



North Herts District

Interpretation of COMET Model Results

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Please note that this COMET modelling work was based on assumptions of proposed schemes in the districts at that time; as the district transport strategies evolve, some of these schemes may change.

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1 Introduction

Hertfordshire County Council have developed a Countywide model COMET. This consists of a suite of models including a Variable Demand Model, Highways Model and Public Transport Model and has been used to test the cumulative impacts of Local Plan growth across the county.

The model was updated in Autumn 2016 with districts Local Plan development assumptions at that time. Two model tests were undertaken as follows:

- “Do Minimum” – Local Plan growth plus committed / highly likely transport schemes
- “Do Something” – Local Plan growth plus additional transport mitigation measures as identified by the districts and boroughs in Autumn 2016.

The development of the “Do Minimum” model has already been documented in the ‘Hertfordshire COMET Local Plan Do Minimum Forecasting Report (dated January 2017)’. Countywide results of the “Do Something” run have been documented in the presentation ‘COMET_2031_DS Outputs _01032017’.

This note provides a more detailed assessment of the model results from the Do Something run within North Herts District taking into account the cumulative impact of growth and potential transport schemes in other Hertfordshire districts.

COMET is a strategic countywide model and has not been developed specifically to represent traffic conditions in urban areas. The model has not been validated in urban areas within North Hertfordshire. The model’s main purpose is to simulate inter-urban movements in Hertfordshire and the calibration / validation process has been conducted accordingly. This has an implication on the level of confidence that can be placed on results in urban areas of North Herts.

The highway assignment component of the COMET model suite is in SATURN. SATURN is a tool that suits the strategic geographical scale of COMET, however, does not enable investigation of detailed sections of the highway network (e.g. detailed junction or corridor assessment). At this stage, therefore, the results presented here should be interpreted as high level indications of likely traffic conditions.

More localised modelling work has already been undertaken using the WHaSH model of the A1m corridor.

The COMET model enables an interpretation of potential impacts across the whole borough area taking into account the influence of growth and schemes in other areas. The problem locations from the COMET work are then compared with the results from the more specific local modelling work (using WHaSH).

2. Model Assumptions

2.1 Planning Assumptions

Planning assumptions are as per the COMET Do Minimum run and are listed in Table 1 below.

Table 1 COMET Model Local Plan v2 run Planning Assumptions

	Additional dwellings 2013-2031¹	Additional Jobs 2013-2031
District (NHDC)	15,9691	10,5752 ²
County Overall	91,209	92,344

¹Includes as built and committed from 2013 to 2016 in addition to local plan allocations and windfall allowance

² Based on direct job figures for proposed sites provided by NHDC

2.2 Infrastructure Assumptions

A number of schemes which were deemed as committed or highly likely along with appropriate access points from the key developments were already coded into the “Do Minimum” model. Those relevant to North Herts district are listed in Table 2.

North Herts district also provided a list of transport schemes to include in the “Do Something” Run based on the preferred list of schemes from the more localised WHaSH modelling work. These are listed in Table 3. Given the strategic nature of the COMET model it was not possible to include some of the more minor changes to the highway network. Where scheme elements were not coded this is indicated in the table.

A number of other schemes were also specified by other districts in the county some of which may lead to wider more strategic re routing. Relevant schemes are also listed in Table 3.

Table 2 Schemes relevant to North Herts already included in Do Minimum run

Scheme ref	Location	Description
4	A1m Junctions 6-8 Smart motorway	Widening of A1m to D3L between junctions 6-8.
	Great Northern / Thameslink Rail services	Timetable changes on Thameslink / Great Northern Route as per route consultation for 2018 along with new through services to St Pancras and Brighton
WH7	A1(M) junction 6 pinch point scheme ramp metering	Ramp metering to be switched on on NB on slip
18	Baldock North	New Link Road connecting North Baldock development with North Road and Royston Road.
	Luton	New light rail scheme connecting Luton Parkway station with airport

Table 3 Schemes specified by district to include in the Do Something run

Scheme Ref	Location	Description
HM1	A1 (M) J9 Letchworth Gate / A505 Letchworth	Signalised entries to the roundabout
HM2	A1(M) J8 / A602 Letchworth	Signalisation of Stevenage Rd and Graveley Rd approaches. Left turn slip to be added from Hitchin Rd to southbound A1(M) ON slip
HM3	Whitehorse Street /Station Road/ Clothall Road, Baldock	Signal optimisation
HM4	A602/Trinity Road, Stevenage	Signalised the entry arm at Trinity Rd
HM5	A1155 / A602	Signalised entry arms at A602 & A1155
HM6	A505 / Norton Way	Signal optimisation : add extra stage for the movements from Willian Way
HM7	Woolgrove Road/ Cambridge Rd/ Willian Road Hitchin	Signal optimisation
HM8	Pirton Road / A505 / Upper Tilehouse St/ Wratten Rd , Hitchin	Signalisation of junction
HM9*	Cadwell Lane / Wilbury Way / Woolgrove Rd, Hitchin*	Connect Wilbury Way and Cadwell Road to N of industrial area, plus redesign of Cadwell Lane junction
HM10	Upper tilehouse St / A602/ Paynes Park, Hitchin	Change to a signal controlled junction
HM11	A602 / Monkwood Way	Implement a MOVA signal controlled system at the roundabout
HM12	Six hills way / A602	Signalise roundabout entries Six Hills Way, London Rd, A602
HM13	London Rd / Monkwood Way	Extend flared length on southern approach
HM14	Hitchin Road / Arch Rd Hitchin, Wymondley	Change in junction priorities
HM15	Hitchin Hill – A602 / B656 / Gosmore Rd/ St John's Road, Hitchin	Widening approach arms and signalling
HM16	Six Hills Way / Homestead Moat	Signalised T -junctions at staggered junctions with the introduction of MOVA operated signals
HM18	A602/ Coreys Mill Lane	Signalise the roundabout entries : A602, Coreys Mill Lane , A602
HM19	A1072 Martins Way / Canterbury Way	Signalise roundabout entries Canterbury Way, Grace Way
HM20	B197 Gravely Rd / North road	Priority junction to Roundabout - 2 lanes circulatory, flared to 2 lanes on all approaches
NH1	Bancroft / Hermitage Road	Improve signalised junctions and pedestrian phasing in Hitchin

NH2	Queen Street / Hermitage Road	Improve signalised junctions and pedestrian phasing in Hitchin
Additional Relevant schemes specified by Welwyn Hatfield Borough Council		
WE_107 (WH1 rev)	A1(M) Junction 6 including Clock Roundabout	1.Segregate left turn from B197 Great North Road 2*.Extend length of 2 lane Church St approach and extend 3 lane approach from Welwyn Bypass 3*.Lane markings on nearby roundabouts 4.Upgrade Welwyn bypass to dual carriageway
Additional schemes specified by Stevenage Borough Council		
STV24	A1(M) Junction 7 and slip roads	Lengthening of SB off slip
STV25	A1M_J8_SB_Off_Slip_AM	Extend width of A1m north of junction 8 to allow a lengthened off slip
STV27	A602_Rdbout_Bragbury_End	Assume single carriageway roundabout tying in Hooks Cross bypass onto A602 immediately to the south of the Chequers pub
STV28	A602 / Hertford Road	Signalisation
STV29	A602 Corridor further improvement	New S2L road tying into existing A602 / Watton High Street junction at south and running parallel to railway line before linking with scheme 27 to north
STV30	A602 Hitchin Road / A1072 Gunnels Wood Road (westbound approach)	Introduce Mova control with widening
STV31	A1155 Fairlands Way / Grace Way	Increase capacity on WB approach. Introduce a segregated straight on lane (westbound) at the roundabout, with a merge provided on exit
STV35*	A602 / Stevenage Road	Turn ban. Ban the left turn movement from the A602 eastern approach arm to rural Ashbrook Road*
STV36	Six Hills Way / Valley Way roundabout	Signalise junction and modify layout. Additional flares on western and southern approaches. Change to a signal controlled T-Junction, with a 2 car right turn flare on the western approach and a 2 car left turn flare on the southern approach
STV37	A602 / Valley Way / Broadwater Crescent	Implement a MOVA signal controlled system at the roundabout
STV38	London Road / Toby Carvery Junction	Change to a signal controlled junction
STV39	B197 North Road / A602 Lytton Way	Modify existing junction layout with additional flare. Implement a 3 car flare to enable 2 lanes of traffic onto the circulatory from the B197 North Road approach.
STV40	A1072 Gunnels Wood Road / Clovelly Way	Add segregated left turn lane to junction. New segregated LT lane from GWR south. Introduce a

		segregated left turn lane from Gunnels Wood Road to Clovelly Way.
STV41	Lytton Way redesign (town centre)	Close Lytton Way between Swingate and Six Hills Way to traffic except buses
STV42	New Station (masterplan proposals)	Increase capacity of station allowing increased frequency on the Hertford loop. Allows all services from the Hertford branch line to terminate at Stevenage. New track will connect the fifth platform to Langley Junction allowing the Hertford Loop trains to turnback without requiring access to East Coast Main Line and deliver operational improvements.

