
Site Allocation Options

Stage 1: Strategic Assessment

<i>Ver</i>	<i>Date</i>	<i>Author</i>	<i>Review</i>	<i>Approve</i>	<i>Comments</i>
0.1	6 Jan 17	DF	NE		Initial Draft for comments
0.2	12 Jan 17	DF		DF	DRAFT send to Blaby DC
0.3	20 Jan 17	DF	NE		Update following client email comments and meeting on 19 Jan 2017
1.0	23 Jan 17	DF		DF	Complete
1.1	24 Jan 17	DF		DF	Typos and minor corrections

0 Executive Summary

- 0.1.1 Blaby District Council (BDC) have appointed Edwards & Edwards Consultancy Ltd (EAE) to assess the Highways and Transportation impacts of possible housing and employment sites that are options within the emerging Local Plan for possible delivery prior to 2029¹.
- 0.1.2 This report provides the findings from the first stage of the work. This consists of an initial assessment that looks at the strategic impact of the different options within the emerging Local Plan in order to identify whether there were likely to be any transport ‘show-stoppers’ for any of the options as well as highlighting the location of links and junctions on the highway network that could, potentially, experience a material impact from any of the development options.
- 0.1.3 The Leicester Lane site (estimated at around 42 dwellings) is considered too small to be part of this initial strategic assessment. At this stage its direct impact can reasonably be assumed to be mainly its access arrangements and impacts on Leicester Lane, and junctions off Leicester Lane.
- 0.1.4 Access locations/arrangements to any of the potential development options are not considered in detail as part of this study and would need be included as part of a later stage of work if any of the sites are pursued.
- 0.1.5 The Leicester and Leicestershire Integrated Transport Model (LLITM) has been developed by Leicestershire County Council to assist in the understanding of transport impacts of development within Leicestershire. For this study it has been used to show the forecast traffic levels on each link in the network in 2031 together with junctions that are predicted to be stressed in this future year.
- 0.1.6 This LLITM v5 core scenario is used by the Leicestershire County Council Highways Authority as their reference case for assessing local plan options and growth strategies. This

¹ Whilst the final year of the local plan is 2029 modelling is undertaken in 2031 which is the closest year forecast in the transport model. This study compares options and does not attempt to quantify impacts and therefore the difference in years will not have a material impact on the results presented.

scenario has been used previously by Blaby District Council, Oadby and Wigston, Harborough and Leicester City Council (Planning and Highways) to undertake assessments similar to that undertaken in this study. Thus, the assumptions and results will be in a form that is consistent with previous studies and be in a format that the City and County Highways Authorities will find familiar and straightforward to use. The scenario includes the M1 and M69 bridge associated with the Lubbethorpe development.

- 0.1.7 The TRICS database was used to estimate the number of trips generated by each of the potential development options sites and the LLITM v5 core scenario was used to determine the potential distribution of trips to and from each of the sites.
- 0.1.8 Separate assessments have been undertaken for the housing and employment parts of the study.

0.2 Housing

- 0.2.1 The study looks at reducing, by the year 2029, the number of houses delivered at Lubbethorpe by 750, from 4,500 to 3,750, and replacing them with houses delivered on alternative locations.
- 0.2.2 In order to deliver the 3,750 houses in Lubbethorpe it is still considered necessary to provide the transport mitigation measures set out in the S106 agreement as all the measures will have reached their agreed trigger points.
- 0.2.3 Two options included sites of 500 dwellings with the balance of 250 dwellings located within the PUA. In this study the impact of these 250 dwellings has not been considered. However, if either of these options was taken forward then the impact of these 250 dwellings would need to be considered
- 0.2.4 The analysis shows that transport mitigation work is likely to be required for sites of both 500 dwellings and 750 dwellings as both are likely to cause impacts that would need to be investigated further.
- 0.2.5 In this study the nature of any mitigation has not been investigated. However, it should be noted that as well as physical works on the links or junctions identified, the mitigation could also include specific measures to reduce the level of traffic accessing the site, such as:
- The provision of walking and cycling facilities
 - Public transport services
 - Travel planning
- 0.2.6 For all three options there is likely to be the need for further investigation in order to determine whether the following are required:
- Measures to reduce or facilitate the movement of traffic though Kirby Muxloe including junctions and links associated with Kirby Lane, Station Road, Main Street, Desford Road and Ratby Lane
 - Improvement to A47/Braunstone Lane junction
 - Measures to facilitate movements along Ratby Lane between the A47 and Kirby Muxloe with the aim of encouraging traffic to use this route in preference to Kirby Lane
 - Improvements to junctions on the A46. The junction with Ratby Lane has recently been improved in order to provide access to the Optimus Point and Glenfield

developments. However, when designing these improvements, the scheme would not have considered the impact of development on the A47 or Kirby Muxloe.

- 0.2.7 In addition, the development at Kirby Muxloe would need to consider the potential impact of traffic
- routing through Kirby Road and Station Road in Glenfield to the A50,
 - on Desford Lane towards Desford,
 - on Ratby Lane towards Ratby
 - and orbital movements on the A46 to make use of radial routes such as the A50 and Anstey Lane to access the areas to the North of Leicester
- 0.2.8 The options for sites North or South of the A47 would need to consider the impact of increased traffic on the A47 between Desford Crossroads and the city centre. It is possible that impacts may be felt as far back as the junction with the A5 at Dodwells/Longshoot. It is also possible that with a reduction in traffic associated with the Lubbethorpe development traffic from either of the A47 sites could make use of any 'freed-up' road space to access the M1 bridge and the Outer Ring Road (A563). Should the work be progressed further, It will be important to consider whether the road layout within Lubbethorpe² could facilitate the movement of through-traffic, or whether the street layout within the settlement has been designed to minimise these movements.
- 0.2.9 Due to the likely impacts on County and City Highways as well as the Strategic Road Network it would be necessary to involve the County and City Highways Authorities as well as Highways England in any review and/or assessment of the options.

0.3 Employment Land

- 0.3.1 This study looks at adding employment sites to a location in Enderby and/or Stoney Stanton. The sites partially replace land that has been lost to other uses, or land that is now not expected to come forward. For this phase of the study these sites were assumed to create additional traffic movements, rather than a redistribution of trips. The impact of this assumption can be tested in a later stage of work (if considered necessary).
- 0.3.2 The study again used the TRICS database to estimate trip volumes to the sites. This time based upon the expected use-class and the estimated Gross Floor Area. The following points highlight how trip volumes could depend on the landuse type.
- B1 office space is likely to generate a high volume of commuters. A large proportion will arrive in the morning peak and depart in the evening peak. It might be expected that there would be a higher density of workers than in B2 or B8 employment land. This type of landuse can generate a 'large' volume of trips compared to other employment land types.
 - B2 industrial space again attracts a large proportion of commuters who will arrive in the morning and depart in the evening. There is a lower density of workers compared to offices, and generally a lower volume of trip-making per square metre of floorspace compared to the B1 landuse (Office). However, there are also a greater volume of movements of people and goods into and out of the site relating to deliveries, tradesman etc. These are predominantly undertaken by cars and vans (which are not distinguished in this modelling).
 - B8 warehouse space is generally more variable, with the trip volumes highly dependent on the business that occupies the site. HGV deliveries are more

² The road layout is calmed, straight, 6.8m carriageways with 3m footways. This may allow, but not necessarily encourage rat-running.

common, and movements might occur throughout the day without necessarily peaking during the conventional morning or evening rush hour. In addition, many of the employees may be shift workers with changeover patterns that lead to traffic movements outside the conventional peak hours. Generally, the volume of movements per sqm of land is much lower than other land use types. However, the volume of HGV movements is much higher.

- 0.3.3 This phase of the study has concentrated on the morning peak, as this is the time period where any employment land will have the maximum impact on the rest of the network. However, if taken forward, the scenarios with B8 employment land will need to consider the impact outside of these time periods (for instance early morning, or during the day), particularly as the Enderby option is located near to the primary access to the M1/M69 as well as major retail destinations.
- 0.3.4 Also, this study has included the impact of HGV's associated with the B8 employment land. Following the practice in the LLITM modelling each HGV is defined to be equivalent to two cars. Traffic volume is then measured in passenger car units (pcu). For instance 1 HGV + 1 car is equivalent to 2 vehicles or 3 pcu.
- 0.3.5 Note however that at this stage separate distributions for car and HGV have not been used. It is possible that the HGV movements to the M1 have been underestimated, however the distributions were obtained from a LLITM zone that was made up entirely of B1, B2 and B8 employment land which will reduce this risk. In a later stage of work it would be necessary to estimate separate distributions for cars and HGV's.
- 0.3.6 As in the housing part of the study the nature of any mitigation has not been investigated, as this phase aims to be a proportionate study to allow informed decisions to be made as part of the option assessment process. It should be noted that as well as physical works on the links or junctions identified, the mitigation could also include specific measures to reduce the level of traffic accessing the site, such as:
- The provision of walking and cycling facilities
 - Public transport services
 - Travel planning
- 0.3.7 At Enderby two development options were considered³:
- Option 1: 152,000sqm of B8 warehouse
 - Option 2: 152,000sqm made up of 15,200 sqm (10%) B1, 30,400sqm (20%) B2 and 106,400sqm (70%) B8
- 0.3.8 For both options the importance of the M69 bridge is shown in the results, with the M69 bridge directing traffic via the new M1 bridge to the Outer Ring Road and to the North of Leicester; thus, avoiding the Fosse Park Area. It is important to be cautious with this result as the LLITM zone used to estimate the distribution loaded traffic onto the highway network close to the M69 bridge on new highway infrastructure. A potential consequence is that the traffic from this location may be slightly more inclined to using the M1 bridge rather than the B4114 to access the North of Leicester. Consequently, this study may slightly underestimate the amount of traffic on Leicester Lane and the B4114 and the Fosse Park area of Leicester
- 0.3.9 **For Option 1** it is estimated that around 128 vehicles (67 of them HGV's) might access the site in the morning peak hour. This is equivalent to 195 pcu which would directly access

³ The Gross Floor Area (GFA) was estimated at 40% of the total site area of 38ha

Leicester Lane. This could result in increases in traffic levels on the following links and junctions (note adding these volumes do not total 195pcu as a single vehicle may make use of several of the links or junctions)

- Around 53pcu could access the site via the M69 bridge
- Around 63pcu could use Smith Lane through Grove Park to access the Outer Ring Road. This is a potentially undesirable route with implications for Smith lane as well as junctions at either end.
- Around 87pcu could use the B4114/A563 roundabout and
- Around 51pcu the A5460 to access the M1/M69 junction
- Around 29 pcu would use the outer ring road to the A463 junction and 16pcu to the Pork Pie Roundabout.
- Around 19 pcu could use the B582 via Desford Crossroads.
- Around 16 pcu could use the Foxhunter roundabout

0.3.10 All these locations would need to be investigated further in order to determine whether traffic could be accommodated, or whether additional mitigation would be required. The volumes of traffic are such that some form of mitigation is likely to be required, particularly as these locations are predominantly forecast to be congested in 2031. In addition, should traffic not use the M69 bridge as forecast⁴, and if traffic was re-routed away from the Grove park area then the development could put a considerable strain on Leicester Lane/B4114 and B4114/A563 junctions and links between them

0.3.11 **For Option 2** around 673 vehicles (around 47 of which could be HGVs) totalling 720 pcu could access the site during the morning peak hour. This is a significant volume of vehicles in an already congested area of the network and would likely have a substantial impact on traffic already using the network.

0.3.12 Access arrangements to the sites do not form part of this first phase of the study. However, a very high-level assessment suggests that the site could be accommodated on Leicester Lane. LLITM forecasts that Leicester Lane, without the development, may carry around 1,500 pcu⁵ of traffic in the AM Peak hour in 2031. Even with an additional 720 vehicles this is short of the expected link capacity of Leicester Lane which could be in the order of 2,500 vehicles⁶ in an hour. This suggests that Leicester Lane could accommodate the traffic. However, this does not consider the impact of congestion or delay at the junctions in the vicinity of the site on Leicester Lane, Smith Lane, B4114 and A563.

0.3.13 The forecast increase in traffic volumes at these junctions are of a magnitude that it is likely that even if improvements could be made at these junctions, it is unlikely that the impact could to be 100% mitigated. Thus, the new traffic is likely to displace existing traffic to other roads resulting in knock-on effects to links and junctions beyond what could be anticipated in this study.

0.3.14 For the direct impacts this study anticipates the following increases in AM Peak hour traffic (note adding these volumes do not total 720pcu as a single vehicle may make use of several of the links or junctions):

⁴ For instance if it was not delivered before the employment site at Enderby was complete

⁵ Note that this figure is based upon this run of the model only, and has not been validated against traffic counts. A Traffic Surveys would be required to confirm this conclusion..

