

A38 Derby Junctions

TR010022

Volume 6

6.1 Environmental Statement
Chapter 3 – Scheme History and
Assessment of Alternatives

Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed
Forms and Procedure) Regulations 2009

April 2019

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

A38 Derby Junctions Development Consent Order 202[]

6.1 Environmental Statement Chapter 3 Scheme History and Assessment of Alternatives

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3. Scheme history and assessment of alternatives

3.1 Scheme history

- 3.1.1 In April 2001 the Highways Agency¹ undertook a Road Based Study (RBS) to consider options for dealing with congestion and safety, environmental impacts, economic, accessibility and integration problems as associated with the three roundabout junctions on the A38 through Derby (namely Kingsway junction, Markeaton junction and Little Eaton junction). A public consultation on various short-term (interim) and long-term options was held in July 2002, with the RBS being issued in October 2002. The RBS recommended that the long term improvements should involve grade-separation of each of the three junctions on the A38 through Derby.
- 3.1.2 Between 2002 and 2005 development of the proposals to grade separate the A38 junctions through Derby were under consideration by the Highways Agency, including a range of option studies and public consultation events. However, work on the proposals were suspended in 2005 due to a funding decision, and put on hold in 2008 following the UK economic downturn.
- 3.1.3 The A38 Derby Junctions scheme effectively remained on hold until 2013 when it was announced as part of the Government's 2013 spending review. Thereafter, in January 2014, the Highways Agency commissioned a review of the scheme status to identify the work required to take the proposals to the next development stage. The scope of the review included re-examining the traffic problems and confirming if a solution was required; reviewing the options considered; determining the work required in the next stage, along with programmes and budgets; providing an indicative update of the economics appraisal and procurement strategies. The purpose of the review was to enable the Highways Agency to consider the entry of the A38 Derby Junctions scheme into the planned programme of improvement works.
- 3.1.4 The review indicated that significant delays were occurring at each of the three junctions and that the interim schemes implemented via the Pinch Point Programme at Markeaton junction and Little Eaton junction (refer to Chapter 2: The Scheme, para. 2.3.6) were providing a measure of relief, but did not replace the need for long-term grade-separation. Thus in order to progress the Scheme, AECOM was awarded the contract by the Highways Agency on 14 July 2014 to provide design services for the A38 Derby Junctions scheme to take it through to Preferred Route Announcement.
- 3.1.5 In 2015 the government launched its first 'Road Investment Strategy' (RIS) (Department for Transport (DfT), 2015) which set out an ambitious, long-term programme for motorways and major roads with the stable funding needed to plan ahead effectively. The RIS announced 127 major schemes to be delivered over the course of the first Road Period (2015/16 to 2019/20), one of which was the A38 Derby Junctions scheme - referred to as "*replacement of three*

¹ Highways Agency was replaced by Highways England in April 2015. The Secretary of State appointed Highways England (the "Licence holder") as a strategic highways company by way of an Order in accordance with Section 1 of the Infrastructure Act 2015. The Licence came into force on 1 April 2015.

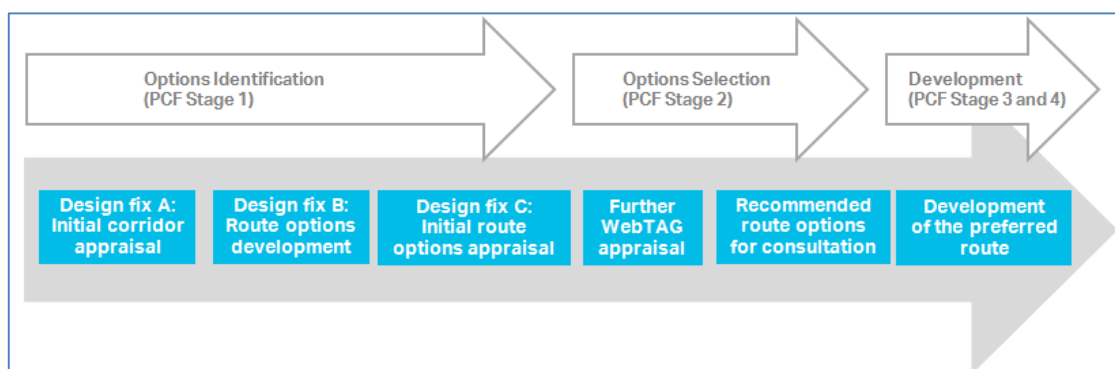
roundabouts on the A38 in Derby with grade-separated interchanges, raising the A38 in the East Midlands to Expressway standard and removing congestion”.

- 3.1.6 Following the Preferred Route Announcement on 31 January 2018, the Scheme design has progressed in preparation for the submission of the application to the Secretary of State under the Planning Act 2008 (PA 2008). The Scheme is a Nationally Significant Infrastructure Project (NSIP) as it consists of the alteration of a public highway in accordance with sections 14(1)(h) and 22(1)(b) of the PA 2008 (refer to Chapter 1: Introduction, para. 1.3.1).

3.2 Selection of Scheme

- 3.2.1 The process of option identification and selection undertaken for the Scheme is summarised in Section 3.3. This process has followed the Highways England Project Control Framework (PCF) stages as shown in Illustration 3.1 (the Scheme development is currently progressing through PCF Stage 3).

Illustration 3.1: Option identification and selection process

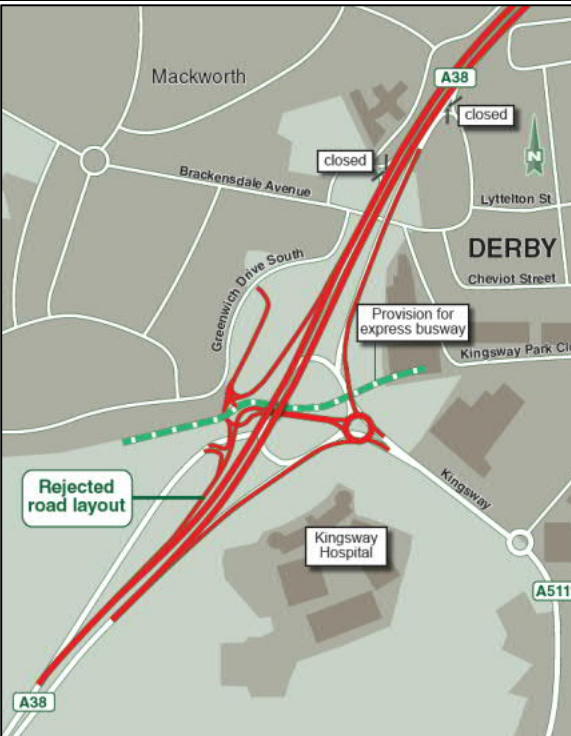
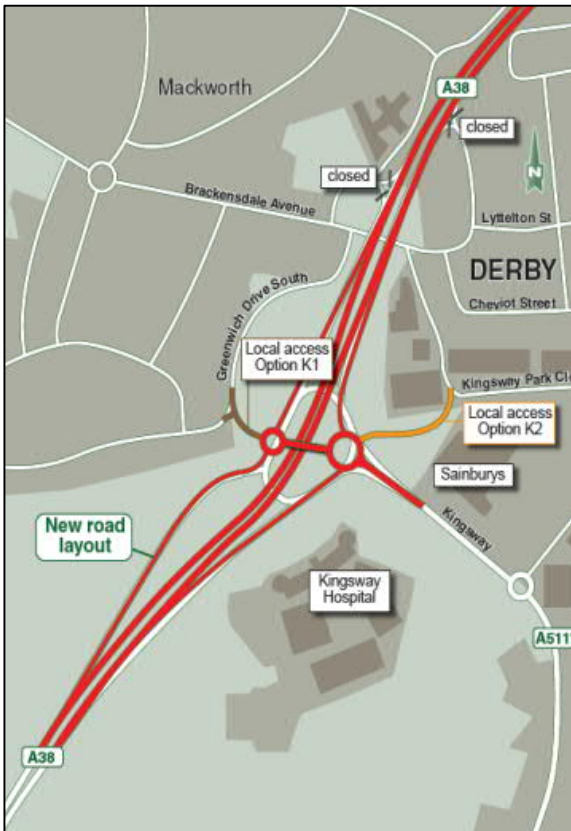



Options identification

Options (2002 - 2005) and preferred options

- 3.2.2 Given the history of the A38 Derby Junctions scheme, a wide range of alternatives were developed, considered and assessed during the period 2002 and 2005 (covering PCF Stages 1 and 2). A summary of the main options that were presented by the Highways Agency during the 2002 and 2003 public consultation events are summarised in Table 3.1, together with details as to why the options were discounted, and which options were taken forward as the preferred options (together with associated reasons).
- 3.2.3 The 2002 consultation events covered options associated with all junctions, whilst the 2003 supplementary consultation only considered options at Little Eaton junction following the interest generated by the 2002 consultation events.

Table 3.1: Main A38 Derby junctions options considered (2002 - 2005) and preferred options

Option descriptions and assessment	
Kingsway junction	
<p>Option 1</p> <p>Option description: This option entailed placing the A38 mainline on an embankment, passing over the junction. Link roads and roundabouts would be provided providing access onto the A5111, as well as linkages onto Greenwich Drive South. This layout provided space for an express busway that was being considered at the time. This option emerged as the preferred option when the proposed scheme was taken to public consultation in 2002.</p> <p>Option appraisal: Following assessment, this option was not taken forward due to:</p> <ul style="list-style-type: none"> Difficulties with the alignment of the A5111 and the impact of the large A38 embankment. High visual impact due to the A38 passing over the junction on an embankment. Higher construction costs and greater environmental impacts compared to the preferred option (see Option 2 below). 	
<p>Option 2</p> <p>Option description: Key features of this option are as follows:</p> <ul style="list-style-type: none"> The A38 would be lowered to pass underneath the existing roundabout in a new underpass. Construction of two new roundabouts and a new bridge at existing ground level to carry traffic across the lowered A38. Existing A38 carriageways would generally be converted into the junction slip roads. Provision of local access onto Greenwich Drive North. A38 widening to three lanes in each direction between Kingsway junction and Kedleston Road junction. Speed limit increased from 40mph to 50mph. <p>Option appraisal: This option was taken forward as the preferred option given that it would avoid many of the problems associated with Option 1 as described above. Placement of the scheme in an underpass would reduce environmental effects, including avoiding the high visual impacts associated with the Option 1 embankment.</p>	

Option descriptions and assessment	
This option essentially remains the preferred option, although the Scheme design has evolved in terms of local access linkages (i.e. use of local access Option K2 rather than Option K1 – refer to para. 3.2.7).	
Markeaton junction	
<p>Option 1</p> <p>Option description: The plan shows the option which emerged as the preferred option when the proposed scheme was taken to public consultation in 2002. Here the A38 mainline would pass through the junction in an underpass, with a single bridge provided for the A52 Ashbourne Road, with associated slips onto and off the new A38 mainline. In order to accommodate this option, land would be taken from Queensway, requiring building demolition.</p> <p>Option appraisal: Following further traffic studies, it was concluded that this single bridge option could not accommodate the predicted growth in traffic flows. As a result, this single bridge option was rejected, being replaced with options that included a two bridge roundabout (see options below).</p>	
<p>Option 2</p> <p>Option description: The option entailed the A38 mainline being placed in an underpass, but rather than taking land from Queensway, this option entailed moving the A38 mainline westwards. Thus this option would require land take from within Markeaton Park, whilst also resulting in the potential loss of the petrol filling station and land where the McDonald's restaurant is now located.</p> <p>Option appraisal: This option was rejected following the 2002 public consultation, mainly due to unacceptable environmental impacts due to the required land take from Markeaton Park.</p>	
<p>Option 3</p> <p>Option description: This option entailed putting the A38 mainline on an embankment with a "flyover" arrangement through the junction.</p> <p>Option appraisal: This option was rejected on the grounds of the high visual impact created by the embankment and the associated retaining walls.</p>	
<p>Option 4</p> <p>Option description: Key features of this option are as follows:</p> <ul style="list-style-type: none"> • The A38 mainline lowered to pass underneath the existing roundabout in an underpass. • Construction of two new bridges to carry the A52 and roundabout traffic across the lowered A38. 	

