

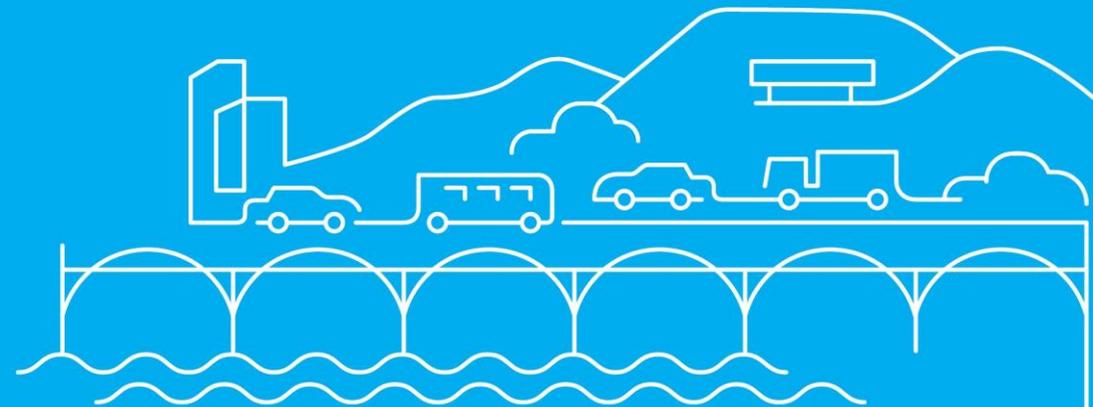
# Specialist Professional and Technical Services (SPATS) Framework

Lot 1

## Task 414: A46 Corridor Study Initial Report

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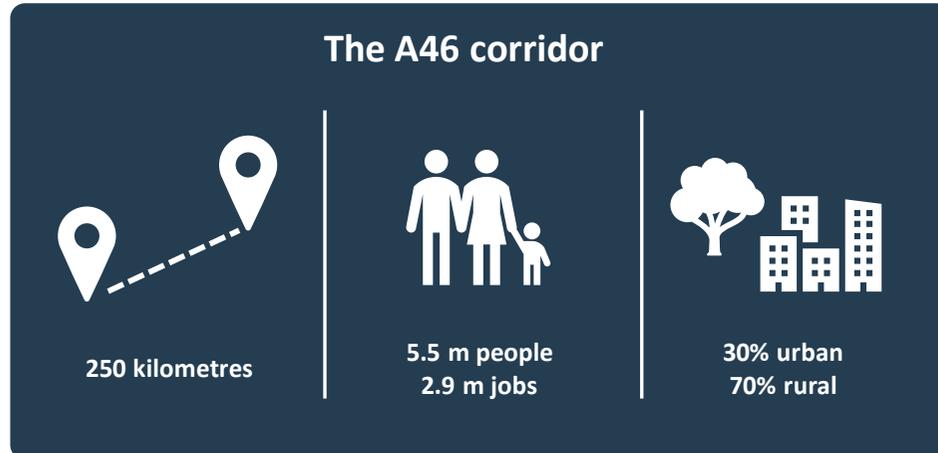
## Executive Summary

### Chapter 1. Background and context

The A46 corridor runs for over 250 kilometres from the M5 at Tewkesbury to Grimsby in Humberside. As well as the A46, the corridor includes sections of the A44, A422, A45, M69, M1, A15, M180, A160, and the A1173.

Numerous studies have examined options for improving sections of the A46. Most recently, the Midlands Connect strategy identified the potential for the A46 to take a bigger role in supporting the economy of the Midlands and the UK as a whole, and the Long-Term Midlands Motorway Hub Study, commissioned jointly by Midlands Connect and Highways England, examined the broad impacts of upgrading the A46 to a common expressway standard between the M5 and the M6/M69.

Following this work, this study has been commissioned to enhance the evidence base behind this corridor, and to use that evidence to develop a strategic case for investment along all or part of the corridor to support Midlands Connect's broader objectives.



The characteristics of the road vary significantly along the corridor, from single carriageway rural sections to urban dual carriageways and motorways. Upgrades to the original roads have been piecemeal as the most pressing problems of congestion and safety have been addressed. However at-grade junctions and single carriageway sections result in traffic bottlenecks, exacerbated by very high traffic volumes in some locations.

The character and function of the landscape the corridor passes through is also very varied. Approximately two-thirds of the corridor passes through rural areas, running adjacent to market towns and villages, but passing directly through relatively few, and connecting them to the wider Strategic Road Network.

The corridor serves many, sometimes conflicting, purposes for both local and longer-distance traffic including:

- providing access international gateways including the Humber Ports, Port of Bristol, Humberside, Coventry and Birmingham Airports;
- linking locations on the A46 to other parts of the Strategic Road Network (SRN) and the rest of the country;
- providing critical connections between homes and jobs;
- providing access to existing jobs and housing sites; and
- acting as a ring road and/or bypass for locations such as Warwick, Coventry, Leicester and Lincoln; and
- to a greater or lesser extent, providing connectivity for parts of long-distance journeys.

### Chapter 2. Underlying economic conditions in the corridor

The A46 corridor is already an important economic spine; businesses in the corridor producing £124 billion output in 2015, nearly 9% of English GVA.

The largest single industrial sector is Distribution (Wholesale & Retail, Logistics & Transport & Food Services), which accounts for 20% of all economic output, whilst Manufacturing accounts for 16%. In comparison to England as a whole, the corridor's economy has a high share of Agriculture, Other Production (quarrying and mining) and Manufacturing (almost twice the English average, and 30% above the national average outside London); but a low relative share of economic activity in Information & Communication, Finance and Business Services.

Over a quarter of all jobs and GVA in the corridor are in sectors dependent on the Strategic Road Network such as retail, manufacturing and construction. The share of Midlands jobs in these sectors is higher than any other part of England and significantly above the UK average.

The agricultural industry, whilst not the dominant sector in any one location, is important to many areas along the corridor. The road network is vital in the distribution of perishables and produce but also in ensuring high quality staff are available to sustain the industry and ensure its future.

In the more peripheral parts of the corridor (to the north-east and south-west the dominant sectors tend to be manufacturing and less footloose sectors such as tourism and agriculture. The performance of these sectors are less dependent on peak-time network performance and more dependent on reliable journey times. The central part of the corridor, including the Coventry/Leicester economic hub and Warwick, has a more mixed economy including manufacturing and logistics, but also a larger professional services sector which is dependent on peak period capacity, connectivity to labour markets and absolute journey times.

### The economy of the A46 corridor



8.6% of English GVA



16% of GVA in manufacturing, 20% in distribution



22% of goods & services are exported

The East and West Midlands exports a higher share of GVA than any other region in England after the North East. Access to international gateways is therefore critical to the Midlands economy. Half of these exports are generated in the A46 corridor and are particularly important to the economies of Solihull, Coventry, North and North East Lincolnshire, Warwickshire and Worcestershire.

Over the period 2015 to 2030, the economic output of the corridor is forecast to increase by a third to £153 billion. Over the same period, the number of jobs in the corridor is forecast to grow by 146,000 or 5%. Growth rates are particularly high in the logistics & freight, retail & wholesale and manufacturing sectors. These forecasts represent 'business as usual' growth; investment in the A46 and other strategic infrastructure would deliver considerably higher growth in jobs, GVA and, critically, housing. Long-term population and housing growth will be considered in detail in the Enhanced Strategic Case.

### Chapter 3. Conditions and use of the A46

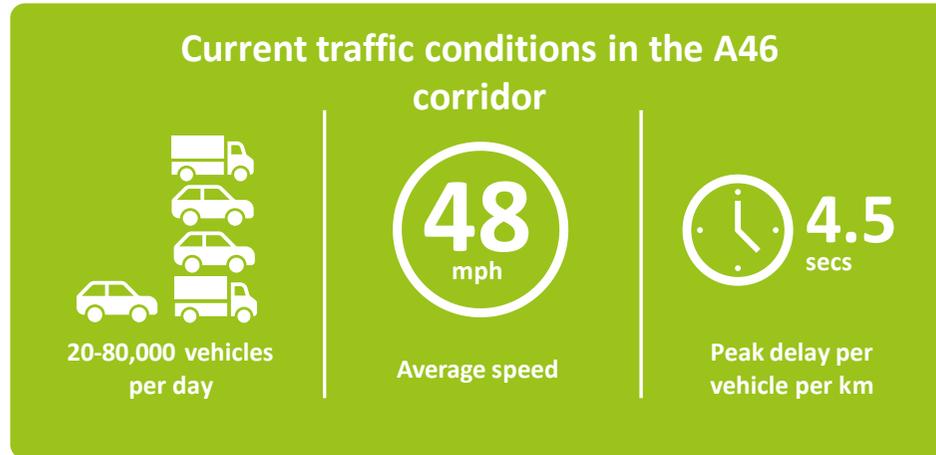
Traffic flows (excluding the short M1 section) are highest on the Leicester Western Bypass (70-80,000 vehicles Annual Average Daily Traffic – AADT in 2017). Traffic levels on the Coventry-Leicester and Leicester-Newark sections are lower at approximately 40,000 AADT, whilst traffic levels on the more peripheral sections can fall to 20,000 AADT.

The performance of the vast majority of the corridor falls below the Midlands Connect Conditional Output of an average speed during the peak periods of 60 mph. Average speeds tend to be higher where road standards are higher; such that where improvements have been made average speeds are consistent with the design standard. The only sections of the A46 which meet or exceed the conditional output are those which operate as either Dual-2 lane All Purpose or Motorway (D3) standard.

These sections are also where traffic is greatest, meaning that the sections with generally higher speeds are also those with higher traffic levels but also greater aggregate levels of delay which reflects the higher capacity of the links and junctions which are more typical in the central section. In this regard, the capacity and standard of the road does influence its use compared to alternatives, as a higher standard will make the A46 more attractive. But it is also clear that, historically, investment has occurred in those locations experiencing the greatest delays due to congestion, meaning that the capacity and/or standard of the road is influenced by demand for its use.

Both average speeds and journey time reliability are significantly impacted by at-grade junctions with the worst 'hotspots' including the M1/A46 around Leicester, Hobby Horse Interchange, the A1/A46 interchange, Lincoln bypass and the Coventry ring road. The absolute capacity of the road also causes delays where traffic is highest. Particularly high 'volume / capacity ratios' are observed around Evesham, Coventry, Leicester and Lincoln where local and longer-distance traffic interact.

Average journey times on the A46 are generally slightly lower than those on alternative motorway journeys (such as the M5/M42/M6). The evidence suggests that the A46 currently carries a relatively small proportion of national traffic as the variability of journey times on the motorway network tends to be lower, and the legibility of the route is poorer.



There are also currently relatively few journeys which currently travel along the entire corridor, which reflects the poorer legibility and performance of the corridor at present, but also the fact that there are currently relatively few journeys travelling between the South West and Humberside areas; investment in the corridor could fundamentally influence business locational decisions meaning that over time the A46 corridor could become a much more important economic spine.

Origin-destination patterns in the corridor are complex. A significant proportion of traffic is made up of sub-regional journeys of 50-100 kilometres in length; most of which begin, end or pass through the central section. Some sections also have a particularly important local function; for example only 20% of traffic on the Leicester Western Bypass is through traffic (although the very high traffic volumes on this section mean it is also strategically important).

Road Safety is a key issue for the A46 corridor due to a range of issues including road geometry and a number of single carriageway sections which results in overtaking manoeuvres and consequential accidents. Congestion at key junctions also results in a range of accidents. Accident blackspots tend to occur more frequently north of Newark and south of Coventry.

## Chapter 4. National, sub-regional and local roles and objectives

The role and function of the A46 corridor is complex and varies greatly in different locations. The study has adopted a simplified model to understand and describe the role and function based on three geographic levels.

### National role

The A46 is used by vehicles making much longer journeys to, from and across the Midlands. For these journeys, the A46 offers east-west connectivity between:

- the M5 and M1 corridors;
- the M1 and A1 corridors; and
- the A1 corridor and south Humberside.

Current evidence suggests that the A46 corridor fulfils this role between the M5 and A1, but only for a minority proportion of journeys. However there is significant potential for investment in the A46 to facilitate and unlock growth within the corridor itself and to provide an legible national corridor providing an alternative to the congested motorway network.

The A46 could also play a part in enhancing the performance of the ports at either end of the corridor. Whilst better road infrastructure is not the only requirement to achieve this, improvements to the road network immediately serving the ports will be important in supporting growth in the future.

### Sub-regional role

The sub-regional roles of the A46 corridor have been defined as:

- providing connectivity between the Midlands' economic hubs (Leicester/Coventry, the West Midlands conurbation Hub and the Nottingham/Derby hub) as well as Warwick/Leamington Spa;
- providing connectivity within those hubs, particularly between Leicester and Coventry;
- providing connectivity from the hubs and other urban centres to other parts of the UK and international gateways; and
- providing strategic access to the strategic employment and housing growth sites.

The evidence suggests that this is a primary function of the A46 corridor, particularly for the central section between Warwick and Leicester; and to a lesser extent further afield to Stratford and Newark.

### Local role

The A46 corridor also supports the communities along its length by:

- providing access to local growth sites (with local rather than sub-regional importance);
- providing better connectivity to other settlements either in the immediate vicinity;
- providing 'last mile' connectivity for sub-regional trips through improved connectivity to the core SRN (for example by improving trips between Market Rasen and Peterborough by better connectivity to the A1); and
- reducing adverse impacts of local economies and communities such as severance or safety.

The importance of the A46 corridor to local communities varies; where it is the main road providing capacity and connectivity it has a more significant role than where this is not the case.

Outcome-based objectives for each section at a national, sub-regional and local level are set out in Table 4-2.

## Chapter 5. Constraints on growth

Investment in the A46 can unlock and enable economic growth by:

- improving connectivity and reducing journey times for freight to support business productivity and reduce transport-related and other operational costs – bringing suppliers and markets closer to businesses;
- improving connectivity and reducing journey times for people on this critical part of the SRN to expand skilled labour pools, attract skilled labour through enhanced quality of life and make business to business interaction easier and cheaper (supporting agglomeration benefits);
- reducing the variability of journey times so that businesses can minimise costs associated with building in additional time into schedules to allow for delays in deliveries and ensure goods are delivered on time;
- providing additional **capacity** to enable growth in jobs and homes, including providing capacity for, and access to, key growth sites;

- improving links to international gateways, improving the attractiveness of the Midlands and wider UK economy for new international trade and investment; and
- raising the resilience of the network to planned maintenance, incidents and events so that businesses can continue to operate normally during periods of disruption.

Interviews have been held with Local Enterprise Partnerships (LEPs), Local Authorities and businesses to better understand the potential constraints which the A46 corridor is placing on growth and operational efficiency, and also the potential to overcome those constraints.

The key constraints identified by the LEPs are:

- the numerous at-grade junctions and single-carriageway sections, leading to congestion and safety issues;
- a lack of capacity to cater for the current demand, limiting its role, including as an important east-west route;
- the lack of capacity and congestion constrains the potential for growth in the corridor; and
- the lack of resilience of the road network, including but not limited to the A46, meaning that incidents cause severe disruption on alternative routes.

The businesses interviewed raised the following issues:

- safety issues caused by vehicles queuing back from junctions;
- poor reliability of journey times along the entire corridor constrains the potential use of the road;
- delays due to congestion impacting on costs to businesses and delivery time targets;
- timings and location of entry points to ports means that some businesses had expressed capacity and connectivity as a key issue in ensuring port slots are met; and
- the variability in standard of road results in unreliable journey times and congestion.

Access to skilled labour is seen as an issue across the A46. In more peripheral areas such as Greater Lincolnshire, poorer connectivity makes commuting difficult and therefore, attracting labour from other areas is challenging. The A46 can play a key role in expanding the labour markets of the urban areas along the corridor. In high growth areas around Warwick, Coventry and Leicester the A46 is becoming increasingly important for local traffic and for accessing jobs in city centres and key Midlands Connect growth sites.

The A46 could provide much better national and sub-regional connectivity particularly from the Coventry/Leicester Hub to the South West.

Delivering reliability, not speed is the key to making the route more attractive to business and freight. Investing in the A46 could relieve pressure at key nodes and intersections with heavily congested motorways on the SRN (M1, M5, M40 etc) and on alternative routes such as the M5/M42/M6.

As population and housing spreads across a wider area people are using the A46 to commute longer distances to access jobs. This is a key issue for the A46 as it needs to serve the needs of both longer distance traffic and more local traffic.

## Chapter 6. Potential benefits of investment

The strategic case for investment in some or all of the A46 corridor has been expressed at a national, sub-regional and local level.

### National

#### M5 J9 (Tewkesbury) – M1 J21 (Leicester)

An expressway standard A46 corridor between Tewkesbury and Leicester could enable average speeds of 60 mph. This would reduce journey times between the M5 J9 and M1 J21 by as much as 16 minutes and significantly reduce the variability of journey times.

Such a corridor would attract a larger share of long-distance national traffic away from the heavily congested Midlands Motorway Hub (M5/M42/M6) and offer much greater resilience for east-west traffic in the event of an incident or major roadworks on the Hub.

It would offer businesses using the corridor much more certainty over delivery times, and reduce fuel costs as stop-start conditions around at-grade junctions would be reduced. Providing journey time certainty is a key consideration for businesses (particularly freight) in their journey choices and investment decisions.

#### M1 (Leicester) – A1 (Newark)

The majority of the A46 between the M1 (J21A) and the A1 at Newark is already built to expressway standard. However, the congestion hotspots on this section, in particular on the Leicester Northern Bypass, at Hobby Horse Interchange and at the junction with the A1 at Newark mean that the route is less attractive than the alternative M1/M18 route.

Congestion on the M1 and M18 is forecast to worsen significantly in the future meaning the A46 could provide an increasingly attractive alternative for long-distance journeys. Should conditions on the M42 north-east of the Midlands Motorway Hub also worsen significantly, the A46 could also offer an alternative for trips currently using the M5/M42 route between the South West and Yorkshire.

#### A1 (Newark) – Humberside

Journeys between the A1 corridor and south Humberside have the choice of routeing via the A1/M18/M180 or the A46 via Lincoln and onward on the A46 or A15. Average journey times to the Grimsby area are lower via the A46 than the M180 but are also less reliable.

For port traffic, just in-time-deliveries are critical, meaning that reliability of journey times to and from the Humber is for many businesses more important than the absolute journey times. Whilst these needs are best met by the A1/M180 at present, investment in the A15, or A46 east of Lincoln could, along with increasing RoRo traffic through the ports, may mean there is a case for investment in one of these routes.

### Sub-regional

Businesses state they are constrained with regards their supply chains, sales and labour markets based on those which can be accessed in reasonable journey time (up to an hour). Reducing journey times will enable expanded labour markets, particularly in the central section. Supporting growth in the urban centres and improving access to skilled labour. Agglomeration and productivity gains will benefit both the Midlands economic hubs and longer-distance agglomeration between the South West, the Midlands, and the North.

Quicker journeys will also support business efficiency and growth by bringing businesses closer together, reducing effective distances to markets and supply chains. This will have a positive impact on economic growth from increased output and job creation through enabling growth in key business clusters and high value economic sectors.

There are a large number of housing and employment growth sites along the A46 corridor. Improvements to the A46 could therefore support the development of strategic growth sites in three ways:

- by further improving the connectivity of the existing sites, particularly on the east-west axis;
- by improving the attractiveness of other locations further away from the motorway network;
- by providing sufficient capacity to accommodate the additional demand for travel this growth will generate

### Local benefits

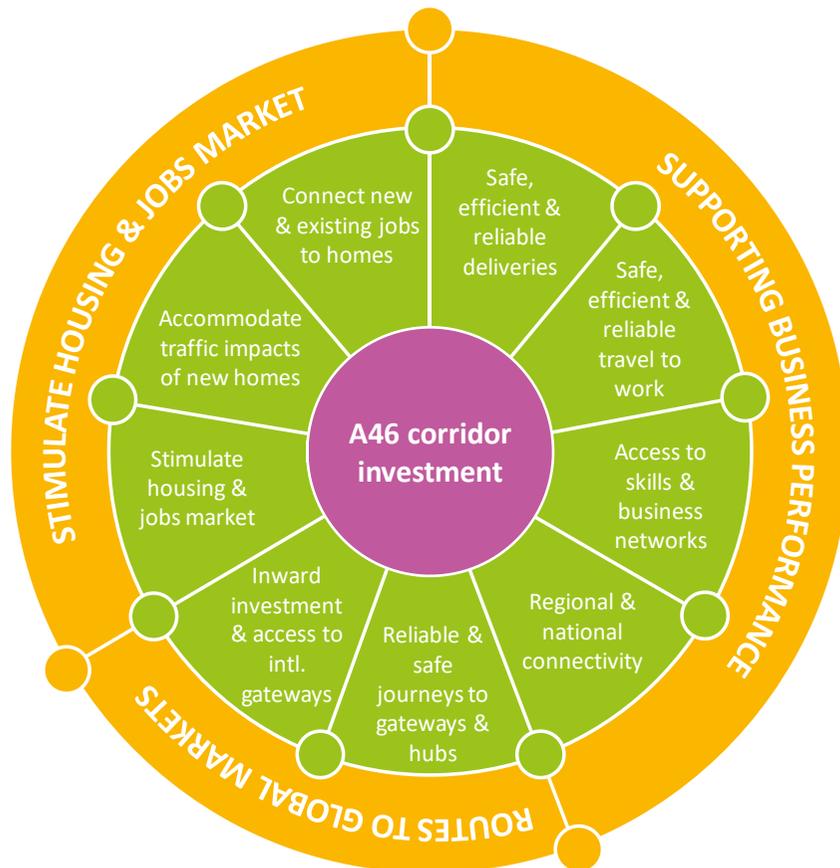
Improvements to the A46 corridor offer the potential to deliver community benefits in numerous locations along the corridor. In particular investment could:

- reduce the number of accidents and accident injuries, especially on the single-carriageway sections south of the M40 and east of Newark, at busy junctions, and where the road passes through urban areas (such as Ashchurch);
- reduce the number of residents affected by traffic noise (Noise Important Areas are prevalent around the settlements);
- improve local air quality, particularly in the Air Quality Management Areas at Stratford, Coventry, Leicester and Lincoln; and
- remove traffic from locations where the volume of vehicles, in particular HGVs, and the road itself act as a barrier to movement and result in unattractive environments.

## Summary of key points

Below the key points from the report are summarised. The points have been grouped under the three economic roles identified for the Strategic Road Network in Highways England's Initial Report, and the specific ways in which this can be achieved under each role.

Figure ES1: Economic roles of the SRN



Adapted from Highways England RIS2 Initial Report

## Economic Role 1: Supporting business productivity and competitiveness, and enabling the performance of SRN-reliant sectors

### 1A: Ensure that businesses can deliver their goods and services to clients and customers safely, reliably & efficiently

- The A46 corridor is equivalent to 60% of the Midlands Connect economy and 8.6% of the English economy: £124 billion GVA, and 2.9 million jobs.
- The economy (GVA) in the corridor is forecast to grow by 35% between 2014 and 2030, but this 'business as usual' (BAU) growth could be significantly higher with greater investment supporting productivity and new sites. BAU+ investment could deliver BAU+ growth.
- Journey time reliability, rather than absolute journey time, is critical to businesses. Relieving pinch-points could therefore be key to achieving reliability (and connectivity) ambitions.
- Improved connectivity will make more peripheral land/premises more accessible and therefore viable; supporting profitability and helping to re-balance the economy (e.g. by broadening supply chains).

### 1B: Ensure that people can get to work safely, reliably and efficiently

- An improved A46 offers potential for significant localised improvements in safety, air quality, severance for local communities.

### 1C: Ensure that businesses can access the skills and business partnerships they need to thrive and grow

- The SRN is critical to the economy of the Midlands. 28% of Midlands GVA is in SRN-dependant sectors (construction, manufacturing, logistics and quarrying/mining), much higher than the English average (21%). 37% of the economy in East Yorks./N Lincolnshire is in SRN-dependent sectors.

See also 'Connect new and existing homes to jobs' below.

### 1D: Enable regional and national connectivity

- The case for investment as an end-to-end national route is not strongly evident at the moment. However, there is potential for the road to become a much more important route in terms of providing national east-west connectivity and building greater resilience into the SRN.

- Improving the capacity, reliability and legibility of the A46 corridor could create a new economic spine for the Midlands and UK. At the moment, the corridor is typically seen as a feeder route to the 'real SRN' rather than a genuinely strategic inter-regional corridor.

## Economic Role 2: Providing efficient routes to global markets through international gateways

### 2A: Provide reliable and safe journeys to and from major gateways and cross-modal transport hubs

- The A46 has the potential to provide much greater connectivity in terms of sub-regional movements (e.g. between the south Midlands and South West and North East). There is potential for significant journey time reductions, particularly between the M5 and M40.

### 2B: Enhance the attractiveness of UK investment locations and connectivity to international gateways

- Unreliability of journey times on the corridor deters use by vehicles involved in just-in-time delivery systems. This is a particular issue for trips to the ports (exporting activities are particularly important to economies of Derby, Coventry and Kingston-upon-Hull).
- Better accessibility to the Port of Bristol and Humber ports via the A46 could help to sustain and grow the markets for these ports by attracting new business (some of which could be re-routed from other ports) especially in the RoRo market.

## Economic Role 3: Stimulating & supporting the sustainable development of homes & employment spaces

### 3A: Stimulate the housing and employment market in particular locations

- This is a corridor in which businesses want to locate, but current performance a deterrent to investment. Poor performance is impacting locational investment decisions as well as operational performance and profitability. Ashchurch is quoted as an example of a location where access to the motorway network is inhibiting investment, as is M69 J2.
- There is significant growth potential in the corridor which could be unlocked with BAU+ investment in the A46 (as well as skills, land etc).

- There are a number of emerging and high growth sectors in the corridor which would benefit from improved road connectivity, reliability and capacity. These include the battery technology sector in Warwickshire, the cyber security sector in Worcestershire, car manufacturing, 'Silicon Spa' in north Gloucestershire and food production in Leicester.
- The A46 could also unlock growth in more peripheral areas in sectors which are more dependent on good connectivity but which may previously not have located there, e.g. wind turbine production in Lincolnshire. Whilst other locations may still have better connectivity, but peripheral areas may have other locational advantages.

### 3B: Accommodate the traffic impact of meeting the government's housebuilding target

- Additional road capacity will unlock housing sites to meet long-term strategic housing needs, especially in the high pressure central area (as well as supporting shorter term growth).
- New capacity and connectivity provided by an improved A46 would also 'spread the load' of commuting journeys on the road network (such as the M40 and M1) by enabling a more diverse pattern of commuting.

### 3C: Connect new and existing homes to jobs

- There are shortages of skilled labour in many parts of the corridor, for example the agri-food and manufacturing sectors in Lincolnshire, and the manufacturing and sector in Worcestershire. Better connectivity between homes and jobs enabled by the A46 will help to reduce these skills shortages, especially in more peripheral areas.
- Improved connectivity will expand labour pools, by bring cheaper housing further from urban centres within viable commuting times. By enabling the right type of housing in the right locations (those connected to employment centres) businesses will have access to a wider pool of skilled labour.

## 1. Background and context

### 1.1 Introduction

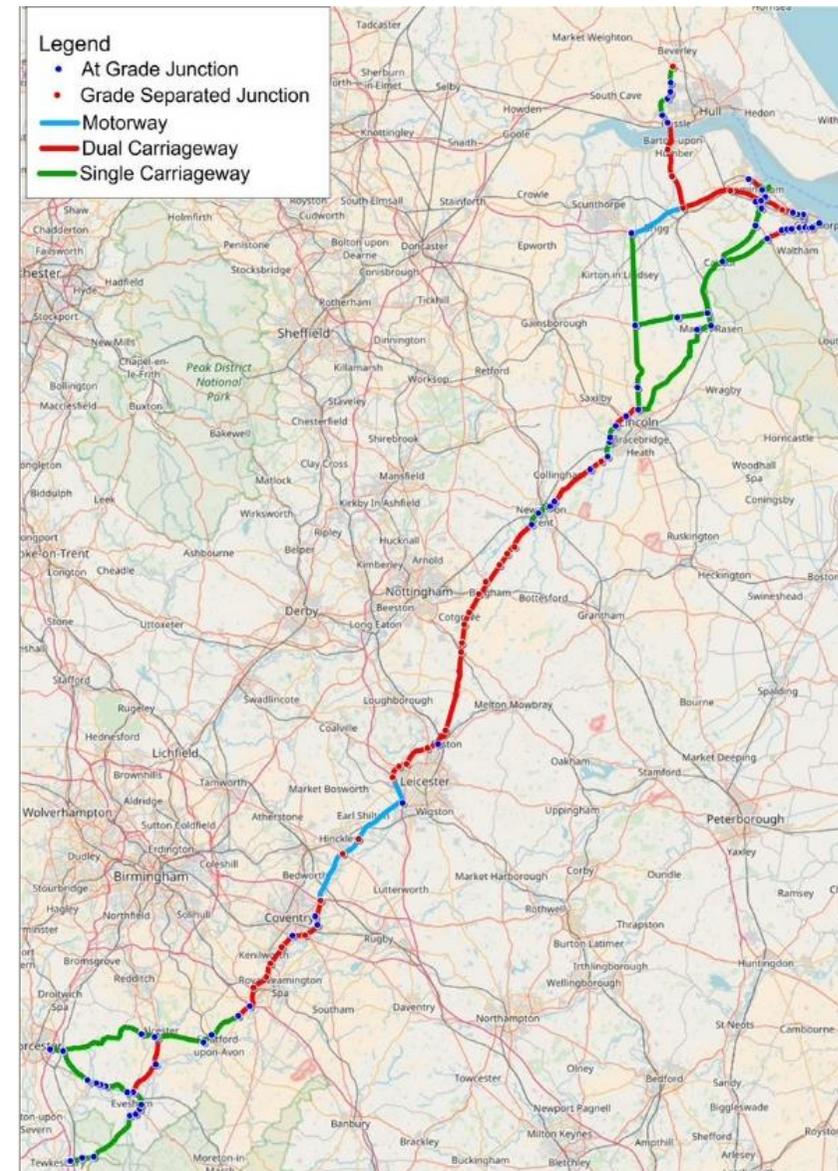
The A46 corridor runs 250 kilometres between the South West of England and Humberside through the Midlands. The corridor comprises the M69 and short sections of the M1 and A45. At either end the corridor divides into a number of corridors, notably the A15 and A1173 in the north, and the A44 and A435 in the south (the A46 begins again in Cheltenham and continues via Stroud to Bath). The majority of the A46 corridor is within the area of interest for this study, as shown in Figure 1-1.

The A46 corridor performs many functions: a bypass to the major settlements along its length (such as Coventry, Leicester, Newark and Lincoln); a connection between radial road corridors (such as the M1 and A1); and providing access to the Port of Bristol, the Humber Ports, and South Wales.

The road's form is as varied as its function: from single carriageway 'A' road with local accesses to three-lane dual carriageways and motorways. As a consequence of the design of the roads in the corridor and the widely-varying demand for its use, the performance of the corridor also varies considerably. High demand around the urban areas results in peak time delays, as do many of the at-grade junctions. Road safety, noise and air quality issues are most prevalent where the roads pass close to, or through, communities. In general the problems on the corridor are well-understood, and in many cases local solutions have already been developed.

Despite the corridor largely comprising a single 'A' road, the corridor has not historically been considered as a whole; improvements to the original 1920s road have been delivered locally on a needs basis by the (then) Highways Agency and by local highway authorities (the section between the M5 and Lincoln is now part of the Strategic Road Network).

Figure 1-1: Study area



As described in Chapters 2 and 3, there are numerous and varied problems and issues along the corridor in terms of congestion and accident hotspots, environmental and community impacts which future investment should seek to address. Failure to do so will result in further worsening of current network performance, increased impacts on communities and the environment, and inhibit future economic and housing growth.

Despite the fact that the corridor provides relatively rare east-west connectivity, relatively few longer-distance journeys use the A46 for a significant distance due to the varied standards of the road and the resultant performance. In addition, the demand for travel along the length of the corridor is thought to be limited, potentially in part due to the lower standard of some of the corridor, but also reflecting the fact that there is no large city at either end. As discussed later in this report, there are a large number of strategic housing and employment growth sites on or close to the corridor. This is significant in terms of the potential for the corridor to assist in these sites coming to fruition, however it is noteworthy that the majority of these sites are located where the A46 intersects with other, higher-quality sections of the SRN, such as the M40, M6 and M1; suggesting it is the connectivity offered by these roads, rather than the A46, which is determining the location of these sites.

## 1.2 Midlands Connect

Midlands Connect is a pan-Midlands partnership of local transport authorities, local enterprise partnerships and local business representatives working with the Department for Transport and its key delivery bodies. The Partnership now forms the transport component of the Midlands Engine.

The aim of the Partnership is to support the Midlands Engine to unlock the Midlands' economic potential and support the competitiveness of the whole UK through improving strategic transport links to speed up journey times and improve reliability, capacity and journey quality where it's needed. Midlands Connect's aspirations are for strategic transport networks which:

- are ready for HS2; and are able to fully exploit the economic and regeneration potential the new railway will bring;

- enable the productivity of Midlands businesses to be maximised;
- enable the population and employment growth critical to the future needs of the Midlands economy;
- enable Midlands businesses to efficiently access overseas markets through international gateways;
- enhance the quality of life of Midlands residents; and
- minimise the impacts of travel on the environment.



In March 2017, Midlands Connect published a long-term transport strategy which sets out the Partnership's views on the infrastructure capital programme needed over the next 25 years to improve connectivity between key economic hubs in the Midlands, and to the rest of the UK and overseas, and the benefits they will bring.

Since the publication of the Strategy, Midlands Connect has been successful in securing £6 million to fund an ambitious three-year programme of technical work to develop further the projects identified in the Strategy. This study is part of this technical programme.

## 1.3 Background to this study

### 1.3.1 A46 Partnership

In recent years, interest in improving the A46 corridor has been growing. In 2015 the A46 Partnership was formed comprising local authorities and Local Enterprise Partnerships. The objective of the A46 Partnership, since expanded to include authorities as far north as Leicester, is to work together to bring forward improvements on the corridor to address challenges including congestion, road safety, poor resilience and community severance.

The A46 Partnership published its prospectus: 'Investing in the A46 to keep the Midlands Moving' in December 2017.

### 1.3.2 Midlands Connect Strategy

In its 2017 Strategy, the Midlands Connect Partnership identified the potential significance of the whole A46 corridor in supporting economic growth in the Midlands. The Strategy notes that improvements to the corridor could:

- provide a strategic alternative to the M5/M42: reducing pressure on the Midlands Motorway Hub, increase network resilience;
- improve connectivity between the South West and south Midlands, supporting the manufacturing, logistics and agricultural sectors along the corridor;
- improve journey time reliability for all journeys, including freight;
- assist in unlocking and accelerating numerous strategic housing and employment sites in the corridor; and
- overcome local community impacts such as safety and severance.

The strategy also sets out Midlands Connect's aspirations for the strategic road network and the rail network. The 'Conditional Outputs' for roads (see Figure 1-2) describe the long-term aspiration for road journeys between key centres being both quick and reliable in terms of journey time. At this time, much of the A46 corridor does not meet either of these aspirations.

Figure 1-2: Midlands Connect Conditional Outputs - road



The Strategy included proposals for a strategic study of a potential expressway route between the M5 and the M40, as well as development of business cases for upgrades along the corridor. This study is the first part of this work; but with a broadened scope covering the corridor from the M5 to Humberside rather than the M40.

### 1.3.3 Long-Term Midlands Motorway Hub Study

The Midlands Motorway Hub spans key sections of the M42, M5 and M6, and lies at the heart of the regional and national strategic road network. Both Highways England and Midlands Connect partnership have identified the critical importance of the Hub to both the regional and national economy.

However, the performance of much of the Hub network falls below what is required to support economic growth in the Midlands and further afield. Therefore, in late 2016, Midlands Connect and Highways England commissioned a study to prepare a long-term investment strategy to address challenges and meet the network performance, economic growth and wider objectives.

The study, which concluded in December 2017, examined a wide range of potential options for meeting these objectives, including measures to reduce demand on the Hub by providing alternative routes further afield. The A46 corridor between the M5 and M6 was identified as potentially providing an attractive alternative to the M5/M42/M6 route via the Hub.

The study examined the broad impacts of upgrading the A46 to a common expressway standard between the M5 and the M6/M69, which included: a mixture of new offline alignment and online dualling from M5 J9 to south of Evesham; online dualling of the Evesham Bypass; and online dualling between Alcester and the A439.

The initial assessment of the upgrade found that journey times could be reduced by as much as 20 minutes between the M5 and M40, but that congestion on the A46/A45 around Coventry could increase as more traffic is drawn into the corridor. Based on a discounted capital cost of £780 million, the scheme achieved an initial Benefit: Cost Ratio of 1.45:1, however the scale of scheme benefits was thought to be under-estimated due to under-estimation of jobs growth in the alternative M42 corridor.

Wider economic benefits were not estimated for the scheme on its own, but the study concluded that investment in this route would deliver significant wider economic benefits resulting from:

- increased agglomeration and productivity gains through supporting inter-city movements;
- long-distance agglomeration arising from reduced journey times between the South-West, the Midlands and on to Yorkshire and the North-East; and
- a positive impact on economic growth from increased output and job creation through enabling growth in key business clusters and high value economic sectors.

The study concluded that improvements to the A46 were worthy of further consideration to better understand the potential national, regional and local benefits which it could deliver.

## 1.4 Study objectives and scope

As a result of the findings of the Long-Term Midlands Motorway Hub Study, Midlands Connect has commissioned ACJV to undertake a study of the whole A46 corridor from the M5 to the M180. The purpose of the study is to enhance the evidence base behind this corridor, and to use it to develop a strategic case for investment along all or part of the corridor to support Midlands Connect's broader objectives.

The study objectives, as set out in the client brief are to:

- convey the current and potential future role and function of the A46 through the Midlands and nationally;
- develop a set of specific transport objectives for the A46, based upon the aspiration for its future role and operation;
- identify a long-list of options which could meet the transport objectives, and undertake a high-level assessment of the potential VFM, benefits and impacts of the different options;
- shortlist the better options to be carried forward;
- make recommendations as to how investment in the corridor should be sequenced;
- form a preliminary enhanced strategic case for improving the A46 based on the strategic and economic benefits; identifying the role and contribution each section makes to the overall case for investment;
- achieve strong stakeholder buy-in to the proposals being put forward; and
- scope the work required to take the first three sections of route to a Strategic Outline Business Case stage.

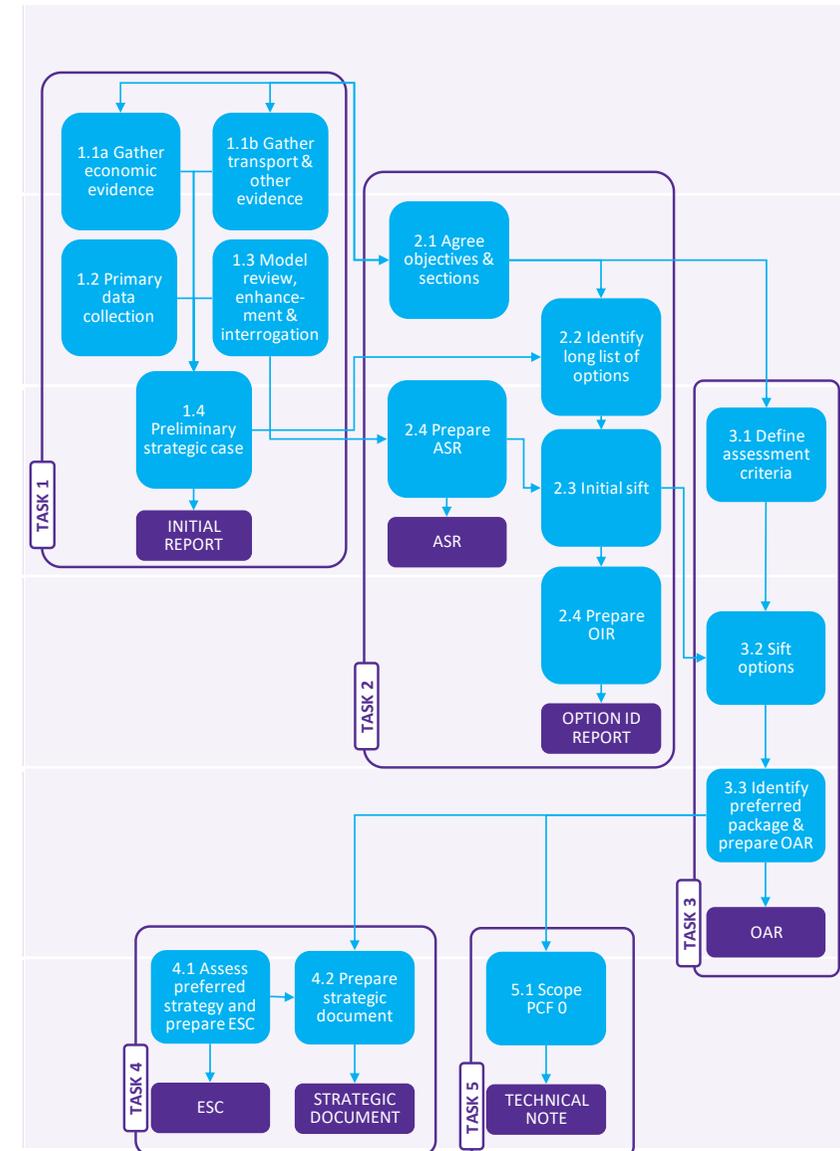
## 1.5 Purpose and structure of this report

This is the first deliverable from the study and is intended to draw together a range of technical work undertaken to date to set out a preliminary strategic case for investment in the A46 corridor. The overall study process is shown in Figure 1-3.

The remainder of this report is structured as follows:

- Chapter 2 provides a description of the nature of the corridor whilst chapter 3 describes the performance and use of the A46;
- Chapter 4 considers the role and function of the corridor now and in the future (including outcome objectives);
- Chapter 5 discusses how the corridor in its current form may be constraining economic growth; and
- Chapter 6 sets out the preliminary strategic case for investment.

Figure 1-3: Study process

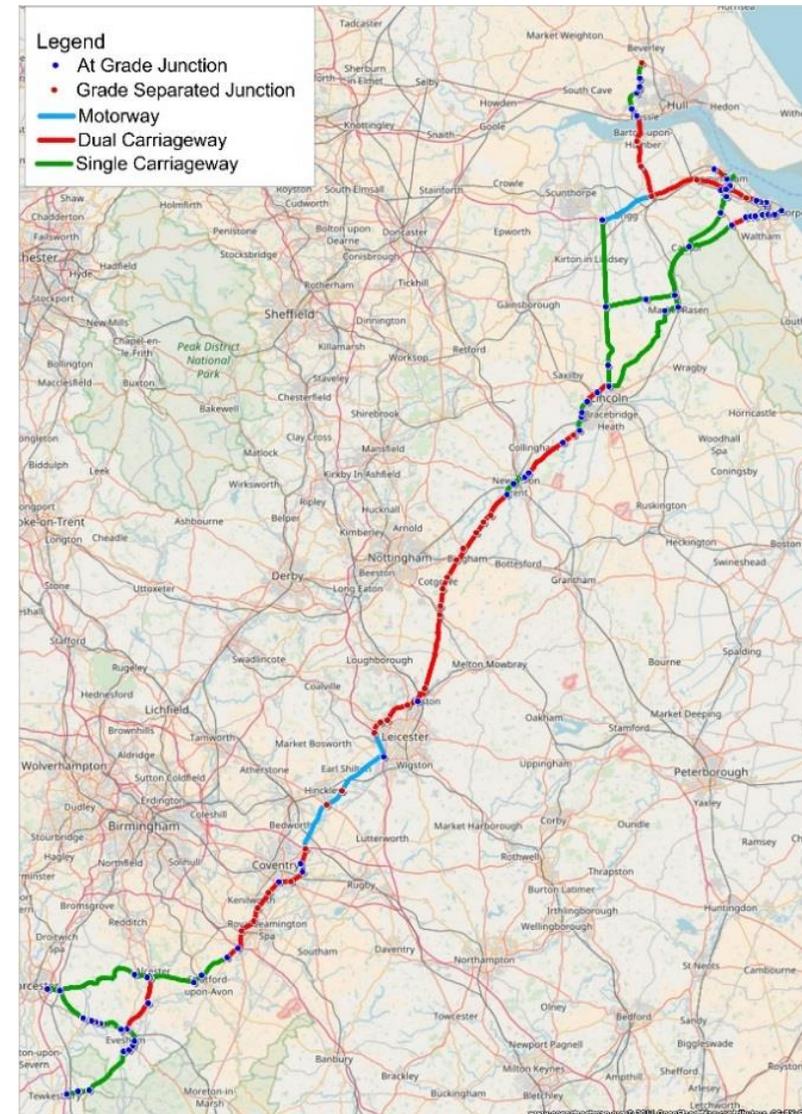


## 1.6 Overview of A46

The A46 study area is a 145-mile-long corridor from Tewkesbury (Gloucestershire) to Hull (Humberside) with many different characteristics, geographies and economies. The cities of Coventry and Leicester are the largest centres on the corridor with a number of small-medium centres including Ashchurch, Evesham, Stratford, Warwick, Newark and Lincoln providing key roles to their various economies. There are also a range of similarities which are shared across the corridor. These similarities create a common set of conditions which are prevalent across the corridor and which offer strengths and weaknesses, including:

- providing access to a range of international gateways including the Humber Ports, Port of Bristol, Humberside, Coventry and Birmingham Airports;
- a key link for centres on the A46 to other parts of the Strategic Road Network (SRN) and the country;
- potential to support and unlock a range of employment and housing sites across the corridor which could support long-term growth through improved agglomeration and increased labour markets;
- providing a dual role for local and strategic traffic – the A46 is the ring road/bypass for a series of centres whilst also forming part of the SRN along the majority of its route;
- a series of at grade junctions/roundabouts serving local centres which restricts the flow of strategic traffic; and
- the key highway connection (M69) within the Coventry and Leicester hub identified within the Midlands Connect Strategy.

