Technical Note

Project:	Gadbrook NPIF	**Project No:**	387230
Title:	Results of the transport modelling		
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Introduction

This note provides details of the transport modelling undertaken for the A556 Gadbrook Business Park junction upgrade. This modelling forms an input into the National Productivity Investment Fund (NPIF) application for this scheme.

Scheme Details

The scheme involves the inclusion of a left turn slip road out of Gadbrook Business Park, widened approaches to the junction on the A556 and a widened northern arm of the junction.

Scope of the Assessment

The assessment has consisted of a comparison of vehicle hours and vehicle kilometres with and without the scheme in the scheme opening year of 2020. As the scheme cost is under £5m a full benefit-cost ratio (BCR) calculation has not been carried out, in line with the NPIF guidance[1].

The scheme has been assessed for highway trips only. There are no public transport routes that use this junction.

The scheme has been modelled initially using LINSIG, and the preferred option has then been assessed using the Northwich Traffic Model (NTM). This means that the results of traffic re-routing are accounted for in the analysis which would not be the case if the scheme were modelled purely in LINSIG. The saving in vehicle hours as extracted from NTM will be less than the equivalent analysis from LINSIG. This is due to the re-routing impact as the reduced junction delays leading to more vehicles using the junction.

[1] NPIF Bidding Guidance

Transport Modelling Method

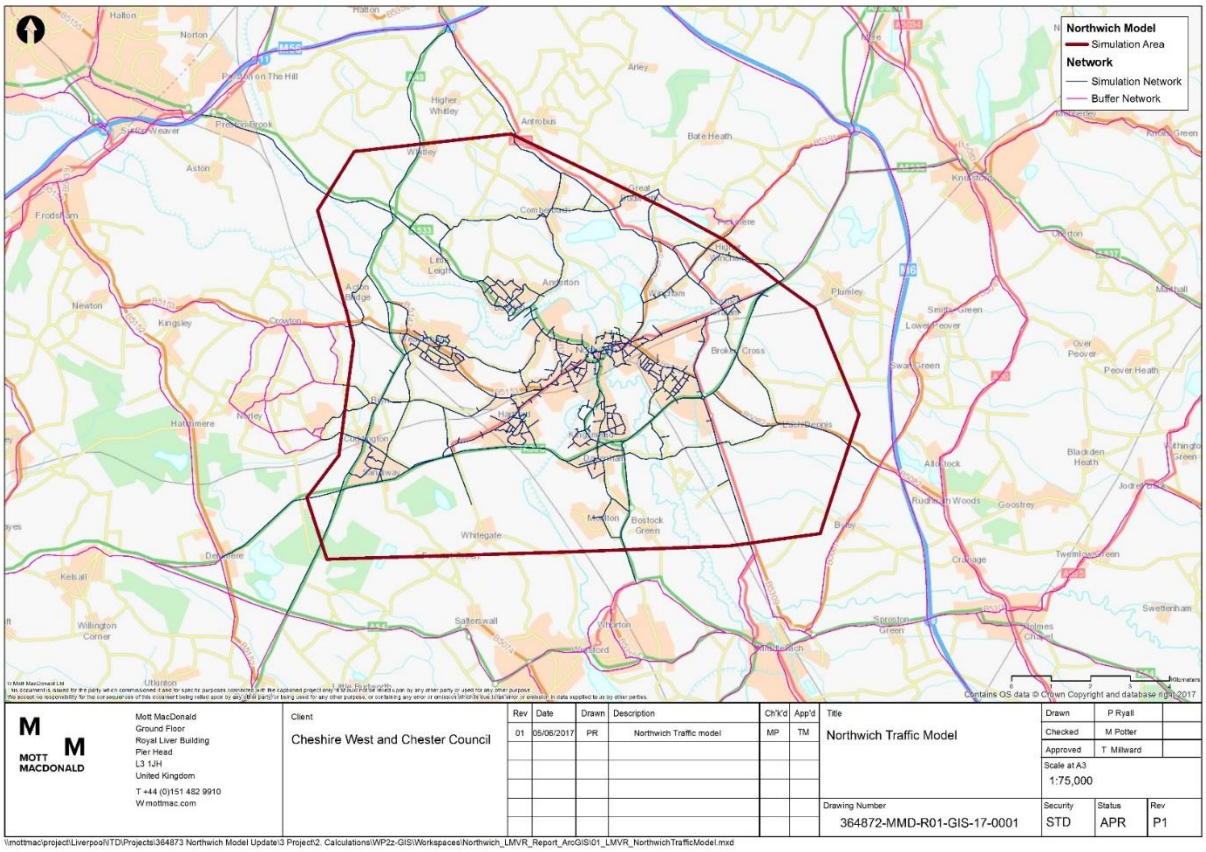
Base Model

The scheme has been assessed using the NTM. This is a SATURN model covering Northwich and its surrounding villages. Figure 1 presents the model coverage. The NTM has a calibrated base year of 2016 and has the following modelled time periods:

- AM peak hour (08:00 – 09:00);
- Average inter peak hour (10:00 – 16:00); and
- PM peak hour (17:00 – 18:00)

Full details of the development of this model can be found in the NTM Local Model Validation Report.[2]

Figure 1: NTM Model Coverage



[2] LMVR_NorthwichBaseYearModel_RevB_Issue

A 2020 matrix has been developed based on future job forecasts at Gadbrook Business Park with TEMPRO[3] 7.2 growth applied elsewhere.

