Cheshire East Transport Models Review

SUMMARY HIGHWAY IMPACTS AND MITIGATION PROPOSALS FOR LOCAL PLAN STRATEGY

FINAL

May 2014
# Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Introduction</td>
<td>1</td>
</tr>
<tr>
<td>2  Transport Impact of Development Proposals for Crewe</td>
<td>6</td>
</tr>
<tr>
<td>3  Transport Impact of Development Proposals for Macclesfield</td>
<td>23</td>
</tr>
<tr>
<td>4  Transport Impact of Development Proposals for Congleton</td>
<td>31</td>
</tr>
<tr>
<td>5  Transport Impact of Development Proposals for North Cheshire Growth Village (Handforth East Site)</td>
<td>40</td>
</tr>
<tr>
<td>6  Transport Impact of Development Proposals for Knutsford</td>
<td>45</td>
</tr>
<tr>
<td>7  Transport Impact of Development Proposals for Sandbach</td>
<td>50</td>
</tr>
<tr>
<td>8  Transport Impact of Development Proposals for A51 Corridor / Nantwich</td>
<td>56</td>
</tr>
<tr>
<td>9  Transport Impact of Development Proposals for small town / other development locations</td>
<td>61</td>
</tr>
<tr>
<td>10 Conclusion</td>
<td>68</td>
</tr>
<tr>
<td><strong>Appendix A</strong> Technical Review of Transport Models</td>
<td>72</td>
</tr>
<tr>
<td><strong>Appendix B</strong> Plans of the proposed mitigation schemes</td>
<td>75</td>
</tr>
</tbody>
</table>
1 Introduction

The purpose of this report is to review the transport modelling work undertaken by Cheshire East Council (CEC) and their contractors in relation to the Local Plan Strategy Proposals and advise on the acceptability of the development proposals and adequacy of any proposed mitigation measures.

Highway Studies

A number of detailed highway studies have been undertaken for the three largest settlements in the CEC area (Crewe, Macclesfield and Congleton) where the majority of development is proposed to take place. The studies assess the impact of development proposals contained in the Local Plan Strategy. This work required a thorough examination of the potential transport impacts of the proposals. These studies have been undertaken both with regard to the Local Plan and with a view to securing funding for highway schemes from the Local Transport Plan, Strategic Economic Plan and other sources such as the Community Infrastructure Levy (CIL). The outputs of the studies have been used to inform the schemes included in the Local Infrastructure Delivery Plan. Figure 1.1 (overleaf) extracted from the Local Plan Strategy illustrates the location of the key places referred to in the report.

In addition traffic modelling has been undertaken for a number of smaller settlements / locations commensurate with the amount of development proposed as set out in planning guidance. Some of this work has been undertaken to support the council’s determination of planning applications.

Traffic Modelling

Traffic modelling work entails using commercially available computer software (that is approved by the Department for Transport (DfT)). This software is used to replicate existing traffic conditions, based on surveys of traffic volumes by vehicle type, journey times along defined routes, and interviews with car drivers to establish details of journey origins, destinations and purpose. Forecasts are then made of future demand for travel based on general traffic growth (irrespective of new development from the Local Plan Strategy), with traffic generated by the Local Plan Strategy added on top of this. The future year traffic runs are usually undertaken without and with mitigation to allow the impacts of mitigation to be assessed.

The traffic model will usually comprise a network of nodes and links that represent junctions and road between the junctions. It is worth noting that traffic models usually include a detailed model area where all key junctions are modelled in detail and a less detailed area (often referred to as “buffer”) further out, where key junctions are included but no attempt is made to model delay at the junctions. The detailed model area would typically include the whole of an urban area being investigated and sufficient distance beyond this to capture all areas likely to be significantly impacted by the traffic scheme or development traffic under...
consideration. Junction capacities are typically put into the coding of junctions in the
detailed area, as well as the number of traffic lanes, and signal timings. The capacity
and speed of the roads in between junctions (referred to as “links” in the network),
are also included. Link speeds and capacities in the less detailed area typically
include an element of junction delay, to ensure route choice reflects observed delay.

A matrix of movements is constructed to reflect the number of trips between parts of
the model. Trips are aggregated into zones that represent geographical areas where
similar types of trip and patterns of movement are observed.

Traffic in the model is able to choose the optimum route though the network to
minimise delay. This process is known as “assignment”. Typically this process is
iterative, in that the volume of traffic using a junction will dictate how much delay
there is. The amount of delay resulting from the traffic in assignment run one is fed
back into a second assignment whereby traffic will reroute to find the new optimum
route. This process is continued until the amount of traffic switching route is as close
to zero as possible between one assignment and the next.

As noted previously patterns of movement are established for the existing situation
“base year” and for one or more future years “forecast years”. In this case a year
close to the final year of the Local Plan (2030) has typically been used for the
forecasts.

Local Plan Strategy Priorities

There are four strategic priorities in the Local Plan Strategy, which includes
Strategic Priority 4 ¹ which focuses on transport. “Good transport links are crucial for
a successful economy, thriving towns and rural areas and a good quality of life for all
our residents. We want to make sure that our transport system enables people to
got to the places they want to, when they want to; that people can walk and cycle as
a real alternative to the car and that our transport system is integrated across all
modes of transport.” This sets the context for the highway studies.

Separate sections in this report will consider the studies that have been undertaken
in each of the following settlements / development areas:

1. Crewe
2. Macclesfield
3. Congleton
4. Handforth East
5. Knutsford

¹ P53 Cheshire East Local Plan Strategy – Submission Version : March 2014
6. Sandbach

7. Nantwich / A51 Corridor

8. Small towns and other development locations.

The review will include a consideration of the existing situation on the Highway Network with regard to the operation of junctions, vehicle delay, travel times through the network and any other transport related issues. It will also consider the following key questions for each of the above locations:

**What are the significant Highway Impacts?**

– this will include an assessment of the impact of the proposed development on the transport network overall and at specific locations identified as critical to the operation of the network.

**What are the mitigation measures required to address these impacts?**

- A table listing committed Highway schemes will be presented with details of the promoter of the scheme, level of funding commitment, expected opening date.

- A table listing potential new mitigation measures (highway schemes and other measures) to deal with this impact compared to the situation without the mitigation measure(s). This list will include details of the scheme promoter, level of funding commitment, expected opening date plus an assessment of the deliverability of the scheme and any uncertainties, or challenges that may impact on the delivery of the scheme. It should be noted the situation without the new mitigation measures will include the list of committed mitigation measures identified previously. It is important to note that this “do minimum” situation will therefore usually include improvements to the network compared to the existing situation. This “do minimum” position is the appropriate position to compare the impact of the developments to, as these improvements would have happened regardless of any other considerations. It is usually not appropriate to make reference to existing conditions, as general traffic growth and changes to the highway network will provide a different situation in future, regardless of any traffic generated by new development.

**How would the mitigation be planned / resourced and delivered?**

- This will include statements on the need for developer funding to implement mitigation measures and the likelihood of other public funding being secured.
Figure 1.1 Cheshire East Local Plan Strategy Key Diagram

2 Figure 1.1 page 2 Local Plan Strategy, March 2014
What are the issues and requirements for sustainable transport?

- This will include an assessment of the role that public transport currently plays and whether the development proposals will require any revisions or additional public transport to assist in the mitigation of forecast transport issues.

- It will also include consideration of impacts on walking / cycling and the potential for the development increasing the volume of trips made on foot / by bicycle.

Are there any challenges that need to be addressed?

- This section will consider if the mitigation measures have any other issues that need to be addressed before they can be implemented. Where appropriate this will include a consideration of actions that will be required by CEC or others in order to facilitate the implementation of the proposed mitigation schemes.

Overall conclusions for the study area

– Each section will conclude with a section that

1. Summarises the anticipated impacts and required mitigation for the development proposed;

2. Indicates why the development proposals are acceptable in traffic and wider transport terms (with reference to any required mitigation).
Traffic modelling has been undertaken to assess the impact of the proposed Local Plan Strategy development, including residential, employment and commercial sites. The highway impacts of development proposals have been assessed using Cheshire East Council’s (CEC) traffic model for the town (which uses Saturn software). The total amount includes a mixture of existing allocations of committed development, recent completions and new allocations.

Figure 2.1 shows the location of the development proposals in and around Crewe.

The tests undertaken have considered a range of scenarios which included the consideration of six alternative development scenarios. These varied in terms of both location and the volume of development proposed and were used to inform the scale of development appropriate in Crewe, with regard to the wider growth agenda and ‘All Change for Crewe’ Strategy. The precise quantity and location of development included in the Local Plan Strategy has not been tested in the model, however Option 5 provides an adequate reflection of the development proposals contained in the Local Plan Strategy.

The exact development proposals in the Local Plan Strategy for Crewe comprise up to 7,500 new residential units, 65 hectares of employment land, and 5,000 sqm of retail in the town centre, and further convenience retail, in addition to a range of community facilities.

A consistent set of sites was included in all scenarios, with a mix of other sites included to create the alternative scenarios, Table 2.1 below shows the housing numbers in each of the six options.
Table 2.1 Local Plan Residential Development Sizes (Dwellings)

<table>
<thead>
<tr>
<th>Site Ref.</th>
<th>Development</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
<th>Option 4</th>
<th>Option 5</th>
<th>Option 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Basford East</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>3</td>
<td>Basford West</td>
<td>100</td>
<td>200</td>
<td>200</td>
<td>100</td>
<td>300</td>
<td>370</td>
</tr>
<tr>
<td>4</td>
<td>Bombardier</td>
<td>300</td>
<td>0</td>
<td>658</td>
<td>0</td>
<td>624</td>
<td>624</td>
</tr>
<tr>
<td>5</td>
<td>Coppenhall East</td>
<td>850</td>
<td>850</td>
<td>850</td>
<td>850</td>
<td>850</td>
<td>850</td>
</tr>
<tr>
<td></td>
<td>Coppenhall East Extension</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1200</td>
</tr>
<tr>
<td>6</td>
<td>Leighton West</td>
<td>2000</td>
<td>400</td>
<td>1600</td>
<td>1800</td>
<td>1150</td>
<td>1800</td>
</tr>
<tr>
<td>9</td>
<td>Shavington East</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>10</td>
<td>Shavington Triangle</td>
<td>500*</td>
<td>0</td>
<td>0</td>
<td>500*</td>
<td>360</td>
<td>360</td>
</tr>
<tr>
<td>11</td>
<td>South Crewe/Rope</td>
<td>261</td>
<td>1261</td>
<td>261</td>
<td>261</td>
<td>261</td>
<td>1361</td>
</tr>
<tr>
<td>12</td>
<td>Sydney Road</td>
<td>0</td>
<td>0</td>
<td>460</td>
<td>0</td>
<td>0</td>
<td>460</td>
</tr>
<tr>
<td>13</td>
<td>Duchy Land</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Village A, Crewe Hall</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1000</td>
<td>1500</td>
</tr>
<tr>
<td>14</td>
<td>Village B, Barthomley</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1000</td>
<td>2500</td>
</tr>
<tr>
<td>15</td>
<td>Wistaston Green</td>
<td>0</td>
<td>1000</td>
<td>0</td>
<td>750</td>
<td>0</td>
<td>1000</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td></td>
<td><strong>5,011</strong></td>
<td><strong>5,211</strong></td>
<td><strong>5,029</strong></td>
<td><strong>5,261</strong></td>
<td><strong>6,845</strong></td>
<td><strong>13,325</strong></td>
</tr>
</tbody>
</table>

*Houses to be located in Shavington Triangle or Shavington East

The options in Table 2.1 were categorised as follows:

- Option 1 – Urban Regeneration and No Green Gap Sites;
- Option 2 – Green Gap / Southern Focus, a Higher Growth Strategy;
- Option 3 – Northern Crewe / Urban Regeneration Focus;
- Option 4 – Least Impact on Known Highway Hotspots;
- Option 5 – Medium Impact on the Highway Network; and
- Option 6 – Maximum Impact on the Highway Network.

Option 5 was used in the Crewe Impacts and Mitigation Strategy report as this option reflects the closest position to that proposed in the Local Plan Strategy.