⁶ DMRB volume 5, Section 1, Part 3 TA79/99

- Around 191 pcu could access the site via the M69 bridge
- Around 204pcu could use Smith Lane through Grove Park to access the Outer Ring Road. This is a potentially undesirable route with implications for Smith Lane as well as junctions at either end. The routing and impacts on the junctions on the A563/Grove Park/A4114/Leicester Lane would need to be looked at in more detail. The model shows potentially significant increases in traffic levels of 313pcu at B4114/A563 junction and 255 vehicles at A563/Smith Lane junction
- Around 193pcu the A5460 to access the M1/M69 junction. Of these 98 use the M1 stretch around Leicester Forest East, 68 use the M69, and 38 use the A46
- Around 103 pcu would use the outer ring road to the A463 junction and 63pcu to the Pork Pie Roundabout.
- Around 74 pcu could use the B582 via Desford Crossroads.
- Around 57 pcu could use the Foxhunter roundabout

0.3.15 The impacts could also extend to the A47/Braunstone Way roundabout (100pcu), A563 New Parks Way (39pcu), A46 (38pcu) and the M1 North of 21a (60pcu).

0.3.16 The scale of these increases mean that more transport evidence would be required to convince the City and County Highways Authorities and Highways England that the impact of the development could be mitigated and that the impact would not be severe.

0.3.17 **Option 3, At Stoney Stanton**, consists of a development of 11,600sqm⁷ (GFA) of B2 industrial employment land on the northern edge of the settlement. It is estimated that this would generate around 112 vehicles to and from the site. These would be predominantly light vehicles; therefore, this is equivalent to 112 pcu.

0.3.18 The most significant impacts are likely to be felt within the settlement with an additional 77 vehicles (approx. 10% increase) using Huncote Road / Long Street to access the B581. There are numerous priority T-junctions on this stretch as well as residential frontages. It is likely that junctions on this stretch would want to be checked together with the junctions with the B581/Long Street and B581/Hinckley Road.

0.3.19 Outside the settlement:

- The County Highways Authority will also want to be satisfied that there would be no impact at the B4114/Braunstone Road and B4114/Coventry Road junctions where an increase of 30 vehicles is forecast.
- Highways England will wish to know the impact at M69/J2 where around 20 vehicles might access the M69.

0.4 Recommendations

0.4.1 Housing sites

- All three scenarios showed that additional mitigation work would likely be required as it was very unlikely that traffic from these locations would benefit from mitigation measures designed to support Lubbethorpe
- Due to the likely impacts of each of the three scenarios on the local highway network as well as the Strategic Road Network it would be necessary to involve the County and City Highways Authorities as well as Highways England in any review and/or assessment of the options.
- The scale of the development (whether 500 or 750 dwellings) didn't alter **where** further mitigation might be required.

⁷ Based upon a 40% occupancy of a 2.9ha site

-
- There are also likely to be further impacts from the 250 dwellings that were proposed for the PUA in two of the scenarios. Whether it is possible to mitigate the cumulative impact of these 250 dwellings will depend on the scale⁸ of the developments and the location.

0.4.2 Employment sites

- The study was undertaken using the LLITM core scenario that includes the assumption that there is a bridge across the M69 linking Leicester Lane to Lubbesthorpe. Should the Enderby employment site be delivered before the delivery of the bridge then further work would be needed, to the satisfaction of the Highway Authorities, to assess the likely impacts of this on the existing highway networks and determine the extent of mitigation required if traffic is unable to use the bridge
- All three options would require further investigation to determine the needs of mitigation including its form, type and extents. It is recommended that this work is undertaken in consultation with the local Highway Authorities and Highways England to avoid abortive work.
- Mixed land use development at the Enderby site could result in very significant increases in traffic levels due primarily to commuting traffic for the office (B1) and to a slightly smaller extent the industrial (B2) floorspace. Mitigating the impact of this traffic at this congested point in the network would be challenging and is very likely to result in the displacement of traffic. This would need to be assessed and mitigated especially if this displaced traffic resulted in traffic utilising unsuitable alternative routes.
- The Warehousing (B8) landuse impacts to the highways network would be primarily caused by the large volume of HGV movements that could occur throughout the day. It should be noted that, if this site is going to be taken forward, it is very likely that the Highway Authorities will require further investigations an assessment of the impact of these HGV movements throughout the day
- At Stoney Stanton the scale of development is much smaller. However the largest increase in traffic is likely to be focussed on the residential Huncote Road / Long Street for which there are no reasonable alternative routing options. As a consequence of this any mitigation is likely to be limited to controlling traffic speeds, on street parking, etc. along these residential streets

⁸ small and windfall developments of 10-15 houses would have a small individual impact on the highways network. It would be more difficult to prove they have a cumulative impact compared to a single large development of 250 dwellings for instance

1 Contents

0	<i>Executive Summary</i>	1
0.2	Housing.....	2
0.3	Employment Land	3
0.4	Recommendations	6
1	<i>Contents</i>	8
2	<i>Background to the Study</i>	9
2.2	Housing Scenarios:	9
2.3	Employment Land scenarios	11
3	<i>Background Assumptions</i>	12
3.1	LLITM Modelling Assumptions-	12
3.2	Traffic Volumes and Stressed Junctions.....	12
3.3	Junctions and Links to be assessed	12
3.4	Lubbesthorpe Transport Mitigation from the S106 agreement.....	13
4	<i>Trip Generation</i>	15
4.1	Assumptions	15
4.2	Housing land assessment.....	15
4.3	Employment land assessment.....	15
5	<i>Housing Options</i>	17
5.2	Option 1: Bloods Hill, Kirby Muxloe (500 dwellings).....	17
5.3	Option 2: A47S (500 dwellings) and Option 3 A47N (750 dwellings)	20
5.4	Recommendations	23
6	<i>Employment Options</i>	24
6.2	Scenario 1 Enderby development of B8 Employment land	25
6.3	Scenario 2: Enderby development of B1, B2 and B8 Employment land	26
6.4	Scenario 3: Stoney Stanton. Development of B2 Employment land	28
6.5	Recommendations	29
Appendix A.	<i>Traffic Levels and Stressed Junctions in 2031</i>	31
Appendix B.	<i>Changes in traffic Levels for the Housing Scenarios</i>	34
Appendix C.	<i>Changes in traffic Levels for the Employment Scenarios</i>	35

2 Background to the Study

- 2.1.1 Blaby District Council (BDC) have appointed Edwards & Edwards Consultancy Ltd (EAE) assess the Highways and Transportation impacts of proposed housing and employment sites that are options within the emerging Local Plan for possible delivery by 2029. The Leicester and Leicestershire Integrated Transport Model (LLITM)⁹ considers the impacts upto 2031.
- 2.1.2 This report provides the findings from the first stage of the work which undertook an initial assessment of the impact using the existing core scenario run of LLITM v5 to determine the potential location of impacts on links and junctions for three housing scenarios and three employment scenarios.
- 2.1.3 The study will focus on the AM Peak hour (0800 to 0900) in order to highlight the location of links and junctions that might require mitigation in order to support the proposed developments.
- 2.1.4 The Leicester Road site identified in the Delivery DPD preferred options (estimated at of 42 dwellings) is considered too small to be part of this initial strategic assessment. At this stage its direct impact can reasonably be assumed to be mainly its access arrangements and impacts on Leicester Lane, and junctions off Leicester lane (including with the B4114).
- 2.1.5 Access locations/arrangements to any of the potential development options are not considered in detail as part of this study and may require further assessment as part of a later stage of work if any of the sites are taken forward.

2.2 Housing Scenarios:

- 2.2.1 It is anticipated that the development at Lubbethorpe may fall around 750 dwellings short of its target to deliver 4,500 dwellings in the period upto 2029. In order to make up the shortfall Blaby District Council have proposed three options for delivering these 750 dwellings based upon the delivery of a primary site together with a balance of dwellings delivered on smaller sites within the Principal Urban Area (PUA).
- Option 1: 500 dwellings at Bloods Hill Kirby Muxloe with 250 dwellings elsewhere in the PUA
 - Option2: 500 dwellings in land South of the A47 with 250 dwellings elsewhere in the PUA
 - Option 3: 750 dwellings on land North of the A47
- 2.2.2 In this study, we have looked at adding the new dwellings as described in options 1, 2 and 3 and reducing the number of houses delivered at Lubbethorpe and then looking at the net change in traffic levels on individual links and junctions.
- 2.2.3 In the options that involve adding 250 houses to 'unknown' locations in the PUA it has not been possible to reliably predict the location of any highways impact. Consequently, the comparison of the Kirby Muxloe and A47 South sites, each of 500 dwellings, were made against a reduction of 500 dwellings in Lubbethorpe. For this study, this effectively means

⁹ LLITM is a landuse and transport model that has been developed by Leicestershire County Council. It provides a means of estimating future demands for travel and estimating their impact on the transport network (including highways). The model is multimodal which means that it takes into account changing demands for travel by walking, cycling, bus, train as well as car.

that the net impact of changing the location for delivery of the remaining 250 dwellings has not been determined and it would only be possible to determine the impact of the remaining 250 houses once their location is known.

- 2.2.4 For the Lubbesthorpe development LLITM uses two zones to represent the origin and destination of trips to the Lubbesthorpe development. One to the North of the site and the other towards the South. At the outset of this study it was decided to compare the options against distributions from each of the locations as it was thought that one, or other, might have a greater impact on the net change in traffic levels when part of option 1, 2 or 3. However whilst the distributions are quite different (with the Northern zone making greater use of the new M1 bridge which is largely complete and likely to open in spring 2017 whilst the Southern zone makes use of the M1 and M69¹⁰ bridges) they both have similar impacts when considering the net increases in traffic levels for the three options.
- 2.2.5 Figure 1 shows the location of the three housing development options at Kirby Muxloe (KM), North of the A47 (A47N) and South of the A47 (A47S) together with two locations where the LLITM model assumes traffic from the Lubbesthorpe development joins the highways network (Lubb N and Lubb S)

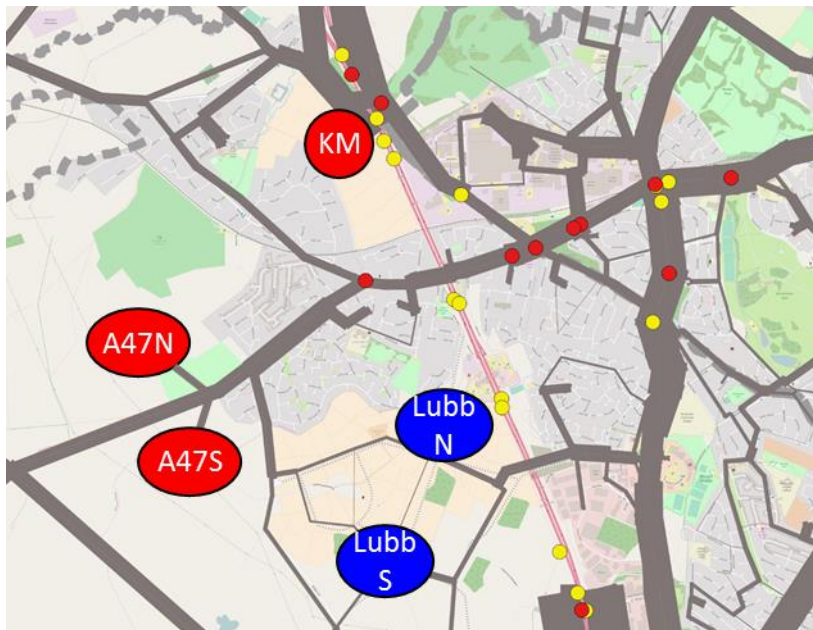


Figure 1 Location of the housing options

See Appendix A for explanation of the annotations on the map.

- 2.2.6 The result is that the 3 options considered as part of this study are shown in Figure 2.

¹⁰ Which is triggered on the delivery of 2,000 dwellings at Lubbesthorpe

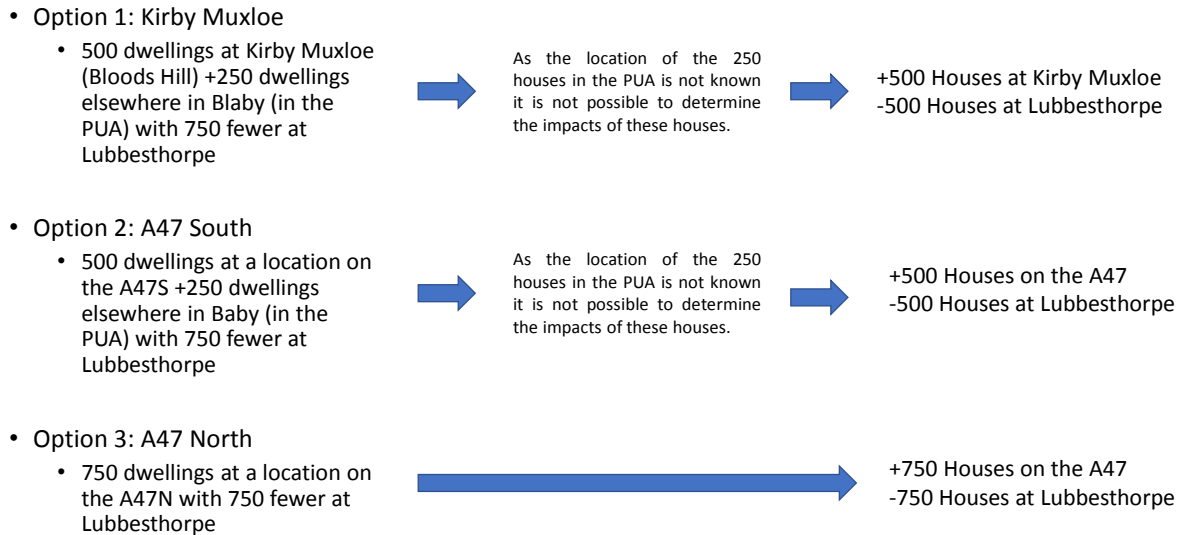


Figure 2: The Housing Scenarios

2.3 Employment Land scenarios

2.3.1 This study looks at adding employment sites to a location in Enderby and/or Stoney Stanton. The sites partially replace land that has been lost to other uses, or land that is now not expected to come forward. For this phase of the study these sites were assumed to create additional traffic movements, rather than a redistribution of trips. The impact of this assumption can be tested in a later stage of work (if considered necessary), however the assumption is likely to be valid for this initial phase of the study



Figure 3: Locations of employment sites Enderby (Emp1) and Stoney Stanton (Emp2)

See Appendix A for explanation of the annotations on the map.

