Technical Note

Project:	**Elstree Way Corridor**	Job No:	**60278138**
Subject:	**PM Peak Traffic Model Analysis of Alternative Scheme**		
Prepared by:	**George Vogiatzakis**	Date:	**03 April 2014**
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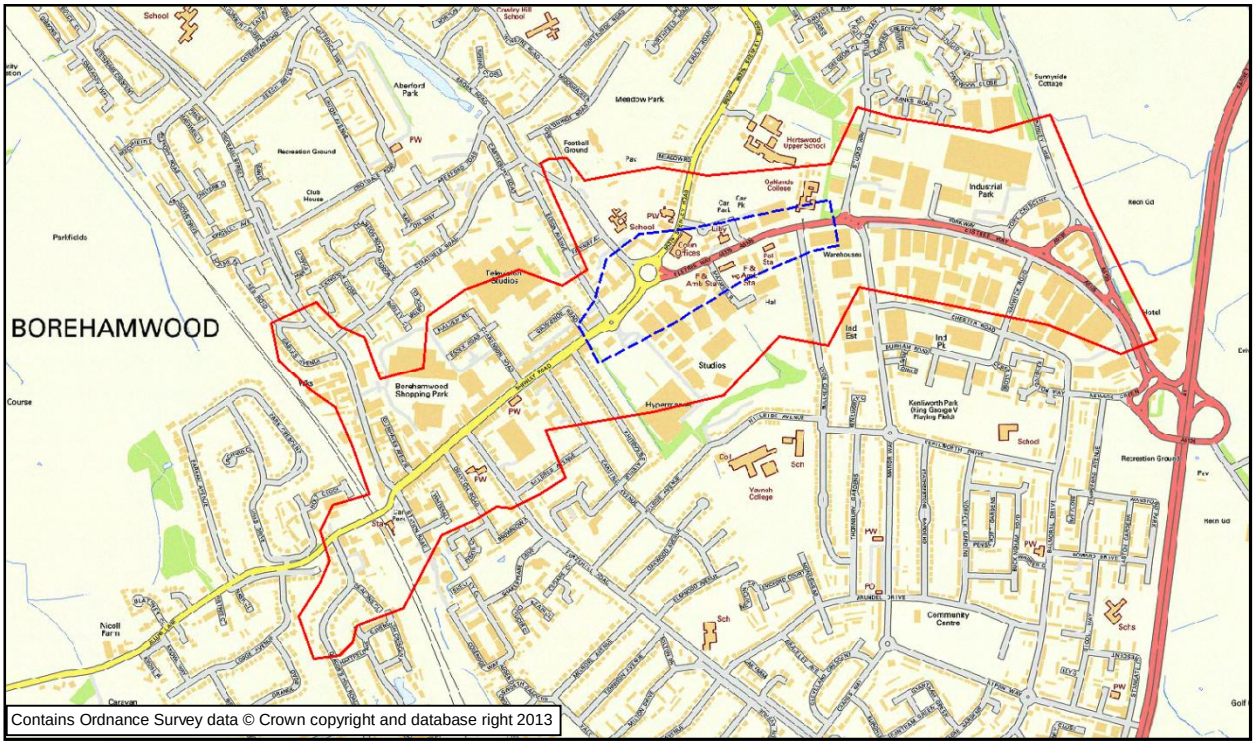
1: Introduction and Context

AECOM has been requested by Hertsmere Borough Council (HBC) to prepare robust scheme proposals with associated cost estimates for Elstree Way Corridor. HBC also require an understanding of how the scheme could be implemented over a series of phases dependent upon the scale of development and associated funding available.

The primary area of interest is highlighted with a red perimeter in **Figure 1**, with a blue perimeter highlighting the broad scheme area;

Figure 1: Scheme location and area of interest



In 2010 the Elstree and Borehamwood Transport Study tested a number of scenarios for the corridor and surrounding road network. Option 2B was the preferred scenario and the key principles of this have been taken forward in the Preliminary Design work for the corridor.

From 2B, two alternative options were proposed;

- Option 1) Focussing on the key junctions with minimal engineering interventions on the links; and
- Option 2) Increased interventions on links using a combination of medium and quality materials;

Of these, Option 2 was taken forward for traffic analysis for a forecast year of 2026. The results of this analysis however, suggested that there would be significant congestion around the central junction of Elstree Way and Shenley Road, which was proposed to change from the existing large roundabout to a signalised crossroads.

Further to this Option 2 (referred to in this note as the 'Old Scheme') a New Scheme which maintains the general structure of the road highway, but with improved facilities for non car users, including cycle lanes and pedestrian crossings, has been proposed.