Note: * Schemes specified by the district but not modelled

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3. Model Results

3.1 Flow Differences

Figures 3.1 and 3.2 show the difference in flows between the “Do Something” and “Do Minimum” runs in AM and PM peak in the North Herts area with green illustrating where flows increase and blue indicating where there are decreases in flow. More detailed changes in the Hitchin and Letchworth area are shown in Figures 3.3 and 3.4. Given there is no change in the planning data this illustrates whether the specified schemes cause re-routing of traffic or release additional capacity. As COMET also includes a Variable Demand and Public Transport model behavioural responses to congestion such as peak spreading and switching to other modes (especially rail) are also taken into account.

In the AM peak the key differences in flows are around the A1m junctions. At junction 9 the scheme tested reduces delays and encourages traffic to stay on the A1m rather than diverting to alternative routes. This shows up as an increase in southbound flows on the A1m mainline and a decrease on the A505 and more rural roads which were previously used as alternative routes. More detail is shown in Figure 3.5 below:

In contrast at junction 8 there is a reduction in traffic using the A602 approaches and an increase in traffic travelling into Stevenage on more minor routes.

Elsewhere there are localised changes in traffic flow due to the mitigation schemes. In Hitchin for example the signalisation of the Pirton Road / A505 junction (scheme HM8) causes traffic to divert away from Pirton Road and back onto the A505 although some of this traffic then appears to rat run through Willow Lane (see Figure 3.6 for detail) and the changes to the Little Wymondley junction (HM14) allow more traffic to route through this junction. Elsewhere signal optimisation also allows additional traffic through key junctions.

Flow changes are also evident at the junction in the centre of Knebworth with a switch from north south to east west routes. No mitigation scheme has been specified in Knebworth itself but it is likely that traffic patterns in the area have been changed by the various mitigation measures in Stevenage.

In the PM peak there is less change in traffic flow around A1m (junction 9) although the rerouting away from the A602 and onto more minor roads is more evident around junction 8

Figure 3.1- 2031 “Do Something” v “Do Minimum” Flow Difference in North Herts- (8-9am)

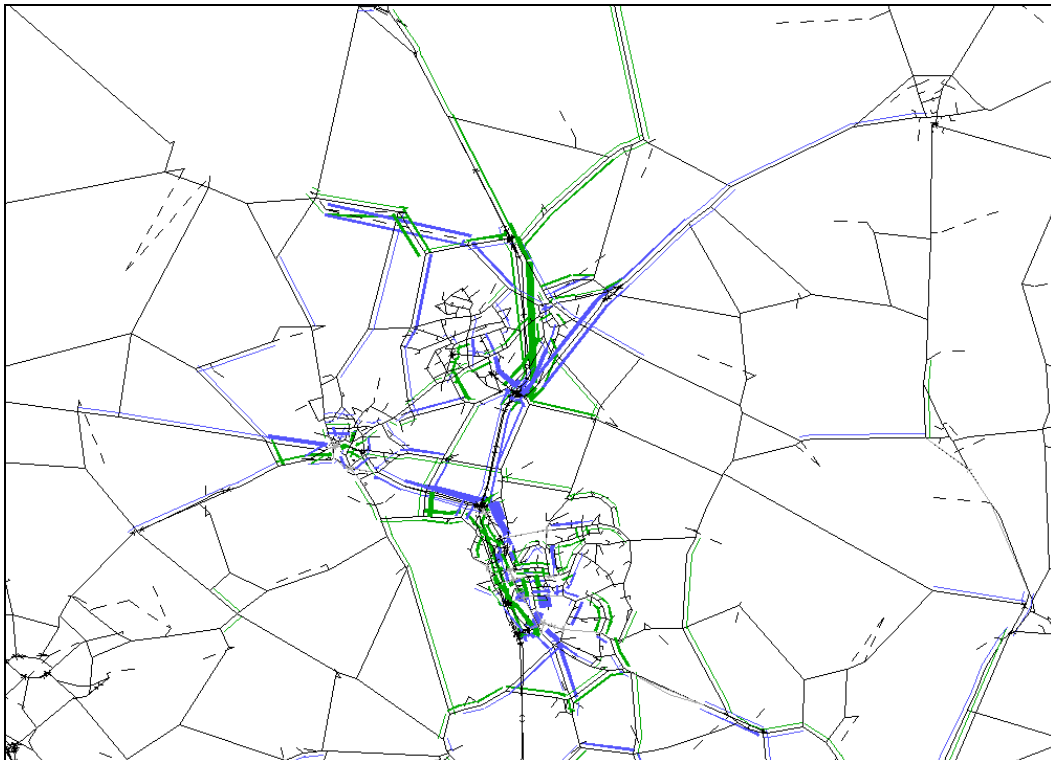


Figure 3.2 -2031 “Do Something” v “Do Minimum” Flow Difference in North Herts (18:00-17:00)

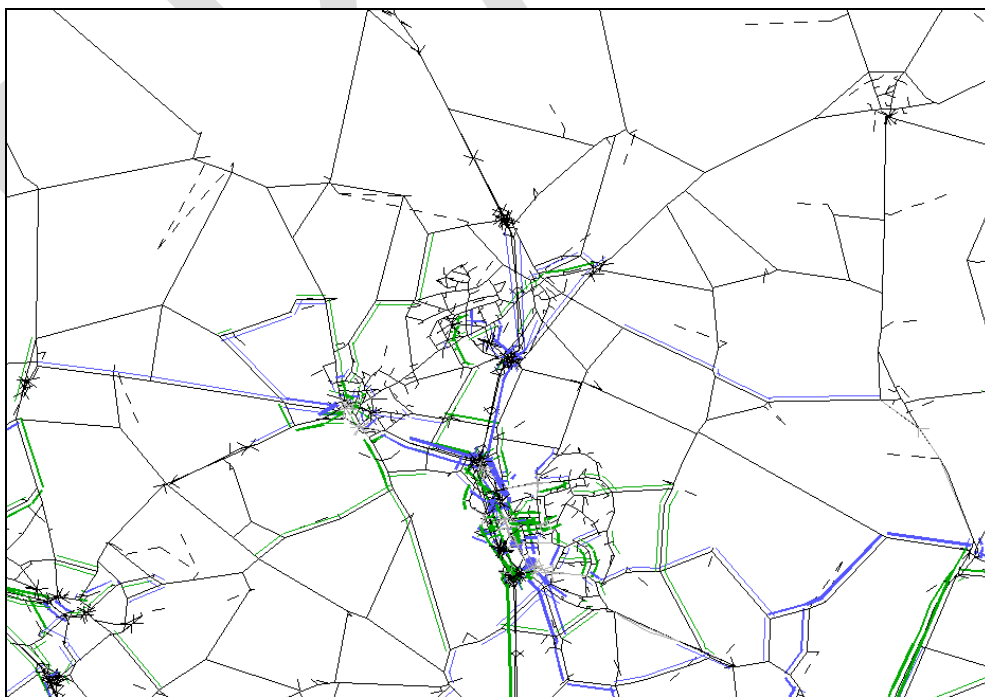


Figure 3.3- 2031 “Do Something” v “Do Minimum” Flow Difference in Hitchin & Letchworth-
(08:00-09:00)

