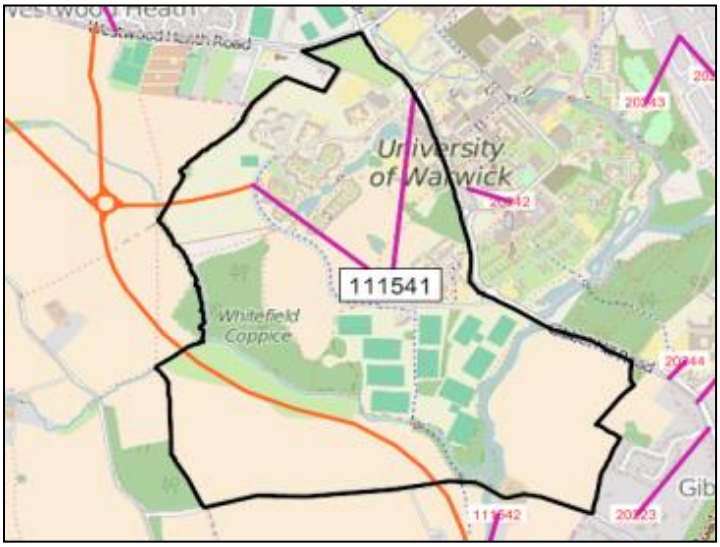

Figure 5.1: University of Warwick Connection onto New Link Road

5.3 OPTION PERFORMANCE

Appendix R provides detailed analysis of the performance of each option and specific information in relation to:

- Journey times of new route and existing alternative route;
- The Volume/ Capacity of the new link road;
- Network Statistics from the local area; and
- Changes in flows on existing roads.

Table 5.1 and Table 5.2 provides a summary of the performance of each option during the AM and PM peak comparing performance against the Do Minimum:

- Average Network Speed changes;
- Travel Distance changes;
- Changes in traffic flow; and
- Traffic flow on new link road.

It should be noted that in all options, there are increases in flow on the A46 around Stoneleigh junction; this is to be expected, as the Link Road is designed to attract traffic to the area.

With the current access assumptions at the University of Warwick, Gibbet Hill Road is highly trafficked; however, as the access strategies to University of Warwick are refined, this could have an impact on traffic flows on Gibbet Hill. With new means of access made available to the UoW, it would be envisaged that Gibbet Hill Road would be downgraded and traffic calmed, making it much less attractive to the travelling public that the high quality Link Road alternative.

The tables show the following:

- **Option 1:** Single Carriageway
  - Improvements in average speed and distance travelled
  - One of the lowest traffic flows on the new link road in AM peak
  - Reduction in traffic on A45 and A452
- **Option 1:** Dual Carriageway
  - Greatest improvement in average network speeds in both AM and PM peak
  - Highest two way traffic flow on new link road.
  - Greatest reduction in traffic flow on A45 near Pickford Green during AM and PM peak
- **Option 2**
  - General improvements in average speed and distance travelled
  - Traffic flow reduction on A45
  - Highest traffic flow increases on A453 between Sixteen Acre Wood & Hampton Lane during PM peak
- **Option 3**
  - Second highest increases in network speed and distance travelled
  - Traffic flow reductions on A45 and A452
- **Option 4**
  - Network speed increases and travel distance increases similar to Option 2
  - Highest traffic flow increases on A453 between Sixteen Acre Wood & Hampton Lane during AM peak
  - Second highest traffic flow on new link road

Table 5.1: AM Peak Performance Compared to Do Minimum

	Option 1 Single	Option 1 Dual	Option 2	Option 3	Option 4	Option 5	Option 6	Option 6A
Increase in Average Network Speed	4.2	6.2	5.4	5.7	5.4	3.3	3.8	5.1
Total Network Travel Distance Increase	15,400	20,759	16,759	19,106	17,626	9,268	8,675	17,199
Change in two way Traffic on A45 near Pickford Green	-374	-439	-418	-385	-417	-92	-76	-346
Change in two way Traffic on A452 between Sixteen Acre Wood & Hampton Lane B4102	-131	-214	1044	-195	1051	14	-94	952
Two Way Peak Flow on Link Road	2,974	3,658	3,431	3,145	3,500	3,525	2,542	3,088