A strategic SATURN traffic model has been used to analyse the New Scheme's traffic impacts at a wider level and a localised Paramics model used to analyse the scheme at a corridor level, identifying operationally the impact.

The updated scheme includes:

- New toucan crossings
- Upgrade of pelican to toucan crossings
- Relocation of the studio entrance on the Brook Road and Elstree Way roundabout
- Road kerb realignments
- Access blockings on minor roads

The purpose of this technical note is to report on the PM peak model which has been developed, comparing it with the Old Scheme for reference.

This note should be read in conjunction with the previous notes, in particular with reference to assumptions made behind the modelling approach.

Sections

Following this introduction the following sections included within this technical note are:

2: New Scheme Testing
3: Summary & Conclusions

2: New Scheme Testing

This section sets out the high level review of the corridor and wider area models for the area of interest and reports on the Corridor model results, comparing the previous Elstree Way Corridor scheme (Old Scheme) against the proposed scheme (New Scheme), for the PM peak time period.

Future Year (2026) Scheme Network Assumptions

Modelled road network characteristics, development trip rates and driver behaviour assumptions are the same as described in the Old Scheme model analysis note, which should be referred to for additional information.

Operational Corridor (Paramics model) Assessment

SATURN Analysis & Paramics Demand Derivation

The future year (2026) Paramics model uses a cordon extract from the wider strategic SATURN model for its traffic demand. The SATURN model demand includes the application of a growth factor based on traffic growth forecast for the locality as defined in TEMPRO. In the preceding technical note to this one, the higher demand was previously referred to as a sensitivity test and is used here in order to conduct a more robust analysis of the scheme.

The implementation of the New Scheme results in some traffic re-routing away from the town centre in the SATURN model, but not to such a large extent as for the Old Scheme. Comparative traffic flows from the SATURN model for the Old and New Schemes can be found in Appendix A. Key link flows are presented in the table below;

Road Link	Direction	Old Scheme Flow	New Scheme Flow	Difference
Brook road	Northbound	610	450	-160
	Southbound	730	690	-40
Shenley Rd North	Northbound	340	470	+130
	Southbound	20	450	+430
Shenley Rd West	Westbound	610	850	+240
	Eastbound	400	620	+220
Elstree Way	Westbound	1010	880	-130
	Eastbound	880	930	+50

Table 1 – Comparison of PM Peak hourly flows (in vehicles) for Old and New Schemes

A relative comparison of the New Scheme against the Old Scheme in the SATURN flows shows;

- Little change on Brook Road southbound, but a more noticeable decrease in traffic northbound, likely a transfer to Shenley Road North, which is more accessible in the New Scheme;
- An increase in traffic using north Shenley Road, particularly in the soutbound direction. This occurs as capacity is greater for this approach without the traffic signal crossroads;
- An increase in traffic using west Shenley Road, as capacity is increased without the traffic signal crossroads; and
- A small decrease in traffic using Elstree Way eastbound, as capacity is reduced with the new Toucan crossings, but an increase westbound due to the congestion reduction through the central junction.

Taking an average of these flows through the central Elstree Way / Shenley Road area, there is an approximate 16% increase in the New Scheme PM peak scenario compared to the Old Scheme PM peak. Across the cordon Paramics area as a whole, the increase is approximately 10%, suggesting that the New Scheme has a higher capacity for traffic overall.

It is noted that within the SATURN model, more traffic routes onto adjacent corridors as traffic demand increases, generally moving away from the Elstree Way corridor. The ability of traffic to move onto alternative routes is reliant upon the accuracy of the base model for these areas, which has been carried forward in the future year assessments and has not been revalidated as part of this work.

The Paramics model uses base year (2010) time period profile to fine traffic flows on a five-minute basis.

Paramics Analysis

The following analysis compares the output of the local corridor model for the New Scheme against the previous Old Scheme analysis.

Screen shots of the network conditions as estimated in the Paramics model at 30-minute intervals are presented in the Appendix.

By looking at the screenshots it can be seen that the model performs well in most areas. However, the primary pinch point now appears to be the Furzehill Rd / Shenley Road roundabout, which is beyond the scheme extent. As we can see from the Paramics screenshots, a westbound queue propagates back upstream during the modelled PM period, approaching the Shenley Road / Elstree Way roundabout.

Journey time route comparison

Figure 2 below shows the journey time routes which have been used in part to compare the relative performance of the Old and New Schemes.