There are some developments included in the submission version of the Local Plan Strategy which were not explicitly included in the modelling such as Crewe Green and Sydney Road. However, the quantum of development on the Village A site at Crewe Hall, in Crewe town centre and at Leighton West has reduced from that in Option 5. Given that these developments will all have an impact on the Sydney Road corridor it is considered that the net impact is appropriately modelled. Also, the Council are currently undertaking a detailed microsimulation modelling study of the corridor from Crewe Green to Leighton West (expected completion is June 2014). This is based on the final Local Plan Strategy development proposals and will further refine the mitigation strategy on this corridor.
Also, since the development of Option 5 there has been a slight reduction in development at Shavington, 60 homes between Shavington Triangle and East Shavington sites. This impact in south Crewe will be offset by the increase of 70 homes on the Basford West site, as all three sites will impact on the same strategic corridors.

The most significant difference between Option 5 and the final Strategy is the removal of Village B at Barthomley between Crewe and the M6. However, the inclusion of this site in the modelling ensures that the impact of housing and employment sites in Alsager, in particular the housing at Whitemoss Quarry and strategic employment area at Radway Green, and their impact on the Crewe area is robustly tested through this exercise.

Overall, it is considered that Option 5 offers a robust scenario test and will be representative of the expected impacts of the Local Plan Strategy on the highway network Crewe.

Given the scale of the Leighton West site, an additional set of tests were undertaken to examine alternative allocations of land in the Leighton West area, which were variants on Option 5 “Medium Impact”. In the Leighton West Testing Summary Report these scenarios are referred to as 5a, 5b, 5c and 5d.

The 2006 base highway model was used to run the tests in order to be consistent with previous assessments. It should be noted that analysis of traffic count data collected between 2004 and 2013 indicates that there has been limited growth in traffic. The 2006 base model therefore adequately reflects the current situation.

The future year used for the forecast flows was 2032, which was considered to be representative of the 2030 horizon year for the Local Plan Strategy. In order to forecast the number of trips in each scenario a two stage process was adopted.

Stage 1 = adjusting the 2006 trip matrix to reflect changes in car based trips should no additional development take place “background growth”.

Stage 2 = calculating the number of additional trips associated with each scenario and adding these to the background growth matrix generated in step 1.

Local Plan development trips have been calculated using industry-standard predictions of the level of traffic generated by individual land uses, based on a database of traffic surveys across the United Kingdom known as the national Trip Rate Information Computer System (TRICS). This database is based on observed trips generated by new developments across the United Kingdom.

Development traffic has been distributed across the town’s network using Census data that recorded where residents of Crewe and visitors to the town travelled to work. Adjustments were also made to allow for linked trips to mixed use developments (housing and employment) such as Leighton West and Basford East.
CEC have successfully implemented a programme of measures including travel planning, cycling and walking routes in Crewe funded by £3.2million from the Government's Local Sustainable Transport Fund. A SUSTRANS funded Connect2 project was also completed in 2013 to create a link for pedestrians and cyclists between Nantwich and Crewe. Bus use has also been encouraged under the “All Change for Crewe” initiative. Therefore an 8% reduction was also made to reflect CEC’s continuing commitment to encouraging sustainable travel.

Following the traffic generation and distribution process, it is predicted that the Local Plan development proposals (as included in Option 5) would increase the level of traffic on 2006 Base levels by 43% in the morning peak hour and 34% in the evening peak hour. These increases are expected to occur over the Local Plan period to 2030. Similar increases were predicted for Option 5b (43% in the AM peak and 35% in the PM peak).
Figure 2.1 Crewe Town Development Map

---

3 Figure 15.1 page 180 Local Plan Strategy, March 2014
In addition modelling work has been undertaken in collaboration with the Highway’s Agency to assess the impact of development proposals in Sandbach, Alsager and Crewe on the M6 Motorway and junctions between the local and strategic road networks (ie Junctions 16 and 17 on the M6 Motorway).

This modelling work has examined the incremental impact over time as development is phased over the local plan period up to 2030. The results demonstrate that a gradual worsening of performance is predicted with the addition of the development traffic onto the network without mitigation.

**What are the significant highway impacts?**

Crewe’s highway network is heavily constrained, a function of the limited number of railway crossings. Tests were undertaken to understand the level of existing traffic delay compared with the level of delay expected in the future with development. This was then used to shape the level and location of development and any necessary mitigation measures.

A comparison has been made between the Do Minimum situation (ie without any additional highway schemes to mitigate the impact of developments) and each of the six options (including mitigation schemes to address problems associated with development traffic), with regard to a number of criteria:

1. Distance travelled in the network (increased distances may suggest longer alternative routes are being used to avoid congestion)
2. Time spent by vehicles in the network
3. Changes in overall delay
4. Changes in overall average speed
5. Changes in average delay per vehicle kilometre travelled

Table 2.2 includes the aggregate summary statistics for Option 5 (simulation area only) compared to the situation without any mitigation.

<table>
<thead>
<tr>
<th></th>
<th>Do Minimum</th>
<th>Do Something</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM</td>
<td>IP</td>
</tr>
<tr>
<td><strong>Total pcu Distance (km)</strong></td>
<td>511,856</td>
<td>364,734</td>
</tr>
<tr>
<td><strong>Total pcu Time (hours)</strong></td>
<td>11,047</td>
<td>6,401</td>
</tr>
<tr>
<td><strong>Total pcu Delay</strong></td>
<td>3,363</td>
<td>1,385</td>
</tr>
</tbody>
</table>
Table 2.2 Aggregate Model summary statistics (simulation area only) for Option 5

<table>
<thead>
<tr>
<th>(hours)</th>
<th>46.3</th>
<th>57.0</th>
<th>51.1</th>
<th>48.2</th>
<th>58.0</th>
<th>52.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Speed (kph)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Delay per pcu km (sec/km)</td>
<td>23.6</td>
<td>13.7</td>
<td>16.4</td>
<td>20.6</td>
<td>12.7</td>
<td>14.7</td>
</tr>
</tbody>
</table>

For Option 5 the proposed mitigation will reduce average delay slightly in all three time periods and marginally increases average speeds.

Plots were also created for each option identifying the location and scale of delay at junctions across Crewe. In general, the delay plot analysis shows more and larger delays in the AM and PM peaks, as would be expected, with lesser delays in the inter-peak. Also as expected is junction delay increases where new developments are in close proximity. However Weston Road / University Way consistently experiences large delays. This junction would therefore require additional measures to ensure that it can deal with even minimal levels of development.

As expected, junction delay increases where new developments are in close proximity. Key junctions are illustrated in Figure 2.2 and include:

1. A530 Middlewich Road / Smithy Lane;
2. A530 Middlewich Road / Flowers Lane;
3. Flowers Lane / Bradfield Road / Smithy Lane;
4. A51 / Middlewich Road;
5. Middlewich Road / Wistaston Green Road / Nantwich Road;
6. Crewe Road / A500;
7. Crewe Green Link Road, South Roundabout;
8. Weston Road / University Way;
9. A500 / A531 / A5020;
10. Macon Way (roundabout with A534/A532);
11. A534 Nantwich Road / A5019 Mill Street / B5071 South Street;
12. Sydney Road / Herbert Street; and
13. A534 Crewe Green Road / A5020 University Way / Hungerford Road.

In order to minimise the level of delay a complementary list of mitigation schemes have been developed to help manage the level of impact on the highway network.

The residual impact on the highway network with the mitigation in place is considered to be broadly acceptable.
Figure 2.2 Location of key junctions and key movement corridors in Crewe

*Note* The list of key junctions is on the previous page.
With regard to the strategic network, modelling concluded that both the M6 Junction 16 and 17 Pinch Point schemes (see table below) are successfully able to accommodate development related traffic over the assessment period. In later periods however, delay is experienced at these junctions as a consequence of the significant level of development proposed. It is also worth noting that the model developed for this testing is likely to overstate the level of predicted delay as it is not able to reflect the likelihood of driver behavior changes (both in timing and route choice) in response to increased congestion. CEC are working with the Highway’s Agency to identify additional schemes to increase capacity at junctions 16 and 17 on the M6 in the longer term, which are in the Local Infrastructure Delivery Plan as longer term proposals. Such schemes would be expected to be funded by Local Developer Contributions and other National Funding sources.

**What are the mitigation measures required to address these impacts?**

Targeted mitigation on key growth corridors, such as the Sydney Road / A500 / A530 corridor will ensure that the impact of development on the key transport arteries of the town is prioritised.

**Committed Highway / Transport Schemes:**

<table>
<thead>
<tr>
<th>Scheme / initiative</th>
<th>Scheme Objective / purpose</th>
<th>Funding Source / committed?</th>
<th>Expected completion / delivery date</th>
</tr>
</thead>
<tbody>
<tr>
<td>M6 Junction 16</td>
<td>Relieve congestion on slip roads and on surrounding roads.</td>
<td>Department for Transport Pinch Point programme / S106. £7m Funding Committed</td>
<td>Delivered by Highways Agency and CEC Highways. Expected to be completed in March 2015</td>
</tr>
<tr>
<td>Basford West Spine Road</td>
<td>Provide access to development land and provide relief to congested parts of the network</td>
<td>Department for Transport Pinch Point programme / S106. £4.7m Funding Committed</td>
<td>Expected to be completed in March 2015.</td>
</tr>
<tr>
<td>A500-A5020 Crewe Green Link Road (South)</td>
<td>Provide access to development land and provide relief to congested parts of the network</td>
<td>Department for Transport, Developer Contribution. £26.5m Funding Committed</td>
<td>Planned for completion in Summer 2015</td>
</tr>
</tbody>
</table>
Table 2.3 Committed Mitigation Schemes for Crewe

<table>
<thead>
<tr>
<th>Scheme Description</th>
<th>benefits</th>
<th>Funding Details</th>
<th>status</th>
</tr>
</thead>
<tbody>
<tr>
<td>M6 junction 17 improvements (new roundabout on northbound slip and signals on southbound slip)</td>
<td>Relieve congestion on slip roads and on surrounding roads.</td>
<td>Department for Transport Pinch Point programme. £3.4m Funding Committed</td>
<td>Delivered by Highways Agency. Planned for completion in March 2015</td>
</tr>
<tr>
<td>Crewe to Nantwich Greenway</td>
<td>Provide a safe alternative for sustainable modes of transport along the A51 corridor, to encourage sustainable modes and reduce car trips.</td>
<td>Department for Transport Connect2 initiative. Funding Committed.</td>
<td>Completed in March 2013</td>
</tr>
<tr>
<td>Upgrade of Nantwich Road Urban Traffic Control (UTC) system.</td>
<td>Relieves congestion on the Nantwich Road corridor.</td>
<td>Committed as part of LSTF bid</td>
<td>2015</td>
</tr>
<tr>
<td>Sydney Road Rail Bridge – signals removed and bridge widened to accommodate 2 lanes of traffic operating free-flow;</td>
<td>Relieves congestion at a pinch point on the network.</td>
<td>£2.35m Major Scheme funding, £1.13m S106 contingent on development thresholds being reached. £1.3m from CEC Capital Programme/CIL</td>
<td>CEC Highways/Local Enterprise Partnership Currently proposed for completion in March 2017</td>
</tr>
</tbody>
</table>