2.3.2 Three options were considered (based upon estimated Gross Floor Area)

- Option 1: Enderby - 152,000sqm of B8 warehouse land
- Option 2: Enderby - 152,000sqm made up of 15,200 sqm (10%) B1, 30,400sqm (20%) B2 and 106,400sqm (70%) B8 in Ender

-
- Option 3: Stoney Stanton - 11,600sqm of B2 land

3 Background Assumptions

3.1 LLITM Modelling Assumptions-

- 3.1.1 This LLITM v5 core scenario is used by the Leicestershire County Council Highways Authority as their reference case for assessing local plan options and growth strategies. This scenario has been used previously by Blaby District Council, Oadby and Wigston, Harborough and Leicester City Council (Planning and Highways) to undertake assessments similar to that undertaken in this study. Thus, the assumptions and results will be in a form that is consistent with previous studies and be in a format that the City and County Highways Authorities will find familiar and straightforward to use..
- 3.1.2 The 2031 scenario contains a number of assumptions on transport schemes that will have been delivered. Improvements in the area of this study include:
- M1 motorway Bridge
 - M69 motorway bridge
 - Access schemes for the Lubbesthorpe Development
 - A47/Kirby Lane junction
 - M1/J19 (Cathorpe improvements)
 - A5 (Dodwells / Longshoot)
- 3.1.3 The LLITM 2031 scenario does not include improvements to A47 Desford crossroads, however this will not have a material impact on this stage of the study.
- 3.1.4 For this study the assumption that the M1 bridge, and M69 bridge have been delivered will have a material effect on the results for the site in Enderby. The M1 bridge is nearing completion and is likely to open in spring 2017, however the M69 bridge is only triggered on delivery of the 2,000th dwelling at Lubbesthorpe. Should the M69 bridge not be delivered then traffic from Lubbesthorpe would be less likely to access the Grove Park/Fosse Park area using Leicester Lane potentially leading to a potential reduction in background traffic levels. However, traffic from new development at Enderby would not be able to make use of the M69 bridge meaning there could be a larger impact in the Fosse Park/Grove Park area. Should this option be pursued further then discussion will be required with County Highways regarding the testing of an option without the M69 bridge.

3.2 Traffic Volumes and Stressed Junctions

- 3.2.1 Appendix A shows the LLITM forecast traffic levels and the location of junctions that are forecast to be close to or above their design capacity in 2031. This is sufficiently in the future that it provides a suitable proxy for 2029.
- 3.2.2 Traffic from the proposed development that make use of these congested junctions are likely to have a higher impact on delay and congestion.

3.3 Junctions and Links to be assessed

- 3.3.1 Figure 4 shows the locations of links and junctions that have been assessed for the Housing sites and the Enderby Employment site. The assessment of the Stoney Stanton site also includes the local impact within the settlement and the localised impact on the B4114.

3.3.2 Those junctions that are forecast by LLITM to be stressed in 2031 are shown in the key.

- Junctions at >85% of their design capacity (coloured yellow) will cause some delays with some stop-start queuing, and reduced predictability about journey times
- Junctions at >100% of their design capacity (coloured red) will see more severe delays, stop-start queuing, increased risk of accidents due to congestion/driver frustration/increased levels of conflict, and unpredictable journey times.

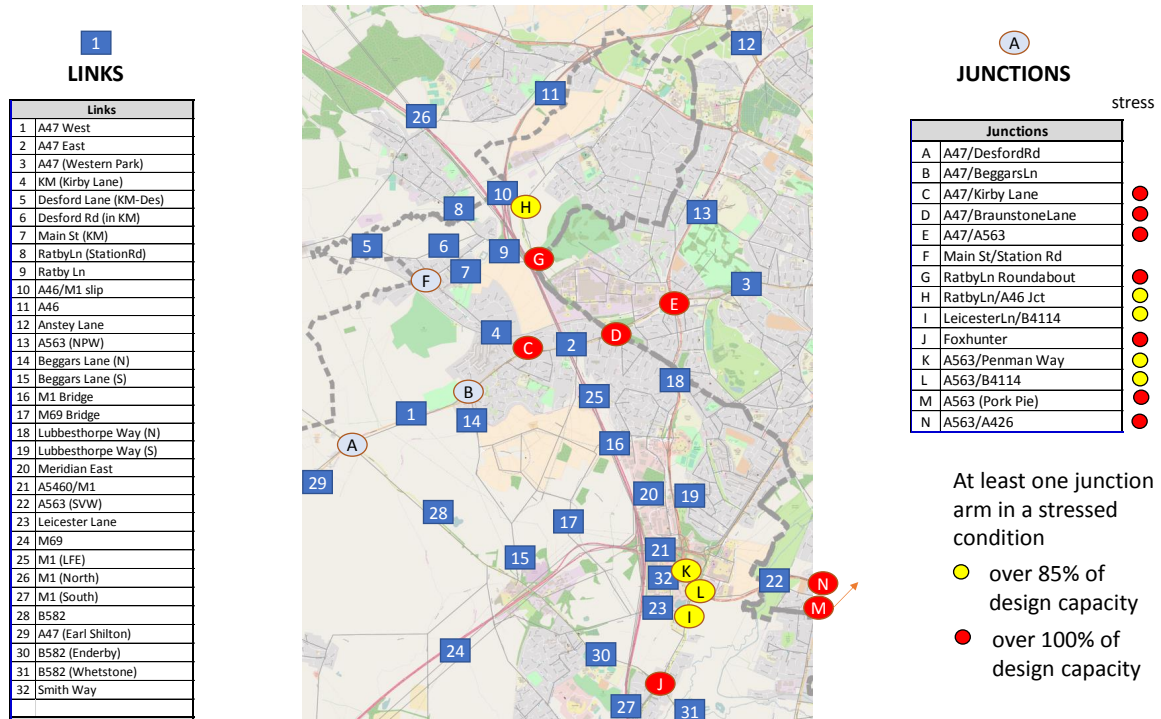


Figure 4: Location of junctions and links analysed as part of this study

3.4 Lubbesthorpe Transport Mitigation from the S106 agreement

- 3.4.1 The S106 agreement sets out the mitigation measures that have been agreed with respect to the New Lubbesthorpe development
- 3.4.2 Figure 5 shows the approximate location and trigger point for the delivery of each transport related measure. Based upon the trigger points all the schemes would be delivered prior to the delivery of the three housing options
- 3.4.3 However should the M69 bridge not be delivered before the developments proposed in this study, there would likely to be significant changes to traffic patterns. The impact of the non-delivery of the M69 bridge has not been included within this assessment but could be an important scenario/consideration in any further study.

Lubbesthorpe Transport Mitigation
 From the signed S106 agreement

	scheme	trigger
A	M1 Bridge	Delivered through LPPF
1	Beggars Lane Northern Access	
2	A47 / Beggars Lane	51 st dwelling
3	Traffic Calming in KM and Warren Lane	301 st dwelling
4	A47 / Baines Lane	301 st dwelling
5	A47 Bus Lane Baines Lane to Braunstone Lane	351 st dwelling
6	A47 / Braunstone Lane jct	750 th dwelling
7	A47 / A563 jct	501 st dwelling
8	A47 / Kirby Lane jct	
9	Causeway Lane / Vaughan Way	1000 th dwelling
10	M69 bridge Link	2000 th dwelling
11	Leicester Lane / St Johns jct	
12	Meridian South / A563	
13	A5460 to A563 link	
14	Withers Way / A563 improvements	
15	Desford Crossroads	3500 th dwelling
16	Foxhunter Roundabout	3000 th dwelling

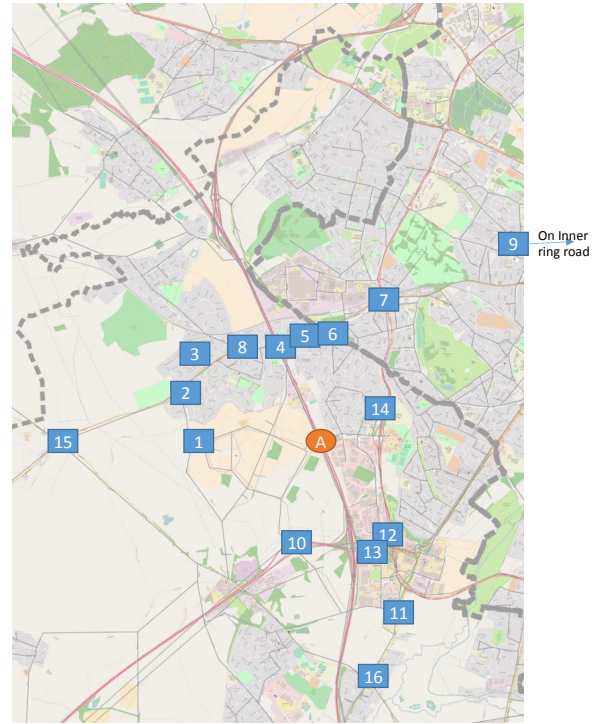


Figure 5: Transport Mitigation in the Lubbesthorpe S106 agreement

4 Trip Generation

4.1 Assumptions

- 4.1.1 For each of the housing and employment scenarios it was necessary to estimate the number of vehicles that could be generated by the sites, and for the housing scenarios the reduction in the number of vehicles to and from Lubbethorpe.
- 4.1.2 During the preparation of a planning application the consultant would consider the impact of housing type, facilities on the site (shops/schools etc), bus services, opportunities for encouraging walking and cycling and travel planning measures when estimating the number of vehicles that arrive and depart from the site.
- 4.1.3 However, for this study it was not possible, nor necessary, to include this level of detail. Instead unadjusted trip-rates obtained from TRICS were used.
- 4.1.4 These are likely to be higher than would appear in a planning application, but ensure that a robust assessment is undertaken by making-sure that the results over-, rather than, under-emphasise the potential impacts.

4.2 Housing land assessment

- 4.2.1 Trip rates for housing in Kirby Muxloe, Land North of the A47, Land South of the A47 as well as the Lubbethorpe development were determined using the TRICS database.
- 4.2.2 There are unlikely to be any significant reasons why trip-rates from the various sites would vary, therefore the trip-rates that were determined from the previous study¹¹ for Blaby District Council will be used.
- 4.2.3 As recommended in the 6C's design guide the 85th percentile trip-rates are used.

Table 1: Trip Rate (vehicles per dwelling) and Trip Volumes (Vehicles)

Vehicles	AM: 0800 to 0900		
	Arr	Dep	total
85 th percentile	0.162	0.459	0.621
500 Dwellings	81	230	311
750 Dwellings	122	344	466

- 4.2.4 For the Kirby Muxloe and A47 sites these additional vehicles are added to the road network. The same number of vehicles is then removed from the Lubbethorpe site in order to estimate the net change in the number of vehicles on each link of the highway network.

4.3 Employment land assessment

- 4.3.1 A Technical note has been produced¹² summarising the process of estimating the trip generation of the employment land.
- 4.3.2 The study used the TRICS database to estimate trip volumes to the sites. The volumes were based upon the expected use-class and the estimated Gross Floor Area of the site. The following points highlight how trip volumes can depend on the landuse type.