Figure 1-4: A46 Corridor characteristics



### 1.6.1 Sections of the A46

The A46 has varying characteristics and roles. Further details are provided below on the rationale for dividing the route into five sections as shown in Figure 1-5:

- Section 1 - Tewkesbury (M5 J9) – Warwick (M40 J15)
- Section 2 - Warwick (M40 J15) – M1 (Leicester)
- Section 3 - Leicester (M69 to Syston)
- Section 4 - Syston-Newark
- Section 5 - Newark-Humber Ports

### 1.6.2 A46 Corridor Studies

The route has been subject to a range of studies across the years led by Highways England, Midlands Connect and the local authorities. Most recently this has included the Midlands Motorway Hub, the work of the A46 Partnership and a range of Strategic Outline Business Cases (SOBCs) and Option Assessment Reports (OARs) to inform the Highways England's RIS process. These are summarised in Appendix A.

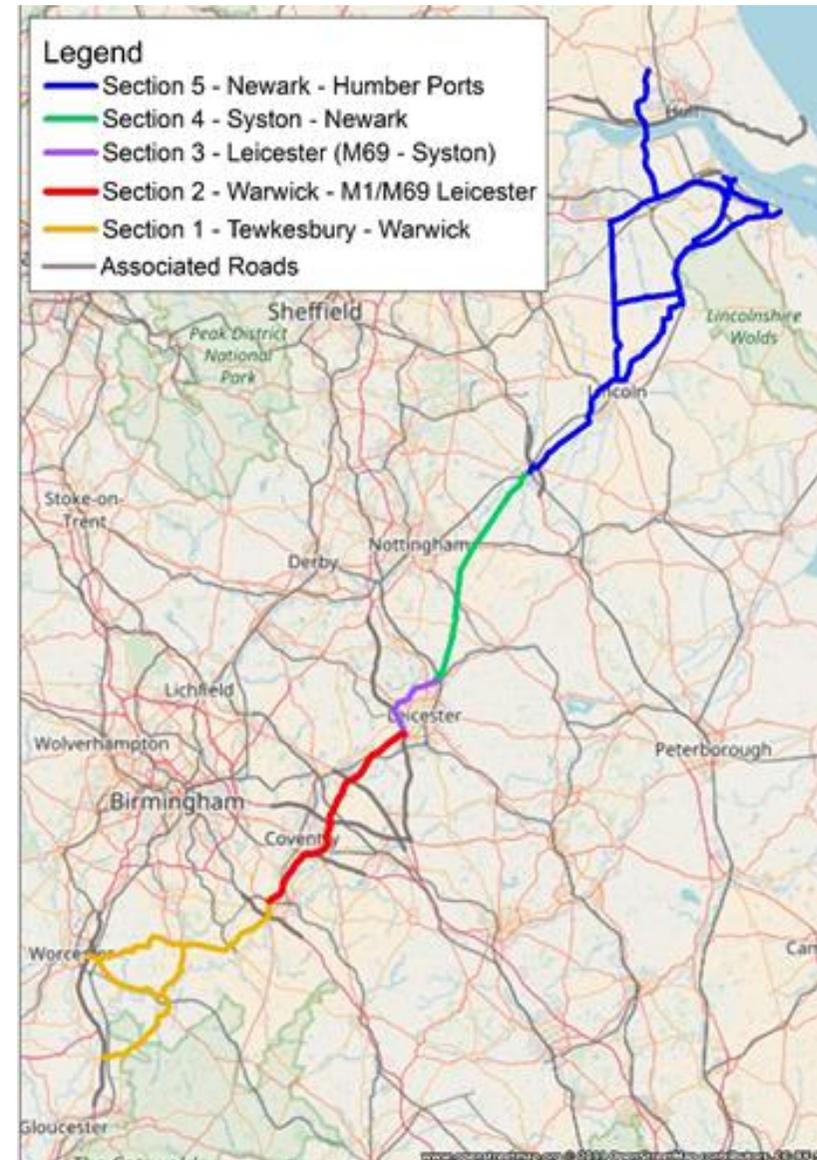
### 1.6.3 Planned schemes

The route has a number of schemes proposed by Highways England and the local authorities. These are at different stages of development but include:

- Binley Interchange (Coventry) - Part of Walsgrave and Binley improvement package. No confirmed delivery date.
- Walsgrave Interchange (Coventry) - Part of Walsgrave and Binley improvement package. No confirmed delivery date.
- Newark bypass - Committed for study in RIS1 and delivery in RIS2 (subject to a deliverable scheme being established).
- Lincoln eastern bypass - Due to be completed by late 2019

A full list of the planned schemes within the corridor is also provided in Appendix A.

Figure 1-5: A46 sections



### 1.6.4 Design standards

Figure 2-1 sets out the range of different highway characteristics which exist across the corridor. This shows that the corridor has a series of challenges which means the route struggles to act as a viable alternative to other parts of the SRN. This means that the route is not proactively used by the freight industry due to poor reliability and legibility. Highway design characteristics also mean that certain sections are subject to a range of road safety concerns. It is also important to note a range of environmental constraints and issues. These are outlined in more detail below.

## 1.7 Relevant policies

### 1.7.1 Highways England Strategic Road Network Initial Report

Highways England's Strategic Road Network Report was published in December 2017. It sets out how the UK's economy is reliant on the Strategic Road Network (SRN) through:

- 9 out of 10 businesses in England being located within 10 miles of the SRN and 47.5 million people (90%) living within 6.2 miles of the SRN;
- almost three quarters of businesses regard tackling road network congestion as either critical or important to their future business operations; and
- sectors heavily reliant on the SRN employ 7.4 million people and contribute £314 billion in Gross Value Added to the economy.

The report also sets out four strategic economic roles that the SRN and Highways England can play in supporting the economy, as shown in Figure 1-6.

Figure 1-6: Strategic roles for the SRN and Highways England to support economic growth



Adapted from SRN Initial Report (December 2017)

Investment in the A46 can help to support the first three of these roles (the fourth relating to Highways England's role as an employer and sector-influencer). In summary:

#### Economic role 1

- ensuring that businesses can deliver their goods and services to clients and customers safely, reliably and efficiently;
- ensuring that people can get to work safely, reliably and efficiently;
- ensuring that businesses can access the skills and business partnerships they need to thrive and grow; and
- enabling regional and national connectivity.

#### Economic role 2

- providing reliable and safe journeys to and from major gateways and cross-modal transport hubs; and
- enhancing the attractiveness of UK investment locations and connectivity to international gateways such as the Humber Ports and Port of Bristol.

#### Economic role 3

- stimulating the housing and employment market in particular locations by providing access to sites and unlocking land;
- accommodating the traffic impact of meeting the government's housebuilding target; and

- connecting new and existing homes to jobs.

The benefits of investing in transport demonstrate the importance to the UK economy of a well-functioning SRN. It supports local, regional and national economic growth and is vital for the UK to continue to be able to compete in the global markets. The economic potential of the network is particularly important in the context of the UK's lagging productivity (by worker) which is 18% below the G7 average.

Investment in the A46 has both the potential to support growth in areas of high productivity and to spatially rebalance the economy through supporting growth in more peripheral regions.

The SRN Initial Report also details an indication of how the SRN could develop over the medium term. This includes a mixture of Smart Motorway, Motorway, Current/Planned/Potential Expressways and All-Purpose Trunk Roads (APTR). The A46 is shown as having the potential to be at the following standards in the medium term:

- M5 (Tewkesbury) – M40 (Warwick): APTR;
- M40 (Warwick) – M6/M69 (Coventry): Expressway;
- M69: Motorway (as now);
- M1 J21 – J21A (Leicester): Smart Motorway;
- M1 J21A (Leicester) – A1 (Newark): Expressway; and
- A1 (Newark) – Lincoln: APTR.

### 1.7.2 DfT Consultation on Major Road Network

The DfT has launched a consultation in December 2017 on the proposed Major Roads Network (MRN). A specific new funding stream is proposed that will be dedicated to investing in this network and raising the performance standards which motorists experience on it. The main objectives of the MRN are to:

- reduce congestion;
- support economic growth and regional rebalancing;
- support housing delivery;
- support all road users; and
- support the SRN.

This MRN proposal includes the A15 from where the SRN classified section of A46 ends at Lincoln (intersection of A46/A57) up to the M180 and beyond into Humberside.

Investing in the A46 and complementary infrastructure will both support existing businesses to operate and flourish, and encourage growth in key business sectors and drivers of the economy including, manufacturing, the automotive and aerospace sectors; wholesale, retail and logistics; agri-food businesses, and urban agglomerations.

But business as usual investment will only enable business as usual growth. Transformational investment in the A46, along with unlocking skills, land and other enablers, will potentially result in much larger, structural changes in the Midlands economy whereby existing connectivity constraints are removed so that opportunities for jobs and housing growth and significantly enhanced and much more ambitious growth can be realised.

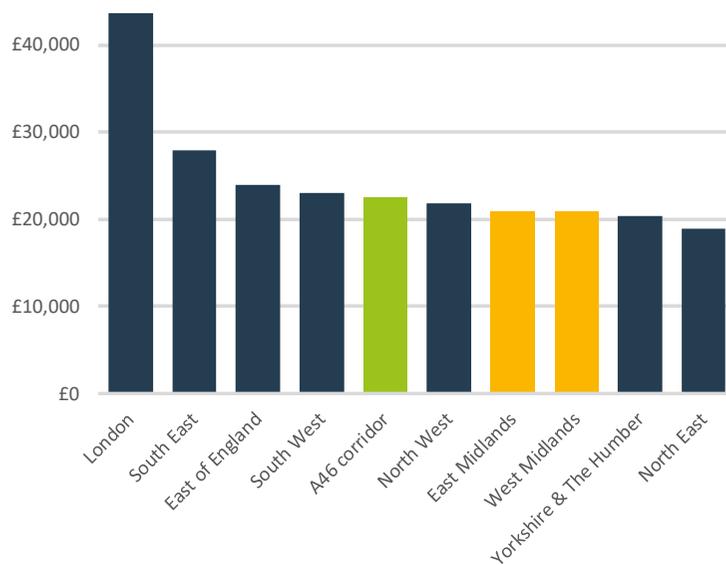
## 2. Underlying economic conditions in the corridor

This chapter describes the current economic characteristics of the A46 corridor. It also examines the potential for growth in the corridor in terms of both employment and housing.

### 2.1 Current economic activity

The A46 corridor accounts for a significant proportion of the UK economy. In 2015, the economic output of the corridor authorities of £124 billion<sup>1</sup> accounted for 8.6% of English GVA.

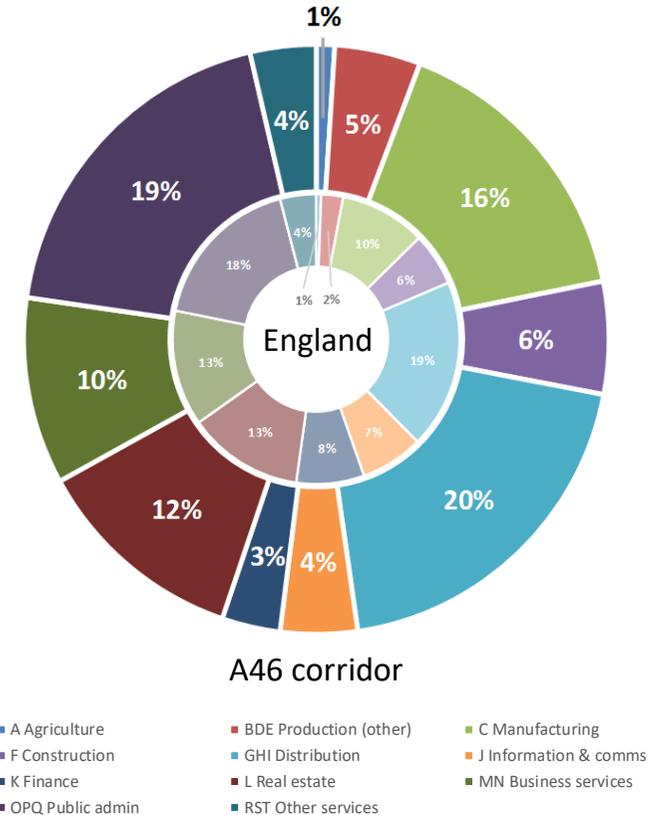
Figure 2-1: GVA/head by region (2015)



Source: Office of National Statistics (ONS)

There are some 28.8 million jobs in the A46 corridor. Productivity levels (GVA/head) are above the Midlands average, and above those of the North of England, as shown in Figure 2-1. The breakdown of the industries that form the corridor's economy is shown in Figure 2-2, compared to the industrial breakdown for England as a whole.

Figure 2-2: GVA by industry in A46 corridor and England (2015)



Source: Office of National Statistics (ONS)

<sup>1</sup> Source: ONS

The industry that makes the greatest contribution to the A46 corridor's economy is GHI Distribution<sup>2</sup>, followed closely by Public Administration and Manufacturing. The prominence of Public Administration is expected given the significance of the public sector to any economy outside of London.

In comparison to England as a whole, the corridor's economy has a high share of Agriculture, Other Production (quarrying and mining) and Manufacturing (almost twice the English average, and 30% above the national average outside London); but a low relative share of economic activity in Information & Communication, Finance and Business Services.

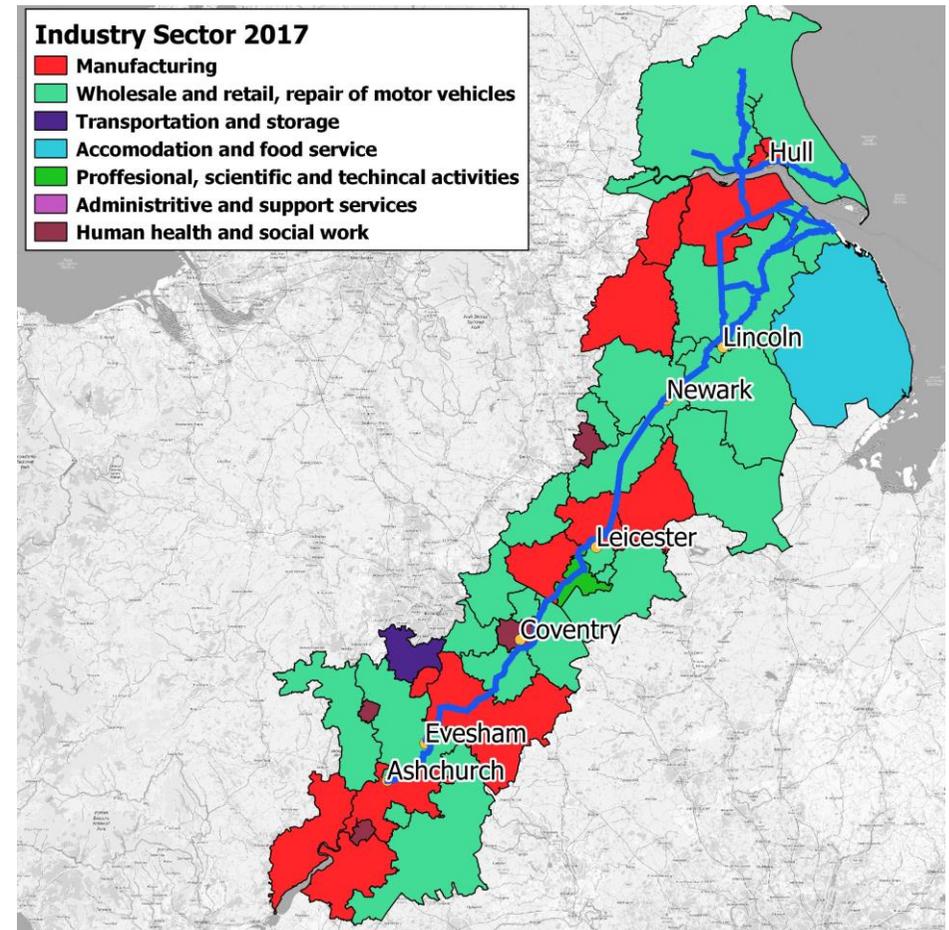
### 2.1.1 Dominant economic sectors

Analysis of the industrial structure of the A46 corridor provides insight into the types of businesses located along the route. Figure 2-3 shows the primary industry of each local authority along the A46. In common with much of the UK, the service sector including Wholesale and Retail Trade is dominant in many parts of the corridor (it is one of the top three sectors in 38 of the 40 local authorities analysed); for this reason. Figure 2-4 shows the second-largest sector.

Manufacturing is as the dominant sector in a number of the more rural areas but not in the (more mixed) urban economies. Notably, there are clusters of manufacturing at each end of the corridor and around Leicester and Coventry.

The relative importance of manufacturing and other sectors reliant on the SRN for their business operations is further emphasised when considering the second most dominant sector, which shows that there is a relatively high presence of manufacturing, construction and logistics firms, located on sections of the corridor; 29 local authorities have manufacturing (C) in the top three dominant sectors.

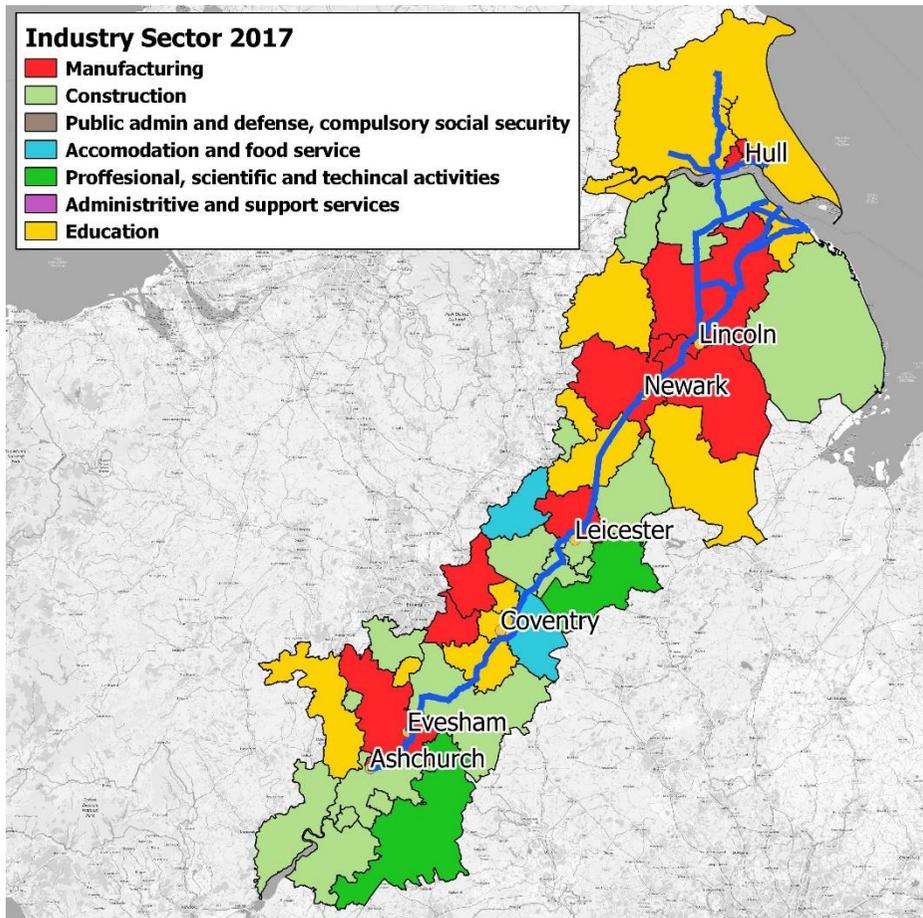
Figure 2-3: Dominant sector by local authority (2016)



Source: Business Register of Employment Survey

<sup>2</sup> Which includes G Retail & Wholesale; H Distribution & Storage; and I Accommodation & Food Service Activities

Figure 2-4: Secondary sector by local authority (2016)



Source: Business Register of Employment Survey

Manufacturing relies upon the road network for business to business connections, to draw in supplies and to get goods to domestic and international markets. The high presence of manufacturing, construction and logistics firms across the A46 corridor is in part due to historic reasons but is also influenced by firms being within clusters, good access to supply chains and proximity to large firms in the industry.

The golden triangle is also located along the route including DIRFT (Daventry International Rail Freight Terminal) – a major location for distribution, freight and logistics firms. This emphasises the importance of the corridor to major employers in the logistics, retail, wholesale and distribution sectors.

An enhanced A46 could help support growth of these sectors in key locations where business conditions are favourable; and through better connectivity provide conditions for productivity gains from reduced journey times and increased business to business interaction.

#### 2.1.1.1 Agriculture

The agricultural industry, although not appearing as a dominant industry, is important to many areas along the corridor. The report Horticulture: Opportunities and challenges for the horticulture and potato sectors in the West Midlands<sup>3</sup> sets the importance of the horticultural sector. The contribution made by the industry to the UK economy was estimated to be £3.6 billion in 2010 with the West Midlands expected to make up about 14% of that total.

The modern agricultural business is increasingly high-tech and produces a wider range of produce. An efficient and reliable road network is critical to the operations in the agri-food business to ensure regular deliveries of produce.

<sup>3</sup> Getting to the Heart of Horticulture: Opportunities and challenges for the horticulture and potato sectors in the West Midlands, EFPF

The road network plays a wide ranging and significant role within the agricultural and horticultural industries. Not only is it vital in the distribution of perishables and produce but also in ensuring high quality staff are available to sustain the industry and ensures its future. The report sites that the industry struggles to draw in workers from local populations due to the seasonal nature of the work. This has resulted in the industry struggling to find skilled and productive work forces.

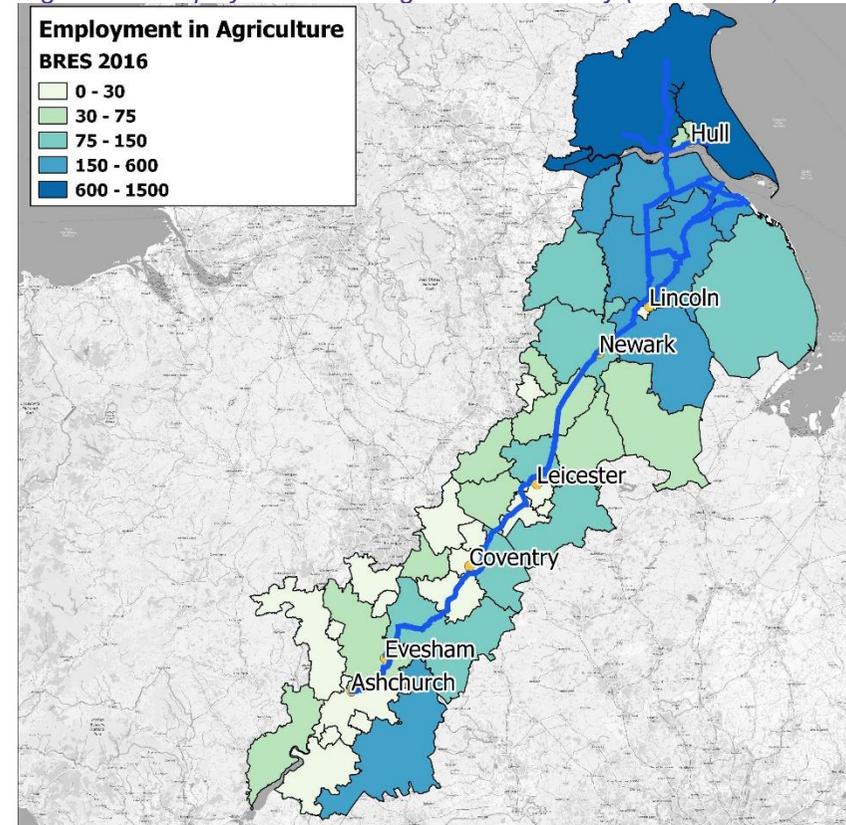
The Business Register of Employment Survey (BRES) has been used to identify the areas with the greatest number of employees in the industry, shown in Figure 2-5. Food and agriculture is particularly important to the areas at the north-east and south-west sections of the A46.

The northern section of the A46 corridor has a greater number of people employed in the agricultural sector than the southern sections. The cities and urban districts along the route are the areas with the least employment in this industry.

During the summer of 2010 the East Riding of Yorkshire Rural Partnership (ERoYRP) conducted a workshop where a long list of issues and problems faced by the industry were sifted through.

The report<sup>4</sup> covers a considerable range of the needs of the agricultural industry but also presents many opportunities. One opportunity covered is the role the industry plays in generating sustainable power, such as electricity from wind, biomass for power, anaerobic digestion, heat from renewables and transport from renewables.

Figure 2-5: Employment in the Agricultural Industry (BRES 2016)



Source: Business Register of Employment Survey (BRES)

The agricultural industry in the West Midlands region and more specifically along the corridor in the northern section is an important part of the industry with a greater breadth of employment opportunities than one might expect.

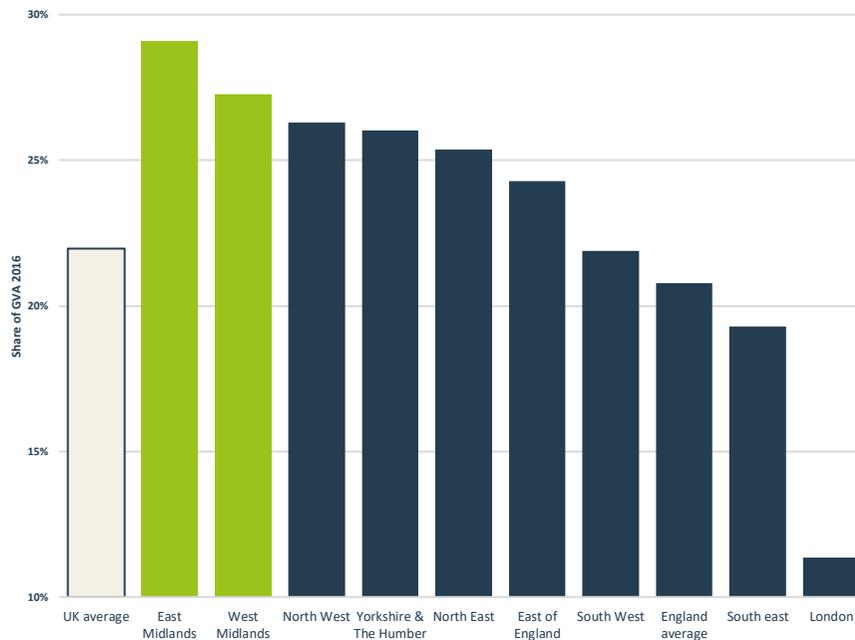
<sup>4</sup> The Importance of Agriculture and Land Management to the East Riding of Yorkshire, Stage 2 Report, March 2011

### 2.1.2 SRN-dependent sectors

The RIS2 Initial Report identified those sectors for which the SRN is vital for their performance: logistics & freight, retail & wholesale, construction and manufacturing<sup>5</sup>. These 'SRN-dependent' sectors account for over a quarter of the corridor's economy and represent 10% of England's total output in these sectors.

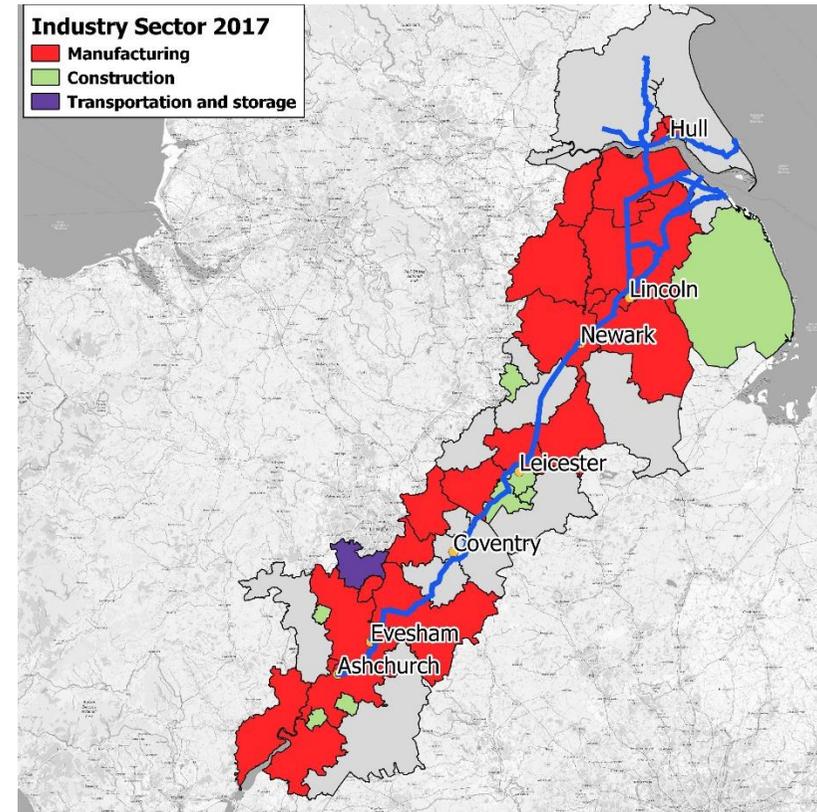
As shown in Figure 2-6, a much larger share (28%) of the Midlands' economy is in these sectors than any other part of England (the English average being 21%).

Figure 2-6: Share of GVA in SRN-dependent sectors by region, 2016



The locations where these sectors are most dominant are shown in Figure 2-7.

Figure 2-7: Locations where SRN-dependent sectors are the largest or second largest economic sector by GVA



### 2.1.3 Importing and exporting

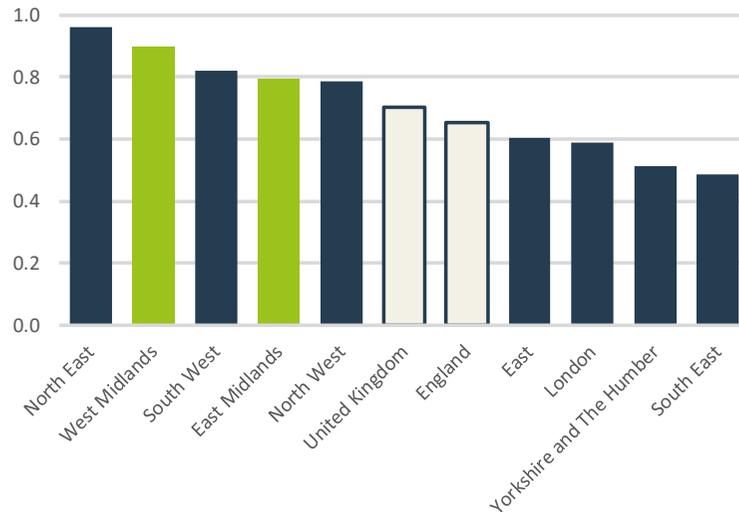
The total value of exports from Midlands<sup>6</sup> businesses in 2017 exceeded £40 billion, and accounted for 17% of all UK exports. Of these exports, half were to EU countries. An above-average share of imported and exported goods to/from the Midlands are in the machinery, transport and manufacturing sectors, and a below-average share from the chemicals sector.

<sup>5</sup> For further information see Appendix E

<sup>6</sup> East Midlands and West Midlands regions. Source: Regional Trade Statistics (HMRC)

In 2017, the total value of imports was £47 billion, meaning that the Midlands, like the UK as a whole, is a net importer of goods and services. However, as shown in Figure 2-8, the value of goods exported in the Midlands is high compared to the UK and English average. Only the North East has a higher export/import ratio than the West Midlands.

Figure 2-8: Export/import ratio 2017 by English region

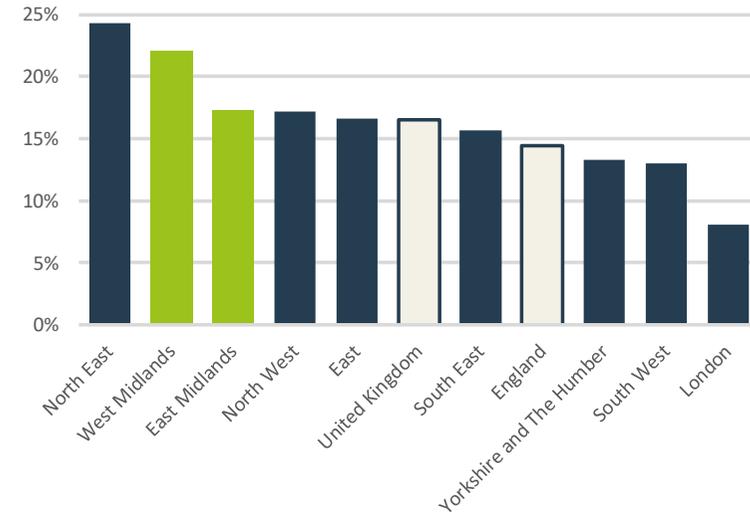


Source: Regional Trade Statistics (HMRC)

In fact, exporting represents a higher proportion of the total production in the Midlands than anywhere else in England, as shown in Figure 2-9. Overall, the £40 billion of exports from the Midlands accounts for 20% of the total value of goods and services produced (17% in the East Midlands and 22% in the West Midlands). This compares to an English average of 14%.

Strong transport connectivity to international gateways is important for all parts of the UK, but is particularly important to the Midlands (as well as the North East of England).

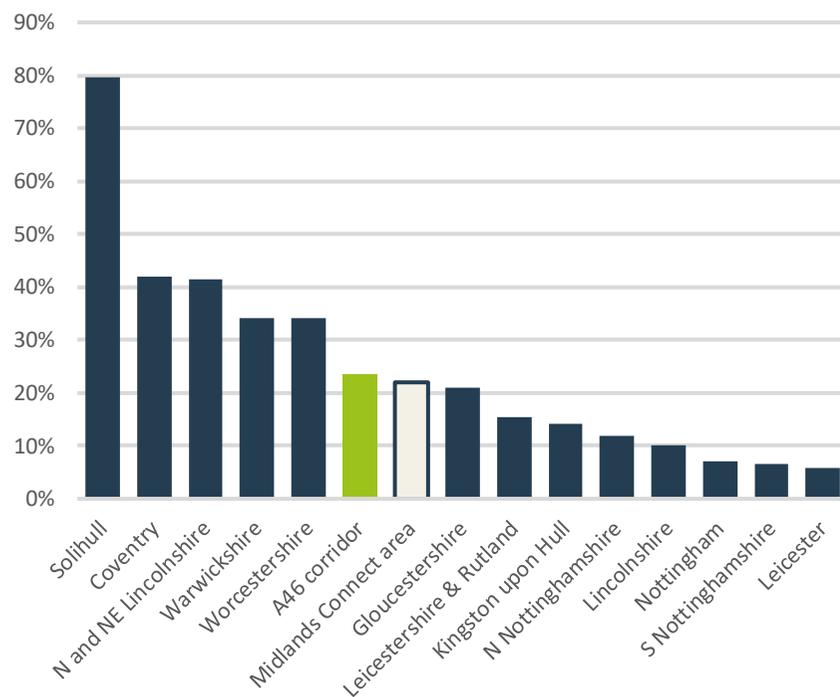
Figure 2-9: Value of exported goods and services as a proportion of total GVA, 2017



Source: Regional Trade Statistics (HMRC) and ONS

The A46 corridor accounts for approximately half of the Midlands Connect economy, and also half of its imports and exports. Exports represent 23% of GVA in the corridor and are particularly important to the economies of Solihull, Coventry, North and North East Lincolnshire, Warwickshire and Worcestershire (where manufacturing tends to be a higher share of GVA) as shown in Figure 2-10.

Figure 2-10: Export value as share of GVA by NUTS3 area



Source: HMRC (Export value, provisional 2017) and ONS (GVA 2016). Analysis is for entire NUTS 3 area in each case.

### 2.1.4 Major employers

Information on the largest businesses in the Midlands will be included in the Enhanced Strategic Case.

## 2.2 Forecast economic growth

### 2.2.1 Current forecast growth

Over the period 2015 to 2030, the economic output of the corridor is forecast to increase by a third to £153 billion. Over the same period, the number of jobs in the corridor is forecast to grow by 146,000 or 5%, as shown in Table 2-1.

The table also shows the share of jobs and GVA within each region and also in the SRN-dependent sectors.

Growth in GVA in these sectors is forecast to be at a higher rate than the corridor's economy as a whole; with extremely high percentage growth in the northern end of the A46 corridor, as shown in Figure 2-11 **Error! Reference source not found.** Growth rates are particularly high in the logistics & freight, retail & wholesale and manufacturing sectors; whilst business services are forecast to grow relatively quickly in Nottingham, Leicester and Coventry.

Table 2-1: Forecast economic growth in A46 corridor

	2015	2030	Change
Jobs (total, million)	2.83	2.98	+5%
GVA (total, billion)	£115	£153	+33%
Jobs (SRN-dependent sectors, m)	0.79	0.82	+4%
GVA (SRN-dependent sectors, bn)	£32	£44	+36%
% of jobs in SRN-dependent sectors	28.0%	27.7%	
% of GVA in SRN-dependent sectors	28.0%	28.7%	

Source: Cambridge Econometrics

As shown in Table 2-1, the share of total employment (as a percentage of the whole economy) in SRN-dependent sectors is forecast to decrease slightly in the corridor; this is a result of slightly higher forecast growth in jobs in other sectors. Whilst the share of GVA in SRN-dependent sectors is forecast to increase, the rate of growth is less than in England a whole, for which the share of jobs in these sectors increases from 23.7% in 2015 to the same as the corridor (28.7%) in 2030.

It is important to note however that the forecasts presented here are based on extrapolation of current conditions and assume a 'business as usual' level of investment in our transport networks. Truly transformational investment in the A46 corridor provides an opportunity to achieve growth well above these forecasts in key growth sectors and in housing, by providing the right conditions for growth. This would contribute to spreading growth across a wider area, rebalancing England's economy, and increasing productivity across the Midlands.

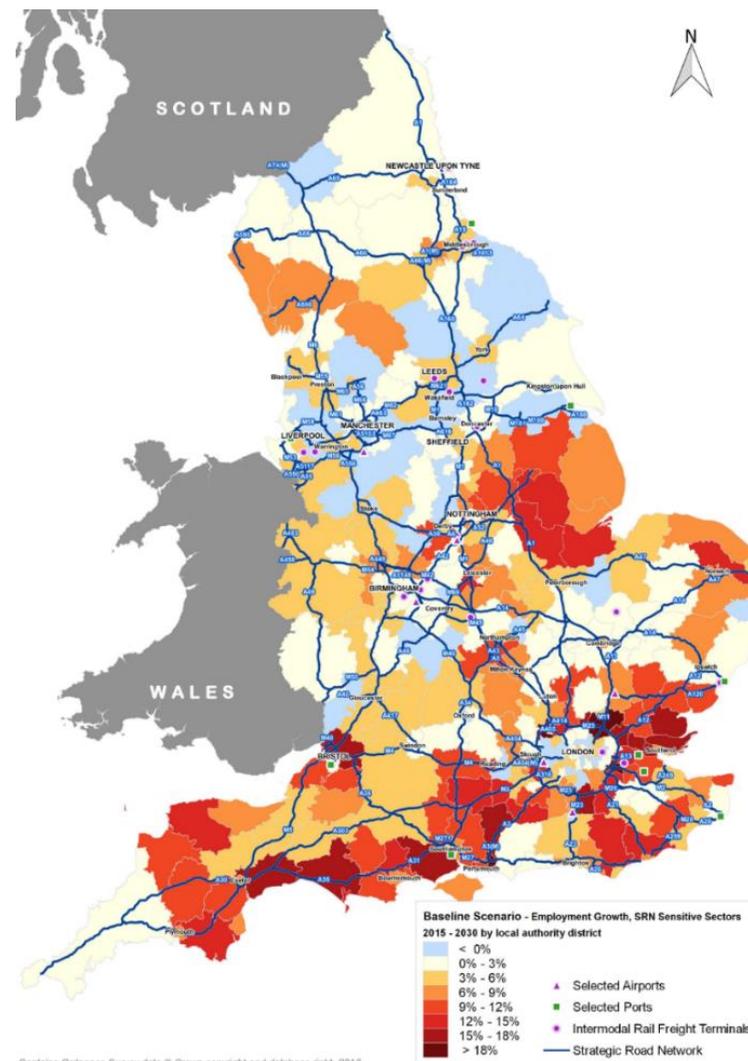
### 2.2.2 Forecast growth in SRN-dependent sectors

Forecast changes in GVA and employment in the SRN-dependent sectors are shown in Table 2-2 and shown in Figure 2-11. Definitions of the SRN-dependent sectors are provided in Appendix E.

Table 2-2: Forecast change in jobs and GVA in A46 corridor by sector

	Change 2015-2030	
	Jobs	GVA
Land transport	-14%	+25%
Retail & wholesale trade	+8%	+32%
Primary materials (quarrying & mining)	-39%	-50%
Manufacturing (users of transport services)	-20%	+38%
Manufacturing (reliant on other sectors which are users of transport services)	-25%	+39%
Construction	+18%	+49%
SRN-dependent sectors	+4%	+36%
Non SRN-dependent sectors	+6%	+31%
All economic sectors	+5%	+33%

Figure 2-11: Forecast percentage employment growth in SRN-dependent sectors, 2015-2030



Source: Highways England The Road to Growth

The changes in jobs and GVA shown above are generally in line with national (English) trends (see Figure 2-12). The biggest variances are:

- jobs in the land transport sector are forecast to fall by 14% compared to the English average of 18%;
- the output of the retail and wholesale sector is forecast to grow two percentage points above the national average;
- the manufacturing sector in the corridor is expected to grow in GVA terms more than the English average, and lose proportionately fewer jobs;
- the GVA of the construction sector is expected to grow by two percentage points less than the English average.

The highest growth rates are expected in the **construction sector**. The largest absolute increases in jobs and GVA occur in East Riding of Yorkshire, Leicester and Solihull, locations where housing and jobs growth is expected to be significant. The largest percentage increases tend to be in the same locations, as well as more rural locations such as Stroud, North West Leicestershire and Lincolnshire.

High GVA growth rates are expected in **manufacturing**, although in the same period manufacturing jobs are forecast to fall (reflecting significant productivity improvements). However these trends are slightly better than the English average. The largest absolute increases in manufacturing GVA in the corridor are forecast in the larger urban centres: Coventry, Solihull, Leicester; Kingston-Upon-Hull and Stratford-upon-Avon. The largest percentage increases tend to be forecast in more rural areas, notably Lincolnshire, Warwickshire and Worcestershire, although the percentage increase in Leicester is also high.

Like manufacturing, the economic output of the **land transport** sector is forecast to increase whilst employment falls. The largest absolute and percentage increases in GVA tend to be expected in the north of the corridor, but it is some of these locations which are also expected to see the largest falls in employment in the sector. Warwickshire and Worcestershire are forecast to see reductions in both employment and GVA. This demonstrates the importance of connecting areas at the ends of the A46 to the heart of the network.

Figure 2-12: Forecast % change in GVA by sector



Unsurprisingly, the largest absolute increases in **retail and wholesale** jobs and GVA are forecast in the main urban centres: Greater Leicester, Nottingham, and Kingston-Upon-Hull, Warwick, but also in the west Lincolnshire growth towns.

In line with the national trend, the **primary materials** sector is forecast to contract both in terms of jobs and GVA. The largest absolute falls in employment in this sector are expected in the quarrying industry in North West Leicestershire, Charnwood, and in the mining industry in East Riding of Yorkshire.

## 2.3 Population and housing growth

*Section to be added in the Enhanced Strategic Case which:*

- *summarises current population distribution and growth;*
- *discusses population and housing growth forecasts (official)*
- *sets out the strategic population and housing growth targets and plans set by LAs in the corridor over and above the shorter-term Local Plan Growth, including outcomes of SHMAs*
- *includes a map showing where homes and jobs growth is expected to be highest in the corridor (similar to the Ox-Cam approach).*

## 2.4 Commentary

The A46 corridor comprises of a varied economic geography along the route, ranging from intense high growth areas to rural and peripheral regions. It serves a number of locations that have a high concentration of sectors that are heavily reliant on road network for access to domestic and international goods markets, business to business connectivity, and to labour markets.

The economic make-up of the locations along the corridor will, to a greater or lesser extent, be influenced by the quality of existing road connectivity. For example Leicester's important retail and food production sector is concentrated around the M1.

In general, the overall mix of economic sectors in the larger, central urban areas will be determined by a wide range of factors including access to labour markets, availability of commercial premises, land prices and rail connectivity. Road connectivity will influence this, but not necessarily be the most dominant economy-shaping factor. However in more peripheral areas, the lack of good road connectivity may historically have acted as a deterrent for companies in SRN-dependent sectors from locating there, or may inhibit growth in those sectors.

The A46 currently plays a number of important roles at a national, sub-regional and local level. These are discussed in detail in Chapter 6. Nationally it is an important link between the A1 and M1 corridors, providing connectivity between the Midlands and Humberside. Sub-regionally it links some of the key economic hubs in the Midlands to each other and the rest of the UK. Locally it supports local economies function, and interact with their hinterlands. At all levels, it supports and enables growth.

However, as discussed in the next chapter, these multiple roles result in high demand for travel, especially around the main urban centres. Delays due to high traffic volumes and infrastructure which has not kept pace with demand increase costs for businesses, reduce the attractiveness of the Midlands for inward investment, and inhibit both jobs and housing growth. This is true for all economic sectors, but in particular effects firms operating in globally significant industry clusters that currently rely on national and international supply chains (such as the advanced manufacturing sector).