**New Mitigation:**

Table 2.4 lists the new mitigation measures that are required to mitigate for the predicted impacts associated with the development proposals included in the Local Plan Strategy.
<table>
<thead>
<tr>
<th>Scheme / initiative</th>
<th>Scheme Objective / purpose</th>
<th>Funding Source</th>
<th>Expected completion / delivery date</th>
<th>Deliverability</th>
</tr>
</thead>
<tbody>
<tr>
<td>A500 corridor improvements Barthomley Link Road to M6 (widening)</td>
<td>To deal with existing problems and impacts of development traffic.</td>
<td>CIL / Department for Transport £25m</td>
<td>To be confirmed</td>
<td>Concept design. Assumes any land requirements are available for the scheme</td>
</tr>
<tr>
<td>Nantwich Road at Gresty Road / South Street improvements</td>
<td>To deal with impacts of development traffic.</td>
<td>CIL and S106 from developers. Partly funded from S106 contributions already</td>
<td>By 2016</td>
<td>Scheme previously developed and funding secured. Land ownership for scheme secured.</td>
</tr>
<tr>
<td>Flag Lane Link – linking Flag Lane and Dunwoody Way via Harrison Drive.</td>
<td>To deal with impacts of development traffic.</td>
<td>CIL and S106 from developers.</td>
<td>Linked to dev’t progress</td>
<td>LTP funding commitment. CEC highways would deliver.</td>
</tr>
<tr>
<td>Crewe Green roundabout junction improvements</td>
<td>To deal with impacts of development traffic.</td>
<td>Developer, Local Transport Plan, Local Enterprise Partnership £5m</td>
<td>To be confirmed</td>
<td>Assumes any land requirements are available for the scheme. Some developer contributions agreed. Detailed design complete.</td>
</tr>
<tr>
<td>Project Description</td>
<td>Objective</td>
<td>Funding Source</td>
<td>Status</td>
<td>Outcome</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>-----------------------------------------</td>
<td>---------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Realignment of Smithy Lane and new roundabout junction on A530</strong></td>
<td>To deal with impacts of development traffic.</td>
<td>S106, CIL, Single Local Growth Fund. £750k</td>
<td>To be confirmed Linked to dev’t</td>
<td>Concept design complete. CEC highways would deliver.</td>
</tr>
<tr>
<td><strong>Realigned A530 Middlewich Road</strong></td>
<td></td>
<td>S106, CIL, Single Local Growth Fund. £5m</td>
<td>To be confirmed – linked to devt</td>
<td>Concept design complete. CEC highways would deliver.</td>
</tr>
<tr>
<td><strong>A51 Nantwich by-pass / A530 roundabout capacity improvements.</strong> *</td>
<td>To address existing congestion and deliver development in the Local Plan.</td>
<td>S106, CIL, CEC Capital Programme</td>
<td>To be confirmed</td>
<td>Concept design work complete. CEC highways would deliver.</td>
</tr>
<tr>
<td><strong>New Link road to access Minshull New Road via new roundabout.</strong></td>
<td>Part of Leighton West network strategy.</td>
<td>S106, CIL</td>
<td>To be confirmed – linked to devt</td>
<td>Network strategy to be developed with the Leighton West development</td>
</tr>
<tr>
<td><strong>Replace signals at junction of Eardswick Lane and Flowers Lane with a new roundabout.</strong></td>
<td>Part of Leighton West network strategy.</td>
<td>S106, CIL</td>
<td>To be confirmed – linked to devt</td>
<td>Network strategy to be developed with the Leighton West development</td>
</tr>
<tr>
<td><strong>Increased capacity and layout changes at Leighton West roundabout</strong></td>
<td>Part of Leighton West network strategy.</td>
<td>S106, CIL</td>
<td>To be confirmed – linked to devt</td>
<td>Network strategy to be developed with the Leighton West development</td>
</tr>
</tbody>
</table>
A51 Nantwich Bypass / A534 roundabout capacity improvements *

To address existing congestion and deliver development in the Local Plan.

S106, CIL, CEC Capital Programme

To be confirmed

Concept design work complete. CEC highways would deliver.

A500 Nantwich Bypass / A51 roundabout capacity improvements *

To address existing congestion and deliver development in the Local Plan.

S106, CIL, CEC Capital Programme

To be confirmed

Concept design work complete. CEC highways would deliver.

Crewe Green Link Road / Weston Road roundabout junction improvement

Improve access to Crewe and employments areas from the strategic network

S106, CIL, CEC Capital Programme

To be confirmed

To be developed.

NOTE *Also included in the Nantwich highway mitigation package

**Table 2.4 New Mitigation Schemes for Crewe**

Although the proposed junction improvements and developer mitigation go a long way to alleviating congestion issues at the identified junctions some high levels of delay still remain and further interventions will be required to support the future operation of the network.

As noted previously mitigation measures are targeted on specific corridors that already experience congestion. Targeted mitigation on key growth corridors, such as the Sydney Road / A500 / A530 corridor will ensure that the impact of development on the key transport arteries of the town is prioritised.

Table 2.5 compares the existing situation to the future year with the proposed mitigation measures in place. This shows that delay increases and speed decreases during all the modelled time periods (morning peak, evening peak and the average inter-peak hour).
<table>
<thead>
<tr>
<th></th>
<th>2006 base model</th>
<th>2032 with mitigation (option 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM</td>
<td>IP</td>
</tr>
<tr>
<td>AM</td>
<td>479,295</td>
<td>322,469</td>
</tr>
<tr>
<td>IP</td>
<td>8,094</td>
<td>4,803</td>
</tr>
<tr>
<td>PM</td>
<td>1,096</td>
<td>570</td>
</tr>
<tr>
<td></td>
<td>59.2</td>
<td>67.1</td>
</tr>
<tr>
<td></td>
<td>8.2</td>
<td>6.4</td>
</tr>
<tr>
<td></td>
<td>511,856</td>
<td>364,734</td>
</tr>
<tr>
<td></td>
<td>11,047</td>
<td>6,401</td>
</tr>
<tr>
<td></td>
<td>3,363</td>
<td>1,385</td>
</tr>
<tr>
<td></td>
<td>46.3</td>
<td>57.0</td>
</tr>
<tr>
<td></td>
<td>23.6</td>
<td>13.7</td>
</tr>
<tr>
<td></td>
<td>367,920</td>
<td>6,349</td>
</tr>
<tr>
<td></td>
<td>520,246</td>
<td>2,125</td>
</tr>
<tr>
<td></td>
<td>12.7</td>
<td>14.7</td>
</tr>
</tbody>
</table>

Table 2.5 Aggregate model statistics for existing (base) situation and future year with proposed mitigation measures.

Table 2.6 compares the future situation without mitigation to the situation with mitigation, which shows how the mitigation limits the increase in delay and reduction in average speeds.

<table>
<thead>
<tr>
<th></th>
<th>2032 without mitigation</th>
<th>2032 with mitigation (option 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM</td>
<td>IP</td>
</tr>
<tr>
<td>AM</td>
<td>511,856</td>
<td>364,734</td>
</tr>
<tr>
<td>IP</td>
<td>11,047</td>
<td>6,401</td>
</tr>
<tr>
<td>PM</td>
<td>3,363</td>
<td>1,385</td>
</tr>
<tr>
<td></td>
<td>46.3</td>
<td>57.0</td>
</tr>
<tr>
<td></td>
<td>23.6</td>
<td>13.7</td>
</tr>
<tr>
<td></td>
<td>367,920</td>
<td>6,349</td>
</tr>
<tr>
<td></td>
<td>520,246</td>
<td>2,125</td>
</tr>
<tr>
<td></td>
<td>12.7</td>
<td>14.7</td>
</tr>
</tbody>
</table>

Table 2.6 Aggregate model statistics for future year (2032) situation without any mitigation and situation with proposed mitigation measures.

These results are likely to be an overestimate of the impact as they take no account of possible changes to driver behaviour (i.e. changing working patterns) or reductions in future trip rate generations (a trend that is continuing). Some of the additional delay would also accrue over time as a result of other background traffic growth.

How would mitigation be planned/resourced and delivered?

The schemes above are included in the Local Infrastructure Delivery Plan and will be part funded through the CIL. Larger, more strategic schemes will also be the subject of funding bids for central government funding.
What are the issues and requirements for sustainable transport?

As noted before CEC have successfully implemented a programme of measures including travel planning, cycling and walking routes, funded by £3.2million of funds from the Government’s Local Sustainable Transport Fund as well as a SUSTRANS funded Connect2 scheme to link Crewe and Nantwich. Bus use has also been encouraged under the “All Change for Crewe” initiative.

Further targeted travel planning and investment in Local Public Transport is proposed, (including improvements in access to the railway station) to achieve a reduction in the number of new vehicle trips on the highway network. Also, there is likely to be redevelopment of the Bus Station site over the next two to three years, which will include provision of a new facility.

Are there any challenges that need to be addressed?

Additional funding is required from other sources to supplement the CIL / developer contributions. Compulsory Purchase Orders may be required for Land, but CEC have undertaken sufficient preparatory work for this to be completed at the appropriate time.

Overall conclusions for Crewe.

The mitigation measures proposed across Crewe have been particularly focused on key corridors where impacts from development traffic have been minimised or neutralised.

1. Summary of anticipated impacts and required mitigation for the development proposed;

   The development proposals lead to an increase in delay and reduction in average speeds compared to the current situation. The proposed mitigation measures are able to limit the increase in delay and reductions in average speed. The Average speed moves from moving from 59.5kph in the base year to 52.2kph with the mitigation measures in place

   It should be noted again that the results are likely to be an overestimate of the impact as they take no account of possible changes to driver behaviour (i.e. changing working patterns) or reductions in future trip rate generations (a trend that is continuing). Some of the additional delay would also accrue over time as a result of other background traffic growth.

2. Justification as to why the development proposals are acceptable in traffic and wider transport terms;

   The level of delay forecast to occur with the level of development is broadly acceptable in order to deliver the economic vision for Crewe. Key corridors have been identified and protected from the largest increases in travel time. Journey times on the Sydney Road / A500 / A530 corridors have been
prioritised, maximising Crewe’s network connectivity. Further and continued
Investment in Crewe’s public transport infrastructure (the most
comprehensive provision in Cheshire East) will help address potential
problems associated with local trips. Evidence from recent investment has
already demonstrated that there is scope to significantly manage demand for
short distance travel by private car through modal transfer to more
sustainable modes.

Further analysis and assessment is contained in the full Crewe Town &
Leighton West study reports.
Traffic modelling has been undertaken to assess the impact of development proposals comprising up to 3,500 new residential units, 15 hectares of employment land, and 7,000 sqm of convenience retail, in addition to a range of community facilities. Figure 3.1 shows the location of these proposals on a map of Macclesfield and surrounds. The highway impacts of development proposals have been assessed using Cheshire East Council’s (CEC) traffic model for the town (which uses S-Paramics software).

Local Plan Strategy development trips have been calculated using industry-standard predictions of the level of traffic generated by individual land uses, based on a database of traffic surveys across the country. Development traffic has been distributed across the town’s network using Census data that recorded where residents of Macclesfield and visitors to the town travelled to work. Following the traffic generation and distribution process, it is predicted that the Local Plan Strategy development proposals would increase the level of traffic on 2012 Base levels by 15% in the morning peak hour and 18% in the evening peak hour. These increases are expected to occur over the Local Plan period to 2030.

What are the significant highway impacts?

Traffic modelling shows that areas of the existing highway network already operate over capacity during the peak hours. Significant infrastructure improvements are required to avoid severe impacts on the highway network. During the Local Plan period (up to 2030) a number of highway infrastructure improvements have been identified for delivery. The following key locations have been identified from initial modelling work for highway infrastructure improvements:

- A537 Chester Road corridor, from the Broken Cross junction to Fieldbank Road;
- A537 Cumberland Street corridor, from the Prestbury Road roundabout to Churchill Way;
- The A523 Silk Road / Hibel Road junction;
- A536 Congleton Road / B5088 Oxford Road ‘Flowerpot’ junction;
- A538 Churchill Way / A536 Park Road roundabout;
- A523 Silk Road, between Buxton Road and Brook Street; and
- A523 Mill Lane, between the Silk Road and Windmill Street.

In the absence of any improvements, journey times would be expected to increase to unacceptable levels, with the average journey increasing by over 50%.
With future development in the town, almost all routes will experience an increase in traffic during the morning and evening peak periods. The greatest traffic flow increases are shown to occur in the A536 Congleton Road corridor, the A523 London Road / Silk Road corridor, and the A537 Chester Road / Chelford Road corridor.

Table 3.1 lists the predicted network wide average journey times (in seconds) for the morning and evening peaks, for the existing 2012 situation and the future year situation without any mitigation.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Time Period</th>
<th>Average Journey Time (Seconds) 2012 existing situation</th>
<th>Average Journey Time (Seconds) 2030 without Local Plan Strategy proposals (Future Base)</th>
<th>Average Journey Time (Seconds) 2030 with Local Plan Strategy (no mitigation)</th>
<th>% change from future base to future with Local Plan Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM peak</td>
<td></td>
<td>400</td>
<td>400</td>
<td>617</td>
<td>54%</td>
</tr>
<tr>
<td>PM peak</td>
<td></td>
<td>458</td>
<td>484</td>
<td>803</td>
<td>66%</td>
</tr>
</tbody>
</table>

Table 3.1 Network wide average journey time comparisons (without mitigation)
Figure 3.1 Macclesfield Town Development Map

Figure 15.12 page 220 Local Plan Strategy, March 2014
What are the mitigation measures required to address these impacts;

A range of measures were tested to mitigate the proposed Local Plan development. In Macclesfield, the focus has been on improvements to the existing highway network rather than extensive new highway infrastructure. This has been shaped by a review of the outputs of detailed highway modelling. Measures can be delivered on a phased basis as and when development occurs and funding is available. With the proposed mitigation strategy in place it is considered that an acceptable level of mitigation can be achieved.