Option descriptions and assessment

- Speed limit increased from 40 to 50 mph.
- A38 widened to three lanes in each direction between Kingsway junction and Kedleston Road junction.
- Access to Esso petrol station and McDonald's restaurant modified, with access from the A38 being closed, with a revised access provided off the A52.
- Construction of new slip roads to permit all turning movements.
- Existing Markeaton Park entrance closed, with new park access provided off the A52.



Option appraisal: This option was selected as the preferred option as it would avoid significant land take from Markeaton Park, place the A38 mainline in an underpass through the junction (and thus avoiding visual impacts associated with the embankment option), and provide a two bridge roundabout able to accommodate predicted traffic flows.

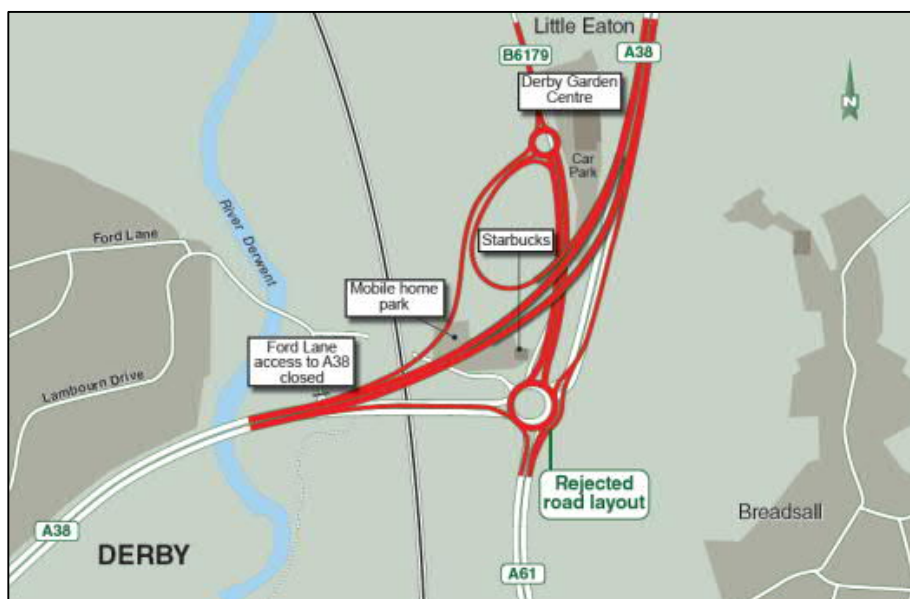
This option essentially remains the preferred option, although the Scheme design has been subject to a number of minor design evolutions. This includes some refinements to the junction geometry due to the identified need to signalise the junction.

Little Eaton junction

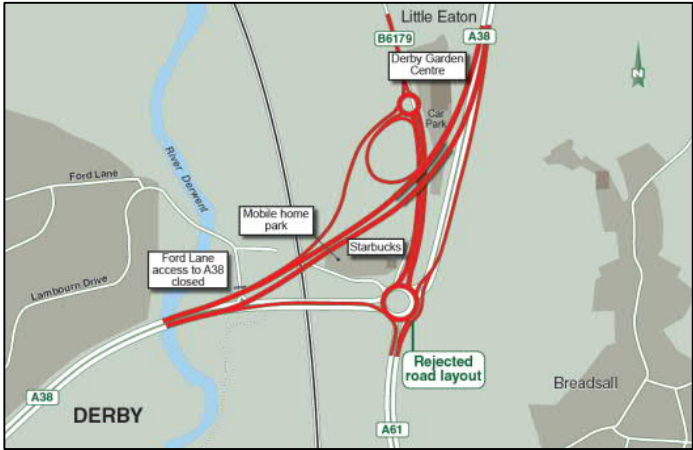
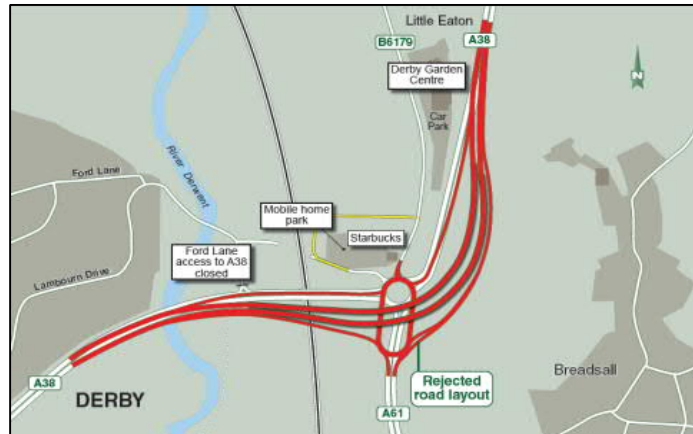
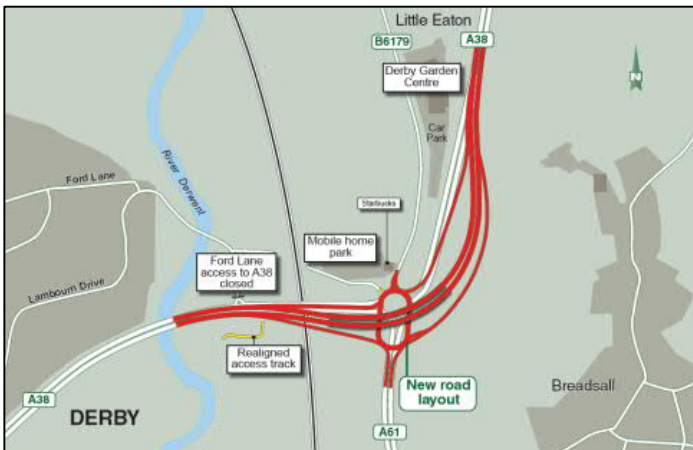
A wide range of options were considered for Little Eaton junction during the 2002 public consultation. Following the 2002 consultation revised options for the Little Eaton junction were developed and a supplementary public consultation took place in October 2003 - the options illustrated below were presented during the 2003 Little Eaton public consultation.

Option 1

Option description: This option placed the A38 mainline passing through the junction on an embankment to the north of the existing Little Eaton junction. The existing Little Eaton junction would be retained to provide access to the A61, whilst a new roundabout would be provided to the north of the new A38 mainline on the B6179.



Option appraisal: This option was not progressed following the 2003 consultation events due to low support from the public and stakeholders, as well as impacts on both local residents and

Option descriptions and assessment	
commercial premises – this included loss of land from the Derby Garden Centre and loss of residential properties within the Ford Farm Mobile Home Park.	
<p>Option 2</p> <p>Option description: This option entailed the A38 passing on embankment to the north of the existing Little Eaton junction (similar to Option 1).</p> <p>Option appraisal: This option was not progressed following the 2002 consultation events due to low support from the public and stakeholders, and impacts on local residents and commercial premises (as detailed for Option 1).</p>	 <p>The map shows the A38 road layout for Option 2. The road is shown in red, passing north of the existing Little Eaton junction. Key features include the River Derwent, Ford Lane, Lambourn Drive, Derby Garden Centre, Car Park, Mobile home park, Starbucks, and Breadsall. The A38 is shown as a single line, and the A61 is shown as a single line. The map also shows the A38 and A61 junctions. The A38 is shown as a single line, and the A61 is shown as a single line. The map also shows the A38 and A61 junctions.</p>
<p>Option 3</p> <p>Option description: This option would position the A38 on embankment to the south of the existing A38 alignment. This option was identified as the preferred option in that land take outside the existing highway boundary would be minimised and there would no direct impacts on the Ford Farm Mobile Home Park or the Derby Garden Centre.</p> <p>Option appraisal: Option 3 was subsequently refined and emerged as the preferred option on the basis that the revised layout:</p> <ul style="list-style-type: none"> • Provides a more compact footprint. • Reduces impacts on the River Derwent floodplain and the Derwent Valley Mills World Heritage Site. • Reduces both construction costs and traffic disruption during construction. • Retains existing access arrangements to Ford Lane and the Starbuck's site. <p>A slightly revised Option 3 layout was presented during public consultation events held in 2015.</p>	  <p>The top map shows the Option 3 road layout. The road is shown in red, passing south of the existing A38 alignment. Key features include the River Derwent, Ford Lane, Lambourn Drive, Derby Garden Centre, Car Park, Mobile home park, Starbucks, and Breadsall. The A38 is shown as a single line, and the A61 is shown as a single line. The map also shows the A38 and A61 junctions. The A38 is shown as a single line, and the A61 is shown as a single line. The map also shows the A38 and A61 junctions.</p> <p>The bottom map shows the revised Option 3 road layout. The road is shown in red, passing south of the existing A38 alignment. Key features include the River Derwent, Ford Lane, Lambourn Drive, Derby Garden Centre, Car Park, Mobile home park, Starbucks, and Breadsall. The A38 is shown as a single line, and the A61 is shown as a single line. The map also shows the A38 and A61 junctions. The A38 is shown as a single line, and the A61 is shown as a single line. The map also shows the A38 and A61 junctions.</p>

A38 Derby Junctions scheme development – 2005 to 2015

- 3.2.4 Work on the A38 Derby Junctions scheme was suspended in 2005 due to a funding decision, and put on hold in 2008 following the UK economic downturn. As detailed in Section 3.1, the scheme effectively remained on hold until 2013 when it was announced as part of the Government's 2013 spending review. Following completion of the 2014 Highways Agency review of the Scheme, work to identify preferred options recommenced in 2015 (refer to sections below).

A38 Derby Junctions scheme development (2014 to Preferred Route Announcement January 2018)

- 3.2.5 Development of the A38 Derby Junctions scheme recommenced in July 2014 (still at PCF Stage 2), building upon the preferred options as detailed in Table 3.1, namely:

- Kingsway junction: Option 2.
- Markeaton junction: Option 4.
- Little Eaton junction: Option 3.

- 3.2.6 The non-statutory public consultation was carried out in February and March 2015. This involved a two day exhibition in central Derby and supplementary exhibitions held in Breadsall, Little Eaton and Mackworth. The purpose of these consultation events was to illustrate how the A38 Derby Junctions scheme had developed since the previous public consultation events held in 2002 and 2003.

- 3.2.7 The 2015 public consultation events presented the following:

- Kingsway junction:
 - Option 2 was presented as the preferred option together with key characteristics, benefits and impacts.
 - Details of previously considered options that were rejected, namely Option 1 as detailed in Table 3.1, together with reasons why the option was not preferred.
 - Details of three local access options, together with associated impact and benefits – namely Option K1 local access via Greenwich Drive South; Option K2 local access via Kingsway Park Close; and Option K3 no local access provisions.
- Markeaton junction:
 - Option 4 was presented as the preferred option together with key characteristics, benefits and impacts.
 - Details of previously considered options that were rejected, namely Options 1, 2 and 3 as detailed in Table 3.1, together with reasons why these options were not preferred.

- Little Eaton junction:
 - Option 3 was presented as the preferred option together with key characteristics, benefits and impacts.
 - Details of previously considered options that were rejected, namely Options 1 and 2 as detailed in Table 3.1, together with reasons why these options were not preferred.
 - Details of two local access options, together with associated impact and benefits – namely Option L1 which would close Ford Lane access on the A38 (to the west of the Midland Mainline railway line), with no new link provided; Option L2 which would close Ford Lane access on the A38 (as per Option L1), but with a new one-way link road to the B6179.

3.2.8 As a result of the 2015 consultation, members of the public and consultees were encouraged to provide comment on the alternative options presented, as well as suggestions for any alternative solutions to the preferred options.

3.2.9 Several alternative options were received from consultees - these ranged from amendments to the presented junction options, to complete alternative schemes and alignments. All alternative scheme options received are detailed in the options assessment reports provided in Appendix 3.1 and 3.2 [TR010022/APP/6.3] for Kingsway junction and Little Eaton junction respectively. Refer to para. 3.2.18 regarding options related to Markeaton junction.

3.2.10 All alternative options received were considered under a two-stage assessment process, comprising the following:

- I. An initial sifting assessment.
- II. Options passing initial sifting were then subject to a more detailed qualitative assessment.