### 3. Conditions and use of A46 corridor

#### 3.1 Introduction

This chapter summarises the traffic conditions and travel patterns on the A46 corridor. Specifically, it describes:

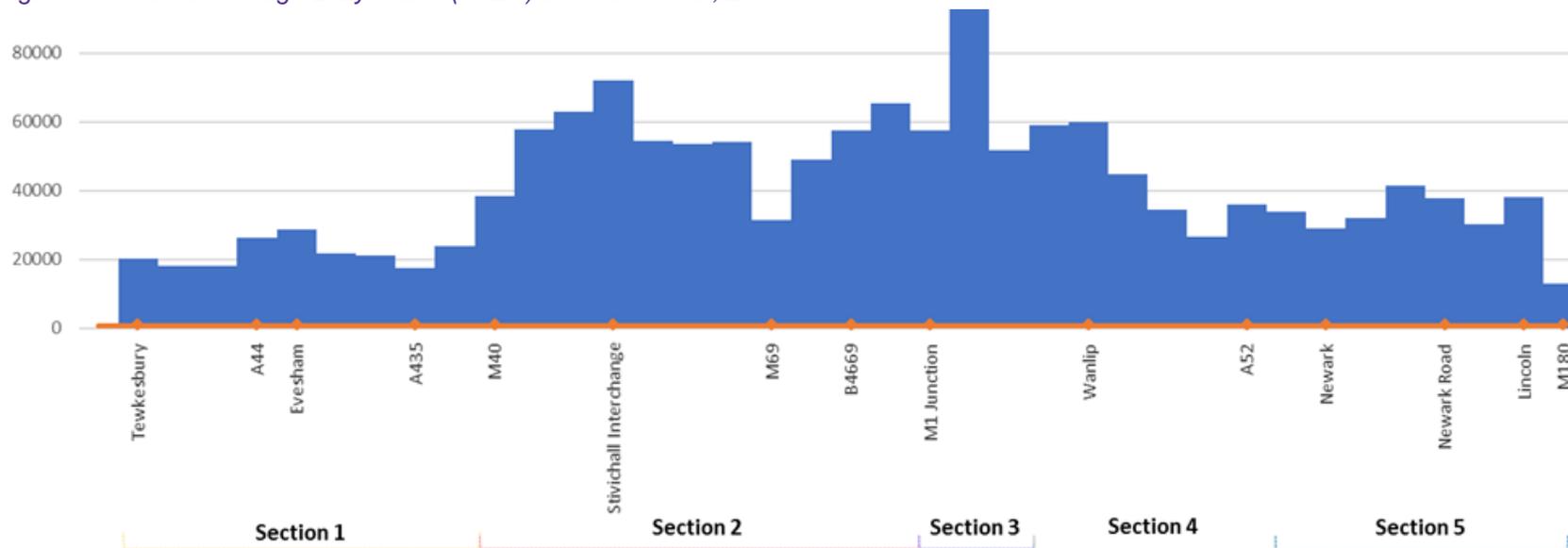
- A46 average speeds and journey times;
- analysis of alternative routes;
- analysis of bottlenecks;
- analysis of journey time reliability;
- traffic flows and travel patterns;
- summary of traffic conditions by section of the A46; and
- community impacts and environmental designations.

Typically data for the northbound direction are presented. However it is recognised that southbound conditions may be different at certain locations and where appropriate southbound data is also presented. Local conditions will be examined in detail during option development.

#### 3.2 Current traffic volumes

Traffic volumes vary significantly across the A46. Figure 3-1 shows average annual daily traffic (AADT) flows across the A46 extracted from the M-RTM 2015 base year model. (NB The value for the M1 has been truncated as this is the section of the A46 with the highest flow – actual AADT is 140,000).

Figure 3-1: Annual Average Daily Traffic (AADT) on A46 corridor, 2017



Source: Highways England WebTRIS

As can be seen traffic flow broadly corresponds to capacity, aside from the M1 section, the busiest sections are between Coventry and Leicester extending north around the Leicester bypass. The upgraded section between Leicester and Newark has an average daily flow of 40-50,000 vehicles while the sections at the start/end have lower flows between 20-25,000 as single carriageways.

The level of traffic shown above therefore is likely reflect the available capacity (where demand exceeds supply) rather than necessarily the underlying demand for travel, which may be constrained by the lack of capacity and/or the poor journey time reliability on the corridor.

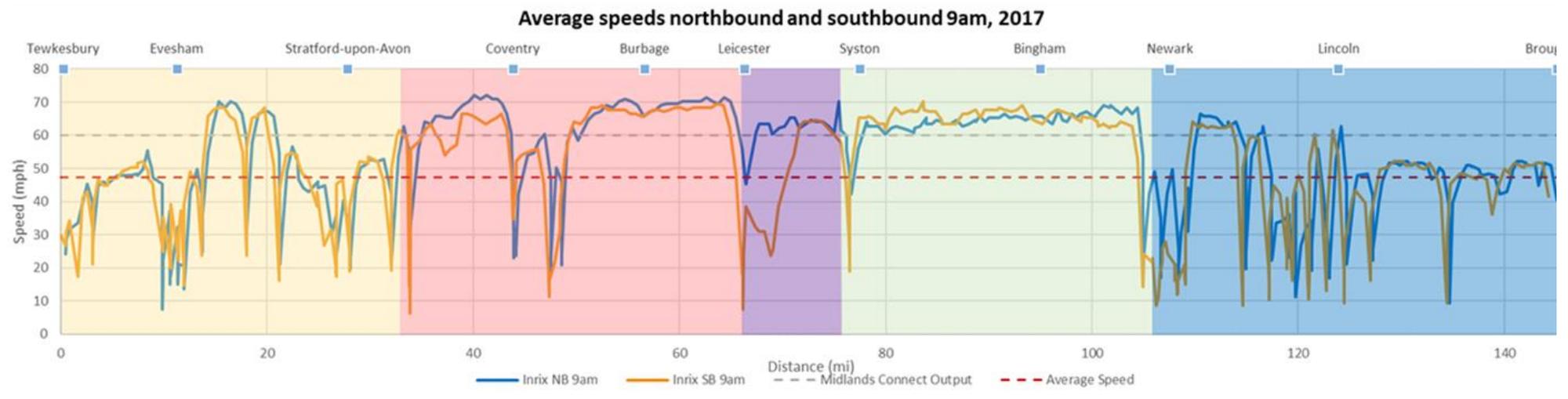
### 3.3 Average speeds and journey times

Average journey times and speeds have been derived using the INRIX dataset and Roadway Analytics tool. The INRIX data are derived from GPS traces for trips made through the corridor which record actual speeds and location. The INRIX dataset is derived from a mix of sources but has the advantage it is observed data.

INRIX data in this report is from weekdays in November 2017 at 09:00 (for consistency with the M-RTM). As such it represents a 'snapshot' of conditions in that time period rather than an average over a longer period.

Average speeds northbound and southbound along the corridor are shown in Figure 3-2 from M5 J9 (on the left) to the M180 (on the right). The figure therefore covers the A46, M69, M1 and A15; the other roads in the corridor are not shown on this chart. The grey dotted line represents the mile a minute Midlands Connect Conditional Output; the red dashed line shows the average observed speed across the whole route; and the solid orange line shows the observed average speed at 09:00 on weekdays in November 2017.

Figure 3-2: Average speeds northbound and southbound at 09:00, weekdays, November 2017



Source: INRIX. Note there is a small, but real difference between northbound and southbound mileage in certain locations.

Figure 3-3: Average northbound speeds by time period, weekdays, November 2017

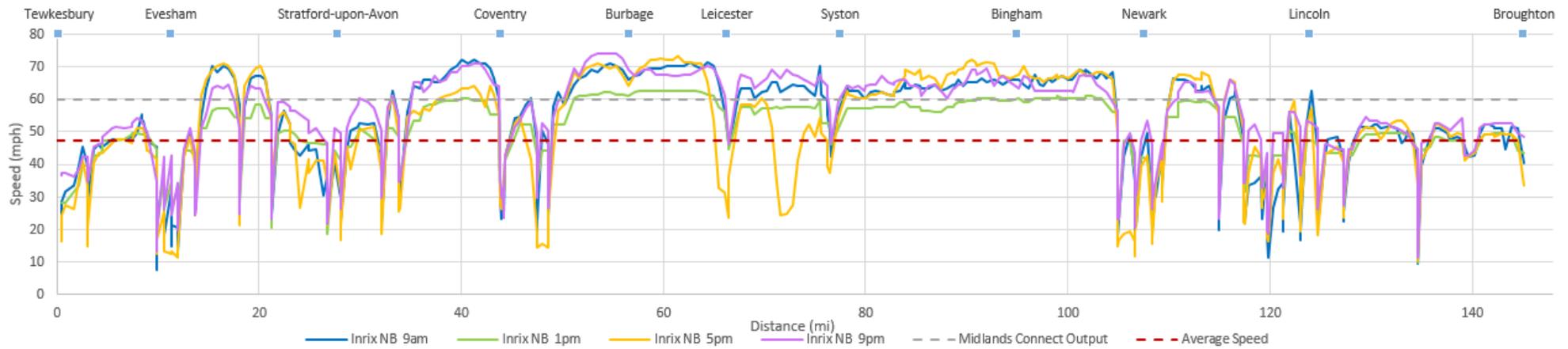
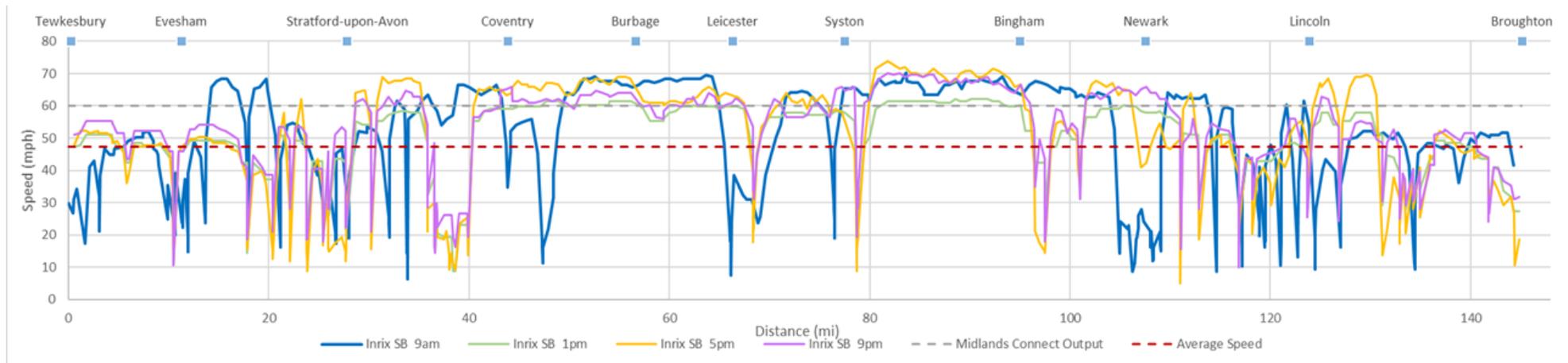


Figure 3-4: Average southbound speeds by time period, weekdays, November 2017



Source: INRIX

Figure 3-2 shows delays in the southbound direction are much worse around Leicester in the morning peak period. Note also the poor performance of the sections between Ashchurch and Stratford, and from Newark to Lincoln.

Figure 3-3 and Figure 3-4 show average speeds at three different times of day:

- 09:00 (the morning peak);
- 13:00 (the inter-peak); and
- 17:00 (the evening peak).

As can be seen, network performance depends on the time of the day and direction, with southbound being generally worse than northbound. Note also that average speeds are actually lower at 13:00 than at 09:00 or 17:00, probably as a result of higher percentage of HGV trips which are limited to lower speeds and lead to platooning of traffic on single carriageway roads.

It is reasonable to conclude that most of the A46 corridor does not meet the 60 mph Conditional Output, and that some sections fall well below the desired conditional speed.

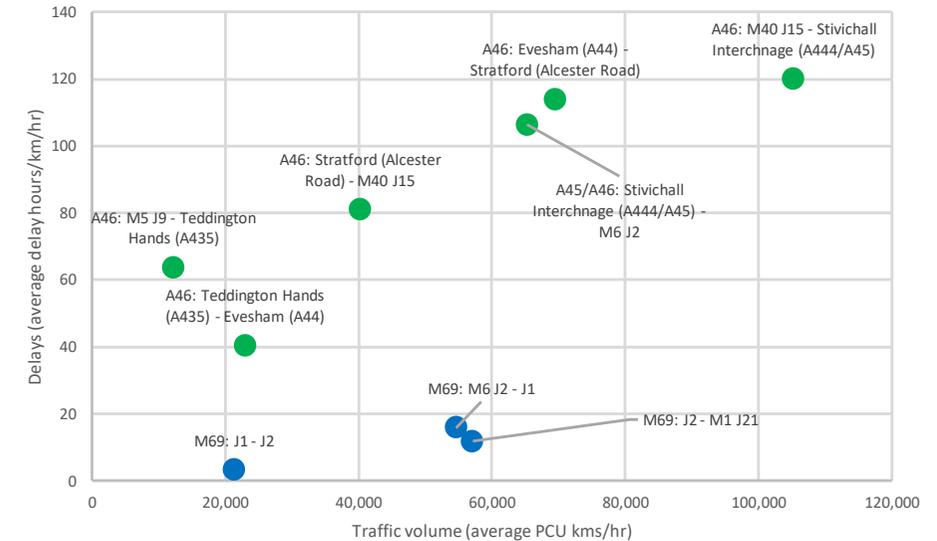
Average speeds are highly variable where there are at-grade roundabouts and/or sections of single carriageway. For example, lower speeds can be seen around Evesham, Stratford, Warwick, Coventry, Leicester, Newark and Lincoln.

The best-performing section of the A46 is the M69 between Coventry and Leicester followed by the section between Leicester and Newark, parts of the Coventry bypass and a small section at Salford Priors. Observed speeds fall as the M69 approaches the M1 which reflects the merger of the two motorways and is a known pinch point due to the proximity of Leicester services and the A46 diverge.

The average speed profile largely matches the road standard; such that where improvements have been made average speeds are consistent with the design standard. The only sections of the A46 which meet or exceed the conditional output are those which operate as either Dual-2 lane All Purpose or Motorway (D3) standard.

These sections are also where traffic is greatest, meaning that the sections with generally higher speeds are also those with higher traffic levels (as indicated by the circles to the right of Figure 3-5). The chart also shows that it is also these sections which have greater aggregate levels of delay (indicated by the vertical axis), which reflects the higher capacity of the links and junctions which are more typical in the central section. In this regard, the capacity and standard of the road does influence its use compared to alternatives, as a higher standard will make the A46 more attractive. But it is also clear that, historically, investment has occurred in those locations experiencing the greatest delays due to congestion, meaning that the capacity and/or standard of the road is influenced by demand for its use.

Figure 3-5: Traffic volume and delay west of the M1.



Source: Long-Term Midlands Motorway Hub Study analysis using the Midlands Regional Highway Model (M-RTM)

Figure 3-5 also shows that the A46 between the M5 and M40 has relatively low traffic levels, but mid-range delays, reflecting the mixed standard of route; whilst the section from the M40 to the M6 has relatively high delay and high demand. This gives an indication of where investment is likely to result in the highest traditional benefits.

### 3.4 Volume : capacity ratio

The M-RTM was used to understand where the network is currently under most stress by examining the ratio of assigned traffic to the volume of each link. The capacity is determined based on coded characteristics of each section, such as number of lanes, and the speed of traffic (using speed-flow relationships).

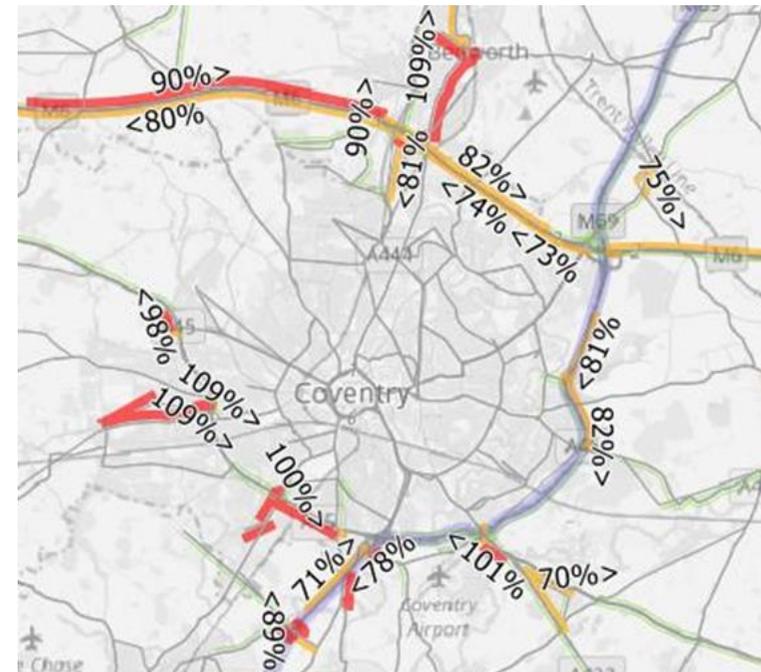
Figure 3-6 to Figure 3-9 show where the volume : capacity ratio (VCR) in the 2015 base year model exceeds 85%, where 85% is taken as a proxy for congestion i.e. above this level the road start to experience a drop in performance. The sections which have the highest VCR are:

- on the Evesham bypass southbound, due to the multiple at-grade junctions;
- around Coventry, due to remaining at-grade junctions and very high traffic volumes;
- north of Leicester between the M1 and Hobby Horse interchange, reflecting the high traffic volumes on this section; and
- on the Lincoln bypass, due to the single-carriageway standard, at-grade junctions and relatively high traffic volumes.

Figure 3-6: VCR 2015 base year, morning peak period - Evesham



Figure 3-7: VCR 2015 base year, morning peak period - Coventry





### 3.5 Journey times on alternative national routes

The A46 could have potential to be more attractive for long-distance journeys between the M5 and M1 corridors, between the M1 and A1 corridors and between the A1 corridor and Humberside. Journey times on the A46 have been compared to those on the alternative (and generally preferable) routes using Google traffic data. The data represents ‘typical conditions’ on a Friday in the northbound direction at the time of extraction (February 2018).

Figure 3-10 and Table 3-1 compare journey times between M5 J9 (Tewkesbury) and M1 J21 (Leicester) Tewksbury via the A46 and via the M5/M42/M6. As can be seen, the reported journey times in the morning peak on the two routes are identical, but in the inter-peak the A46 route is potentially seven minutes quicker.

Figure 3-10: Journey times comparison M5 J9 to M1 J21, typical Friday



Table 3-1: Journey times comparison M5 J9 to M1 J21, typical Friday

Route	Morning peak journey time (mins)	Inter-peak journey time (mins)
Via M5/M42/M6	90	87
Via A46/A45	90	80

Source: Google

However, analysis of travel patterns shows that very few, less than 10% of total trips, use the A46 in preference to the M5/M42/M6 alternative. Assistance from HE Traffic Officers and formal diversionary routes may be one reason why vehicles choose to use the motorway network rather than the A46.

Figure 3-11 and Table 3-2 compare journey times between M1 J21 (Leicester) and Grimsby via the M1/M180 and via the A46/A15. The journey times are again similar, but slightly higher via the M1 in both the morning and inter-peak periods by up to 10 minutes. However, like the M5 to M1 section, the majority of long-distance traffic making this south east to north east movement uses either the M1 or A1.

Figure 3-11: Journey times comparison M1 J21 to Grimsby, typical Friday

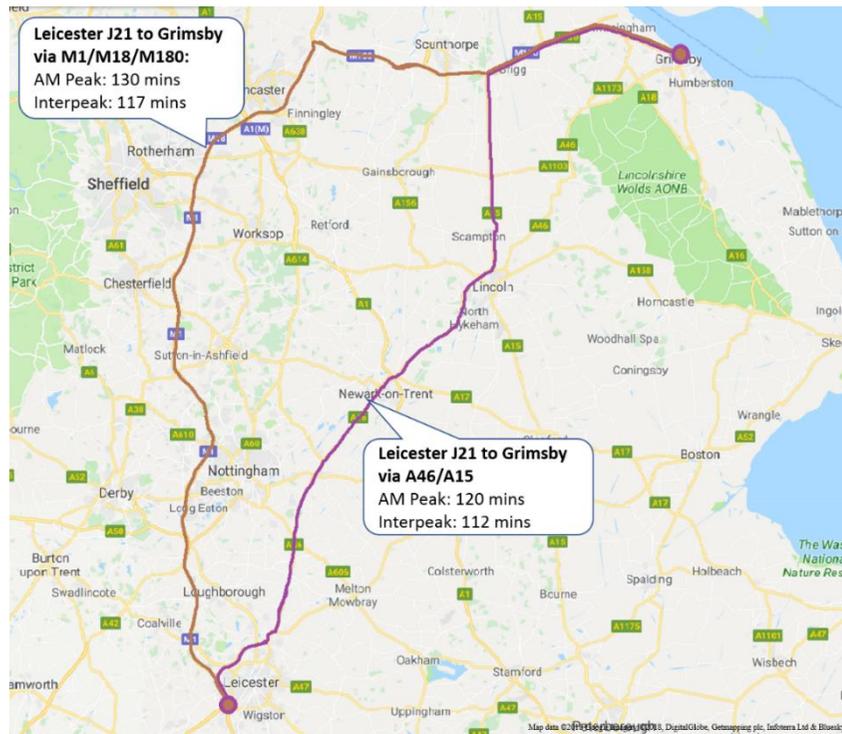


Table 3-2: Journey times comparison M1 J21 to Grimsby, typical Friday

Route	Morning peak journey time (mins)	Inter-peak journey time (mins)
Via M1/M18/M180	130	117
Via A46/A15	120	112

Source: Google

Figure 3-12 and Table 3-3 compare journey times between Newark and Grimsby via the A1/M180 and the A46/A15. The journey via the A46 is significantly quicker both in the peak and off-peak, but again the business interviews suggest that most businesses prefer the A1/M180 route as it offers a greater certainty of journey time than the A46/A15 corridor.

Figure 3-12: Journey times comparison: Newark to Grimsby, typical Friday



Table 3-3: Journey times comparison Newark and Grimsby, typical Friday

Route	Morning peak journey time (mins)	Inter-peak journey time (mins)
Via M1/M18/M180	95	89
Via A46/A15	85	71

### 3.5.1 Shortfall to conditional output

Table 3-4 shows current journey time on each section (east/northbound) and the journey time assuming the Midlands Connect Conditional Output of an average speed of 60 mph. The table then shows the shortfall of current performance against the Conditional Output.

Table 3-4: Time savings based on current speeds assuming 60 mph Conditional Output

From/To	Current average journey time (09:00 weekday (mins)	Journey time based on average 60 mph (mins)	Shortfall	
			mins	%
1 M5 to M40	47	34	13	28%
2 M40 to M1	35	32	3	9%
3 M1 to Hobby H	11	10	1	1%
4 Hobby H to A1	35	33	2	6%
5 A1 - Humberside	48	36	12	25%
<b>A46</b>	<b>176</b>	<b>145</b>	<b>31</b>	<b>18%</b>

Source: INRIX

The largest shortfall is at either end of the route, where design standards are lower. Between the M5 and M40, an average of 60 mph would mean journey times by 13 minutes (28%) shorter than at present, whilst between the A1 and Scawby (M180) times would be 12 minutes (25%) shorter.

### 3.6 Traffic 'bottlenecks'

The INRIX Roadway data have been analysed to identify where delays are most severe. The severity of delay is represented by an 'impact factor' which considers:

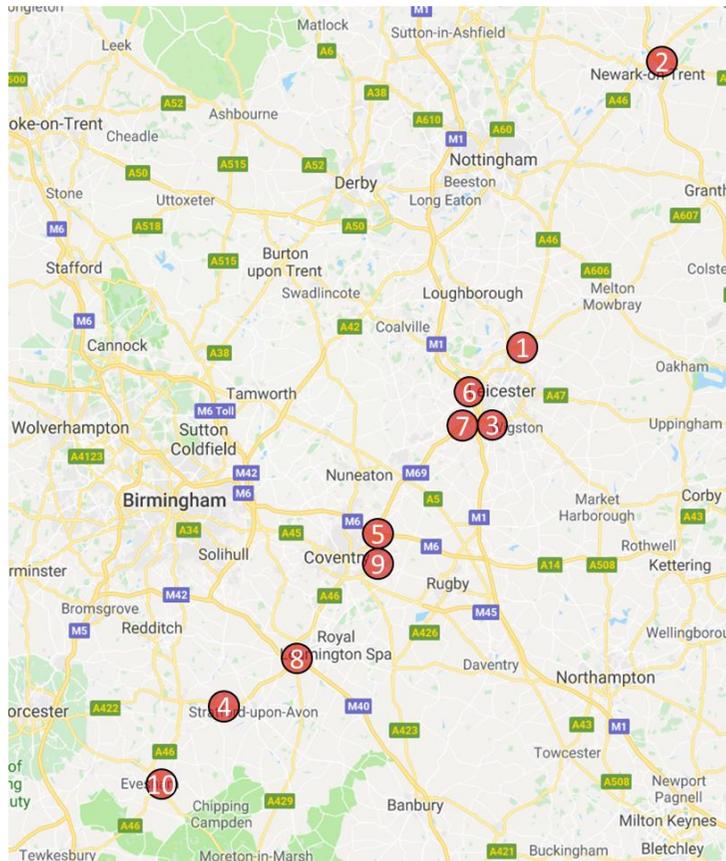
- The average duration during which the bottleneck occurred (for those exceed a duration of about one minute). A 'bottleneck' is defined as occurring when recurring congestion is identified by the INRIX Analytical Tool. In the case of the Newark A46/A1 junction (ranked #2), the most fleeting bottleneck lasted just one minute, with the longest lasting nine hours and 20 minutes.
- The average maximum length of queuing during each bottleneck event. In the case of Newark A46/A1 junction, for instance, the smallest maximum length recorded was 0.31 km, with the longest 11 km, effectively queuing down the A46 as far as East Stoke.
- The 'number of times that a bottleneck event was recorded in 2017 at that location.

One interpretation of the impact factor is that this provides a proxy for the junctions in the network which could if upgraded provide the highest economic benefits.

The top ten worst traffic bottlenecks on the whole corridor are shown in Figure 3-13 and Table 3-5. There is a cluster of 5 bottlenecks around Leicester, due to M1 J21, weaving on the M1 and traffic volumes on the A46 north of Leicester.

However, the worst observed bottleneck is at Syston is ranked as the worst with the highest impact factor with the second worst bottleneck is at Newark with the A1. At the southern end, the 4<sup>th</sup> worst is at Stratford/Alcester Road, followed by Warwick and the Coventry Bypass.

Figure 3-13: Location of top 10 worst traffic 'bottlenecks', 2017



Source: INRIX

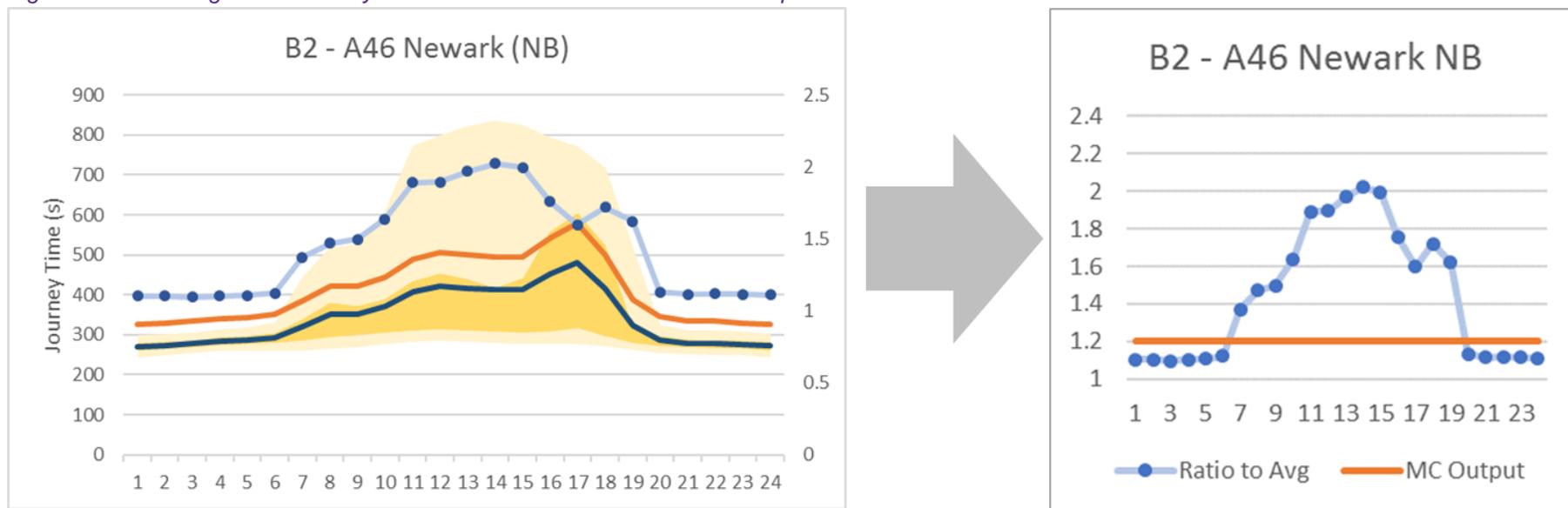
Table 3-5: Top ten worst traffic bottlenecks, 2017

Ref & rank	Location	Occurs	Avg. duration (mins)	Avg. max. queue length (km)	Events during 2017
1	Hobby Horse interchange	Mostly PM	25	3.57	1471
2	A46/A1 junction Newark	At any time	40	4.52	486
3	M1 J21-J21A	Mostly AM	29	6.56	358
4	A46 at Stratford	AM or PM	21	3.37	836
5	M1 J21 / M69	PM	62	4.81	181
6	Leicester Western Bypass	Mostly AM	24	2.88	737
7	M69 J1 - M1 J21	PM	45	4.57	193
8	A46 / M40 interchange	Mostly AM	23	6.32	223
9	A46 at Binley	Mostly AM	47	4.29	138
10	Evesham Bypass	Mostly PM	26	3.52	292

Source: INRIX

The top ten hotspots in each section are shown in Appendix D.

Figure 3-14: INRIX-generated delay data and conversion to Conditional Output



### 3.7 Journey time reliability

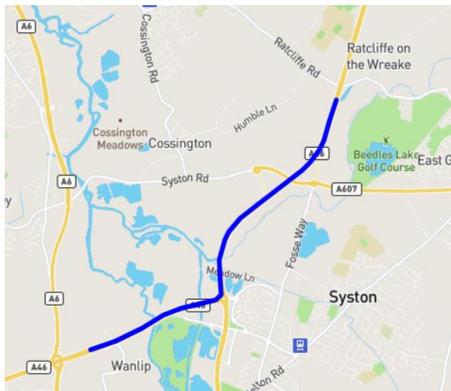
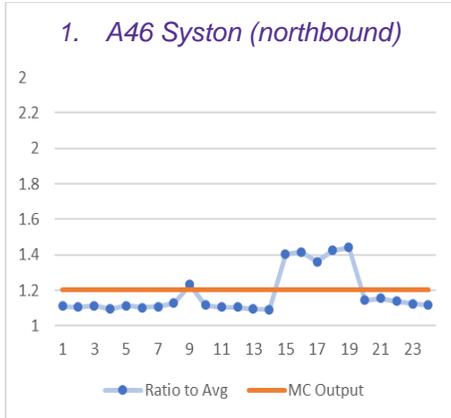
Using the INRIX data each of the bottlenecks has been analysed in detail and tested against Midlands Connect's Conditional Output relating to journey time reliability. Bottlenecks

The following plots show the journey time variability at the bottlenecks and their variability across an average day. Variability is shown as the ratio of the 95<sup>th</sup> percentile journey time and the average journey time. This is therefore a consistent measure of 'spread' of journey times as the Midlands Connect Conational Output. The higher the ratio, the wider the spread of journey times and therefore the less reliable.

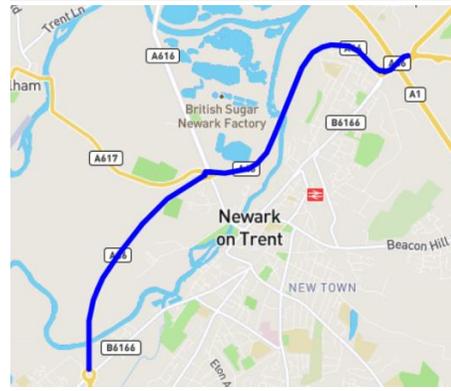
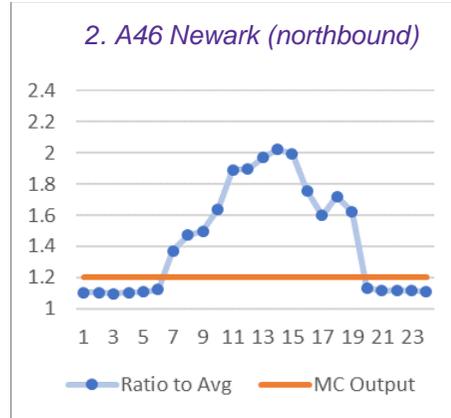
The plots have been derived from journey time data on selected links, similar to that shown on the left in Figure 3-14. The light yellow shaded area indicates the gap between the 75<sup>th</sup> and 95<sup>th</sup> percentile journey times (in seconds). The average journey time is shown as a dark blue line. The graph on the right plots the ratio of the 95<sup>th</sup> percentile journey time to the average.

To meet Midland Connect's Conditional Output, the ratio of average to 95<sup>th</sup> percentile should not exceed 1.2. As can be seen from the right-hand chart in Figure 3-14, journey time variability on the Newark bypass exceeds the Midlands Connect Conditional Output for most of the day.

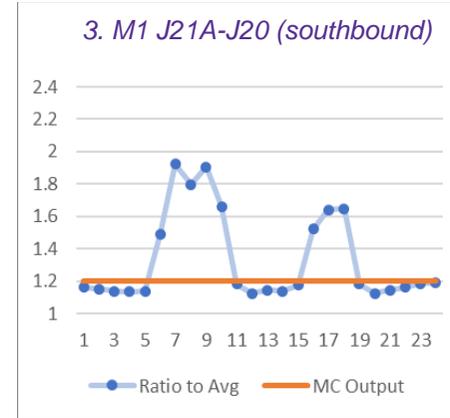
Similar charts for the top ten bottlenecks are shown in the following pages.



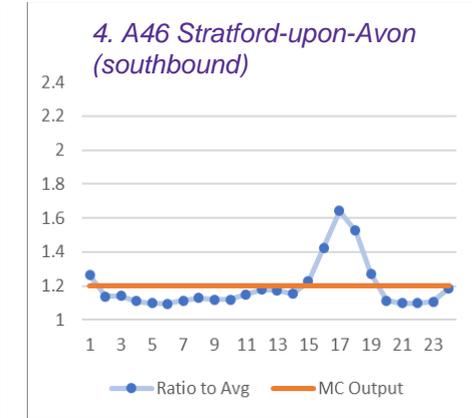
At Syston Hobby Horse Junction, reliability fails to meet the required standard in the evening peak, with 20% additional variability.



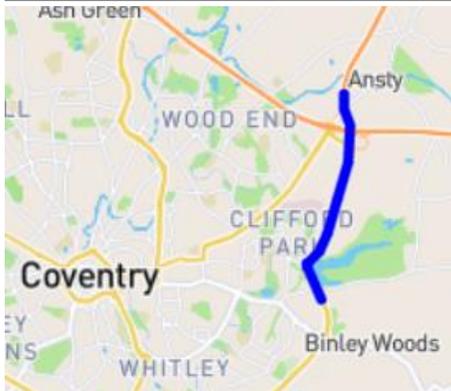
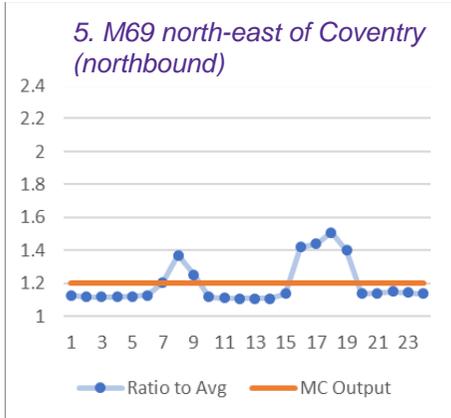
At Newark Intersection with the A1, journey times are too variable throughout the day, with journey times of more than double the average occurring in the afternoon on more than 5% of days.



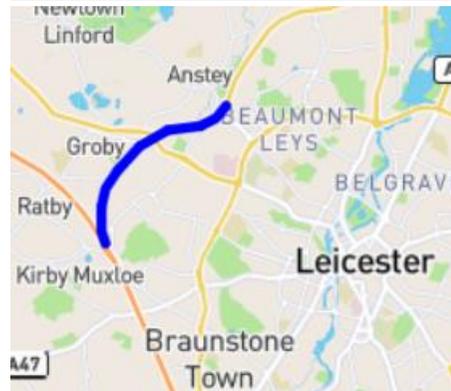
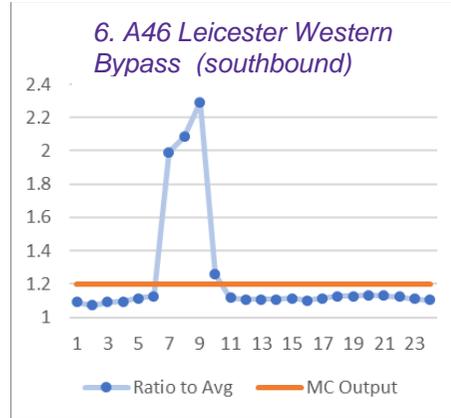
At the south bound M1 approach to the M69 junction, journey times are too variable in the AM and PM peaks



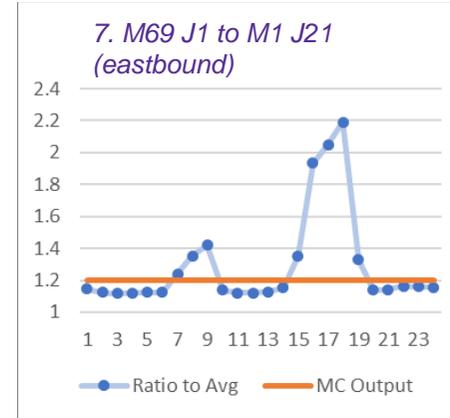
At Billesley heading west from Stratford on the A46, there is regular high journey time variability in the evening peak hours.



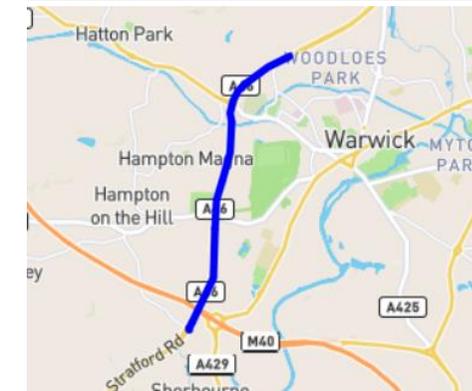
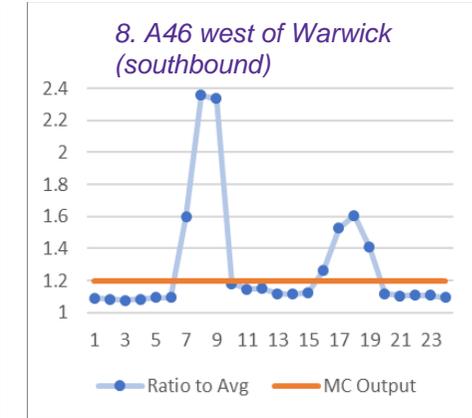
At Coventry on the A46 northbound where it meets the M69, variability exceeds the requirement in the peaks by an additional 20-25%.



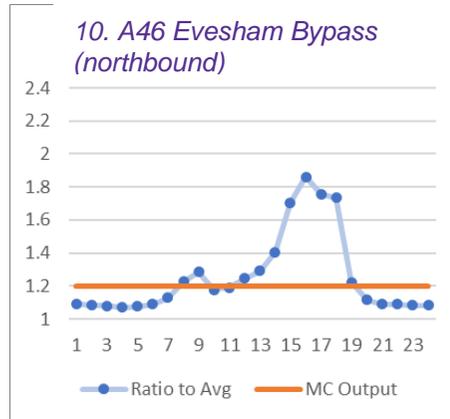
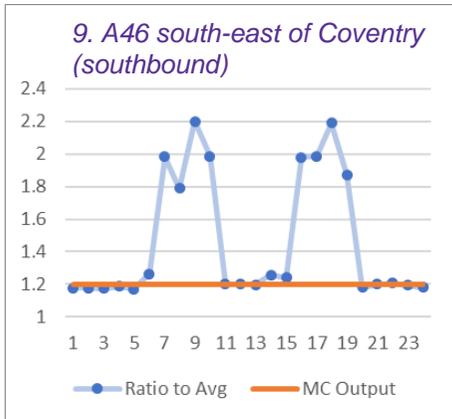
On the southbound approach to the M1, variability exceeds the output in the morning peak.



On the M9 approach to the M1, variability exceeds the requirement considerably in the PM peak, less so in the AM peak.



On the southbound A46 approach to A429/M40 junction, reliability fails to meet the conditional output in the morning peak where journey times can double on more than 5% of days between 7am and 9am.



At the A428 Binley roundabout in Coventry, journey time variability is high in the morning and evening peaks, for up to a total of 8 hours of the day. This means that journeys take 80% longer than expected, on more than 5% of days.



On the Evesham bypass, northbound journey time variability is higher than required for 10 hours of the day, especially in the evening peak.

### 3.7.1 Potential time savings from reducing journey time variability

As can be seen from the previous section delays occur at many of the at-grade junctions on the A46 leading to a wide variation in journey times. Removing the delays would significantly reduce journey times and journey time variability.

Table 3-6 shows that during the worst hour of the day the observed journey times (from INRIX) are notably longer than the average times shown in Table 3-4. The table also shows that the 95<sup>th</sup> percentile journey time (i.e. the time within 95% of journeys are made) can be substantially longer than the average time; in Section 3 the 95<sup>th</sup> percentile journey time is 81% higher than the median journey time.

Reducing the variability of journey times through investment in the A46 corridor would theoretically result in time savings per vehicle during the worst hour of up to 19 minutes (in Sections 1 and 2) with lower, but still significant, savings in the other sections.

Table 3-6: Potential journey time savings

Section	Cond Output 60 mph	Worst hour	Median JT in worst hour (mins)	95 <sup>th</sup> % time in worst hour (mins)	95 <sup>th</sup> % / median JT	JT saving (mins)	
1	M5 – M40	34	16:00	50	69	1.38	19
2	M40 – M1	32	16:00	40	59	1.48	19
3	M1 – A607	10	16:00	16	29	1.81	13
4	A607 – A1	33	16:00	36	47	1.31	11
5	A1 – M180	36	07:00	50	59	1.18	9

Source: INRIX

Figure 3-15 to Figure 3-19 show the current variability in journey times for each section of the A46 across the day in the north/eastbound direction. The y-axis shows the 'spread' of journey times, with a higher number equating to a wider spread of journey times. The metric used is the ratio of the journey time of the 95<sup>th</sup> percentile journey and the average journey time. So for example, a ratio of .5 means that 95% of journeys are made within 50% of the average journey time.

One of the Midlands connect Conditional Outputs is that 95% of journeys between city centres are made within 20% of the average speed (i.e. a ratio of 1.2).