Journey times on a number of individual routes across the town have been reviewed to establish the level of development impact. On a small number of routes, significant increases in journey times are still predicted to occur following the implementation of mitigation measures. Significant increases are predominantly concentrated on short stretches of the network, or individual junctions.

The “Macclesfield Movement Strategy” encompasses the necessary mitigation measures required to address the identified transport issues, as outlined in the next section.

A number of schemes are being developed close to Macclesfield that will improve strategic transport connections. These include the Poynton Relief Road and potential improvements on the A523 between Poynton and Macclesfield, to improve safety and potentially increase capacity. A multi modal strategy examining what can done to reduce the level of private car trips (with a particular focus on the A523 corridor) is under development as part of the Poynton Relief Road work.

Table 3.2 lists the new mitigation measures that are required to mitigate for the predicted impacts associated with the development proposals included in the Local Plan Strategy.

<table>
<thead>
<tr>
<th>Scheme / initiative</th>
<th>Scheme Objective / purpose</th>
<th>Funding Source</th>
<th>Expected completion / delivery date</th>
<th>Deliverability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Link Road from A536 Congleton Road to A523 London Road</td>
<td>To deal with impacts of development traffic.</td>
<td>CIL and S106 from developers. £17.5m</td>
<td>To be confirmed linked to dev’t</td>
<td>To be funded by LEP and dev’t</td>
</tr>
<tr>
<td>A523 Poynton to Macclesfield Improvements</td>
<td>To improve links to / from the M6 from / to Macclesfield and maximise the</td>
<td>CIL and Single Local Growth Fund. £5m</td>
<td>To be confirmed, linked to the delivery of the Poynton Relief Road</td>
<td>Feasibility work underway.</td>
</tr>
<tr>
<td>Project</td>
<td>Description</td>
<td>Funding</td>
<td>Status</td>
<td>Responsible Authority</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>---------</td>
<td>--------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Highways advantages of the SEMMMs / Poynton Relief Road schemes.</td>
<td>Scheme (expected to be open in 2018)</td>
<td>CIL £8m</td>
<td>To be confirmed Linked to dev’t or funding bids</td>
<td>Detailed design complete. To be delivered by CEC highways.</td>
</tr>
<tr>
<td>Town Centre Movement Strategy, including improvements to the Cumberland Street Corridor.</td>
<td>To deal with impacts of development at key locations in the town centre.</td>
<td>CIL and S106 from developers. £2m</td>
<td>To be confirmed Linked to dev’t</td>
<td>Concept design complete. Delivered by CEC Highways</td>
</tr>
<tr>
<td>Silk Road / Hibel Road roundabout – proposed signals</td>
<td>To deal with impacts of development</td>
<td>CIL and S106 from developers. £1.5m</td>
<td>To be confirmed Linked to dev’t</td>
<td>Concept design complete. Delivered by CEC Highways</td>
</tr>
<tr>
<td>Hibel Road junction improvements and signal coordination</td>
<td>To deal with impacts of development</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broken Cross proposed signalised crossroads</td>
<td>To deal with impacts of development</td>
<td>CIL and S106 from developers. £770k</td>
<td>To be confirmed Linked to dev’t</td>
<td>Detailed design complete. To be delivered by CEC highways</td>
</tr>
<tr>
<td>Flowerpot junction – capacity improvements</td>
<td>To deal with impacts of development</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Description</td>
<td>Mitigation Aim</td>
<td>Funding Details</td>
<td>Status</td>
<td>Delivery Responsibility</td>
</tr>
<tr>
<td>---------------------</td>
<td>----------------</td>
<td>----------------</td>
<td>--------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>A537 Chester Road / Ivy Road junction improvements</td>
<td>To deal with impacts of development</td>
<td>CIL and S106 from developers. £770k</td>
<td>To be confirmed Linked to dev’t</td>
<td>Detailed design complete. To be delivered by CEC highways.</td>
</tr>
<tr>
<td>A537 Chester Road / Fieldbank Road provision for right turn storage</td>
<td>To deal with impacts of development</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Macclesfield Canal towpath improvements</td>
<td>To improve sustainable transport links into the town centre.</td>
<td>Canal and River Trust, CIL, S106 from developers and external grants. £500k</td>
<td>To be confirmed</td>
<td>Initial design complete. To be delivered by CEC highways and Canal and River Trust.</td>
</tr>
<tr>
<td>Improvements to walking and cycling links between Tytherington and Macclesfield town centre.</td>
<td>To improve sustainable transport links into the town centre.</td>
<td>CIL, and S106 from developers. £107k</td>
<td>To be confirmed Linked to dev’t</td>
<td>Concept design complete. To be delivered by CEC highways.</td>
</tr>
</tbody>
</table>

**Table 3.2 New Mitigation for Macclesfield**

In selected locations more than one mitigation option exists, each with associated pros and cons. Highway improvements will continue to be developed by CEC, with further consideration of the relative advantages in terms of capacity benefits against the deliverability of the scheme. Nevertheless, CEC is committed to deliver the necessary highway improvements identified.

Table 3.3 lists the predicted network wide average journey times (in seconds) for the morning and evening peaks for, the future year base (without development), the future year situation (with development) without any mitigation and the situation with development and all the proposed mitigation.

Implementation of the improvements is predicted to minimise the impacts of the proposed development. Delivery of the improvements would minimise increases in average journey times across the town to around 15% (as illustrated in Table 3.3).
This level of increase over the Local Plan period is considered to be reasonable, and on the basis of the identified highway improvements, can be accommodated without severe impact.

With the full mitigation strategy in place the average journey times across the modelled highway network would increase by less than 15% and over an extended period, this is likely to be an overestimate as drivers adjust their behaviour over time. This would entail revising the timing of journeys to avoid the peak, more working from home and so on.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>AM peak</th>
<th>PM peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Period</td>
<td>Average Journey Time (Seconds) 2030 without Local Plan Strategy proposals (Future Base)</td>
<td>Average Journey Time (Seconds) 2030 with Local Plan Strategy (no mitigation)</td>
</tr>
<tr>
<td>2030 without Local Plan Strategy proposals (Future Base)</td>
<td>400</td>
<td>617</td>
</tr>
<tr>
<td>2030 with Local Plan Strategy (no mitigation)</td>
<td>484</td>
<td>803</td>
</tr>
</tbody>
</table>

Table 3.3 Network wide average journey time comparisons (with mitigation)

How would mitigation be planned/resourced and delivered?

The schemes above are included in the Local Infrastructure Delivery Plan and will be part funded through the CIL. Larger, more strategic schemes will also be the subject of funding bids for central government funding. Schemes will be prioritised for incremental delivery aligned to the pace and location of development.

What are the issues and requirements for sustainable transport;

Targeted travel planning and investment in Local Public Transport are proposed, (including access to the railway station) to achieve a reduction in the number of new vehicle trips on the highway network.

Two schemes are specifically identified in the Local Infrastructure Delivery Plan and listed in Table 3.1 that will improve facilities for pedestrians and cyclists.

In addition the Macclesfield Town centre Movement Strategy will assess pedestrian, cycling and Public Transport provision, with respect to meeting modal split targets identified in the Local Transport Plan.
Given the commitment to the provision of facilities for sustainable transport an 8% reduction was made to future year demand for travel. A multi-modal strategy examining what can be done to reduce the level of private car trips (with a particular focus on the A523 corridor) is also under development as part of the Poynton Relief Road work.

**Are there any challenges that need to be addressed?**

To achieve significant capacity enhancements that address existing congestion issues and minimise the additional impacts of the proposed development, significant highway improvements will be required. CEC is committed to deliver the necessary highway improvements identified.

**Overall conclusions for Macclesfield.**

1. **Summary of anticipated impacts and required mitigation for the development proposed;**

   The proposals have relatively modest impacts on junctions and hence journey times across Macclesfield. The proposed mitigation measures would address most of the identified issues but some localised delay would remain. Mitigation could be delivered on an incremental basis.

2. **Justification as to why the development proposals are acceptable in traffic and wider transport terms;**

   It is acknowledged that the town currently experiences peak period congestion, and development is predicted to increase average journey times across the town. Whilst drivers would be expected to notice increases in journey times as they experience additional delay at selected locations, the increases will take a number of years to occur, and may well be further mitigated as drivers retune their journeys to avoid peak congestion or increase the amount of time they work from home. On this basis, the modelling suggests that traffic flow increases associated with the proposed level of development can be mitigated to avoid severe impact to the operation of the local highway network.
Traffic modelling has been undertaken to assess the impact of development proposals comprising up to 3,500 new residential units, 24 hectares of employment land, and appropriate convenience retail space to meet local needs, in addition to a range of community facilities. Figure 4.1 shows the location of these proposals on a map of Congleton and surrounds. The highway impacts of development proposals have been assessed using Cheshire East Council’s (CEC) traffic model for the town (which uses SATURN software).

**What are the significant highway impacts?**

Key junctions that suffer congestion and where development traffic increases the scale and duration of queuing include:

- A34 Rood Hill / A54 Rood Hill / A34 Clayton By-pass (signalised junction)
- A34 Clayton By-pass / Barn Road / A34 Clayton By –pass (roundabout junction)
- A34 West Road / West Street / A34 Clayton By-pass (roundabout junction)
- A34 West Road / A54 Holmes Chapel Road / A34 Newcastle Road / A534 Sandbach Road (roundabout junction / gyratory)

The Council is promoting a new link road between the A536 Macclesfield Road (to the north east near to the village of Eaton) and the A534 Sandbach Road (to the west of Congleton). This road is known as the “Congleton Link Road” or CLR and it would be the preferred mitigation measure. Figure 4.1 includes several possible routes under consideration for the proposed CLR scheme.

The location of the proposed development in Congleton is ideally located to reduce the impact on the existing highway network; trip making patterns are generally biased to the north in this area.

This has wider benefits over and above the base mitigation strategy, including improving access to employment, addressing Air Quality Management Areas (AQMAs), reducing community severance on existing routes and improving strategic highway links across the Borough.

Should the work to develop the Congleton Link Road be unsuccessful in securing funding or the delivery of the scheme be delayed or (for reasons unknown) the scheme was not deliverable on a phased basis, an alternative (sub optimal) local mitigation strategy has been developed (commonly referred to by the DfT as a “low cost alternative”), that addresses issues resulting from the proposed development.

A package of measures including upgrades to key junctions with localised widening to two lanes in each direction would increase capacity at these junctions. The
location of the proposed improvements is illustrated in Figures B-2 and B-3 in Appendix B. These improvements are at a preliminary stage of development and have been designed to squeeze as much additional highway capacity out of the existing network as possible and using existing highway land to address deliverability issues.

Whilst allowing the delivery of the proposed Local Plan allocations, this approach does not deliver the wider network improvements of the new link road and may have a detrimental impact on a larger number of existing properties than the CLR alternative, (as existing roads are widened in more densely populated areas).

However, this approach does offer some traffic benefits, providing sufficient additional capacity to deliver the local plan growth (but less than the new link road). It does however do little to address air quality, severance or allow the redistribution of existing road space of other uses (cycleway, enhanced bus provision, etc.) which is part of the wider link road strategy.

Table 4-1 compares the average speed in the current situation (“base year”) across the modelled area with the situations with on line mitigation and the preferred CLR scheme. Red shading indicates a significant increase (greater than 4 seconds), orange a modest increase (between 1 and 4 seconds), and yellow a small increase (less than 1 second), compared to the current situation.

The key conclusion is that the CLR limits the increase in delay, to smaller amount than the on line scheme which makes delay significantly worse, particularly in the PM peak.