Table 5.2: PM Peak Performance Compared to Do Minimum

	Option 1 Single	Option 1 Dual	Option 2	Option 3	Option 4	Option 5	Option 6	Option 6A
Increase in Average Network Speed	3.6	4.9	3.7	4.5	4.2	2.8	2.7	4.0
Total Network Travel Distance Increase	15,707	21,608	16,099	19,684	19,562	8,508	7,241	16,981
Change in two way Traffic on A45 near Pickford Green	-421	-589	-464	-488	-494	-122	-143	-348
Change in two way Traffic on A452 between Sixteen Acre Wood & Hampton Lane B4102	-29	-95	742	-95	725	3	-4	665
Two Way Peak Flow on Link Road	3,076	3,861	3,473	3,249	3,694	2,408	2,733	3,212

- **Option 5**
  - Lowest increase in network speed during the AM peak, second lowest during the AM peak.
  - Low increase in network travel distance
  - Low traffic flow reductions on A45 near Pickford Green
  - Lowest traffic flow on new link road during AM peak.
- **Option 6**
  - Lowest increase in network speed during the PM peak, second lowest during the AM peak.
  - Lowest increase in network travel distance
  - Low traffic flow reductions on A45 near Pickford Green.
  - Lowest traffic flow on new link road during AM peak.
- **Option 6A**
  - Increases in network speed and travel distance similar to Option 1 dual, 2,3 and 4
  - Third highest traffic flow increases on A452 between Sixteen Acre Wood & Hampton Lane

A simplistic ranking of the options based on the traffic metrics in Table 5.1 and Table 5.2 has been undertaken ranking each element from 1 to 8, with 1 given to the best option and 8 the worst. This results rank the options in regards to traffic performance as follows:

1. Option 1 Dual;
2. Option 3;
3. Option 4;
4. Option 2;
5. Option 6A;
6. Option 1 Single;
7. Option 5; and
8. Option 6.

This provides a guide to the performance of the options relating to each other but as outlined in this report there are other elements which need to be taken into consideration.

6 STAKEHOLDER INTERFACE TO DATE

6.1 INTRODUCTION

Due to the early stage of the A46 Link Road Phase 2 (and 3) in its project life cycle, there was a limited opportunity for WSP|PB to liaise with stakeholders directly. It was agreed with CCC/WCC that meetings would be arranged giving priority to the main affected parties within the immediate study area. Often these meetings were preceded by a meeting between the landowners and CCC/WCC without WSP|PB being present. All meetings were agreed to be commercially confidential and all notes were recorded as Draft Final after inputs were received from the attendees.

6.2 DETAILS OF MEETING

WSP|PB attended the following meetings with stakeholders in the presence of CCC/WCC:

- University of Warwick;
- Commercial Estates Group (CEG);
- Crest Nicholson;
- Warwick Design Services – two occasions, the first held on 14th March 2016 being quite informal and not officially minuted; and
- Arup as primary designers for the King's Hill development, one overlapping with the University of Warwick meeting and a second relating only to the housing development.

Agreed formal notes of these meetings are contained in Appendix S of this document, presented in the order indicated above. Arup has not supplied formal notes of the meeting regarding King's Hill which took place on 7th June 2016 but key points circulated by WSP|PB are included in Appendix S by way of record.

6.3 KEY POINTS

The affected landowners welcomed the concept of the A46 Link Road in principle but obviously have their own vested interest to protect as commercial entities. For example,

- Crest Nicholson understandably would prefer not to have a strategic dual carriageway bisecting their housing development;
- the University of Warwick would appreciate it if their request for two entrances to the campus from the west, one off the primary road and the other of the local road network; and
- King's Hill asked that a direct access off the proposed Phase 1 Stoneleigh junction be considered for their secondary entrance to the development at the western end.

At the CEG meeting, it was recorded that Warwick District Council was keen to create a Local Area Plan for the development which is being proposed from the general Cromwell Lane/Westwood Heath Road, through the study area and eastwards through King's Hill in the greater Whitley area. This would ensure consistency of approach in association with CCC e.g. number of car parking spaces per residence, minimum cross sections widths, etc. The concept is viewed as an appropriate way forward.