Figure 3-15: Section 1: M5 (Tewksbury) to M40 (Warwick)

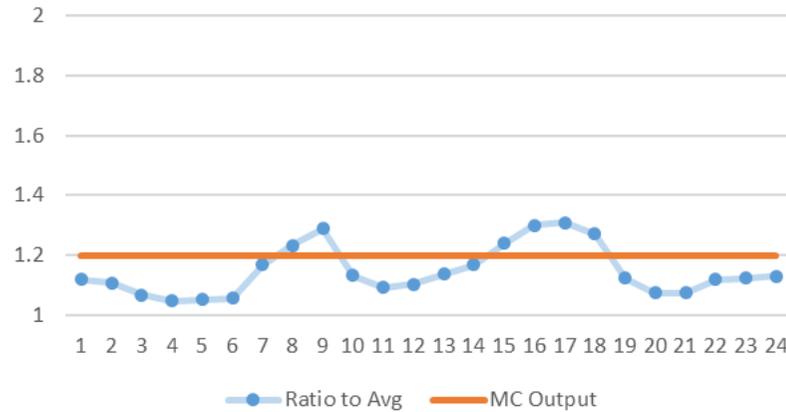


Figure 3-16: Section 2: M40 (Warwick) to M1 (Leicester)

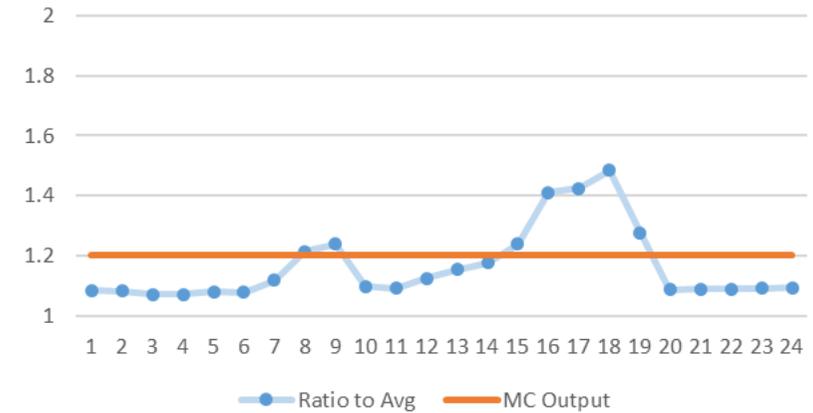


Figure 3-17: Section 3: M1 (Leicester) to A607 (Syston)

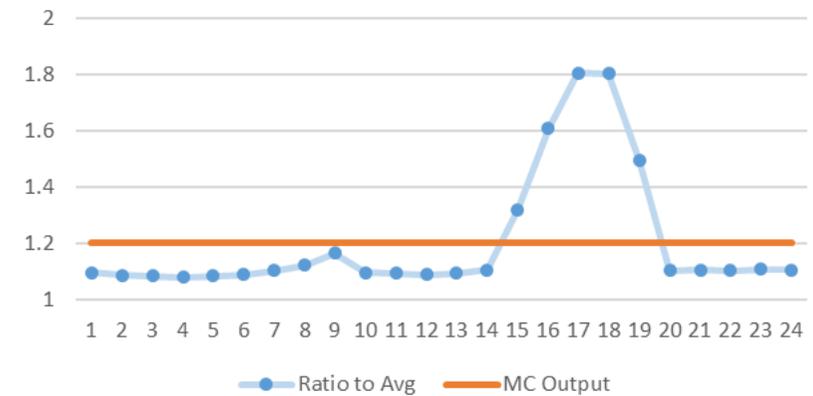


Figure 3-18: Section 4: A607 (Syston) to A1 (Newark)

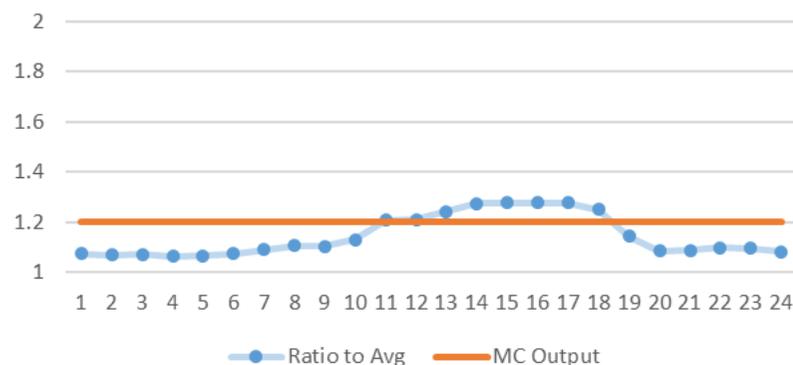
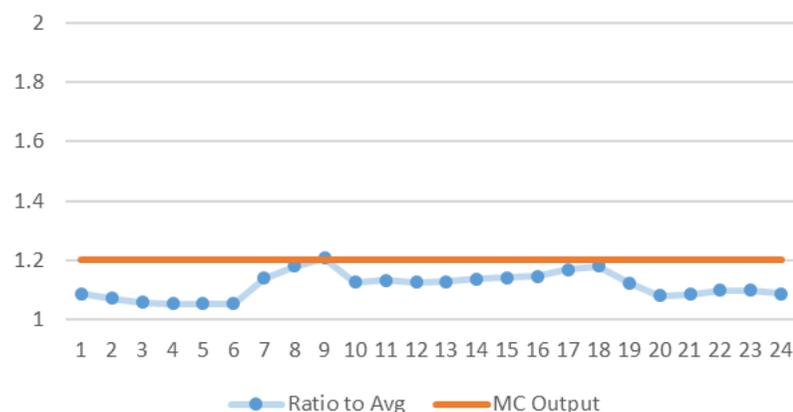


Figure 3-19: Section 5: A1 (Newark) to M180 (Humberside)



The charts indicate that, in each section, the variability of journey times is typically low (and within Midlands Connect’s aspiration) before 08:00 and after 19:00.

However, during the working day, the variability can increase significantly, as traffic levels increase. In Sections 1, 2 and 5, journey time variability deteriorates during the morning and evening peak periods (although in Section 5 this variability remains relatively low).

Variability of northbound journey times is highest in Section 3, with 95% of evening peak journey times occurring within 1.8 times the average time, whilst morning peak variability is much lower. In section 4 variability is less peaked, but above Midlands Connect’s Conditional Output for much of the working day.

Where there are observed delays it is reasonable to assume that this causes some suppression of traffic demand and, as has been observed elsewhere, upgrading can lead to a release of suppressed traffic.

### 3.8 Trip origins and destinations

The M-RTM has been used to understand the patterns of regional and long-distance travel in the A46 corridor. Figure 3-20 shows the share of east/northbound traffic entering the corridor which also travels through ‘downstream’ sections. Traffic which does not travel through to a subsequent section either has a destination in the section, or continues on an alternative corridor (such as the M40, M1 or A1).

The table shows that, according to the M-RTM, less than 5% of the eastbound traffic entering the A46 from the M5 continues on the A46 beyond the M40; and a similarly low share of traffic entering at the M40 continuing beyond the M1. A higher proportion of traffic entering the corridor at the M1 continues into Section 4 (or beyond), in part perhaps due to the fact that this is a shorter section, but noting that the share of short trips on this section is still high. Nearly 40% of vehicles entering the A46 corridor at the A1 continue beyond the end of the corridor. Overall, the analysis suggests that a relatively small share of traffic uses more than one section of the A46 corridor, and that few journeys use more than four sections.

Should appropriate data be available, analysis will be presented in the Enhanced Strategic Case on the overall demand for travel between the South West, Midlands and Humberside to understand the extent to which this demand is already using the A46 corridor.

Figure 3-21 uses similar model outputs to present a simplified pattern of journeys in the corridor, but based on traffic in both directions. Each line relates to traffic on a section of the corridor, with the darker colour within the line indicating the section. The lines are drawn to give an approximation of the extent of the origins and destinations of trips using that section, and the key routes where traffic joins and leaves the corridor.

The figure illustrates the complexity of traffic patterns on the corridor, and reinforces that the corridor is not used in its entirety, and that a key function of the A46 is to provide connectivity to radial corridors such as the M1

### 3.9 Select link analysis

Detailed analysis of travel patterns has been undertaken using the Saturn M-RTM 2015 base year model and running select link analysis (SLAs) to identify the pattern of origins and destinations in each section of A46.

The following plots have been produced by extracting trip matrices and link flows from the Saturn assignment model for a selected link in each section of the A46. The analysis uses the morning peak period (average hour, 07:00-10:00) scenario.

Figure 3-20: Travel patterns in A46 Corridor (east/northbound)

	To					
	Section 1 (M5-M40)	Section 2 (M40-M1)	Section 3 (M1-A607)	Section 4 (A607-A1)	Section 5 (A1-Humber)	Other
Entering 1 (at M5)	95.7%	4.3%	0%	0%	0%	0.0%
Entering 2 (at M40)		91.2%	4.7%	1.9%	0%	2.3%
Entering 3 (at M1)			80.7%	5.2%	0.3%	13.7%
Entering 4 (at A607)				95.1%	2.7%	2.2%
Entering 5 (at A1)					61.8%	38.2%

Source: M-RTM

Figure 3-21: Simplified trip patterns in corridor

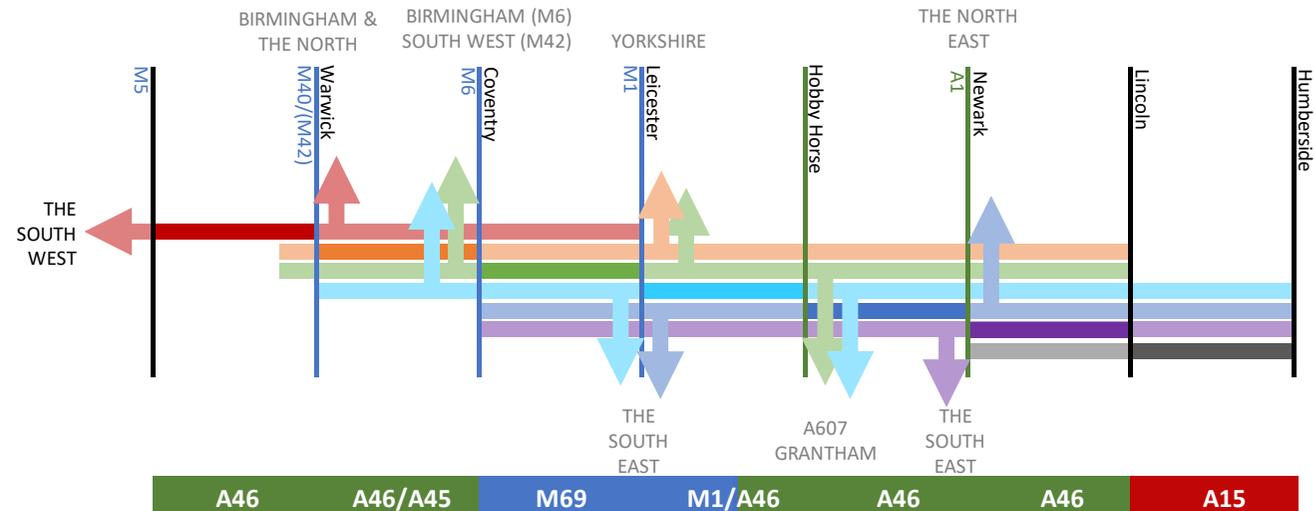
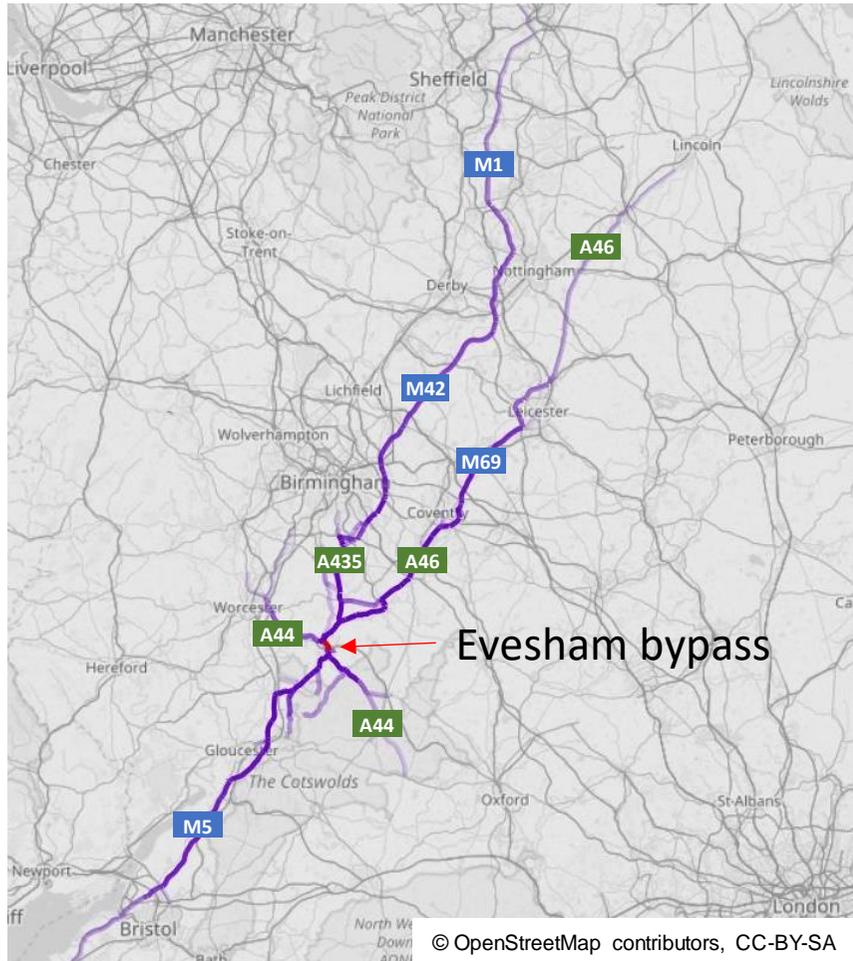
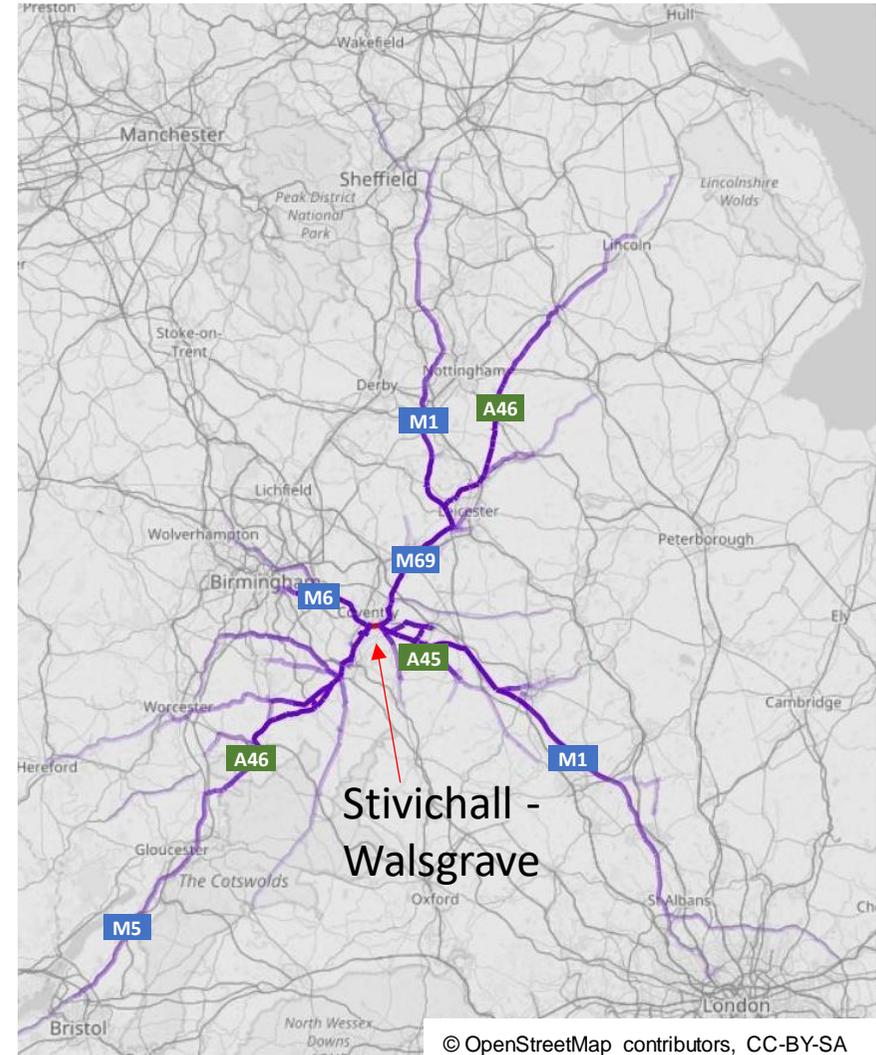


Figure 3-22: Select link analysis Section 1: A46 southbound on Evesham bypass, morning peak period, 2015



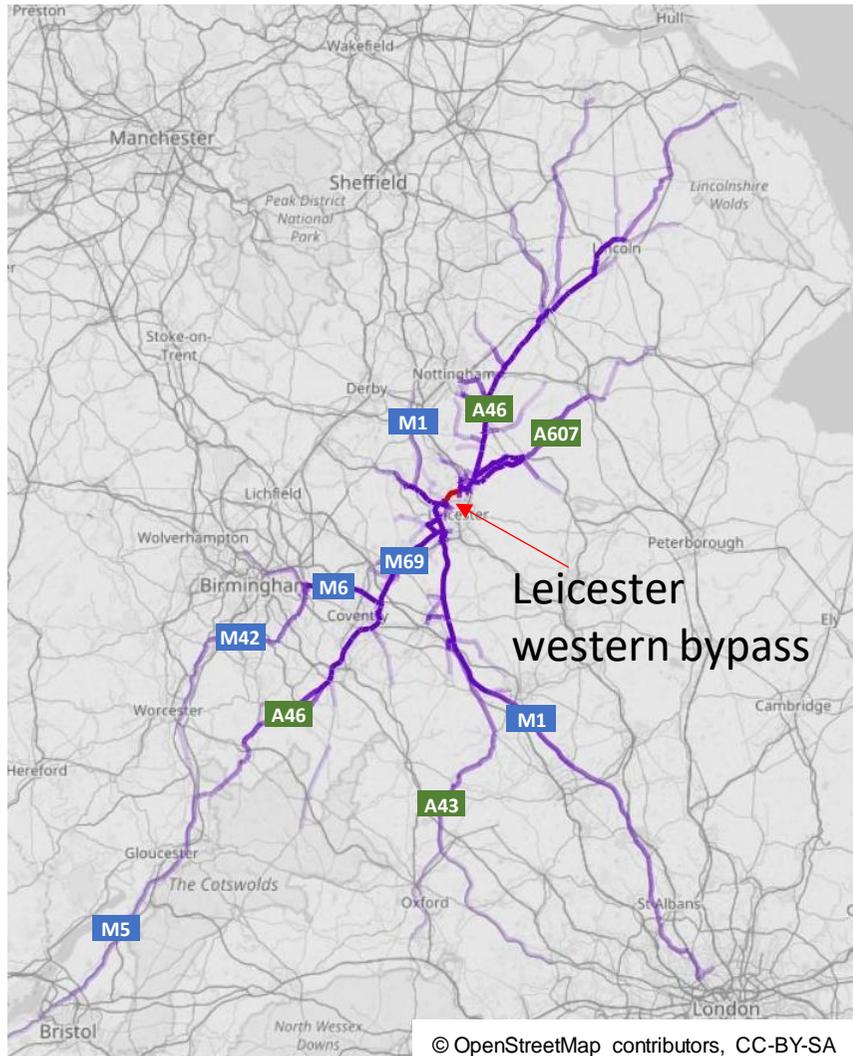
Source: Midlands Regional Traffic Model

Figure 3-23: Select link analysis Section 2: A46 westbound between Stivichall and Walsgrave intersections, morning peak period, 2015



Source: Midlands Regional Traffic Model

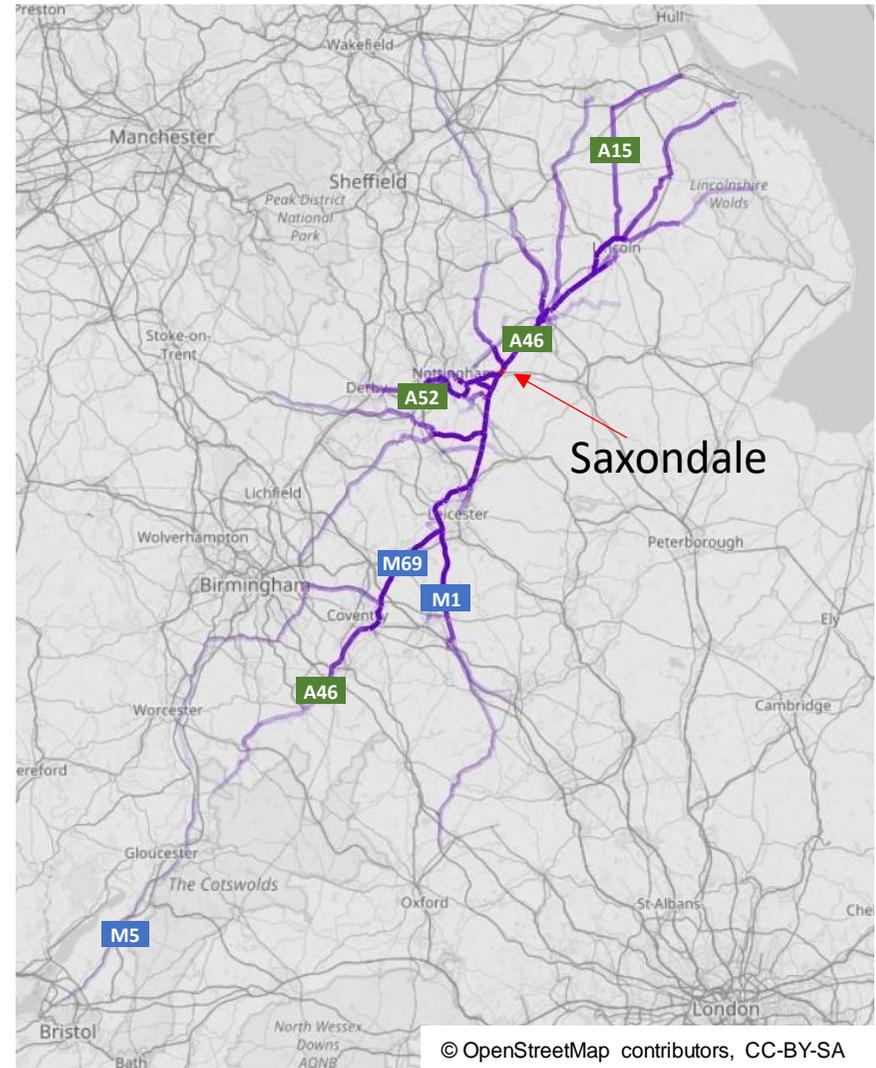
Figure 3-24: Select link analysis Section 3: A46 westbound on Leicester Western Bypass, morning peak period, 2015



© OpenStreetMap contributors, CC-BY-SA

Source: Midlands Regional Traffic Model

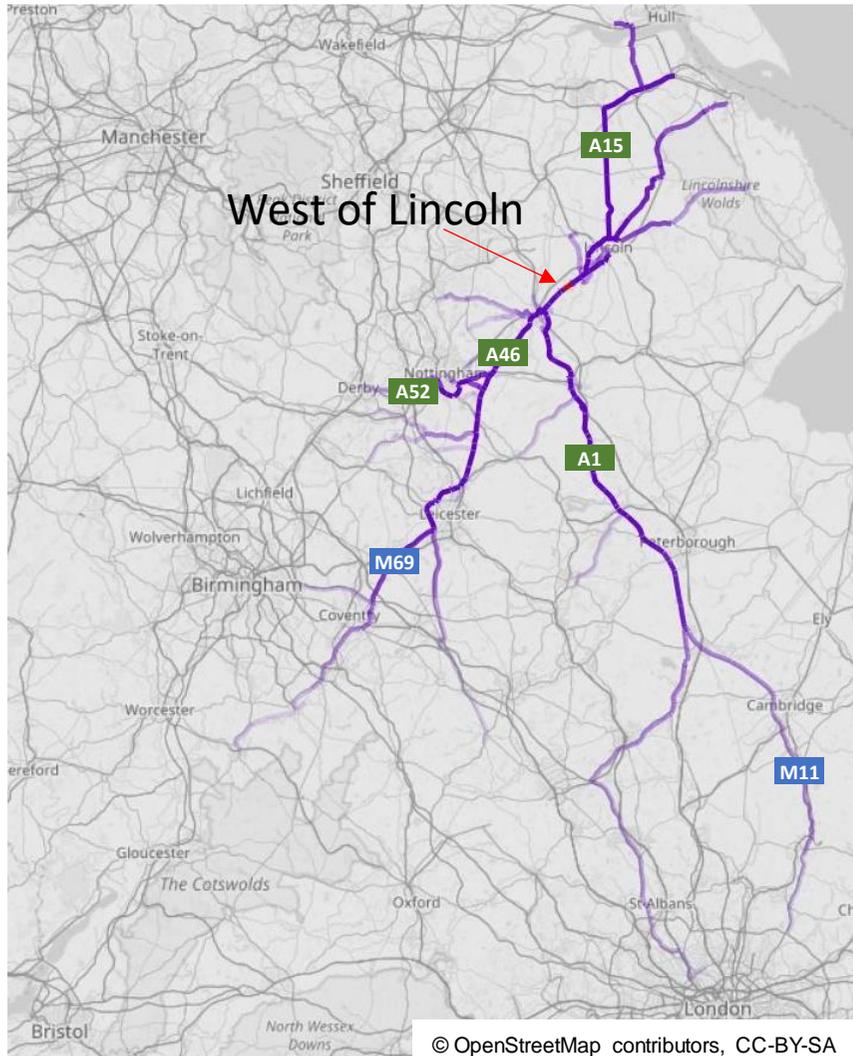
Figure 3-25: Select link analysis Section 4: A46 southbound, north of Saxondale interchange, morning peak period, 2015



© OpenStreetMap contributors, CC-BY-SA

Source: Midlands Regional Traffic Model

Figure 3-26: Select link analysis Section 5: A46 southbound, west of Lincoln, morning peak period, 2015



Source: Midlands Regional Traffic Model

### 3.9.1 Summary of traffic conditions

The following pages provide a summary of the key characteristics of the performance and usage of the A46 corridor by section.

Key issues on Section 1: Tewkesbury (M5) to Warwick (M40)

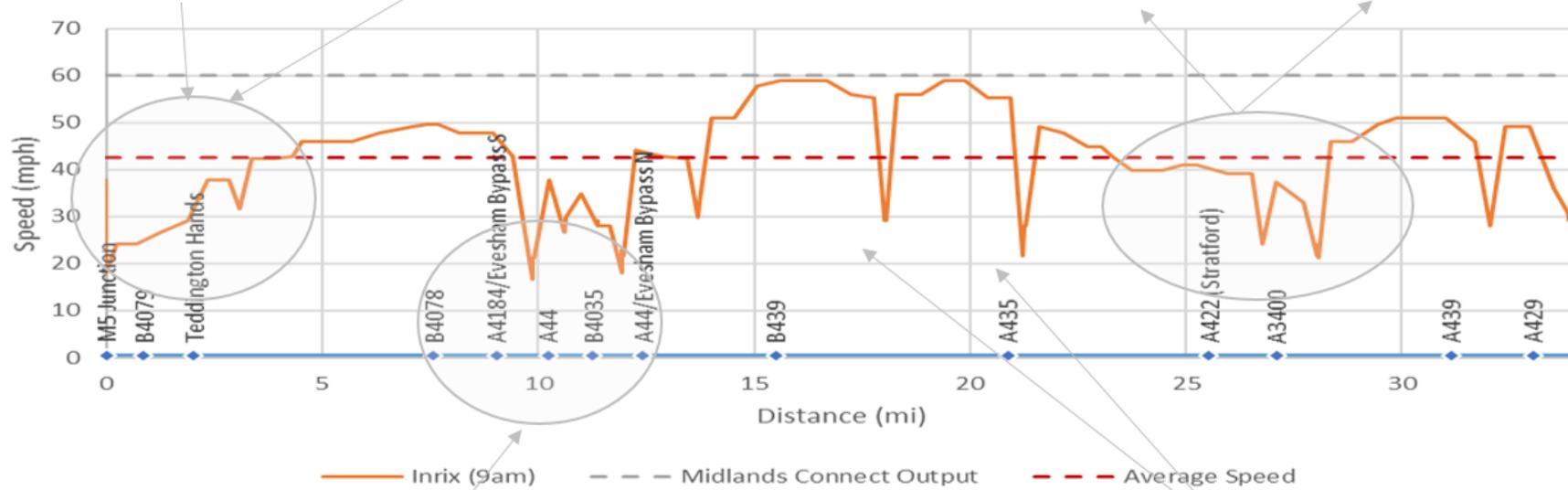
**M5 J9/Ashchurch**

Delays at M5/J9 due to capacity problems at circulatory in peak hours. Congestion due to distribution park and frontage onto A46. Single carriageway section with slow speeds and priority junctions.



**Stratford-Evesham**

Mix of local and sub-regional traffic causing delays on by-pass.. Land safeguarded in Core Strategy for widening of bypass. Three main roundabouts show delays and blocking back. Poor standard Stratford-Alcester leads to congestion and safety issues.



**Evesham bypass**

Highly variable journey times due to locally generated trips using A46 bypass for local generated trips to avoid congested town centre. Delays propagating into local network.

Future plans under consideration include a potential western bypass to form a complete ring road and junction improvements linked to housing development and improved link to M50.

Highways England currently investigating as part of RIS



**Salford Priors dual carriageway**

Only section to meet conditional output. Delays due to at-grade roundabouts forcing mainline traffic to slow to allow local traffic to enter.

Key issues on Section 2: Warwick (M40) to Leicester (M1)

**A46 Stanks, Warwick**

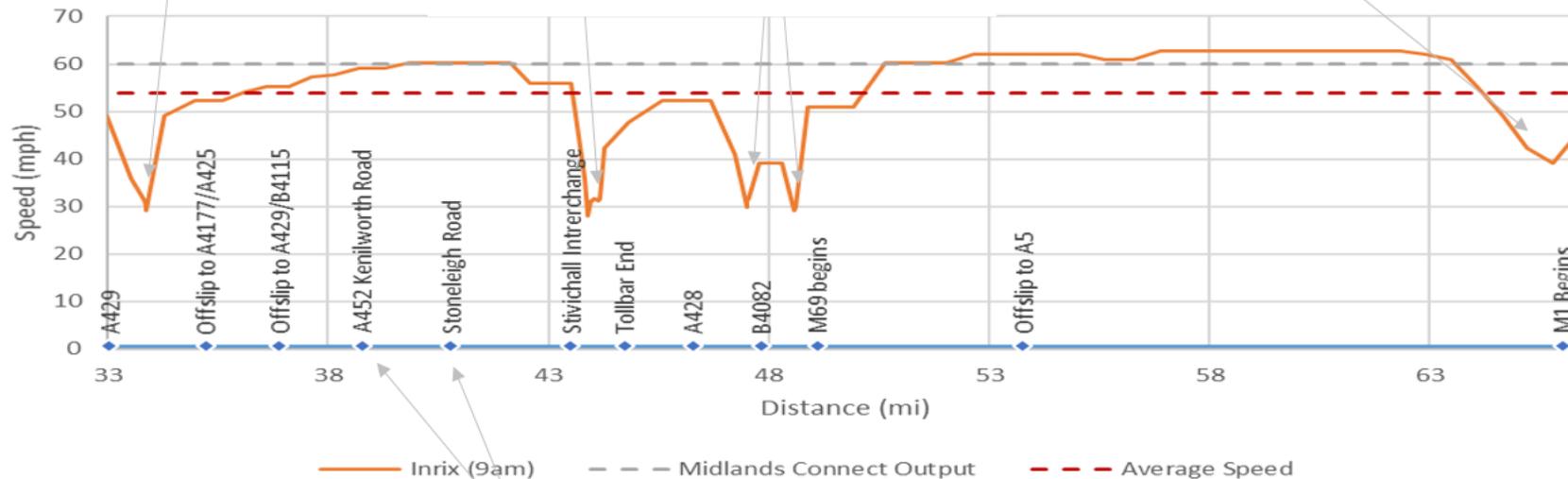
Warwickshire County Council Plans to signalise junction to prevent blocking back at A46 junction, benefitting A46 and local road network.

**Coventry bypass**

Delays at Binley (A428) to be addressed via RIS1 scheme with a grade separation (construction start due 2018).  
 Scheme development of grade separation of Walsgrave junction deferred to Road Period 2.  
 Tollbar End scheme completed in Dec 2016.

**M69/M1 Junction**

Delays at the M69/M1 junction are part of the cluster of bottlenecks highlighted in INRIX dataset. This section is carrying a mix of local, sub-regional and regional traffic. RIS1 includes plans for upgrade to of M1 J19 to 23a including J21 but alternative eastern by-pass of Leicester also promoted by Leicester County Council.



**A46 Stoneleigh & Thickthorn**

Warwickshire County Council scheme to improve safety and reduce queuing due to be implemented in 2020/21. Longer-term aspirations for improvements also at Thickthorn roundabout (A452)

Key issues on Section 3: Leicester (M1) to Hobby Horse (A607)

**M1 J21-J21a**

Identified as the third, tenth and thirteenth greatest bottleneck on the whole route, this junction is a significant source of delay for through routes along the A46 between the West Midlands and East



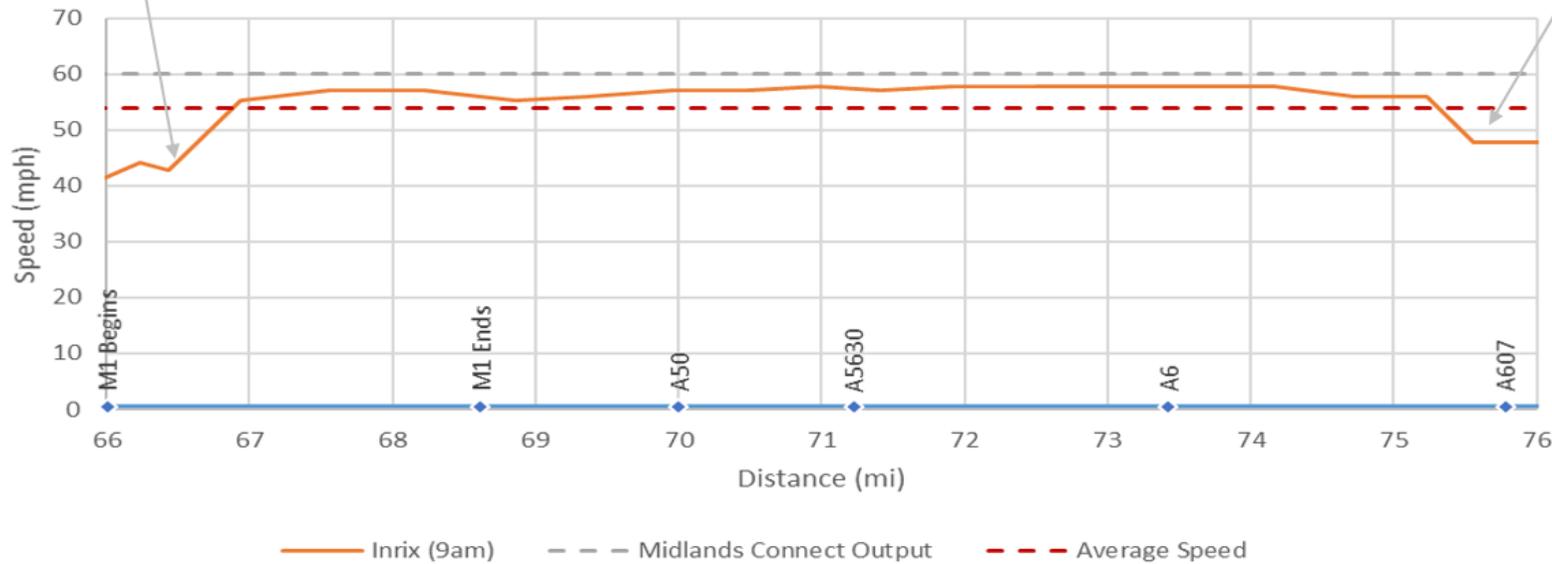
**M1 J22 Kirby Muxloe**

Various plans prepared including upgrade to Smart Motorway D4 ALR J19 to J23 in RIS1 but construction in RIS2, potential closure of Leicester Forest East Services, provision of free flow junction between M1



**A46/Syston (Hobby Horse)**

Identified as the number one bottleneck on the A46 by INRI dataset. When there are queues at this location last for 25 minutes on average. Also saw the 4<sup>th</sup> highest accident count on the route 2013-2017.



Key issues on Section 4: Hobby Horse (A607) to A1

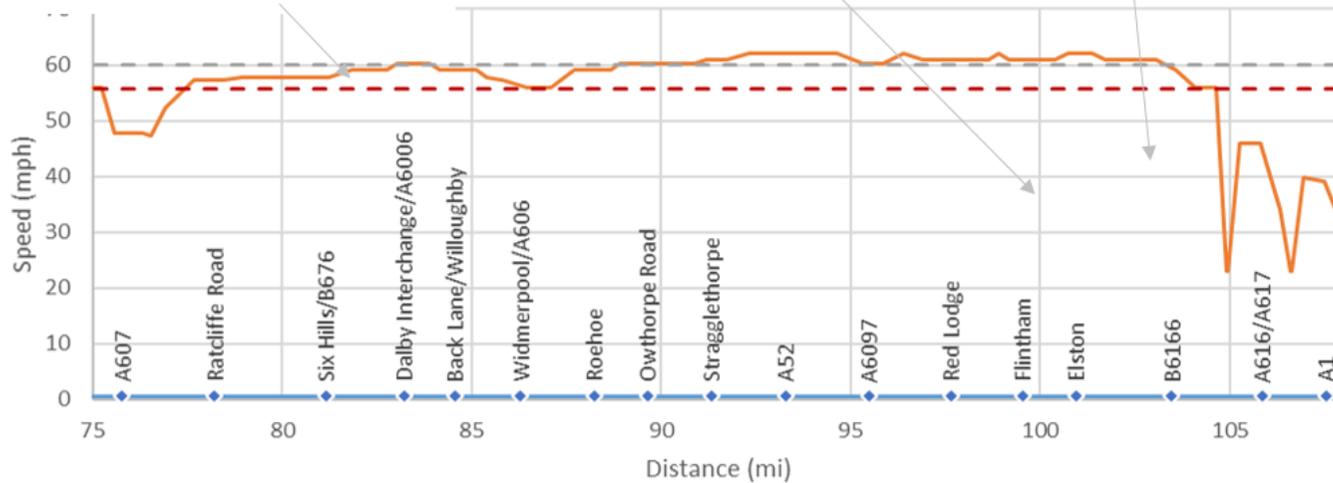
**Newark on Trent**

Major delays at Newark due to at-grade roundabouts and dumb bell junction with A1. Highlighted by INRIX as a major bottleneck.

Plans considered or a Newark northern bypass committed for study in RIS1 with development in RIS2 subjective to deliverable scheme.

**A46 Hobby Horse to Newark**

Section from Leicester to Newark upgraded to D2AP already meeting Conditional Output



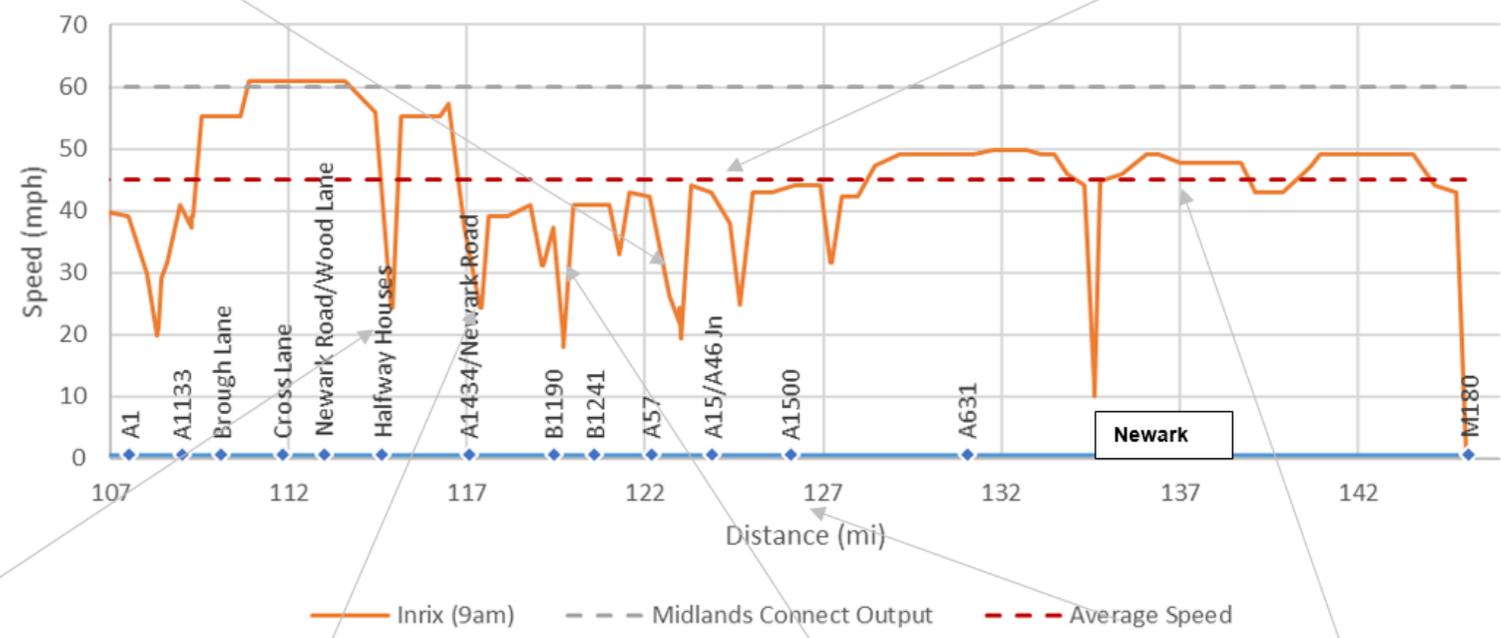
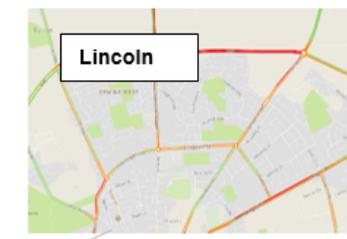
— Inrix (9am)    - - - Midlands Connect Output    - - - Average Speed

Key issues on Section 5: Key issues on Section 5: A1 to Humberside

**A46 Lincoln Bypass**  
 Lincoln Bypass is a source of significant delay on the north section due to frequent at-grade junctions and high peak hour flows.



**Carholme Roundabout A46/A57**  
 Ranked ~2 by number of accidents in past 5-years, at the junction of important north-south (A46) and east-west (A57) routes, the A57 is an important route towards Lincoln City Centre. Queuing on approaches in peaks periods.



**Halfway Houses**  
 Ranked #2 by number of accidents on A46, 2013 - 2017

**Hykeham Roundabout A46/A1434**  
 Ranked #5 by number of accidents on A46, 2013 - 2017. Important junctions between orbital and radial routes in to Lincoln.

**Doddington Roundabout A46/A57**  
 Ranked #9 by number of accidents on A46, 2013 - 2017

**A15**  
 With a 50-mph speed limit throughout due to road width and geometry and no passing places

### 3.10 Road safety & community severance

Road Safety is a key issue for the A46 corridor due to a range of issues including road geometry and a number of single carriageway sections which results in overtaking manoeuvres and consequential accidents. Congestion at key junctions also results in a range of accidents. Figure 3-27 shows the top 20 accident hotspots on the corridor over the period 2013-2017. Supporting data is shown in Table 3-7.

Figure 3-27: A46 accident hotspots

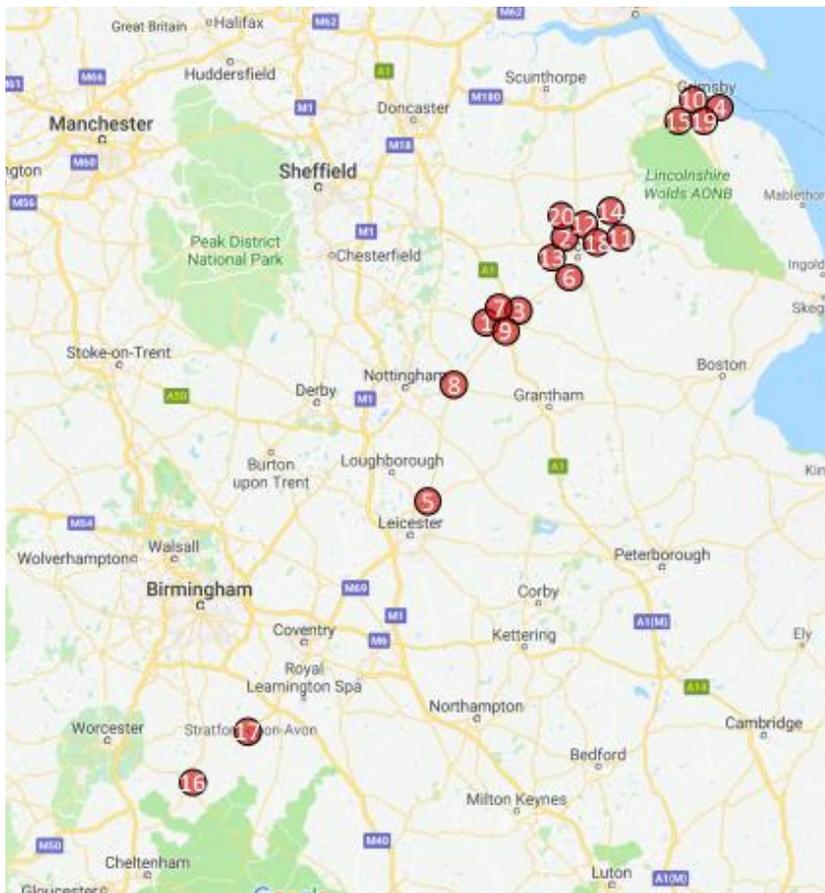


Table 3-7: Top 20 Road safety hotspots on A46, 2013-2017

Rank	Site	Category			Total
		Fatal	Serious	Severe	
1	Newark: A617 roundabout	0	3	30	33
2	Lincoln: Carholme roundabout (A57)	0	0	32	32
3	Newark: B6116 roundabout	0	3	27	30
4	Grimsby: Weelsby Road	0	3	25	28
5	Syston: Hobby Horse (A607)	0	0	25	25
6	Lincoln: Hykeham roundabout (A1434)	0	1	23	24
7	Newark: To A1 northbound roundabout	0	2	21	23
8	Saxondale roundabout (A52)	0	6	16	22
9	Newark: To A1 southbound roundabout	0	1	21	22
10	Grimsby: Scartho Road roundabout	0	1	20	21
11	Lincoln: A158 roundabout	0	0	20	0
12	Lincoln: Riseholme roundabout (A15)	0	3	16	19
13	Lincoln: Doddington roundabout (B1190)	0	3	16	19
14	Welton: A46/Lincoln Road	0	0	18	0
15	Grimsby: Winchester Av-Hereford Av	0	2	16	18
16	Evesham: A46/B4035 roundabout	0	4	14	18
17	Stratford: Bishopton roundabout (A3400)	0	1	17	18
18	Lincoln A15 to A158	0	2	14	16
19	Grimsby: Bradley Road – Winchester Av	0	4	12	16
20	Lincoln: Riseholme roundabout (A15/B1226)	0	3	13	16

Source: STATS19 Accessed via Crashmap. A44 and A422 not included in analysis.

It is notable that many of the top 20 accident hotspots are roundabouts or other junctions, often with very high traffic flows.