Table 4-1 : Average Delay across the network comparison between base year (2012) and 2032 with alternative mitigation schemes

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Average Delay 2012</th>
<th>Average Delay 2032 – Do Minimum</th>
<th>Average Delay 2032 – On Line Scheme</th>
<th>Average Delay 2032 – CLR Preferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM</td>
<td>12.7</td>
<td>17.0</td>
<td>17.2</td>
<td>12.9</td>
</tr>
<tr>
<td>IP</td>
<td>7.7</td>
<td>12.4</td>
<td>11.6</td>
<td>9.0</td>
</tr>
<tr>
<td>PM</td>
<td>12.6</td>
<td>25.4</td>
<td>23.3</td>
<td>14.4</td>
</tr>
</tbody>
</table>

The aggregate statistics can be compared to the AM peak average delay in Crewe (a larger urban area), which would be expected to be more congested. Delay in Crewe is modelled to be 8.2 seconds per kilometre in the base 2006 situation, which compares to 12.7 seconds for the AM peak in Congleton in 2012. Although limited traffic growth between 2006 and 2012 would be expected to have increased delay in Crewe by a small amount in the intervening period, delay in Crewe in 2012 would still
Highways not be greater per kilometre travelled than it is Congleton. This suggests that peak period delay in Congleton is already a problem.
Figure 4.1 Congleton Town Development Map

5 Figure 15.25 page 256 Local Plan Strategy, March 2014
What are the mitigation measures required to address these impacts;

Committed Highway Schemes, including:

- M6 junction 17 improvements (new roundabout on northbound slip and signals on southbound slip)

**New Mitigation scheme include:**

Either:

**Preferred Mitigation** – New single carriageway Congleton Link road to link the A536 Macclesfield Road to the A534 Sandbach Road. This both mitigates the proposed development impact on the highway network and provides an improvement over the existing operation of the highway network as well as providing a range of wider benefits. If necessary this scheme could be delivered on a phased basis.

**Base Mitigation** – A corridor improvement scheme along the A34 corridor through Congleton has been developed which provides an acceptable level of mitigation of the proposed development traffic.

**Table 4.2** illustrates the forecast impacts of the CLR on various aggregate statistics that include a measure of delay, average speed and average delay per pcu.

**Table 4.3** illustrates the forecast impacts of the On-Line mitigation scheme on various aggregate statistics that include a measure of delay, average speed and average delay per pcu.

**How would mitigation be planned/resourced and delivered?**

The schemes above are included in the Local Infrastructure Delivery Plan and will be part funded through the CIL.

The majority of the scheme funding for the new CLR (A536 – A534 link road) will be the subject of a funding bid for central government funding (through devolved funding streams). The Council has recently submitted its bid to government through the Cheshire and Warrington LEP Strategic Economic Plan for Local Growth Funding towards the CLR.

Public Consultation, scheme development and funding bid success will assess the likelihood of the Link Road scheme proceeding in full. If not, the scheme is capable of being delivered on a phased basis or as a last alternative; the on-line mitigation strategy will allow the proposed development to be delivered without severe highway impacts.
What are the issues and requirements for sustainable transport?

The nature of the existing observed movements in the Congleton area is such that public transport is not a viable alternative to the private car for most trips. However, targeted travel planning and investment in Local Public Transport will be investigated, to achieve a reduction in the number of new vehicle trips on the highway network.

It is considered that the ‘clustering’ of development as proposed will be more likely to allow the sustainable delivery / extension of the public transport network.

The Bus and Rail network

It should be noted that the Congleton Public Transport network is not dense and has a relatively small commercial bus network. Rail services are largely limited to an hourly stopping service to/from Stoke and to/from Manchester via Stockport.

Most of the existing trips and new trips associated with the new development have origins and destinations that are distant from the existing public transport network. Although these trips will be encouraged to change mode where possible through enhanced public transport provision, the nature and disbursement of the trips suggests that local highway interventions are necessary.

A complimentary multi modal strategy will however be developed in parallel with the CLR to make the best use of capacity on the existing A34 corridor that is ‘released’ by the CLR. This may include new/improved bus facilities and improvements to existing crossing facilities or the provision of new facilities for pedestrians and cyclists. This will encourage trips within Congleton (for example from existing housing in Congleton, to new employment opportunities, as well as trips from new housing to existing shops and schools) to use sustainable modes.

The on-line mitigation scheme has limited scope to improve facilities for sustainable modes as the on-line scheme increases flows of traffic along the existing A34 corridor.

Are there any challenges that need to be addressed?

The CLR scheme has yet to receive funding from Government, but a submission has been made for funding from the Strategic Economic Plan. A major scheme business case is being developed.
Overall conclusions for Congleton.

a. Summary of anticipated impacts and required mitigation for the development proposed;

The level of development proposed for Congleton inevitably increases pressure on the existing highway network that require improvements to the Highway Network to mitigate potential impacts.

As can be seen in the information in Table 4-1 (above) and Table 4-2 (below), the CLR easily mitigates the proposed development impact on the highway network, actually provides an improvement over the existing operation of the highway network for key movements as well as providing a range of wider benefits. The modelling evidence supports that CLR is the preferred mitigation scheme.

All proposed development is accommodated with no significant deterioration in operating conditions. It should be noted that the CLR would generate benefits in terms of reduced delay, noise and accidents and improved air quality even if only minimal levels of development was proposed. The scheme has been developed over a period of nearly 2 year. A preferred route has been identified and is currently being considered by Council members. This scheme could be delivered on a phased basis.

The minimum level of mitigation required to accommodate the proposed level of development is an on-line improvement scheme along the A34 corridor. As demonstrated in Table 4-3 (below) the scheme generally reduces the impact of the development compared to the situation without any mitigation. Localised improvements in conditions at the A34 West Road / West Street roundabout are offset by a deterioration of conditions at the A34 Clayton By-pass / A54 Rood Hill traffic signals. By contrast to the CLR the on-line scheme does little to address wider existing problems such as Air Quality, Severance, and economic regeneration which accrue with the CLR.

Further analysis is contained in the detailed Congleton Report6.

b. Justification as to why the development proposals are acceptable in traffic and wider transport terms;

The development proposed is acceptable with the proposed levels of mitigation (preferred and minimum mitigation). However, it is recognised that the net impact on the Highway network with the preferred scheme is significantly better than with the on line improvement scheme

---

6 Congleton Traffic Model, Assessment of Local Plan Strategy Highway Impacts and Mitigation, May 2014
With the CLR in place the local road network can accommodate all the development proposals in the Local Plan Strategy.

The CLR provides sufficient capacity to accommodate all the proposed development as well as addressing long standing traffic related issues such as air quality and severance, caused by traffic on the A34 in particular. It is important to note that there is a significant improvement with CLR in place compared to the existing situation on many roads within Congleton. The scheme is a viable prospect for external funding, is well developed and if necessary can be delivered on a phased basis, to match the available level of funding.

The preferred mitigation scheme (CLR) would be expected to be funded from a mix of Government funding, CIL and developer contributions, and would deliver wider benefits and a general improvement across the Congleton highway network, compared to the current situation.

Early indications suggest that the on-line improvements are likely to provide sufficient capacity to accommodate the proposed amount of development. They do not however address all the existing transport issues in the town including severance, air quality and noise issues. Localised problems may increase at some locations. The on-line scheme needs to be delivered in its’ entirety in order to provide the necessary enhancements in capacity to accommodate development related traffic. A phased delivery is not viable in terms of providing the capacity necessary to accommodate the proposed development in the Local Plan Strategy.

This scheme is expected to derive funding from developers via the CIL and may also require Local Growth Fund or additional CEC funds to allow it to be delivered. It would however require less CEC / LEP funding than the CLR.
### Table 4-2: Network wide impacts in 2032 (summary statistics without and with the CLR scheme).

<table>
<thead>
<tr>
<th>Year : 2032</th>
<th>Without Mitigation</th>
<th>Do Something</th>
<th>CLR Preferred mitigation</th>
<th>DIFFERENCE</th>
<th>% DIFFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM</td>
<td>IP</td>
<td>PM</td>
<td>AM</td>
<td>IP</td>
<td>PM</td>
</tr>
<tr>
<td><strong>Total pcu Distance (km)</strong></td>
<td>124,229</td>
<td>83,458</td>
<td>125,749</td>
<td>125,184</td>
<td>84,605</td>
</tr>
<tr>
<td><strong>Total pcu Time (hours)</strong></td>
<td>2,469</td>
<td>1,564</td>
<td>2,789</td>
<td>2,266</td>
<td>1,475</td>
</tr>
<tr>
<td><strong>Total pcu Delay (hours)</strong></td>
<td>588</td>
<td>288</td>
<td>888</td>
<td>448</td>
<td>211</td>
</tr>
<tr>
<td><strong>Average Speed (kph)</strong></td>
<td>50.3</td>
<td>53.4</td>
<td>45.1</td>
<td>55.2</td>
<td>57.4</td>
</tr>
<tr>
<td><strong>Average Delay per pcu km (sec/km)</strong></td>
<td>17.0</td>
<td>12.4</td>
<td>25.4</td>
<td>12.9</td>
<td>9.0</td>
</tr>
</tbody>
</table>

### Table 4-3: Network wide impacts (summary statistics without and with the on line scheme).

<table>
<thead>
<tr>
<th>Year : 2032</th>
<th>Without Mitigation</th>
<th>Do Something</th>
<th>On line mitigation</th>
<th>DIFFERENCE</th>
<th>% DIFFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM</td>
<td>IP</td>
<td>PM</td>
<td>AM</td>
<td>IP</td>
<td>PM</td>
</tr>
<tr>
<td><strong>Total pcu Distance (km)</strong></td>
<td>124,229</td>
<td>83,458</td>
<td>125,749</td>
<td>124,087</td>
<td>83,693</td>
</tr>
<tr>
<td><strong>Total pcu Time (hours)</strong></td>
<td>2,469</td>
<td>1,564</td>
<td>2,789</td>
<td>2,470</td>
<td>1,549</td>
</tr>
<tr>
<td><strong>Total pcu Delay (hours)</strong></td>
<td>588</td>
<td>288</td>
<td>888</td>
<td>591</td>
<td>269</td>
</tr>
<tr>
<td><strong>Average Speed (kph)</strong></td>
<td>50.3</td>
<td>53.4</td>
<td>45.1</td>
<td>50.2</td>
<td>54.0</td>
</tr>
<tr>
<td><strong>Average Delay per pcu km (sec/km)</strong></td>
<td>17.0</td>
<td>12.4</td>
<td>25.4</td>
<td>17.2</td>
<td>11.6</td>
</tr>
</tbody>
</table>
As part of the Local Plan the North Cheshire Growth Village is proposed east of Handforth, to the south of the A555 and adjacent to the A34. This is the only new settlement proposed in the Local Plan. Traffic modelling has been undertaken to assess the impact of development proposals comprising up to 1,850 new residential units, 12 hectares of employment land, and convenience retail to meet local needs, in addition to a range of community facilities. Figure 5.1 shows the detailed site location. Figure 1.1 (in section 1) shows the location close to Handforth on the northern edge of the CEC area.

What are the significant highway impacts?

Currently during the AM and PM peak periods the A34 suffers from congestion at a number of junctions towards Manchester. In 2001 the South East Manchester Multi Modal Study (SEMMMS) recommended that a highway scheme should be built to provide a new east-west link between the A6 and M56, which is known as the A6 Manchester Airport Relief Road (A6MARR). This road will alleviate some of the existing congestion issues in the area, as will the proposed Poynton Relief Road, which ties in with the A6MARR road to the east of the site. These schemes are intended to promote economic growth; a function of which must include new housing.

Relatively limited growth in housing numbers is planned in this locality; one of the reasons for this is the existing congestion on the A34 corridor.

An alternative scenario has also been tested that delivers a similar number of houses spread across 4 sites in the north of the CEC area. Modelling tests have been undertaken that compare the North Cheshire Growth Village with this alternative scenario. These tests have been undertaken with the A6MARR traffic model maintained by HFAS (provider of transport modelling services for the Greater Manchester Authorities). The distribution of trips is assumed to be the same for both scenarios (ie the origin / destination of trips to / from the development sites is the same for the four site scenario and the North Cheshire Growth Village scenario).

The overall results can be summarised as follows:

a) There is no significant change in the operation of the majority of the junctions on the A34 and A555 corridors, (with the A555/ A5102 North dumb-bell junction improving its’ operation) with the single North Cheshire Growth Village Site.

b) A single North Cheshire Growth Village Site has a slightly reduced overall impact compared to the four Alternative Sites combined.
c) A single North Cheshire Growth Village Site has a greater impact on the A34 immediately to the south of the proposed site (in CEC’s area) when compared to the four Alternative Sites combined, but the impact is similar north of the A555 (in the Stockport Metropolitan Borough Council (SMBC) area).