Figure 2: Paramics model journey time validation routes

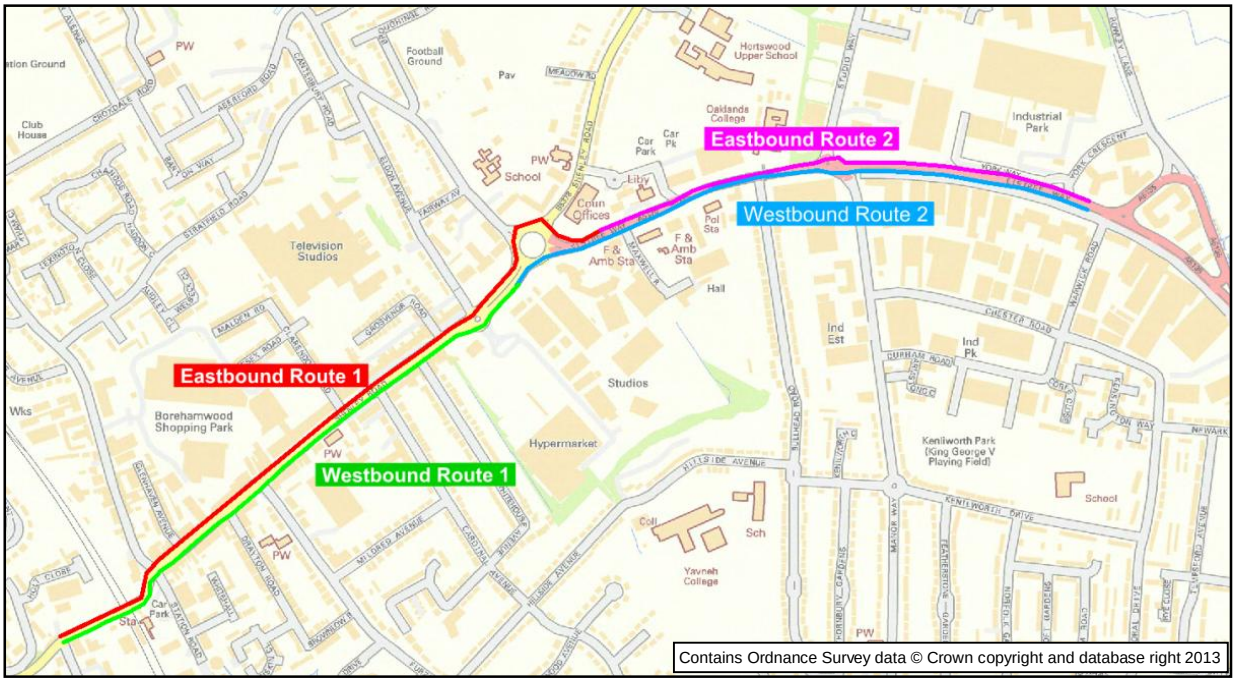


Figure 3 and **Figure 4** below show journey time route outputs for the local corridor model, comparing the Base model against the two Do-Something (Old and New) schemes under the higher (Tempro - Borehamwood) traffic growth assumption.

Figure 3 shows the impact of the New Scheme is generally quite small on most of the sections of the Elstree Way corridor. Most notable however, is the Westbound route, section 1, where there is a significant amount of additional delay.

The new toucan crossings do increase congestion, but when these were included in the Saturn model some traffic diverts onto alternative routes, to the point where the flows appear to be within the capacity of the equivalent section in the operational Paramics model.

Figure 3: PM peak Base (Base) and New Scheme sensitivity test (DS+) journey time comparison