Approximately two-thirds of the corridor passes through rural areas, running adjacent to market towns and villages, but passing directly through relatively few. However, in those locations where the corridor passes directly through a town e.g. Ashchurch and Evesham, community severance is a key issue where pedestrians and cyclists struggle to cross the road which acts as a barrier to businesses and communities. The volume of traffic and HGV's also creates an unattractive environment for local people. In these locations, frontage restrictions also limit the scope of improvements possible in the corridor.

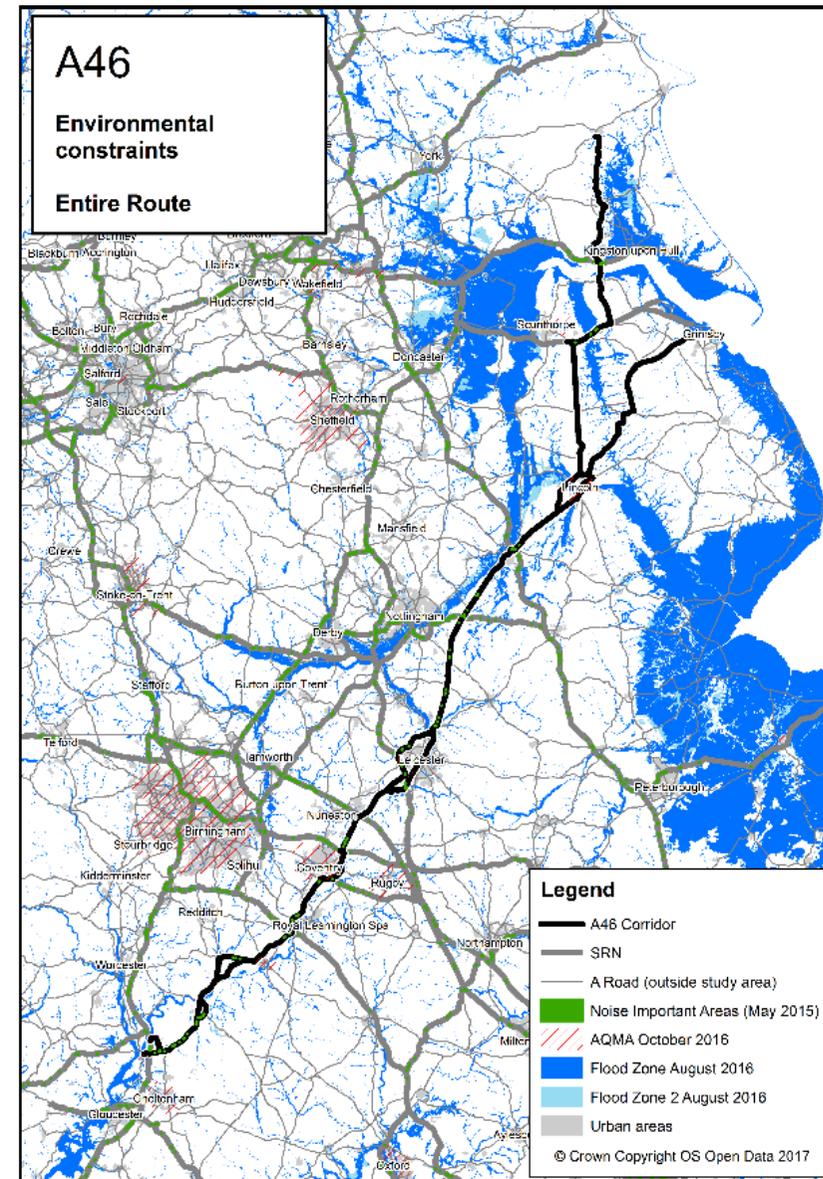
### 3.11 Environmental considerations

Given the length of the study area there are a range of environmental considerations which need to be taken into account. These will be considered in more detail in the Enhanced Strategic Case. However it is important to note the following headline issues:

- Air Quality Management Areas (AQMA's) are situated at Stratford, Coventry, Leicester and Lincoln;
- Noise Important Areas are prevalent across the length of the route; and
- flood risk around Warwick and to the north of the corridor from Newark to the Humber Estuary.

Figure 3-28 sets out a summary of the key issues. A more detailed breakdown by environmental theme is included in Appendix B.

Figure 3-28: A46 Environmental constraints



## 4. National, sub-regional and local geographies and objectives

### 4.1 Introduction

The aim of the study is to examine how Midlands Connect's strategic outcomes (see section 1.3.2) can be achieved to benefit the economy of the Midlands as a whole, including therefore the economies of the many towns and cities in the Midlands, as well as supporting the wider UK economy. The study will therefore examine how improvements to the A46 corridor could achieve these outcomes at national, sub-regional (Midlands) and local levels; recognising that some outcomes will be more relevant to some geographies than others. As such, outcome objectives have been defined at these three levels (see following section).

This three-tier model is of course an artificial construct; in reality economies, and the travel which supports them, operate on a broad, continuous spectrum of geographies. However, some simplification of reality is required for presentational and practical purposes. Below we set out some broad definitions which will be adopted in this study for each of the three geographies:

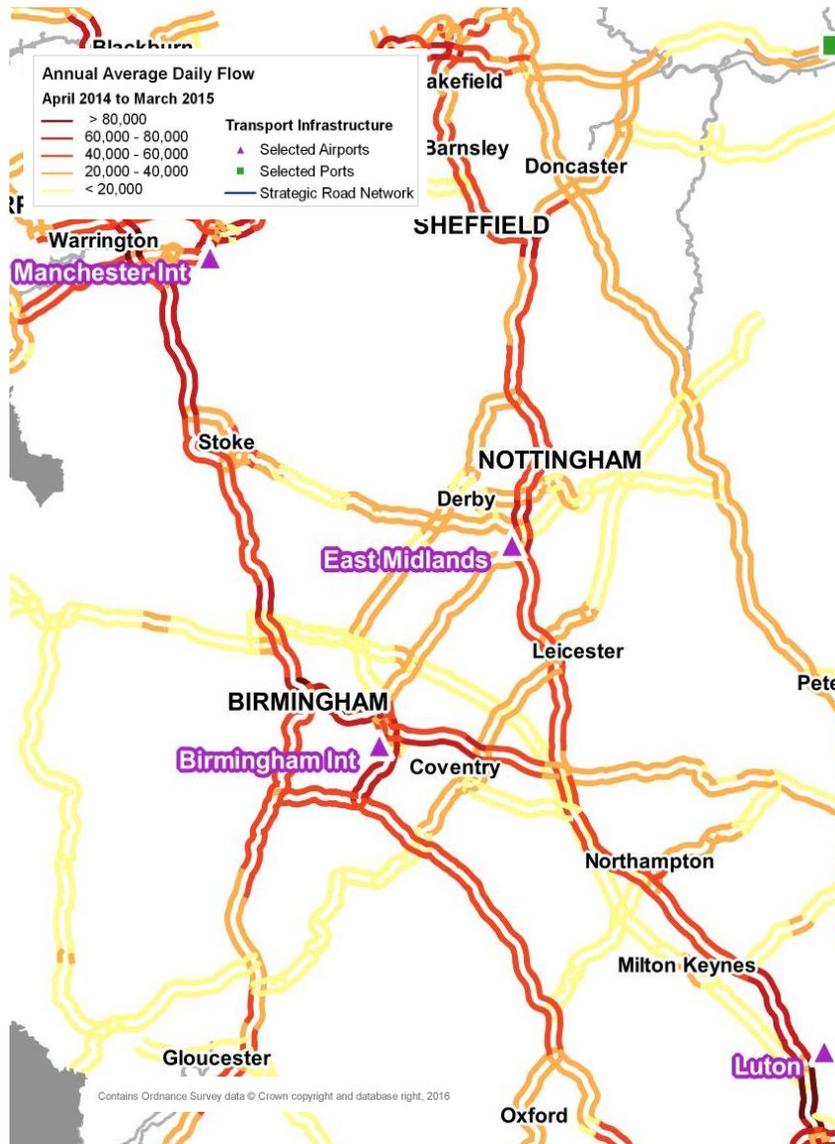
### 4.2 National

A view has emerged relatively recently that the A46 corridor could play a much more important national function than at present; although as yet this concept has not yet been better defined. In terms of traffic volumes (see Figure 4-1), much of the A46 corridor carries relatively low levels of traffic compared to the busiest sections of the Strategic Road Network; with some notable exceptions such as the A45/A46 around Coventry, the M1 between J21 and J21A<sup>7</sup> and the Leicester Western Bypass. Note that not all of the A46 corridor is part of the SRN.

In terms of share of traffic comprising HGVs (see Figure 4-2), the corridor is also typically not as high as what might be considered the core of the SRN (the M1, M6 M25 and A1); with the exception of the M69 where 30-50% of vehicles are HGVs (albeit on a relatedly lightly trafficked road). Analysis supporting Highways England's Strategic Economic Growth Plan included an estimation of the economic value of each section of the SRN based on the costs which users were willing to pay to use it (see Figure 4-3). Again, the A46 corridor does not figure strongly compared to elsewhere, although given the analysis was based on traffic flow and delays, this may be to be expected.

<sup>7</sup> Those sections of other roads along the corridor which are necessary to define a continuous route from the M5 to Humberside are considered to be in scope (such as the M1 J21-J21A and the M69).

Figure 4-1: Annual AADT on SRN, 2014-2015



The national importance of the A46 could also be determined by the extent to which the route is used by 'national journeys'. Taking this to mean journeys which pass through the Midlands, the evidence currently available suggests that a relatively small share of journeys on the A46 corridor are travelling between locations outside the Midlands. The select link analysis in Chapter 3 shows that most of the longer-distance traffic on the A46 is staying on the SW-NE axis rather than going elsewhere.

In general therefore, the A46 does not currently perform what might be described as a 'national function' based on its current usage. This is not to say that some 'national' (long-distance) journeys do not make use of parts of the corridor as this clearly is the case, but that:

The corridor does not generally offer a high quality end-to-end journey experience for trips between the South West and Humberside (or relatively long journeys between locations between these points).

The total quantum of long-distance travel (say, the South West to Humberside) has not yet been established as being significant, although this may yet still be the case.

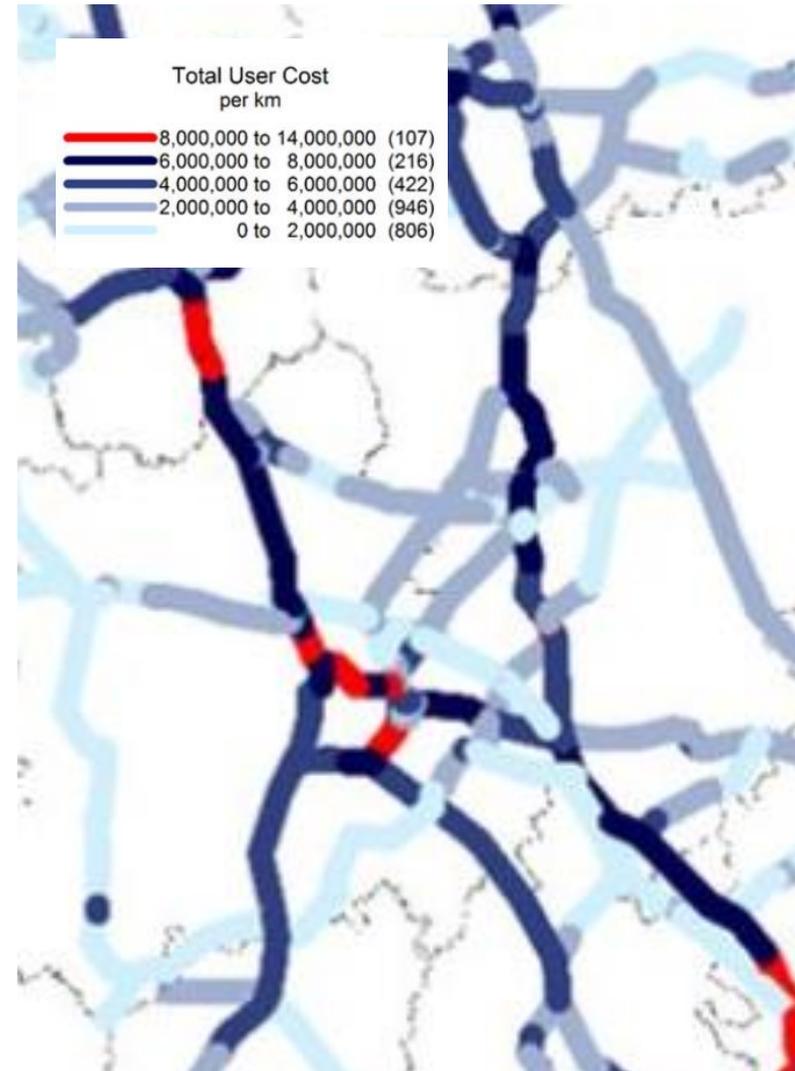
Higher-quality alternative routes exist for long-distance journeys which are typically (but not always) quicker; and which are typically more reliable. The lack of alternative routes in the event of incidents once on the A46 corridor (especially the northern and southern thirds of the route) is often cited as a reason not to use the corridor.

Figure 4-2: Share of traffic comprising HGVs on SRN



Source: Highways England

Figure 4-3: 'Economic value' of SRN by section



Source: Strategic Economic Growth Plan

In the future this situation could change as a consequence of the spatial distribution of jobs and housing growth, changes in business operating practices relating to supply chains and importing/exporting patterns for example. Given the objectives of this study, the hypothesis is that these economic changes will in part be dependent on an improved A46 corridor which offers levels of performance commensurate with other 'core' parts of the SRN and which support business efficiencies, agglomeration and so on.

As an east-west connection, the A46 has the potential to provide direct passage for inter-regional freight movements. With a consistent approach applied to the physical provision, name and operational elements, it has the potential to offer another reliable route option on the SRN. There is a receptive freight industry audience for proactively upgrading the route to expressway status with local plan policy listing A46 junction upgrades high in the list of priorities.

At the national level for the A46 to become of national importance, it must offer high quality alternatives to the current preferred routes; either because these will be quicker than the current routes, or because an improved A46 would improve the resilience of the national network by providing alternatives to the favoured routes.

Based on this premise, the A46 could become a nationally important route:

- between the M5 corridor and M1 corridor (offering an alternative to the M5/M42/M6);
- between the M1 corridor and the A1 corridor (offering an alternative to the M1/M18 or A14); and
- between the A1 corridor and Humberside (offering an alternative to the A1/M180/A180).

Nationally important journeys may potentially use the A46 corridor for one, two or all three of these movements, and indeed some already do. The case for the A46 offering a viable alternative at a national level for the first two movements is relatively strong, whilst the case for the A1 – Humberside movement appears less strong based on current network performance and likely future investment on the A1.

#### 4.2.1 Access to international gateways

The work to date has concluded that the Motorway network around the Humber ports provides the connectivity needed for strategic traffic but International gateways operate tight journey schedules and require reliable and strategically important road networks to complement their arrangements. As a significant volume of airport cargo tends to be shipped over night, the A46 could play a pivotal role in supporting access to Coventry, East Midlands and Humberside airports outside the 'shoulders of the day'.

There is a high dependency on Immingham for fresh produce from Amsterdam and Eastern Europe so just in time deliveries out of the port are really important. A significant proportion of flows through the ferry terminal are Ro-Ro/container based so being able to get out of the Humber areas and south is a key issue and a key opportunity.

Whilst Third Party Logistics and Freight Forwarders would welcome an expansion in seaports business, their growth is customer led so at present there is not much critical mass of movement going up to Hull/Grimsby/ Immingham. Most goods are next day through airports or the Channel seaports so only a relatively small percentage would have any reason to go through the Humber ports at present unless going to Scandinavia or Norther European ports.

### 4.2.2 Choice of port

Research suggests that a wide range of factors determine the performance of ports, and therefore their attractiveness to importers and exporters, both in the UK and overseas<sup>8</sup>. In practice, businesses consider the combination of these factors within a 'total logistics chain' when choosing ports through which they will export or import goods and raw materials.

Feng's research indicates that, for the Humber Ports, sea-side factors such as handling speeds, port charges and shipping services are much more important determinants of port performance than the quality of land side links (road and rail access) which are seen as having only medium importance.

Having said this, stakeholder interviews undertaken as part of this research suggest that whilst stakeholders see land side access as only of medium importance, the performance of the Humber ports in this regard is seen as poor by both rail and road. Stakeholders cited poor road infrastructure both on the north bank (A63 Castle Street and Hedon) and the south bank (the A160 and A180).

There is clearly potential for the Humber ports to increase throughput. Whilst better road infrastructure is not the only requirement to achieve this (for example port charges are seen as high), improvements to the road network within the Humberside area, and between Humberside and elsewhere, will be important in supporting growth in the future.

Whilst similar research is not available, there is no reason to expect the key performance factors to also apply to other UK ports. Indeed the A46 could play a role in raising the attractiveness of ports in the South West and North, thereby relieving pressure on the high-demand ports on the South and South East coasts.

### 4.3 Sub-regional

Midlands Connect has established that the Midlands economy comprises a complex mixture of local, sub-regional, national and international linkages between suppliers, businesses and markets. Describing the 'sub-regional economy' is therefore problematic in that it is so diverse, but also because the detailed understanding of how the Midlands economy 'works' by sector and location is still emerging.

However, we can more easily define what we mean by 'sub-regional journeys' for the purposes of this study. At one level, it could be argued that these are simply those journeys which are neither 'national' nor 'local'. Midlands Connect has established the importance of the strategic transport networks in supporting the Midlands' economy<sup>9</sup>. In particular, the Strategy focusses on exploiting the locational and economic advantages of the major urban areas and connecting 'intensive growth corridors' where conditions for growth are already most favourable. These 'hubs' and 'corridors' are shown in Figure 4-4

The eleven major urban areas within the hubs are home to half of the jobs in the Midlands and account for half of total economic output<sup>10</sup>. The foundations for future economic growth are the 'intensive growth corridors' that provide national and inter-regional connectivity.

In the context of the A46 Corridor Study, the relevant growth corridors are:

- Corridor 4, in particular the A46/A15 section between south Nottinghamshire and Humberside via Lincoln; and
- Corridor 5, in particular the M69/A46/A45 section linking Leicester, Coventry and Warwick.

<sup>8</sup> Feng, M (2010) A comparative study of ports and their hinterlands: factors determining port performance and choice University of Hull PhD Thesis

<sup>9</sup> See Midlands Connect (March 2017) Midlands Connect Strategy: Powering the Midlands Engine

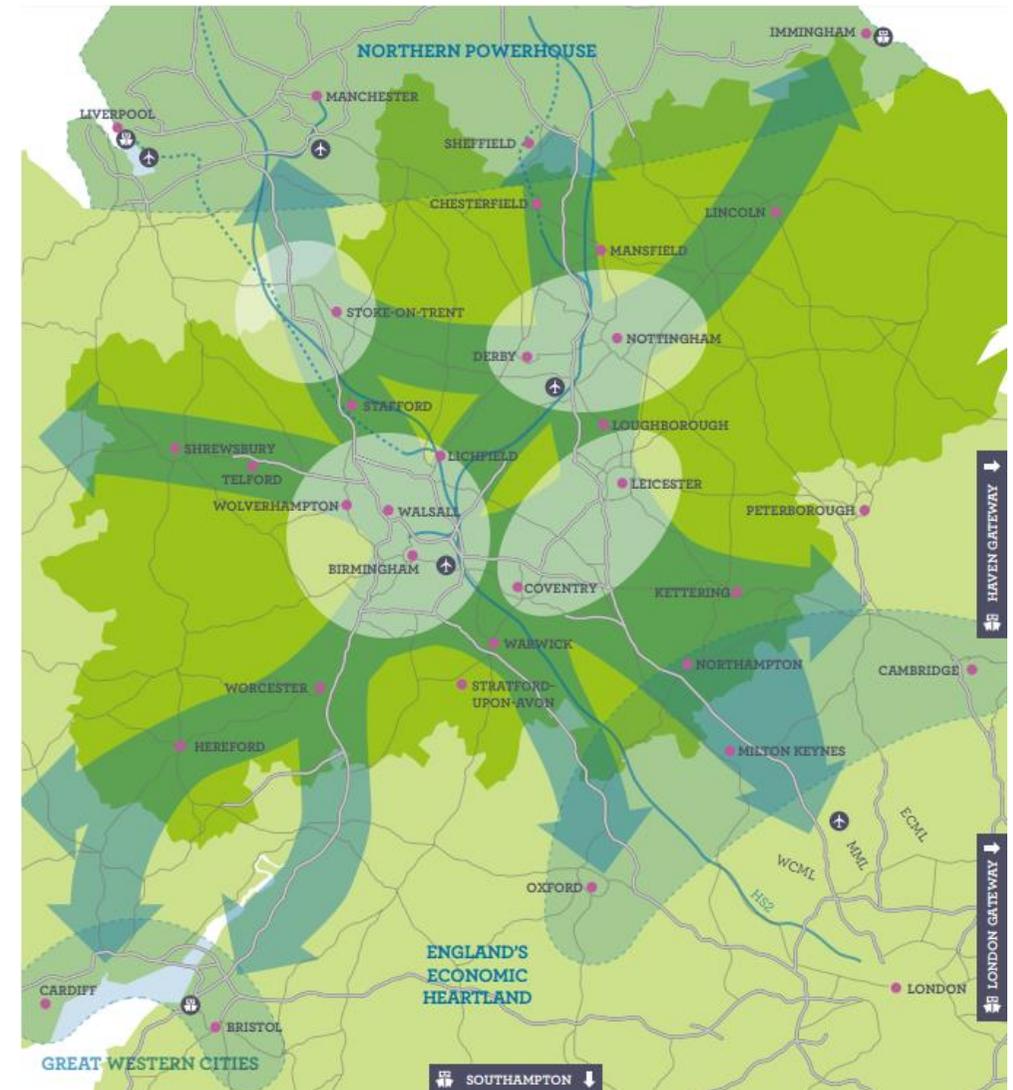
<sup>10</sup> Based on Centre for Cities definition of Primary Urban Areas.

The A46 between the M5 and Warwick is not identified explicitly as an intensive growth corridor as a consequence of the current importance of the A46, rather than the level of growth expected, which is significant, especially at the intersections of the A46 and other corridors (M5, M50). Enhancements to the A46 corridor could provide an alternative to Corridor 6 (Birmingham-Worcester-South West) for some journeys, and provide some resilience for that corridor.

For the purposes of this study, sub-regional journeys have been defined as those which support growth in the Midlands by:

- joining together the hubs (e.g. between Leicester/Coventry and the West Midlands conurbation hub and the Nottingham/Derby hub);
- joining together urban centres within those hubs (e.g. between Leicester and Coventry, and arguably between Warwick and Leamington);
- providing connectivity to other parts of the UK and international gateways (notably to the South West, Humberside – including the Humber Ports, and parts of journeys to East Midlands and Birmingham International Airport); or
- providing strategic access to key growth sites (jobs and housing).

Figure 4-4: Midlands Connect 'Intensive Growth Corridors' and 'Economic Hubs'



## 4.4 Local

The A46 corridor is used by a large number of local journeys – short trips associated with economic and other activities relating predominantly to an urban centre and its hinterland. These trips may use the A46 as an alternative to more direct route via the urban centre (for example Evesham) or to orbit around a settlement before using an arterial route to access the centre or elsewhere in the urban area (for example Leicester or Coventry).

The A46 can, or could, support local economies and communities in other ways too, including:

- providing access to local growth sites (with local rather than sub-regional importance);
- providing better connectivity to other settlements either in the immediate vicinity;
- providing ‘last mile’ connectivity for sub-regional trips through improved connectivity to the core SRN (for example by improving trips between Market Rasen and Peterborough by better connectivity to the A1); and
- reducing adverse impacts of local economies and communities such as severance or safety.

## 4.5 National, sub-regional and local objectives

In Table 4-2 the Midlands Connect outcome objectives are described in greater detail as they relate to the three spatial levels described above: national, sub-regional and local. Local objectives are described on a section-by-section basis using the initial five-section definition from the brief (which may be subject to revision at a later stage of the study).

### 4.5.1 Summary of function by section

Based on the commentary above, the function of each of the sections of the corridor has been summarised in Table 4-1. The table is intended to give a broad indication of the relative importance of each function within each section, but also allow comparison between sections. As the study develops consideration will be given as to where there is scope to change or influence these functions.

Table 4-1: Relative importance of current function in each section

	Section 1 - Tewkesbury (M5) – Warwick (M40)	Section 2 - Warwick (M40) – Leicester (M1)	Section 3 - Leicester (M1 J21) to Syston (A607)	Section 4 – Syston (A607) – Newark (A1)	Section 5 – Newark (A1)-Humber Ports
National	Low	Medium	Medium	Medium	Low
Sub-regional	Low	Medium	Medium	Medium	Medium
Local	Medium	High	High	Low	Medium

Table 4-2: Outcome objectives by section

	Summary	Section 1 - Tewkesbury (M5) – Warwick (M40)	Section 2 - Warwick (M40) – Leicester (M1)	Section 3 - Leicester (M1 J21) to Syston (A607)	Section 4 – Syston (A607) – Newark (A1)	Section 5 – Newark (A1)-Humber Ports
<b>National</b>		Provide a viable alternative route (to the M5/M42/M6) for long-distance east-west traffic travelling between the M5 and M1 corridors.  Build resilience for east-west movements on the SRN (especially the M5, M42 and M6).	Provide a viable alternative route (to the M5/M42/M6) for long-distance east-west traffic travelling between the M5 and M1 corridors.  Provide a viable alternative route (to the M40/M42/A42) for long-distance east-west traffic travelling between the M40 and M1 corridors.	Provide a viable alternative route (to the M1/M18) for long-distance east-west traffic travelling between the M1 and A1/A1(M) corridors.	Provide a viable alternative route (to the M1/M18) for long-distance east-west traffic travelling between the M1 and A1/A1(M) corridors.	Provide a viable alternative route (to the A1/M180) for long-distance east-west traffic travelling between the A1/A1(M) corridor and south Humberside.  Build resilience for east-west movements on the SRN (especially the M180).
<b>Sub-regional</b>	Inter- hub connectivity (journey times and reliability)		Provide high quality connectivity between War/LS, Cov/Lei and Der/Not.	Provide high quality connectivity between War/LS, Cov/Lei and Der/Not; and between Cov/Lei and the Birmingham/Solihull/ Black Country hub.	Provide high quality connectivity between War/LS, Cov/Lei and Der/Not.	
	Connections to the UK and international gateways (journey times and reliability)	Provide high quality connectivity between: the South West (including Port of Bristol) and War/LS, Cov/Lei, and Der/Not.  Settlements in this section and BIA, EMA and HS2 Interchange station.	Provide high quality connectivity between: The South West (including Port of Bristol) and War/LS, Cov/Lei, and Der/Not.  War/LS, Cov/Lei and Humberside.  Settlements in this section and BIA, EMA and HS2 Interchange station.	Provide high quality connectivity between: The South West (including Port of Bristol) and Der/Not.  War/LS, Cov/Lei and Humberside.  Settlements in this section and BIA, EMA and HS2 Toton station.	Provide high quality connectivity between: The South West (including Port of Bristol) and Der/Not.  War/LS, Cov/Lei, Der/Not and Humberside.  Settlements in this section and BIA, EMA and HS2 Toton station.	Provide high quality connectivity between: War/LS, Cov/Lei, Der/Not and Humberside.  Settlements in this section and BIA, EMA and HS2 Toton and Sheffield stations.

	Summary	Section 1 - Tewkesbury (M5) – Warwick (M40)	Section 2 - Warwick (M40) – Leicester (M1)	Section 3 - Leicester (M1 J21) to Syston (A607)	Section 4 – Syston (A607) – Newark (A1)	Section 5 – Newark (A1)- Humber Ports
	Strategic employment growth sites	Support delivery of strategic employment sites at Malvern Hills and Worcester Technology Park; and the longer-term supply of jobs..	Support delivery of strategic employment sites at Tournament Fields (Warwick), Whitley South, Whitley Business Park, University of Warwick and Stoneleigh Park, Coventry Friargate, Anstey Park, Magna Park, UK Central (via M40) and Horiba-MIRA (via A5); and the longer-term supply of jobs at sites such as the National Battery Manufacturing Development Facility which is likely to be located on the section of the A46 between the A45 and the M6.	Support delivery of strategic employment sites at Horiba-MIRA, Leicester Strategic Regeneration Area and Coalville Growth Area; and the longer-term supply of jobs.	Support delivery of strategic employment sites at A46 Corridor Sites, Nottingham Broadmarsh & Southern Gateway and Nottingham Creative Quarter, and Newark; and the longer-term supply of jobs.	Support delivery of strategic employment sites at Newark, Teal Park (North Hykeham), Lincoln Science & Innovation Park, Hemswell Cliff, Normanby Enterprise Park, Able Marine Energy Park (Immingham) and Europarc (Grimsby; and the longer-term supply of jobs.
	Strategic housing growth sites	Support delivery of longer-term supply of housing.	Support delivery of strategic housing sites at Keresley SUE, Eastern Green (Coventry), Gaydon/Lighthorne Heath, King's Hill, North Nuneaton, Dordon/Polesworth SUE, Long Marston Garden Village, Meon Vale, Rugby Radio Station site, and South West Rugby; and longer-term supply of housing.	Support delivery of strategic housing sites at Ashton Green SUE; ; and longer-term supply of housing.	Support delivery of strategic housing sites at Loughborough (West); and longer-term supply of housing.	Support delivery of strategic housing sites at the Lincoln Western Growth Corridor, South East Quadrant (Canwick Heath), and South west Quadrant (all Lincoln); Lincolnshire Lakes (Scunthorpe); and longer-term supply of housing.

Local	Local growth sites	Support delivery of local employment and housing sites (including Evesham SUE, at Long Marston and Stratford).	Support delivery of local employment and housing sites (including Walsgrave Hill Farm (Coventry), The Asps and Harbury Lane (both Warwick), and Thickthorn housing/employment site.	Support delivery of local employment and housing sites including Hamilton (NE Leicester).	Support delivery of local employment and housing sites including Rushcliffe SUE (Nottingham) Newark Future Growth Point and SUE.	Support delivery of local employment and housing sites, including at Gainsborough.
	Community impacts	Minimising the negative impacts of the road corridor on communities: air quality (noting the Stratford AQMA), safety (particularly at Stratford), noise and severance (particularly at Ashchurch and Evesham).	Minimising the negative impacts of the road corridor on communities: air quality (noting the Coventry AQMA), safety (particularly on the Coventry Eastern Bypass), noise (noting the Coventry NAAs) and severance (in particular at Warwick).	Minimising the negative impacts of the road corridor on communities: air quality, safety, noise and severance (in particular on the M1 J21-J21A).	Minimising the negative impacts of the road corridor on communities: air quality, safety (in particular at Hobby Horse interchange), noise and severance	Minimising the negative impacts of the road corridor on communities: air quality (noting the Lincoln AQMA), safety, noise and severance
	Environmental impacts	Minimise the negative impacts of the road corridor on the built and natural environment (including at Bredon Hill National Nature Reserve and the Cotswolds AONB). Minimise GHG emissions.	Minimise the negative impacts of the road corridor on the built and natural environment (including at Coombe Abbey and SSSIs to the east of Coventry). Minimise GHG emissions.	Minimise the negative impacts of the road corridor on the built and natural environment (including at including Kilby Foxton Canal SSSI and Lubbesthorpe Monument). Minimise GHG emissions.	Minimise the negative impacts of the road corridor on the built and natural environment (including at Barkby Grange and Newark Flood Zone). Minimise GHG emissions.	Minimise the negative impacts of the road corridor on the built and natural environment (including Whisby Nature Park and Humber Flood Zone). Minimise GHG emissions.

Cov/Lei = Coventry/Leicester Hub; Der/Not = Derby/Nottingham Hub; War/LS = Warwick/Leamington

## 5. Constraints on growth

### 5.1 Introduction

To understand the constraints on growth in more detail and the potential for future investment in the corridor, we have undertaken a range of interviews with the LEPs, Highway Authorities and Planning Authorities within the corridor. The various organisations contacted are detailed below in Figure 5-1, Figure 5-2, and Figure 5-3.

Figure 5-1: LEPs interviewed on A46 Corridor

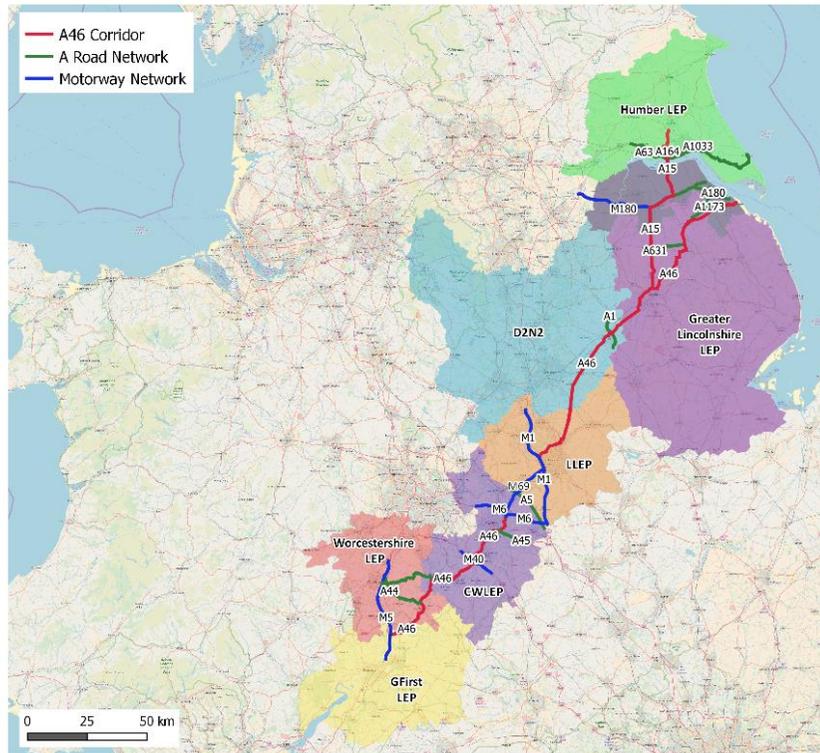
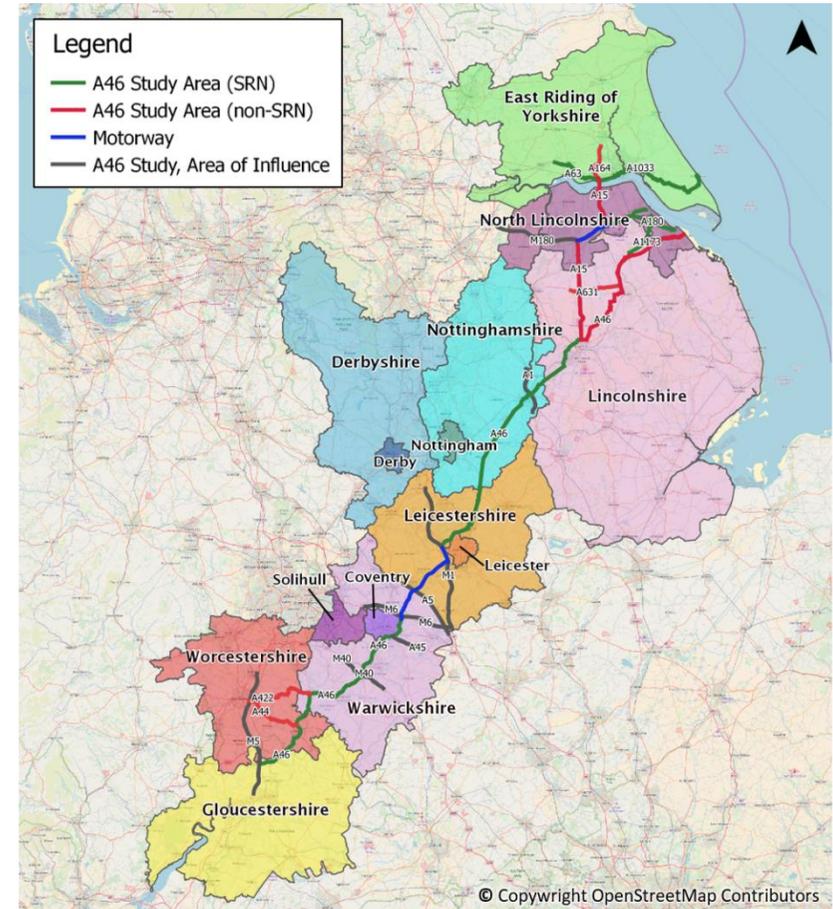


Figure 5-2: Highway authorities interviewed on A46 Corridor





The five key issues along the A46 according to LEPs and LA's were as follows:

- **Safety.** There are safety concerns for several junctions along the A46 where vehicles are queuing along the hard-shoulder of the motorway to exit onto the A46 (e.g. M5 J9). This can result in vehicles, particularly HGVs, blocking the inside lane of the motorway. This observation is confirmed by analysis of delays at M5 J9.
- **Resilience.** There are concerns that when an incident occurs on the surrounding motorway network, the A46 does not have the ability to cope with displaced traffic. This can have a major cost implication for businesses and reduce accessibility for residents. Analysis also shows that journey time reliability is an issue for some sections of the A46 particularly where the road has not been improved.
- **Growth.** The A46 is a significant growth corridor and a place where businesses want to locate. However, current capacity concerns and forecast traffic growth suggest that the A46 will become a constraining factor to future growth along the corridor. The road network must also play a role in unlocking land for development.
- **Function.** There is concern that congestion on the A46 corridor is reducing its ability to meet its function a strategic connection between the south-west and north-east of England. Analysis of traffic data shows that there is little, if any, end-to-end journeys along the A46 supporting long distance traffic.
- **Potential.** The A46 has the potential to be a nationally significant artery for the movement of goods and people. However, demand for travel in the corridor currently outweighs its capacity, therefore it cannot meet its potential.

Five key issues along the A46 according to businesses:

- **Connectivity to Ports.** Timings and location of entry points means that some businesses had expressed the lack of use of rail and / or waterways as an issue. They would use them if the connections were available near to distribution sites, for example Doncaster Rail Port could be used for Nisa Retail to distribute to Scotland, if timings are suitable. AB Ports have the capacity to be able to increase their capacity of freight (already 80m tonnes annually through Humber) if Dover cannot handle the amount of freight post-Brexit due to clearance and holding area requirements, but would need the increase the rail gauge to be able to transport containers by rail.
- **Unreliability during busy periods.** Businesses quoted various hours around the peak periods of extreme unreliability along the length of A46; a prime example are bottlenecks identified at Newark onto the A1 and the at-grade junctions on the Coventry southern bypass. This was deemed to be due to a lack of resilience at key points on the route, which quickly become congested during peak periods. Nisa Retail stated that segregating goods vehicles on key routes would improve the reliability on the routes.
- **Increased business costs due to delays.** Delays are impacting on delivery time targets, which in turn drives inefficient routing. The planners plan to arrive on time, but are unable to fill delivery vehicles due to driving time lost through delays. A reduction in distances travelled and removal of bottle neck delays, so the capital could be released for growth in the business.
- **Safety.** There are safety concerns for several junctions along the A46 where vehicles are queuing up to roundabouts (for example Stoneleigh Bypass Junction and Thickthorne Roundabout). This can result in vehicles, queueing back for some distance, which causes congestion along the route. These concerns are supported by an analysis of accidents hot spots presented earlier in this report. Other examples of this were supplied by AB Ports around the A63 in Hull, which can be problematic during disruption.

- **Lack of continuity of road standard.** Several businesses quoted the differences between standards of carriageway along the A46, and that although dual-carriageway running provides improved capacity, it will always cause bottlenecks when reducing back down to single carriageway. The inconsistent standards also results in a loss of legibility of the route as a whole.

## 5.2 Business performance and investment

The relationship between transport and the economy is complex. Whilst the capacity, connectivity and reliability of the road network are all critical to ensuring a successful economy, strong network performance in itself does not ensure economic performance. Rather transport is one of several locational factors, alongside access to a skilled workforce and the availability of land, which are prerequisites of growth.

In this context, investment in the A46 can unlock and enable economic growth by:

- improving connectivity and reducing journey times for freight to support business productivity and reduce transport-related and other operational costs – bringing suppliers and markets closer to businesses;
- improving connectivity and reducing journey times for people on this critical part of the SRN to expand skilled labour pools, attract skilled labour through enhanced quality of life and make business to business interaction easier and cheaper (supporting agglomeration benefits);
- reducing the variability of journey times so that businesses can minimise costs associated with building in additional time into schedules to allow for delays in deliveries and ensure goods are delivered on time;
- providing additional **capacity** to enable growth in jobs and homes, including providing capacity for, and **access** to, key growth sites;
- **improving links to international gateways**, improving the attractiveness of the Midlands and wider UK economy for new international trade and investment; and

- raising the **resilience** of the network to planned maintenance, incidents and events so that businesses can continue to operate normally during periods of disruption.

In order to identify the key constraints and opportunities on the corridor this section details the employment and population growth areas to establish commuter patterns and the consequence that these dynamics have on the road network. In helping to build the preliminary strategic case this section will also articulate the consequences of poor performance and how this may hinder economic growth in the future and facilitating the key enablers above.

### 5.2.1 Cities along the A46

At a city level, Centre of Cities have undertaken analysis that includes cities on or near the A46. Cities included in the 2017 Centre for Cities Outlook include Hull, Nottingham, Derby, Leicester, Birmingham, Coventry and Gloucester. Evidence from the 2017 Outlook shows that the exporting of products is particularly important to the cities of Derby and Coventry and hence access to ports, which the A46 provides, is vital. Coventry and Derby had the 6th and 7th highest value of exports per job respectively with £23,430 and £23,390 exported per job. This displays how vital exports are to these city's economies and how many jobs in the area rely on export based industries which in turn rely on efficient connectivity to major ports and airports. The importance of freight on this corridor becomes a key consideration when looking to establish the opportunities and constraints on growth.

Of greater importance to this study is the exporting of goods rather than services due to the formers reliance on the road network, ports and airports. Both Derby and Coventry are leading UK goods exporters with exported good value per job ranking 3<sup>rd</sup> and 4<sup>th</sup> respectively out of the cities examined. Hull also relies heavily on goods exportation having the 10<sup>th</sup> highest good export value per head while services exported per head is the lowest of all examined cities. In terms of goods exported per job, both Nottingham and Gloucester perform very poorly relatively to the rest of the UK (58th and 51st respectively).

Certain cities on the A46 corridor rely heavily on exporting a single product. Over half of Hull's exports are pharmaceutical products, 60% of Coventry's exports are road vehicles and 71% of Derby's products are power generating machinery. This suggests that these areas have significant competitive advantages in these industries which better connectivity will allow them to maintain and grow.

Most British cities current export value mainly comes from the exporting of good and services to the EU (46%). Due to the uncertainty currently surrounding the UK's future trading arrangements with the EU, future trade growth may lie elsewhere. Cities that currently do a large amount of business with countries outside of the EU will already have diplomatic relations in place and hence, be in a better position to capitalise on these opportunities. Hull, Derby, Birmingham and Coventry have significant shares of exports to countries outside the EU, with 46% of Hull's exports and 22% of Derby's exports being destined for the US and 25% of Coventry's exports and 20% of Birmingham's exports being destined for China.

These four cities all rely less on the EU for exporting than the UK average, with Birmingham having the highest percentage of exports to the EU of the four cities (39%). From these figures, the A46 corridors largest goods exporting cities are in a strong position to benefit from new trading arrangements if the correct transport infrastructure is in place to allow efficient transportation of goods produced.

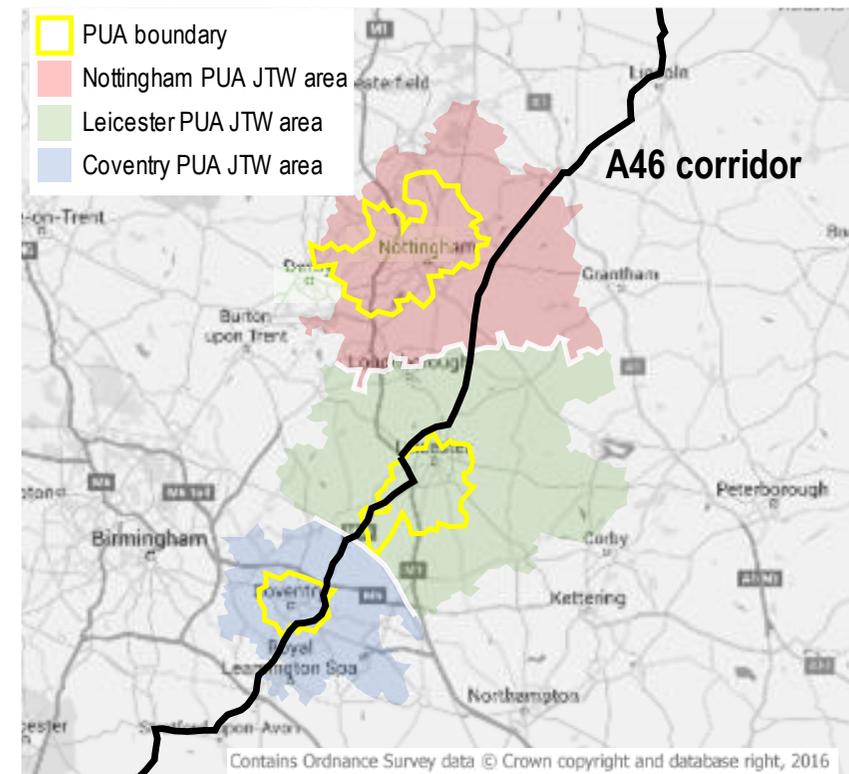
### 5.2.2 Labour markets of urban areas

One of the most significant considerations of business performance and investment is access to quality labour markets. Labour pools need to be diverse and wide so that businesses can draw upon the various skill sets and levels required to operate and grow.