¹¹ See table 4 in [03 TRICS results v1.0.pdf](#). Trip Generation for sites in Blaby (EAE technical note) 4/7/16

¹² See [03 TRICS Employment Sites within Blaby results 0.5.pdf](#)

- B1 office space is likely to generate a high volume of commuters. A large proportion will arrive in the morning peak and depart in the evening peak. It might be expected that there would be a higher density of workers than in B2 or B8 employment land. This type of landuse can generate a large volume of trips.
- B2 industrial space again attracts a large proportion of commuters who will arrive in the morning and depart in the evening. There is a lower density of workers, and generally a lower volume of trip-making per square metre of floorspace compared to the B1 landuse. . However, there are also a greater volume of movements of people and goods into and out of the site relating to deliveries, tradesman etc. These are predominantly undertaken by cars and vans (which are not distinguished in this modelling).
- B8 warehouse space is generally more variable, with the trip volumes highly dependent on the business that occupies the site. HGV deliveries are more common, and might occur throughout the day without necessarily peaking during the conventional morning or evening rush hour. In addition, many of the employees may be shift workers with changeover patterns that lead to traffic movements outside the conventional peak hours. Generally, the volume of movements per sqm of land is much lower than other land use types. However, the volume of HGV movements is much higher.

4.3.3 This phase of the study has concentrated on the morning peak, and this is the time period where any employment land will have the maximum impact. However, if taken forward, the scenarios with B8 employment land will need to consider the impact outside of these time periods, particularly as the Enderby option is located near to the primary access to the M1/M69 as well as major retail destinations.

4.3.4 Also this study has included the impact of HGV's associated with the B8 employment land. Following the practice in the LLITM modelling each HGV is defined to be equivalent to two cars. Traffic volume is then measured in passenger car units (pcu). For instance 1 HGV + 1 car is equivalent to 2 vehicles or 3 pcu.

4.3.5 These estimated trip volumes are summarised in Table 2

Table 2: Trip Rates and traffic volumes (in units of vehicles and pcu) for the three employment land scenarios

				Vehicles			PCU			
				in	out	total	in	out	total	
Trip Rates			B1	car	1.640	0.278	1.918	1.640	0.278	1.918
vehicle/pcu per 100sqm (GFA)			B2	car	0.612	0.350	0.962	0.612	0.350	0.962
AM Peak hour (0800 to 0900)			B8	car	0.023	0.017	0.040	0.023	0.017	0.040
85th percentile trip rate				HGV	0.022	0.022	0.044	0.044	0.044	0.088
Enderby	Scenario 1	152,000	B8	car	35	26	61	35	26	61
				HGV	33	33	67	67	67	134
		Total	68	59	128	102	93	195		
	Scenario 2	15,200	B1	car	249	42	292	249	42	292
		30,400	B2	car	186	106	292	186	106	292
		106,400	B8	car	24	18	43	24	18	43
HGV				23	23	47	47	47	94	
Total	483	190	673	507	214	720				
Stoney Stanton	Scenario 3	11600	B2	car	71	41	112	71	41	112
				Total	71	41	112	71	41	112

5 Housing Options

5.1.1 Appendix B contains details of the changes in traffic levels on each of the monitored links and junctions.

5.2 Option 1: Bloods Hill, Kirby Muxloe (500 dwellings)

5.2.1 Figure 6 shows the **net change** in traffic levels between adding houses at Kirby Muxloe and removing houses from the North of Lubbesthorpe

5.2.2 Figure 7 shows the **net change** in traffic levels between adding houses at Kirby Muxloe and removing houses from the South of Lubbesthorpe.

5.2.3 Whilst net reductions in traffic levels are dependent on whether the comparison is made against the Northern Lubbesthorpe or Southern Lubbesthorpe distribution the net increase is largely unaffected. Consequently for Option 2 and 3 only the comparison between the distribution from the Northern part of the Lubbesthorpe site will be made.

5.2.4 The links and junctions in red broadly show where net traffic increases and further investigation is required to determine whether additional mitigation is required.

Additional Dwellings
500 Dwellings, Blood Hill,
Kirby Muxloe

Reduction in Dwellings
500 dwellings in the
NORTHERN part of
Lubbesthorpe

Further 250 dwellings
reduction in Lubbesthorpe
matched by 250 increase
in or adjacent to the PUA.
Location of new dwellings
not known. For this
analysis there is assumed
to be no net change in
traffic

Note Results show traffic in Main Street rather than Desford Road in Kirby Muxloe. This is an artefact of the modelling... Traffic is likely to split between the two roads.

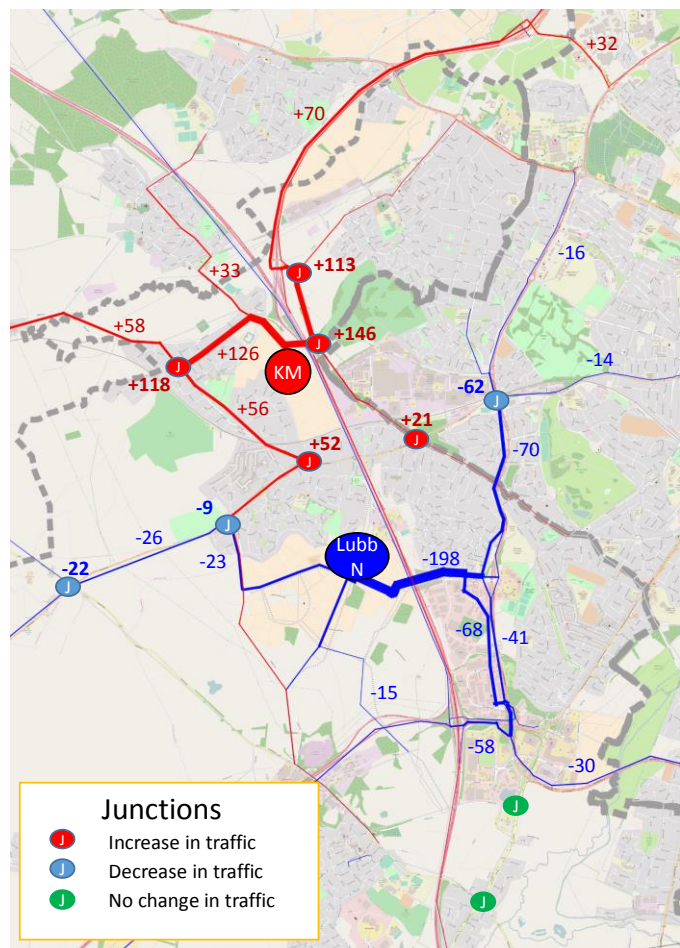


Figure 6: Kirby Muxloe and North of Lubbesthorpe (net changes in traffic levels)

Additional Dwellings
500 Dwellings, Blood Hill,
Kirby Muxloe

Reduction in Dwellings
500 dwellings in the
SOUTHERN part of
Lubbesthorpe

Further 250 dwellings
reduction in Lubbesthorpe
matched by 250 increase
in or adjacent to the PUA.
Location of new dwellings
not known. For this
analysis there is assumed
to be no net change in
traffic

Note Results show traffic in Main Street rather than Desford Road in Kirby Muxloe. This is an artefact of the modelling... Traffic is likely to split between the two roads.

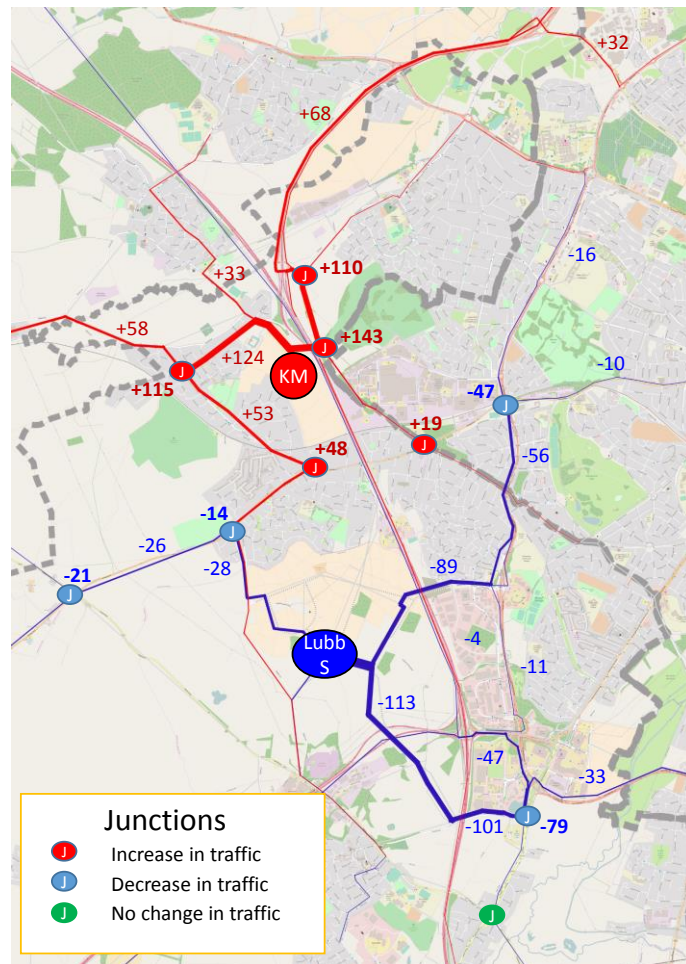


Figure 7: Kirby Muxloe and South of Lubbesthorpe (net changes in traffic levels)

- 5.2.5 In this study the nature of any mitigation has not been investigated. However, it should be noted that as well as physical works on the links or junctions identified, the mitigation could also include specific measures to reduce the level of traffic accessing the site, such as:
- The provision of walking and cycling facilities
 - Public transport services
 - Travel planning
- 5.2.6 Specific junctions, that are already identified as stressed in LLITM, that could see increases in traffic are:
- A47/Kirby Lane (52 vehicles)
 - A47/Braunstone Lane (19 or 21 vehicles)
 - Ratby Lane Roundabout (146 vehicles)
 - Ratby Lane/A46 junctions (113 vehicles)
- 5.2.7 Stressed junctions that might experience a decrease in traffic include:
- A47/A563 (-62 vehicles)
- 5.2.8 In addition traffic levels could fall on Lubbesthorpe Way, Meridian East, A5460 and the A563 to the South of Leicester as drivers are likely to want to access the North of the City from Kirby Muxloe, rather than the south. As part of this reduction the following junctions could

see a reduction in traffic if it was assumed that the Lubbesthorpe distributions were based upon those from the southern part of the Lubbesthorpe development

- Leicester Lane/B4114 (-79 vehicles)
- A563/Penman Way (-48 vehicles)
- A563/B4114 (-84 vehicles)
- A563 (Pork Pie) (-16 vehicles)

5.2.9 In terms of mitigation to support development in Kirby Muxloe these results show that traffic increases associated with 500 dwellings in Kirby Muxloe might lead to the following being required:

- Measures to reduce or facilitate the movement of traffic though Kirby Muxloe including junctions and links associated with Kirby Lane, Station Road, High Street, Desford Road and Ratby Lane
- Improvement to A47 / Braunstone Lane / Ratby Lane junction
- Measures to facilitate movements along Ratby Lane between the A47 and Kirby Muxloe with the aim of encouraging traffic to use this route in preference to Kirby Lane
- Improvements to junctions on the A46. The junction with Ratby Lane has recently been improved in order to provide access to the Optimus Point and Glenfield developments. However, when designing these improvements, the scheme would not have considered the impact of development on the A47 or Kirby Muxloe.

5.2.10 In addition, the development at Kirby Muxloe would need to consider the potential impact of traffic routing through Kirby Road and Station Road in Glenfield to the A50, and orbital movements on the A46 to make use of radial routes such as the A50 and Anstey Lane to access the Northern Part of Leicester

5.2.11 Figure 8 summarises the key locations where the different highways authorities are likely to require details of the increased impact of any development and details of possible mitigation measures.