Again at the CEG meeting, the issue of achieving a change in the planning status of their land through the on-going review of the Warwick District Local Plan, from "safe guarded" to "allocated" was discussed. They advised that such a change would enable their commercial position in relation to being able to help fund the Phase 2 works to be clarified and hopefully advanced. It

was further noted that they were seeking this change through representation in addition to and not as opposed to the neighbouring Crest Nicholson development site.

Discussions after the King's Hill meetings indicated the obvious interface with the proposed King's Hill development in relation to the previously reported A46 Link Road Phase 1 (Stoneleigh) and the southern portion of Phase 2. At this time, WSP|PB proposals are that the secondary means of access for that development would be off the roundabout associated with the realignment of Dalehouse Lane and Stoneleigh Road. The suggestion of a fifth arm onto the A46 Stoneleigh Junction is not considered appropriate as it would result in the dedicated slip road from the University of Warwick direction to the A46 northbound having to be removed from the junction provision with associated reduction in performance.

The King's Hill alternative suggestion of retaining the local road roundabout associated with the stand alone A46 Stoneleigh Road junction and providing an access/egress to King's Hill at that point on the network is similarly not entertained at this time. It would result in an additional junction on the proposed Link Road which would increase journey time delays for the strategic traffic.

7 LAND ACQUISITION INFORMATION

7.1 INTRODUCTION

Due to the large study area involved with the Phase 2 study area, WSP|PB has not carried out a formal Land Registry search to date. However, significant data has been acquired in regard to ownership and interests and this is discussed in detail below. The information gleaned and discussed below is presented graphically in a drawing contained with Appendix T but must be regarded as provision until proven by Land Registry title deeds. It is noted that land ownership associated with Phase 3 has not been advanced at this stage.

7.2 SOUTHERN PORTION OF THE STUDY AREA

Information about the interface with the proposed Phase 1 works at the A46/C32 Stoneleigh Road junction is as informed in the Technical Report for that scheme with the exception of an understood change of ownership of the Mars Pension estate to Stoneleigh Park. No other changes in details are understood to have occurred. Interfacing with Arup regarding King's Hill proposals to the east of Stoneleigh Road confirms previously held information. They have land interests to the west of the road also and south of the Coventry to Kenilworth railway line. It is noted that there are potential plans for a park and ride station on this line, close to the planned intersection of the A46 Link Road and the A429 Kenilworth Road. A review of the Land Registry website suggests that there is a number of registered plots, including one large one (bisected by the railway line) in this area north and west of the gardening centre/allotments.

The residential properties which are present along the portion of Stoneleigh Road to its junction with Kenilworth Road and those on Kenilworth Road itself are in multiple ownership.

As you would expect, within this portion of the study area, there is adopted highway. This means that the public has a right to use the land for that purpose but the ground underneath it is likely to belong to the adjacent (riparian) landowner. Full details of the extent of adopted highway, provided by CCC and WCC to date, are contained with Appendix U also, covering all the study area and not divided into sections as per the text here.

7.3 MIDDLE PORTION OF THE STUDY AREA

The middle part of the study area is dominated by the start of the CEG and University of Warwick land interests. Whilst the former does not own the land at this time, they have the option on the land (which is in the Steel family) and a number of smaller adjacent plots. Their land interests extents to Westwood Heath Road. A number of smaller plots exist to the west of their land interest, running up to and being impacted upon by HS2. The University of Warwick is a large land owner in the area, occupying land which was bequeathed to then by Coventry City and Warwickshire County Council when they were founded. It is recorded here that a number of small plots contained within the boundary shown as being their interest do not belong to them e.g. a number of the residential houses on the south side of Kirby Corner Road but these are omitted from the drawing for clarity at the scale required.

7.4 NORTHERN PORTION OF THE STUDY AREA

The northern portion of the study area is dominated by CEG, the University of Warwick and the proposed Crest Nicholson development. Similar to CEG, they do not own the land but have the development option on it through the single party owner. Elsewhere, the properties on Cromwell Lane and Westwood Heath Road, adjacent to Cromwell Lane and towards Kirby Corner roundabout, are in multiple ownerships. Other isolated plots are identified on the drawing in Appendix T.