3.2.11 The purpose of the initial sifting assessment was to identify those options that were potentially viable and worthy of further consideration. The initial sifting assessment entailed a preliminary examination of each alternative option using information as provided by the consultee and the application of assessment methods detailed in the DfT's web-based Transport Analysis Guidance (WebTAG) - The Transport Appraisal Process (DfT, 2014). The performance of the various alternatives were assessed against the following criteria:

- Scheme objectives
- Deliverability
- Feasibility

3.2.12 The current Scheme objectives are detailed in Chapter 2: the Scheme, Section 2.2, whilst for the option appraisal process described the objectives were distilled down into the following eight key requirements:

- Economy:
 1. To reduce congestion and increase reliability of journey times on the strategic corridor.

2. To minimise traffic disruption due to construction works and incidents.
 3. To achieve optimum whole life costs taking into account future maintenance and operation, and disruption to users.
- Environment:
 4. To minimise impacts on both the natural and built environment, including designated landscape and biodiversity features.
 5. To seek to mitigate impacts on air quality and noise.
 - Society:
 6. To improve the safety for all road users.
 7. To seek to reduce severance by maintaining or providing appropriate facilities for crossing, and travelling along the route for non-motorised users.
 - Public accounts:
 8. To be affordable and represent High Value for Money according to DfT's appraisal criteria.
- 3.2.13 All alternative options were scored against these eight key requirements, and rated as to whether they were of: poor fit, low fit, reasonable fit, good fit, or excellent fit. Alternatives were also rated as to whether they could be delivered (taking into account political, planning, timescale or third party issues) and whether the alternative was feasible (taking account of physical constraints, land availability and design standards). Options were thus rated from 1 (unlikely to be deliverable or feasible), 2 (deliverable or feasible with major challenges) or 3 (likely to be deliverable or feasible, with some challenges).
- 3.2.14 In order for the alternative to pass the initial sift, it had to achieve a baseline score of 3 against each of these criteria. Details of the assessment methodology and the option scores are provided in Appendix 3.1 and 3.2 [TR010022/APP/6.3] for Kingsway junction and Little Eaton junction respectively. The sifting assessment included the options published for the public consultation events in order to form a baseline. Alternative options were then compared to the relevant base-lined published option, combination of options or the whole scheme, as appropriate.
- 3.2.15 Alternative options that passed the initial sift were subsequently subjected to further assessment - this further assessment entailed the analysis of:
- Costs estimates.
 - Engineering assessment.
 - Environmental assessment.
 - Traffic and economics assessment.

3.2.16 As detailed in Appendix 3.1 and 3.2 [TR010022/APP/6.3], the only options which passed the baseline score and which were subject to further assessment were as follows (all referenced illustrations are included within the chapter text, whereas all figures cited herein are located in Environmental Statement (ES) Volume 2 [TR010022/APP/6.2]):

- Kingsway junction:
 - Presented junction layout with Option K1 (see Illustration 3.2).
 - Presented junction layout with Option K2 (see Illustration 3.3).
 - Consultee J's option alternative with Option K1 (see Illustration 3.4).
- Little Eaton junction:
 - Option 2 (as described in Table 3.1 and see Illustration 3.5).
 - Option 3A (see Illustration 3.6).
 - Southern Sweep (see Illustration 3.7).

3.2.17 These alternative options are illustrated in Table 3.2, which also shows the presented options at the 2015 public consultation events.

3.2.18 Whilst some alternative options for Markeaton junction were received (e.g. tunnel from south of Kingsway junction to the north of Markeaton junction; new trunk road from A38/A50 Toyota junction to north of Little Eaton junction), none of these passed the initial sifting process and were thus excluded from further assessment.

Table 3.2: Alternatives at Kingsway junction and Little Eaton junction subject to further evaluation, together with presented options at the 2015 public consultation events

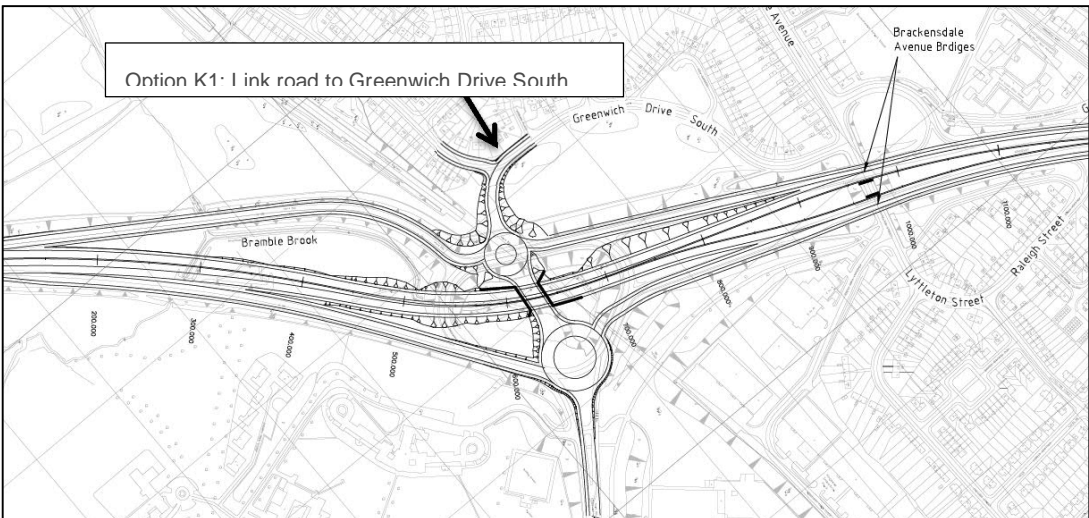
Illustration No:	Options considered for further assessment
Kingsway junction	
<p>Illustration 3.2: Kingsway junction - presented junction layout with Option K1 (note that this was the 2015 presented junction layout for Kingsway junction)</p>	

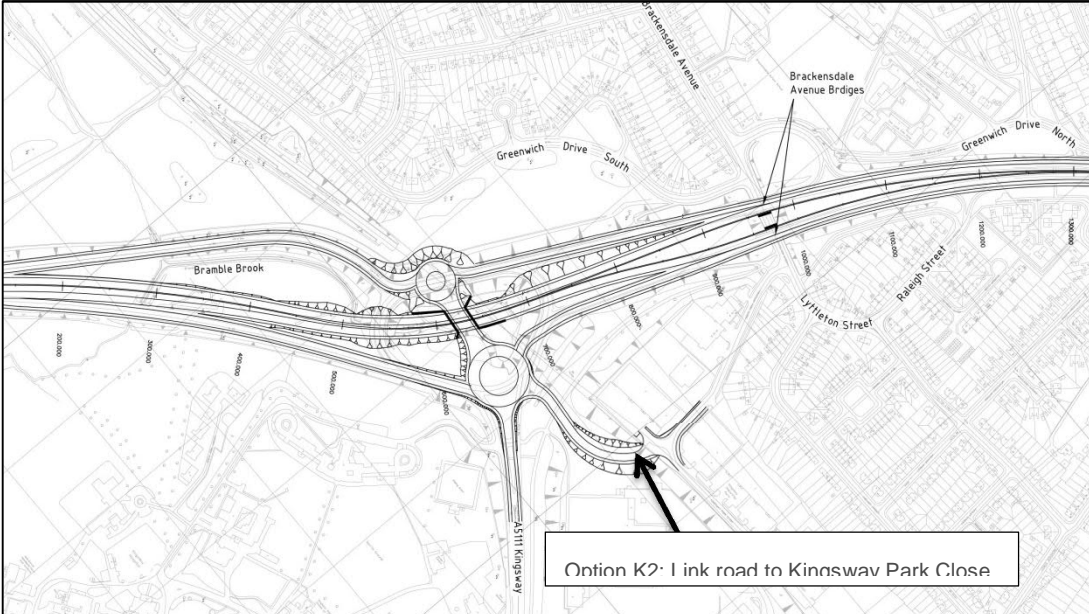
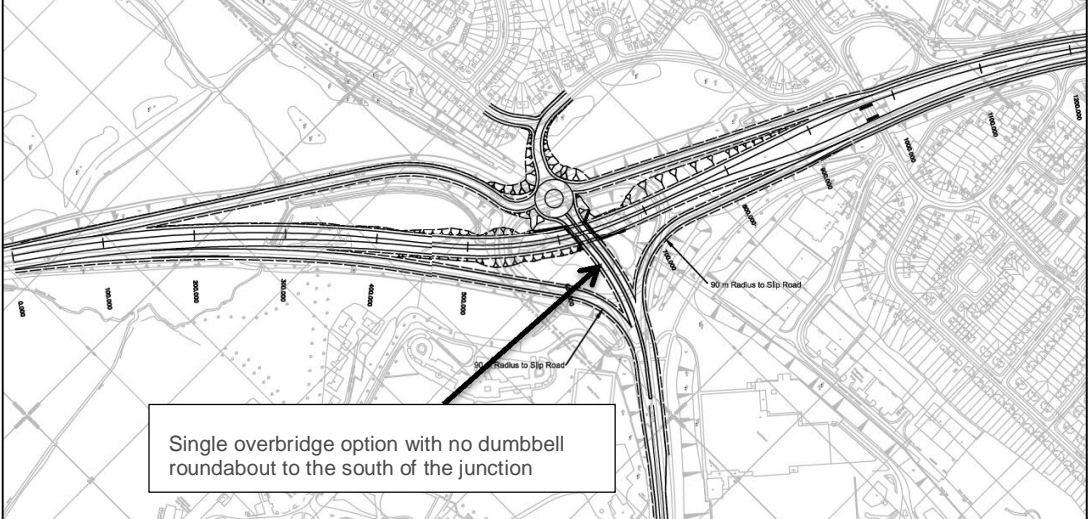
Illustration No:	Options considered for further assessment
<p>Illustration 3.3: Kingsway junction - presented junction layout with Option K2</p>	 <p>Option K2: Link road to Kingsway Park Close</p>
<p>Illustration 3.4: Kingsway junction - consultee J's alternative with Option K1</p>	 <p>Single overbridge option with no dumbbell roundabout to the south of the junction</p>

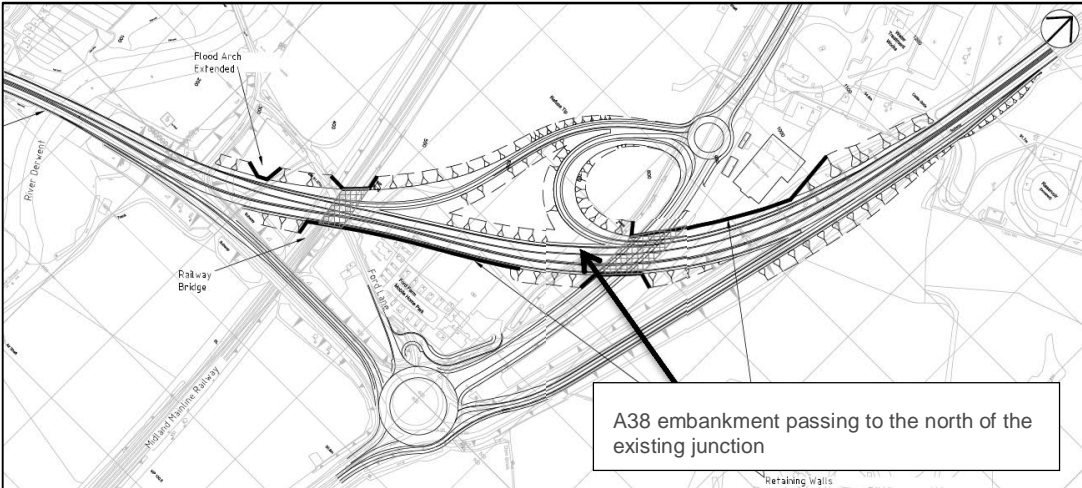
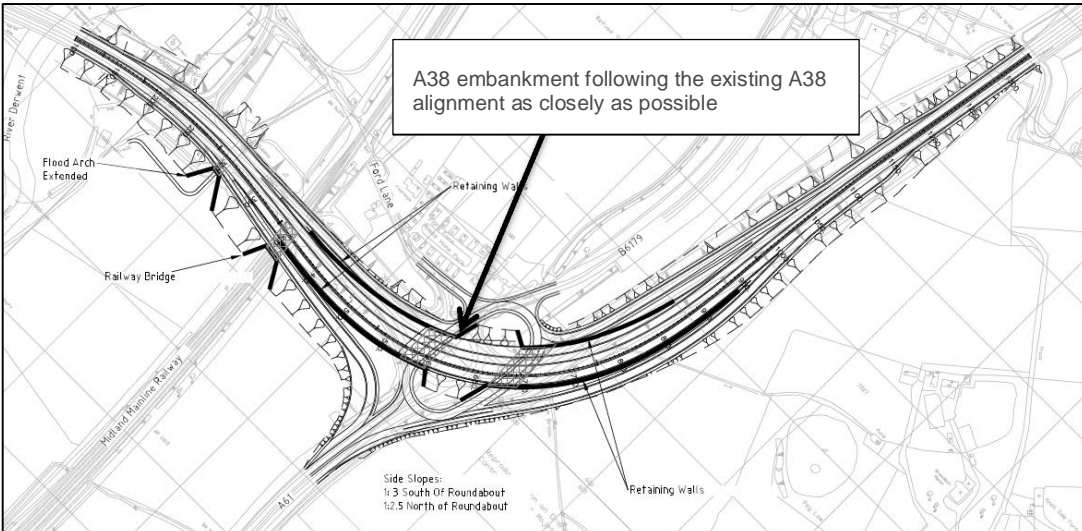
Illustration No:	Options considered for further assessment
Little Eaton junction	
Illustration 3.5: Little Eaton junction - Option 2	
Illustration 3.6: Little Eaton junction - Option 3A	