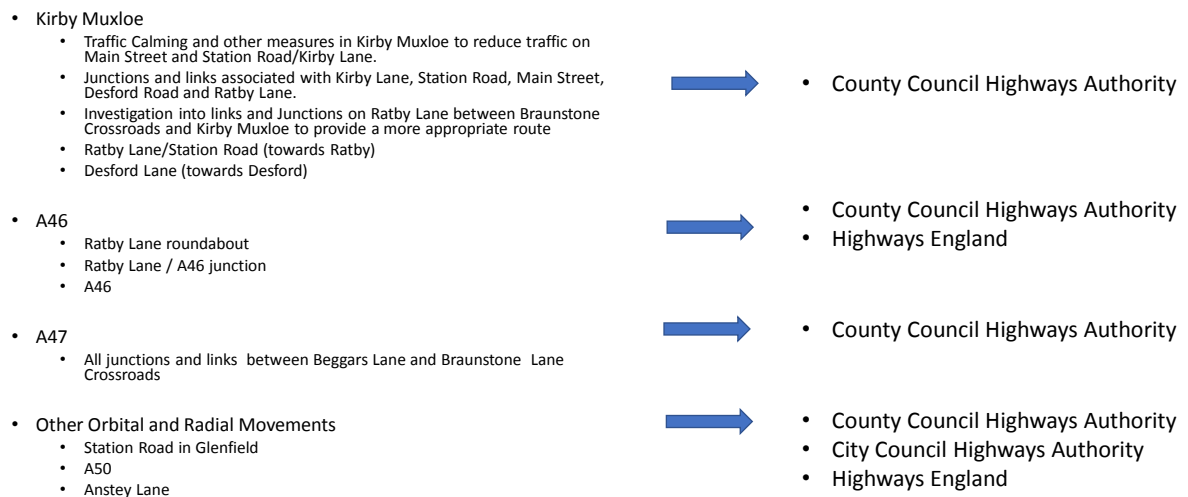


Figure 8: Key locations where further investigation might be required for a development of 500 dwellings in Bloods Hill, Kirby Muxloe

5.3 Option 2: A47S (500 dwellings) and Option 3 A47N (750 dwellings)

- 5.3.1 Option 2 and Option 3 are presented together as the proposed developments access the A47 at a very similar location. The difference between the options primarily relates to the size of the site, with an additional 250 houses proposed for the land North of the A47 (Option 3).
- 5.3.2 Figure 9 shows the change in traffic levels for option 3, with 750 dwellings on land to the North of the A47 and a reduction in 750 dwellings on the Northern part of Lubbesthorpe. The change in traffic levels, on each link, is around 50% greater than is estimated for option 2 where 500 dwellings are located on land to the South of the A47
- 5.3.3 The plot of the change in traffic levels for option 2 has not been shown separately in this report as the scale of the development (500 dwellings or 750 dwellings) does not materially impact the **key locations** where traffic levels increase or decrease. Consequently, the locations where mitigation is likely to be required to support the site North of the A47 also applies to the site South of the A47. If this work was progressed to the next stage, then the scale of development would need to be looked at in more detail, and possibly differing measures proposed to mitigate the different levels of impact
- 5.3.4 Whilst net reductions in traffic levels for each option are dependent on whether the comparison is made against the Northern Lubbesthorpe or Southern Lubbesthorpe distribution the location of the net increase in traffic (and thus the location where mitigation might be required) is largely unaffected. Consequently, for simplicity, only a single plot showing a reduction in traffic from the Northern part of Lubbesthorpe has been included in this report.

Additional Dwellings
750 Dwellings, Land North of the A47

Reduction in Dwellings
750 dwellings in the **NORTHERN** part of Lubbesthorpe

Note Results show traffic in Main Street rather than Desford Road in Kirby Muxloe. This is an artefact of the modelling... Traffic is likely to split between the two roads.

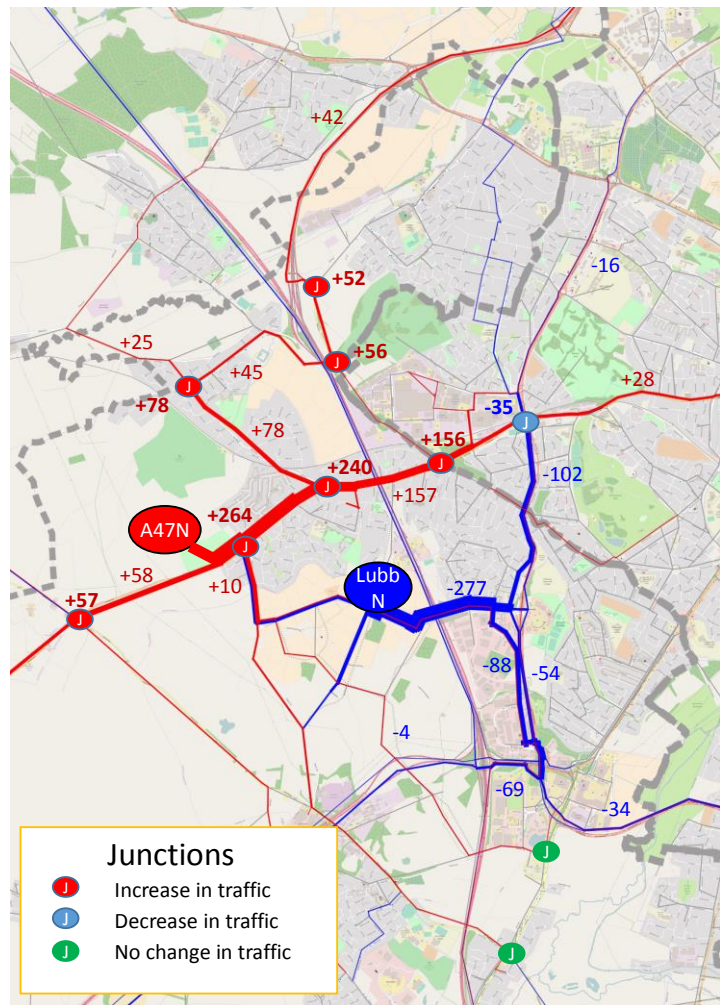


Figure 9: Land North of the A47 and Northern part of Lubbesthorpe

5.3.5 The modelling shows that:

- Traffic from either site located on land adjacent to the A47 would likely use the A47 to access the City with increases in traffic levels on the entire route into the city. The only location where traffic levels might reduce could be the A47/A563 junction where orbital movements accessing Lubbesthorpe could be reduced.
- Orbital movements to the North of Leicester from drivers accessing the A47 site would use the A46 in preference to the A563. Potentially using roads through Kirby Muxloe to gain access to the A46
- Located on the West of Leicester the site could also provide preferential access to origins and destinations towards Hinckley and Warwickshire increasing traffic levels on the A47 towards Desford Crossroads and beyond (potentially to Dodwells/Longshoot on the A5).
- Junction 21 of the M1 is less accessible to the proposed locations (compared to Lubbesthorpe) and there could be a reduction in traffic accessing the M1/M69 at J21

5.3.6 Turning to mitigation, it is clear that in order to deliver the 3,750 houses in Lubbesthorpe it will still be necessary to provide the transport mitigation measures set out in the S106 agreement as all the triggers will have been activated.

5.3.7 In addition these results show that there are junctions that are already identified as stressed in LLITM could see further increases in traffic. These are:

- The majority of Junctions on the A47 between Kirby Lane and the Inner Ring Road in Leicester (except the junction with the A563). For example
 - 234¹³ vehicles at A47/Kirby Lane
 - 154 vehicles at A47/Braunstone Lane
- Ratby Lane Roundabout (52 vehicles)
- Ratby Lane/A46 junctions (48 vehicles)

5.3.8 Traffic levels could fall on Lubbethorpe Way, Meridian East, A5460 and the A563 to the South of Leicester as drivers are likely to want to access the North of the City, from the sites on the A47, rather than the south. As part of this reduction the following junctions could see a reduction in traffic if it was assumed that the Lubbethorpe distributions were based upon those from the southern part of the Lubbethorpe development

- Leicester Lane/B4114 (-108 vehicles)
- A563/Penman Way (-69 vehicles)
- A563/B4114 (-115 vehicles)
- A563 (Pork Pie) (-21 vehicles)

5.3.9 For both option 2 and 3 there will be a need to investigate:

- the impact of increased traffic on the A47 between Desford Crossroads and the city centre. It is possible that impacts may be felt as far back as the junction with the A5 at Dodwells/Longshoot
- Measures to reduce or facilitate the movement of traffic though Kirby Muxloe including junctions and links associated with Kirby Lane, Station Road, Main Street, Desford Road and Ratby Lane
- Measures to facilitate movements along Ratby Lane between the A47 and Kirby Muxloe with the aim of encouraging traffic to use this route in preference to Kirby Lane
- Improvements to junctions on the A46. The junction with Ratby Lane has recently been improved in order to provide access to the Optimus Point and Glenfield developments. However, when designing these improvements, the scheme would not have considered the impact of development on the A47 or Kirby Muxloe.

5.3.10 It is also possible that with a reduction in traffic associated with the Lubbethorpe development traffic from either of the A47 sites could make use of any 'freed-up' road space to access the M1 bridge and the Outer Ring Road (A563). Should the work be progressed further it will be important to consider whether the road layout within Lubbethorpe¹⁴ could facilitate the movement of through-traffic, or whether the street layout within the settlement has been designed to minimise these movements.

5.3.11 Figure 10 summarises the key locations where the different highways authorities are likely to require details of the impact of any development and details of mitigation measures.

¹³ For option 3 (750 dwellings on land to the North of the A47)

¹⁴ The road layout is calmed, straight, 6.8m carriageways with 3m footways. This may allow, but not necessarily encourage rat-running.

-
- Kirby Muxloe
 - Traffic Calming and other measures in Kirby Muxloe to reduce traffic on Main Street and Station Road/Kirby Lane.
 - Investigation into links and Junctions on Ratby Lane between Braunstone Lane Crossroads and Kirby Muxloe to provide a more appropriate route

 - A46
 - Ratby Lane roundabout
 - Ratby Lane / A46 junction
 - A46

 - A47
 - All Junctions and links between (at least) Desford Crossroads and the city centre



- County Council Highways Authority



- County Council Highways Authority
- Highways England



- County Council Highways Authority
- City Council Highways Authority

Figure 10: locations where further investigation might be required

5.4 Recommendations

5.4.1 Should any of the housing options be taken forward the following bullet points summarise the recommendations from this study.

- All three scenarios showed that additional mitigation work would be required as it was very unlikely that traffic from these new locations would be entirely mitigated by the proposed transport improvement measures associated with the Lubbethorpe development.
- Due to the likely impacts of each of the scenarios on the local highway networks as well as the Strategic Road Network it would be necessary to involve the County and City Highways Authorities as well as Highways England in any review and/or assessment of the preferred option(s).
- The scale of the development (whether 500 or 750 dwellings) didn't alter where further mitigation might be required.
- There are also likely to be further impacts from the 250 dwellings that were proposed for the PUA in two of the scenarios. Whether it is possible to mitigate the cumulative impact of these 250 dwellings will depend on the scale¹⁵ of the developments and the location.

¹⁵ small and windfall developments of 10-15 houses would have a small individual impact on the highways network. It would be more difficult to prove they have a cumulative impact compared to a single large development of 250 dwellings for instance

6 Employment Options

- 6.1.1 Appendix C contains details of the increases in traffic volumes on each of the assessed links and junctions. Results are presented for the morning peak hour (0800 to 0900) with traffic volumes measured in passenger car unit's (pcu's)
- 6.1.2 This study looks at adding employment sites to a location in Enderby and/or Stoney Stanton. Although some of the change is replacement for land lost to other uses, for this phase of the study these sites were assumed to create additional traffic movements, rather than a redistribution of trips. The impact of this assumption can be tested in a later stage of work (if necessary), however the assumption is likely to be valid for this initial phase of the study.
- 6.1.3 The study again used the TRICS database to estimate trip volumes to the sites. This time based upon the expected use-class and the estimated Gross Floor Area. The following points highlight how trip volumes could depend on the landuse type.
- B1 office space is likely to generate a high volume of commuters. A large proportion will arrive in the morning peak and depart in the evening peak. It might be expected that there would be a higher density of workers than in B2 or B8 employment land. This type of landuse can generate a large volume of trips.
 - B2 industrial space again attracts a large proportion of commuters who will arrive in the morning and depart in the evening. There is a lower density of workers, and generally a lower volume of trip-making per square metre of floorspace compared to the B1 landuse. However, there are also a greater volume of movements of people and goods into and out of the site relating to deliveries, tradesman etc. These are predominantly undertaken by cars and vans (which are not distinguished in this modelling).
 - B8 warehouse space is generally more variable, with the trip volumes highly dependent on the business that occupies the site. HGV deliveries are more common, and might occur throughout the day without necessarily peaking during the conventional morning or evening rush hour. In addition, many of the employees may be shift workers with changeover patterns that lead to traffic movements outside the conventional peak hours. Generally, the volume of movements per sqm of land is much lower than other land use types. However, the volume of HGV movements is much higher.
- 6.1.4 This phase of the study has concentrated on the morning peak, and this is the time period where any employment land will have the maximum impact. However, if taken forward, the scenarios with B8 employment land will need to consider the impact outside of these time periods, particularly as the Enderby option is located near to the primary access to the M1/M69 as well as major retail destinations.
- 6.1.5 Also, this study has included the impact of HGV's associated with the B8 employment land. Following the practice in the LLITM modelling each HGV is defined to be equivalent to two cars. Traffic volume is then measured in passenger car units (pcu). For instance 1 HGV + 1 car is equivalent to 2 vehicles or 3 pcu.
- 6.1.6 Note however that at this stage separate distributions for car and HGV have not been used. It is possible that the HGV movements to the M1 have been underestimated, however the distributions were obtained from a LLITM zone that was made up entirely of B1, B2 and B8 employment land. For a later stage of work it would be necessary to estimate separate distributions for cars and HGV's.

6.1.7 As in the housing part of the study the nature of any mitigation has not been investigated. However it should be noted that as well as physical works on the links or junctions identified, the mitigation could also include specific measures to reduce the level of traffic from workers accessing the site, such as,:

- The provision of walking and cycling facilities
- Public transport services
- Travel planning

6.2 Scenario 1 Enderby development of B8 Employment land

6.2.1 Scenario 1 is assumed to consist of 152,000 sqm of B8 employment land. The primary use of B8 land is for warehouse type activities.

6.2.2 Table 3 shows the estimated trip generation in the AM Peak hour. As can be seen a large proportion of the vehicles entering and exiting the site could be HGV's.