This work shows that wherever housing is located in this area highway trips will gravitate to the A34 corridor. On this basis, it is considered that the relatively small growth that has been allocated in this location is best delivered in a sustainable community to provide the critical mass necessary to make public transport measures effective and reduce the quantum of new trips on the highway network, compared to smaller housing sites located along the A34 and A555 corridors.

Whilst the addition of the North Cheshire Growth Village results in no significant change in the operation of the majority of the junctions on the A34 and A555 corridors, there are four junctions where their operational performance is predicted to get worse. Three of these junctions are on the A34 within Stockport and one is in Cheshire East immediately adjacent to the site.

The junctions where operating conditions are predicted to get worse are:

1. A34 / A560 Gatley signals (SMBC area)
2. A34 / B5094 gyratory (SMBC area)
3. A34 / A555 gyratory (SMBC area)
4. A34 / Handforth Dean Retail Park dumb-bell (West) (CEC area)

What are the mitigation measures required to address these impacts?

It is however expected, that as part of the North Cheshire Growth Village a number of additional improvement schemes will be required to mitigate the local impact of the traffic that the site will generate. These could include:

- A new junction with the A555 serving the proposed site.

Strategic travel plan, which may include:

- Improved walking, cycling and bus links to local stations serving Manchester.
- Improved bus services to key service centre locations, including Manchester Airport.
- Provision of essential services within the site, including shops, education and employment.
Highways

- Park and ride provision.
- Junction improvement contributions in the SMBC area, including the A34 corridor.

The highway improvements will be developed as part of the masterplan for the North Cheshire Growth Village (Handforth East) site and detailed in the Local Infrastructure Delivery Plan and will require funding through CIL/S106 contributions.

A multi modal study of the A34 corridor is now underway to understand what additional measures could be implemented to address the broader congestion impacts on the A34 corridor.

What are the issues and requirements for sustainable transport?

The package of sustainable transport measures includes improved walking, cycling and bus links to local stations serving Manchester. There are challenges with regard to the capacity of the existing rail network to support increased service frequencies or provide additional seating. The Northern Hub scheme (which has secured funding) will address some of these issues by removing the infrastructure constraints on the rail network that currently restrict the network capacity.

The package also proposes improved bus services to key service centre locations, including Manchester Airport. If these are not commercially provided, services will require revenue support for at least an initial “pump priming” period. CEC funds for revenue support for existing services are already limited.

Are there any challenges that need to be addressed?

Some of the mitigation measures need to be agreed jointly with SMBC as they would be delivered in the SMBC area.

Overall conclusions for North Cheshire Growth Village.

1. Summary of anticipated impacts and required mitigation for the development proposed;

   The study is expected to conclude that a new junction on the A555 is likely to be required. Other highway measures will include improvements to junctions in the Stockport Metropolitan Borough Council area, including the A34 corridor. Measures to limit the number of additional car trips will include improved walking and cycling links to local railway stations at Handforth, Bramhall and Cheadle Hulme, improved bus services and Park&Ride. These improvements would be funded by developer contributions through CIL / S106 contributions.

2. Justification as to why the development proposals are acceptable in traffic and wider transport terms;
The proposed mitigation will address some of the existing problems on the A34 corridor as well as permitting the proposed level of development at the Growth Village. The new development is ideally placed to minimize the level of new trips on the highway network.
Figure 5.1 North Cheshire Growth Village

---

7 Figure 15.30b page 270 Local Plan Strategy, March 2014
Traffic modelling has been undertaken to assess the impact of development proposals comprising up to 650 new residential units, 10 hectares of employment land, and convenience retail to meet local needs, in addition to a range of community facilities (including a new primary school). This is split over two sites (North West Knutsford and Parkgate Extension) which are illustrated in figure 6.1 below.

The amount of development proposed (650 houses) is relatively small and is commensurate with a town the size of Knutsford (population around 13,000 in 2011).

**What are the significant highway impacts?**

Development detailed in the Local Plan Strategy is expected to impact upon the operation of the highway network on the A50 and A537 corridors, and at the following locations in particular:

- Brook Street / Hollow Lane signal junction
- Adams Hill / Toft Road junction
- Canute Place / Manchester Road / Northwich Road roundabout

These junctions currently experience congestion during the peak periods and traffic modelling has been undertaken to understand the impact of background traffic growth and traffic growth as a result of the development sites in the Local Plan.

**What are the mitigation measures required to address these impacts?**

The traffic modelling has been used to develop schemes to mitigate against the impact of the additional traffic, improvement schemes have been identified at these junctions above and the corridors in between and are detailed in the Local Infrastructure Delivery Plan. The new mitigation schemes are listed in Table 6.1.
<table>
<thead>
<tr>
<th>Scheme / initiative</th>
<th>Scheme Objective / purpose</th>
<th>Funding Source</th>
<th>Expected completion / delivery date</th>
<th>Deliverability</th>
</tr>
</thead>
<tbody>
<tr>
<td>A537 Adams Hill junction improvements</td>
<td>To deal with existing problems and impacts of development traffic.</td>
<td>S106, Local Transport Plan, CIL £200k</td>
<td>To be confirmed, linked to development</td>
<td>Concept design complete. CEC highways would deliver.</td>
</tr>
<tr>
<td>Widening of A50 between junction with A5033 and junction with Adams Hill</td>
<td>To deal with impacts of development traffic.</td>
<td>CIL and S106 from developers. £930k</td>
<td>To be confirmed, linked to development</td>
<td>Concept design complete. CEC highways would deliver.</td>
</tr>
<tr>
<td>A5033 / A50 roundabout junction improvement</td>
<td>To deal with impacts of development traffic.</td>
<td>Funded by development/ CIL.</td>
<td>To be confirmed, linked to development</td>
<td>No committed funds. CEC highways would deliver.</td>
</tr>
<tr>
<td>Mobberley Road / Parkgate Lane junction improvements</td>
<td>To deal with impacts of development traffic.</td>
<td>Funded by development £200k</td>
<td>To be confirmed, linked to development</td>
<td>Concept design complete. CEC highways would deliver.</td>
</tr>
<tr>
<td>Brook Street / Hollow Lane junction improvements</td>
<td>To deal with impacts of development traffic.</td>
<td>Funded by development £400k</td>
<td>To be confirmed, linked to development</td>
<td>Concept design complete. CEC highways would deliver.</td>
</tr>
</tbody>
</table>

Table 6.1 New Mitigation Schemes for Knutsford

These highway improvements are detailed in the Local Infrastructure Delivery Plan and will require funding through CIL / S106 contributions.

What are the issues and requirements for sustainable transport?

The Local Infrastructure Delivery Plan also includes proposals for public realm improvements on King Street in the town centre, as well as improvements to cycle and walking links to the town centre and station from Local Plan development sites, school and local employment areas.
Figure 6.1 Knutsford Town Development Map

---

Figure 15.31 page 271, Local Plan Strategy, March 2014
Are there any challenges that need to be addressed?

None anticipated.

**Overall conclusions for the study area.**

1. **Summary of anticipated impacts and required mitigation for the development proposed;**

   There are a number of key junctions and corridor improvements required on the A50 and A537 in Knutsford. These have been developed to tackle existing congestion and also that caused by the traffic generated by the development included in the Local Plan.

   Also, as a result of the improved capacity on the local strategic network in the town, public realm improvements will be enabled within the heart of the town centre, including roads such as King Street.

2. **Justification as to why the development proposals are acceptable in traffic and wider transport terms;**

   The mitigation proposed as part of the Local Plan development will help address existing congestion problems and ensure that the traffic generated from these sites does not cause unacceptable increases in delay to journeys through the network.

   The improvements will also help increase the resilience of the network when there are issues on the strategic network (including the M6) in the area which often sees an increase in traffic on the A50 passing through Knutsford.
Traffic modelling has been undertaken to assess the impact of development proposals comprising up to 2200 new residential units, 20 hectares of employment land, and convenience retail to meet local needs, in addition to a range of appropriate leisure facilities (potentially including a hotel, public house or restaurant). Development proposed in the Local Plan (site CS24) is focused on the area of land close to Junction 17 of the M6, which is illustrated in Figure 7.1.

**What are the significant highway impacts?**

The corridor on the A534 from the M6 in to Sandbach currently suffers from congestion along its length, particularly at the following locations:

- M6 Junction J17
- A534 / Congleton Road priority junction
- A534 / The Hill traffic signal junction
- Wheelock Bypass / Brookhouse Road roundabout

Development located on this corridor is expected to exacerbate the existing issues and as a result mitigation schemes have been identified in the Local Infrastructure Delivery Plan and developed using local traffic modelling.

In addition (as referred to in section 2 with regard to Crewe), modelling work has been undertaken in collaboration with the Highway’s Agency to assess the impact of development proposals in Sandbach, Alsager and Crewe on the M6 Motorway and junctions between the local and strategic road networks (ie Junctions 16 and 17 on the M6 Motorway).

This modelling work has examined the incremental impact over time as development is phased over the local plan period up to 2030. The results demonstrate that a gradual worsening of performance is predicted with the addition of the development traffic onto the network without mitigation.
What are the mitigation measures required to address these impacts?

Already committed mitigation schemes are listed in Table 7.1.

<table>
<thead>
<tr>
<th>Scheme / initiative</th>
<th>Scheme Objective / purpose</th>
<th>Funding Source / committed?</th>
<th>Expected completion / delivery date</th>
</tr>
</thead>
<tbody>
<tr>
<td>M6 junction 17 improvements (new roundabout on northbound slip and signals on southbound slip)</td>
<td>Relieve congestion on slip roads and on surrounding roads. Delivers sufficient ‘headroom’ for Local Plan; further improvements may be necessary towards ends of plan period.</td>
<td>Department for Transport Pinch Point programme. £3.4m Funding Committed</td>
<td>Delivered by Highways Agency. To be completed in March 2015</td>
</tr>
<tr>
<td>A534 / Congleton Road junction</td>
<td>Relieve congestion.</td>
<td>Developer contributions from already Committed developments. Funding Committed. £50k</td>
<td>CEC Highways to deliver. Initial design complete delivery linked to dev’t. Date to be confirmed.</td>
</tr>
</tbody>
</table>

Table 7.1 Committed Mitigation Schemes for Sandbach
Figure 7.1 Sandbach Town Development Map\textsuperscript{9}

\textsuperscript{9} Figure 15.43 page 302 Local Plan Strategy, March 2014
A number of new mitigation measures have been proposed which are listed in Table 7.2.

The schemes on the A534 are included in the Local Infrastructure Delivery Plan and require funding through CIL/S106 contributions.

<table>
<thead>
<tr>
<th>Scheme / initiative</th>
<th>Scheme Objective / purpose</th>
<th>Funding Source</th>
<th>Expected completion / delivery date</th>
<th>Deliverability</th>
</tr>
</thead>
<tbody>
<tr>
<td>A534 / The Hill traffic signal junction improvement</td>
<td>To deal with impacts of development traffic.</td>
<td>CIL and S106 from developers. £1.5m</td>
<td>To be confirmed linked to dev’t</td>
<td>Initial design. Dependent on dev’t</td>
</tr>
<tr>
<td>A534 Wheelock Bypass / Brookhouse Road roundabout improvements</td>
<td>To deal with impacts of development traffic.</td>
<td>CIL and S106 from developers.</td>
<td>To be confirmed linked to dev’t</td>
<td>Initial design. Dependent on dev’t</td>
</tr>
<tr>
<td>Widening of A534 between the two junctions listed above.</td>
<td>To deal with impacts of development traffic.</td>
<td>CIL and S106 from developers.</td>
<td>To be confirmed linked to dev’t</td>
<td>Initial design. Dependent on dev’t</td>
</tr>
<tr>
<td>Package of measures to provide sustainable transport routes between development sites and Sandbach town centre / and Sandbach railway station.</td>
<td>Promote sustainable travel and reduce car trips with good linkages to the town centre and national rail network.</td>
<td>CIL and S106 from developers.</td>
<td>To be confirmed linked to dev’t</td>
<td>Initial design. Dependent on dev’t</td>
</tr>
</tbody>
</table>
### Table 7.2 New Mitigation Schemes

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Objective</th>
<th>Funding Details</th>
<th>Status</th>
<th>Delivery Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trent and Mersey Canal Towpath improvements</td>
<td>Promote sustainable travel and reduce car trips with good linkages to the town centre and national rail network.</td>
<td>Canal and River Trust, CIL, S106 and external grants £400k</td>
<td>To be confirmed.</td>
<td>Initial design complete. CEC highways and Canal Trust to deliver.</td>
</tr>
<tr>
<td>Crossing of the A534 on the Wheelock Rail Trail improvement</td>
<td>Promote sustainable travel and reduce car trips with good linkages to the town centre and national rail network.</td>
<td>To be confirmed.</td>
<td>To be confirmed.</td>
<td>Concept design completed. CEC highways to deliver.</td>
</tr>
</tbody>
</table>

The proposals have been modelled using a local junction assessment model (based on Industry Standard LinSig software) to assess the impact of providing two continuous traffic lanes between the A534 / The Hill traffic signals and the Wheelock Bypass / Brookhouse Road roundabout. The model runs indicate that this scheme would accommodate the proposed development.