7.5 EASTERN POINT OF STUDY AREA

This section of the study area runs along Kirby Corner Road and then Charter Avenue and Sir Henry Parkes Road to the A45. The area is the subject of investigation work associated with potential improvements to the local road network to address existing issues and the impact of traffic attracted to Phase 2 and 3 area post construction. Landownership will rest with multiple owners owing to the urban nature of the environment with several large plots belonging to the University of Warwick and Coventry City Council (e.g. the Canley fire station and the cemetery). Visual inspection suggests that much of the housing stock is current or ex-Council but this would need to be confirmed.

7.6 SUMMARY

As expected in an urban and edge of urban locations, a significant number of land owners would be impacted upon by the proposals for Phase 2 and associated local road improvements. As an emerging Preferred Route is firmed up, it is recommended that a full Land Registry search is undertaken on the associated corridor within the larger study area.

For the purpose of estimating the cost of land, it is assumed that all land south of Cromwell Lane/Westwood Heath Road is developable and so an appropriate rate per hectare will be utilised. In the case of Phase 3 works, residential property costs will be based on historical data available from the web on recent selling prices.

It is noted that a number of the affected parties would gain finically from the provision of the A46 Link road Phase 2 and accordingly, it may be the case that land acquisition costs could be treated as a developer contribution towards the capital cost of the scheme. This would require a legal agreement between CCC/WCC and each of the developer parties involved, to obtain land by negotiation or for a nominal (say £1) value.

8 COST ESTIMATE

8.1 INTRODUCTION

This chapter and its associated appendix provide information on the cost estimate generated by WSP|PB for the A46 Link Road (Phase 2 &3) scheme.

8.2 APPROACH

Due to the early stage of development of the scheme, WSP|PB has endeavoured to be as realistic as possible with the approach taken for the scheme, breaking it down into components based on the unit costs compiled from a range of projects. Unit costs are generally published as a range of prices dependant on a number of factors. The summary sheet resulting from this approach is shown. The project estimate is based on a Q2, 2016 price base. The estimate is based on the following drawings and briefing information:

- 70018890-WSP-H-A46-M2-HE-SK101 –DS1 & DS2 Option 1 Rev1
- 70018890-WSP-H-A46-M2-HE-SK102 –DR3 & DS4 Option 2 Rev1
- 70018890-WSP-H-A46-M2-HE-SK104 –DS7 & DS8 Option 4 Rev1
- 70018890-WSP-H-A46-M2-HE-SK106 –Option 6A Rev1
- 160615 Costing Brief in relation to A46 Link Road Phase 2 Stage 1 PM

8.3 ASSUMPTIONS AND EXCLUSIONS

A number of assumptions have had to be made in the compilation of the cost such as:

- The scheme is priced as a stand-alone scheme assuming that it is not constructed as a variation order under the HS2 scheme.
- The prices are based on competitively tendered rates.
- The 2 phases of the scheme have been priced independently and assumes each phase is a separate contract and will have its own set up and dismantle charges. This estimate report excludes cost for phase 1 – works to A46 Stoneleigh Junction.
- The scope of work services diversions is unknown at this time and an allowance of 5% of the construction cost has been assumed.
- Prices are current as of Q2 2016.
- In Option 6A the route crosses the potential route for HS2. We have assumed a 23 x 6m box structure will be jacked into place under the live rail line. We have assumed that as the structure is short it will not be defined as a tunnel and will not require all tunnel systems such as ventilation, lighting, smoke extraction, fire alarm, drainage, PA, ERT, over height detection etc.
- An Optimism bias of 44% has been allowed, this recommended by the Green Book as published by the OGC. This can be further reduced based on grounds that the contributory risk factors have been managed. The reduction of the optimism bias should be a team decision.
- Reduced preliminary costs which would result from the contractors constructing HS2 who would be approached to tender has not been allowed for specifically.
- Quantities are based on the route optioneering design as included in this report and will be subject to change as the granularity of the design increases and specific items become apparent.