Table 3: AM Peak traffic entering and exiting the site

GFA (sqm)	type		Vehicles			PCU		
			in	out	total	in	out	total
152,000	B8	car	35	26	61	35	26	61
		HGV	33	33	67	67	67	134
		Total	68	59	128	102	93	195

6.2.3 it is estimated that around 128 vehicles (67 of them HGV's) might access the site in the morning peak hour. This is equivalent to 195 pcu which would directly access Leicester Lane.

6.2.4 Figure 11 shows the estimated increase in traffic volumes at key junctions and links associated with arrivals and departures in the AM peak hour.

6.2.5 The model suggests that

- with the M69 and M1 bridges in place traffic(around 53pcu) using the A563 might avoid the Fosse Park area and access the site from the North West using the new highways infrastructure. The traffic volumes are relatively low, but significant enough that further investigation is likely to be required. Should the M69 bridge not be completed then this volume of traffic would likely divert through Leicester Lane, B4114, Grove Park and A563
- around 63pcu of traffic could use Smith Lane through Grove Park to provide access the A563. This is a potentially undesirable route with implications for Smith lane as well as junctions at either end. The routing and impacts on the junctions on the A563/Grove Park/A4114/Leicester Lane would need to be looked at in more detail
- Access to the M1/M69 junction is important with 51 pcu using the A5460. Of these 26 use the M1 stretch around LFE, and 18 on the M69. Again, the increases in traffic levels are relatively low compared to the total number of vehicles, but the increase is significant enough to warrant further investigation
- there could be increases in traffic on the A563 that could impact the A563/A426 and A563 (Pork Pie) junctions. Again these volumes are small compared to the background traffic levels.
- Around 19 pcu could use the B582 via Desford Crossroads.
- Around 16 pcu could use the Foxhunter roundabout

6.2.6 All these locations would need to be investigated further in order to determine whether traffic could be accommodated, or whether additional mitigation would be required. The volumes of

traffic are such that some form of mitigation is likely to be possible. However these are predominantly at locations that are forecast to be congested. In addition, should traffic not use the M69 bridge and/or if traffic was re-routed away from the Grove park area then the development could put a considerable strain on Leicester Lane/B4114 and B4114/A563 junctions and links between them

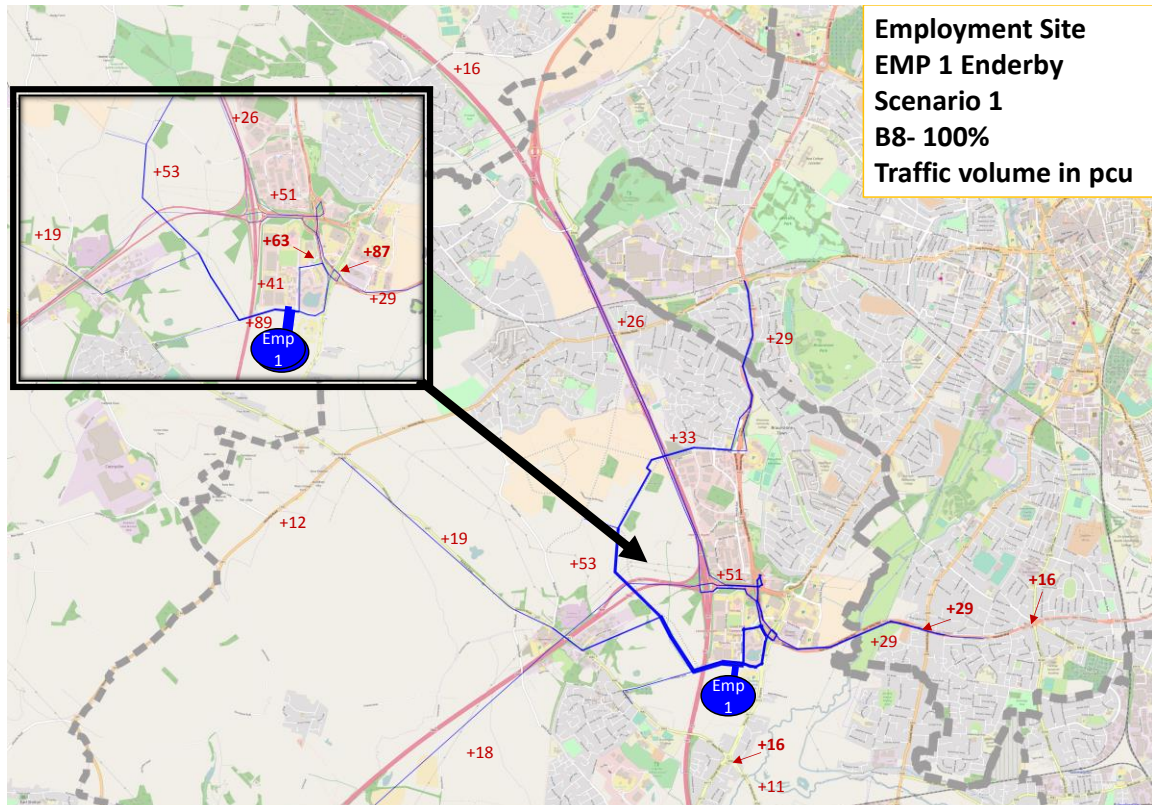


Figure 11: Scenario 1. AM Peak traffic levels in pcu

6.3 Scenario 2: Enderby development of B1, B2 and B8 Employment land

- 6.3.1 Scenario 2 consists of developing the same parcel of land as in scenario 1, but changing the landuse mix to include B1 (office) and B2 (industrial) employment. This changes not only the volumes of vehicles using the site during the morning peak hour, but also the proportions travelling in each direction¹⁶.
- 6.3.2 Because of the, still, sizeable proportion of B8 (warehouse) employment land the number of HGV movements is likely to be significant. Table 4 shows that around 673 vehicles (around 47 of which could be HGVs) totalling 720 pcu could access the site during the morning peak hour. This is a significant volume of vehicles in an already congested area of the network..

¹⁶ Office traffic is predominantly inbound commuters, whilst industrial units have more deliveries and outbound movements associated with goods

Table 4: AM Peak traffic entering and exiting the site

	GFA (sqm)	type		Vehicles			PCU		
				in	out	total	in	out	total
Scenario 2	15,200	B1	car	249	42	292	249	42	292
	30,400	B2	car	186	106	292	186	106	292
	106,400	B8	car	24	18	43	24	18	43
			HGV	23	23	47	47	47	94
			Total	483	190	673	507	214	720

- 6.3.3 Access arrangements to the sites do not form part of this first phase of the study. However, a very high-level assessment suggests that the site could be accommodated on Leicester Lane. LLITM forecasts that Leicester Lane, without the development, could carry around 1,500 pcu¹⁷ of traffic in the AM Peak hour in 2031. Even with an additional 720 vehicles this is short of the expected link capacity of Leicester Lane which could be in the order of 2,500 vehicles¹⁸ in an hour. This suggests that Leicester Lane could accommodate the traffic. However this does not consider the impact of congestion or delay at the junctions in the vicinity of the site on Leicester Lane, Smith Lane, B4114 and A563.
- 6.3.4 The forecast increase in traffic volumes at these junctions are of a magnitude that it is likely that even if improvements could be made at these junctions, the impact would not be 100% mitigated with the result that existing traffic would be displaced to alternative roads resulting in knock-on effects to links and junctions beyond what could be anticipated in this study.
- 6.3.5 Figure 12 shows the estimated increase in traffic volumes at key junctions and links associated with arrivals and departures in the AM peak hour. The inbound and outbound traffic distributions are assumed to be the same as in scenario 1. However the traffic volumes are increased considerably

The model suggests that

- with the M69 and M1 bridges in place traffic using the A563 might avoid the Fosse Park area and access the site from the North West using the new highways infrastructure. 191 pcu using the M69 bridge and 113pcu using the M1 bridge. Around 345pcu could use Leicester Lane turning towards the M69 bridge.
- This could extend around to the A563/A47 junction where an additional 100pcu are forecast
- Around 204pcu could use Smith Way through Grove park to access the Outer Ring Road. This is a potentially undesirable route with implications for Smith lane as well as junctions at either end. The routing and impacts on the junctions on the A563/Grove Park/A4114/Leicester Lane would need to be looked at in more detail. The model shows potentially significant increases in traffic levels of 313pcu at B4114/A563 junction and 255 vehicles at A563/Smith Lane junction
- Access to the M1/M69 junction is significant with 193 pcu using the A5460. Of these 98 use the M1 stretch around LFE, 68 on the M69, and 38 on the A46
- Around 103 pcu would use the outer ring road to the A463 junction and 63pcu to the Pork Pie Roundabout.

¹⁷ Note that this figure is based upon this run of the model only, and has not been validated against traffic counts. A Traffic Survey would be required to confirm this conclusion..

¹⁸ DMRB volume 5, Section 1, Part 3 TA79/99

- Around 74 pcu could use the B582 via Desford Crossroads.
- Around 57 pcu could use the Foxhunter roundabout

6.3.6 The impacts could also extend to the A47/Braunstone Way roundabout (100pcu), A563 New parks Way (39pcu), A46 (38pcu) and the M1 North of 21a (60pcu).

6.3.7 The scale of these increases mean that more transport evidence would be required to convince the City and County Highways Authorities and Highways England that the impact of the development could be mitigated.

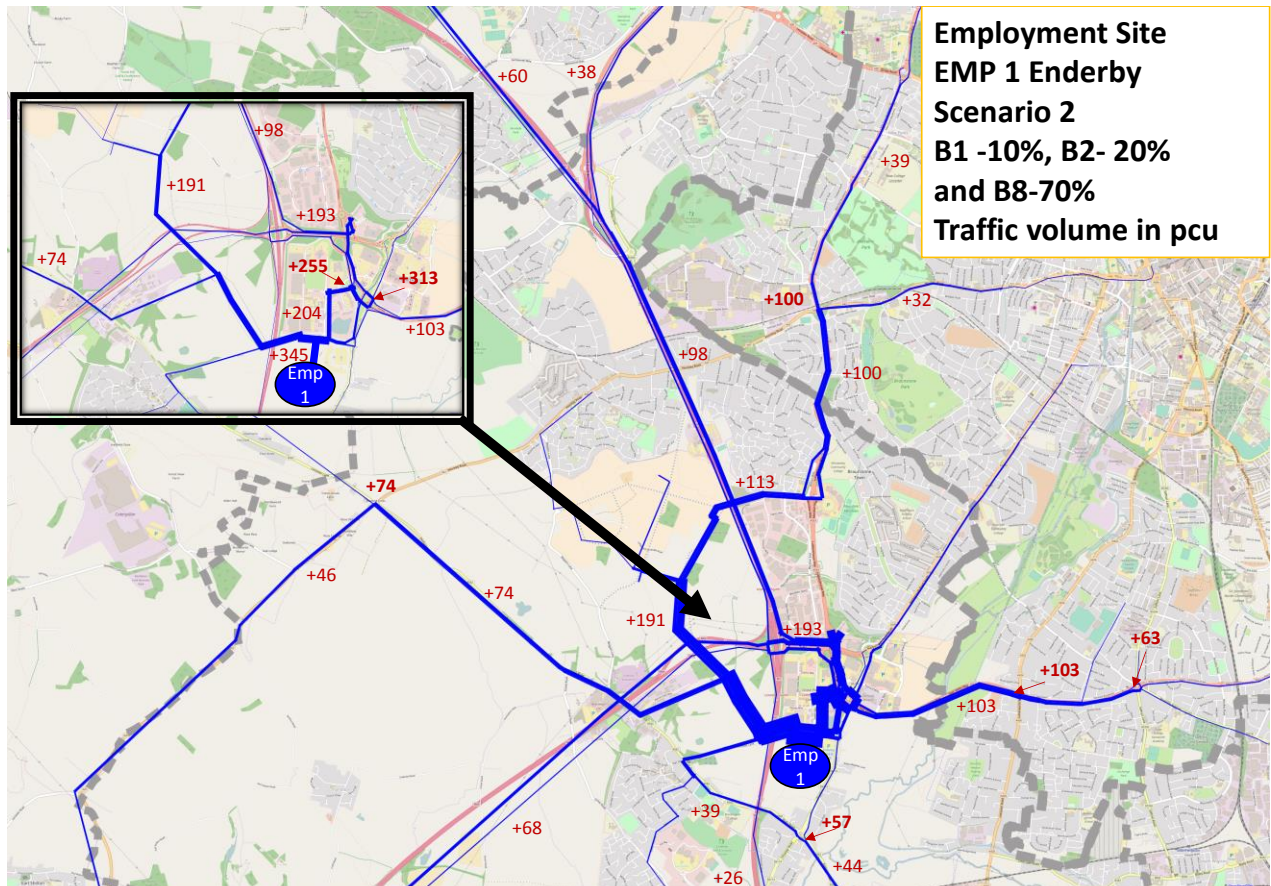


Figure 12: Scenario 2. AM Peak traffic levels in pcu

6.4 Scenario 3: Stoney Stanton. Development of B2 Employment land

6.4.1 At Stoney Stanton option 3 consists of a development of 11,600sqm of B2 industrial employment land on the northern edge of the settlement. It is estimated that this would generate around 112 vehicles to and from the site. These would be predominantly light vehicles; therefore, this is equivalent to 112 pcu, see Table 5.

