

## **Congleton Traffic Model**

# **Updated Assessment of Local Plan Strategy Highway Impacts and Mitigation**

**FINAL**

**January 2016**

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### 1.1 Background

The *Assessment of Local Plan Strategy Highway Impacts and Mitigation* report (produced in May 2014) considered the transport modelling work undertaken in Congleton and quantified the existing problems experienced on the highway network of Congleton.

The review considered the following key questions:

- What are the significant Highway Impacts?
- What are the mitigation measures required to address these impacts?
- What are the issues and requirements for sustainable transport?
- Are there any significant issues to be resolved?

The preferred CLR scheme, which consists of an off line link road connecting the A534 west of Congleton to the A536 north of Congleton, is intended to address a number of transport problems in and around Congleton, addressing the following objectives:

- To support the economic, physical and social regeneration of Congleton by creating and securing jobs.
- To relieve existing town centre traffic congestion/ HGVs, remove traffic from less desirable roads and facilitate town centre regeneration.
- To open up new development sites and improve access to Radnor Park Industrial Estate and Congleton Business Park.
- To improve strategic transport linkages across the Borough facilitating wider economic and transport benefits.
- To reduce community severance along key town centre corridors
- To reduce traffic related pollutants within the towns declared Air Quality Management Areas.

A Low Cost option, which consists of a series of improvements to the existing highway network in Congleton, has also been identified.

When the *Assessment of Local Plan Strategy Highway Impacts and Mitigation* report was previously produced, the Low Cost option was at a preliminary stage of development. Over the last 18 months the Low Cost option has been further developed.

### 1.2 Purpose of the report

The purpose of this report is to establish the following:

What the future road network will be like if no additional mitigation schemes are implemented, referred to as the “Do Minimum”.

What the impacts of the proposed Local Plan developments on the Do Minimum highway network are. This analysis allows us to establish what capacity exists (if any) on the existing network before any potential mitigation is assessed.

The impacts of the two alternative mitigation schemes (the preferred Congleton Link Road scheme and the Low Cost option), with regard to their impact on the following:

- Impact on Transport Users
- Impacts of Construction
- Development Land Unlocked
- Future-proofing
- Environmental Impact
- Wider Impacts
- Scheme Costs
- Funding Sources

The operational impact of the two alternative mitigation schemes based on traffic associated with the local plan development.

### 1.3 The Need for a Scheme

Congleton has been identified as a hotspot for congestion, which is a major constraint on the Development Strategy for the town. Specifically the convergence of four strategic road routes (A34, A54, A534 and A536), and limited crossing points of the River Dane impacts on vehicle movements through and around the town.

There is heavy reliance on the private car in the surrounding area with high car ownership (84% of households own a car) and it is the most common mode of transport to employment. The roads through the town carry a mix of both local traffic and through traffic to destinations further afield, such as Macclesfield and the M6. Therefore roads close to the town centre are under pressure from the volume of traffic, at peak hours in particular, with significant delays being experienced.

A link road passing to the North of Congleton has been promoted by Cheshire East Council as the preferred means of opening land to potential development, reducing town centre congestion and improving journey time reliability.

Public transport is available however it does not provide a viable alternative to the private car for most journeys. The preferred CLR scheme is not anticipated to have a significant impact on public transport, however the reduced level of congestion forecast for the existing highway network would be expected to improve peak hour reliability for buses and reduce emissions from buses. Sustainable modes (walking and cycling) will benefit from a reduction in traffic within Congleton with the preferred CLR scheme in place.

Traffic is forecast to grow in Congleton as a result of background traffic growth and development related traffic. When forecast traffic flows are assigned to the do minimum road network, as would be expected flow increases are generally greatest within Congleton along the A34 corridor where most of the proposed development is located. Similarly delays increase at the key junctions on the network such as the Waggon and Horses gyratory, West Road / West Street roundabout and the Rood Hill traffic signals.

## 1.4 The Preferred CLR scheme

The council's preferred strategy is to provide a new link road between the A536 and A534 referred to as the "Congleton Link Road" (CLR). The CLR would be a single carriageway road, designed to modern standards that would include a parallel pedestrian / cycle route. It includes a new bridge over the River Dane and connecting roads into the Congleton Business Park and Radnor Park industrial estate (via Back Lane). It would be designed to the latest high standards for road safety and environmental mitigation.

The preferred CLR scheme is expected to relieve traffic congestion at various locations, particularly on the A34 through Congleton, with through traffic from the A536 / A34 (north) using the Link Road to access the A534 to reach the M6 (south) at junction 17, and vice versa. Journey times are improved for through traffic and traffic within Congleton. Without mitigation a small increase in traffic is forecast on minor roads to the south and west of Congleton. Additional mitigation measures have been proposed that discourage the use of inappropriate minor roads such as Wallhill Lane and encourage vehicles to stay on appropriate roads. Automatic Traffic Counts (ATCs) will be placed on these roads to monitor the impact of the traffic post-construction. Forecast flows (with the identified mitigation measures) on the existing A34 through Congleton, though higher than in the "without mitigation" situation, are significantly lower than they would be without the Congleton Link Road.

