A27 Worthing and Lancing improvements: Traffic Modelling Summary

Introduction

This note describes the purpose and application of traffic modelling within the context of the A27 Worthing and Lancing improvements scheme. More detailed documents covering this topic are available on our website: **www.highways.gov.uk/a27Worthing-and-Lancing** and copies will be available at the exhibitions. The traffic modelling is based on a highway model developed by our consultants, WSP, using traffic data collected in 2015.

Why do we carry out traffic modelling?

The A27 Worthing and Lancing improvements scheme may have both positive and negative impacts beyond the immediate area of the scheme itself. Therefore the proposed scheme needs to be appraised for value for money, environmental impact and highway design. Traffic modelling is used to provide forecast traffic data in terms of vehicle volumes, speeds and highway capacity. To measure these considerations we have developed a computer-based traffic model using specialist transport modelling software. The model uses data collected in 2015 to represent vehicle trips made in the West Sussex Coastal area between Chichester and Brighton, including areas of the South Downs National Park to the north of the A27 such as Steyning and Storrington. The model is capable of identifying trips of any distance, based on observed trip origin and destination. The routes taken by vehicles are estimates by the model, based upon the lowest cost in terms of time or distance, and re-routeing of vehicles in response to congestion.

The traffic model forecasts how busy our roads would be if we made any fundamental changes to the road network compared to 'do nothing'. The model forecasts how many motorists will use the new or improved route and how many will continue to use alternative routes. Some motorists are currently likely to be avoiding particular routes due to congestion and would therefore be attracted to the new or improved route once completed. This is assessed against 'doing nothing', to quantify the changes in traffic patterns as a result of the scheme.

What factors are taken into account in traffic modelling?

The A27 Worthing and Lancing improvements scheme cannot be looked at in isolation. We must also look at the combined impacts of other highway improvements that may be implemented elsewhere along the A27 corridor and across the local road network. We must also consider the impacts that new developments such as new homes, schools, employment areas and other local amenities may have on future traffic growth.

Lastly, we take into account demographic changes such as population levels and travel choice trends, including car ownership levels, which may change in the future.

Within the context of the A27 Worthing and Lancing improvements scheme, all of the above in combination will have an impact on traffic volumes in the future. The purpose of the traffic model is to measure and assess these predicted impacts, including how well the proposed scheme designs will cope with the traffic volumes as forecast by the traffic model. We also use the model to assess the economic benefits of each option in terms of journey time, vehicle operating cost and accident savings, and the environmental changes in terms of air quality and noise.

The model used to assess the Worthing and Lancing improvements takes account of other committed highway schemes, such as those planned or under construction by West Sussex County Council. However the A27 Chichester Improvements scheme (which has been

cancelled by the Government) and the planned A27 Arundel bypass scheme are not included in the traffic model because each scheme has to show that it has benefits on its own.

What are the components of a traffic model?

The traffic model extent covers an area larger than the proposed scheme. This is to capture long-distance journeys with a choice of routes, and to ensure impacts that reach well beyond the scheme are captured. A traffic model has four component parts:

1. Links - which represent the roads in the network, including dual carriageways, rural roads, town centre roads and so on.
2. Nodes - which represent the junctions in the network, including roundabouts, traffic signal controlled junctions and 'give way' junctions.
3. Zones - which are geographical areas that identify where trips begin (origin) or end (destination) such as residential areas, employment areas, educational sites (schools, colleges, etc.), hospitals, shopping areas, etc. Zones are often aligned with Census or administrative boundaries.
4. The final component is the traffic itself. Traffic is represented as beginning and ending in the zones. The traffic model will route the traffic from the origins to the destinations using the route of least cost – in terms of time and fuel consumption – through the network (via the links and nodes) taking into account the other traffic in the model. In this way, the traffic model can measure congestion by calculating the delays at the nodes (junctions) and also the volumes of vehicles along the links (roads). The model also calculates the number of trips re-routing as a result of congestion.

How do we understand traffic origins and destinations?

There are several ways we collect traffic origin and destination information. One method is by roadside interviews, where drivers are stopped at interview sites along key roads in the area and asked where they began their journey and where they are travelling to. We cannot stop and ask every driver, but we interview a large enough sample to build a representative picture of travel patterns. This method was used to collect data for the current traffic model.

We also use Census data which contains anonymous information about where people live, and their method of travel to work. This provides very accurate information about commuter travel patterns.

We can also use data from mobile phone companies. They anonymously collect travel pattern data by tracking the precise position and movement of mobile phones. All of the data is aggregated and anonymised to comply with data protection laws. We have developed a regional traffic model using mobile phone data, which is currently being used to provide an updated model to assess the A27 Worthing and Lancing improvements.

How accurate is traffic modelling?

The traffic model has to be representative of current traffic volumes and journey times through the road network. The model developed for the A27 Worthing and Lancing improvements scheme is representative of traffic conditions in 2015, which is when the observed data was collected.

Department for Transport (DfT) guidance states that observed origin-destination data is valid for 6 years, so the age of the data is regarded as current. A traffic model's accuracy is measured against stringent criteria set by the DfT and when measured against those criteria (acceptability of 85% of modelled road link flows meeting the criteria compared to the observed), our traffic model showed that 92% of road link flows met the validation criteria in the AM peak and PM peak periods, and 100% in the inter-peak. When comparing the modelled journey times against observed journey times for all 3 time periods, for all journey time routes 100% met the DfT

criteria (acceptability of 85% of modelled journey time routes compared to the observed). The model validation was approved by our Traffic Appraisal, Modelling and Economics Division (now Transport Planning Group).

How do we forecast future traffic growth?

The scheme will take a number of years to design and construct, so we must base our modelling on traffic growth forecasts for the future. Traffic growth happens as a result of:

- Demographic changes, such as population growth and car ownership levels
- Land use changes, such as new homes or other new developments
- Economic activity, such as fuel prices and household income levels
- Infrastructure changes, such as new or improved highway schemes or junction improvements.

The Department for Transport (DfT) provides advice on these topics including statistics for anticipated annual traffic growth. These growth values are adjusted to take account of local planning information using growth factors by district from local plans, provided by the Government's National Trip End Model. Heavy goods vehicle growth is applied using national growth factors from the National Transport Model. The traffic growth, which is normally a percentage increase, is then applied to the 2015 Base Year traffic model to produce future year traffic models. These future year traffic models can then be used to predict the impacts and benefits of the proposed scheme.

All Highways England Road Investment Strategy (RIS) have an opening year and a horizon year. The principal checks on our design are the forecast traffic flows at the new road opening date (2023) and a 2041 horizon year.