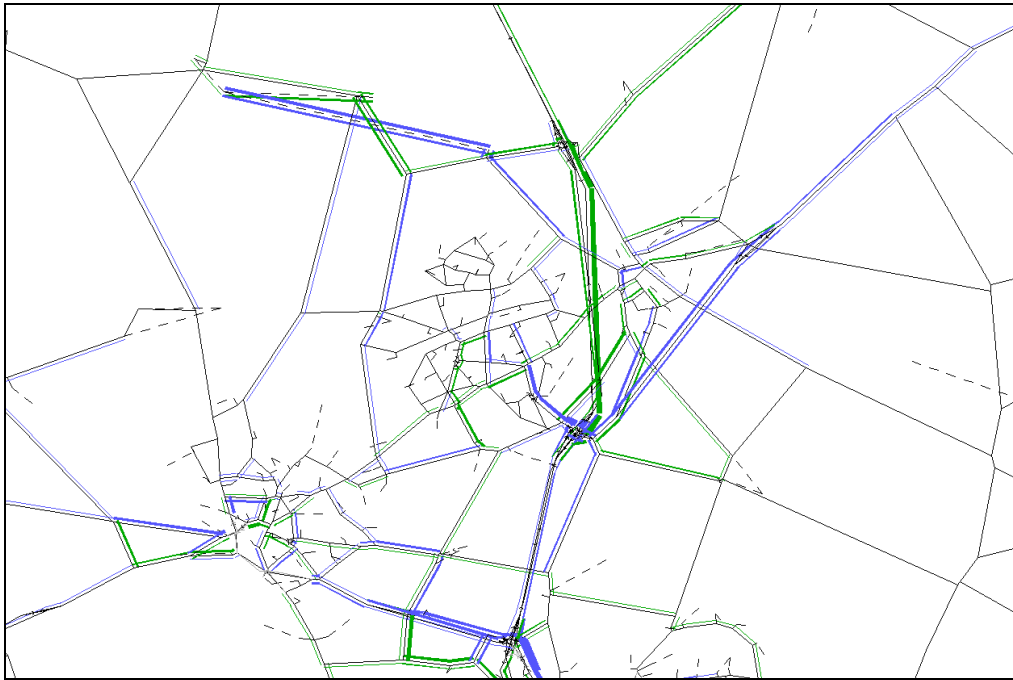


Figure 3.4- 2031 “Do Something” v “Do Minimum” Flow Difference in Hitchin & Letchworth-
(1700- 1800)

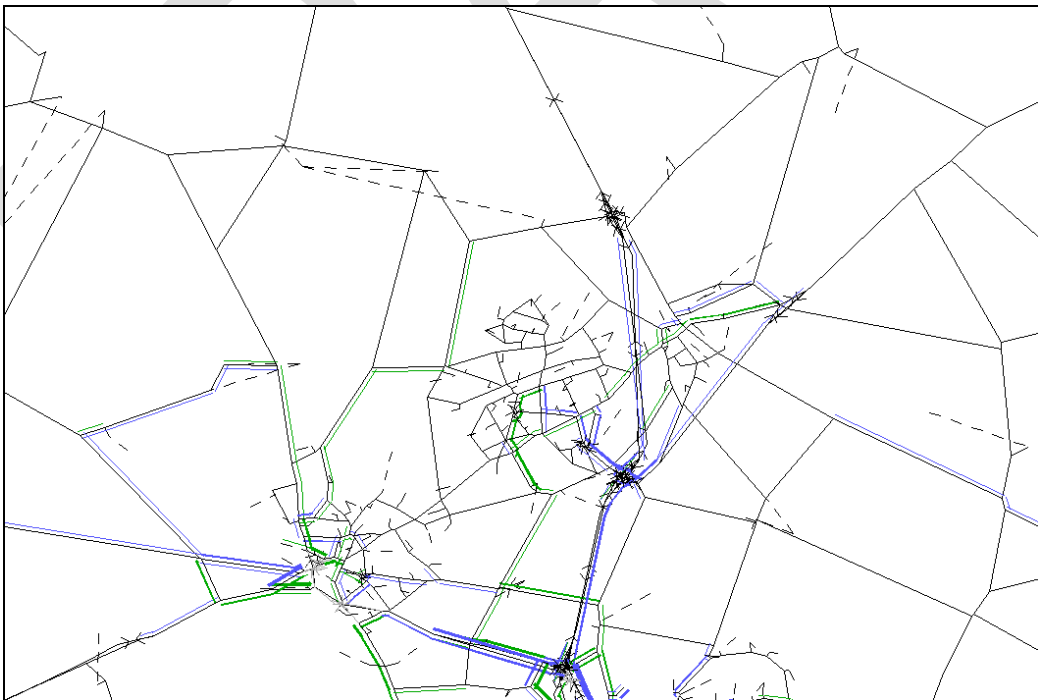
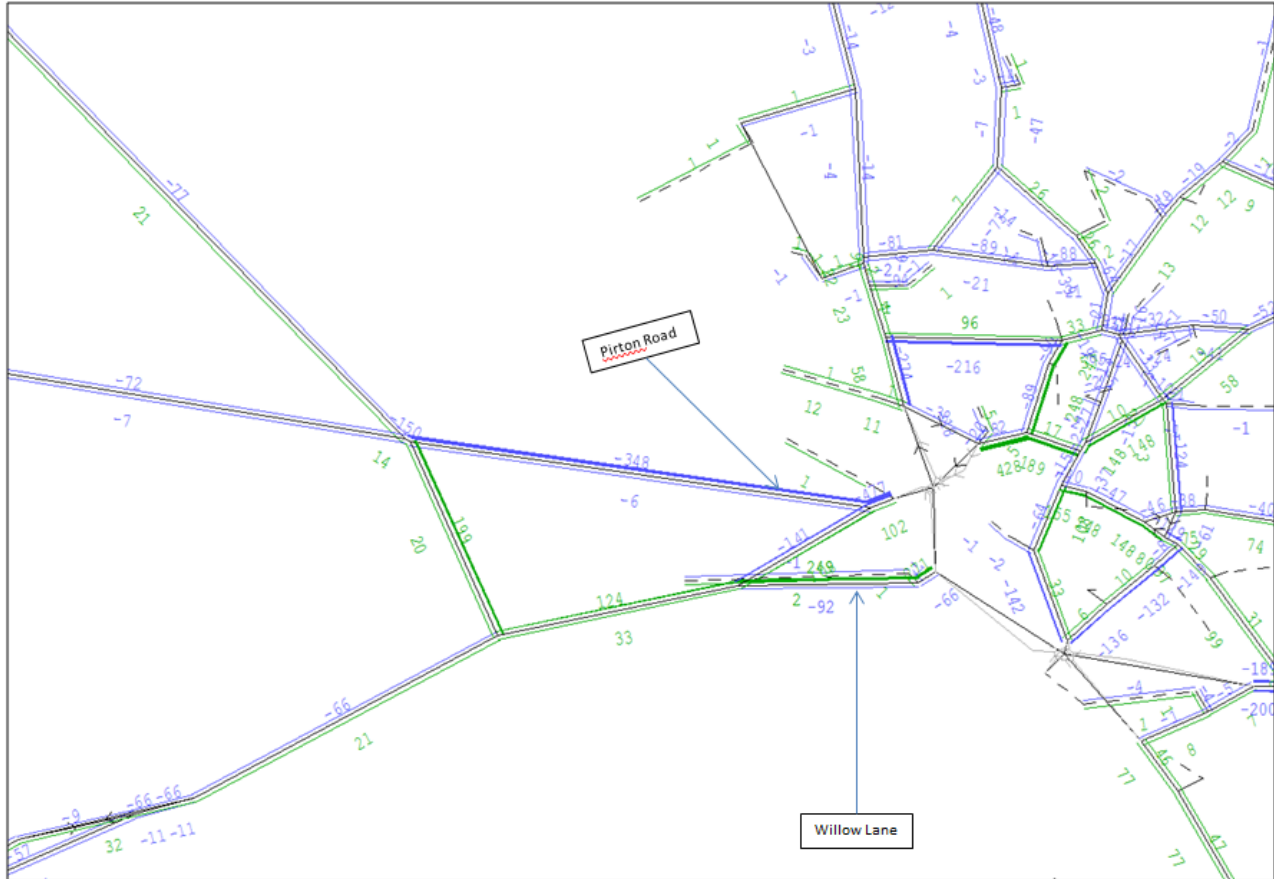


