Appendix 1: Transport CPRE Leicestershire (UR 20038675)

Extract from Midlands Connect A46 Report

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:

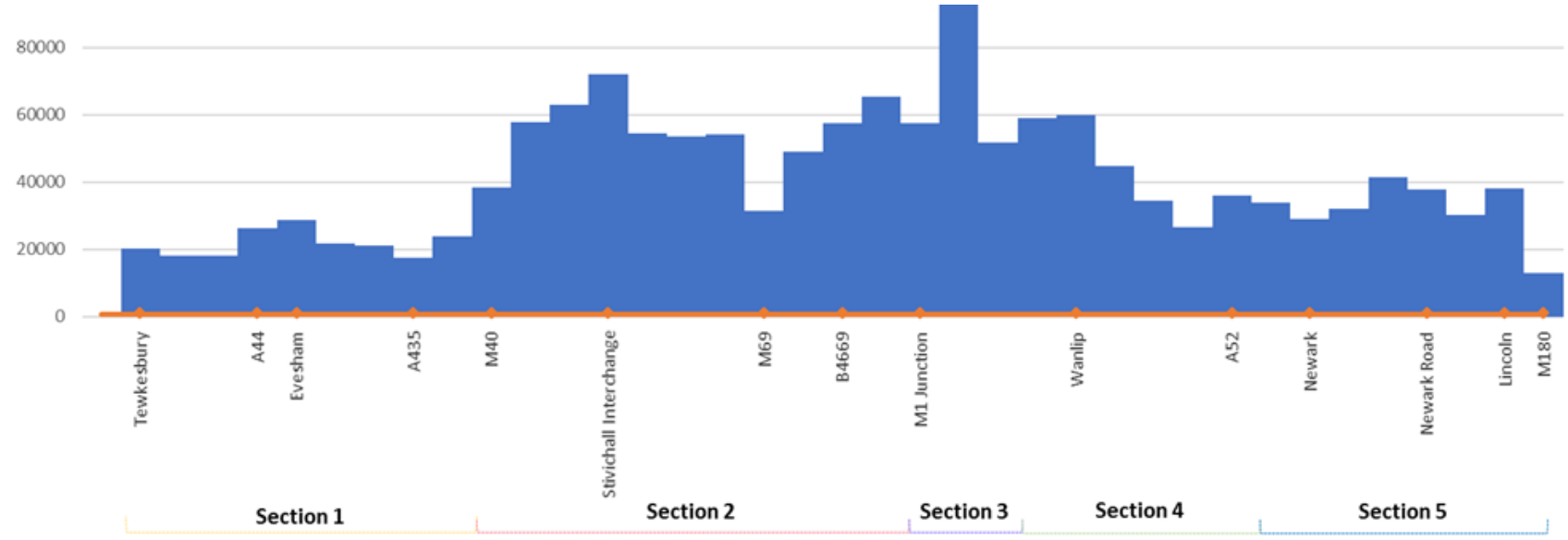
- A46 average speeds and journey times;
- analysis of alternative routes;
- analysis of bottlenecks;
- analysis of journey time reliability;
- traffic flows and travel patterns;
- summary of traffic conditions by section of the A46; and
- community impacts and environmental designations.

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.