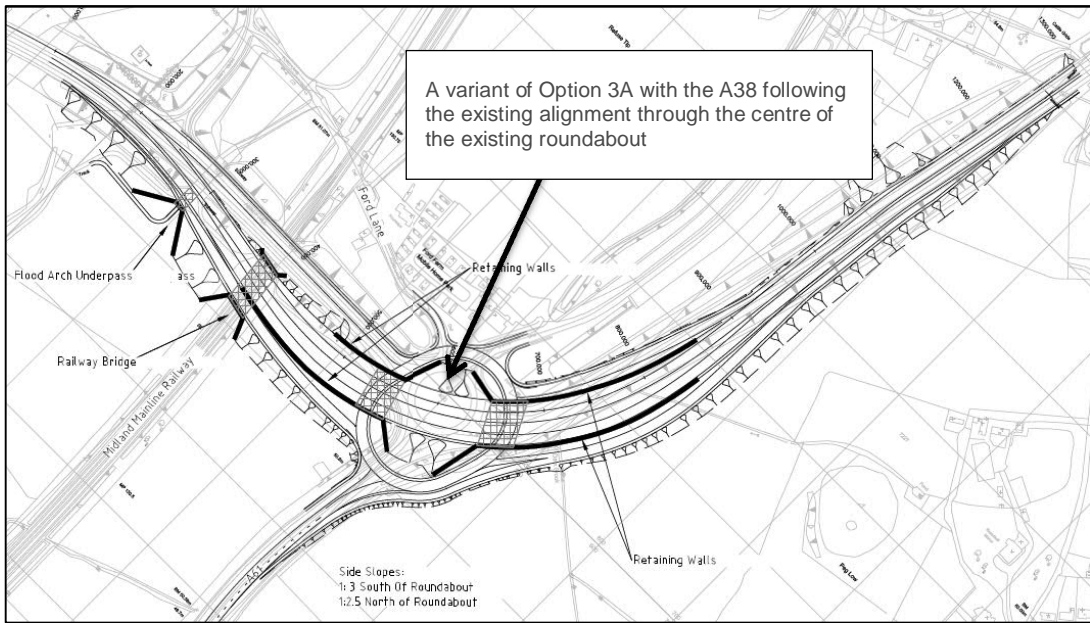
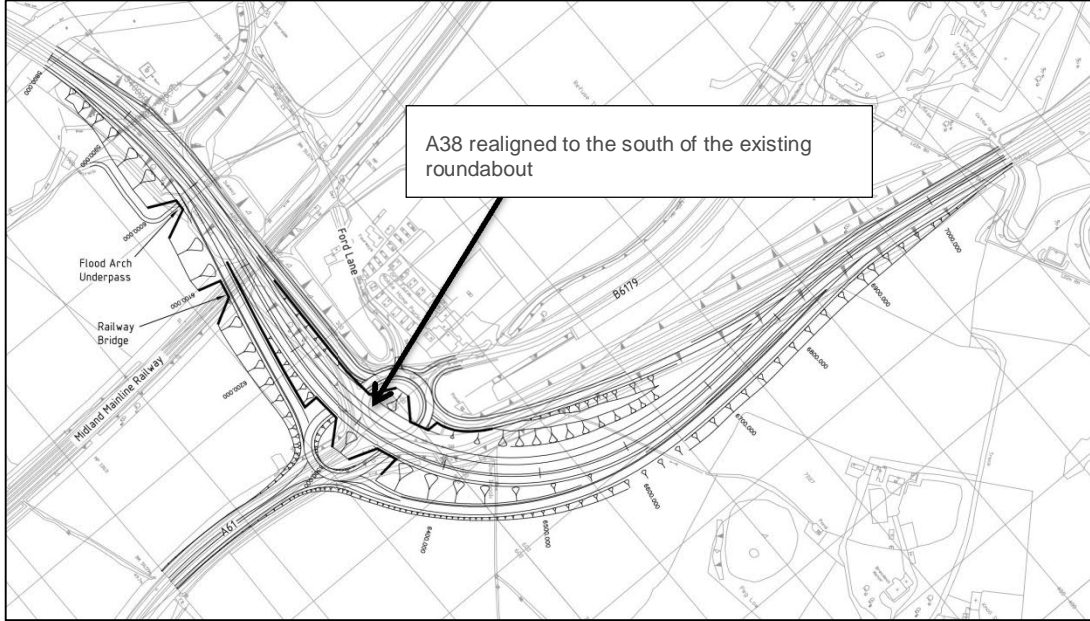
Illustration No:	Options considered for further assessment
Illustration 3.7: Little Eaton junction - Southern Sweep	 <p>A variant of Option 3A with the A38 following the existing alignment through the centre of the existing roundabout</p>
Illustration 3.8: Little Eaton junction - 2015 presented junction layout	 <p>A38 realigned to the south of the existing roundabout</p>

Illustration 3.2

3.2.19 The assessment involved the initial appraisal of the options as presented at the 2015 public consultation events (referred to as the presented junction layout for Kingsway junction (see Illustration 3.2), and the presented option at Little Eaton junction (see Illustration 3.8), and then an assessment of the alternative option in order to evaluate its performance against the presented option. Options that ranked the highest were given a score of 1.

3.2.20 The main assessment findings are detailed in Tables 3.3 and 3.4, whilst Appendix 3.1 and 3.2 **[TR010022/APP/6.3]** provide full details of the assessment findings.

Table 3.3: Kingsway junction: summary of qualitative alternative options assessment (refer to Appendix 3.1 [TR010022/APP/6.3] for the full option assessment report)

Options	Key elements of option	Cost comparison	Summary of engineering assessment	Summary of qualitative environmental appraisal	Summary of traffic and economics appraisal
Presented junction layout with option K1 (see Illustration 3.2)	This option is based upon the preferred option as presented at the 2015 public exhibitions, but with local access Option K1. As a result of having to close existing local access routes to and from Brackensdale Avenue and Raleigh Street, Option K1 would enable residents in the Mackworth area to access the A38 via Greenwich Drive South.	The cost estimate was prepared as based upon the layout drawings prepared for the option. A schedule of activities was created and then priced using Highways England's cost estimating database. The cost comparison indicated that Option K1 was considerably cheaper than Option K2. The higher costs to deliver Option K2 were principally related to the associated costs of design and construction due to the link crossing a former landfill site.	The engineering assessment considered geometry, public utilities, provisions for pedestrians and cyclists, drainage, geotechnics, departure and relaxations from Highways England design standards, and construction phasing. This evaluation indicated that overall the differences in engineering performance was relatively small. However, Option K2 ranked the highest for the greatest number of sub-categories and was consequently preferred in engineering terms.	The presented junction layout with Option K2 offers the potential to significantly reduce the loss of public open space (by approximately 1,500m ²) and reduce landscape and visual effects. Whilst Option K2 would result in the loss of some public open space, given that losses would be significantly smaller than with Option K1 (approximately 500m ²), there would be less impact on public open space losses, whilst severance issues along Greenwich Drive South would be avoided. Option K2 would also be less visible to residential receptors than Option K1, thus requiring less landscape mitigation. The presented junction layout with Option K2 would perform slightly worse than the presented junction layout with Option K1 in terms of (unmitigated) effects upon geology and soils, materials and water resources due to Option K2 being part located over an area of former landfilling. However, with adherence to standard construction practices and appropriate design, adverse	The evaluation indicated that Option K2 ranked the highest in all categories, providing better road safety and reassigning traffic more efficiently. The consultee J's option ranked as the worst option in each of the traffic and economics assessment categories.
Presented junction layout option K2 (see Illustration 3.3)	This option is based upon the preferred option as presented at the 2015 public exhibitions, but with local access Option K2. This option would provide local access for residents in the Mackworth area, but via a link road to the east of the proposed Kingsway				

Options	Key elements of option	Cost comparison	Summary of engineering assessment	Summary of qualitative environmental appraisal	Summary of traffic and economics appraisal
	junction (link to Kingsway Park Close). The proposed link would pass at-grade behind the existing Kingsway Retail Park and in cutting across a former landfill site and dismantled railway.	Additionally, Option K2 is a longer link so there would be an increase in the basic cost of delivering it and the associated land that would be required.		residual effects would be reduced to non-significant levels (such that residual effects would be similar to those that would be experienced with the presented junction layout with Option K1). Option K2 would avoid the significant traffic noise level increases along Greenwich Drive South (as associated with the presented junction layout with Option K1). However, Option K2 would transfer the noise effect identified for the presented junction layout with Option K1 from Greenwich Drive South onto Kingsway Park Close.	
Consultee J's option with option K1 (see Illustration 3.4)	This option is a variant of the Presented Junction Layout, but replaces the east roundabout, originally accommodating A38 southbound and Kingsway traffic movement, with a merge and a diverge slip road from and to the A38 southbound. This option has been amended to accommodate the K1 local access route. Due to the removal of the roundabout located to the east, it was not possible to accommodate the option with K2.	Considered that the cost of this option would be very similar to that for the presented junction layout with option K1 (any difference would be likely to be less than 5%).		Consultee J's option would impose a significant diversion for trips to and from Mackworth. Consultee J's option performed worse than the presented junction layout with Option K1 in terms of effects upon air quality and noise along a section of the A5111 which would be used as a permanent diversion, and along any minor local roads used by traffic avoiding the congestion at the Kingsway Retail Park roundabout.	