Figure 3.5 Detailed flow changes around A1(m) junction 9 (AM peak)



Figure 3.6 Detail of flow differences in the Pirton Road / A505 area in Hitchin

2031_Difference DM vs DS _AM_ on Willow Lane



3.2 Network Stress - Introduction

The figures in this section show the resultant Volume to Capacity Ratios in the local district area which are a measure of link stress. Those links with a Volume / Capacity Ratio of over 85% (shown in Orange) and 95% (shown in Red) are flagged up as the volume of traffic is close to or at / over the capacity of the link). Other links operating within capacity are not shown. Locations with significant predicted junction delays are also shown (orange dots indicate junctions with 1-2.5 minute delay and red dots indicate junctions with 2.5 to 5 minute delays). The equivalent results for the Do Minimum run are shown for comparison.

3.3 Network Operation in the Royston Area

Figures 3.7 – 3.10 show the detail for the Royston area. The COMET modelling work Do minimum run indicates issues with link capacity on the A505 and the approach routes to the key junctions. Long delays are also forecast at the A505 / Old North Road junction and there are also issues with link capacity on Melbourne Street between the Kneesworth Street and A10 junctions. (see Figures 3.7 & 3.9).

In Royston no additional mitigation measures were tested in the Do Something model and therefore the network stress and junction delays remain (see Figures 3.8 & 3.10). It should be noted that the modelling work does not include any new development accesses onto the A505.

Figure 3.7 - 2031 Do Minimum Volume to Capacity Ratios & delay in Royston (08:00-09:00)

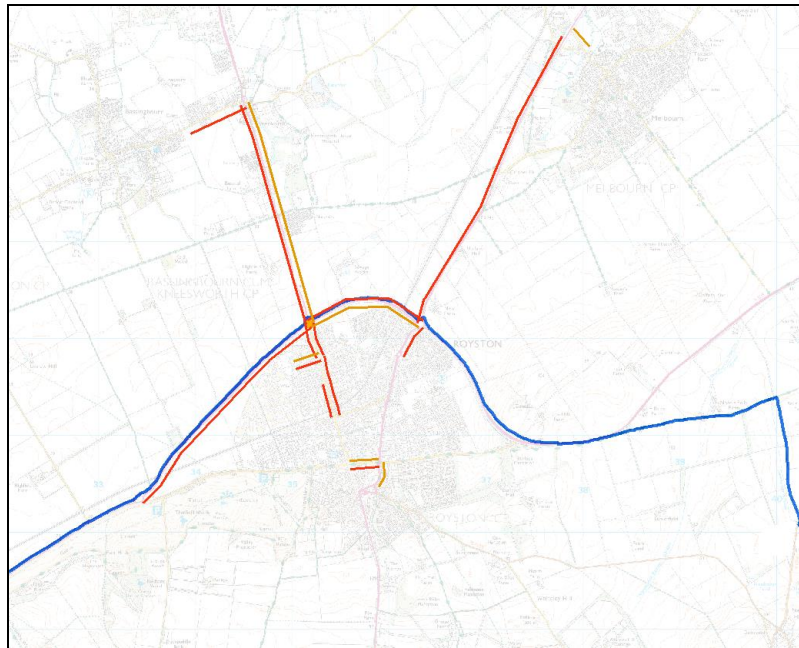


Figure 3.8- 2031 Do Something Volume to Capacity Ratios & delay in Royston (08:00-09:00)

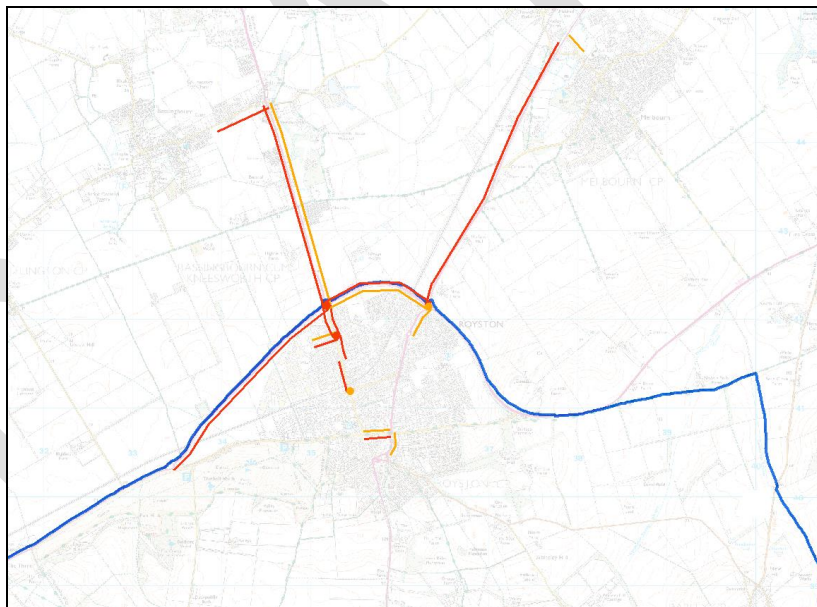


Figure 3.9 2031 Do Minimum Volume to Capacity Ratios & delay in Royston (17:00-18:00)

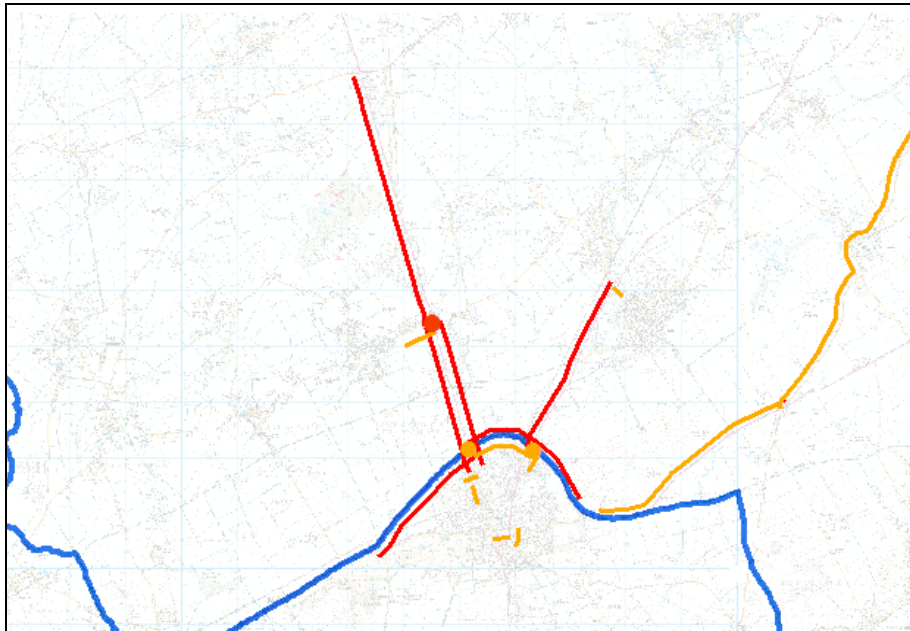
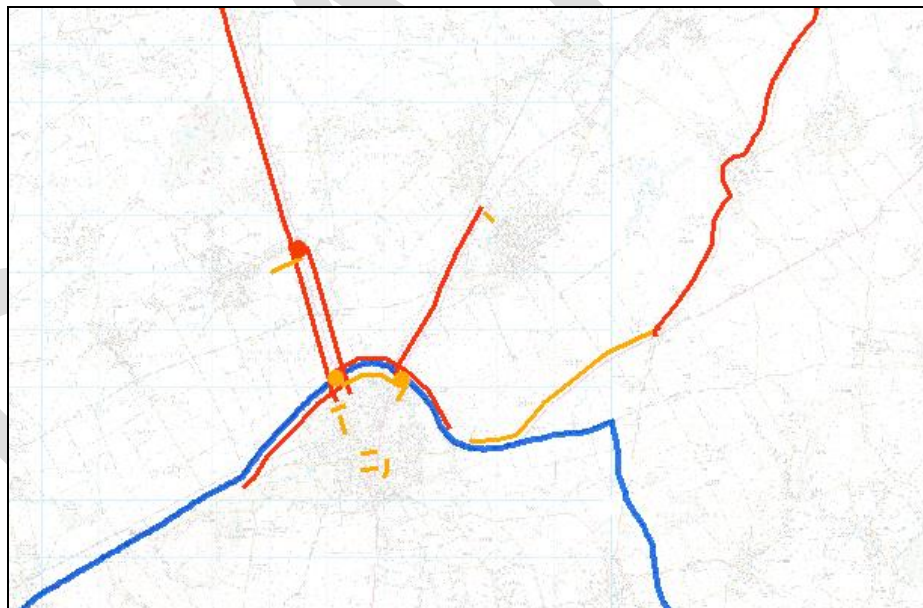