Table 5: AM Peak traffic entering and exiting the site

	GFA (sqm)	type		Vehicles			PCU		
				in	out	total	in	out	total
Scenario 3	11,600	B2	car	71	41	112	71	41	112
			Total	71	41	112	71	41	112

6.4.2 Figure 13 shows the estimated increase in traffic volumes at key junctions and links associated with arrivals and departures in the AM peak hour

6.4.3 The most significant impacts are likely to be felt within the settlement with an additional 77 vehicles using Huncote Road / Long Street to access the B581. There are numerous priority T-junctions on this stretch as well as residential frontages. It is likely that junctions on this stretch would want to be assessed together with the junctions with the B581/Long Street and B581/Hinckley Road .

6.4.4 Outside the settlement:

- The County Highways Authority will also want to be satisfied that there would be no impact at the B4114/Broughton Road and B4114/Coventry Road junctions where an increase of 30 vehicles is forecast.
- Highways England will wish to know the impact at M69/J2 where around 20 vehicles might access the M69.

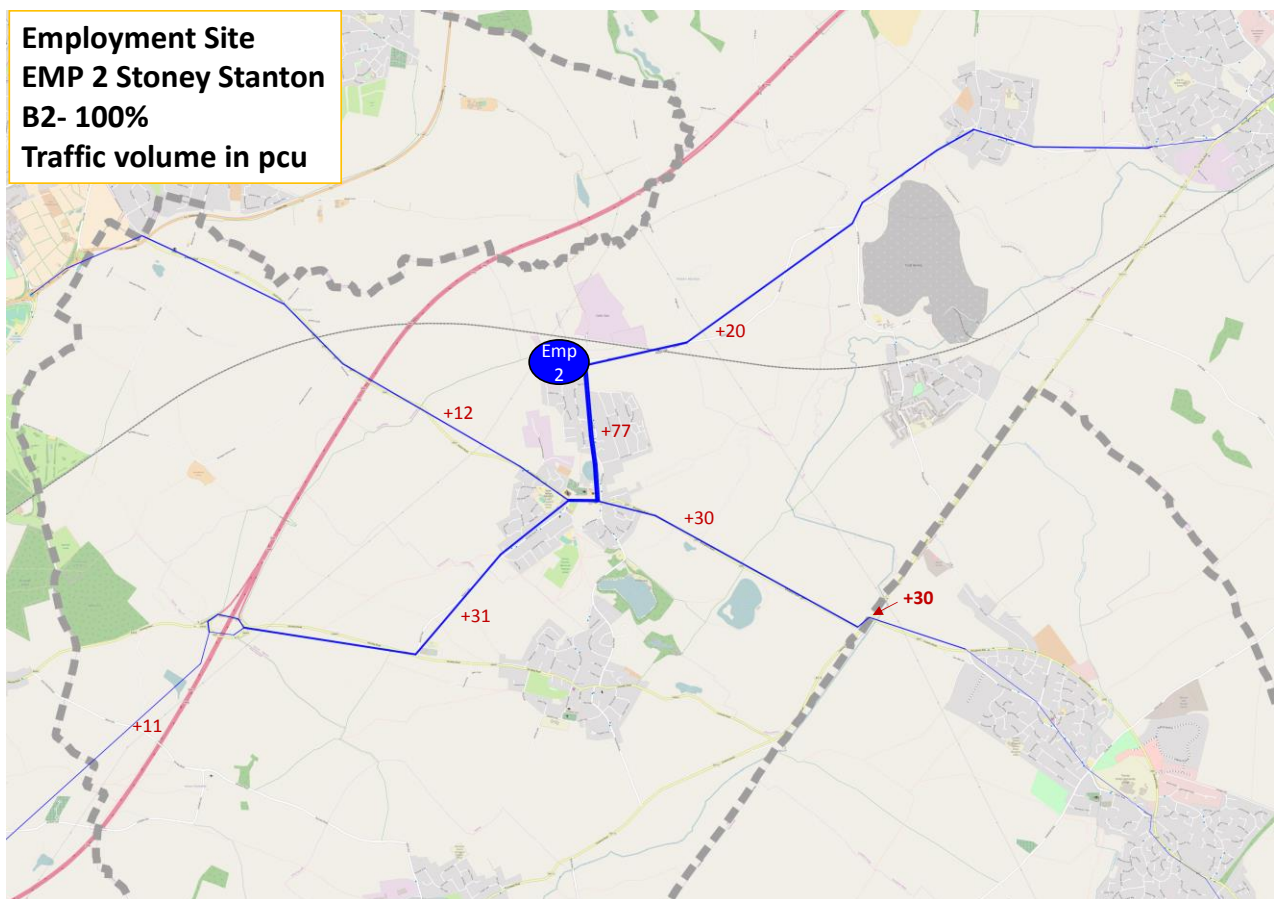


Figure 13: Scenario 3. AM Peak traffic levels in pcu

6.5 Recommendations

6.5.1 Should any of these options be taken forward the following bullet points summarise the recommendations from this study

- The study was undertaken using the LLITM core scenario that includes the assumption that there is a bridge across the M69 linking Leicester Lane to Lubbethorpe. Should the Enderby employment site be delivered before the

delivery of the bridge then further work would be needed, to the satisfaction of the Highway Authorities, to assess the likely impacts of this on the existing highway networks and determine the extent of mitigation required if traffic is unable to use the bridge

- All three options would require further investigation to determine the needs of mitigation including its form, type and extents. It is recommended that this work is undertaken in consultation with the local Highway Authorities and Highways England to avoid abortive work.
- Mixed land use development at the Enderby site could result in very significant increases in traffic levels due primarily to commuting traffic for the office (B1) and to a slightly smaller extent the industrial (B2) floorspace. Mitigating the impact of this traffic at this congested point in the network would be challenging and is very likely to result in the displacement of traffic. This would need to be assessed and mitigated especially if this displaced traffic resulted in traffic utilising unsuitable alternative routes.
- The Warehousing (B8) landuse impacts to the highways network would be primarily caused by the large volume of HGV movements that could occur throughout the day. It should be noted that, if this site is going to be taken forward, it is very likely that the Highway Authorities will require further investigations including an assessment of the impact of these HGV movements throughout the day
- At Stoney Stanton the scale of development is much smaller. However the largest increase in traffic is likely to be focussed on the residential Huncote Road / Long Street for which there are no reasonable alternative routing options. As a consequence of this any mitigation is likely to be limited to controlling traffic speeds, on street parking, etc. along these residential streets

Appendix A. Traffic Levels and Stressed Junctions in 2031

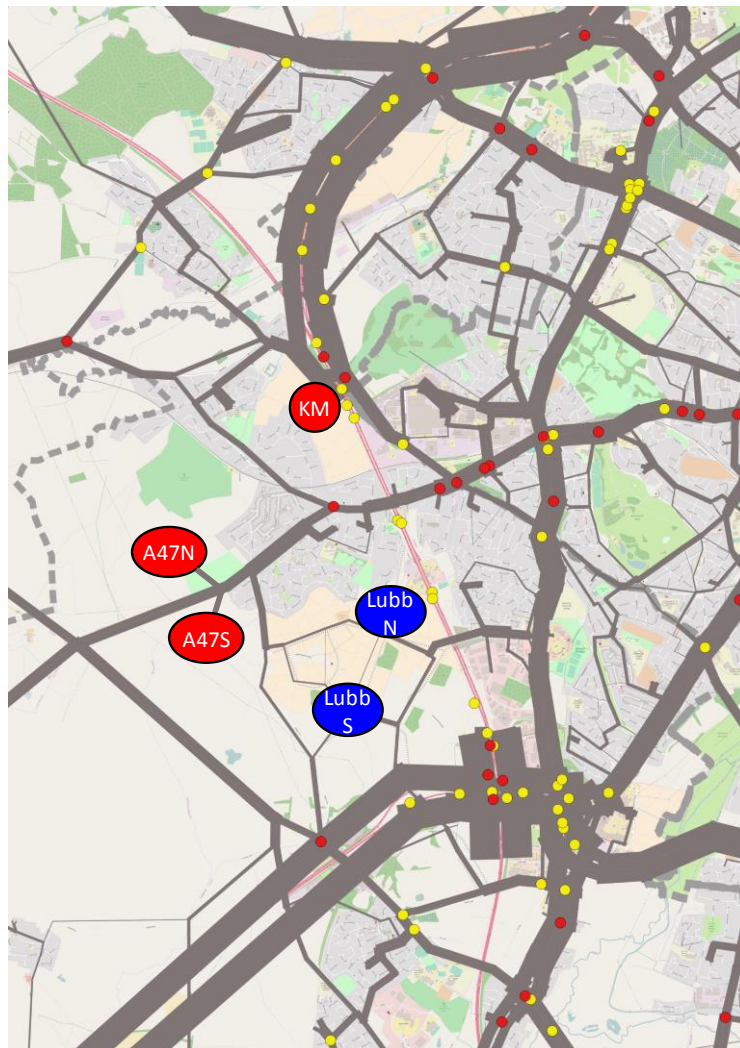
The following maps show the forecast 2031 background traffic level together with stressed junctions from the LLITM AM Peak hour transport model.

- The width of the link is proportional to the traffic volume (traffic on part of the M1 is not shown to aid readability of the map)
- Yellow dots show junctions at >85% of their design capacity
- Red dots show junctions at >100% of their design capacity

As junctions' approach or exceed their design capacity the operation of the junction becomes more problematic with greater delays, greater stop-start traffic, greater journey time uncertainty and increased risk of accidents.

The following maps show traffic levels and junctions in the LLITM v5 core scenario that are forecast to be stressed in the morning peak hour of 2031

Kirby Muxloe and A47 Housing Developments

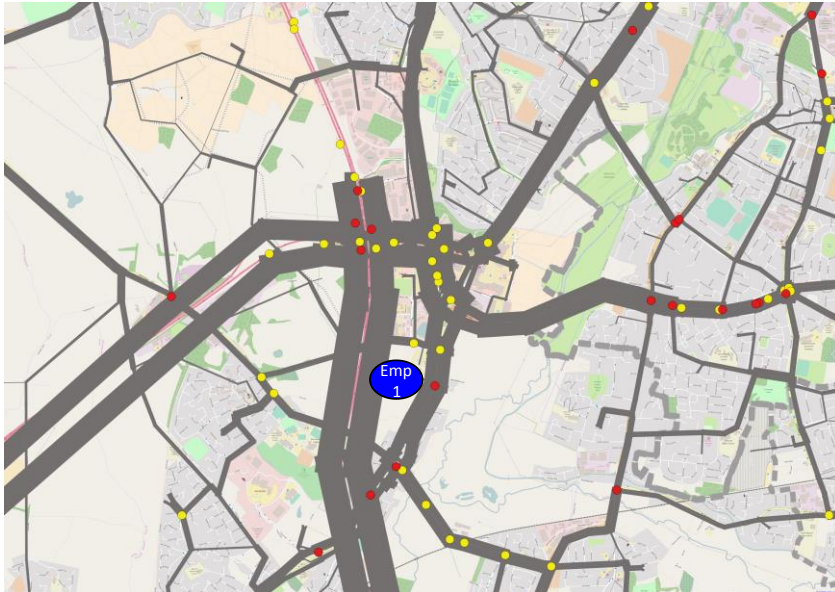


The map shows potential stresses at the following junctions and series of junctions:

- The A47 corridor

-
- Ratby Lane in Kirby Muxloe
 - Leicester Lane, B4114, B582 in Enderby
 - Fosse Park area
 - M1/M69/A5460
 - A46
 - Anstey Lane
 - A50
 - A563 (Outer Ring Road)

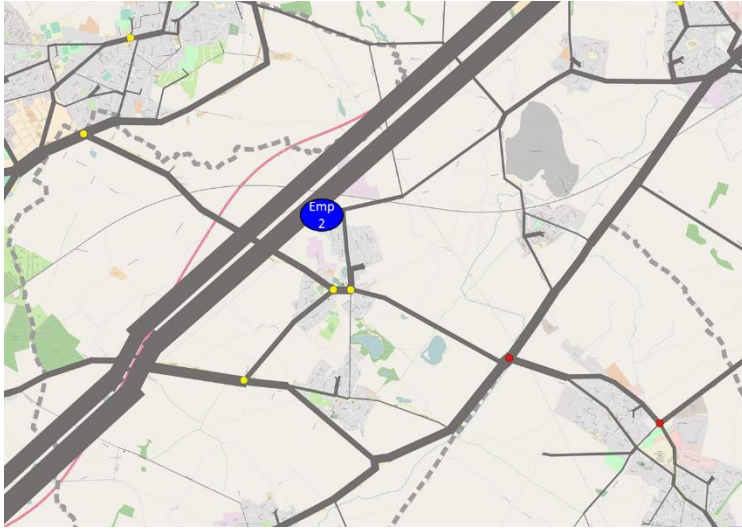
Enderby Employment site



Shows potential stresses on junctions at:

