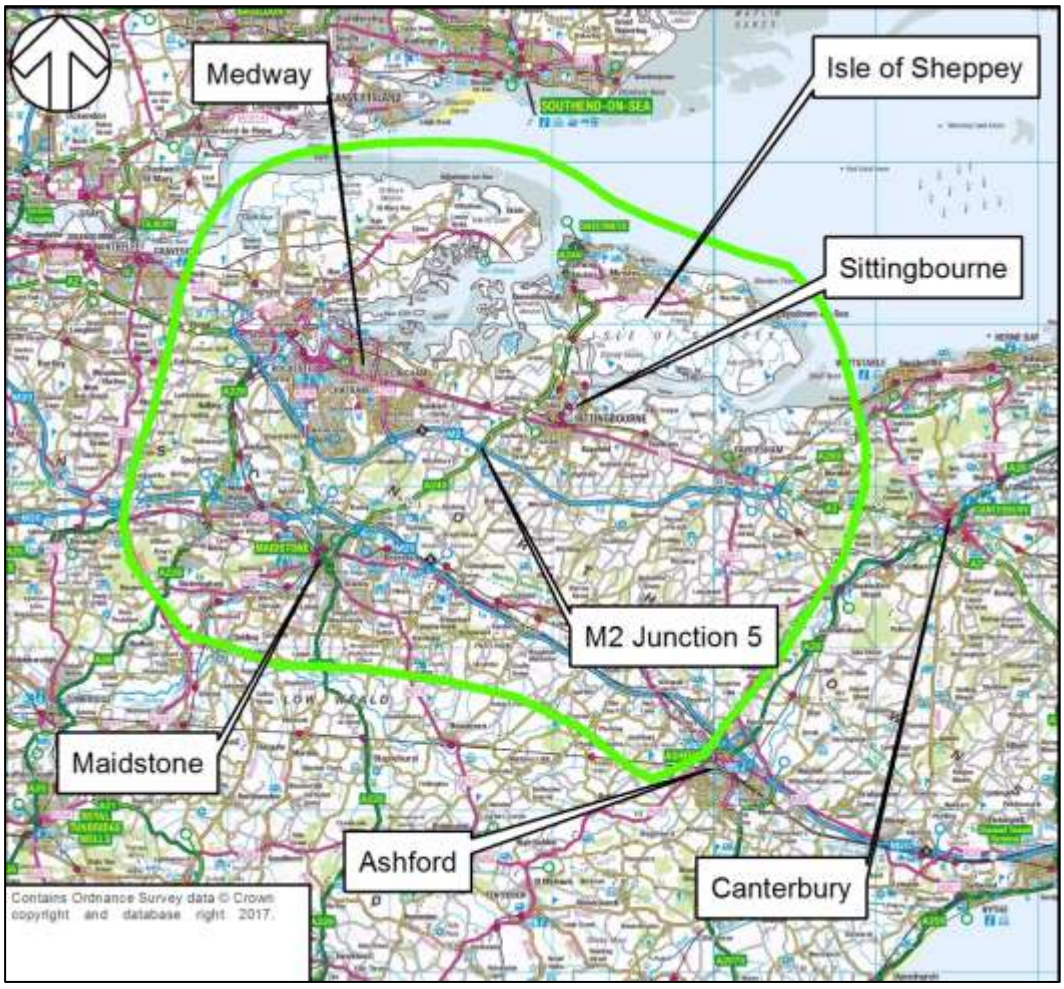
# M2 Junction 5 improvements: Traffic Modelling Summary

## Introduction

This note describes the purpose and application of traffic modelling within the context of the M2 Junction 5 / A249 Stockbury Roundabout improvements scheme. More detailed documents covering this topic are available on our website: www.highways.gov.uk/m2-junction-5-improvements and copies will be available at the exhibitions. We have recently developed a number of regional traffic models; the model relevant to this study is the South East Regional Model (SERTM).

Using SERTM, our consultants WSP have developed a Local Traffic Model (LTM) for testing the impact of proposed scheme options. Figure 1 shows the extent of the LTM area which is modelled in detail. The traffic model extent covers an area significantly 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.

*Figure 1: M2 Junction 5 Improvements - Model Study Area (green outline)*




## Why do we carry out traffic modelling?

The impact of the M2 Junction 5 improvements scheme on the wider network is assessed using the LTM. The model provides forecast traffic data in terms of vehicle volumes, speeds, journey time, delays and highway capacity. Outputs from the traffic model are used to assess environmental impact, highway design, economic assessment and value for money.

The traffic model is used to predict traffic flows on the network where there is no scheme ('doing nothing') and with a scheme ('doing something'). The model forecasts how many motorists are likely to use the network with the scheme in place, and how this will affect the rest of the network. 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 impact that new developments such as new homes, schools, employment areas, retail areas and other local amenities are considered as part of the traffic modelling. Demographic changes such as population levels and travel choice trends, including car ownership levels, which may change in the future also need to be taken into account.

The model takes account of other committed highway schemes, such as those planned or under construction by Kent County Council. However the local authority aspiration for creating a new Junction 5A on the M2 is not included as it is not in the committed schemes. The impact of Operation Stack has not been assessed in the model as the impacts are generally short-term, occasional and in addition solution is being investigated currently.

The impact of Lower Thames Crossing will be assessed in due course once the Lower Thames Crossing team have completed their modelling assessment which will then feed in to this scheme assessment. Additionally further modelling may be required later if the preferred scheme details differ from the one being considered now.

## 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?

The traffic origins and destinations in SERTM were derived from data provided by 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. Census data which contains anonymous information about where people live, and their method of travel to work was also used to as it provides very accurate information about commuter travel patterns.

By using SERTM, the origins, destinations and number of trips in the M2 Junction 5 traffic model have come from mobile phone and census data. In order determine the routes the traffic takes, a number of link counts and a junction turning count around M2 Junction 5 were completed to determine the traffic flows and key turning movements at the junction. The link counts were completed over a 14 day period and the junction turning counts over a 12 hour period. To supplement this, traffic count data was obtained from Kent County Council.

## 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 M2 Junction 5 / A249 Stockbury Roundabout 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. The M2 Junction 5 traffic model showed a high level of accuracy when measured against those criteria in terms of link flows, turning flows at junctions, and journey times. Our Transport Planning Group has reviewed suitability of the M2 Junction 5 model and given its approval for assessing the proposed schemes.

## 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, new homes and 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.

As with all Highways England Road Investment Strategy (RIS) schemes, the benefits of the proposed scheme are reported on at set time periods: scheme opening year (2022) and the forecast years 2031, 2036, 2041 and 2051. To see whether the proposed scheme offers value for money, economic assessment is carried out for the period 2022 to 2081.