Figure 3.10 - 2031 Do Something Volume to Capacity Ratios & delay in Royston (17:00-18:00)



3.4 Network Operation in Letchworth and Baldock

Figures 3.11 -3.14 show the localised highway stress and delay in the Letchworth and Baldock areas. The AM peak Do Minimum model (Figure 3.11) indicates that there are issues with link capacity in Baldock around the Whitehorse Street / Station Road junction and on the B656 Hitchin Street.

In Letchworth the main constraints appear to be around the A505 / Letchworth Gate / Pixmore Way junction with more localised issues around Avenue One and Works Road. The model is also indicating problems and delays around A1m junction 9, particularly on the southbound slip roads which leads to long delays.

In the PM peak there is additional highway stress around the High Street / B656 junction in Baldock, on Letchworth Gate and Norton Road to the north (Figure 3.13).

In the Do something model additional mitigation schemes in this area are limited to signal reoptimisation at the Whitehorse Street / Station Road junction and around A1m junction 9 where there are, signalisation of additional arms and timing optimisation

In the AM peak the impact of this mitigation is to reduce stress on the A1m junction 9 southbound on and offslips and around the Whitehorse Street / Station Road junction (See Figure 3.12). The other issues however remain unresolved and link stress becomes more of an issue on the A505.

In the PM peak the scheme at junction 9 appears to alleviate link stress around this junction but there is little impact elsewhere (Figure 3.14).

Figure 3.11- 2031 “Do Minimum” Volume to Capacity Ratios in Letchworth & Baldock (08:00-09:00)

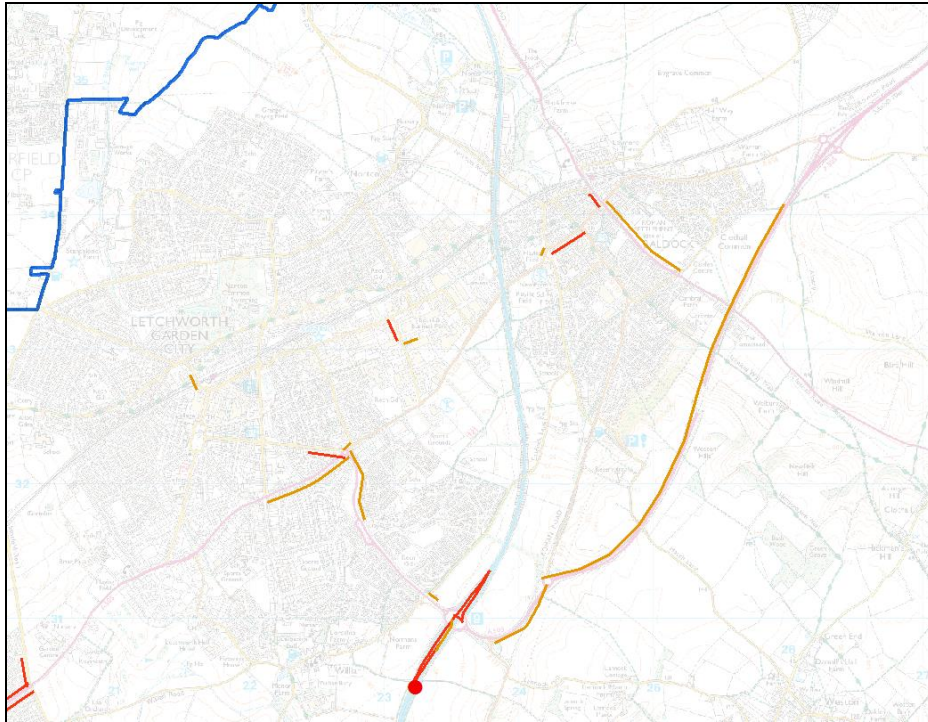


Figure 3.12- 2031 “Do Something” Volume to Capacity Ratios in Letchworth & Baldock (8-9am)

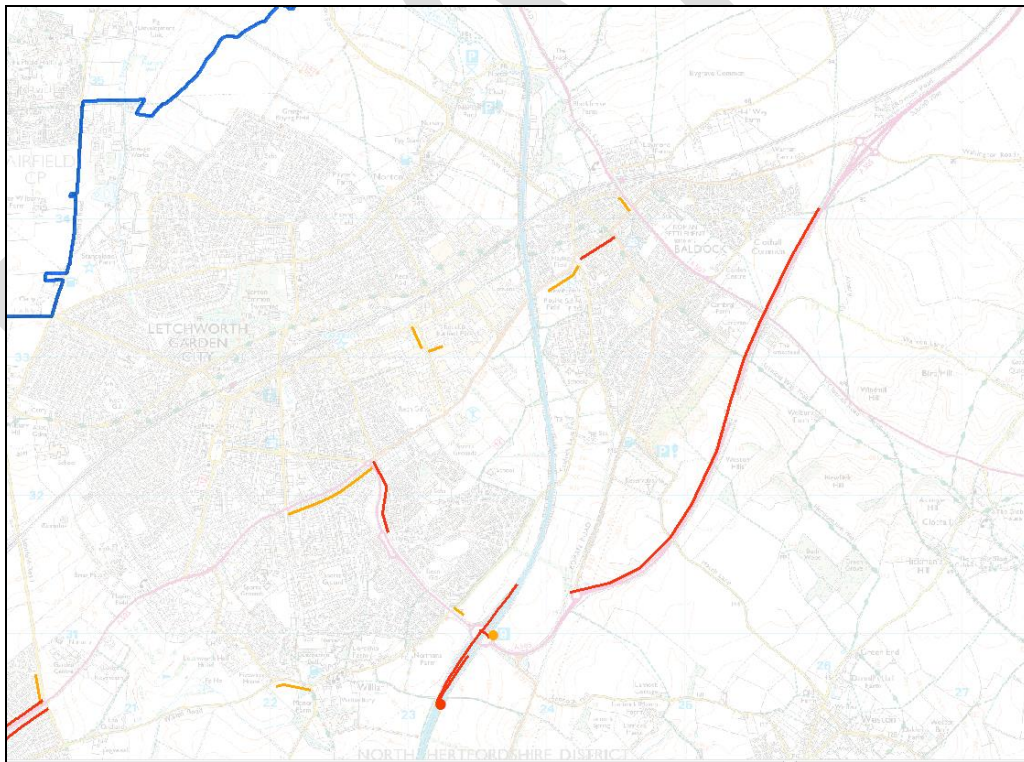


Figure 3.13- 2031 Do Minimum Volume to Capacity Ratios in Letchworth & Baldock - (17:00-18:00)