Based on travel to work data from the 2011 Census, the journey to work areas for the three Primary Urban Areas in the corridor have been plotted (see Figure 5-4).

The areas show the MSOAs<sup>11</sup> where 20% or more of the employed population work in the relevant PUA. The map therefore shows the relative attractiveness of the PUA compared to 'competing' PUAs rather than absolute numbers of commuters. Whilst it is possible for a location to therefore fall within more than one journey to work area, the three specific areas shown do not overlap.

Figure 5-4: Journey to work areas of Nottingham, Leicester and Coventry Primary Urban Areas



<sup>11</sup> Middle Layer Super Output Areas (Census geographic sub-division, of which there are 7,201 in England and Wales)

The map shows that the journey to work areas tend to follow key arterial routes, which offer better connectivity to the urban centres, and which tend to be home to the majority of the working population. Improved connectivity enabled by a better A46, could have the effect of enlarging these (and other) journey to work areas and, as a consequence, reduce the dominance of a single PUA in each area (thereby resulting in some overlapping of labour markets).

The Census data also show that commuting by car within each of the main cities along the A46 tended to decline between 2001 and 2011, whilst car commuting from elsewhere generally increased. This is shown in Table 5-2, which uses data at local authority level.

Table 5-2: Change in number of car commuters, 2001-11

	From everywhere	From own local authority
Coventry	6.1%	-10.3%
Leicester	10.9%	3.3%
Nottingham	-1.5%	-11.0%

Source: Census 2001 and 2011

This suggests that average car commute trips to locations along the A46 corridor are becoming longer, emphasising the importance of highways such as the A46 in supporting labour market catchments.

#### 5.2.2.1 The impact of congestion on labour markets

Analysis has been undertaken to estimate the volume of commuting to the three cities (plus Birmingham) and the average drive time. relationship between the level of commuting into cities along the route of the A46, and the time taken to commute by car. The resultant distance decay curves are provided in Appendix C.

The charts shows that, unsurprisingly, the number of people commuting to the centres falls with distance (and time); and that the speed of 'decay' appears higher (i.e. the curve is steeper) when the city size is larger. The results are significant at the 1% level.

The findings do need to be treated with some caution because:

- the analysis compares 2011 commuting patterns with 2018 data on journey times;
- the locations included in the analysis represent anywhere within a 90 minute drive, it is not restricted to the A46 corridor;
- the analysis is undertaken at a relatively high geographic level; and
- the journey times are based on a single day of data and so are influenced by the traffic conditions that day.

Nonetheless, the analysis does suggest that shorter journey times during the peak periods could lead to an expansion of the labour market of cities along the A46 corridor, and open up new work opportunities for residents, helping to spread the distribution of commuting trips and potentially reduce demand on busy routes such as the M40, M1, M42 and M6.

#### 5.2.2.2 The importance of labour markets to the A46 corridor's economy

The data analysis throughout this section identifies the relationships between time, distance and number of commuters to the larger urban centres along the corridor. These findings relate to supporting agglomeration benefits, better functioning labour markets and better functioning markets are important is important to the stakeholders along the corridor.

Throughout the A46 corridor, industries can struggle with skills shortages and labour markets are constrained due to connectivity issues or congestion. Examples include the games industry around Leamington Spa, the advanced manufacturing sector in Derbyshire/ Nottinghamshire and the agri-food sector in Greater Lincolnshire. While having a well-functioning transport network does not necessarily solve skill shortages, it does help to improve the labour pool that may be drawn upon. A successful and improved A46 corridor should, in theory, increase the pool of labour that firms can attract by increasing the number of people within a commutable distance hence, improving their ability to meet demand for skilled labour.

Skills gaps are a significant issue along on the route. A lack of skilled staff was perceived as the second largest barrier to growth for both the advanced manufacturing and engineering sector (AME) and food and drink sector in the Leicester and Leicestershire LEP (LLEP) 2015 sector plans. Another issue identified for workforces was the effects of an ageing workforce. This is particularly the case in the textiles industry that has been identified as an area of growth by LLEP.

Skills shortages also exist in Greater Lincolnshire, particularly in the manufacturing and agri-food sectors. Businesses from both these sectors stated in 2012 that attracting management was difficult as poor road infrastructure made potential employees unwilling to commute and therefore they would have to relocate which can be costly.

Worcestershire manufacturing businesses also reported skills shortages when responding to the 2013 manufacturing survey but this tended to be product specific with most of the issues occurring in chemicals / pharmaceuticals and metals / fabricated products.

The road network can limit an industries ability to recruit staff, such as the logistics industry. The logistics D2N2 LEP 2014 logistics and 2015 LLEP development plans highlight how potential staff will not consider the industry due to poor road side facilities and rest areas. This problem is particularly restricting the entrance of female workers into the industry.

## 5.3 Freight

*“Making the route into a dual carriageway, adding flyovers, or converting it towards more of a motorway-type of road would have massive benefits. Traffic would be much more predictable.”*

FCC Environment, North Hykeham Lincolnshire

To hauliers, freight carriers and the logistics sector reliability and resilience is key to success. The analysis above has some key impacts on the freight and logistics industry. In general, this industry benefits from:

- improved connectivity and reduced journey times for freight to support business productivity and reduce transport-related and other operational costs – bringing suppliers and markets closer to businesses;
- Improved connectivity and reduced journey times for people on this critical part of the SRN to expand skilled labour pools, attract skilled labour through enhanced quality of life and make business to business interaction easier and cheaper (supporting agglomeration benefits); and
- reduce the variability of journey times so that businesses can minimise costs associated with building in additional time into schedules to allow for delays in deliveries and ensure goods are delivered on time.

Indeed, if journey times are to increase this may negatively impact any gains from agglomeration, the benefits of better functioning markets and labour supply. The detrimental impacts of falling effective density – because of increased journey times – to the economy should not be underestimated.

### 5.3.1 Freight investment decisions

Given the above, it is noteworthy that there is little evidence to suggest that investment is being constrained as a consequence of limited road infrastructure; businesses which previously relocated to along or adjacent to the A46 are, in some cases, reflecting on the success of the transition; in light of experiencing delays and traffic congestion.

Evidence from the Freight Quality Partnership (FQP) in Leicestershire, reveals how capacity and infrastructure issues were the cause of aggravation for businesses who sought to initially take advantage of strategic locations in the area. Similarly, business consultation at industrial parks in Ashchurch revealed that some businesses within the freight and delivery sectors were re-evaluating their choice of location for their operations.

Locational investment decisions can be strongly influenced by employee access and travel as much as the benefit to logistics operation. Emerging hubs, notably at Ashchurch, experience acute congestion and delays that extend journey times, impact business efficiency and feed into decisions around relocating premises. As with much of the evidence collected, pinch points and junction design tend to exacerbate conditions.

There is a feeling that agricultural freight movements tend to play 'second fiddle' to manufacturing and production activities politically which effects the level of priority attached to supporting and funding infrastructure schemes in certain areas, notably east of Lincoln. So, whilst investment has tended to be channelled towards the Midlands, the increased importance of port traffic and agricultural production could help shift the focus to the A46.

*"Agricultural output in Evesham would benefit from an expressway type development as food production is tied to place and isn't mobile so developments would pivot around this factor."*

Key Stakeholder (Anonymous)

Potential brownfield sites 'ripe' for development are being considered, but in the context of the A46, around Leicestershire most notably, has been upgraded to expressway as part of the Strategic Growth Plan. This is what could be called an 'infrastructure first' approach. However, this is not necessarily the case with the pace of developments resulted in provision being 'bolted on' at a later stage to offset the consequences of capacity problems.

In some cases, there is caution against allocating B8 provision on the A46 for fear of exacerbating congestion and poor air quality (Thickhorn, Warwick) whilst the Coventry Local Plan (2017) stresses the allocation of sites that 'have the greatest potential to generate economic growth through cluster linkages' (e.g. Whitley Business Park). However, it was only recently that 'access problems' had been overcome through highway improvements.

### 5.3.2 Role of international gateways

International gateways are important to consider when evaluating the potential of highway investments given their contribution to the UK economy. For instance, an Oxford Economics report "Economic Benefits from Air Transport in the UK (2011)" estimated that the airport sector supported 921,000 jobs, contributed £49.6bn to the UK economy and £8bn in tax revenues. More importantly the water ports carried 95% of UK trade by volume (75% by value)<sup>12</sup>. The A46 supports a number of ports along its route.

#### 5.3.2.1 Ports connected to the A46

Ports – both air and water – lie along the route of the A46 which already contribute a significant amount to the UK economy. The port of Grimsby and Immingham is ranked 4th place in the UK in terms of the value of their combined imports and exports; unlike many other ports Grimsby and Immingham import a similar value to what they export. In addition, the port of Grimsby and Immingham experiences the greatest port traffic (5.4m tonnes) in the UK<sup>13</sup>.

Also benefiting from the A46 traffic is the Port of Hull, also on the Humber Estuary. It handled 10,167 tonnes of freight in 2016, which was eleventh highest in the UK. It relies on moving 9% of UK forestry product traffic, 6.5% of iron and steel traffic, and 5.7% of 'dry bulk' traffic<sup>14</sup>.

<sup>12</sup> Strategic Economic Growth Plan: International gateways and the strategic road network, Highways England

<sup>13</sup> Strategic Economic Growth Plan: International gateways and the strategic road network, Highways England

<sup>14</sup> Office of National Statistics

At the other end of the A46, freight traffic also uses the Port of Bristol, which carried 8,532 tonnes of port freight in 2016, which was ranked 15<sup>th</sup> in the UK. Despite this, 4.3% of the UK's freight shipping traffic uses this port, which is the seventh busiest in the UK. Significant sectors using this port include coal, agricultural and other 'dry bulk' products<sup>15</sup>.

Freight traffic also uses the A46 to access airports, the most significant of which is East Midlands International, which is the UK's largest cargo-only airport and the headquarters for UPS and DHL. East Midlands Airport carried 300,101 tonnes of freight in 2016, the second-most in the UK behind London Heathrow. 4.6 million passengers also passed through this airport in 2016, which is the thirteenth most in the UK<sup>16</sup>.

Another significant gateway on this route is Birmingham Airport, which handled 30,010 tonnes of freight in 2016, which was the sixth most in the UK that year. Freight from Birmingham Airport in 2016 increased by 319% on 2015, which was the fastest growth in the UK. Furthermore, 11.6 million passengers passed through this airport in 2016, which was the seventh most in the UK, and the A46 is an important access route<sup>17</sup>.

Two smaller airports on this route are Humberside Airport, which mainly operates for short-haul commercial flights to Europe, though passenger numbers have steadily declined every year since 2006, and Coventry Airport, which carries freight and runs private flights. Both airports rely on the A46 for access<sup>18</sup>.

#### 5.3.2.2 Expansion of port traffic along the A46

There are expansion plans at some of these locations, which could increase freight and passenger traffic wishing to use the A46. The Port of Bristol has been approved for a new deep-sea container terminal, which will increase freight traffic<sup>19</sup>.

Birmingham Airport has planned to expand in line with HS2, expecting a greater share of air traffic using the airport, as the rail journey times between London and Birmingham reduce<sup>20</sup>.

East Midlands International Airport has ambitions to increase its passenger numbers through a substantial extension and the remodelling of the existing passenger terminal building<sup>21</sup> and its cargo facility is also expanding which will increase the freight traffic using the airport<sup>22</sup>.

These international gateways demonstrate that the A46 is a key route for the UK's economic development. In particular, the sea freight traffic at Grimsby, the air passenger traffic at Birmingham, and the air freight traffic at East Midlands show that these locations are nationally-significant international gateways.

*"AB Ports have the capacity to be able to increase their capacity of freight (already 80m tonnes annually through Humber) if Dover cannot handle the amount of freight post-Brexit."*

Associated British Ports, Humberside

#### 5.3.2.3 Future uses of international gateways

International gateways operate tight journey schedules and require reliable and strategically important road networks to complement their arrangements. As a significant volume of airport cargo tends to be shipped over night, the A46 could play a pivotal role in supporting access to Coventry, East Midlands and Humberside airports outside the 'shoulders of the day'. Figure 5-5 below presents visually some key findings.

<sup>15</sup> Office of National Statistics

<sup>16</sup> Civil Aviation Authority

<sup>17</sup> Civil Aviation Authority

<sup>18</sup> Civil Aviation Authority

<sup>19</sup> <https://www.bristolport.co.uk/trades/containers/deep-sea-container-terminal>

<sup>20</sup> <http://www.bbc.co.uk/news/business-37611683>

<sup>21</sup> <http://mag-umbraco-media-live.s3.amazonaws.com/1006/surface.pdf>

<sup>22</sup> <http://www.eastmidlandsairport.com/about-us/cargo/>

The SEGRO Logistics Park and intermodal facility at East Midlands Gateway will have a transformational ‘cascading’ impact on local freight movements. 6 million sq. ft. of logistics accommodation has been planned on a site that will be able to handle 1,800 lorries per day with network resilience being even more decisive in this context.

An Intermodal freight terminal / hub has been previously considered at Ashchurch and a new parkway at Worcester is under construction, alongside re-opening a new rail link to Evesham within an historic Local Transport Plan (LTP) to simultaneously establish the location and offset future capacity constraints on both rail and road connections. Nevertheless, this would be a long-term aspiration.

The A46 (M69) supports additional freight handling and traffic generation from Coventry Airport which is situated directly adjacent the corridor. However, access is constrained by its proximity to the congested A45 / A46 roundabout at Toll End Bar; although traffic generally travels by night to avoid this being a crucial issue. The airport caters for air mail, bulk freight with good local links helping improve supply chains and new investment opportunities.

An underlying issue that may only become apparent at a later stage is the need to consider ‘frontloading’ HGV facilities (toilets, laybys, live information totems) at expanding sites to avoid subsequent problems with informal parking and local routing. Also, it is whether the A46 (M69) becomes part of the first and last mile routing from airport hubs with Network Rail also producing a ‘Strategic Freight Network’ to link British Ports with key populations by rail.

There is a high dependency on Immingham for fresh produce from Amsterdam and Eastern Europe so just in time deliveries out of the port are important. Approximately one third of tonnage through Grimsby and Immingham are Ro-Ro/container based so being able to get out of the Humber areas and south is a key issue and a key opportunity.

*“The A46 is currently an enabler – but there is not much alternative so if there is disruption it can cause significant problems. This causes delays and therefore businesses costs increase due to overtime requirements waiting with shipments to be picked up.”*

Associated British Ports, Humberside

Whilst 3PL and Freight Forwarders would welcome an expansion in seaports business, their growth is customer led so at present there is not much critical mass of movement going up to Hull/Grimsby/Immingham. Most goods are next day through airports or the Channel seaports so only a relatively small % would have any reason to go through the Humber ports at present unless going to Scandinavia/N. European ports.

The East Midlands Economic and Surface Access Strategy SDP (2015) points to numerous occasions where quick and reliable access is critical in a number of sectors. The strategy believes that the integrated freight market will grow at a faster rate than the traditional freight market and that the location and accessibility is the key to the success of its future growth with a number of mail business – DHL, UPS and TNT – locating adjacent to the East Midlands Airport.

These express freight operators require excellent surface access connectivity (90% of England and Wales with a 4 hour 55mph drive) with international services, almost exclusively, carrying items for business. Connectivity and capacity is essential for the air cargo industry and in particular, express freight operations domestically and internationally. The Associated British Ports (ABP) website identifies four key Humberside ports that they manage.

*“Brexit may have an impact on customs clearance and holding areas at Dover, but there is a lot more space at Humber ports, so this could be an opportunity but would require more infrastructure for onward travel.”*

Associated British Ports, Humberside

Grimsby is the major UK car port and therefore has strong freight associations with the rest of the UK and especially the Golden Triangle where car based industries have traditionally been based. The current preferred route is the westerly connections provided by the M180/A180; the A46 could act as an alternative route in the future. ABP also reference Humberside Airport being ‘20 minutes’ away from the ports which is significant for short hop domestic cargo activity.

*‘The A46 is a major constraint currently and stops use of Humber Ports from the area’*

Worcestershire County Council

## 5.4 Future importance of freight to A46

The A46, although less criticised than other roads on the SRN, still contends with its perception and image as a feeder route to the motorway network or hub for freight and logistics activity as opposed to a genuinely strategic, inter-regional corridor. Maintaining supportive 'sections' along the A46 for freight movements could come more naturally in the short term with a more strategic role in the medium to long term as an expressway.

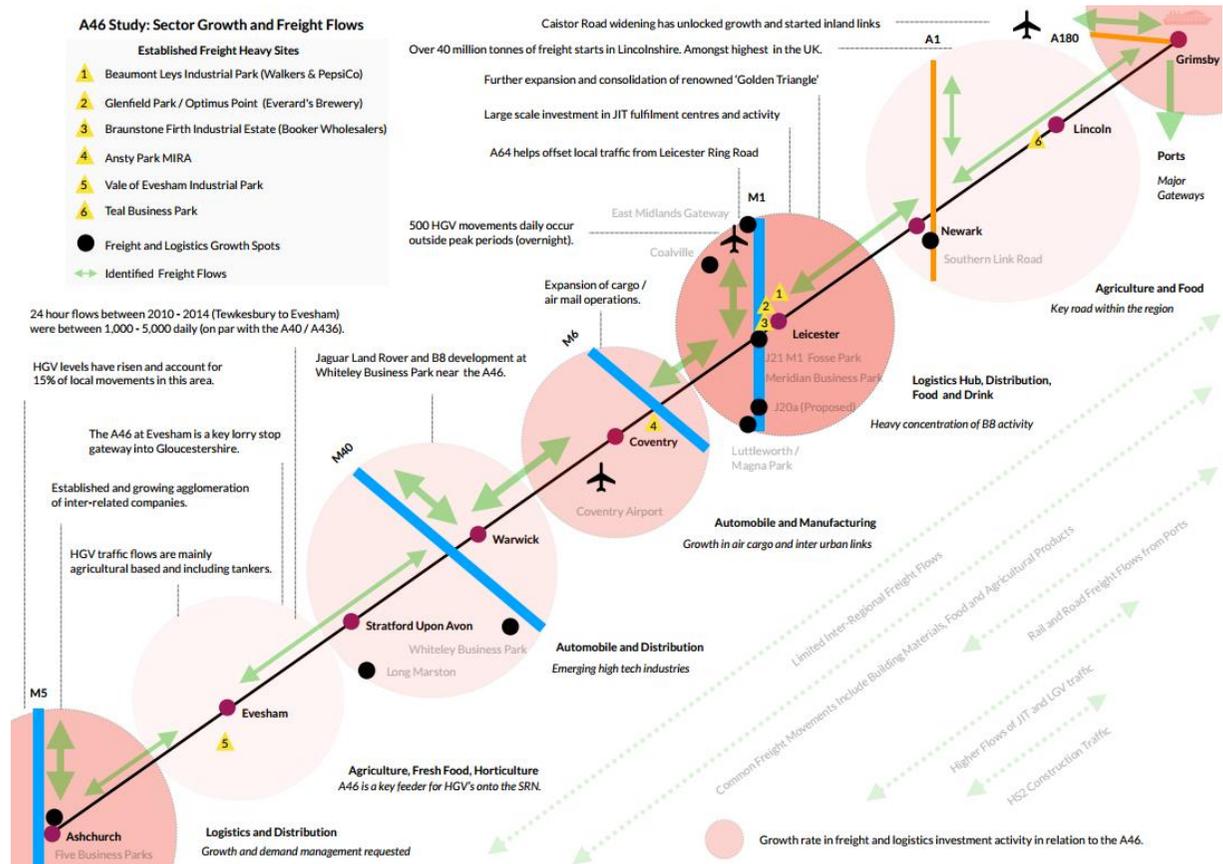
The prominence of established industry sectors are being reinforced with growth projections and policy all building on existing foundations. Areas such as Leicestershire and Coventry, that are traditionally associated with B8 activity, continue to expand in the same vein. These are the typical logistics and distribution centres that will more than likely be attracted by low risk and historic links to dovetail surrounding operations.

*"Much rests also on the expectation and perception of what the A46 should be providing which itself is informed by historical accounts of the corridor as a means of transporting freight etc."*

Area Manager, Road Haulage Association (2017)

However emerging freight forwarders and third sector companies attracted by the same pull factors to established regional bases (focusing again on Coventry and Leicester; the core hubs), presents a new challenge. New fulfilment centres are being developed at a rapid pace and Just In Time deliveries are also flooding roads with additional local trips. The ripple effects on the SRN could place additional emphasis on the A46 to cover new demands as well as other routes in and round places such as Corby, Daventry and Northampton.

Figure 5-5: Summary of freight issues



Whilst the A46 can add resilience to existing, established transportation and commercial networks, it is in a strategically important position to support emerging key players within new industries, namely the development of battery technology in electric vehicles (Warwickshire). The A46 also could take on more importance or at least met its potential as a major corridor if priority was assigned to linking it with the SRN; especially in places like Lincoln (A1 and A15).

*“There is a huge variety of goods and deliveries being transported across the A46 from food, building material, cars and machinery but bulky materials not usually transported via the A46”*

Area Manager, Road Haulage Association (RHA, 2017)

Questions remain around future proofing growth of emerging logistics and freight hubs at Ashchurch and intermodal facilities at airports and ports en-route. There is a common theme running throughout policy and stakeholder discourse that the A46 will have to be upgraded (especially in certain sections around Leicestershire and Gloucestershire notably) to be able to unlock growth in logistics / distribution activity and manage additional freight trip generation.

Port and airport access has commonly been cited in relation to the implications of Brexit on the inter-regional flow of goods and shipments and how added emphasis is being placed on even closer connections within the Midlands and East Coast Ports via a combination of road and rail. There is likely to be support for further modal shift from road to rail for connections to Nuneaton, which already has sufficient loading gauge clearance.

Whilst rail is likely to play an increased role in the transferal of goods, road haulage will still remain the dominant mode of exchange; to and from international gateways. The role of the A46 in this equation is particularly vague, especially for longer distance freight movements. The design inconsistencies along the A46, across its entirety, would deter the transportation of bulkier goods; especially when alternative, established routes are already in place.

#### 5.4.1 Reliability and resilience

Disruption and journey time variability can impact on firms costs by increasing labour costs, reducing credibility of the firm and hence, reducing future business. Journey time variability is often caused by congestion on the road network reducing the efficiency of business journeys. Journey time variability can also be caused by planned roadworks and the magnitude of the impact of these is often linked to the layout of the road and number of carriageways present.

*“Pinch points are during certain times of day rather than in actual locations, times of heavy traffic are from 8am to 10am and again from 4pm to 7pm, when we suffer the majority of our delays on route.”*

Nisa Retail, Lincolnshire

Reliability issues caused by a series of at grade junctions and signalized junctions and the inability to overtake causes unreliability in the Gloucestershire, Worcestershire and Warwickshire section of the corridor. Most notably at Ashchurch between M5 junction 9 and Aston Cross, the Evesham bypass, the Stratford-upon-Avon bypass and Warwick bypass.

*“There a lot of distribution to businesses in Leicestershire and therefore poor network performance has a negative local impact for businesses”*

Leicester City Council

There is evidence that journey time variability affects businesses along the A46. The Leicester and Leicestershire LEP business survey found that that 28% of business reported a financial impact of planned disruption (e.g. roadworks). In addition, 50% of businesses believe that there would be significant benefits to their business if congestion was reduced.

The A46 corridor around, Leicester is notoriously congested. The main area of congestion is between J21 and J21a on the M1 where east to west A46 traffic mixes with north to south traffic. Despite improvement to this junction, traffic still persists making travelling between the A46 and M69 difficult.

Similar, concerns about congestion were present in the D2N2 LEP, where 21% of hauliers believe road congestion is a key priority to address in the 2014 LEP logistics plan. In addition, 32% of logistics business believed that fuel was a significant cost to their businesses. In general the A46 in Nottinghamshire performs well with the exception being around Newark where the road becomes single carriage way for a short stretch.

*“A46 around Lincoln is very inconsistent in terms of continuity, which causes pinch points where double carriageway converges into single carriageway, and roundabouts also creates issues too”.*

FCC Environment, North Hykeham Lincolnshire

Evidence from stakeholder engagement with LEPs, local councils and businesses in Greater Lincolnshire suggest that there are significant issues with journey time reliability with inconsistent standards around Lincoln where the road fluctuates between being dual carriageway and single carriageway. This makes journey times along this section uncertain meaning businesses must allow extra time for travel. Issues with resilience of the network are also present with the A15 and A46 north of Lincoln generally being disrupted significantly by poor weather, accidents and road works.

## 5.5 Growth aspirations and constraints by section

In this section, the strengths and expectations of each LEP area is summarised, along with a summary of the transport constraints which may affect those aspirations, in particular regarding the freight industry.

Maps showing the growth sites and congestion bottlenecks can be found in Appendix D.

### 5.5.1 Section 1 – M5 (Tewkesbury) – M40 (Warwick)

#### 5.5.1.1 Growth sites

There are clusters of growth sites in this section in and around Warwick, Stratford-on-Avon, Evesham, Tewkesbury, Ashchurch and Cheltenham. These include:

- The cyber security industry located to the south of the A46 corridor. Cheltenham is currently the home of GCHQ and plans for expansion centre around a nearby 45-hectare site close to M5 J10 which hopes to create 7,000 new jobs. At Malvern the main site for cyber security is Malvern Hills Science Park.
- The agri-food sector in the Vale of Evesham where the A46 forms a central spine, but which experiences significant levels of congestion. The industry is aiming to grow using its unique advantages such as the National Centre of Excellence for Horticulture at Pershore College and the Food Enterprise Zone present in the Vale of Evesham.

- Worcester Technology Park is due to create over 5,500 jobs which could also be hindered by congestion on complimentary routes on the A422 and A44. Growth is also expected in the local supply chain and exportation of products by promoting the made in Worcestershire brand although it is acknowledged that the poor internal road network is a barrier to growth.
- Redevelopment of the Ashchurch MOD site (G5) where 7,000 houses are planned to be delivered. In addition, 3,300 new jobs are expected to be delivered as part of a mixed-use development close to M5 Junction 9. Traffic congestion is known to be inhibiting development in this area.
- Strategic housing sites around Warwick, Leamington Spa and Stratford-on-Avon (the latter being subject to a number of traffic bottlenecks). Up to 13,000 new homes could be built at Long Marston Airfield Garden Village.

*'There is currently no public transport, walking or cycling access to Vale Park so employees are dependent on driving'*

Wychavon District Council

Figure 5-15 also shows the bottlenecks identified from the INRIX work for this section. There are delays at all the at-grade junctions between Ashchurch and the M40, particularly around Evesham and Stratford

The significant issues that exist in Section 1 include inconsistent standards in the road with stretches of dual carriageway interwoven with stretches of single carriageway. The A46 intersects the M5 at J9 which suffers from significant congestion with queuing or blocking back onto the M5 possible at peak periods. This can be made worse during times of disruption on the M5 leading to the A46 becoming a diversionary route.

*'Network performance has a significant impact on the delivery of the strategic economic plan'*

Wychavon District Council

### 5.5.1.2 Freight issues

The situation at Ashchurch and the confluence of the A46 and J9 of the M5 as an emerging freight, logistics and warehousing hub is becoming notorious for traffic congestion; with limited infrastructure capacity both hindering future growth and being unable to meet existing local and strategic journey demands.

The A46's role as an emergency diversionary JIT route should not be underplayed and the relationship this point around J9 of the M5 has on the Central Severn Vale economic area. The route comes into play for diversions of the West Midlands. However, many problems are with HGV's originating outside the county and where drivers are not aware of optimum routing.

*"Warwickshire County Council considers the A46 a more viable route than those via the Birmingham Box at certain times of the day due to journey time reliability".*

Transport Manager, Warwickshire County Council (2017)

Junction remediation is desirable including removal of traffic lights, improved phasing and capacity as well as potential 'dualling' of the A46 to reduce bottlenecks. Additional trip generation is also seen to exacerbate issues without any forward planning for accommodating growth on the SRN; to the point where the situation is viewed as 'urgent'.

*"I have no choice but to operate in the Tewkesbury area as this is central to where most of my clients are. If I were setting up business from scratch or considering moving to the area then the current congestion would make me think twice about considering alternative locations outside the area".*

Transport Business Owner, Ashchurch Industrial Park

### 5.5.2 Section 2 – M40 (Warwick) – M1 (Leicester)

#### 5.5.2.1 Growth sites

This section of the A46 corridor plays a key role in supporting city centre growth as well as connecting a series of economic including UK Central (including Birmingham Airport and the HS2 Birmingham Interchange Station), Warwick, Coventry and Leicester plus growth sites at Horiba-MIRA and Tournament Fields (Warwick). The arrival and construction of HS2 will influence and change the economic dynamics within the area. Some local businesses believe there are opportunities to improve the A46 during this construction period.

*"HS2 is likely to be digging up the A46 anyway, so the time is now to plan for the future and make the changes necessary"*

Stoneleigh Park Estate, Kenilworth, Warwickshire

The main growth sectors are advanced manufacturing and engineering and gaming (around Leamington Spa – 'Silicon Spa'). The A46 is less vital to the games industry due to its product being digitally distributable. The industry is, however, highly productive and but struggles to attract staff due to lack of skills and global competition and therefore, a functioning road network is vital to attract staff from a wide area and encourage people to relocate.

The area around Coventry is already one of the largest car producers with employment in the industry over 500% the national average. The area is seeing investment in R&D by Jaguar Land Rover and Geely (£250 million development just off the M69) with focus on developing new, low emission propulsion systems. The growth predicted at Whitley Business Park and Gaydon are in part to support his activity. This continued investment will help grow and secure the car industry. This is linked with investment at the Humber Ports where new car storage facilities suggest that the A46 could be a vital route for car exportation in the future.

A significant amount of growth is planned in Coventry, close to the A46 corridor. This includes 15,000 jobs at Whitley Business Park (CW9) and 4,000 homes at Kings Hill (CW5). The National Battery Manufacturing Development Facility is also likely to be located on the section of the A46 between the A45 and the M6.

Expansion of the Fosse Park retail park close to M1 Junction 21 is due to begin shortly. Junction 21 is one of a number of traffic bottlenecks along this section which could inhibit growth in the short and long-term. Other current bottlenecks include M69 J1, A46 intersections with the A5 and M6, the eastern side of the Coventry Ring Road and around Leamington Spa.

A number of strategic housing sites are planned, notably at Rugby (including 5,000 homes at the former Rugby Radio Station) and east of Hinckley. The Leicestershire Strategic Growth Plan identifies the need for up to 100,000 new homes by 2031 and notionally a further 90,000 by 2050. Many of these are expected to be delivered on the periphery of the existing Leicester urban area, including along the M69 corridor and a new growth corridor to the south and east of the city. These strategic housing proposals, along with those in other areas, will be examined in more detail later in this study.

#### 5.5.2.2 Freight issues

The prominence of the car industry and its local supply chain naturally orientate the focus around catering for short hop journeys. There are many small B8 locations and retail sites along the A46 that cumulatively generate local traffic. Delays along the A46 coincide with peak periods and where the SRN interfaces with the local road network.

A key, notable impact on future freight flows over this section, in the next 5-8 years, will be in relation to HS2 construction traffic with many junction and road schemes being front loaded in time to avoid coinciding with additional freight volumes.

Business parks at Lutterworth (Magna Park) as well as Fosse Park are 'hot property' with enquiries being made at both sites by large multinational freight forwarders. The former is due to expand by 500 acres with additional storage and distribution facilities being added to supplement the 17 national and 14 regional centres already based on site.

### 5.5.3 Section 3 – M1 (Leicester) – A607 (Hobby horse interchange)

#### 5.5.3.1 Growth sites

Along Section 3 the major growth sectors that rely on the A46 corridor around the Leicester area are the logistics industry and the food manufacturing industry. The area around Leicester has comparative advantage for logistics and distribution being within a 4-hour drive of 95% of the UK's population. It is estimated that developing and redeveloping logistics and distribution sites in the area could generate over 7,000 jobs and contribute £297m to the local economy with growth likely to occur on the Leicester to Hinkley corridor (M69). However, this could be limited by congestion on the road network. Poor road side facilities are also felt to be discouraging people becoming HGV drivers.

The food manufacturing industry is important to the area with several firms located close to the A46 due to the presence of high quality local supply chains and the areas central location. There is potential for growth in the industry as in 2015 most firms (95%) expected to increase revenues and a number of products such as Melton Mowbray Pork Pies and Stilton Cheese are unique to the area.

Growth has also been identified in the export market with currently only 2% of products being exported outside of the EU. To realise this growth there is demand for new premises which could be realised by using the A46. The industry also has opportunities to work with the other areas that have strong food sectors along the route include Lincolnshire, Nottinghamshire and Warwickshire.

A significant amount of growth is planned in Leicester City which while not directly served by the A46, would benefit from improved access to the corridor. In wider Leicestershire, growth sites located close to the A46 including Ashton Green (LE1) where 3,000 homes are planned. Significant delays occur on the adjacent M1 between J21a and J21 due to high traffic volumes and weaving relating to the two junctions and the motorway service area. These issues affect local and longer-distance traffic on both the M1 and M69, as well as approaches into Leicester.

The Leicester and Leicestershire Vision for Growth document sets out the region's agreed strategy for delivering growth up to 2050. The document highlights the A46 corridor as primary growth corridor and estimates that it has the potential to accommodate around 40,000 new homes and additional new jobs.

#### 5.5.3.2 Freight issues

J21 of the M1, is viewed as a hugely significant, 'honeypot' location; whereby the confluence of roads and combination of local and inter regional freight traffic coincides at one point. It is subsequently the pinch point where congestion and delays hamper business efficiency and where the greatest potential exists to unlock future economic growth.

The investment being desired refers to making the A46 at this point 'fit for purpose' by enhancing capacity and the flow through J21 of the M1. There are concerns that retrofitting the junction would have major short-term repercussions with traction and support being generated for a J20a south of J21 to ease local pressure, move motorway services and unlock land for development at Fosse Park and other business sites nearby.

Significant peak period congestion along the A46 from Ratcliffe to Wreake and specifically limited internal capacity constraints on the 'Hobbyhorse' roundabout where the Leicester Bypass merges into the A46 heading northbound, constrains freight movements. Entering the network (A46) from the A6 in the same vicinity is also problematic during peak periods.

*"Food and drink are the biggest, most active sectors across the county and who perhaps have the largest impact on the local road network from freight movements."*

Transport Strategy Officer, Leicester City Council (2018)

### 5.5.4 Section 4 – A607 (Hobby horse interchange) – A1 (Newark)

#### 5.5.4.1 Growth sites

The area also performs well in logistics with significant growth expected around East Midlands Airport (EMA) including the East Midlands Gateway development to compliment the already strong sector within the area with large logistics operations linked to the growing life sciences sector including Boots' headquarters. Many of the largest growth sites are however not immediately adjacent to the A46 in this section.

Directly on the A46, a significant amount of growth is planned including projects in Rushcliffe (ND9) which are forecast to deliver 3,500 new houses and 2,000 new jobs in the area. In addition, the Newark Future project (ND10) is forecast to deliver 8,000 new houses and 2,465 new jobs.

The road is generally of high standard in this section, but there are severe congestion bottlenecks at either end at Hobby Horse and the interchange with the A1.

*"Excluding the area around Newark, the A46 is a high-quality road and is one of the best road corridors around Nottingham"*

Nottinghamshire County Council

#### 5.5.4.2 Freight issues

The long-term aspirations for a new national road from the M1 J20A south east of Leicester that joins with the A46 in Syston, is hoped to relieve pressure on east – west connections through M1 J21 and the A46 north of Leicester. This would place the focus of investment on the 'Hobbyhorse' roundabout whilst unlocking linked development sites (likely to include B8) feeding into the A46 from the south east of the city.

Recent developments and improvements appear to have deflected the focus away from this section of the A46. The confluence with the A607 is a key strategic node, which also feeds traffic into the A46 around East Bridgford and Cotgrave; with many HGV's (over 1,000 vehicles a day) passing along the A46 and bypassing Newark.

## 5.5.5 Section 5 – A1 (Newark) – Humberside

### 5.5.5.1 Growth sites

Along Section 5 of the A46 corridor, growth in Greater Lincolnshire and the Humber is mainly linked to food, ports and logistics and advanced manufacturing, with up to 8,800 new jobs planned in the period to 2031. The area is seeing significant growth in AME mainly around the South Humber Ports, Hull and Lincoln with the offshore wind energy expected to create around 6,000 jobs taking advantage of being within 12 hours of 60% of the entire European market for renewables. Siemens also have plans to grow jobs in Lincoln further and their business currently relies heavily on the A46 corridor for its supply chain to the west and for exportation to the north east.

Growth in the agri-food and food processing industry is also expected. The area has a strong local supply chain which is a major competitive advantage. Significant growth is expected along the A15 to the north of Lincoln and to the west of Grimsby off the A180. This includes the emerging thinking in Northern Lincolnshire of creating an Energy and Food cluster around Scunthorpe, Grimsby and Lincoln and the Grimsby Town deal.

*'The A46 is not only critical to realising projected growth outlined in the local plan but also for accessibility to North East Lincolnshire from the rest of the UK'*

North East Lincolnshire Council

A significant amount of growth is planned at Able Marine Energy Park (LI4) which is expected to deliver 4,100 employment opportunities and Hull City Centre (H2) where 3,200 houses will be delivered plus 13,300 new homes by 2032 in Greater Lincolnshire. South Humber Industrial Investment Programme (SHIIP), Food Enterprise Zones at Hemswell Cliff and Grimsby and Europarc are also key developments which will need effective access to realise their potential.

A number of major residential developments are planned around Lincoln, notably the Lincoln Western Growth Corridor, South East Quadrant (Canwick Heath), and South west Quadrant. The A46 Lincoln bypass is currently subject to severe delays at peak times and could act as an inhibitor of growth in the area.

Similarly, the Lincolnshire Lakes residential development could be adversely affected by the traffic bottleneck where the A15 meets the M180 at Junction 4.

*"We experience daily delays along the A46 corridor, impacting on our delivery on time targets, which in turn can drive inefficient routing, as the planners will plan to arrive on time but are unable to fill the vehicle due to driving time lost through delays."*

Nisa Retail, Lincolnshire

There are significant issues accessing the Port of Hull, although mitigation measures are currently being constructed. Improvements may also be needed to facilitate the significant growth expected to the north of Lincoln along the A15 plus investigating the role and nature of the tolls on the Humber Bridge could facilitate better traffic flow.

*'The lack of continuity in the number of lanes on the A46 around Lincoln has a significant effect on realising the areas Strategic Economic Plan'*

Greater Lincolnshire LEP

### 5.5.5.2 Freight issues

As agricultural production and operations have incrementally sought larger haulage capacity, additional volume and larger vehicles has the potential to place strain on the local road network, particularly in sensitive areas such as through Market Rasen. Momentum is already in place to deliver junction upgrades on the A46 in Grimsby as part of the SEP Access to Employment Zone and burgeoning ports and logistics sector.

Recent 'dualling' of the A46 between Widmerpool and Newark and the planned provision of a Southern Link Road to the south of the town linking the A46 to the A1 are designed to take advantage of the towns growing prosperity and sectorial growth in B2 and B8 activity, particularly demand for strategic logistic uses.

The same concerns expressed by organisations around the concentration of 'mixed traffic' at the A15 / A46 heading southbound, with the need to 'read the road' also making it a far more persuasive argument to rely on the motorway network despite this link being acknowledged as the more attractive option financially.

## 6. Potential benefits of investment

### 6.1 Introduction

This final chapter describes the potential benefits which could arise from investment in the corridor: the strategic case. The intention at this stage is to set out the types of benefit which may arise based on the problems and challenges identified and the agreed outcome objectives.

The different types of benefits are described, and have been grouped based on whether those benefits are likely to be felt at local, sub-regional or national level. As the outcome objectives indicate the desired impacts which are being sought, the types of benefits which could arise relate closely to the outcome objectives. Where the evidence allows, an indication is given on the potential scale of the benefits which could be achieved.

The potential investments required to achieve these benefits, as well as an assessment of the scale and timing of the benefits, will be considered during Tasks 2 and 3 and reported in the Option Identification Report and Option Assessment Report.

### 6.2 National Benefits

In Chapter 4 the national role of the A46 was identified as being to potentially offer high quality routes:

- between the M5 corridor and M1 corridor (offering an alternative to the M5/M42/M6);
- between the M1 corridor and the A1 corridor (offering an alternative to the M1/M18 or A14); and
- between the A1 corridor and Humberside (offering an alternative to the A1/M180/A180).

Nationally-important journeys could use one or more of these sections of the A46, but there is little evidence to suggest that many journeys travel the full length of the A46 at the moment.

However, the research undertaken for this study shows that the A46 corridor is currently under-performing in terms of offering a reliable east-west route, including as a route to the ports, and could be inhibiting growth. An improved A46 which offers a level of reliability and legibility similar to other parts of the SRN could provide an economic spine supporting the performance of existing businesses, and creating the conditions for growth.

#### 6.2.1 Between M5 and M1 corridors

The A46 between the M5 and M1 is currently a mix of single-carriageway and dual-carriageway 'A' roads and the M69 motorway. There are numerous at-grade junctions, particularly between the M5 and M40 but also further north. Whilst the average journey time between the M5 and M1 via the A46/M69 is quicker than the M5/M42/M6 route, the variability of journey times is much greater and there are few parallel routes for those on the A46 in the event of an incident causing severe delays.

A full expressway standard A46 corridor, if it could enable average speeds of 60 mph, would reduce journey times between the M5 J9 and M1 J21 by as much as 30 minutes and significantly reduce the variability of journey times.

Such a corridor would attract a larger share of long-distance national traffic away from the heavily congested Midlands Motorway Hub (M5/M42/M6) and offer much greater resilience for east-west traffic in the event of an incident or major roadworks on the Hub. It would offer businesses using the corridor much more certainty over delivery times, and reduce fuel costs as stop-start conditions around at-grade junctions would be reduced.

The Long-Term Midlands Motorway Hub Study identified that improvements to the A46 between the M5 and M40 would draw additional traffic onto the A46/A45 around Coventry, and the M1/A46 around Leicester. This highlights the importance of developing an investment strategy for the A46 at a corridor-wide level and the need to ensure that the benefits of improvements are recognised in a wider area than the immediate vicinity of the scheme(s).

### 6.2.2 Between M1 and A1 corridors

The majority of the A46 between the M1 (J21A) and the A1 at Newark is already built to expressway standard, whilst the older section of dual carriageway between Hobby Horse and Widmerpool is also dual carriageway, but built to a lower standard. In general therefore, this section already provides a high quality east-west route for national traffic between the M1 and A1, and is used by some national traffic between these corridors.

However, the congestion hotspots on this section, in particular on the Leicester Northern Bypass, at Hobby Horse Interchange and at the junction with the A1 at Newark mean that the route is less attractive than the alternative M1/M18 route for many journeys. Businesses have highlighted that tackling congestion at these hotspots would help to provide journey time reliability and therefore encourage greater use of the corridor.

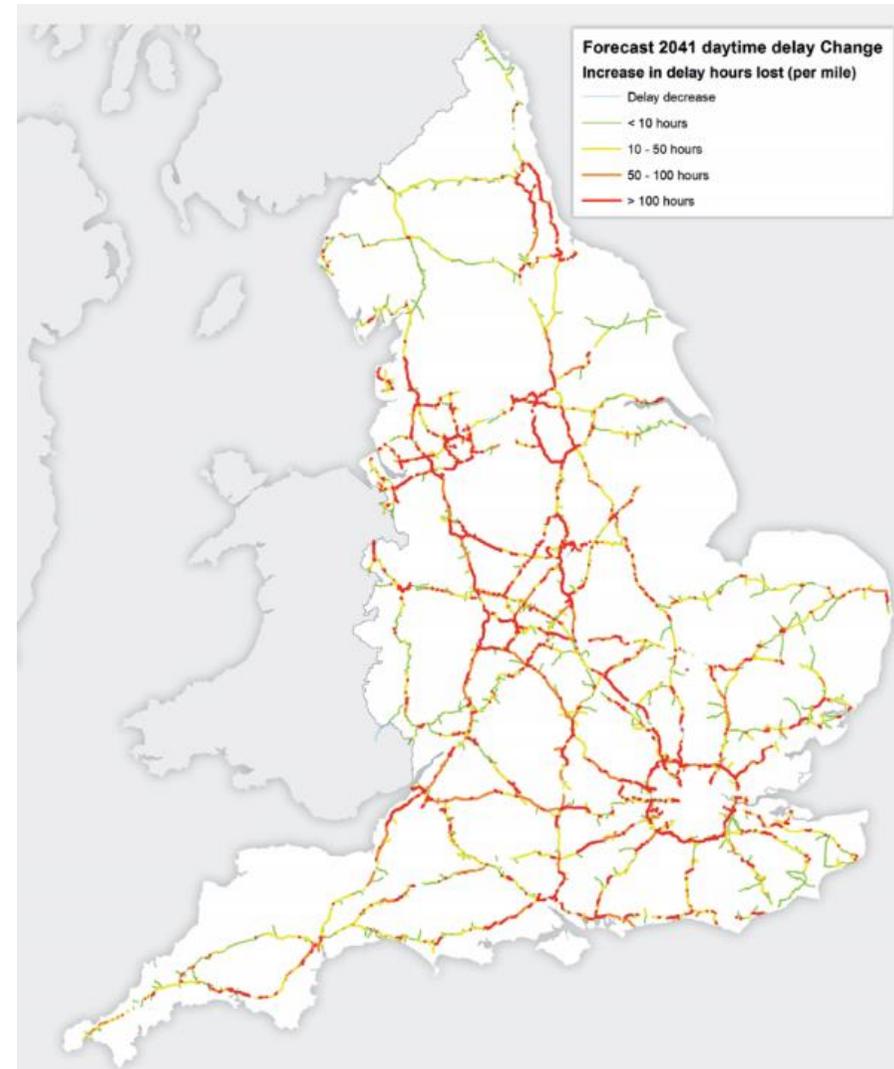
Congestion on the M1 and M18 is forecast to worsen significantly in the future (see Figure 6-1) meaning the A46 could provide an increasingly attractive alternative for long-distance journeys. Should conditions on the M42 north-east of the Midlands Motorway Hub also worsen significantly, the A46 could also offer an alternative for trips currently using the M5/M42 route between the South West and Yorkshire.