Table 3.4: Little Eaton junction: summary of qualitative alternative options assessment (refer to Appendix 3.2 [TR010022/APP/6.3] for the full option assessment report)

Options	Key elements of option	Cost comparison	Summary of engineering assessment	Summary of qualitative environmental appraisal	Summary of traffic and economics appraisal
Presented option (see Illustration 3.8)	This solution would provide full grade separation (two level) of the junction, with the A38 realigned to the south of the existing roundabout. This option would avoid any impact on “Fourways”, the Ford Farm Mobile Home Park, Starbucks and the Derby Garden Centre. However, the resulting alignment means that it lies to the south and east of the current dual carriageway and as a consequence is closer to the village of Breadsall to the east, but further from Allestree to the west.	The cost estimate was prepared by taking off the major quantities from the layout drawings prepared for the option. A schedule of activities was created and then priced using Highways England’s cost estimating database. The costs comparison indicated that the presented option could be delivered at a significantly lower cost than the other options.	The engineering assessment considered geometry, public utilities, provisions for pedestrians and cyclists, drainage, geotechnics, departure and relaxations from Highways England design standards, and construction phasing. This evaluation indicated that overall the differences in engineering performance were relatively small. However, Option 2 was ranked highest for the greatest number of sub-categories and was consequently preferred in engineering terms.	The qualitative environmental assessment indicated that Option 3A and the Southern Sweep option offered the potential to reduce environmental and community effects as compared to the presented option due to reduced permanent land take requirements, as well as marginally reduced noise effects upon Breadsall village. However, Option 3A and the Southern Sweep option would perform slightly worse than the presented option in terms of effects upon travellers due to an extended construction programme. Option 3A also performed worse due to the need for travellers from the B6179 (Alfreton Rd) to use the A61 roundabout to access the A38 southbound carriageway. Both Option 3A and the Southern Sweep would require a temporary diversion route during the construction phase. Construction and use of the temporary diversion route would exacerbate land take effects and	The evaluation indicated that the presented option would be the most beneficial option in transport terms. This is because the option would maintain the status quo in terms of traffic routing, and would be the best option in terms of its transport economic efficiency benefits. Although second to Option 2 in terms of minimising delays during construction, overall the presented option was the most beneficial option in transport terms. The Southern Sweep and Option 2 were very closely matched with the presented option. The Southern Sweep was not preferred to the presented option due to the increased durations of delays and diverting trips during the construction phase. By comparison, Option 2 would require longer distances to be travelled overall after its opening due to the layout of the two roundabout design.
Option 2 (see Illustration 3.5)	This solution would provide full grade separation (two level) of this junction with the A38 realigned along a sinuous horizontal alignment to minimise the impact on “Fourways”, the mobile home park, Starbucks, and the Derby Garden Centre. Extensive widening would be required both in the central	Option 2 would incur higher land costs, although costs would be further adversely affected by VAT charges due to more of the route being away from the existing A38 and			

Options	Key elements of option	Cost comparison	Summary of engineering assessment	Summary of qualitative environmental appraisal	Summary of traffic and economics appraisal
	reserve and the northbound verge to provide the minimum desirable stopping sight distance.	risks associated with remediating the section traversing a former landfill site.		construction phase effects. Although the diversion route would only be required for the duration of the construction works, and not post-construction, the effects on land use and nature conservation would be longer lasting. This includes the loss of some of the existing tree plantation between the western edge of Breadsall village and the A38.	Option 3A was ranked last for all four traffic objectives, although this was attributed to the lack of ability to turn right from the B6179 to the A38 south.
Option 3A (see Illustration 3.6)	This solution would provide full grade separation (two level) of the junction, with the A38 following the existing A38 alignment as closely as possible, but still maintaining the horizontal alignment standards that have been adopted for the presented option.	Option 3A and the Southern Sweep would incur additional costs as a consequence of the construction requiring significant temporary works in order to maintain A38 traffic flow.		The environmental assessment indicated that the potential environmental effects of the presented option and the Southern Sweep are closely matched and the differences in the assessments were marginal.	
Southern Sweep (see Illustration 3.7)	This solution would provide full grade separation (two level) of the junction. This is a variant of Option 3A above with the A38 following the existing alignment through the centre of the existing Little Eaton junction roundabout. This results in the option swinging away south of its current alignment to cross the railway, then swinging back before crossing the River Derwent.	As a consequence, the presented option was preferred on cost grounds.		The potential environmental effects of Option 2 would be higher as compared to the presented option, with elevated effects in terms of air quality, cultural heritage, landscape, nature conservation, geology and soils, materials, community and private assets, water resources and flood risk.	

- 3.2.21 Based upon the results of the costs estimates, engineering, environmental and traffic and economics assessments, at Kingsway junction Option K2 was identified as being preferred as it performed better than Option K1 in terms of engineering, traffic and economics, whilst it would reduce long-term impacts upon an area of public open space, and reduce traffic severance issues along Greenwich Drive South. Consultee J's option ranked lowest in each category. Based on the assessment of the options, it was recommended that Option K2 was progressed with the presented junction layout as the preferred option for grade separation of Kingsway junction.
- 3.2.22 With regard to costs, as these options would only form part of the proposed Kingsway junction, any variations in the estimated costs between these options were in the order of 1% to 3.5% of the overall delivery costs for this junction. As such, the cost element was given a low weighting in influencing option consideration and was therefore excluded from the overall ranking.
- 3.2.23 Refer to Table 3.5 for a summary of the Kingsway junction option assessment findings.

Table 3.5: Summary of assessment of Kingsway junction options

Summary results of	Presented junction layout with option K1 (see Illustration 3.2)	Presented junction layout option K2 (see Illustration 3.3)	Consultee J's option with option K1 (see Illustration 3.4)
Cost	1	2	1
Engineering	2	1	3
Environment	1	1	2
Traffic	2	1	3
Overall ranking	2	1	3

- 3.2.24 Given the results of the evaluation, Option K2 was selected for inclusion in the Scheme design as illustrated in Figure 2.5 [TR010022/APP/6.2] and as described in Chapter 2: The Scheme.
- 3.2.25 The assessment considered the various Little Eaton junction options as detailed in Table 3.4 in terms of cost estimates, engineering, environmental, traffic and economic considerations, with each option being compared to the presented option.
- 3.2.26 A summary of the Little Eaton junction option assessment findings is provided in Table 3.6.

Table 3.6: Summary of assessment of Little Eaton junction options

Summary of results	Presented junction layout (see Illustration 3.8)	Option 2 (see Illustration 3.5)	Option 3A (see Illustration 3.6)	Southern Sweep (see Illustration 3.7)
Cost	1	3	4	2
Engineering	2	1	4	3
Environment	2	3	2	1
Traffic	1	3	4	2
Overall ranking	1	3	4	2

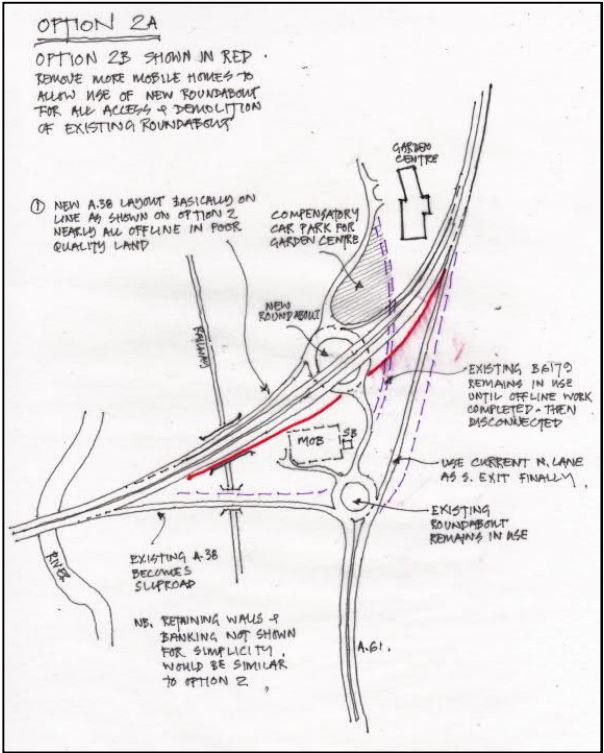


3.2.27 Table 3.6 indicates that while the presented option may not rank highest in each category or sub-category, in overall terms the presented option performed the best. However, there were areas where the presented option would have a potentially greater impact than the alternative options and thus it was highlighted that detailed environmental mitigation strategies should be developed for each of these aspects in conjunction with key stakeholders.

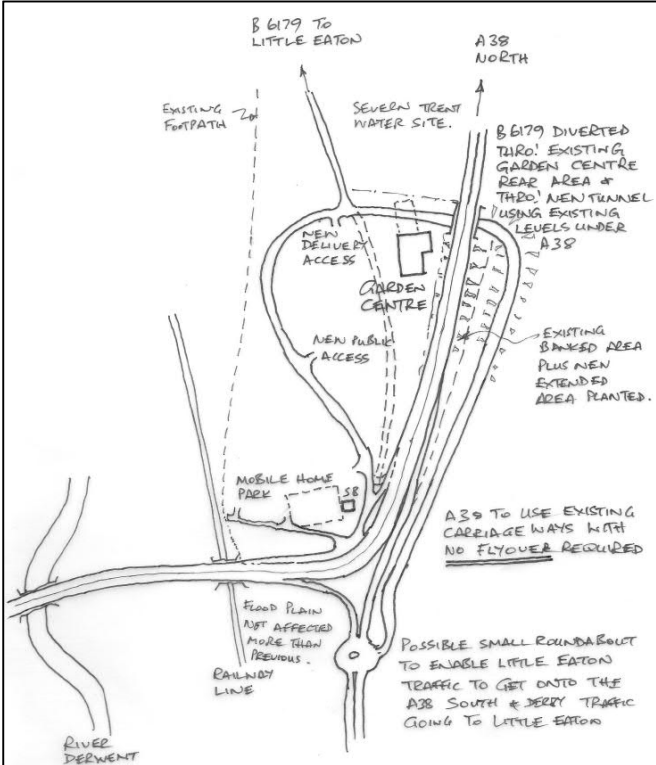
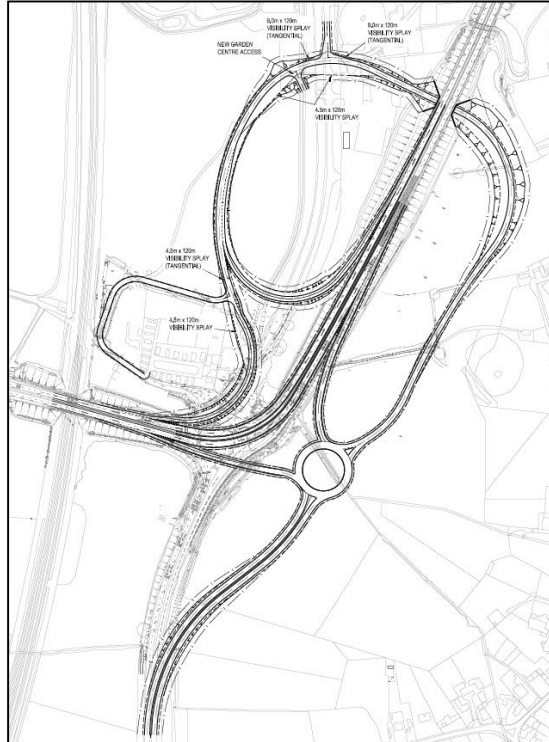
3.2.28 Based on the assessment of the options, it was recommended that the presented option was progressed as the preferred option for grade separation of Little Eaton junction. In order to minimise the impact of the presented option, particularly in terms of design geometry, noise, permanent land use, nature conservation and flood risk, it was highlighted that it would be important that appropriate environmental mitigation measures are considered as part of the assessment and incorporated into the final Scheme design. Such measures have been considered as part of the EIA and appropriate mitigation features have been included in the Scheme design as detailed in the Environmental Masterplans (refer to Figures 2.12a to 2.12h) [TR010022/APP/6.2].

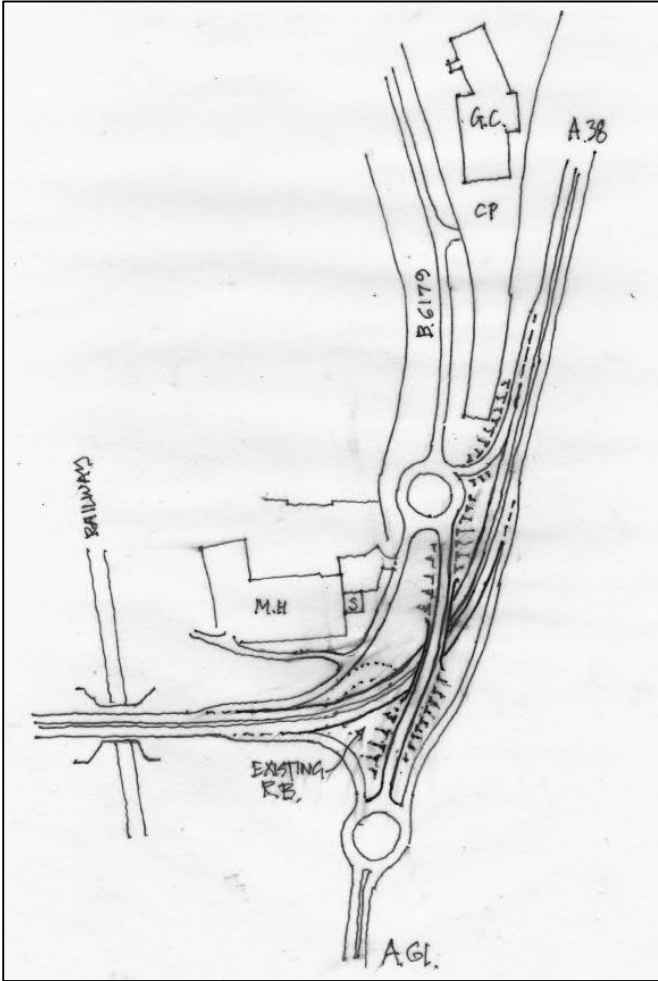
Further options assessments

3.2.29 Following the alternative options assessment as detailed above, further alternative options for Little Eaton junction were received from local residents in March 2016 (Options 2A and 2B), May 2016 (Option X) and June 2016 (Option X1) – refer to Table 3.7. These options were reviewed by the design team who developed some of the options taking into account applicable highway design standards (also refer to Table 3.7) (note that an engineering interpretation drawing for Option X1 was not prepared as the option was not considered to support the defined Scheme objectives).