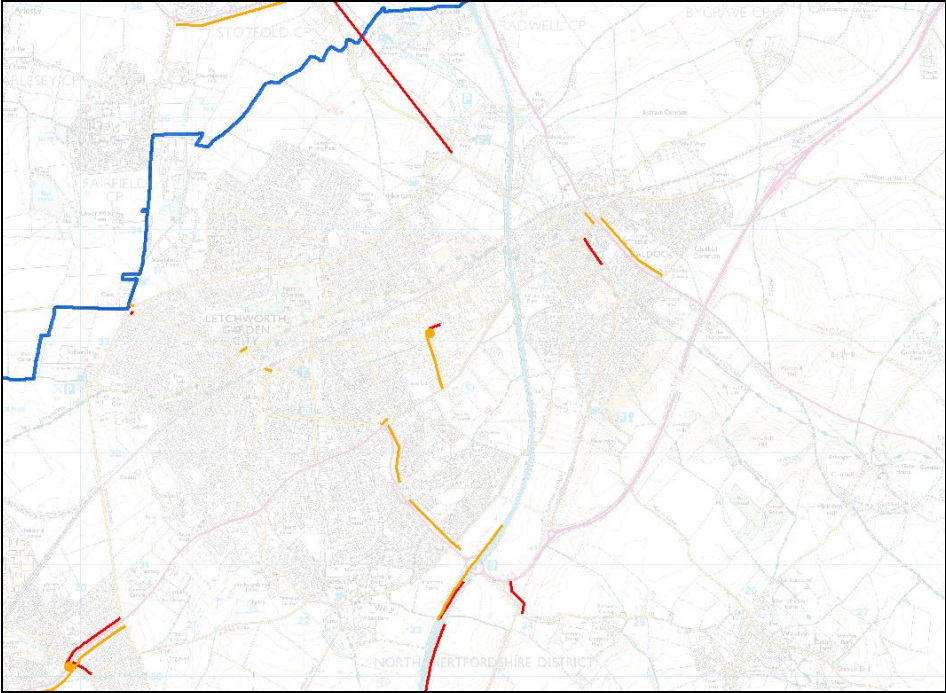
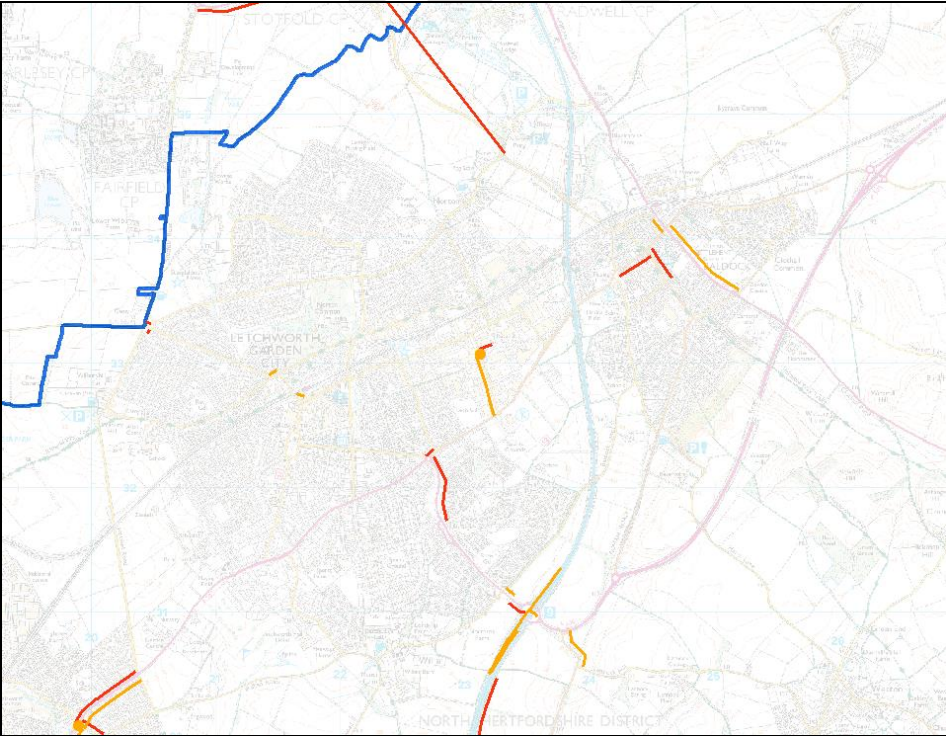


Figure 3.14- 2031 Do Something Volume to Capacity Ratios in Letchworth & Baldock (17:00-18:00)



3.5 Network Operation in Hitchin

Figure 3.15 indicates the localised highway stress and junction delays in the Hitchin area in the AM peak Do Minimum scenario. There are a number of links which the Comet model predicts will be over capacity including Pirton Road, the A600 Bedford Road and the Paynes Park gyratory, A602 Parkway between Paynes Park and the Hitchin Hill roundabout along with the Whitehill Road approach to the A602. There are also a number of issues on the A505 around the Woolgrove Road, Stotfold Road and Grove Road junctions.

In the Do something model a number of mitigation measures are added including signalisation of the Pirton Road / A505 junction and capacity improvements at the A602 / Paynes Park and A602 / Hitchin Hill junctions, along with optimisation of signals in the town centre and at key junctions along the A505. Figure 3.16 indicates that as a result stress on the A602 and around the Paynes Park gyratory is reduced. However, stress and delays on the A600 Bedford Road remain and the capacity and delay issues remain at the A505 junctions despite the application of signal optimisation.

As previously seen in Figure 3.6, signalisation of the A505 / Pirton Road junction encourages traffic to divert away from Pirton Road onto the A505 but there is a risk that some of this traffic may end up rat running through Willow Lane causing additional link stress here.

In the PM peak a similar pattern is evident, although there are fewer issues around the Pirton Road and Willow Lane areas.

To the east of Hitchin the links approaching the Hitchin Road / Arch Road junction in Great Wymondley are shown as being at capacity in the AM peak. Implementing the proposed mitigation measure (changing junction priority) however seems to attract additional traffic through the junction and exacerbates the problem.

3.6 Network Operation other areas

The COMET modelling work does not identify any particular issues with highway stress in Codicote or Knebworth. Both villages benefit from the introduction of the Smart Motorway scheme which reduces the level of through traffic and therefore reduces the impact of additional development traffic. It should be noted however that as COMET is a strategic model it is unable to take into account localised reductions in highway capacity from on street parking which is an issue in both villages.

Figure 3.15- 2031 “DM” Volume to Capacity Ratios and Junction delays in Hitchin (08:00-09:00)

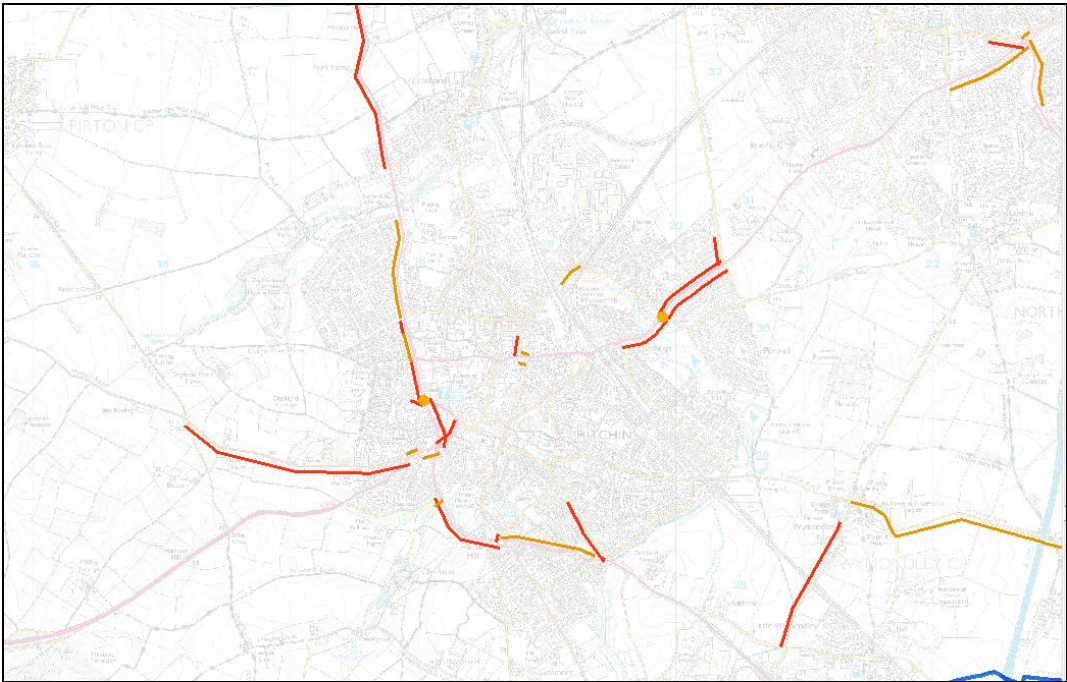


Figure 3.16- 2031 “DS” Volume to Capacity Ratios and Junction delays in Hitchin - (08:00-09:00)