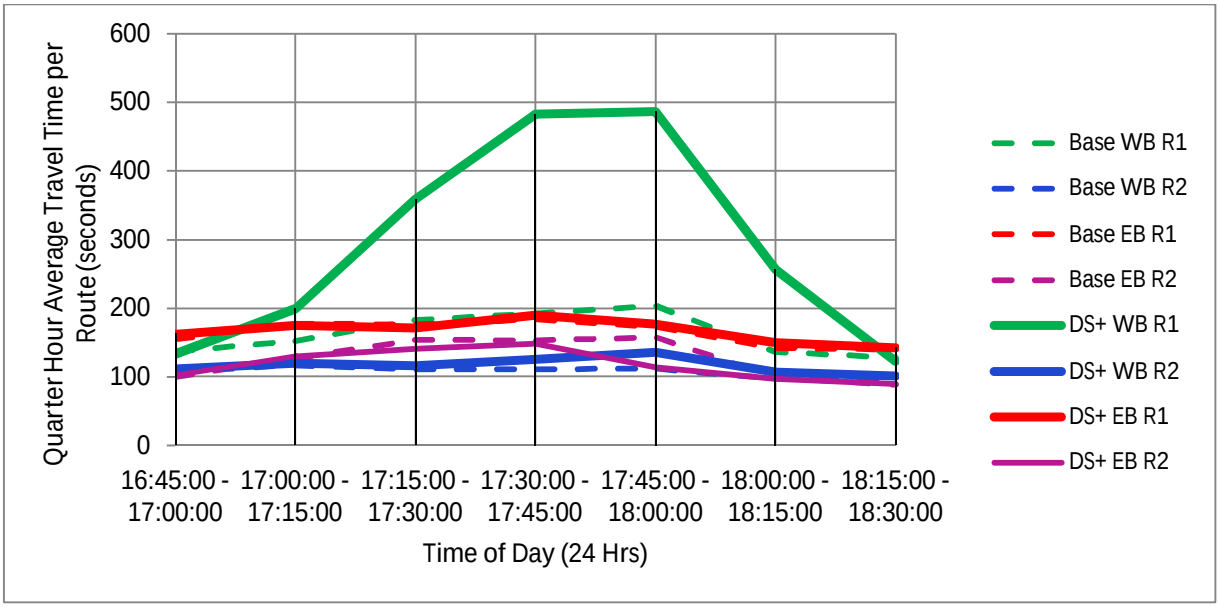
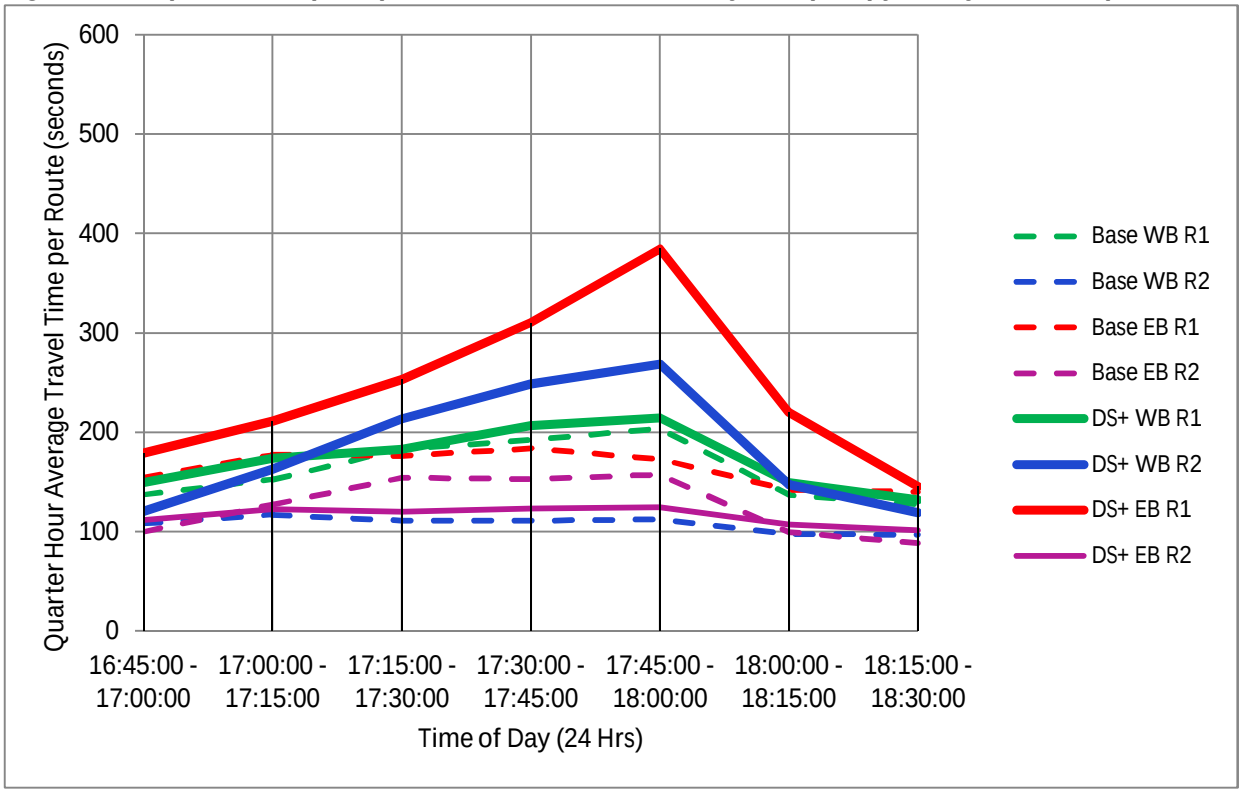


Figure 4 shows the corresponding graph for the Old Scheme.

The central large roundabout on the west part of the corridor was a signalized crossroad at this DS scheme, which acted as a significant capacity constraint under this scenario. As a result, there are were notable queues centrally around that junction, but queuing elsewhere throughout the model is quite limited.