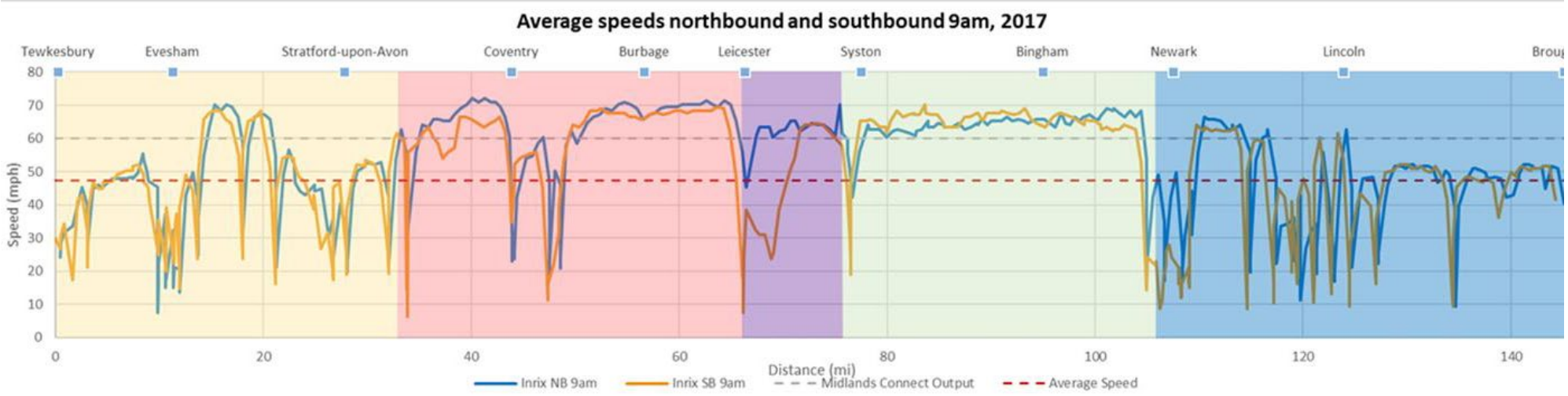
3.3 Average speeds and journey times

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

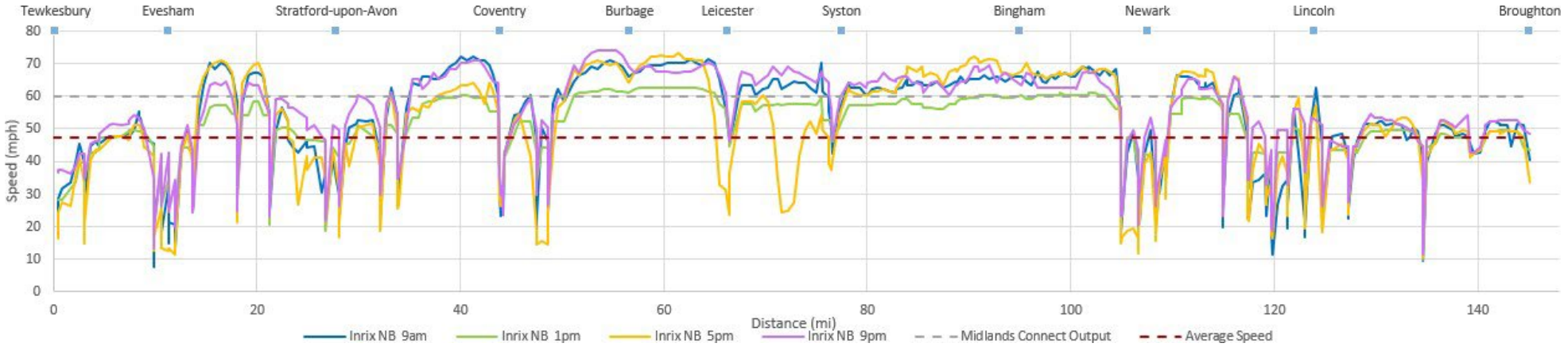
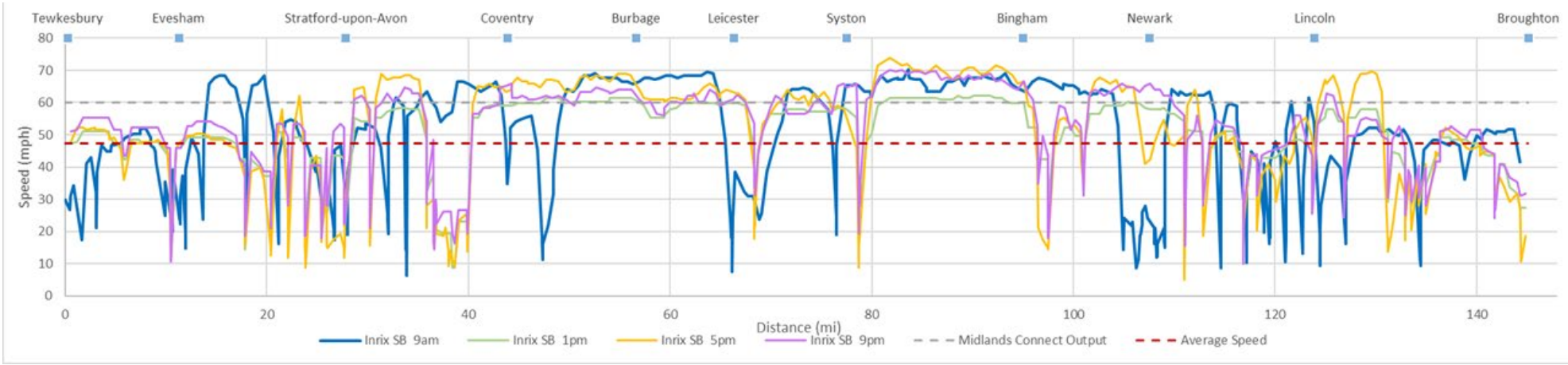


Figure 3-4: Average southbound speeds by time period, weekdays, November 2017



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.