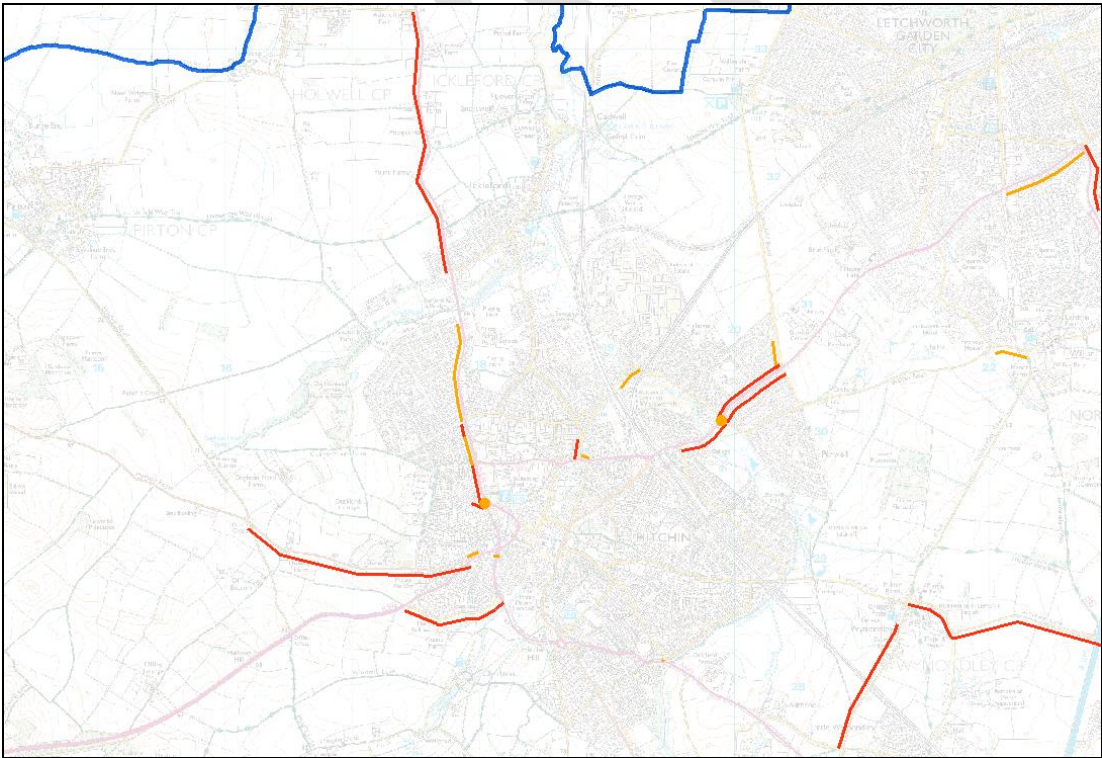


Figure 3.17- 2031 “DM” Volume to Capacity Ratios and Junction delays in Hitchin (17:00-18:00)

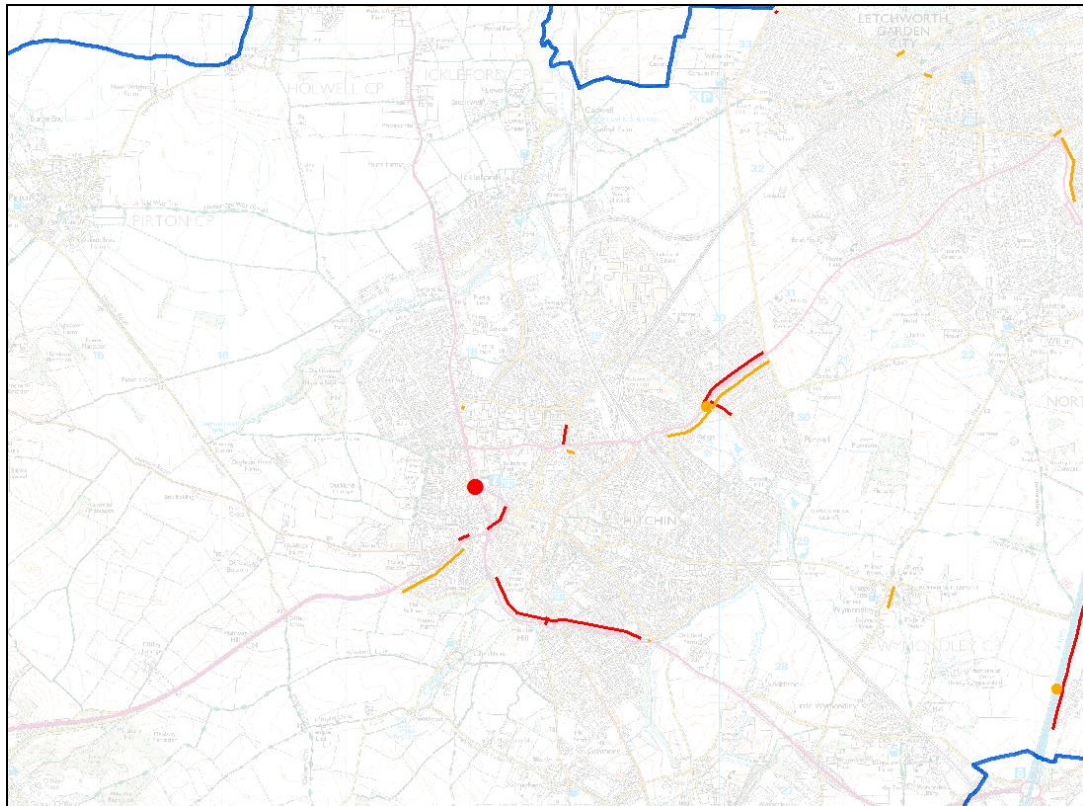
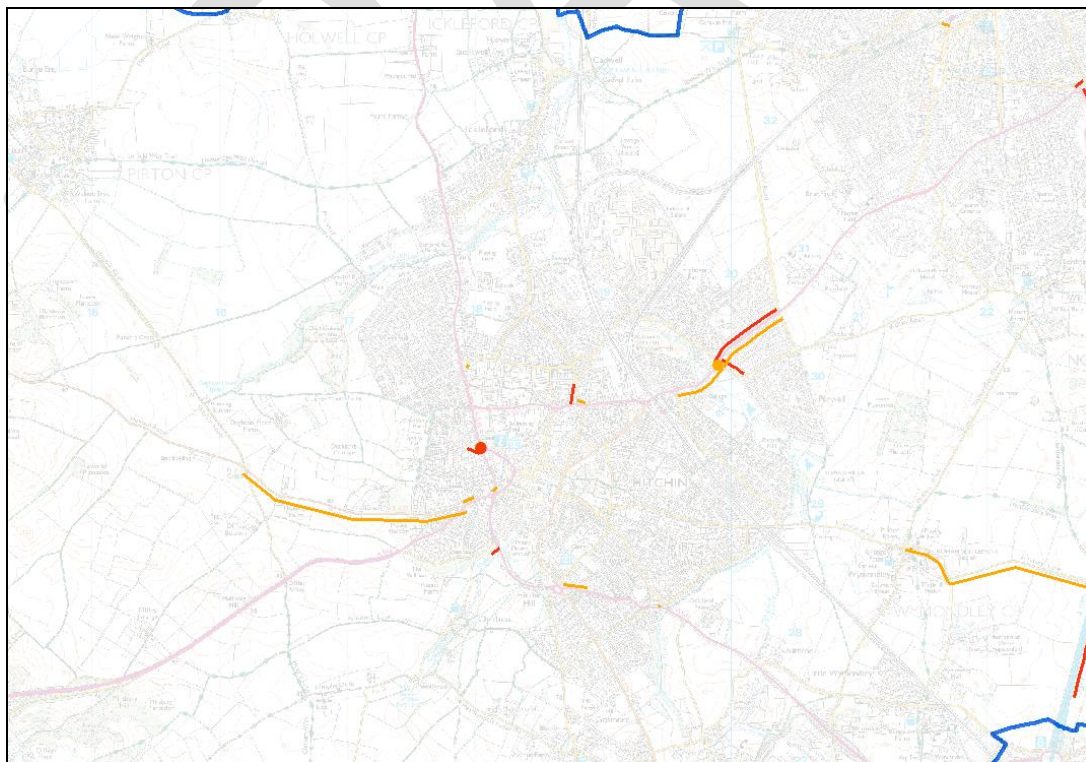