There are forecast to be an additional 1,059 jobs at Gadbrook Business Park in 2020. Table 1 presents the trip rates used to convert these to highway trips. The trip rates have been estimated using the TRICS database. These trips have all been added to the Gadbrook Business Park zone in NTM. Traffic growth elsewhere has been taken from TEMPRO 7.2.

Total traffic growth over Cheshire West and Chester District has been constrained to TEMPRO 7.2 growth in line with DfT Transport Analysis Guidance (TAG) Unit M4 – Forecasting and Uncertainty. Trips to/from Gadbrook Business Park have not been excluded from the constraint but the process has ensured that overall district growth matches TEMPRO 7.2.

Table 1: Trip Rates (Business Park)

	Arrivals	Departures	Totals
Peak Hour (AM)	0.347	0.063	0.41
Interpeak	0.123	0.128	0.251
Peak Hour (PM)	0.044	0.277	0.321

The proposed scheme has been coded into the model using the same coding procedures used in the development of the model. Signal timings and stagings for the scheme have been taken from LINSIG models developed for this assessment (see Technical Note: *Results of the LINSIG Modelling*).

Transport Modelling Results

The assessment has consisted of a comparison of vehicle hours and vehicle kilometres with and without the scheme in the scheme opening year of 2020. **The Gadbrook Business Park junction is on the strategic A556, meaning that there are reassignment effects over the Northwich Strategic Transport model study area. Therefore, this analysis has been carried out over the entire model area.**

Table 2 presents the results for the without and with scheme scenario.

It is observed that:

- In the AM peak hour there is a saving of 37 vehicle hours and an increase of 1,317 vehicle kilometres, the increase in vehicle kilometres is due to traffic re-routeing away from local roads to the strategic A556 where there is now less delay;

[3] DfT Trip End Model Presentation Program

- In the IP there is minimal impact on vehicle hours– to be expected as the scheme is designed to facilitate access to the business park. This result does confirm that the scheme does not have a detrimental impact on existing road users. There is a decrease of 369 vehicle kilometres;
- In the PM there is a saving of 108 vehicle hours and an increase of 433 vehicle kilometres.

When the analysis is broken down by type of user it is observed that:

- The scheme provides a time saving to business users of 5 vehicle hours in the AM peak and 14 vehicle hours in the PM peak;
- The scheme provides a time saving to commuters of 27 vehicle hours in the AM peak and 38 vehicle hours in the PM peak;
- There is a time saving to other users of 4 vehicle hours in the AM peak and 56 vehicle hours in the PM peak.

Table 2: Transport Modelling Results (Scheme Impact Pro Forma for Small Project Bids)

Scenario	Input Data / Key Performance Indicators	Unit	AM Peak Hr Weekday	PM Peak Hr Weekday	Inter-Peak Hr Weekday
Do-Minimum	Number of highway trips affected	vehicles	124,641	130,728	101,379
	Total vehicle travelled time	vehicle-hours	16,378	17,323	9,409
	Total vehicle travelled distance	vehicle-km	903,270	962,417	607,408
	Highway peak period conversion factor	-	2.51	2.74	6.00
	Number of PT passenger trips on affected routes	passenger trips	N/A	N/A	N/A
	Total PT travelled time	passenger-hrs	N/A	N/A	N/A
	PT peak period conversion factor	-	N/A	N/A	N/A
Do-Something	Number of highway trips affected	vehicles	124,641	130,728	101,379
	Total vehicle travelled time	vehicle-hours	16,341	17,215	9,411
	Total vehicle travelled distance	vehicle-km	904,587	962,850	607,039
	Highway peak period conversion factor	-	2.51	2.74	6.00
	Number of PT passenger trips on affected routes	passenger trips	N/A	N/A	N/A
	Total PT travelled time	passenger-hrs	N/A	N/A	N/A
	PT peak period conversion factor	-	N/A	N/A	N/A

Conclusion

It can be concluded that the A556 Gadbrook Business Park junction upgrade provides a significant reduction in vehicle hours.

The assessment has consisted of a comparison of vehicle hours and vehicle kilometres with and without the scheme in the scheme opening year of 2020. As the scheme cost is under £5m a full benefit-cost ratio (BCR) calculation has not been carried out, in line with the NPIF guidance.

The scheme has been modelled initially using LINSIG, and the preferred option has then been assessed using the Northwich Traffic Model (NTM). **This means that the results of traffic re-routing are accounted for in the analysis which would not be the case if the scheme were modelled purely in LINSIG. The saving in vehicle hours as extracted from NTM will be less than the equivalent analysis from LINSIG due to the re-routeing impact of the reduced junction delays leading to more vehicles using the junction.**

The modelling results show:

- In the AM peak hour there is a saving of 37 vehicle hours and an increase of 1,317 vehicle kilometres, the increase in vehicle kilometres is due to traffic re-routeing away from local roads to the strategic A556 where there is now less delay;
- In the IP there is minimal impact on vehicle hours– to be expected as the scheme is designed to facilitate access to the business park. This result does confirm that the scheme does not have a detrimental impact on existing road users. There is a decrease of 369 vehicle kilometres;
- In the PM there is a saving of 108 vehicle hours and an increase of 433 vehicle kilometres.