With regard to the strategic network, it is worth repeating the conclusions referred to in section 2 for Crewe. Modelling concluded that both the M6 Junction 16 and 17 Pinch Point schemes are successfully able to accommodate development related traffic over the assessment period. In later periods however, delay is experienced at these junctions as a consequence of the significant level of development proposed. It is also worth noting that the model developed for this testing is likely to overstate the level of predicted delay as it is not able to reflect the likelihood of driver behavior changes (both in timing and route choice) in response to increased congestion. CEC are working with the Highway’s Agency to identify additional schemes to increase capacity at junctions 16 and 17 on the M6 in the longer term, which are included as longer term schemes for development in the Local Infrastructure Delivery Plan. Such schemes would be expect to be funded by Local Developer Contributions and other National Funding sources.

**What are the issues and requirements for sustainable transport?**

Sustainable access for pedestrians and cyclists from the proposed Local Plan Strategy sites in to Sandbach town centre and to Sandbach railway station will be delivered as part of the mitigation proposals.
Are there any challenges that need to be addressed?

There is a need for continued joint working with the Highway’s Agency to develop solutions that further enhance capacity on the Motorway Network beyond the existing committed schemes.

Overall conclusions for the study area.

1. Summary of anticipated impacts and required mitigation for the development proposed;

A number of small scale mitigation measure have been agreed through the planning process for the sites in Sandbach which already have planning permission. However, the part of the network expected to suffer the most through increased development traffic is the A534 corridor from the M6 at Junction 17 to the Brookhouse Road / Wheelock Bypass roundabout. As a result schemes have been developed to improve the existing congestion in these locations and mitigate against traffic growth brought about by the traffic generated by the Local Plan developments.

2. Justification as to why the development proposals are acceptable in traffic and wider transport terms;

The most significant development area proposed in the Local Plan has good access to the both the local and national strategic road network (A534 and M6). Also, the proposed mitigation will deliver benefits to other road users as well as allowing for development traffic to pass through the network.
Traffic modelling has been undertaken to assess the impact of development proposals comprising up to 1,900 new residential units, 3 hectares of employment land, and convenience retail to meet local needs, in addition to a range of community facilities (including a community hall) and green infrastructure (including public open space and allotments). This is split over three sites (Kingsley Fields site CS21, Stapeley Water Gardens site CS22 and Snow Hill site CS23) which are illustrated in figure 8.1.

Nantwich has been identified as one of the Key Service Centres for Cheshire East, and as such the previously referred to Local Plan Strategy Sites have been allocated for future growth.

The majority of the development expected in Nantwich is to the northwest of the town centre located on the Kingsley Fields site. This site will have direct access on to the A51 Nantwich Bypass and also on to Waterlode in the town centre.

The A51 corridor approaching Nantwich from the East has therefore been identified as the focus for a series of strategic corridor improvements. These measures will address existing and forecast issues along this corridor.

**What are the significant highway impacts?**

It is expected that traffic generated by the development will have its most significant impact on the following junctions on the A51 corridor:

- A51/A500 Cheerbrook Roundabout
- A51/A534 Peacock Roundabout
- A51/A530 Alvaston Roundabout
- A51/A534 Burford Crossroads

The Crewe highway model was used to derive traffic figures that were used in assessments of the operation of the four junctions identified previously. These assessments were undertaken using industry standard junction assessment software (ARCADY and LinSig).
Figure 8.1 Nantwich Town Development Map\textsuperscript{10}

\textsuperscript{10} Figure 15.38 page 288, Local Plan Strategy, March 2014.
What are the mitigation measures required to address these impacts?

A number of transport schemes / initiatives are already under development or being delivered. These include:

<table>
<thead>
<tr>
<th>Scheme / initiative</th>
<th>Scheme Objective / purpose</th>
<th>Funding Source / Commitment</th>
<th>Expected completion / delivery date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crewe to Nantwich Greenway</td>
<td>Provide a safe alternative for sustainable modes of transport along the A51 corridor, to encourage sustainable modes and reduce car trips.</td>
<td>Department for Transport Connect2 initiative. Funding Committed.</td>
<td>Completed in 2013</td>
</tr>
</tbody>
</table>

Table 8.1 Committed Mitigation Schemes for Nantwich

Mitigation schemes have been identified in the Local Infrastructure Delivery Plan at the following locations and funding for these improvements is being sought from Local Plan Strategy development that will affect this corridor through CIL and S106 contributions. These are listed in Table 8.2.

<table>
<thead>
<tr>
<th>Scheme / initiative</th>
<th>Scheme Objective / purpose</th>
<th>Funding Source</th>
<th>Expected completion / delivery date</th>
<th>Deliverability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic management schemes in villages</td>
<td>To deal with impacts of development traffic.</td>
<td>CIL and S106 from Kingsley Fields Area development.</td>
<td>Linked to developer contributions</td>
<td>Dependent on developer contributions.</td>
</tr>
<tr>
<td>Project</td>
<td>Objective</td>
<td>Department</td>
<td>Year</td>
<td>Status</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>-----------------------------------------------</td>
<td>------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Taylor Drive / Edmund Wright Way link.</td>
<td>Provision of relief to congestion on the Welsh Row corridor in the town centre.</td>
<td>Developer Contribution from Queen's Drive residential development site.</td>
<td>To be agreed</td>
<td>Planning application approved</td>
</tr>
<tr>
<td>A51 Nantwich by-pass / A530 roundabout capacity improvements. *</td>
<td>Provision of relief to congestion at existing roundabout junction</td>
<td>CIL and S106 from new development</td>
<td>Not yet confirmed</td>
<td>Dependent on developer contributions.</td>
</tr>
<tr>
<td>A500 Nantwich Bypass / A530 roundabout capacity improvements. *</td>
<td>Provision of relief to congestion at existing roundabout junction</td>
<td>CIL and S106 from new development</td>
<td>Not yet confirmed</td>
<td>Dependent on developer contributions.</td>
</tr>
<tr>
<td>A51 Nantwich Bypass / A534 roundabout capacity improvements *</td>
<td>Provision of relief to congestion at existing roundabout junction</td>
<td>CIL and S106 from new development</td>
<td>Not yet confirmed</td>
<td>Dependent on developer contributions.</td>
</tr>
<tr>
<td>A500 Nantwich Bypass / A51 roundabout capacity improvements</td>
<td>Provision of relief to congestion at existing roundabout junction</td>
<td>CIL and S106 from new development</td>
<td>Not yet confirmed</td>
<td>Dependent on developer contributions.</td>
</tr>
</tbody>
</table>
Table 8.2 New Mitigation Schemes

What are the issues and requirements for sustainable transport

As noted in Table 8.2, a sustainable transport link is being developed along the River Weaver and Shropshire Union Canal to promote sustainable travel and reduce car trips including good linkages to Nantwich town centre and local amenities.

Are there any challenges that need to be addressed?

Third party land may be required to deliver some improvements.

Overall conclusions for the A51 Corridor / Nantwich.

1. Summary of anticipated impacts and required mitigation for the development proposed;

   The developments proposed for Nantwich would be expected to impact on 4 key junctions on the A51 corridor into the town. Without mitigation queues would increase at these junctions and increase journey times. Small scale improvements are proposed to increase capacity (with localised widening on key approach roads, increased width on entries to the roundabouts and so on).

2. Justification as to why the development proposals are acceptable in traffic and wider transport terms;

   The proposed level of development at the locations identified is considered to be acceptable with the proposed junction mitigation measures, as these measures would allow the junctions that would otherwise be impacted to operate effectively.
ALSAGER

Traffic modelling has been undertaken to assess the impact of development proposals comprising up to 1,600 new residential units, 35 hectares of employment land, and convenience retail to meet local needs, in addition to a range of community facilities (including a community hall) and green infrastructure (including new wildlife habitats and amenity open space). This is split over five sites (White Moss Quarry strategic site SL5, Twyfords and Cardway site CS12, Former Manchester Metropolitan University Campus site CS13, Radway Green Brownfield site CS14 and Radway Green Extension site CS15) which are illustrated in Figure 9.1.

Alsager has been identified as one of the Key Service Centres for Cheshire East, and as such the previously referred to Local Plan Strategy Sites and Strategic Locations in and around Alsager have been allocated for future growth.

In addition (as referred to in section 2 with regard to Crewe, and section Sandbach), modelling work has been undertaken in collaboration with the Highway's Agency to assess the impact of development proposals in Sandbach, Alsager and Crewe on the M6 Motorway and junctions between the local and strategic road networks (ie Junctions 16 and 17 on the M6 Motorway).

This modelling work has examined the incremental impact over time as development is phased over the local plan period up to 2030.

What are the significant highway impacts?

The key constraint on the highway network is the town centre junction of Sandbach Road and Crewe Road. Traffic from committed developments and additional development proposed in the Local Plan is expected to result in increased levels of congestion in this area and as a result a junction improvement scheme is proposed as part of the Infrastructure Plan. Junction improvements in the town centre also have to ensure that pedestrian and cycle movements are maintained and improved.

The results of the strategic modelling work demonstrate that a gradual worsening of performance is predicted around the strategic network with the addition of the development traffic onto the network without mitigation.

The Council is also working with Staffordshire County Council to ensure that any wider cross-border traffic impacts as a result of development in Cheshire East are understood and mitigated against.
What are the mitigation measures required to address these impacts?

A number of other local junction improvements will be required associated to development sites including:

- Crewe Road / Hassall Road
- Radway Green Road / Crewe Road
- Site access improvements

These highway improvements are detailed in the Infrastructure Plan and will require funding through CIL/S106 contributions.
Figure 9.1 Alsager Town Development Map\textsuperscript{11}

\textsuperscript{11}Figure 15.18 page 239, Local Plan Strategy, March 2014.
Traffic modelling has been undertaken to assess the impact of development proposals comprising up to 1600 new residential units, 75 hectares of employment land and convenience retail to meet local needs, in addition to a range of community facilities (including a community hall) and green infrastructure (including a network of open spaces and an equipped children’s play space). This is split over two sites (Brooks Lane strategic site SL9 and Midpoint 18 Extension site SL10) which are illustrated in Figure 9.2 below.

What are the significant highway impacts?

Development detailed in the Local Plan is expected to impact upon the operation of the highway network in two locations in particular:

- Leadsmithy Street / A54 traffic signal junction
- Croxton Lane / A54 mini roundabout junction

These junctions currently experience congestion during the peak periods and traffic modelling has been undertaken to understand the impact of background traffic growth and traffic growth as a result of the development sites in the Local Plan. This modelling has then been used to develop schemes to mitigate against the impact of the additional traffic. Improvement schemes have been identified at both the junctions above and are detailed in the Local Infrastructure Delivery Plan.

What are the mitigation measures required to address these impacts?

The proposed Middlewich Eastern Bypass will alleviate existing and predicted congestion in the town centre by removing traffic using the route between the A54 and A533 through the Leadsmithy Street / A54 traffic signal junction.

This scheme is funded by the Regional Growth Fund and delivered through a Section 278 agreement with Pochin. The opening date is still to be agreed, however this expected to be by Summer 2017 with a detailed delivery strategy currently under development.

The Leadsmithy Street / A54 traffic signal junction improvement scheme is already proposed as part of the recent planning permission granted on the housing site on Warmingham Lane southeast of the town centre.

Improvements to sustainable transport are listed in the next section.