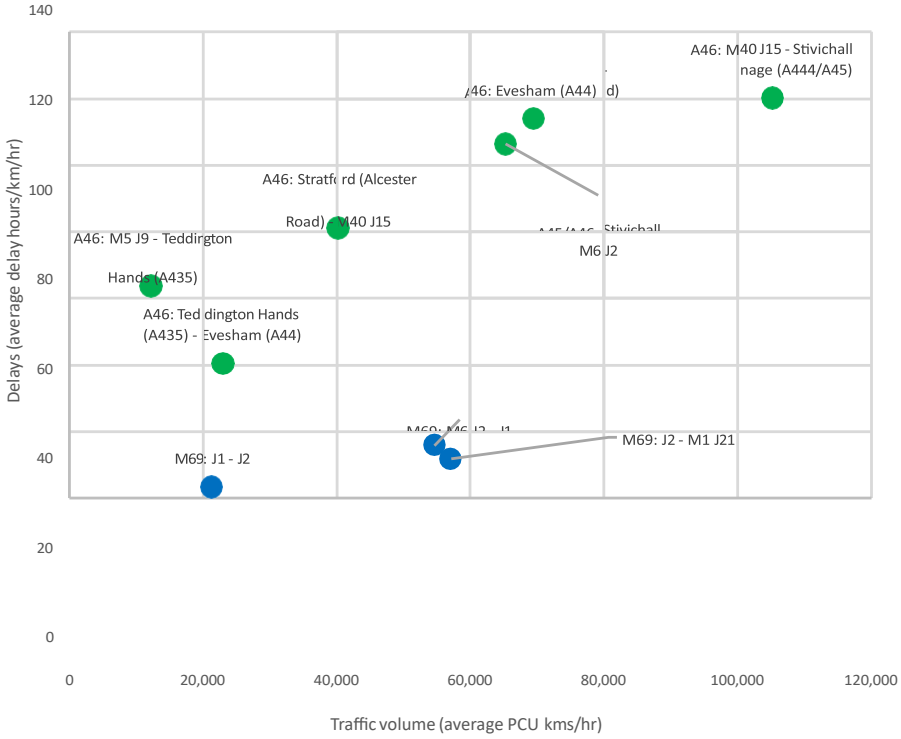
Average speeds are highly variable where there are at-grade roundabouts and/or sections of single carriageway. For example, lower speeds can be seen around Evesham, Stratford, Warwick, Coventry, Leicester, Newark and Lincoln.

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:

- an 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

Figure 3-8: VCR 2015 base year, morning peak period - Leicester

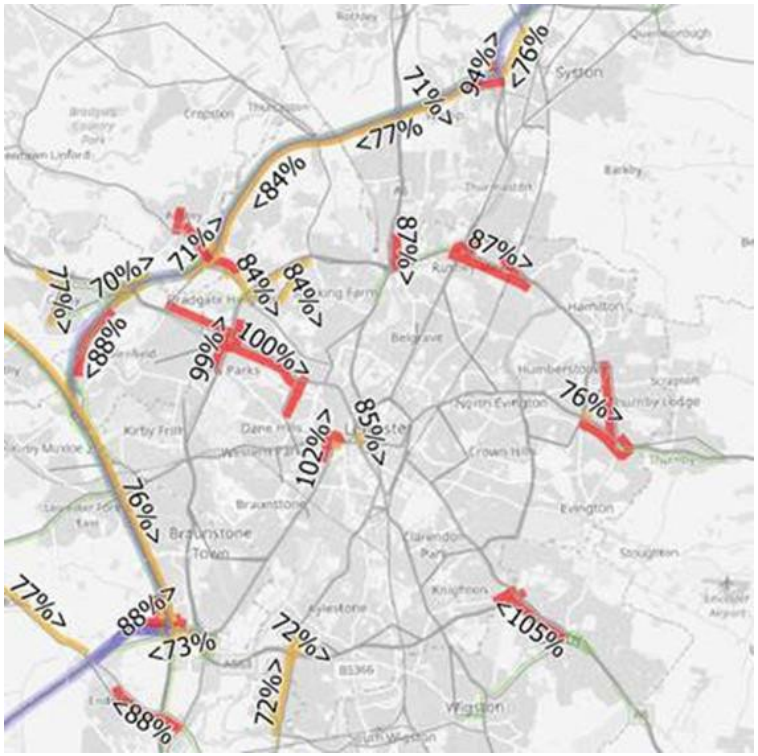


Figure 3-9: VCR 2015 base year, morning peak period - Lincoln