The next stages of this study will consider the interventions necessary to address bottlenecks on the A46 in this section to support the national objectives, as well as sub-regional and local ones.

### 6.2.3 Between A1 corridor and Humberside

Journeys between the A1 corridor and south Humberside have the choice of routing via the A1/M18/M180 or the A46 via Lincoln and onward on the A46 or A15. Average journey times to the Grimsby are faster via the A46 than the M180 but are less reliable. This, and the fact that much of the manufacturing industry in south Humberside is located along the M180 means that the A1/M18/M180 route is favoured by most businesses.

Figure 6-1: Forecast change in delay by 2041



Source: Highways England (2017) Strategic Road Network Initial Report

For port traffic, just in-time-deliveries are critical. There is a high dependency on Immingham for fresh produce from Amsterdam and Eastern Europe; meaning that reliability of journey times to and from the Humber is for many businesses more important than the absolute journey times.

The A1/M180 route offers better average speeds and reliability than the A15 or A46 to Immingham and Grimsby from the A1; but investment in either the A15 or A46 east of Lincoln may be worthwhile to provide a viable alternative. Based on the business interviews, there may not currently be a critical mass of traffic to the Humber ports (for those businesses surveyed, most goods are delivered next day through airports or the Channel seaports) although the growing share of RoRo traffic through the Humber ports may mean this situation changes, and improved connectivity to the south could act as a catalyst for this.

## 6.3 Sub-regional benefits

As described in Chapter 0, at a sub-regional level, investment in the A46 could support better connectivity to, from, within and between the Midlands economic hubs; as well as enabling strategic access to key housing and employment growth sites.

The predominant potential benefits at a sub-regional level are described below.

### 6.3.1 Reduced journey times and improved connectivity

As shown in Figure 3-1, average speeds during the peak period on nearly the entire corridor fall below the Midlands Connect Conditional Output aspiration of 60 mph. Speeds tend to be lower on single carriageway sections which have not been upgraded (north of Newark and south of Warwick) and/or where traffic is highest (around the main urban centres of Coventry and Leicester).

Businesses state they are constrained with regards their supply chains, sales and labour markets based on those which can be accessed in a reasonable journey time (up to an hour).

Reducing journey times will enable expanded labour markets, particularly in the central section (Warwick-Coventry-Leicester), supporting growth in the urban centres and improving access to skilled labour. Agglomeration and productivity gains will benefit both the Midlands economic hubs and longer-distance agglomeration between the South West, the Midlands, and the North.

Quicker journeys will also support business efficiency and growth by bringing businesses closer together, reducing effective distances to markets and supply chains. This will have a positive impact on economic growth from increased output and job creation through enabling growth in key business clusters and high value economic sectors.

Chapter 3 demonstrated that the highest journey time improvements, assuming achievement of an average 60 mph, could be achieved in the southern sections of the route: 19 minutes between the M5 and M40, and another 19 minutes between the M40 and M1.

On this basis, and on the basis that an improved A46 provides better connectivity to the rest of the SRN, the biggest sub-regional benefits from connectivity improvements are likely to be:

- Between the Leicester/Coventry hub (and the Warwick/Leamington Spa area) and the South West via the M5 (also Evesham to the South West).
- Between Evesham and Stratford and the Coventry/Leicester hub (as well as Warwick/Leamington Spa). Section one is home to a number of static industries such as agriculture. Forecast to see growth in agri-tech industries. These industries are unable to locate to other areas due to produce being grown in the vicinity and so would benefit most from improved connectivity. Manufacturing is also a key driver of trips within the section with journeys travelling within the area.

- Within the Coventry/Leicester hub, where the A46 is important to providing access to labour markets and supporting agglomeration. Current network performance on the A46 is poor, but the area is home to SRN-dependent sectors (and growth sites) and the M40, M6 and M1 are all important for connectivity to the rest of the Midlands and UK. However, of those businesses interviewed, international trade was typically via the Channel, Haven and Merseyside ports rather than Bristol or Humberside.

### 6.3.2 Removal of bottlenecks and improved journey time reliability

Chapter 3 also demonstrates the impacts of key delay hotspots on both average speeds and journey time reliability. Journey times through the worst bottlenecks can be up to 2.5 times the average journey time.

A recurring theme in the business interviews was the importance of meeting delivery windows to the just-in-time operational model for the manufacturing sector. High variability of journey times affects businesses' ability to operate efficiently by requiring them to build additional time into delivery windows which in turn requires additional drivers and vehicles.

Benefits to sub-regional journeys will arise from relieving, or bypassing, the causes of the worst unreliability. Typically these are at-grade junctions where the traffic through the junction is at or above the capacity of the junction. Analysis of the INRIX data shows that the most severe bottlenecks include:

- the Hobby Horse interchange (A46/A607);
- the M1 J21-J21A and the Leicester Northern Bypass;
- the A46 west of Stratford;
- A46 junctions with the M40, M6 and A1.

The cluster of bottlenecks to the west and north of Leicester- act as a barrier to agglomeration and access to labour markets. The Coventry/Leicester Hub is a key part of the Midlands Connect strategy and whilst journey times can take less than 45 minutes between the centres, the high variability of journeys times means it can take much longer. The performance of the M1 in particular also impedes longer-distance national trips passing through this area.

Journey time reliability on the A46 around Lincoln is also a real issue. The business interviews suggest that many choose to use the M1/M18 or A1/M18/M180 routes rather than the A46 via Lincoln to access the Humber ports as the journey time variability is much less, even though the average journey time is approximately 20 minutes longer.

### 6.3.3 Supporting strategic growth sites

There are a large number of housing and employment growth sites along the A46 corridor. Midlands Connect has identified the largest of those, identified as key strategic growth sites (see Figures 5-15-19 above). The conditions necessary to enable these sites to be developed vary but, for most, good connectivity to the SRN and/or proximity to urban centres is important to ensure access to labour markets, suppliers or jobs.

The map shows that the A46 corridor sites located close to the SRN are clustered around the intersections with the higher-performing parts of the network: the M5, M40, M6 and M1. The relatively poor performance of the A46 means that locations on the corridor further away from these higher performing corridors appear less attractive for developers or tenants.

Improvements to the A46 could therefore support the development of strategic growth sites in three ways:

- by unlocking land for development through providing access from the SRN, potentially via the local road network;
- by further improving the connectivity of the existing sites, particularly on the east-west axis (to complement the generally better north-south connectivity); and

- by improving the attractiveness of other locations further away from the motorway network by reducing journey times and improving journey time reliability to the motorways.

Further, investment in the A46 may be critical to enable long-term employment and housing growth by providing sufficient capacity to accommodate the additional demand for travel this growth will generate. Around Leicester and Coventry in particular, the SRN and local road network will need to cater for significant housing growth fuelling demand for travel to central and peripheral employment locations. For these journeys, average journey times, rather than reliability, will be a key success factor.

## 6.4 Local benefits

The A46 (and M1, M69, M180, A15, A422, A44 and A1173) are critical to the success of the numerous communities along the corridor. An effective A46 corridor is critical to the operation of the wider local road network; to providing connectivity to settlement hinterlands and locations further afield; to enhancing rather than damaging local communities; and to protecting the built and natural environment.

### 6.4.1 Reducing impacts on communities

Chapter 2 summarises the impacts of the A46 corridor on the communities within the corridor in terms of road safety, noise, air quality and severance. The local authorities along the corridor are well-aware of these issues and over time have sought to mitigate them. This has also been highlighted by the A46 Partnership

Improvements to the A46 corridor offer the potential to deliver community benefits in numerous locations along the corridor. In particular investment could:

- reduce the number of accidents and accident injuries, especially on the single-carriageway sections south of the M40 and east of Newark, at busy junctions, and where the road passes through urban areas (such as Ashchurch); noting that reductions in the number and severity of accidents also improve network performance and resilience;

- reduce the number of residents affected by traffic noise (Noise Important Areas are prevalent around the settlements);
- improve local air quality, particularly in the Air Quality Management Areas (AQMAs) at Stratford, Coventry, Leicester and Lincoln; and
- remove traffic from locations where the volume of vehicles, in particular HGVs, and the road itself act as a barrier to movement and result in unattractive environments (this is particularly relevant to Ashchurch, Evesham, Warwick, Leicester, Newark, Market Rasen and Grimsby, but also smaller settlements such as Beckford and Nettleton).

### 6.4.2 Reducing impacts on the environment

The A46 corridor has a range of Air Quality Management Areas (AQMA's) at locations including Stratford, Coventry, Leicester and Lincoln. There are also a series of Noise Important Areas with particular clusters in the urban sections of the corridor. The appendix provides further environmental constraints including woodland, Areas of National Beauty (AONB) and flood risk areas which will need to be taken into account during the next stages of the study and the influence this may have on scheme deliverability. Technology will also have a role to play in mitigating the impact of increased traffic in the corridor, again this will be considered further as the study progresses.

### 6.4.3 Supporting local economies and enabling local growth sites

The A46 plays a role in supporting the local economies along the corridor in a number of ways:

- operating as part of the local network, providing connectivity within/around settlements and linking settlements to their wider hinterlands (for some settlements, such as Market Rasen and Evesham, the road is a critical component of the local road network);
- ensuring the local road network, and the local trips using it, is not unduly impacted on by through traffic, resulting in congestion;

- providing connectivity between settlements and the motorway network and other high-performing parts of the SRN for businesses and commuters (for example, the logistics sector is already keen to locate in the south-west of the corridor due to the proximity to the M5 (Vale Business Park and Ashchurch Business Park are popular sites which are set to grow; and the A15 provides vital connectivity from Lincolnshire to the Humber ports); and
- providing access to local growth sites, and the capacity to cater for demand to/from them

For those settlements in more peripheral areas, which are more likely to be economically disadvantaged and with less footloose economic sectors (such as agriculture and tourism in Lincolnshire), the A46 is critical to economic and community vitality. Addressing peripherality and access to wider opportunities could help to raise productivity and economic performance of region.

# Appendix A

Additional scheme and study information

Table A1: Recently completed and planned schemes in the A46 corridor

Scheme	Estimated Cost	Funding	Delivery Responsibility	Implementation Period*	Notes
<b>Gloucestershire</b>					
Highway improvement A46 (Shurdington Road) corridor, Cheltenham	-	-	Amev	Completed	Completed October 2017
Junction improvement A417 - Brockworth Bypass / A46 Shurdington Rd, Brockworth	-	Not identified	Gloucestershire County Council	Medium	Identified in the countywide long term capital projects delivery priorities (2021 to 2031)
Junction improvement A419 / A46 Dudbridge Road roundabout, Stroud	-	Not identified	Gloucestershire County Council	Medium	Identified in the countywide long term capital projects delivery priorities (2021 to 2031)
Junction improvement A46 / A4173 junction, Pitchcombe	-	Not identified	Gloucestershire County Council	Medium	Identified in the countywide long term capital projects delivery priorities (2021 to 2031)
Junction improvement A46 / Bath Road (Dudbridge Road), Stroud	-	Not identified	Gloucestershire County Council	Medium	Identified in the countywide long term capital projects delivery priorities (2021 to 2031)
<b>Worcestershire</b>					
A46 Evesham Bypass Junctions	-	-	Highways England Worcestershire County Council	Short	Study to be undertaken for Worcestershire County Council and HE to consider current operation and improvement of the A46 Evesham Bypass.
Evesham - A46 Corridor Major Upgrade Scheme	-	Highways England /Department for Transport /	Worcestershire County Council, Warwickshire County Council, and Gloucestershire County Council	Medium/Long	Studies planned to explore Western Bypass. Opportunities to access the Highways England Growth and Housing Fund for smaller scale schemes to unlock housing developments
<b>Coventry and Warwickshire</b>					
A46/B4082 Walsgrave Improvement (Grade Separation)	TBC	Central Government	Highways England	Medium	Part of Walsgrave and Binley improvement package. Currently being developed during RIS1 for delivery during RIS2
A46/A428 Binley Improvement (Grade Separation)	£52.5m	Central Government	Highways England	Medium	Part of Walsgrave and Binley improvement package. Currently scheduled for delivery in 2019/20 at the back end of RIS1.
A45/A46 Tollbar End Improvement (Grade Separation)	£106m	Central Government	Highways England	Completed	Completed December 2016.
A45/A46 Stivichall (Festival) Improvement	-	Central Government	Highways England	Completed	Completed December 2016, as part of the Tollbar End improvements.
Whitley South, Coventry	TBC	Developer Funding	Developer/Coventry City Council	Medium	New office and industrial site (to be HO for Jaguar Landrover and the Worldwide Technical Centre), access arrangements and transport mitigation arrangements are ongoing.
A46/C32 Stoneleigh Improvement	£20-25m	Growth Deal Developer Funding	Warwickshire County Council Highways England	Medium	Major improvement to the junction to facilitate access to the University of Warwick, Stoneleigh Park and unlock local housing development. Also supports A46 Expressway aspirations. Implementation planned for mid-2019, public consultation was completed in July 2017.
A46/A452 Thickthorn (Kenilworth) Improvement	£2.5m	Growth Deal Developer Funding	Warwickshire County Council	Medium/Long	Scheme identified in Warwick District Local Plan. Funding being sought through Growth Deal #3 bid towards wider improvement along the A452 between Kenilworth and Leamington Spa.
A46/A425/A4177 Stanks (Warwick) Improvement	£6m	Growth Deal	Warwickshire County Council	In construction	Committed Growth Deal #1 scheme, work began Winter 2017.
A46 Gaveston (Leek Wootton) to M40 Junction 15 (Longbridge)	TBC	Central Government	Highways England	Medium/Long	Link capacity issues to be considered as part of wider A46 Expressway proposals.
Stratford Western Relief Road	£30m	CALA Homes		Medium	Scheme not yet given planning permission
A46 Alcester to Stratford-upon-Avon	TBC	Highways England	Highways England	Medium/Long	
M40 Junction 15 (Longbridge)	TBC	Central Government	Highways England	Short	Completed
A46 Stratford-upon-Avon to Oversley Green/Alcester safety improvements	TBC	-	Highways England	Short/Medium	Improvements to Billesley/Binton crossroads and other side road junctions subject to HE business case/value management.
<b>Leicester</b>					
Eastern District Distributor Road	-	-	-	-	
<b>Nottinghamshire</b>					
Newark Northern Bypass	-	-	-	-	Committed for study in RIS1 and delivery in RIS2 (subject to a deliverable scheme being approved)
Newark Southern Link Road	£47m	D2N2, HCA, Urban & Civic plc, and Newark and Sherwood District Council		Short	Due to be completed by March 2020
<b>Lincolnshire</b>					
Lincoln Eastern Bypass	£99m	Central Government, LCC, third-party developers	Lincolnshire County Council	Short	Due to be completed by late 2019
A18/A180 Link Road	£6.266m	DfT, local contributions	North East Lincolnshire District Council	Completed	Opened in June 2016

Table A2: Previous studies in the A46 corridor

Study	Lead Organisation	Notes
Midlands Connect: Barriers to Growth	Midlands Connect	This report sets out evidence on the barriers to growth in the future Midlands economy resulting from connectivity constraints on the Midlands strategic road and rail networks.
Midlands Connect A46 Strategic Case	Midlands Connect	This document presented a strategic case for investment on the A46 between Ashchurch and Leicester to help inform the Midlands Connect Final Strategy and subsequent work programme.
Midland Motorway Hub	Midlands Connect/Highways England	A long-term study of the Birmingham Motorway box which included an assessment of the A46 Expressway as an alternative route to the M5/M42/M6 between Tewkesbury and Leicester.
A46 Corridor Study (M5 J9 to M6 J2) Baseline Assessment Report	Highways England	Sets out the existing issues and the implications of growth. The study was undertaken in order to identify a long-term strategy to address the needs and function of the A46 between M5 Junction 9 and M6 Junction 2. This report provides a baseline assessment of the current operational characteristics of the A46 as a benchmark for the development of the future strategies.
A46 Customer Experience Option Assessment Report (OAR)	Highways England	This OAR looked at the section of the A46 between Tewkesbury and Leicester. It concluded that a study needs to be undertaken to review the existing route and assess the requirements of the route based on planned growth and long-term aspirations. This study will need to review a range of options for widening the route to a minimum of Wide Single Standard, although Dual would have more capacity and would provide better route consistency and reliability.
A46 (Ashchurch) Scoping Report (M5 J9 – Teddington Hands Roundabout)	Highways England	Assessed the level of improvement to A46/M5 J9 required to deliver planned growth arising from the Joint Core Strategy. This identified that an online solution could not support the required growth.
A46 Ashchurch Optioneering Report	Highways England	This considered a set of options that will alleviate existing and future traffic issues on the A46 to provide a short List of strategic options.
A46 A435-M5 J9 OAR	Highways England	This OAR considered a range of short and long-term measures to improve the section between Tewkesbury and Teddington Hands. The OAR recommended that further work should be done to widen the A46 in this section and Extend M5 J9 south and realign A46 to south of Natton, where it would re-joins the existing alignment by Teddington Hands junction (A435)
A46 A435-M5 J9 Strategic Outline Business Case (SOBC)	Highways England	This considered the problems in the Ashchurch area, and the potentially online improvements options. The 'best option' put forward in this report is to fully signalise M5 J9, with circulatory and slip road widening, link signals to Alexandra Way and Shannon Way junctions, and widen A46 from M5 J9 until the railway bridge.

Study	Lead Organisation	Notes
A46 Evesham OAR	Highways England	This OAR considered a range of short and long-term measures to improve the section around Evesham. The OAR recommended that further work should be done to improve the 5 junctions on the A46 and explore a longer term option of an Evesham western bypass.
A46 Evesham SOBC	Highways England	This SOBC considered online highway improvements. The <i>'best option'</i> put forward in this report is to widen the circulating carriageway and entry at the five junctions to increase junction capacity and reduce congestion and delay. The junction improvements should incorporate pedestrian and cycle facilities.
A46 Stratford upon Avon Study	Highways England	Considered 3 junctions near Stratford-upon-Avon at Marraway, Bishopton and Wildmoor. Preferred solutions adopted in A46 Wider Corridor Study.
A46 Stratford upon Avon OAR	Highways England	This OAR considered a range of short and long term measures to improve the section around Stratford. The OAR recommended widening and improvement works to the two junctions in this area.
A46 Stratford-upon-Avon SOBC	Highways England	This SOBC considered the issues surrounding Stratford and the A46 up to the M40. This report found that the <i>'best option'</i> would be to widen the single carriageway section to dual to increase capacity and improve route consistency, and widen and signalise the entry and exit flares at the Wildmoor and Bishopton junctions to increase capacity and reduce congestion and delay. The improvements should incorporate pedestrian and cycle facilities.
A46 Coventry OAR	Highways England	This OAR considered a range of short and long-term measures to improve the section around Coventry. The OAR recommended improvements to the Binley and Walsgrave junctions
A46 Coventry SOBC	Highways England	This SOBC considered options to improve congestion on the Coventry Eastern Bypass, and concluded that the <i>'best option'</i> would be to grade separate the Binley/TGI and Walsgrave roundabouts for development in RIS1 and delivery in RIS2
M69 to M1 J21A OAR	Highways England	This OAR considered a range of short and long-term measures to improve the section around Coventry. The OAR recommended improvement to information provision along M69 section of the corridor paired with south facing slips at M69 Junction 2 and a Sapcote Bypass.
M69 to M1 J21a SOBCs	Highways England	A number of SOBCs have been developed for this section. The <i>'best option'</i> put forward included improvements to the information provision along the M69, creation of south facing slips at M69 J2, and a new J20a on the M1.
A46 North of Leicester Syston to M1 J21a OAR	Highways England	This OAR considered a range of short and long-term measures to improve the section around Leicester. The OAR recommended improvements to the Hobby Horse Junction and technology installations.
A46 North of Leicester Syston to M1 J21a SOBC	Highways England	This section was found to have poor performance. The <i>'best option'</i> included improvement to A46 Hobby Horse junction and installation of VMS, CCTV and queue detection loops across the study

Study	Lead Organisation	Notes
		area linked to local UTC systems to improve knowledge of road condition and performance, and awareness of accidents and journey time.
A46 Newark OAR	Highways England	This OAR considered a range of short and long-term measures to improve the section around Newark. The OAR recommended improvements to the Newark bypass junctions in the shorter term and a longer term feasibility study into an A46/A1 bypass, and dualling or alternate route of the Newark bypass.
A46 Newark SOBC	Highways England	The SOBC found junction performance and safety at the A46/A1 junction as a key issue. A46 Newark Bypass junction improvements was considered the ' <i>best option</i> ' to ensure the smooth running of the Newark bypass, and to maximise cumulative benefits such as congestion reduction throughout the study area.
A46 Swinderby to Lincoln OAR	Highways England	This OAR considered a range of short and long-term measures to improve the section from Swinderby to Lincoln. The OAR recommended improvements to the roundabouts at Carholme and Skellingthorpe and the upgrading of the Lincoln bypass to dual standard.
A46 Swinderby to Lincoln SOBC	Highways England	The SOBC found junction performance and safety as the key issue in this section. The SOBC identified that further work was needed to make improvements to A46/Carholme junction (signalisation/ enlarging), A46/Skellingthorpe junction (signalisation/ enlarging) and the upgrading of single standard sections of the Lincoln bypass to dual standard.

## Appendix B

### Environmental constraints maps

Figure B1: Air Quality Management Areas

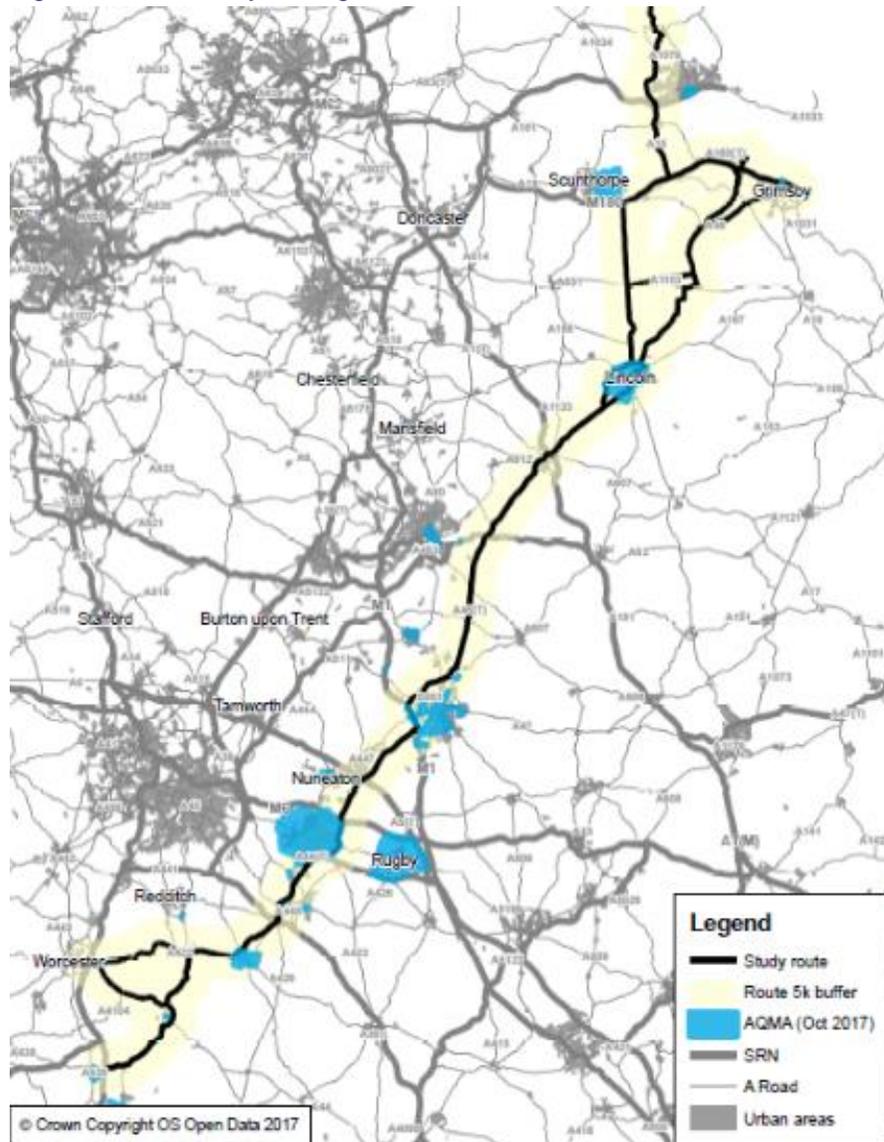


Figure B2: Noise Important Areas

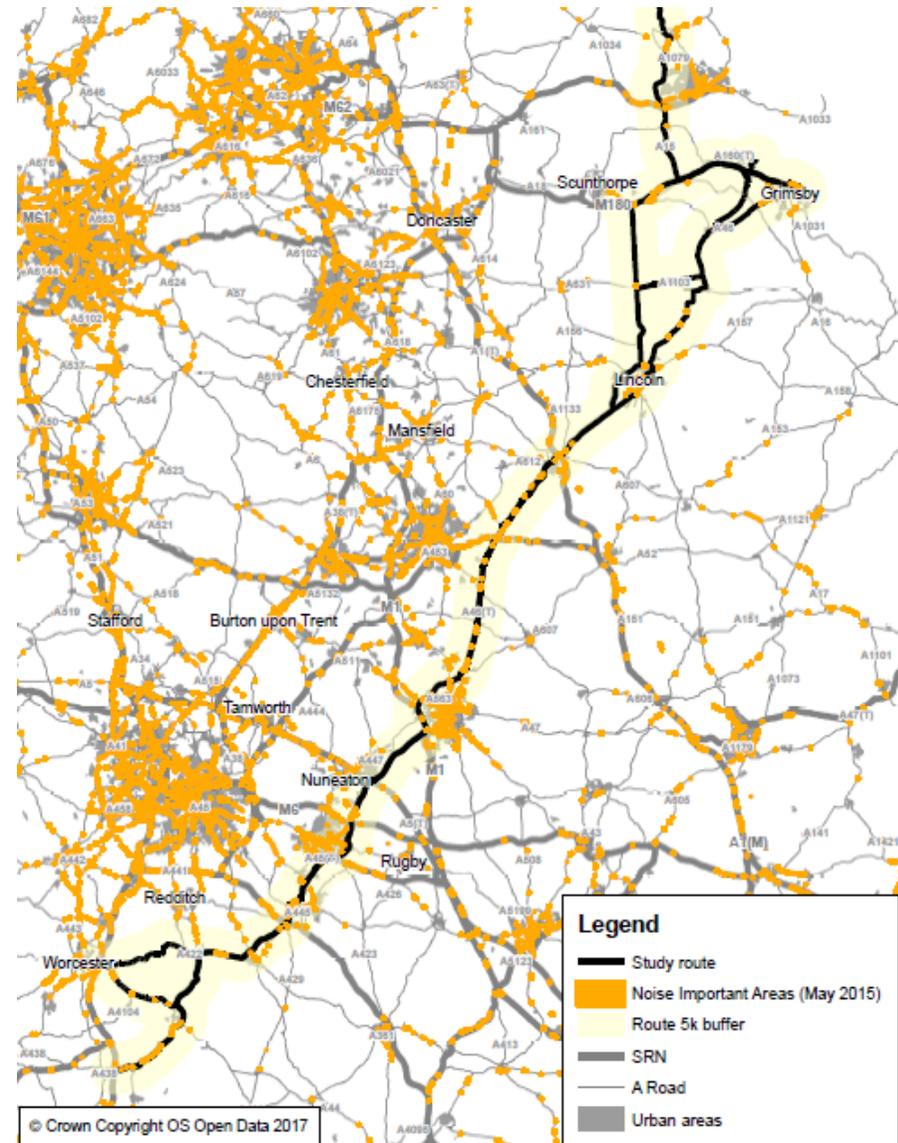


Figure B3: Environmental protection areas

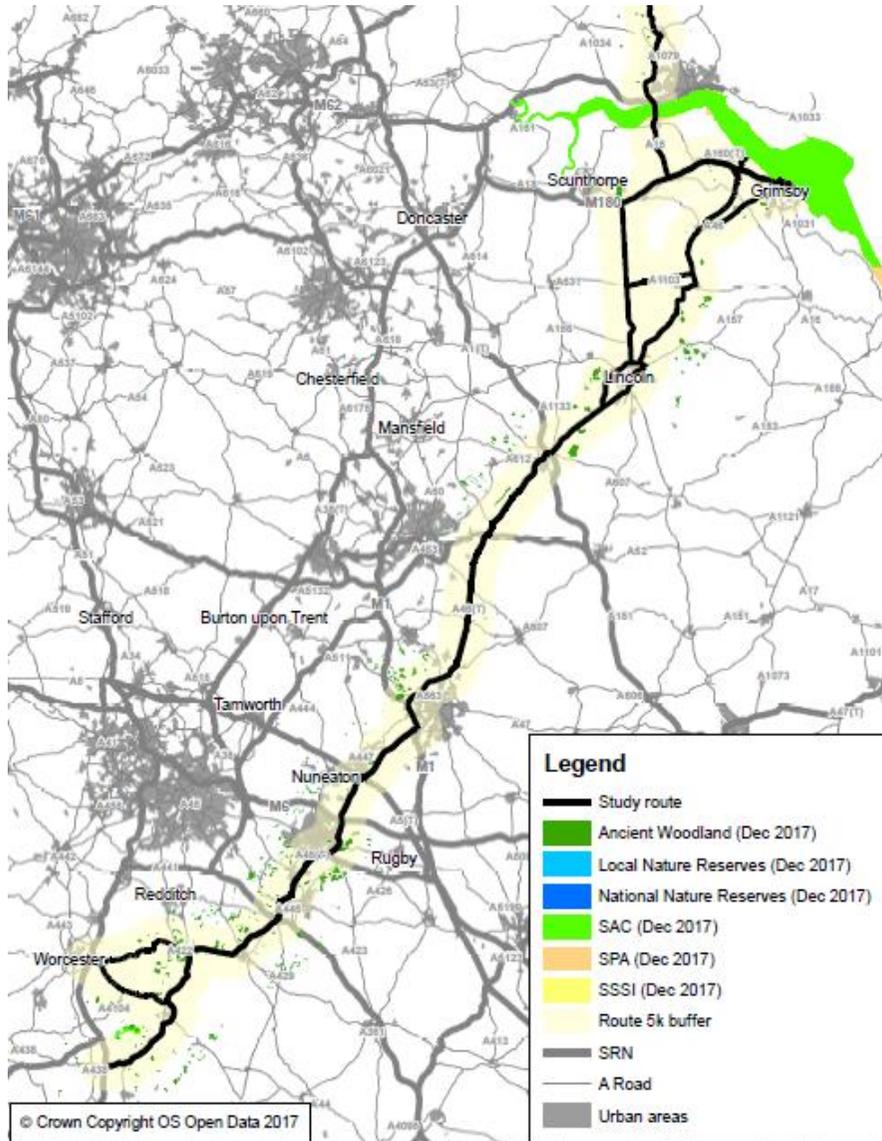


Figure B4: Areas of Outstanding Natural Beauty

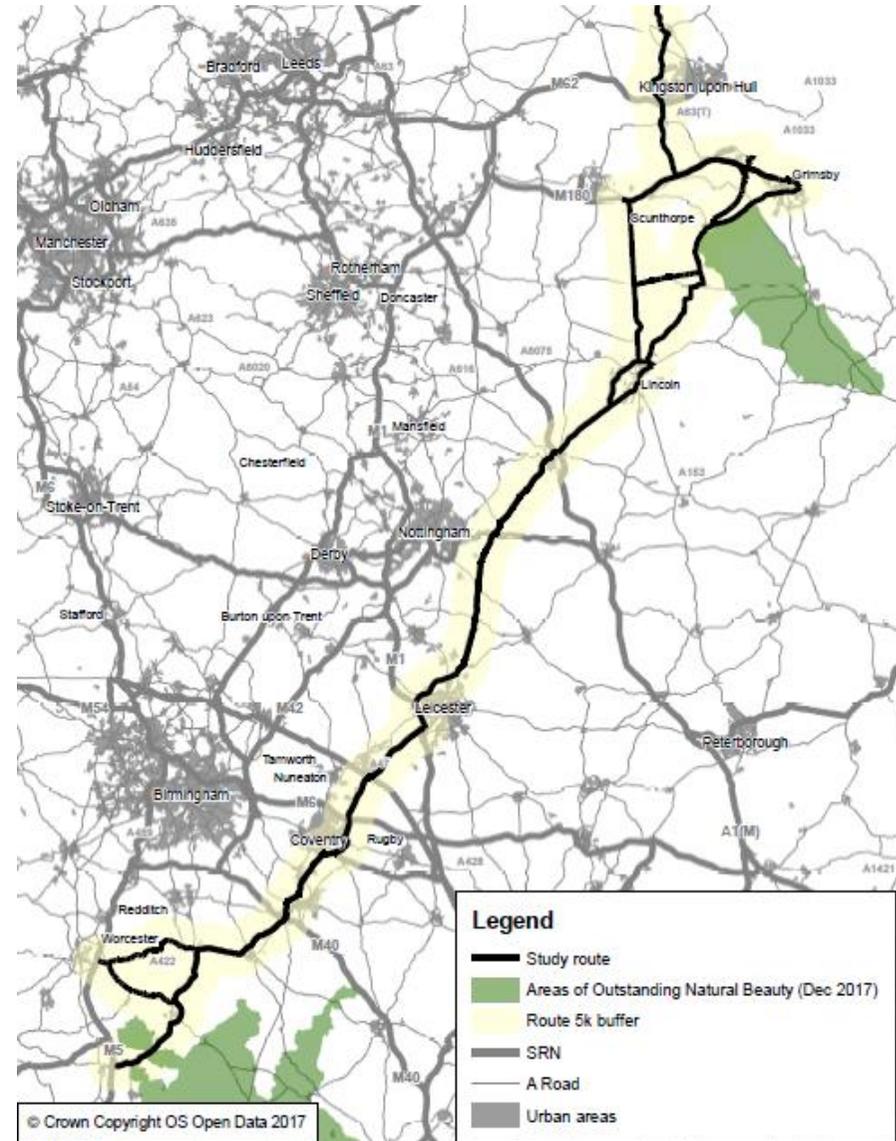


Figure B5: Designated heritage sites

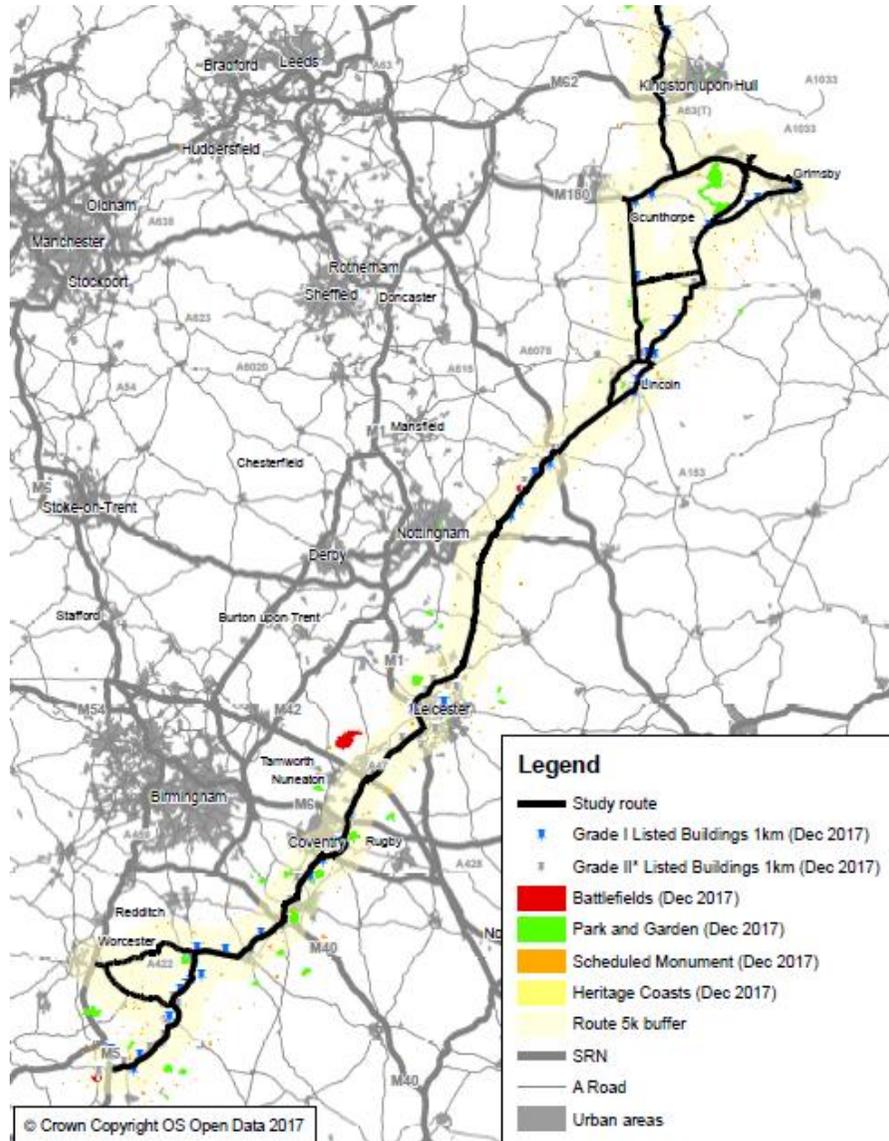
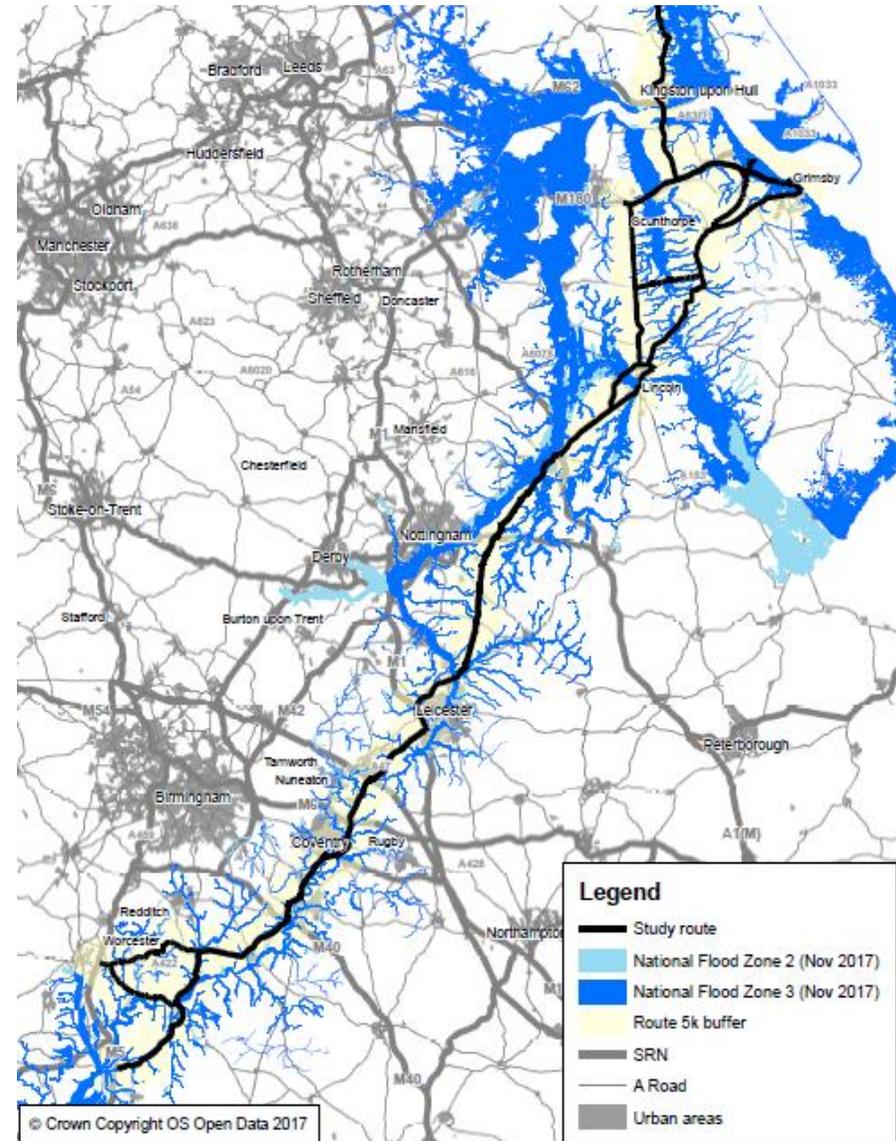


Figure B6: Flood zones

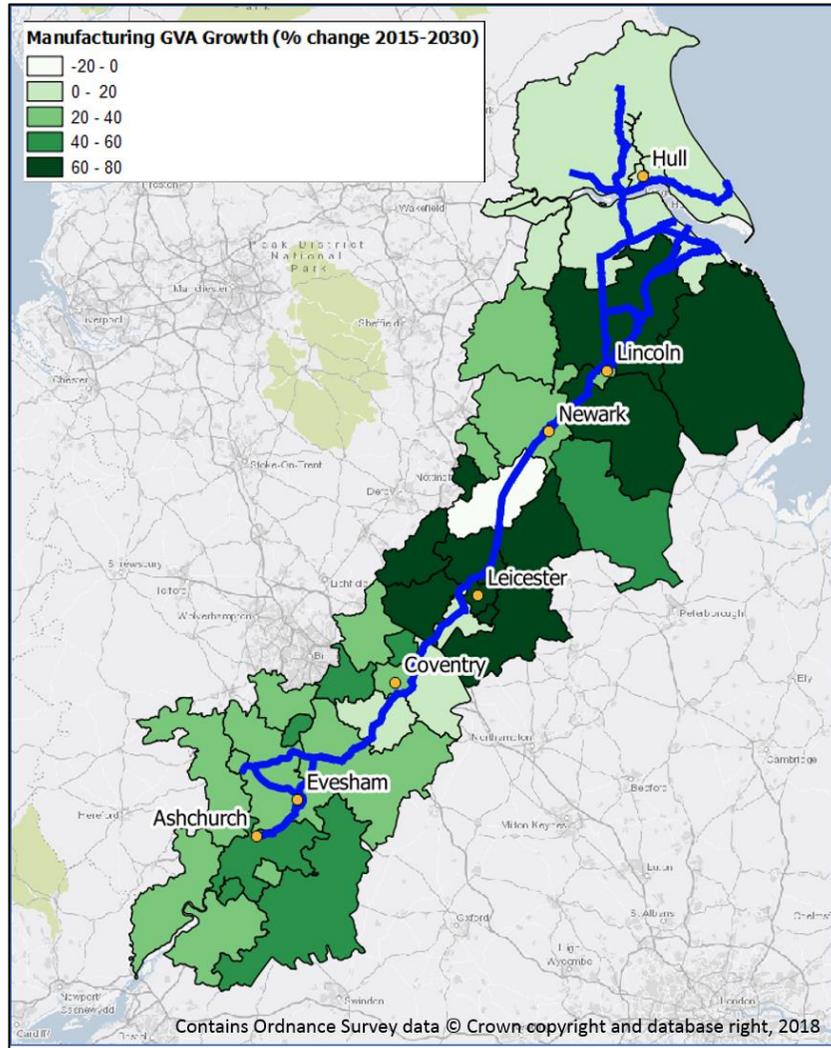


# Appendix C

## Additional economic evidence

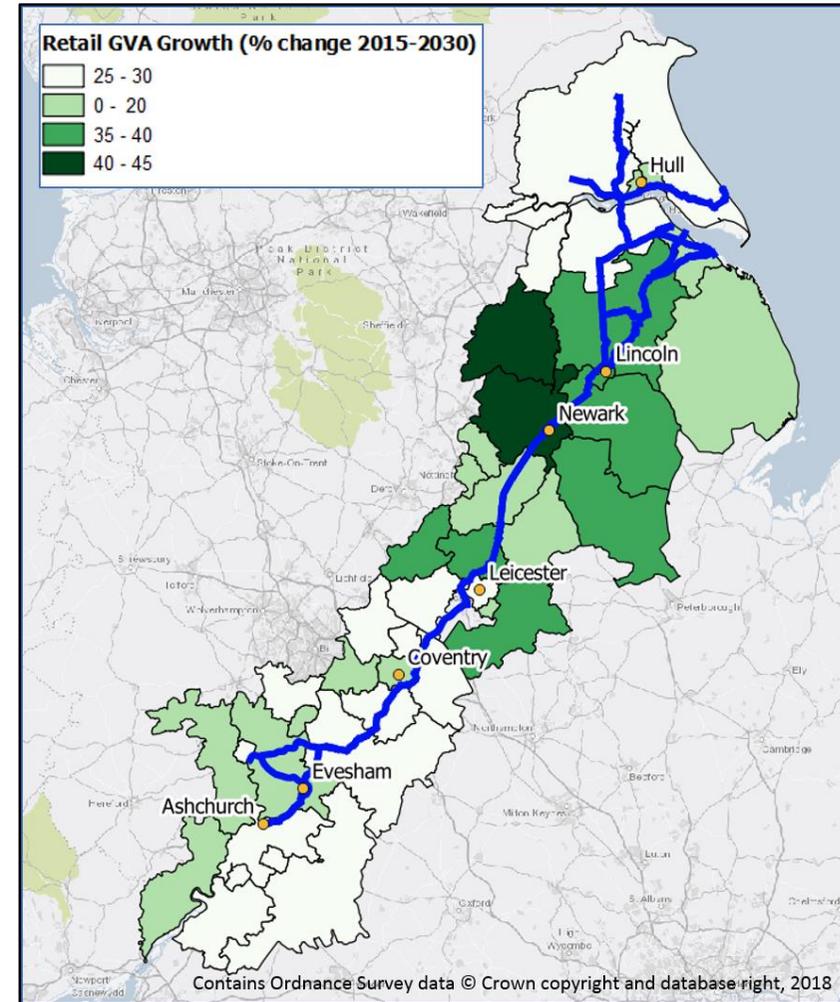
## Economic growth forecasts

Figure A1 Growth in manufacturing (% change 2015-2030)