Comparing the two sets of results, for the Old and New Schemes, it can be interpreted that the old Scheme had a more detrimental impact on travel times in general, with the primary exception being the Westbound Route 1 section.

Figure 4: PM peak Base (Base) and Old Scheme sensitivity test (DS+) journey time comparison



3: Summary & Conclusions

This technical note has presented the findings of the comparison between the PM peak 2026 Old Scheme and PM peak 2026 New Scheme.

This section of the note summarises key findings from the conducted analysis and suggests how the project can be taken forward.

The scheme impact on the corridor can be summarised as follows;

- Under the New Scheme 2026 scenario, compared to the previous scheme, a significant amount of traffic diverts away from the central junction of Brook Road and parts of Elstree Way. On most of the other approaches there is an increase in capacity and an increase in traffic attracted onto those sections of the network.

- Overall traffic queuing extents are not very different from existing under the with-scheme (Do-Something) scenario, compared to the New Scheme. There is a redistribution of location of queuing though, with an increase around the Shenley Rd and Furzehill Rd roundabout, which propagates back through the modelled period.

- The average PM peak hour demand growth is approximately 10% across the network (SATURN model) comparing the New with the Old scheme.

Conclusion

The conclusion of the above analysis at both the local and wider network is that the proposed new Elstree Way Corridor scheme will have some impact in decreasing capacity for traffic compared to the base situation and as a result re-routing may occur. However, the overall reduction in capacity is noticeably less than the Old Scheme.

Under the new Scheme scenario, there is still some a reliance on traffic re-routing around the congested central area or/and people altering their trip patterns, if the scheme is implemented.

The New Scheme highlights a particular problem area downstream from the scheme – the Shenley Rd and Furzehill roundabout. It appears to be a significant limiting factor in the performance of the revised network. It should however be highlighted that the amount of delay at this point is lower in the SATURN model compared to the Paramics model and therefore there is some uncertainty over the extent to which traffic may re-route around it.

There are therefore uncertainty and risks in the modelling analyses and conclusions from these, on that basis we are unable to confirm that the proposed scheme works to an acceptable level.

It is recommended the sensitivity of results (and hence risks) from the application of the assumptions is understood, either through sensitivity testing or updating of the assumptions.

Assumptions
A number of assumptions have been necessary to undertake the modelling work and associated analysis. These assumptions are the same with the ones that were followed on the previous modelling analysis PM scheme. The assumptions have included:

- There are known errors in the coding of the Base SATURN model, carried through to future year modelling, which will impact on the re-routing of traffic. The impact of it should be sense checked in terms of realistic capacity and acceptability and altered if appropriate.

- Similarly there are known errors in the Base Paramics model. These relate more to zoning of traffic, which would ideally be corrected. Driver behaviour at junctions in terms of their gap acceptability and mid-junction queuing is also a query. At present it is assumed that there is no ‘yellow boxing’, but also that traffic does not creep mid-junction when turning right.

- Likewise some caution towards the results should be considered in light of potential inconsistent counts, the lack of queue data and potential unreliability of journey times, which may have an impact on the degree of modelled rat-running.

- Fixed traffic signal timings have been assumed.

- Levels and distribution of development are fluid, those provided during the model development were used.

- Trips arising from the developments have been based on the size of the development (supplied by HCC) and the average trip rate for different types of development. The average trip rates were taken from the previous modelling work for consistency with that work. Those trip rates were based on TRICS data – a database of trip rates for developments, categorised by development type and geographic location.

Way Forward

It is recommended that additional sensitivity testing at the AM should be conducted to investigate the traffic impacts of the New Scheme on the local corridor at the morning peak period.