- Land cost and Compulsory Purchase Orders have been allowed for in this estimate however the prices are only based on web searches in regard to such properties which have been sold on roads or adjacent to the options being considered. We recommend these prices should be verified by land agents who have specialist knowledge of the area.
- Legal and surveying fees associated with land purchase and compensation has been excluded from this estimate.
- No allowance has been made for hazardous materials (e.g. asbestos, V.O.C., knotweed) and this risk should be managed through the optimism bias.
- Costs associated with environmental and ecological constraints have been excluded and should be managed through the optimism bias.
- The following are also excluded at this time - Value Added Tax, inflation costs past Q2 2016, extra over inflation as a result of HS2 and other schemes causing the market to overheat, client's internal Project Management and financial management costs, works associated with HS2, maintenance and demolition costs (of the new carriageway at the end of its useful life) and any works which may be requested by Highways England to be carried out at the same time as the construction to minimise disruption to road users.
- Proposed alterations to the local road network from Kirby Corner / Westwood Heath Road / Gibbet Hill roundabout to A45 are excluded from this report.

8.4 COST ESTIMATE SUMMARY

The table below contains a summary of the split costs for options (Phase 2 & 3) with the associated mainline carriageway lengths; full details of the costs indicated are included in Appendix V.

	Project Cost		Main carriageway route length (km)
Option1 Phase 2	£	57,000,000	5.35
Option1 Phase 3	£	70,000,000	6.35
Option 2 Phase 2	£	56,000,000	5.35
Option 2 Phase 3	£	40,000,000	4.18
Option 4 Phase 2	£	75,000,000	5.21
Option 4 Phase 3	£	37,000,000	4.17
Option 6A Phase 2	£	40,000,000	3.27
Option 6A Phase 3	£	115,000,000	6.98

8.5 SPEND PROFILE

In association with the procurement programme included in the subsequent chapter, the table below indicates a typical spend profile for the scheme going forward to completion of construction and subsequent maintenance period. Below is based on Option 6A Phase 2 budget.

Table 8-1 Anticipated Spend profile for Phase 2

Financial Year	Anticipated Spend, £,000	Activities
2016/2017	£342	Design
2017/2018	£819	Design/Planning Process
2018/2019	£2,954	Design/Planning Process
2019/2020	£4,829	Planning Process/tender
2020/2021	£7,013	Start on site and construction
2021/2022	£10,505	Construction phase 2
2022/2023	£12,284	Construction phase 2
2023/2024	£1,254	Defect Period
Total	£40,000	

The shade cells above would represent elements of the value of works carried out to date and funds requested through the submitted Large Local Major Schemes bid submission to the Department of Transport.

Similarly to table 8-1, the table below indicates a typical spend profile with the spend base on Option 6A Phases 2 and 3 budget.

Table 8-2 Anticipated Spend profile for Phases 2 and 3

Financial Year	Anticipated Spend, £,000	Activities
2016/2017	£342	Design
2017/2018	£819	Design/Planning Process
2018/2019	£2,954	Design/Planning Process
2019/2020	£4,829	Planning Process/tender
2020/2021	£8,267	Start on site and construction
2021/2022	£10,505	Construction phase 2
2022/2023	£12,284	Construction phase 2
2023/2024	£2,852	Defects period/tender process
2024/2025	£45,540	Construction phase 3
2025/2026	£65,354	Construction phase 3
2025/2026	£1,254	Defect Period
Total	£155,000	

9 INDICATIVE PROCUREMENT PROGRAMME

9.1 INTRODUCTION

This Chapter looks at the likely programme associated with the procurement of the A46 Link Road Phase 2. It is based on a number of assumptions which are listed below and would indicate that a likely completion of construction on site could be in mid to late 2023. The programme has been developed in the knowledge that a number of other schemes will be occurring in the study area before, during and after the timescales indicated in the programme contained in Appendix W. These include:

- High Speed 2 construction which is due to be completed in 2026;
- the planned completion of the A46 Link Road Phase 1 at Stoneleigh by 2019; and
- the subsequent completion of Phase 3 with an anticipated earliest completion date of 2026.

Other activities will depend on the housing and economic landscape which will exist over the coming years but would include likely commencement to the Crest Nicholson site, the CEG site and the King's Hill development. Additionally, it can be expected that the implementation of the next University of Warwick Master Plan would be underway from 2018 onwards.