Table 3.7: Alternative Little Eaton junction designs received in 2016 and engineering interpretations subjected to sifting analysis

Option received	Engineering interpretation
<p>Illustration 3.9: Options 2A & 2B (A38 embankment moved to north of existing Little Eaton junction)</p>  <p>This option is a variant of Option 2 and would place the mainline A38 embankment to the north of the existing Little Eaton junction requiring a new bridge over the Midland Mainline railway line. This option would take the car park from the Derby Garden Centre, which would need to be relocated. Two engineering interpretations were generated from this hand annotated design taking into account highway design standards in order to ensure that the layouts complied with designs standards as appropriate and that land impacts were fully understood. Variants of Option 2A were developed for assessment purposes – namely a variant where the southbound entry slip was realigned for geometric reasons and a variant with a single bridge at the junction (namely, Options 2A and 2B).</p>	<p>Illustration 3.10: Option 2A</p>  <p>Illustration 3.11: Option 2B</p> 

Option received	Engineering interpretation
<p>Illustration 3.12: Option X (link road from B6179 to A61 in tunnel under A38)</p>  <p>This option would place the mainline A38 to the north of the existing Little Eaton junction, but at existing ground level. This option would require a link road from a roundabout to the south of the A38 (connecting with the A61) along the eastern side of the A38 and then through a tunnel to connect to the B6179.</p>	<p>Illustration 3.13: Engineering interpretation of Option X</p> 

Option received	Engineering interpretation
<p>Illustration 3.14: Option X1 (link from the B6179 to A61 on a flyover above A38)²</p>  <p>This option would maintain the A38 at ground level, but would require a link road from the A61 to the B6179 on a flyover above the A38.</p>	<p>An engineering interpretation of this option was not prepared as this alternative option did not support the Scheme objectives (refer to sections below).</p>

3.2.30 These options were subject to the initial sifting assessment as described in para. 3.2.10. The results of this analysis are shown in Table 3.8, whilst full details of the sifting assessment are presented in Appendix 3.3 [TR010022/APP/6.3]

² Engineering interpretation drawing for Option X1 was not prepared as the option was not considered to support defined scheme objectives

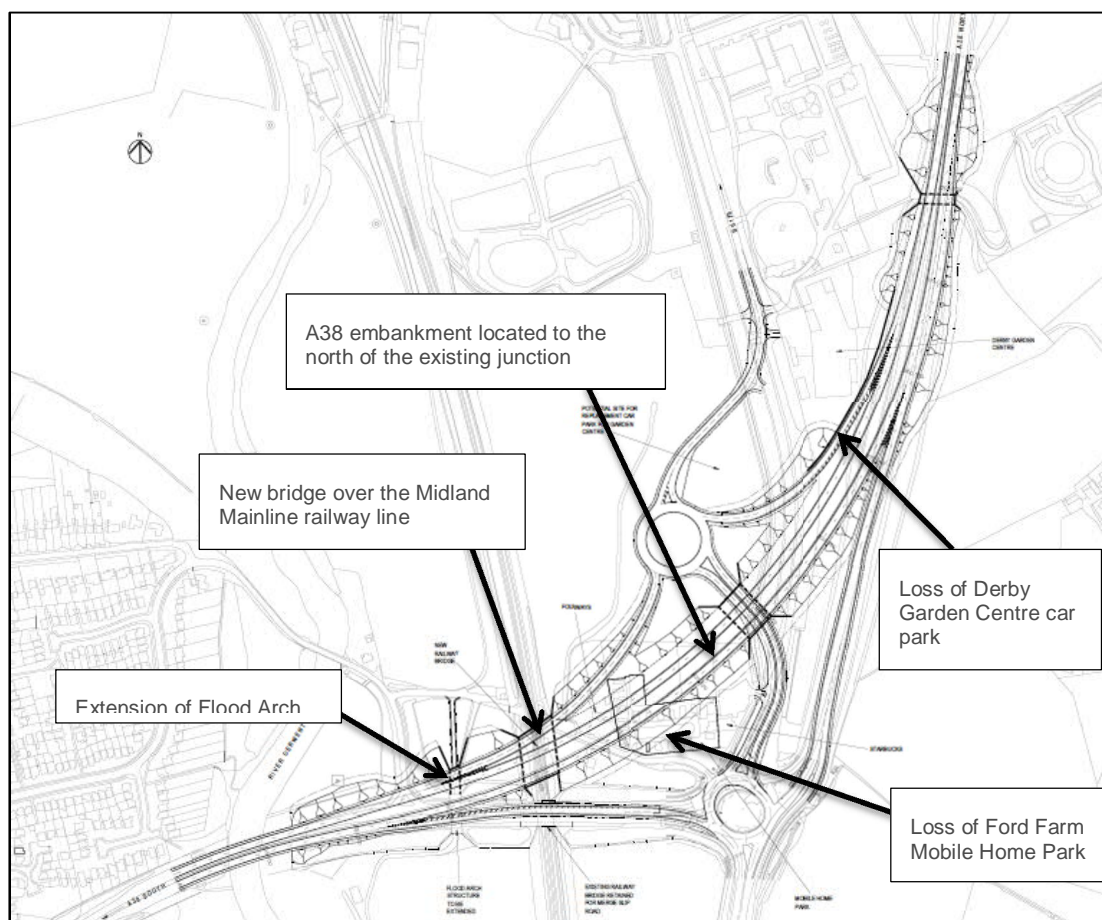
Table 3.8: Summary of sifting assessment of Little Eaton junction Options 2A, 2B, X and X1

Option	Alignment with objectives	Deliverability assessment	Feasibility assessment
Option 2A	This option had a reasonable fit with the defined essential objectives as detailed in para. 3.2.12.	This option would require land take from the Derby Garden Centre car park. This option would thus either require a replacement car park to be provided by negotiation or purchase of the garden centre for an estimated price of £2m. Such options were considered to represent a major deliverability challenge.	This option was found to have no additional feasibility benefits or drawbacks when compared with presented option.
Option 2B	This option had a reasonable fit with the defined essential objectives as detailed in para. 3.2.12.	This option would present the same major deliverability challenges as Option 2A.	This option was found to have no additional feasibility benefits or drawbacks when compared with presented option.
Option X	This option had a low fit with the defined essential objectives as detailed in para. 3.2.12. This option performed substantially worse than the presented option with regard to objective 1 as the option would not improve conditions for A38 through traffic and the difficulties associated with traffic using the various slip roads and road links. The option also scored poorly in terms of objectives 4, 6 and 8.	A review of issues indicated that whilst there would be some challenges, this option would be deliverable.	This option was found to have a number of technical challenges meaning that the option is not likely to be feasible without significant re-design and alteration, whilst the option would have a substantially lower economic benefit/cost ratio (BCR). Technical challenges included creation of large areas of severed land, Ford Lane access off the junction slip road, significant technical challenges associated with constructing the new underbridge, whilst access arrangements for the Starbucks café site may make the business unviable.
Option X1	This option had a low fit with the defined essential objectives as detailed in para. 3.2.12. This option performed substantially worse than the presented option with regard to objective 1 as the option would increase journey times for A38 through-	This option would need to be significantly re-designed in order to conform with design standards. In order to make this option work, the slip road onto the A38 from the northern	This option was found to have a number of technical challenges meaning that the option is not likely to be feasible without significant re-design and alteration, whilst the option would have a substantially lower economic benefit/cost ratio (BCR). There would be significant technical challenges to install the two new roundabouts as they would

Option	Alignment with objectives	Deliverability assessment	Feasibility assessment
	traffic, whilst traffic movements between the northbound A38 and A61 would be significantly disadvantaged by the excessively longer link manoeuvres. The option also scored poorly in terms of objectives 2, 4, 6 and 8.	roundabout would need to pass through the garden centre car park. As such, this option would present the same major deliverability challenges as Option 2A.	need to be sufficiently far away from the new bridge to allow an acceptable vertical alignment, Ford Lane access off the junction slip road, whilst access arrangements for the Starbucks café site may make the business unviable.

- 3.2.31 Table 3.8 indicates that Options 2A and 2B could provide a reasonable fit with the must deliver objectives as detailed in para. 3.2.12. However, these options would only be deliverable with major challenges as compared to the presented option. With regard to Option X and Option X1, these were not deemed able to deliver the essential objectives covering economic, environmental, social and public accounts.
- 3.2.32 Given the above, none of these options passed initial sifting and thus were not subjected to further assessment.
- 3.2.33 Subsequent to the above option appraisals, a meeting took place on 19 January 2017 between the then Transport Minister John Hayes, the MP for Mid-Derbyshire (which includes Little Eaton and Breadsall), Highways England, Breadsall Parish Council and AECOM. The purpose of the meeting was to hear the concerns of the residents of Breadsall village in relation to the proposed improvements to Little Eaton junction. Following the meeting, it was decided to further assess an option that would result in the A38 being re-aligned to the north side of the existing roundabout. The project team was advised to consider the best alternative options as previously discounted, but to disregard previous constraints (e.g. the mobile home park and other businesses) as these could potentially be relocated. This resulted in a new option known as Option 2C – see Illustration 3.15.

Illustration 3.15: Little Eaton junction alternative Option 2C



3.2.34 Option 2C was developed with the assumption that the Ford Farm Mobile Home Park and its residents would be relocated with the existing mobile home park being demolished, whilst the property Fourways and its associated businesses would also be acquired and demolished, plus the provision of a replacement car park area for the Derby Garden Centre which would be lost due to the option. Option 2C was then compared to the presented option in terms of engineering, traffic and economics, environment, stakeholders and land. Details of the assessment are provided in Appendix 3.4 [TR010022/APP/6.3] and summarised in Table 3.9.

Table 3.9: Summary of assessment of Little Eaton junction Option 2C compared to the presented option

Criteria	Summary of results
Costs	Option 2C was estimated to increase the whole scheme costs by between £18.7 to £32.4m (most likely costs increases of £24.5m).
Engineering	<p>In terms of engineering and operational performance, Option 2C would perform better than the presented option in many respects as follows:</p> <ul style="list-style-type: none"> • Full design speed alignments achievable with no departures from standards on the mainline and with the national speed limit applied. • Simpler construction with more of the route being off-line.

Criteria	Summary of results
	<ul style="list-style-type: none"> No lighting required on the A38 mainline so visual impacts of the high embankment would be reduced. The construction programme for Option 2C would be several months shorter than for the presented option. This would not affect the whole scheme construction programme which is driven by the improvements at Markeaton junction.
Traffic and economics	The forecast traffic flows were expected to be similar for both Option 2C and the presented option. As a result, Option 2C would perform as effectively as the presented option. Both Option 2C and the presented option would deliver very good value for money.
Environment	<p>The environmental assessment indicated that overall, the environmental effects associated with Option 2C would be worse than those associated with the presented option. The key environmental issues relating to Option 2C being:</p> <ul style="list-style-type: none"> Increased flood risks and the technical complexity of determining a workable flood mitigation strategy (given the need to extend the flood arch beneath the A38). Effects upon private property which would need to be purchased to provide land for the scheme (namely, moving the mobile home park and land take from the garden centre). Effects on private property would be partly mitigated through the provision of a new location for the mobile home park and an alternative car park for the Derby Garden Centre. Managing contaminated materials in the former landfill site. Effects on the Derwent Valley Mills World Heritage Site (WHS) given the need to construct a new structure cover the Midland Mainline railway line (part located within the WHS).
Stakeholders	Option 2C would require the residents of the mobile home park to be moved to an alternative site. The mobile home owners, with one exception, did not want to move and any relocation would have to be carefully managed due to the age and vulnerability of some residents. The owner of the mobile home park and the van hire business affected, were willing to be relocated to a suitable alternative site. Any new location for the mobile home park would be subject to agreement with the planning authority and the moving process would need to be fully managed for many of the residents.