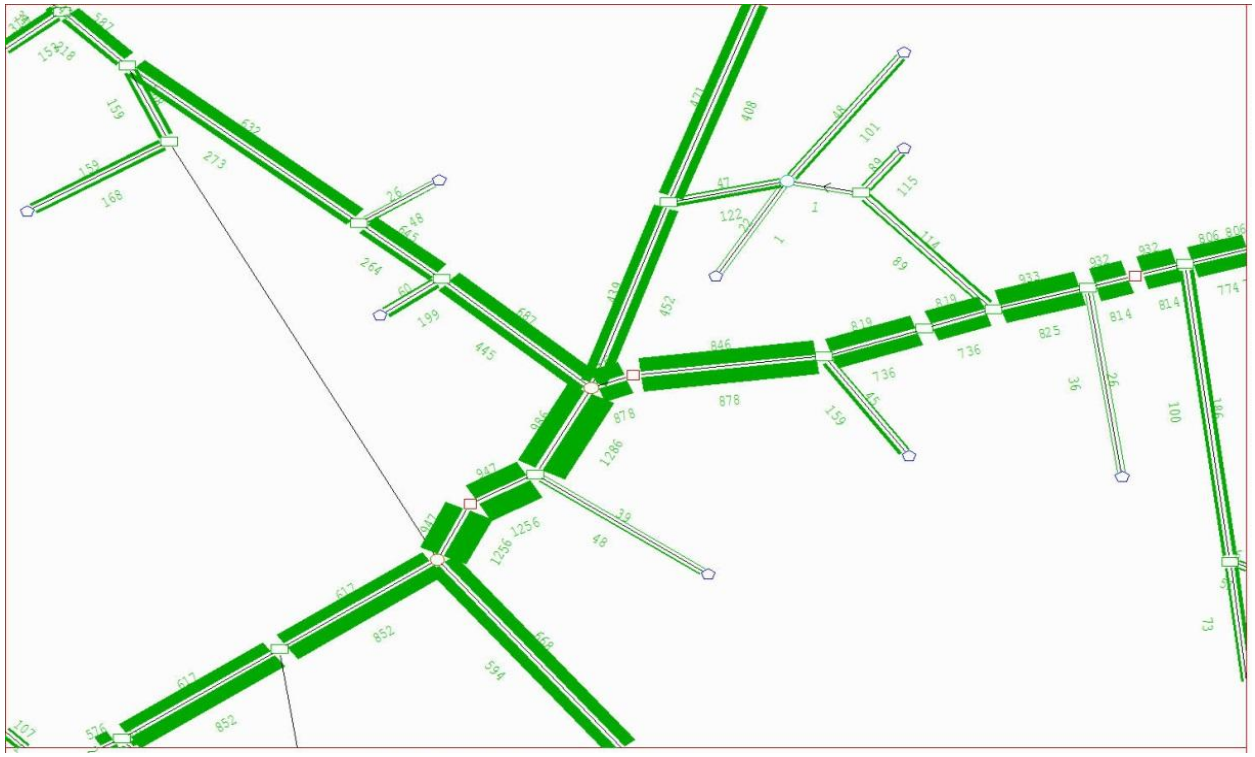
In addition, further analysis should be conducted at the Shenley Rd and Furzehill roundabout which is outside of the current scheme area.

Furthermore, it will be important to understand and provide an understanding of how the scheme should be phased, linking to the availability of the funding stream, as well as the effectiveness of traffic management measures and how these should be adopted.