9.2 ASSUMPTIONS

A number of assumptions underlie the programme presented in Appendix W of this Report. These include:

- A46 Link Road Phase 1 (Stoneleigh) is built and operation under a spate contract;
- The route taken for the approval of the scheme and the acquirement of land would be via the Town and County Planning Act;
- A46 Link Road Phase 3 has been advanced to a position that the planning process associate with Phase 2 is not jeopardised by the subsequent scheme;
- HS2 will be constructed in the area of the West Midlands between 2017 and 2026 with the majority completed by late 2022;
- The duration for the works is estimated to be 18 months;
- Anticipated protection and diversion works can be accommodated within the 18 month period i.e. there are no exceptional lead in to outages for the fuel pipe lines, other under or over ground services;
- Network Rail will be supportive of the application necessary for the possessions needed to construct the railway line crossing of the Coventry to Kenilworth Line;
- There would be sufficient interest in the tender that sufficient tenderers price realistically for it and there would be no challenge to the tender award;
- The necessary funding will be in place from the combined CCC/WCC sources, supplemented as agreed with developer contributions; and
- Every effort has (to date) and will (in the future) be made to assimilate phasing and construction activities with HS2 Ltd and local developers to the mutual benefit of all parties in relation to commercial, sustainable, environmental and external stakeholder interfaces.

10 RISKS

10.1 INTRODUCTION

This Chapter looks at a number of risks which may exist in regard to the proposals contained in this report. The information has been recorded and formatted in a WSP|PB internal document called "T440: Risk – Opportunity Tool" and it is contained in Appedix X.

The details outlined within the document include the following:

- Risk identification reference;
- date and individual identifying the risk;
- category and discipline under which it can be enclosed;
- description of the risk;
- overall rating based on probability and impact;
- proposed mitigation measures; and
- risk owner and revision record.

10.2 LIKELY RISKS

The appendix is the current list of key risks (it should not be viewed as exhaustive) which have been identified to date with a ranking based on high, medium or low impact in terms of either cost or programme. The reader's attention is further drawn to risk issues discussed in the geotechnical and environmental appendices of this report (Appendix I and J respectively). The appendix presents the information after sorting so that the major risks are presented in the initial rows. As can be expected at this early stage of the project life cycle, a large number fall into this bracket.

A key risk that impacts on all Options with the exception of Option 1 (and its variants) and Option 3 is the interface with HS2. Accordingly, this potential impact of the HS2 interface is expanded upon below in Table 10.1. Where future Phase 3 alignments would impact on HS2, every effort would be made to minimise the effects on HS2, assuming that it would be (or close to) operation when Phase 3 was being constructed. The possible interfaces would be as follows:

Table 10-1 Options and HS2 interfaces

Phase 3 Option	Location/description of impacts
2	Crosses HS2 at Waste Lane at the proposed intersection of the existing local road and the HS2 alignment. The new bridge installed by HS2 would form part of the proposed roundabout with a second bridge constructed over HS2 close by and could be constructed under live conditions.
2A	Crosses HS2 immediately to the southeast of the high voltage substation. The road would be on a bridge over the railway line at close to right angles and could be constructed under live conditions.
2B	As per 2A above
4	This would cross HS2 on a nominal 45 degree skew using the proposed tunnel construction at Burton Green. On the basis that the tunnel would be designed for equivalent vehicular loading, no specific impact on HS2 operations would be envisaged.
4A	As per 4 above

5	As per 2A above
6	This option would cross HS2 in the vicinity of Woods and would require the road to pass underneath the HS2 provision. Further along, but still local to the crossing point, the dual carriageway would pass beneath the Greenway and Then residential properties/Red Lane. It would be envisaged that the bridge under HS2 would be of limited proportions say 23 metres wide, 12 metres in length and would have a typical internal dimension of 6 metres, located in a cutting of some 9 metres in overall depth. Jacking under live high speed railway lines has been carried out previously in the UK as evidenced by http://www.atkinsglobal.com/~/media/Files/A/Atkins-Global/Attachments/sectors/roads/library-docs/technical-journal-7/111%20-%20The%20design%20and%20construction%20of%20Cliffsend%20Underpass.pdf .
6A	As per 6 above

Similarly a key risk which affects all options is the manner in which the combined Phase 1, 2 and 3 works are viewed in planning sense. It could be the case, albeit unlikely, that the combined schemes could be regarded as a Nationally Significant Infrastructure Project (NSIP) which would require a Development Consent Order approach as opposed to a local planning application.