3.2.35 As indicated in Table 3.9, Option 2C had a number of advantages over the presented option in terms of engineering design and potential environmental impacts on Breadsall village (in terms of noise, air quality and visual intrusion). It would also reduce the impact on agricultural land within the designated green belt. However, the main disadvantages of Option 2C would be the impacts on the property Fourways (and associated businesses) and the Ford Farm Mobile Home Park; in particular the societal impacts upon the residents of the mobile home park, many of whom are elderly, with some residents considered to be vulnerable. In addition, Option 2C would increase scheme construction costs by an estimated £24.5m, as well as introduce a number of additional adverse environmental effects, such as increased flooding risks, land contamination, and impacts upon the Derwent Valley Mills WHS.

3.2.36 Given the assessment findings, Option 2C was not considered to be preferable to the presented option.

3.2.37 Following this assessment, the Preferred Route Announcement was made on the 31 January 2018 by the Secretary of State resulting in the presented option becoming the Scheme which is subject to the assessment as presented within this ES.

3.3 Scheme design development following Preferred Route Announcement and other notable alternatives

3.3.1 Since the Preferred Route Announcement the further development of the Scheme design has been undertaken in accordance with the criteria for 'good design', outlined in the National Policy Statement for National Networks (NPSNN) (DfT, 2014).

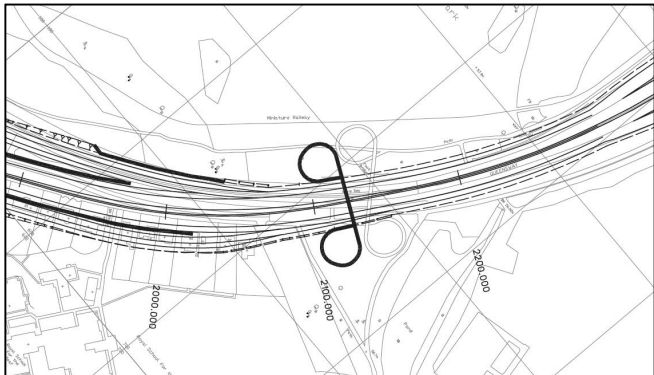
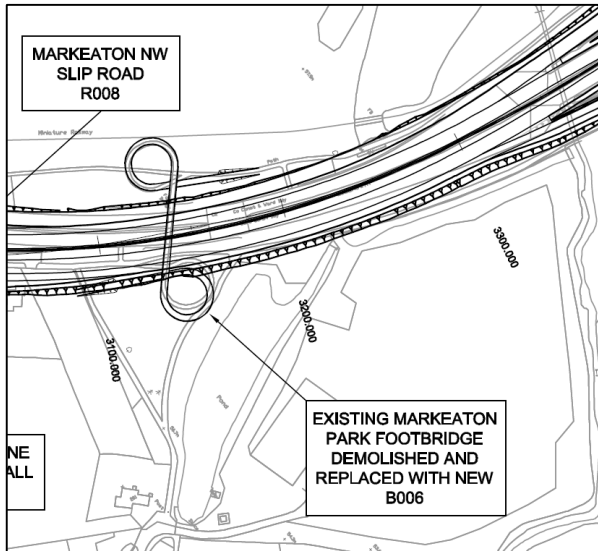
3.3.2 Collaboration between the environmental team and the Scheme design engineers has been an integral part of the design development process. Collaborative planning of the Scheme design has been undertaken with the aim of avoiding and mitigating environmental constraints, whilst also taking into account responses received during consultation.

3.3.3 Notable alternative design options that have been considered are detailed below:

- Location of Markeaton footbridge.
- Configuration of the Esso and McDonalds access at Markeaton junction.
- Location of construction compounds.
- Locations for borrow pits.
- Little Eaton floodplain compensation area options.
- Ford Lane access provisions.
- Noise barriers along both sides of the A38 between Kingsway junction and Markeaton junction.
- Noise barriers along Kingsway Park Close.
- Closure of the existing uncontrolled pedestrian crossing of the A38 between Thurstcroft Close and Greenwich Drive North.
- Lighting options at Little Eaton junction.
- The requirement for visual and noise barriers at Little Eaton junction.
- Public open space losses and exchange land options.

3.3.4 Table 3.10 provides details of the various design options considered and the main reasons for the selection of the chosen option taking into account consultation feedback (where relevant) and the effects of the development on the environment. Where environmental considerations are set out in Table 3.10, only those environmental topics that were impacted by the design options are presented. Other environmental topics which were not impacted or for which there were no differences between the options are not referred to.

Table 3.10: Alternatives considered and options selected

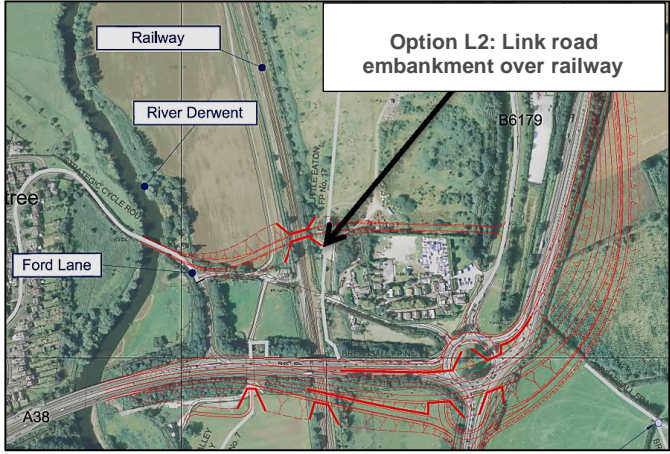
Title	Alternatives considered	Appraisal and decision
<p>Location of Markeaton footbridge</p>	<p>The Scheme would require the demolition of the existing Markeaton footbridge and then provide a suitable replacement. It was the original intention that the replacement footbridge would be positioned to the west of the existing footbridge – see illustration below. Given that the existing footbridge is located in an area with significant tree cover within Markeaton Park and at Mill pond, the proposed replacement footbridge would require the removal of numerous mature trees.</p> 	<p>Following a review of the existing and replacement footbridge proposals, the location of the replacement footbridge was altered in order to minimise tree losses. This would require placement of the new footbridge as near as possible to existing footbridge location – see illustration below.</p>  <p>Whilst this positioning of the new footbridge would minimise losses of mature trees at Markeaton Park and at Mill pond, it is accepted that there would be a period of time when there would be no footbridge, thus causing temporary severance issues for pedestrians and cyclists. However, it was considered that such short term severance issues were preferable to tree losses. Impacts resulting from the temporary absence of a footbridge are assessed in Chapter 12: People and Communities.</p>
<p>Reconfiguration of the Esso and</p>	<p>A number of options have been considered and assessed regarding access configurations for the Esso</p>	<p>The option appraisal process indicated the following:</p> <ul style="list-style-type: none"> Complete closure of the A38 access was not favoured as it could result in

Title	Alternatives considered	Appraisal and decision
MacDonalds access at Markeaton junction	<p>petrol filling station and MacDonalds restaurant at Markeaton junction. Option considered are as follows:</p> <ul style="list-style-type: none"> • Closure of the A38 access and egress. • Full access and egress from the A38. • One way access with the A38. • Various junction configurations with the A52, including roundabout options and a signalised junction. 	<p>the closure of the petrol filling station business (due to refuelling tankers not being able to turn around within the site to enter and exit via the A52).</p> <ul style="list-style-type: none"> • Two way access and egress with the A38 diverge slip road was not favoured by Highways England standards, as such access arrangements are not normally accepted on slip roads due to safety concerns. • A one way (exit only) arrangement with the A38 diverge slip road, together with an access into the site from the A52 (combined with the signalised junction with the new Markeaton Park access) is considered to be an acceptable compromise (and is thus included within the Scheme design).
Construction compounds	<p>Construction compounds would be required in order to facilitate Scheme construction. A number of potential compound areas have been subject to identification and assessment – this included the following locations:</p> <ol style="list-style-type: none"> 1. Compound to the south of Kingsway junction at Rough Heanor Farm. 2. Compound within the Kingsway hospital site. 3. Compound within Mackworth Park. 4. Compound to the south of the A38 at Markeaton and east of Mill pond. 5. Compound to the north of Little Eaton junction on a former landfill site. 6. Compound off the A61 opposite Morrisons. 7. Compound to the south of Little Eaton junction. 	<p>The potential construction compound sites were subject to an evaluation which considered their technical feasibility (including consideration of site size, accessibility etc.), their availability and the associated potential environmental effects. The assessment indicated the following:</p> <ol style="list-style-type: none"> 1. Compound to the south of Kingsway junction at Rough Heanor Farm: Site was considered to be technically feasible, but was not available due to ongoing site development proposals. 2. Compound within the Kingsway hospital site: Site was considered to be technically feasible, but was not available due to ongoing sequential site development. 3. Compound within Mackworth Park: Discussions with DCiC indicated that use of the park as a construction compound would not be in keeping with the existing park use, and potential associated environmental effects. 4. Compound to the south of the A38 at Markeaton and east of Mill Pond: Use of the site for a construction compound was discussed with the land owners who indicated that the site could not be made available. 5. Compound to the north of Little Eaton junction on a former landfill site: The use of this vacant plot of land as a construction compound was discussed with the landowner who indicated that the site could be made available. This site was considered to be of adequate size to accommodate a site compound, whilst the site could be accessed via Alfreton Road (B6179). The area was subject to environmental surveys

Title	Alternatives considered	Appraisal and decision
		<p>and appraisal which indicated that the some locations within the proposed compound area were ecologically constrained (including stands of notifiable weeds), whilst an access to the Alfreton Road would need to be created which would require crossing of the former Derby Canal and some tree removal (noting that the local neighbourhood planning group has aspirations to environmentally enhance the area along a short stretch of the former Derby Canal adjacent to the B6179). The proposed construction compound footprint has been defined taking into account prevailing environmental constraints, whilst compound access proposals would avoid direct impacts upon the former Derby Canal.</p> <p>6. Compound off the A61 opposite Morrisons: Site was considered feasible as a satellite compound, with access being via the A61 roundabout. However, use of the site would be constrained due to congestion on the nearby roundabout. Environmental surveys indicated that the site has a number of environmental constraints, including the presence of the adjacent Breadsall Railway Cutting Local Wildlife Site, whilst an adjacent area is currently undergoing redevelopment for housing.</p> <p>7. Compound to the south of Little Eaton junction: The site immediately adjacent to the Scheme would be of a size suitable for use as a construction compound and would have easy access to the Scheme (over the realigned Dam Brook). The area has been subject to ecological and environmental surveys, which indicates that whilst there are few environmental constraints, the site would be immediately adjacent to Breadsall village.</p> <p>The appraisal undertaken indicated that of the options considered, the most preferable compound site was at the former landfill site at Little Eaton junction (site 5), although parts of site 7 located adjacent to the Scheme would be suitable for materials storage. As such, these sites have been included within the Scheme boundary and are considered in the environmental assessment as reported within this ES. Measures required to minimise potential environmental effects associated with the use of these compound areas are detailed within the OEMP (refer to Appendix 2.1 [TR010022/APP/6.3]).</p>