What are the issues and requirements for sustainable transport

To ensure good pedestrian and cycle access to Sandbach Station from Middlewich, towpath improvements are proposed along the Trent and Mersey Canal adjacent to
the A533 Booth Lane. Also, as part of the Middlewich Eastern Bypass scheme complementary measures to improve access to the town centre for pedestrians and cyclists, as well as the environment within the town centre and Leadsmithy Street are proposed.
Figure 9.2 Middlewich Town Development Map

---

12 Figure 15.34 page 280, Local Plan Strategy, March 2014.
Are there any challenges that need to be addressed?

None.

Overall conclusions for Alsager and Middlewich.

1. Summary of anticipated impacts and required mitigation for the development proposed;

ALSAGER

The proposed development for Alsager has potential impacts on the operation of three key junctions, which are adequately mitigated by the proposed junction improvement measures included in the Local Infrastructure Delivery Plan.

MIDDLEWICH

Similarly the proposed development for Middlewich has a potential impact on the operation of two key junctions in the town. A number of measures are already being delivered to increase capacity, funded by developer contributions from sites with planning permission. The Middlewich eastern bypass scheme would provide adequate mitigation for these impacts and an improvement on current conditions.

2. Justification as to why the development proposals are acceptable in traffic and wider transport terms;

ALSAGER

The proposed development for Alsager and mitigation schemes would allow the network to operate satisfactorily and would be funded by developer contributions / CIL.

MIDDLEWICH

Highway improvement schemes are already delivering increased capacity in Middlewich. In addition the Eastern By-pass scheme would allow the proposed development to be built without any deterioration of network conditions.
Overview

Extensive traffic modeling has been undertaken over the development of the Local Plan, this has been used from the earliest stages of option development to help inform the development mix for towns in the Borough.

The 3 largest towns, Crewe, Macclesfield and Congleton are expected to provide strong levels of growth and as such have had the most detailed traffic modeling work undertaken; using fully validated traffic models. Assessment has also been undertaken on the strategic highway network in collaboration with the Highways Agency. In the smaller towns, traffic assessment work has been undertaken proportionate to the scale of likely impacts.

The traffic modelling is generally considered to present a ‘worse’ case assessment of the future traffic conditions, due to limitations of traffic modelling in representing the changes drivers will make to their behaviour and routes to avoid delays. Some of the additional delay on the road network would accrue anyway as a result of background traffic growth.

This work has ultimately led to a package of mitigation measures that will be required to deliver the necessary development across the Borough. Further work has included the prioritisation and inclusion of these measures in the Local Infrastructure Delivery Plan.

Crewe

In Crewe, the residual impact of the proposed development leads to an increase in congestion on the road network. This is represented by an decrease in the average speed across the modelled network moving from 59.5kph in the base year to 52.2kph with the mitigation measures in place.

A key part of the strategy for Crewe is the safeguarding and improvement of key strategic corridors (including access to emergency service providers) across the town; on these routes journey times will be protected by a series of linked mitigation schemes. For example, the Sydney road corridor, A530 Corridor, A5020 corridor and A500 corridor.

Crewe’s public transport network is the most comprehensive in the Borough and recent funding from the Local Sustainable Transport Fund will help to bolster this further. As such the town is well placed to increase the number of trips made by public transport.
Recent improvements to both J16 and J17, funded through the government's Pinch Point programme, have helped address initial capacity concerns at these locations. In the longer term, further improvement works may be required, and the council and Highways Agency are working together to develop these longer term proposals.

In summary, the proposed level of development in Crewe, in conjunction with the mitigation schemes proposed, will deliver an acceptable level of highway operation.

**Macclesfield**

A range of measures were tested to mitigate the proposed Local Plan development. In Macclesfield, the focus has been on improvements to the existing highway network rather than extensive new highway infrastructure. This has been shaped by a review of the outputs of detailed highway modelling. Measures can be delivered on a phased basis as and when development occurs and funding is available.

A number of schemes are being developed close to Macclesfield that will improve strategic transport connections. These include the Poynton Relief Road and potential improvements on the A523 between Poynton and Macclesfield, to improve safety and potentially increase capacity.

With the full set of mitigation measures in place, the level of additional delay on the road network is kept below a 15% increase. Clearly, there will be times; outside of peak hours and at existing hotspots, where the improvements to the highway network will improve upon the existing conditions.

In summary, with the proposed mitigation strategy in place, it is considered that an acceptable level of highway operation can be achieved.

**Congleton**

Congleton currently experiences heavy traffic congestion, a function of through traffic mixing with local traffic. The highway mitigation strategy in Congleton is to support the principle of a new link road around the town. With the link road in place, the impact of the proposed development on the local highway network is minimal and even taking account of background traffic growth delays across the modelled highway network would be approximately the same as experienced today. However, this hides the fact that for key movements, journey times would be significantly improved. Additionally, background traffic growth, even without the proposed development, would lead to a continuing worsening of the existing conditions.

Public Consultation, scheme development, and funding bid success will assess the likelihood of the link road scheme proceeding. The scheme is scaleable and can be delivered on a phased basis if necessary. Work has been undertaken to
demonstrate that the scheme has a compelling business case to take advantage of external funding opportunities.

As a fall-back position an alternative mitigation strategy has been developed; which involves the improvement of the existing road network. This scheme performs significantly less well than the link road but does offer some mitigation for development impacts.

The Link road also has wider benefits over and above the one line mitigation strategy, including improving access to employment, addressing Air Quality Management Areas, reducing community severance on existing routes and improving strategic highway links across the Borough.

In summary, the proposed development can be easily accommodated on the highway network of Congleton with the preferred link road mitigation in place. This mitigation has a compelling business case, is a strong candidate to secure external funding, offers a set of wider transport benefits and can be delivered (if necessary) in phases. On line improvements also offer some benefits; and these would be pursued as a last resort or as an interim measure allowing the proposed development to be delivered.

**North Cheshire Growth Village**

The road network in this part of the Borough is already heavily congested; this has been acknowledged by the low level of housing growth allocated in this area.

Traffic modeling has established that wherever development in the North of the Borough is located a similar impact on the congested A34 corridor will be experienced. Studies have demonstrated that a reduction in the net number of trips using the network can be reduced by concentrating development in a single location, taking advantage of linked trips (such as on-site schooling) and investing heavily in sustainable travel measures. This forms the basis for the concept of the North Cheshire Growth Village.

Highway improvements will be necessary and these are being developed as part of the masterplan for the North Cheshire Growth Village (Handforth East) site and detailed in the Local Infrastructure Delivery Plan and will require funding through CIL/S106 contributions.

A multi modal study of the A34 corridor is now underway to understand what additional measures could be implemented to address the broader congestion impacts on the A34 corridor; working closely with Stockport Council.
Other Towns

In the towns of Alsager, Knutsford, Middlewich, Nantwich and Sandbach local modelling has been undertaken to examine the effects of traffic growth from the Local Plan Strategy developments at key pinch points on the network. This work has then been used to develop and test local schemes to mitigate the impact of this traffic growth and also in some locations address existing congestion problems. The schemes range from junction improvements such as in Alsager town centre and on the A51 in Nantwich, to corridor strategies in Knutsford and Sandbach, and in the case of Middlewich the delivery of a long standing bypass proposal.
CREWE

Model software used: SATURN
Base year of model: 2006
Future year(s) of model: 2032
Year of construction: 2013
Date(s) of most recent survey(s):
WebTAG compliant: Yes (based on WebTAG Unit 3.19 August 2012).
Validated model? Yes.

Time Periods modelled: AM peak 08:00 to 09:00, Average Inter Peak 10:00 to 16:00 and PM peak 17:00 to 18:00.

MACCLESFIELD

Model software used: S-Paramics
Base year of model: 2012.
Future year(s) of model: 2030
Year of construction: 2012
Date(s) of most recent survey(s): Autumn 2012
WebTAG compliant: DMRB Compliant
Validated model? Yes.

Time Periods modelled: AM peak 08:00 to 09:00, PM peak 17:00 to 18:00 and Saturday Peak 11:15 to 12:15

To appraise the scheme, a traffic model has been developed, which is reported in the Local Model Validation Report (LMVR). The Macclesfield traffic model has been updated using new traffic survey data, for a 2012 base year.

There is Traffic Count data including Automatic Traffic Counts and Manual Classified Turning Counts from across Macclesfield, and 4 journey time routes across the area affected by the proposed scheme.
Base model summary validation statistics (flows and journey times)

A summary of overall model performance, is shown in Table below. This is important not only for scheme option selection and the economic case, but also for the provision of future design and environmental flow data.

Table A-1: Turn Count Validation for All Modelled Junction:

<table>
<thead>
<tr>
<th>Validation Criteria</th>
<th>AM Peak</th>
<th>PM Peak</th>
<th>Saturday Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turn counts within GEH value of 5</td>
<td>95%</td>
<td>91%</td>
<td>96%</td>
</tr>
<tr>
<td>Average GEH value</td>
<td>1.51</td>
<td>1.72</td>
<td>1.32</td>
</tr>
<tr>
<td>Turn counts over GEH value of 5</td>
<td>30</td>
<td>52</td>
<td>20</td>
</tr>
<tr>
<td>Turn counts over GEH value of 7.5</td>
<td>7</td>
<td>16</td>
<td>4</td>
</tr>
</tbody>
</table>

CONGLETON

Model software used: SATURN (version 11.1.09).

Base year of model: 2012.

Year of construction: 2013 (new model network and matrices built from scratch).

Date(s) of most recent survey(s): Oct/ Nov 2012 and April 2013.

WebTAG compliant: Yes (based on WebTAG Unit 3.19 August 2012).

Validated model? Yes.

Time Periods modelled: AM peak 08:00 to 09:00, Inter Peak 11:00 to 12:00 and PM peak 17:00 to 18:00.

To appraise the scheme in line with DfT requirements and WebTAG guidance, a traffic model has been developed, which is reported in the Local Model Validation Report (LMVR). The Congleton traffic model has been built using new observed survey data, for a 2012 base year. The model has been developed to be reflective of a typical, average neutral month (November 2012). It is based on the latest available WebTAG parameters (October 2013- Unit 3.5.6), and meets specified convergence requirements.

There are a total of 6 RSI sites that have been used to developed observed patterns of demand through Congleton, supported by 18 traffic counts (12 calibration and 6 validation), and 9 journey time routes across the area affected by the proposed scheme.

Base model summary validation statistics (flows and journey times)

A summary of overall model performance, against each required WebTAG criterion is shown in A-2 below, and shows that the traffic model meets or exceeds WebTAG requirements in all time periods. This is important not only for scheme option
selection and the economic case, but also for the provision of future design and environmental flow data.

Table A-2: Summary of Model Performance against WebTAG Guidelines:

<table>
<thead>
<tr>
<th>WebTAG Requirement</th>
<th>AM Peak</th>
<th>Inter-peak</th>
<th>PM Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screenline</td>
<td>All/Nearly all</td>
<td>All</td>
<td>All</td>
</tr>
<tr>
<td>Calibration ‘Flow’</td>
<td>&gt;85%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Calibration ‘GEH’</td>
<td>&gt;85%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Validation ‘Flow’</td>
<td>&gt;85%</td>
<td>83%</td>
<td>100%</td>
</tr>
<tr>
<td>Validation ‘GEH’</td>
<td>&gt;85%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Journey Times</td>
<td>&gt;85%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table A-3 has summary statistics for the whole of the simulation model area. As would be expected, delay is greatest in the AM and PM peaks (with little difference between the two peaks). The base model shows that average speeds are lower in the peaks than in the inter peak period.

Journey times from the model show a good fit with observed journey time values, which indicate that the model accurately models delay at key junctions.

Table A-3: Network wide summary statistics for base year model.

<table>
<thead>
<tr>
<th>Year 2012 (base year)</th>
<th>Base Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM</td>
</tr>
<tr>
<td>Total pcu Distance (km)</td>
<td>85,144</td>
</tr>
<tr>
<td>Total pcu Time (hours)</td>
<td>1,591</td>
</tr>
<tr>
<td>Total pcu Delay (hours)</td>
<td>300</td>
</tr>
<tr>
<td>Average Speed (kph)</td>
<td>53.5</td>
</tr>
<tr>
<td>Average Delay per pcu km (sec/km)</td>
<td>12.7</td>
</tr>
</tbody>
</table>
Appendix B  Plans of the proposed mitigation schemes

Figure B-1 Congleton On-Line mitigation scheme

Figure B-2 On-line mitigation scheme (full extent)

Figure B-3 On-line mitigation scheme (A34 Newcastle Road / A534 Sandbach Road / A54 Holmes Chapel Road, detailed drawing)