- Leicester Lane
- B583 through Enderby and towards Whetstone
- B4114
- Fosse Park area
- M1/M69/A5460
- A563 towards Pork Pie Roundabout

Stoney Stanton Employment Site

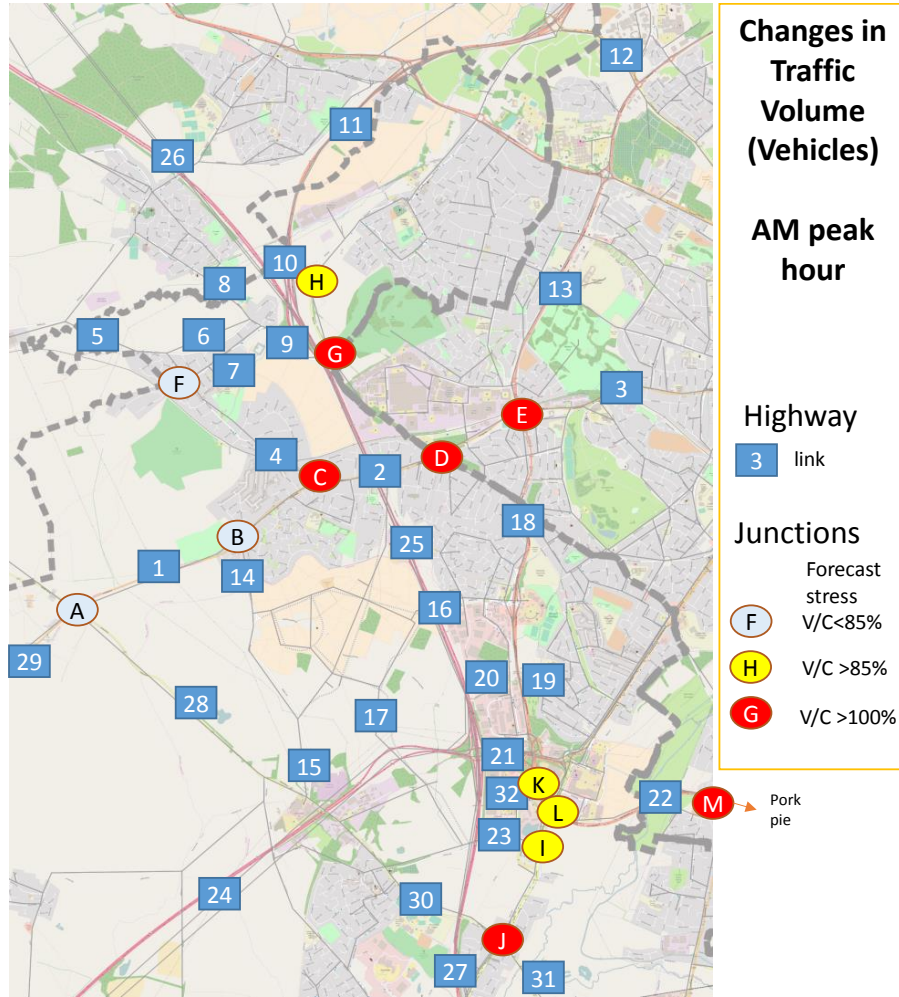


Shows potential stresses on junctions at:

- At B581 junctions within Stoney Stanton
- B4114 / Coventry Road junction
- B4669 / Stanton Lane junction

Appendix B. Changes in traffic Levels for the Housing Scenarios

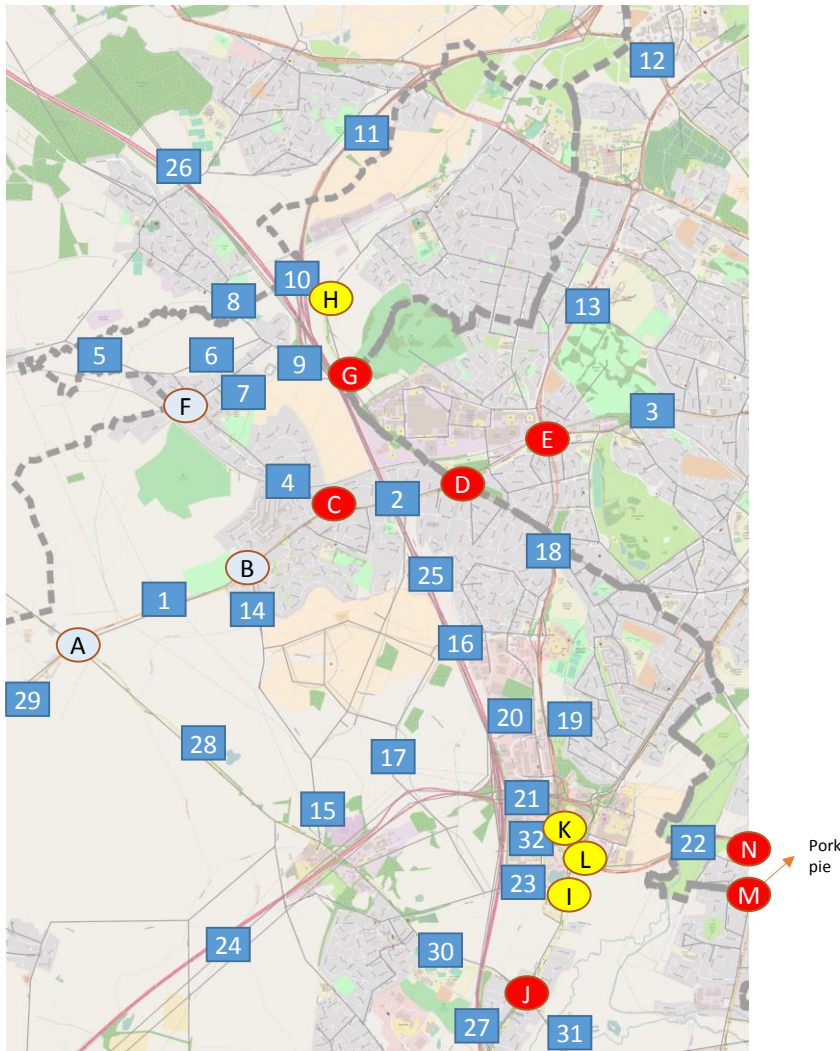
The table shows the net change in traffic levels on key links and junctions to the west of Leicester for each of the scenarios



development	Total Volume	Net Change in Vehicles (AM Peak Hour)					
		Kirby Muxloe		South of A47		North of A47	
		Lubbesthorpe North	Lubbesthorpe South	Lubbesthorpe North	Lubbesthorpe South	Lubbesthorpe North	Lubbesthorpe South
instead of dwellings	2031	500		500		750	
1 A47 West	1,533	-26	-26	39	39	58	57
2 A47 East	1,830	4	3	105	103	157	154
3 A47 (Western Park)	2,642	-14	-10	18	22	28	33
4 KM (Kirby Lane)	870	56	53	52	49	78	74
5 Desford Lane (KM-Des)	1,155	58	58	16	16	25	24
6 Desford Rd (in KM)	664	-2	-2	2	2	3	3
7 Main St (KM)	1,124	126	124	29	27	45	42
8 RatbyLn (StationRd)	1,000	33	33	6	6	8	9
9 Ratby Ln	1,892	149	146	31	28	47	43
10 A46/M1 slip	6,079	20	21	1	2	1	2
11 A46	7,219	70	68	28	26	42	39
12 Anstey Lane	3,241	32	33	2	3	3	4
13 A563 (NPW)	2,361	-16	-13	-12	-9	-16	-13
14 Beggars Lane (N)	1,001	-23	-28	6	1	10	3
15 Beggars Lane (S)	760	1	-2	5	1	6	0
16 M1 Bridge	1,102	-198	-89	-185	-76	-277	-113
17 M69 Bridge	463	-15	-113	-2	-100	-4	-150
18 Lubbesthorpe Way (N)	3,558	-70	-56	-67	-53	-102	-80
19 Lubbesthorpe Way (S)	2,925	-41	-11	-35	-5	-54	-8
20 Meridian East	423	-68	-4	-59	5	-88	8
21 A5460/M1	7,553	-58	-47	-46	-36	-69	-54
22 A563 (SVW)	4,206	-30	-33	-23	-26	-34	-39
23 Leicester Lane	1,563	-7	-101	6	-88	8	-132
24 M69	7,551	-23	-19	-19	-15	-29	-22
25 M1 (LFE)	15,852	0	3	-19	-16	-29	-25
26 M1 (North)	9,773	-20	-18	-20	-18	-30	-27
27 M1 (South)	9,354	1	4	-5	-2	-7	-2
28 B582	1,721	10	10	18	19	27	28
29 A47 (Earl Shilton)	1,886	-12	-11	9	10	14	15
30 B582 (Enderby)	1,377	8	8	11	11	16	15
31 B582 (Whetstone)	2,687	-1	-6	-2	-7	-2	-10
32 Smith Way	511	0	-8	2	-6	1	-11
	-						
Junctions							
A A47/DesfordRd	3,117	-22	-21	38	38	57	58
B A47/BeggarsLn	2,332	-9	-14	73	68	264	251
C A47/Kirby Lane	1,653	52	48	60	56	240	234
D A47/BraunstoneLane	3,382	21	19	103	101	156	154
E A47/A563	5,215	-62	-47	-23	-9	-35	-13
F Main St/Station Rd	1,171	115	115	52	49	78	74
G RatbyLn Roundabout	3,025	146	143	37	34	56	52
H RatbyLn/A46 Jct	2,698	113	110	35	32	52	48
I LeicesterLn/B4114	5,198	0	-79	8	-72	12	-108
J Foxhunter	5,939	2	-4	4	-2	6	-3
K A563/Penman Way	3,796	-8	-48	-7	-47	-10	-69
L A563/B4114	8,708	-30	-84	-23	-77	-35	-115
M A563 (Pork Pie)	4,057	-14	-16	-13	-14	-19	-21

Appendix C. Changes in traffic Levels for the Employment Scenarios

The table shows the net change in traffic levels on key links and junctions to the west of Leicester for each of the scenarios



Changes in Traffic Volume (Vehicles)

AM peak hour

Highway

3 link

Junctions

Forecast stress

F V/C < 85%

H V/C > 85%

G V/C > 100%

Pork pie

Links	Traffic Volume (pcu)			
	Total Volume 2031	Enderby Scenario 1	Enderby Scenario 2	Stoney Stanton Scenario 1
1 A47 West	1,533	0	1	1
2 A47 East	1,830	0	0	-
3 A47 (Western Park)	2,642	9	32	-
4 KM (Kirby Lane)	870	3	12	-
5 Desford Lane (KM-Des)	1,155	1	3	-
6 Desford Rd (in KM)	664	1	3	-
7 Main St (KM)	1,124	0	1	-
8 RatbyLn (StationRd)	1,000	1	4	-
9 Ratby Ln	1,892	0	0	-
10 A46/M1 slip	6,079	10	38	3
11 A46	7,219	10	38	3
12 Anstey Lane	3,241	0	0	-
13 A563 (NPW)	2,361	11	39	-
14 Beggars Lane (N)	1,001	5	19	-
15 Beggars Lane (S)	760	-	-	1
16 M1 Bridge	1,102	33	113	3
17 M69 Bridge	463	53	191	2
18 Lubbethorpe Way (N)	3,558	29	100	1
19 Lubbethorpe Way (S)	2,925	-	-	-
20 Meridian East	423	-	-	-
21 A5460/M1	7,553	51	193	1
22 A563 (SVW)	4,206	29	103	1
23 Leicester Lane	1,563	89	345	1
24 M69	7,551	18	68	5
25 M1 (LFE)	15,852	26	98	4
26 M1 (North)	9,773	16	60	2
27 M1 (South)	9,354	7	26	-
28 B582	1,721	19	74	-
29 A47 (Earl Shilton)	1,886	12	46	-
30 B582 (Enderby)	1,377	8	39	-
31 B582 (Whetstone)	2,687	11	44	-
32 Smith Way	511	41	204	1
	-	-	-	-
	-	-	-	-
Junctions				
A A47/DesfordRd	3,117	19	74	1
B A47/BeggarsLn	2,332	5	21	1
C A47/Kirby Lane	1,653	4	14	-
D A47/BraunstoneLane	3,382	0	1	-
E A47/A563	5,215	29	100	1
F Main St/Station Rd	1,171	3	12	-
G RatbyLn Roundabout	3,025	0	1	-
H RatbyLn/A46 Jct	2,698	0	0	-
I LeicesterLn/B4114	5,198	55	153	2
J Foxhunter	5,939	16	57	4
K A563/Penman Way	3,796	63	255	-
L A563/B4114	8,708	87	313	3
M A563 (Pork Pie)	4,057	16	63	-
N A563/A426	4,829	29	103	-