Figure 3.18- 2031 “DS” Volume to Capacity Ratios and Junction delays in Hitchin (17:00-18:00)



4. Comparison with Local WHaSH Modelling Work

4.1 Introduction

The WHaSH model was specifically developed to test the implications of Local Plan growth in the Hitchin, Letchworth and Baldock areas. As it has been locally calibrated and validated it has been used as the main tool to assess the impact of local plan growth and identify highway mitigation schemes in these local areas. It is a highway based model (so cannot include demand responses) and only takes into account full development growth in the model area (A1 corridor between junctions 2 and 10 plus the urban areas of Hitchin, Letchworth, Baldock, Hatfield, Welwyn Garden City and Stevenage).

COMET is a suite of models consisting of a Variable Demand Model and a public transport model in addition to the highways model. It is therefore able to take into account behavioural changes to increased congestion such as mode shift and peak spreading. As it covers the whole county it is also able to take into account growth and the impact of transport schemes across Hertfordshire (and beyond). A comparison has therefore been made between the problem highway locations identified in the earlier more localised WHaSH modelling work and COMET to identify whether there are additional locations in the district which are problematic (particularly outside the area previously modelled by WHaSH).

A comparison of model results is shown in Table 4.1.

Table 4.1 – Comparison of Problem Locations between WHaSH and COMET

Location	WHaSH (without schemes) ¹	COMET (impact of schemes)	Notes
A505 /Old North Road Royston	Outside model area	Link capacity issues remain on number of approaches with long junction delay	No mitigation identified or tested.
A505 /A10 Royston	Outside model area	Link capacity issues remain on number of approaches with long junction delay	No mitigation identified or tested.
Old North Road / York Way, Royston	Outside model area	Link capacity issues remain on number of approaches with long junction delay	No mitigation identified or tested.
A1(M) junction 10	PM peak delay issue	No issue identified	No mitigation identified or tested
A1 (M) junction 9	Delays both peaks	Reduction in delay and stress on SB slips with scheme	Mitigation scheme consists of signalised entries to roundabout
A1 (M) junction 8	Delays AM esp on NB off slip	Traffic diverts away from junction on more local routes and therefore delay / stress at junction is limited.	Signalisation of Stevenage Road and Gravely Road arms with optimisation
Station Rd/ Whitehorse St / Royston Rd / Clothall Road, Baldock	Delays AM & PM	Reduction in link stress with scheme AM	Signal optimisation assumed. Comet model run assumes new link road through North Baldock site in both DM and DS runs
B656 Hitchin Street / B197 High Street, Baldock	Not an issue	Link stress evident in both DM and DS	No mitigation identified or tested
A505 / Letchworth Gate / B656 / Pixmore Way	Not an issue	Link stress evident both peaks. Worsens in DS	No mitigation identified or tested
A505 /Norton Way	Delays both peaks	Not identified as issue	Signal optimisation tested
Fourth Avenue / Avenue One, Letchworth	Not an issue	Delays & link stress in both peaks in DM & DS	No mitigation identified or tested. Large employment growth in area assumed in COMET
A505 /Stotfold Road, Hitchin	Not an issue	Link stress on A505 EB approach	No mitigation identified or tested
A505 / Woolgrove Road, Hitchin	Delays both peaks	Delays and link stress on A505 approaches in DM	Signal optimisation tested

		and DS.	
Cadwell Lane / Wilbury Way / Grove Road /Woolgrove Road, Hitchin	Delays both peaks	Link stress on Grove Road	Junction not fully represented in COMET so not possible to model potential new link road.
A600 Bedford Road /A505 Fishponds Road, Hitchin	Delays AM peak	Link stress on A600 SB approach AM peak	No mitigation identified or tested
Paynes Park Gyratory, Hitchin	Delays worse in PM peak	Delays & link stress alleviated by scheme although some of this may be due to diversion of some traffic to Willow Lane	Change to signalised junction tested
A505 Upper Tilehouse Street /Pirton Road	Delays both peaks	Link stress on Pirton Road arm, scheme leads to traffic diversion	Signalisation of junction assumed.
A505 / Carters Lane, Offley Cross	Long delays Am & PM	No issue identified but Signalisation of Pirton Road junction increases traffic along this link	No mitigation identified or tested
A602 Parkway / Willow Lane	Long delays AM	Improvement in conditions on A602 but increased stress on Willow Lane with schemes	Impacted by schemes at Paynes Park, Hitchin Hill and Pirton Road junctions
Hitchin Hill - A602 Parkway / London Road / Gosmore Road (Hitchin Hill)	Long delays AM & PM	Scheme alleviates stress	Scheme to widen approach arms and signalise
A602 Stevenage Road / Oakfield	Delays in both peaks	Not identified as an issue	No mitigation identified or tested
Hitchin Road / Arch Road, Great Wymondley		Changing priorities attracts more traffic & exacerbates problems	Change in junction priorities tested
B197 Graveley Road /High Street /North Road	No issues identified	Scheme appears to attract additional traffic to this route and North Road.	Change to roundabout

¹ Delay locations identified from TN NHDC LP Preferred Option Local Plan Test Rev D (Figure 4.1 & 4.2 & Table 4.1)

5. Conclusions

The COMET modelling work has tested the impact of implementing highway improvement schemes identified through the more localised North Herts WHaSH modelling and design work along with those specified by other Hertfordshire districts as part of the COMET Local Plan “Do Something” test. This was undertaken for the districts in early 2017. These results have been compared with the COMET Local Plan Do Minimum run (which includes committed / highly likely transport schemes) to identify the schemes are successful in mitigating the additional pressure from development growth.

The results of the COMET model runs have been compared with the results of the more localised WHaSH model runs to identify if there are other locations which come under pressure when the cumulative impact of growth is taken into account.

The WHaSH model did not include the Royston area and the COMET results indicate predicted stress and delay problems at the A505 junctions to the north of the town in addition to some issues in the town centre.

Elsewhere the locations of stress generally align between the two models on the key A roads although there are some differences on local routes. The WHaSH modelling work was used to identify potential mitigation measures which have then been run through the COMET Do Something scenario (in addition to schemes identified by other districts).

A comparison of results of the COMET Do something (with schemes) and Do Minimum runs indicates that the measures proposed in Hitchin result in improvements to the operation of the A602 route and around the Paynes Park area but do cause some traffic rerouting. Benefits from optimisation of existing signals on the A505 route through the town are however more limited. There are also improvements around junction 9 and in the centre of Baldock from the proposed schemes. It should be noted that no mitigation schemes have tested in the Knebworth, Codicote or in much of Letchworth.

Rat running is evident in the Wymondley area and changing the junction priority in Great Wymondley attracts more traffic on these routes and exacerbates the problems. The conversion of the Gravely Road / North Road junction to a roundabout also seems to attract more traffic to this route.

It should be noted however that the work to date has concentrated on highway mitigation measures and therefore the COMET modelling work does not include any modal shift which could be achieved through the implementation of sustainable transport measures. Whilst the interventions do offer some localised capacity improvements, the consequence is that they potentially induce more traffic and continue to facilitate travel by car. It is therefore important that they form part of a balanced transport strategy which includes improvements to sustainable transport.