Title	Alternatives considered	Appraisal and decision
Use of local borrow pits for materials sourcing	<p>As indicated in Chapter 2: the Scheme, Section 2.6, the Scheme would have a materials imbalance, with a net import of material being required (refer to Table 2.6). As such, a number of potential borrow pit locations in the vicinity of the Scheme were subject to identification and assessment to determine whether any such locations could be a good source of materials.</p> <p>Taking into account local geology, a number of potential borrow pits in the vicinity of the Scheme were identified – refer to Figure 3.1 [TR010022/APP/6.2].</p>	<p>The sites indicated on Figure 3.1 were subject to an appraisal of their suitability as borrow pits, taking into account geological conditions, site accessibility and environmental constraints, noting that only locations outside of the Derwent Valley Mills World Heritage Site (WHS) were selected for appraisal.</p> <p>The appraisal indicated that site 1 (located adjacent to the Scheme at Little Eaton junction – refer to Figure 3.1) and site 2 (located to the south of Breadsall) presented better opportunities for the development of borrow pits in comparison to the other sites considered which were deemed to have potentially significant environmental constraints. However, both sites were rejected for use as borrow pits due to concerns regarding environmental effects upon Breadsall village, whilst site 2 was also subject to housing development proposals.</p> <p>On this basis no borrow pits have been included within the Scheme boundary, and any material shortfall would thus be subject to importation via road haulage by the construction contractor in accordance with a Traffic Management Plan (TMP) (refer to Appendix 2.3 [TR010022/APP/6.3]).</p>
Little Eaton junction floodplain compensation area options	<p>Given that the Scheme would result in the loss of floodplain associated with the River Derwent, there would be a requirement to replace floodplain losses. The Environment Agency requires such losses to be provided on a like-for-like basis e.g. creation of new floodplain to compensate for the loss of floodplain due to the Scheme, resulting in a no net loss.</p> <p>Given the above, a range of floodplain compensation locations has been considered and assessed for suitability – refer to Figure 3.2 [TR010022/APP/6.2]. This figure indicates that some 13 locations have been subject to investigation.</p>	<p>The investigation of the floodplain compensation locations shown in Figure 3.2 included assessing the impact of excavations in these locations on flooding patterns, completion of ecological surveys and an environmental appraisal of area use.</p> <p>The appraisal indicated the following:</p> <ul style="list-style-type: none"> • Locations A to E, and G to K could provide additional floodplain storage within the existing floodplain, but could not achieve floodplain compensation on a like for like basis. • Location F could provide like for like floodplain compensation, but the location was not technically feasible given that it would require floodwater transfer across the existing Midland Mainline railway line. • Location L would involve the removal of the existing Ford Lane embankment. Removal of the embankment would partially achieve like for like floodplain compensation, but flood modelling indicated that embankment removal would have an adverse effect on area flooding by

Title	Alternatives considered	Appraisal and decision
		<p>adversely affecting floodwater passage through the nearby flood arch. Embankment removal would also have adverse ecological effects and require the creation of a new structure for pedestrians and cyclists which could have an adverse effect on the setting of the WHS.</p> <ul style="list-style-type: none"> Location M would provide like for like floodplain compensation. However, this location is located within the WHS, and whilst the site is predominantly agricultural pasture, there are a number of isolated trees that are of ecological note. <p>The appraisal indicated that location M was the only option assessed that was able to adequately provide floodplain compensation on a like for like basis. Consultation with the Environment Agency indicated that floodplain compensation in this location would satisfy their requirements. Given that Location M is within the WHS, this option was taken forward for inclusion within the Scheme design on the basis that the landform created by excavations in this area could be naturalised, such that it would not have a significant effect on the WHS (refer to Chapter 6: Cultural Heritage), whilst also retaining isolated trees of ecological note (refer to Figure 2.10 [TR010022/APP/6.2]).</p>
Ford Lane access alternatives	As detailed in para. 3.2.7, at the 2015 consultation event details of two local access options at Ford Lane were presented, namely Option L1 to close Ford Lane access to and from the A38 (located to the west of the Midland Mainline railway line), with no new link provided, and Option L2 to close Ford Lane access on the A38, with a new one-way link to the B6179 (refer to the illustration below).	<p>A total of 620 responses were received during the 2015 consultation regarding local access at Ford Lane. 37% of respondents preferred Option L2; 37% had no preference; 26% felt that there is no need to provide a new local access route as a result of closing the Ford Lane access (i.e. Option L1).</p> <p>In order to assist the decision making process, the option was subject to evaluation of environmental, engineering and cost considerations. The assessment indicated that Ford Lane link road would likely result in a significant adverse effect on the Derwent Valley Mills WHS given the need for an additional road embankment across the Midland Mainline railway line. In addition, the link road could have significant impacts on area flooding and associated mitigation costs. The link road would also result in additional impacts upon area ecology through the loss of vegetation and associated ecological habitats. The link would also inevitably increase Scheme costs due to the need to construct an additional bridge.</p>

Title	Alternatives considered	Appraisal and decision
		<p>It was considered that as based upon the consultation responses, and due to the potential additional project costs and adverse environmental effects associated with Option L2, that the Scheme design at Little Eaton junction would retain Option L1 (i.e. closure of Ford Lane without a replacement link).</p>
<p>Noise barriers along sections of the A38 between Kingsway junction and Markeaton junction</p>	<p>Noise barriers along sections of the A38 mainline between Kingsway junction and Markeaton junction would have the potential to reduce noise effects as well as screen local residents from traffic using the Scheme. In order to determine local preferences for barriers, the public were asked during statutory public consultation whether they thought such barriers should be provided.</p>	<p>During statutory consultation, responses indicated a preference for the provision of timber noise barriers in order to reduce noise levels and screen traffic between Kingsway junction and Markeaton junction (refer to the Consultation Report [TR010022/APP/5.1]). Following the assessment of potential noise effects associated with Scheme operation, and taking into account consultation responses, noise barriers have been included within the Scheme design along sections of the mainline A38 between Kingsway junction and Markeaton junction as such barriers would reduce environmental effects for local residents (refer to the Environmental Masterplans as presented in Figure 2.12c to 2.12d for details [TR010022/APP/6.2]).</p>

Title	Alternatives considered	Appraisal and decision
Noise barriers along Kingsway Park Close	No noise barriers along Kingsway Park Close were included in the Scheme design taken to statutory public consultation. However, during the consultation the public were asked to identify any locations where they thought such noise barriers should be provided.	A number of statutory consultation responses indicated the desire for noise barriers along the boundary of Kingsway Park Close given that this road would experience a significant increase in traffic flows following Scheme opening (refer to the Consultation Report [TR010022/APP/5.1]). Following the assessment of potential noise effects associated with Scheme operation, and taking into account consultation responses, noise barriers have been included within the Scheme design along Kingsway Park Close as such barriers would be able to reduce environmental effects for local residents. Such noise barriers could be installed along the highway verge without significant clearance of screening vegetation between the road and the adjacent properties (refer to the Environmental Masterplan as presented in Figure 2.12b for details [TR010022/APP/6.2]).
Closure of the existing uncontrolled pedestrian crossing of the A38 between Thurcroft Close and Greenwich Drive North	The Scheme design includes closure of the uncontrolled pedestrian crossing of the A38 between Thurcroft Close and Greenwich Drive North for safety reasons. Alternative access routes would be via Brackensdale Avenue or the new controlled crossings at Markeaton junction. The public were asked during statutory consultation whether they agreed with the proposed closure and if they would use the alternative proposals, and thus gauge local opinion regarding crossing closure.	During statutory consultation, the majority of respondents supported the closure of the uncontrolled pedestrian crossing, indicating that respondents would use the alternative routes provided. However, a very small number of respondents suggested an alternative crossing should be provided in this location such as a footbridge (refer to the Consultation Report [TR010022/APP/5.1]). A new footbridge at this location would increase land take effects and be visually intrusive to local residents. Given the majority of responses indicated that they would use alternative access routes, and given the environmental effects associated with a replacement footbridge provision, the Scheme design retains the closure of this uncontrolled pedestrian crossing.
Lighting options at Little Eaton	It was initially proposed to have 12m high LED luminaires along the A38 mainline that would tie in with existing lighting. Such lighting columns were part of the Scheme design as taken to statutory consultation.	Comments received during statutory consultation indicated that there were local concerns regarding the visual effects associated with proposed lighting columns on the mainline A38 at Little Eaton junction, including visual effects at night (refer to the Consultation Report [TR010022/APP/5.1]). Given the comments received at statutory consultation, an assessment was carried out to determine whether an alternative lighting solution at Little Eaton junction could be used or whether the lighting could be removed altogether. A safety assessment determined that this section of road could operate with an acceptable level of safety if the lighting was removed. To ensure drivers would be aware of the bend in the road at this location, appropriate signing

Title	Alternatives considered	Appraisal and decision
		<p>would be installed along with the provision of solar powered studs integrated within the road pavement – these would indicate the alignment of the road to drivers. Such solar powered studs are being used successfully on the A38 from the A610 Ripley junction (located approximately 12km north of Little Eaton junction) to the A38 junction with the M1 (Junction 28). Following discussions with Highways England, it was considered that lighting columns could be removed from the A38 mainline through Little Eaton junction, as this would reduce visual effects during the night-time, reduce lighting impacts upon ecological species such as bats, and reduce carbon emissions by reducing energy consumption. However, 12m high LED luminaires would be retained at the new at-grade roundabout and the immediate approaches on the slip-roads for safety reasons.</p>
Barriers at Little Eaton junction	<p>In order to reduce the visual and noise effects of the Scheme at Little Eaton junction, a number of options were presented at statutory public consultation, namely no barriers, use of timber barriers, coloured timber barriers, timber barriers with climbing vegetation, or the use of earth bunding.</p>	<p>Consultation responses indicated a strong preference for the use of timber barriers with associated vegetation, as these would provide noise mitigation as well as being able to reduce visual effects associated with vehicles using the Scheme (refer to the Consultation Report [TR010022/APP/5.1]).</p> <p>Following the assessment of potential noise and visual effects associated with Scheme operation, and taking into account consultation responses, barriers have been included in the Scheme design, both along the northbound mainline A38 in the vicinity of the Ford Farm Mobile Home Park, and along the southbound mainline A38 and southbound diverge slip road to the A61 (refer to the Environmental Masterplans as presented in Figure 2.11h and 2.12i for details [TR010022/APP/6.2]).</p>
Public open space losses and replacement public open space offered in exchange	<p>Given the loss of public open space at Kingsway junction adjacent to Greenwich Drive South and at Mackworth Park (approximately 2,050m²) and at Markeaton junction (approximately 5,738m²), there would be a need for the Scheme to replace public open space in exchange.</p> <p>During the Scheme design development, there has been an aim to firstly reduce public open space losses, as well as identify suitable areas of replacement public open space offered in exchange.</p>	<p>Public open space loss minimisation: Since the Preferred Route Announcement the Scheme design has been developed in a manner to minimise losses of public open space. Design decisions that have been made that have significantly reduced public open space losses are detailed below:</p> <ul style="list-style-type: none"> • The Scheme design at Markeaton junction was amended to introduce a retaining wall along the proposed A38 mainline to reduce public open space loss from within Markeaton Park. • The reconfiguration of the Markeaton Park exit to act as the park entrance and exit was amended to reduce public open space losses along the park

Title	Alternatives considered	Appraisal and decision
		<p>edge adjacent to the A52.</p> <ul style="list-style-type: none"> The design of the southbound diverge slip road at Markeaton junction has been amended such that public open space loss from the area around Mill Pond has been reduced. <p>Replacement public open space offered in exchange: Taking into account public open space losses, there is a legal need for the Scheme to provide equivalent replacement public open space offered in exchange. A range of options have been subject to investigation in the vicinity of the Scheme, including the sites below:</p> <ul style="list-style-type: none"> Area left vacant by the closure of Brackensdale Avenue access to and from the A38. Area left vacant by the demolition of two semi-detached properties on the A52 Ashbourne Road. Potential use of green wedge area within the Army Reserves Centre site adjacent to the A38 south of Markeaton junction. Area left vacant following the demolition of 15 detached residential properties on Queensway. Area left vacant by the removal of the existing A38 adjacent to the southern boundary of Markeaton Park. Area left vacant following the closure of the Ford Land access to and from the A38. Site owned by DCiC on the western site of the River Derwent, immediately north of the River Derwent crossing. Area left vacant following the removal of the A38 just to the north of the existing Little Eaton junction. <p>An evaluation has been undertaken to determine the viability of replacement public open space options offered in exchange as detailed above, which included consultation with landowners and DCiC. This evaluation has indicated that the area left vacant following the demolition of 15 detached residential properties on Queensway, the area left vacant by the removal of the existing A38 adjacent to the southern boundary of Markeaton Park and</p>

Title	Alternatives considered	Appraisal and decision
		the area left vacant by the closure of Brackensdale Avenue access to and from the A38, could collectively provide the required public open space replacement (and being located in the near vicinity of where the losses would occur). The Planning Statement [TR010022/APP/7.2] includes an assessment as related to public open space and details of replacement public open space offered in exchange.

3.4 References

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