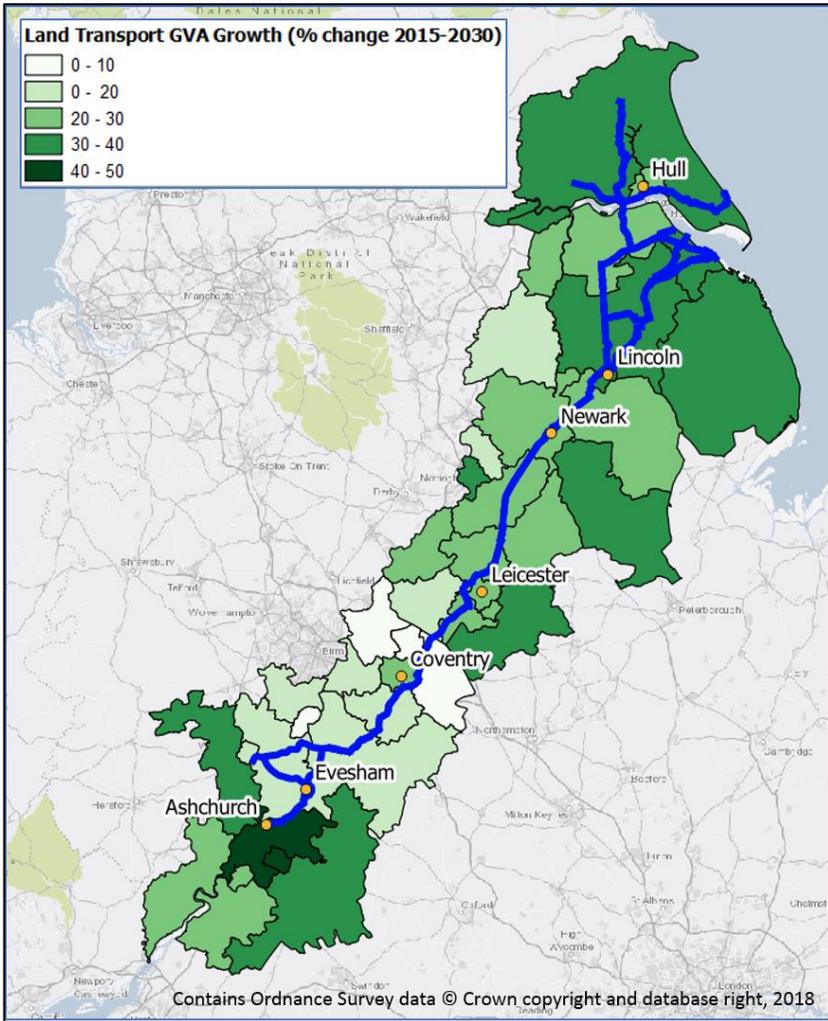
Source: Cambridge Econometrics, Economic Forecasts 2016

Figure A2: Retail GVA growth along (% change 2015 – 2030)



Source: Cambridge Econometrics, Economic Forecasts 2016

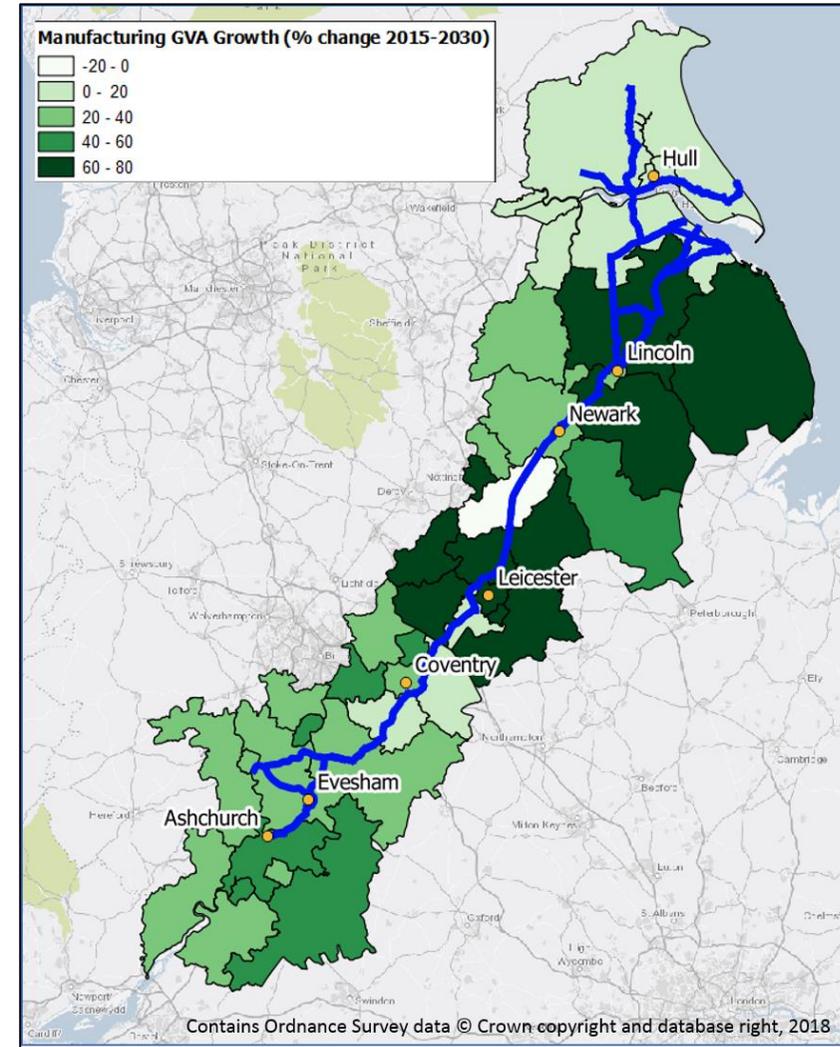
Figure A3: Land Transport GVA growth (% change 2015-2030)



Source: Cambridge Econometrics, Economic Forecasts 2016

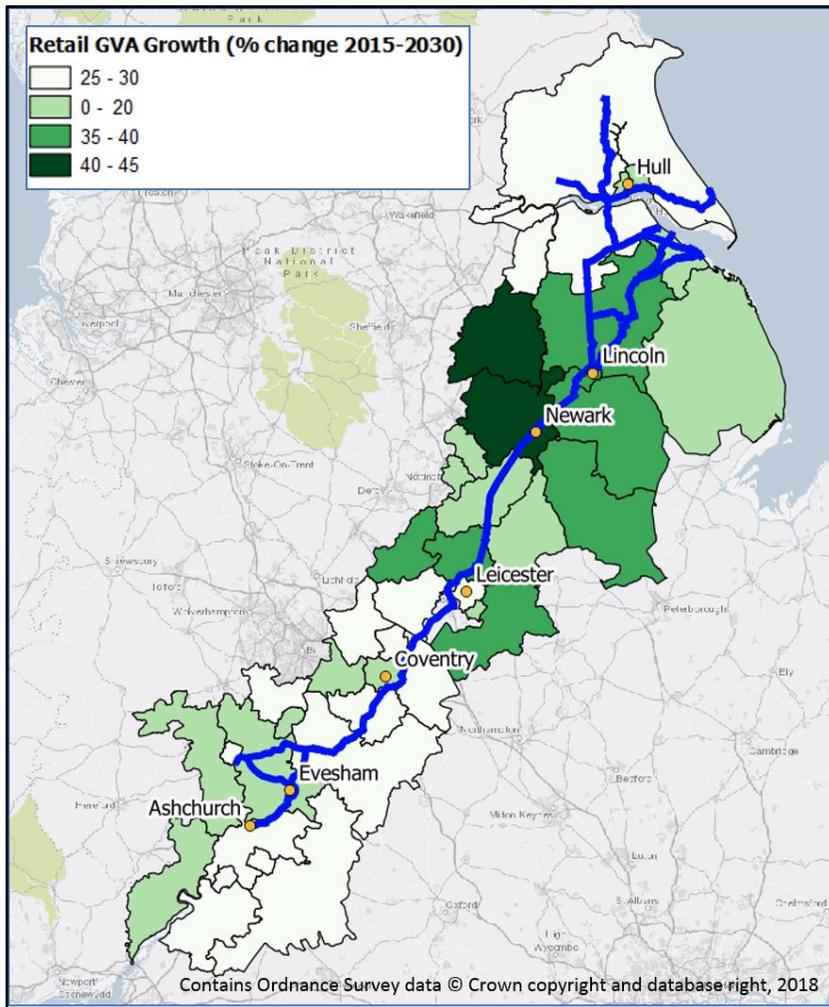
### Forecast change by sector

Figure A4: Change in manufacturing GVA (% change 2015-2030)



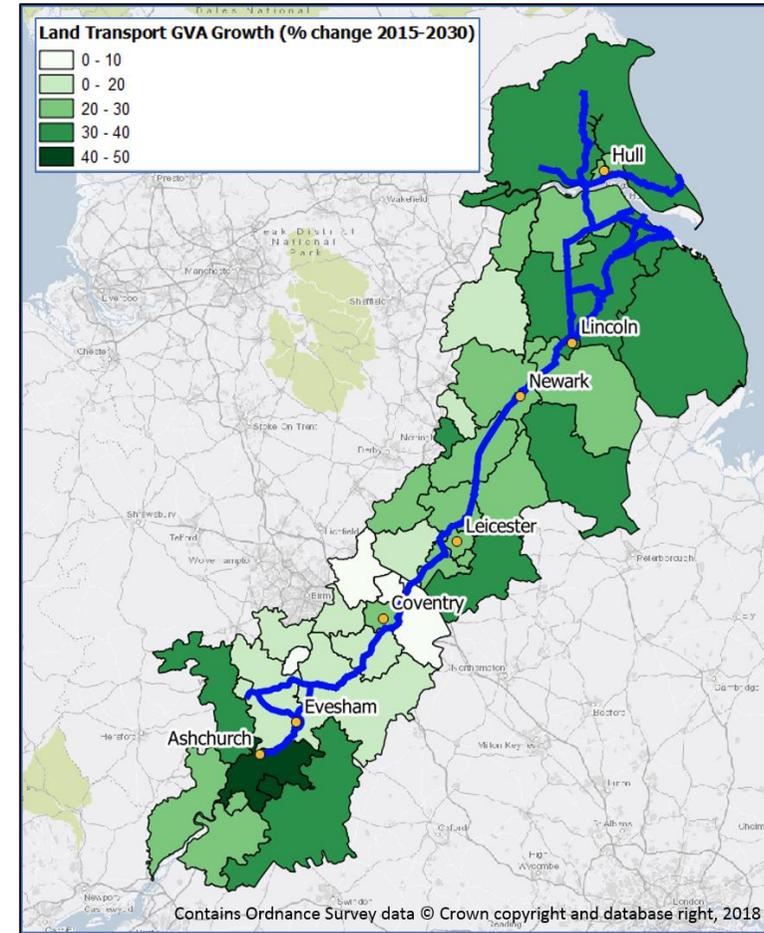
Source: Cambridge Econometrics, Economic Forecasts 2016

Figure A5: Change in retail GVA (% change 2015 – 2030)



Source: Cambridge Econometrics, Economic Forecasts 2016

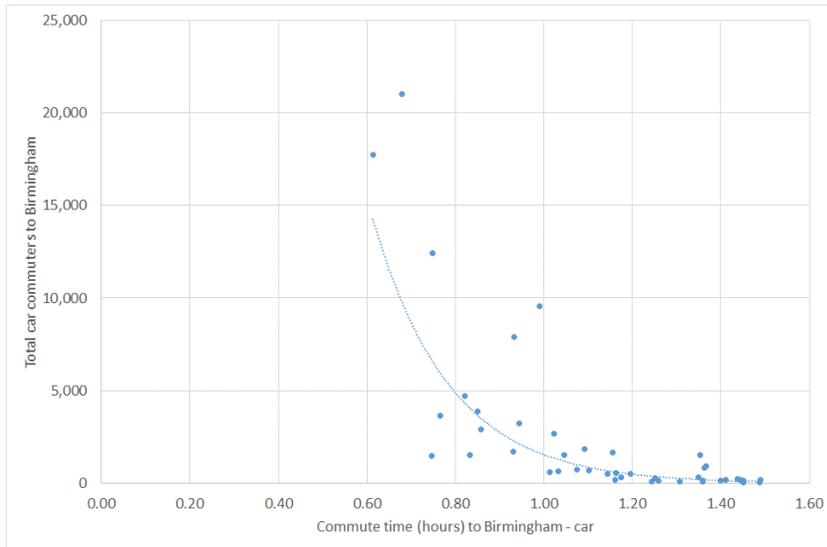
Figure A6: Change in Land Transport GVA (% change 2015-2030)



Source: Cambridge Econometrics, Economic Forecasts 2016

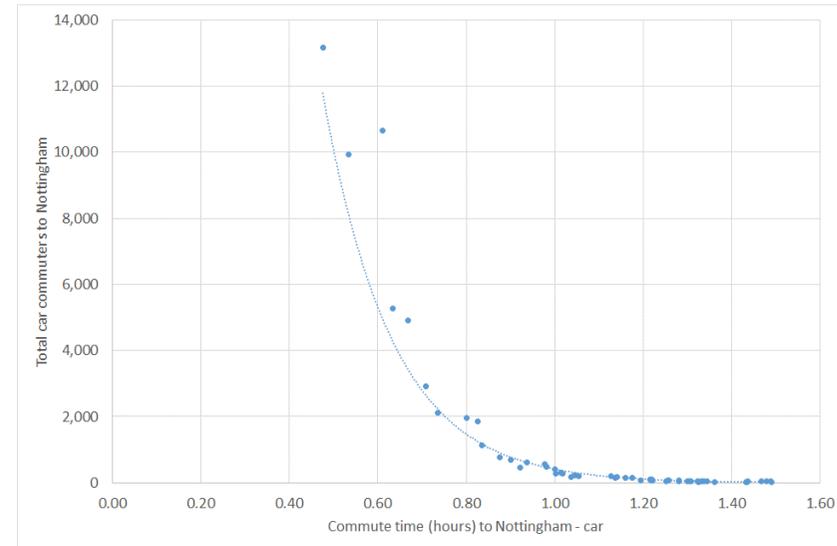
## Commuting distance decay curves

Figure A7: Commute time to Birmingham vs number of car commuters to Birmingham, by local authority



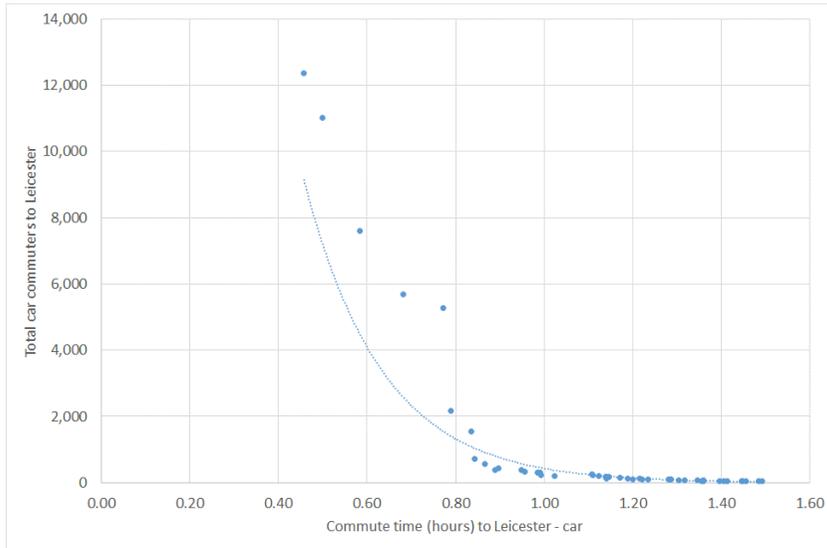
NB excludes Birmingham as an origin location

Figure A8: Commute time to Nottingham vs number of car commuters to Nottingham, by local authority



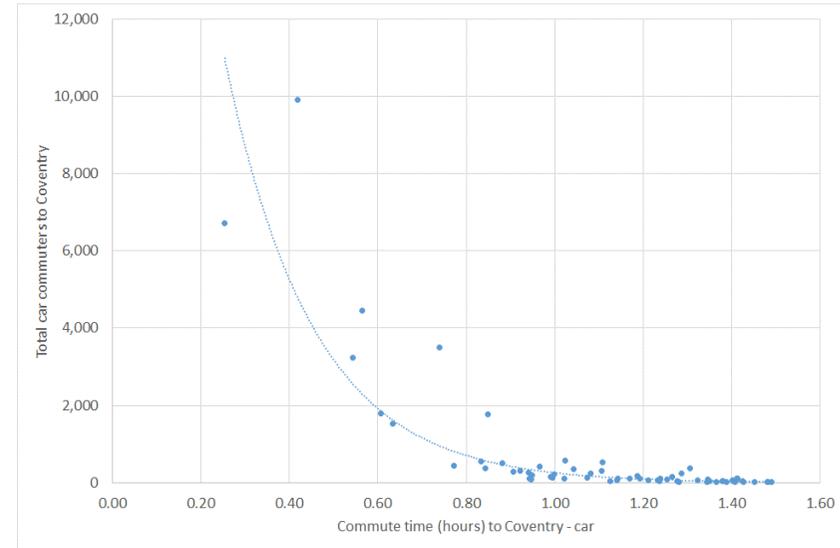
NB excludes Nottingham as an origin location

Figure A9: Commute time to Leicester vs number of car commuters to Leicester, by local authority



NB excludes Leicester as an origin location

Figure A10: Commute time to Coventry vs number of car commuters to Coventry, by local authority

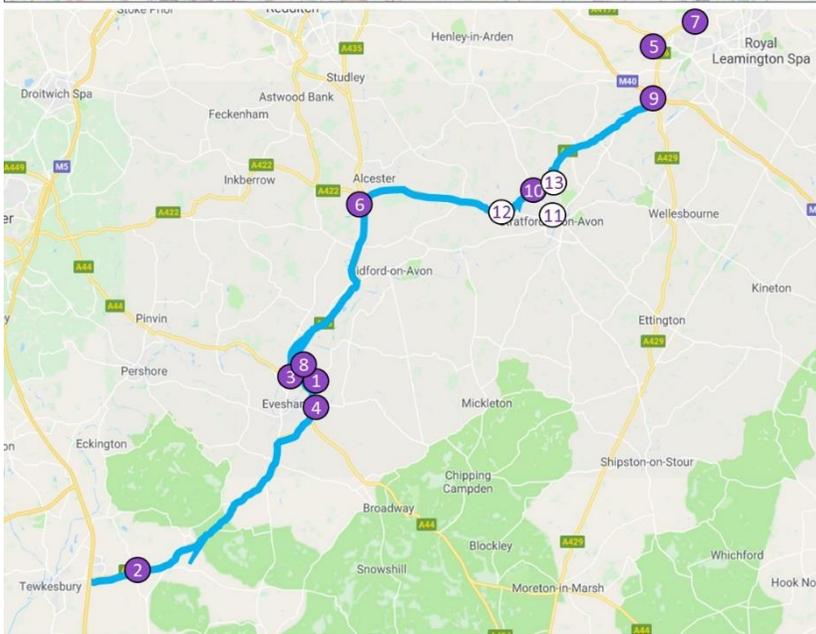
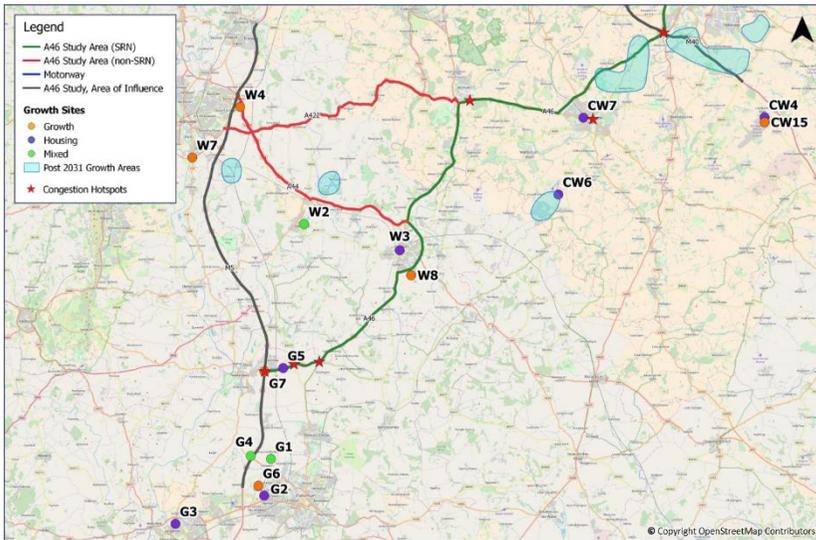


NB excludes Coventry as an origin location

## **Appendix D**

### **Growth sites and key traffic bottlenecks**

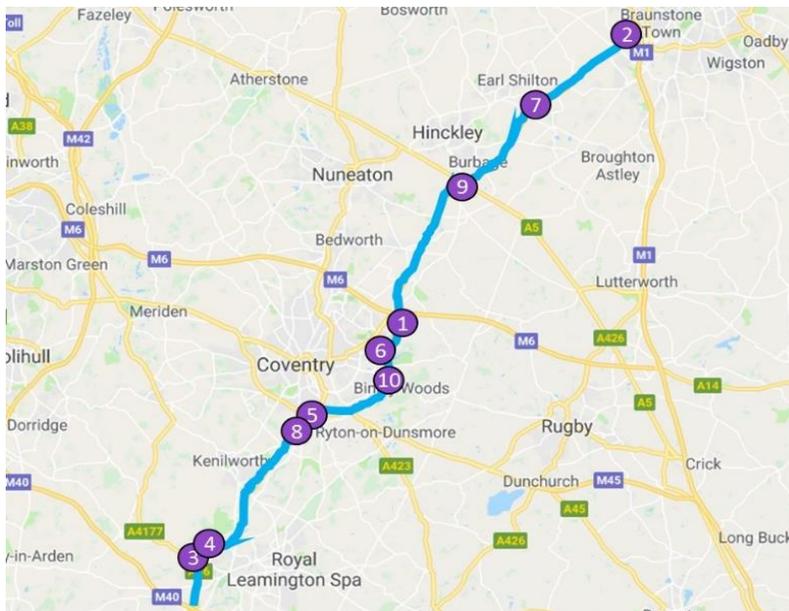
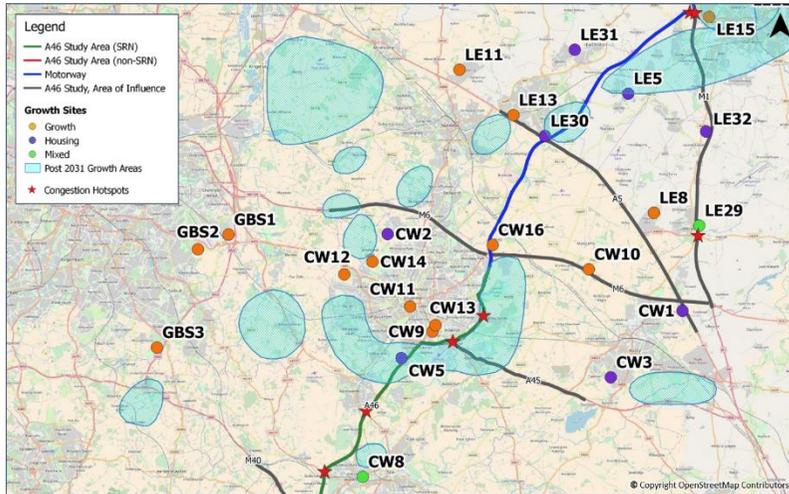
Figure D1: Section 1 Growth sites and bottlenecks, 2017



ID	Site	Homes	Jobs	Source
G1	Elm Park	4,185	4,115	M-RTM, Stakeholder Feedback
G2	West Cheltenham (phase 1)	1,100		Stakeholder Feedback
G3	Northern Gloucester	1,500		Stakeholder Interview
G4	M5 Junction 10	4,500	6,500	Strategic Economic Plan
G5	Ashchurch (MoD)	7,000	TBC	Tewkesbury Borough Council Ashchurch Master Plan
G6	Cyber Park (GCHQ)		7,000	Stakeholder Interview
G7	M5 Junction 9		3,300	Strategic Economic Plan
W2	Pershore	700	TBC	Strategic Economic Plan/ Stakeholder Feedback
W3	Evesham	1,400		Strategic Economic Plan/ Stakeholder Feedback
W4	Worcester Technology Park		5,543	Strategic Economic Plan
W5	Malvern Hills Science Park Expansion		9,600	Strategic Economic Plan
W7	Southern Link Road	2,800	TBC	Strategic Economic Plan/ Stakeholder Feedback
W8	Evesham - Vale Park		1,281	Strategic Economic Plan
CW4	Gaydon, Lighthorne Heath, Europa Way	11,000		Stakeholder Interview
CW6	Long Marston Airfield	12-13,000		Stakeholder Interview/ Feedback
CW7	Stratford Upon Avon	TBC		Stakeholder Interview
CW8	Warwick/Leamington Spa	TBC	TBC	Stakeholder Interview
CW15	JLR - Gaydon Site		1,700	Stakeholder Interview/ Coventry Telegraph

Sites highlighted in purple have been identified by Midlands Connect as strategic growth sites

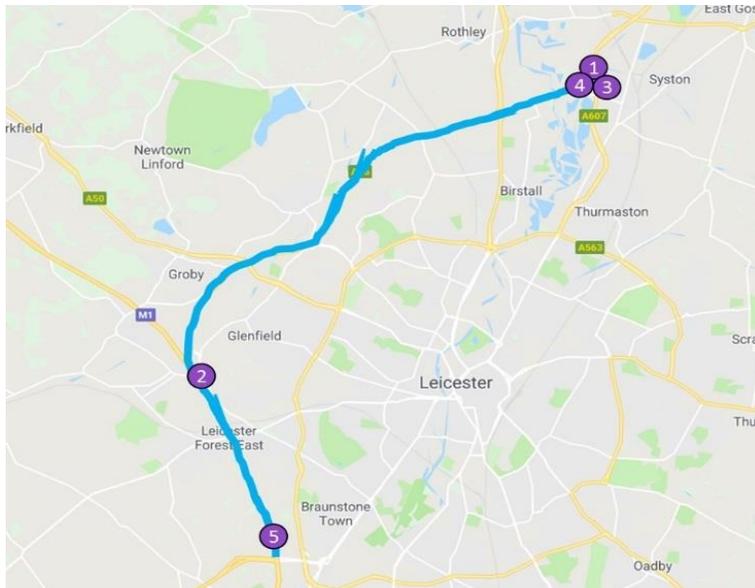
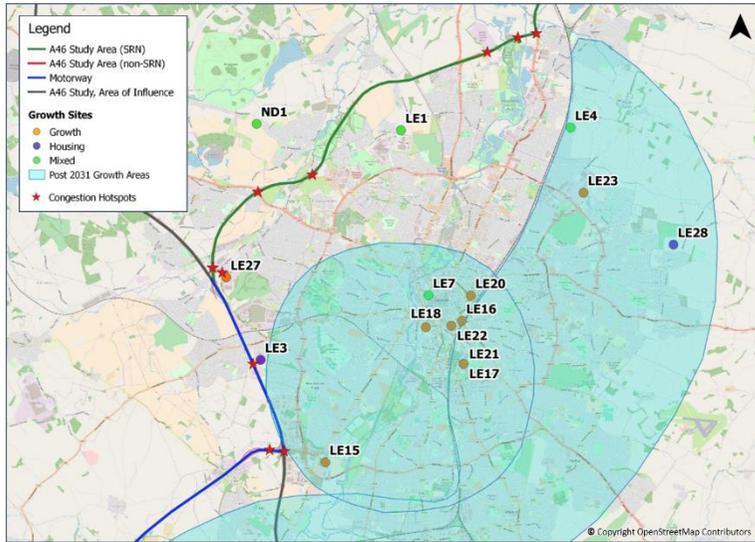
Figure D2: Section 2 Growth sites and bottlenecks, 2017



ID	Site	Homes	Jobs	Source
CW1	A5 - Rugby Radio Station	6,200		M-RTM
CW2	Keresley SUE	3,100		PRISM
CW3	South West Rugby	5,000		Midlands Housing
CW5	Kings Hill	4,000		Interview/ Cov. Telegraph
CW8	Warwick/Leamington Spa	TBC	TBC	Stakeholder Interview
CW9	Whitley Business Park		15,000	Motorway Hub Study
CW10	Ansty Park		10,000	Motorway Hub Study
CW11	Friargate		15,000	Motorway Hub Study
CW12	Eastern Green		4,000	PRISM
CW13	Whitley South		10,000	Motorway Hub Study
CW14	Lyons Park		3,000	Motorway Hub Study
CW16	National Battery Manufacturing Dev. Facility		10,000	Stakeholder Interview/ Cov. Telegraph
GBS1	UK Central, (Solihull)		100,000	MC Strategy
GBS2	Damson Parkway		7,256	PRISM
GBS3	Blythe Valley		3,294	PRISM
LE5	South West Leicestershire	4,000		Strategic Economic Plan
LE9	A5 Magna Park		5,910	M-RTM, Stakeholder feedback
LE12	Horiba-MIRA Technology Park Enterprise Zone		2,000	Strategic Economic Plan
LE14	Centre for Connected Autonomous Vehicle		TBC	Leicester & Leicestershire 2050: Vision for Growth
LE16	Fosse Park Retail Centre		TBC	Leicester & Leicestershire 2050: Our Vision for Growth
LE30	East of Lutterworth	1,750	TBC	Stakeholder Workshop
LE31	M69 J1	2,000		Stakeholder Workshop
LE32	Earl Shilton and Barwell Sustainable Urban Extensions	4,000		Stakeholder Workshop
LE33	Garden Village near Broughton Astley	2,500		Stakeholder Workshop

Sites highlighted in purple have been identified by Midlands Connect as strategic growth sites

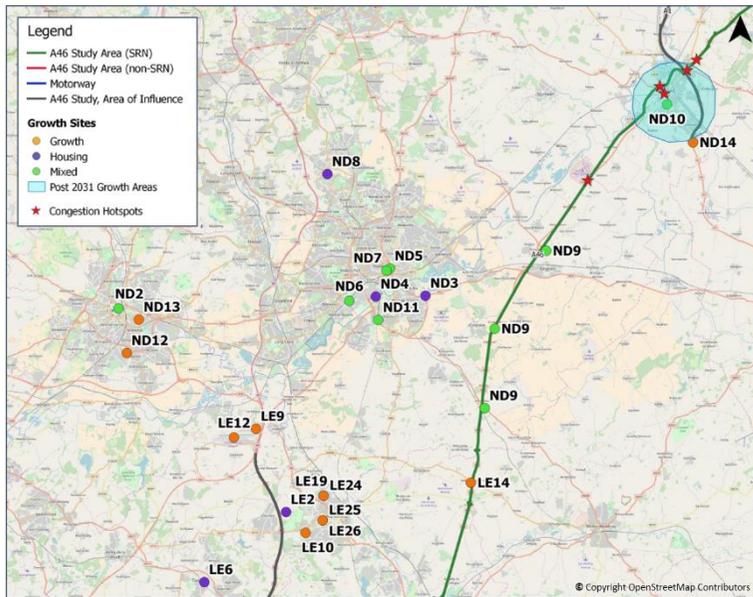
Figure D3: Section 3 growth sites and bottlenecks, 2017



ID	Site	Homes	Jobs	Source
LE1	Ashton Green Leicester (SUE)	3,000		M-RTM
LE3	Lubbesthorpe Planned New Community, Blaby	4,256		M-RTM
LE4	A46 - NE of Thurmaston / NE of Leicester SUE	4,500		M-RTM
LE7	Leicester Urban Area	24,000		Strategic Economic Plan
LE17	City Centre and Strategic Regeneration Area in Leicester		TBC	Leicester & Leicestershire 2050: Our Vision for Growth
LE18	Leicester University		TBC	
LE19	De Montfort University		TBC	
LE22	Global Space Technologies Hub		TBC	
LE23	Space Research Centre & Earth Observation Centre		TBC	
LE24	IBM Client Innovation Centre		TBC	
LE25	Leicester Enterprise Zone		TBC	
LE28	Optimal Point		TBC	Stakeholder Interview
LE29	Scraptoft North	19,000		Stakeholder Workshop
ND1	A453 - Land E & W of Nottingham Road	3,000		M-RTM

Sites highlighted in purple have been identified by Midlands Connect as strategic growth sites

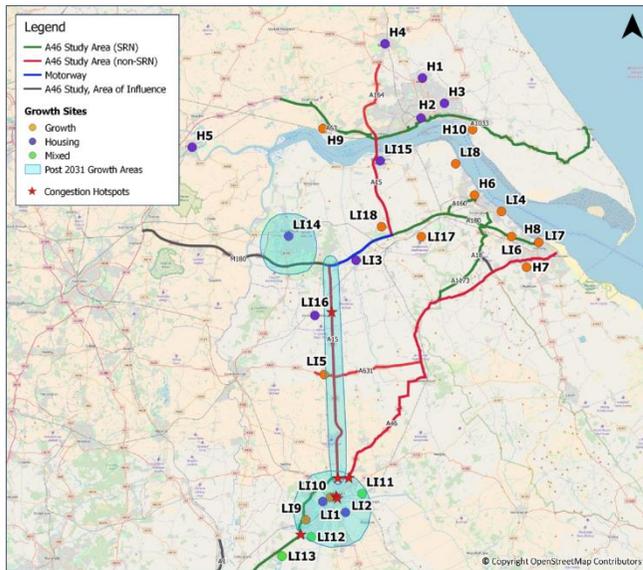
Figure D4: Section 4 Growth sites and bottlenecks, 2017



ID	Site	Homes	Jobs	Source
LE2	M1 - Land at West of Loughborough (SUE)	3,500		M-RTM
LE6	Coalville Growth Corridor	5,275		Strategic Economic Plan
LE10	East Midlands Gateway Strategic Rail Freight Interchange		7,000	Strategic Economic Plan
LE11	Loughborough Science and Enterprise Park		4,000	Strategic Economic Plan
LE13	East Midlands Airport		TBC	Strategic Economic Plan
LE15	Agri-Food and Drink Processing		TBC	
LE21	Charnwood Campus		3,000	
LE26	Loughborough Enterprise Zone		TBC	
LE27	Loughborough University		TBC	
LE28	Life Sciences Opportunity Zone		TBC	
ND2	Our City Our River, Derby	600	6,000	
ND3	Gamston	3,000		
ND4	Waterside	2,000		Stakeholder Interview
ND5	Creative Quarter, Nottingham	3,350	7,103	Strategic Economic Plan
ND6	Nottingham Enterprise Zone	365	6,871	Strategic Economic Plan
ND7	Broadmarsh and Southern Gateway	900	9,900	Strategic Economic Plan
ND8	Rolls Royce site, Hucknall	900	2,200	Strategic Economic Plan
ND9	A46 corridor projects, Rushcliffe	3,500	2,000	Strategic Economic Plan
ND10	Newark future	8,000	2,465	M-RTM
ND11	A52 Clifton	TBC	TBC	Stakeholder Interview
ND12	Infinty Park		2,750	
ND13	Derby A52 Pride Park		3,200	
ND14	Furnwood business park		TBC	

Sites highlighted in purple have been identified by Midlands Connect as strategic growth sites

Figure D5: Section 5 Growth sites and bottlenecks, 2017



ID	Site	Homes	Jobs	Source	
L11	Western Growth Corridor	3,200		Midlands Housing	
LI2	South East Quadrant (Canwick Heath)	3,500		Midlands Housing	
LI3	Brigg	800		Strategic Economic Plan	
LI4	Northern Lincolnshire Enterprise Zones		4,100	Strategic Economic Plan	
LI5	Hemswell Cliff		TBC	Strategic Economic Plan	
LI6	Europarc		TBC		
LI7	Port of Grimsby East		7,000		
LI8	Able Business and Logistics Park		5,340		
LI9	Teal Park		TBC		
LI10	Lincoln Science and Innovation Park		TBC		
LI11	North East Quadrant	1,400			
LI12	South West Quadrant	1,600			Report Feedback
LI13	Witham St Hughes Brigg	1,355			Report Feedback
LI14	Lincolnshire Lakes	6,000			Stakeholder feedback
LI15	Barton-upon-Humber	800		Stakeholder feedback	
LI16	Kirton in Lindsey	500		Stakeholder feedback	
LI17	Humberside Airport		TBC	Stakeholder feedback	
LI18	Elsham Wold Industrial Estate		TBC	Stakeholder feedback	
H1	Kingswood	3,400		Strategic Economic Plan	
H2	Hull City Centre	3,200		Strategic Economic Plan	
H3	East and West Hull	3,500		Strategic Economic Plan	
H4	Beverley	2,500		Strategic Economic Plan	
H5	Goole	1,000		Strategic Economic Plan	
H6	ABLE Marine Park		1,700	Strategic Economic Plan	
H7	Scartho Top		1,000	Stakeholder Interview	
H8	Port of Grimsby		244		
H9	Brough		TBC		
H10	Green Port Hull and Paull		1,000		

Sites highlighted in purple have been identified by Midlands Connect as strategic growth sites

Table D1: Top 10 'traffic bottlenecks' Section 1: M5 to M40, 2017

Ref & rank	Location	Occurs	Avg. duration (mins)	Avg. max. queue length (km)	Events during 2017
1	Billesley	AM & PM	21	3.37	835
2	M40 J15	AM	23	6.21	223
3	Longbridge r'bout	AM	33	7.13	43
4	M5 J9	PM	29	3.31	55
5	A46 / A435	Night	47	5.84	19
6	A46 / B4079	-	6	4.33	164
7	A46 / A4177 / A425	AM	37	6.85	16
8	A3400 / A422	IP	31	3.66	28
9	A46 / Primrose Lane	Night	27	5.25	20
10	A46 / Austin Road	-	18	1.87	70

Table D2: Top 10 worst traffic 'bottlenecks' Section 2: M40 to M1, 2017

Ref & rank	Location	Occurs	Avg. duration (mins)	Avg. max. queue length (km)	Events during 2017
1	M40 J15 / A429 / A46	AM	28	7.35	164
2	A46 / Oak Tree Road	AM	47	4.29	138
3	A46 / Coventry Eastern Bypass	AM	44	4.75	107
4	A46 / A4177 / A425	AM	22	4.43	150
5	A429 / M40 J15 / A46	-	36	7.77	37
6	A46 / A428	AM	35	4.47	26
7	A46 / A45 / B4110	AM	48	11.67	7
8	A46 / A452	IP	31	4.03	31
9	A46 / A428	AM	39	4.6	18
10	A46 near. Hampton Magna	PM	17	5.35	21

Table D3: Top 10 worst traffic 'bottlenecks' Section 3: M1 to Hobby Horse (A607), 2017

Ref & rank	Location	Occurs	Avg. duration (mins)	Avg. max. queue length (km)	Events during 2017
1	M69 J3 / A5460 / M1 J21	AM	29	6.56	358
2	M1 J21 / A5460 J21 / M69 J3	AM	36	6.92	181
3	M1 J21A / A46 / B5380	AM	32	5.22	191
4	M1 J21 / A5460 / M69 J3	AM	29	5.68	142
5	M1 / Baines Lane	AM	21	5.19	160
6	A46 near. Glenfield	AM	18	3.93	225
7	M1 near. Junction 21A	Night	27	5.2	35
8	A46 / A607	AM	26	2.55	73
9	A5630 / A46 / Leicester Road	AM	50	5.3	10
10	M1 J20 / A4304 / A4303	Night	31	13.91	6

Table D4: Top 10 worst traffic 'bottlenecks' Section 4: Hobby Horse (A607) to A1, 2017

Ref & rank	Location	Occurs	Avg. duration (mins)	Avg. max. queue length (km)	Events during 2017
1	A46 near. Glenfield	AM	31	4.69	150
2	M1 J21A / A46 / B5380	AM	78	13.15	6
3	A46 / A607	AM	25	2.6	77
4	A46 / B6166 / Fosse Road	-	24	4.38	36
5	A617 / A46 / B6326	AM	19	3.44	26
6	A5630 / A46 / Leicester Road	AM & PM	85	9.28	2
7	A46 / Wanlip Road	AM	45	3.07	7
8	A46 / A617 / B6326	AM	23	3.06	13
9	A46 / Slack's Lane	AM	70	4.09	2
10	A6 / A46 / Rectory Road	AM	77	5.01	1

Table D5: Top 10 worst traffic 'bottlenecks', Section 5: A1 to M180, 2017

Ref & rank	Location	Occurs	Avg. duration (mins)	Avg. max. queue length (km)	Events during 2017
1	A46 near. Danethrope Lane	AM	26	2.34	475
2	A46 west at A46 / A15 / B1182	AM	43	2.6	176
3	A46 west at A46 / A15 / B1182	PM	42	3.64	104
4	Newark Services Roundabout	AM	28	1.98	186
5	A17 Newark Services	IP	29	1.72	135
6	Ermine Street near Kirton in Lindsey	IP	23	3.35	74
7	A57 near. Brayford Pool	AM	33	3.91	44
8	A1434 / A46 / Middle Lane	PM	21	3.35	73
9	Lincoln Central Train Station	AM	22	2.97	71
10	A46 / A15 / B1226 at Ermine West	AM & PM	20	2.2	105

## **Appendix E**

### **SRN-dependent economic sectors**

## SRN-dependent sectors

The SRN plays a fundamental role of in the operation and competitiveness of particular sectors of the economy that depend on the road network for the success of their business. This note explains the definition of SRN dependent sectors and the rationale for their inclusion.

Cambridge Econometrics determined the sectors of the economy that are the primary users of road transport services, based upon evidence on supply chain linkages between different parts of the economy and sectoral interdependencies in the UK Input-Output tables<sup>23</sup>. These tables capture the linkages between different actors in the economy, including the value of inputs of each sector of the economy (across 105 disaggregated sectors) into each other's sector.

The Input-Output tables were used to assess the extent to which different sectors of the economy demand land transport services (excluding rail)<sup>24</sup>. This can be viewed as a proxy for demand for the SRN, based on the assumption that the vast majority of freight is moved by specialist hauliers, and that the SRN provides the key routes used by these hauliers.

The major users of the SRN were then identified as SRN dependent sectors. Table E1 sets out each sector identified as a major user through the Input-Output analysis, and the rationale for their inclusion in this classification (i.e. why the data highlights them as being key users of the SRN). Table E2 provides further detail on the SIC codes of the sub-sectors included in each category.

Table E1: SRN-dependent sectors

Sector	Rationale for inclusion
Land transport	Businesses in the land transport sector are the primary users of the SRN – they include specialist hauliers, postal and courier activities, as well as warehousing, storage and other support activities to land transportation.
Retail & wholesale trade	Many retail goods are moved along the SRN, both when moving from distribution centre to retail location and from distribution centre direct to consumer.
Primary materials	Primary materials include extraction of coal, petroleum, natural gas, metal ores and other mining & quarrying activity, reflecting the fact that large quantities of these goods are moved using the SRN.
Manufacturing – users of transport services	This sector, including manufacture of food, beverages, tobacco, wood & wood products, paper & paper products, rubber & plastic products and other non-metallic mineral products (such as construction materials) are included as they are substantial users of land transport services, with large quantities of the manufactured goods being moved along the SRN.
Manufacturing – reliant on other sectors which are users of transport services	This sector, which includes motor vehicles, includes sectors that take a substantial proportion of inputs from the manufacturing sectors (identified above) that are heavy users of the SRN. These firms are therefore indirectly dependent upon the SRN.
Construction	Construction is both a direct user of the SRN (in terms of moving vehicles used in construction) and heavily reliant on inputs of manufactured goods (such as non-metallic mineral products) which use the SRN.

Table E2: SRN-dependent sectors: Standard Industrial Classification (SIC) Codes

<sup>23</sup> See <http://www.ons.gov.uk/economy/nationalaccounts/supplyandusetables/datasets/inputoutputsupplyandusetables>

<sup>24</sup>

Category	SIC07 Sector(s)
Land transport	49 Land transport
Warehousing and storage	52.1 Warehousing and storage
Support activities for transportation	52.2 Support activities for transportation
Postal and courier activities	53 Postal and courier activities
Retail & wholesale trade	45 Wholesale And Retail Trade And Repair Of Motor Vehicles And Motorcycles
	46 Wholesale Trade, Except Of Motor Vehicles And Motorcycles
	47 Retail Trade, Except Of Motor Vehicles And Motorcycles
Primary materials	05 Mining of coal and lignite
	06 Extraction of crude petroleum and natural gas
	07 Mining of metal ores
	08 Other mining and quarrying
	09 Mining support service activities
Manufacturing – users of transport services	10 Manufacture of food products
	11 Manufacture of beverages
	12 Manufacture of tobacco products
	16 Manufacture of wood and of products of wood and cork
	17 Manufacture of paper and paper products
	22 Manufacture of rubber and plastic products
	23 Manufacture of other non-metallic mineral products
Manufacturing – reliant on other sectors which are	29 Manufacture of motor vehicles, trailers and semi-trailers

Category	SIC07 Sector(s)
users of transport services	
Construction	41 Construction of buildings
	42 Civil engineering
	43 Specialised construction activities