10.3 FUTURE RISK REGISTER

It is noted that the spreadsheet is a living document and should be updated and edited on a regular basis by the project team as it is a mixture of

- Technical;
- Programme;
- Planning;
- Environmental; and
- Strategic risks.

Depending on the governance required as the project progresses, there may be a need to adopt a specific risk register format e.g. that used by Highways England under their Project Control Framework if they are directly involved in Phase 2 or 3 via funding or procurement.

11 RECOMMENDATIONS

11.1 RECOMMENDATIONS FROM THE STUDY TO DATE

A number of recommendations are listed below some of which are underway at this time:

1. Have discussions with HS2 on the possible implications of the different options, including those for which a preference is evident. A key issue here would be the suggestion of pipe jacking under HS2 for Option 6A;

2. Have discussions with Solihull MBC in relation to those options for phase 3 which would pass through their authority and seek support for the merging preferred options, including the opportunity to get a Balsall Common Bypass into a future Local Plan;

3. Continue to coordinate with developers and Warwick District Council on issues relating to the current review of their Local Plan with the concept of a Local area Plan being developed for the Cromwell Lane to Kenilworth Road to St Martins Road to Whitley South being actively supported;

4. Review the junction strategy further in association with the key demands of affected stakeholder and implement changes to the layout on the preferred route corridors as required to minimise potential objection whilst balancing impacts and potential user delays;

5. Carry out land searches for the area not clearly identified to date so that land owner implications can be better understood;

6. Review the suggestions for improvements from Kirby Corner Roundabout along Kirby Corner Road, through the roundabouts on Sir Henry Parkes Road and the Charter Avenue/A45 junction with CCC as potential adopters of the proposals as Highway Authority;

7. Using Large Local Major Scheme funding requested from the Department for Transport, advance the modelling and economic elements of the study to establish an early Benefit Cost Ratio value to be used as a further impetus to the advancement of the proposals; and.

8. Review the Assessment Matrix contained in Appendix Y which summaries the assessments made of the options and agree with CCC/WCC those that should not be considered further e.g. those that impact excessively on Cromwell Lane and attract traffic to the A452 but do not provide capacity improvements to Balsall Heath area.

12 CONCLUSION

12.1 CONCLUSIONS TO DRAFT REPORT

This section is to be expanded upon after comments from CCC/WCC but at this time we include the following text for consideration:

It is the opinion of WSP|PB that viable technical options exist for the provision of the A46 Link Road Phase 2 and 3 which would connect to the current proposals for junction improvements at the A46 (Trunk Road)/C32 Stoneleigh Road. The initial section of the Phase 2 study area is constrained by horizontal alignment criteria and the proximity to the proposed HS2 works. As the study area widens out to the north, more opportunities exist for different route corridors, mindful of the development proposals in the area, allocated, safe guarded and aspirational. From the general Cromwell Lane area, various route corridors exist for the future Phase 3 – tight to the city boundary, less close to the city boundary, connecting to the A452/A4177 junction passing to the south of the large electricity high voltage sub-station, passing through Burton Green, passing to the south of Burton Green, utilising part or all of the now unprotected Balsall Common Bypass corridor.

A typical cost range for Phase 2 options is from £40 to £75 million and for a combined Phase 2 and 3 options the range is typically £106 to £155 million, at Q2 2016 prices. At this time, no economic appraisal has been conducted but the view is that when reduced journey times and Wider Economic Benefits are monetised, a health Benefit Cost Ratio will result.

The results of environmental and geotechnical activities to date have not shown up constraints of significant importance for the Phase 2 study area.

From confidential discussions to date, there is clear support for Phase 2 and subsequently Phase 3 from affected parties consulted, mindful that they each have their own individual commercial position to defend. A further review of the junction strategy on the emerging preferred options should be able to balance this matter.

With the exception of those Phase 3 routes which pass to the immediate west of the existing urban fringe of Coventry to the north of Cromwell Lane, an interaction with the currently proposed HS2 proposals is inevitable. This is to be subject to a meeting to be arranged in early to mid-August. Similarly, these route corridors would require an interface with Solihull Metropolitan Council, with whom initial officer discussions have occurred.

It is noted that those options which terminate at the existing A452/A4177 junction (Eveson's Fuel) afford a reasonable solution but would result in additional traffic being attracted through Balsall Common where at this time no capacity improvements are included for those options.