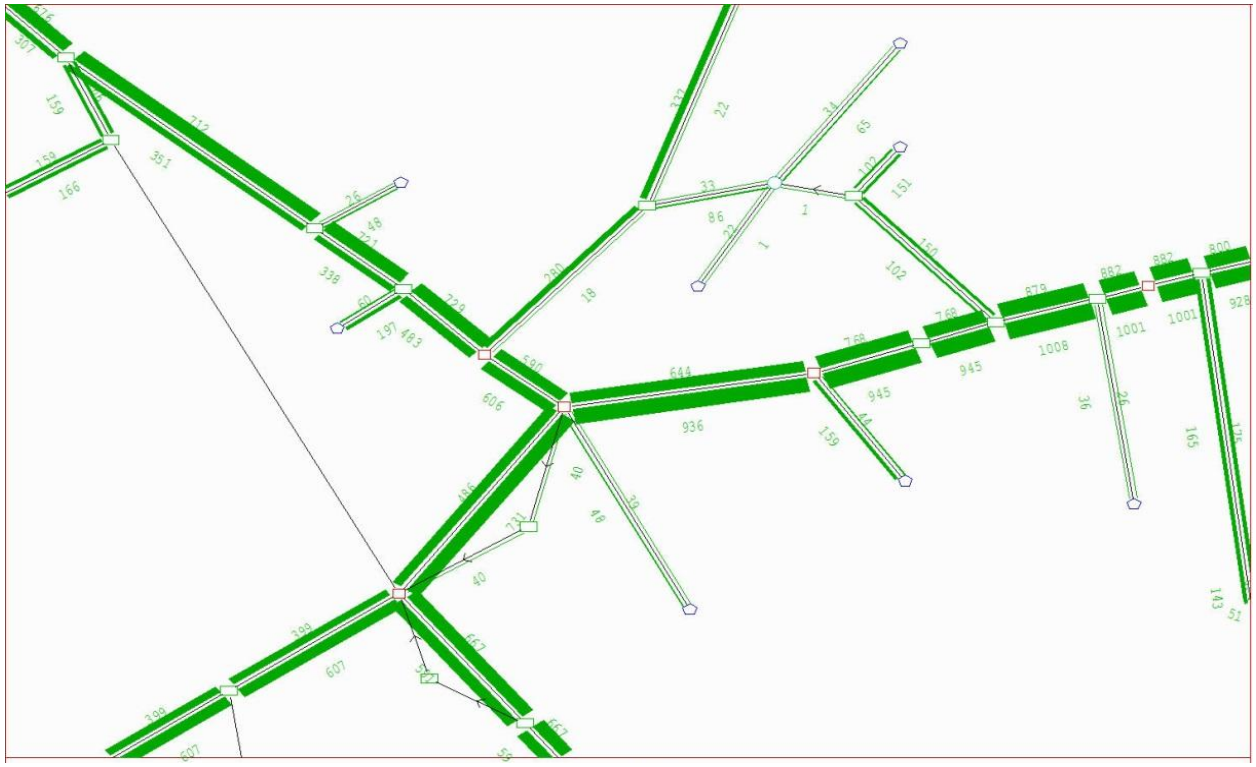
Appendix

Strategic Assessment and Comparison of Scheme

EWC - New Scheme PM peak hour flows



EWC - Old Scheme PM peak hour flows



Operational Assessment

EWC - New Scheme PM

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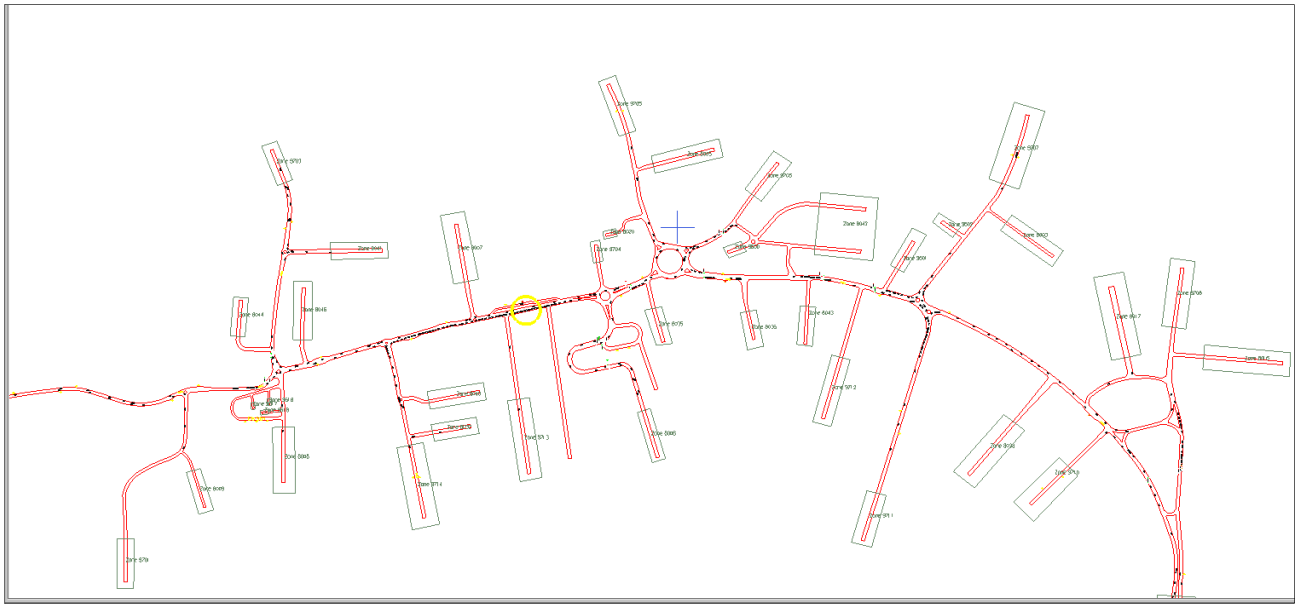

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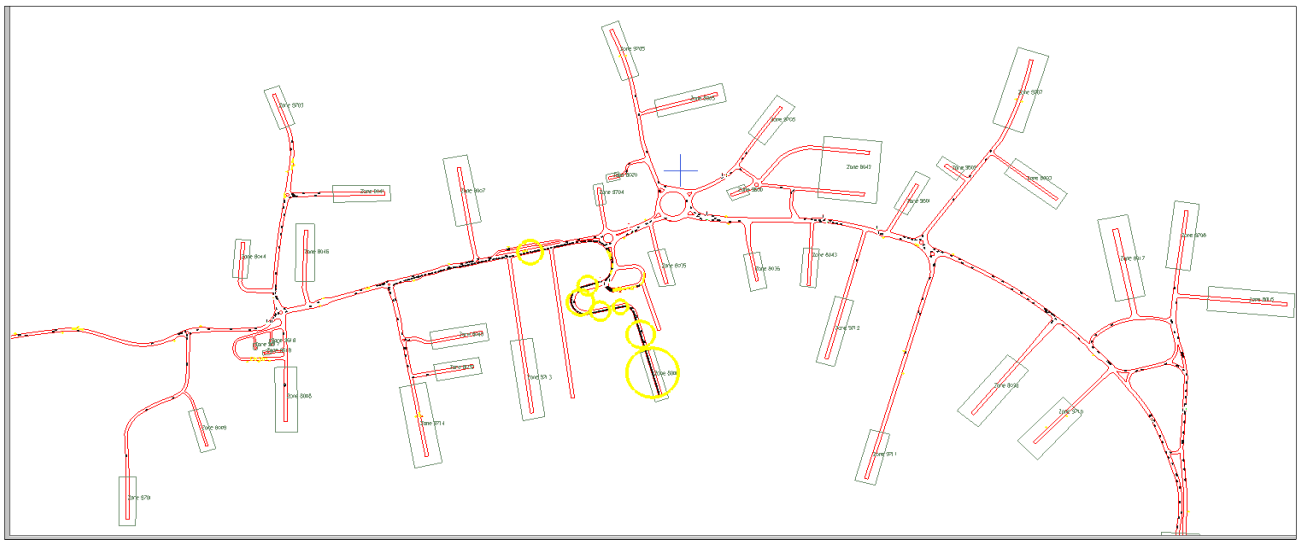

EWC - Old Scheme PM

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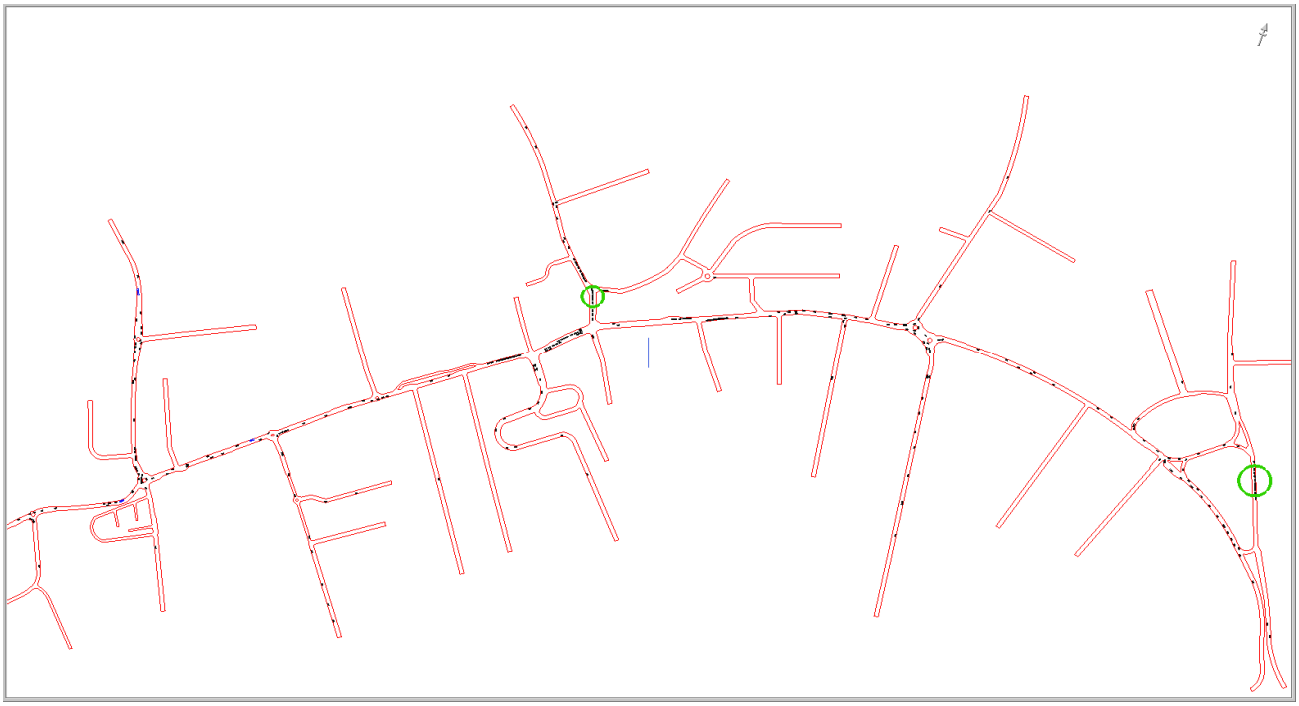

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