In addition, complementary measures will be investigated to reallocate road space to pedestrians, cyclists and public transport where possible in the town centre and surrounding roads (particularly the A34 corridor including West Road, Clayton by-pass and Rood Hill).

An assessment has been made of the potential construction impacts of the preferred CLR scheme which includes the impact on traffic. The proposed approach to construction limits the number of additional HGVs within Congleton. The forecast seven HGV movements daily would have minimal impact on the operation of the network and would be expected to avoid peak periods. It has been assumed that the proposed temporary bridge over the River Dane would avoid further unnecessary HGV movements through Congleton to move surplus material from west to east. Without this temporary bridge around 350 additional HGV movements per day would be required for up to three months which would impose unacceptable impacts on the operation of the highway network, at the most congested junctions.

Outline funding approval has been secured in principle from the Local Strategic Economic Partnership and other external funding bids will be made as the scheme development continues.

## 1.5 The Low Cost Option

The Low Cost option consists of a series of online improvements to the existing highway network in Congleton, including localised widening of the A34 Rood Hill, Clayton By-Pass, West Road and Holmes Chapel Road and junction improvements.

In order to compare the benefits of the Low Cost option with the preferred CLR scheme, a comparative economic assessment has been undertaken.

## 1.6 Report Structure

The remainder of this report is structured as follows:

- Chapter 2 Do Minimum Highway Network Improvements.
- Chapter 3 Assessment of the impact of the proposed Local Plan Developments on the operation of the Do Minimum highway network.
- Chapter 4 Comparison of the Low Cost option and the preferred CLR scheme.
- Chapter 5 Operational impacts of Low Cost and Preferred options
- Chapter 6 Summary and Conclusions.

### 2.1 Introduction

This section of the report lists the two highway improvement schemes that have been implemented during 2015.

### 2.2 Do Minimum Situation

Since the previous assessment was undertaken, two small schemes have been implemented at key junctions in Congleton, funded by developer contributions, to mitigate the impact of traffic associated with new housing development in Congleton.

The two schemes are:

- 1) Localised widening on the eastbound approach on the A34 West Road to the A34 / West Street / Obelisk way roundabout has improved capacity by lengthening the two lane section on the eastbound approach from the A34 West Road.
- 2) Upgrade to signalised junction between the A34 Clayton by-pass, A34 Rood Hill and A54 Rood Hill to MOVA control. This dynamically adjusts signal timings to minimise delay and maximise vehicle throughput at the junction.

The appropriate changes in saturation capacities and optimised signal timings have resulted in improved junction operation, with reduced delay at peak hours in particular.

It should be noted that a number of developments have been granted planning permission since the previous assessment was completed. As a result an updated Core matrix has been derived with all recent new development added to the matrix. The details of what development is now specifically included in the Core matrix are included in the 2015 update to the Traffic Forecasting Report<sup>1</sup>.

The transport model has been updated to reflect the existing situation. This is commonly referred to as the “Do Minimum” situation. The impact of the Low Cost option and the preferred CLR scheme is assessed by comparing results back to the baseline “Do Minimum” situation.

It should be noted that the two improvements schemes which have now been delivered previously formed part of the full package of improvements previously considered for the Low Cost option. Consequently the net benefits of the Low Cost option have been reduced as a result of these changes to the existing highway network.

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<sup>1</sup> OD076 Traffic Forecasting Report (2016 update)



### 3

## Impact of Proposed Local Plan Developments on the Operation of the Do Minimum Highway Network

### 3.1 What are the significant Highway Impacts?

This chapter provides an updated assessment (based on the updated Core plus matrices and updated Do Minimum network) as to what the impacts of the development included in the Local Plan Strategy would be on the existing Highway Network of Congleton, without any mitigation measures.

### 3.2 Analysis of the Impact of Developments on the Aggregate Model Statistics

The scenario without any mitigation (often referred to as a “Do Minimum scenario”) includes all proposed development sites identified in the uncertainty log (the “Core plus” scenario). The uncertainty log will be included in the Traffic Forecasting Report..

The volume of traffic generated by the proposed development would have impacts across the entire Congleton modelled area. These impacts are included in Table 3-1 overleaf. The red shading indicates a significant deterioration in network conditions compared the base situation.

Without mitigation between 2012 and 2032 there would be a considerable increase in total distance travelled, journey time and delay. The biggest deterioration would be experienced in the PM peak.

Across all time periods;

- Average speed across the entire network would reduce by between 7% and 21%.
- Total delay across the entire network would increase by between 118% and 289%.

**Table 3-1: Network wide - Aggregate statistics for Base year (2012) model and situation in 2032 without mitigation:**

Year:	Base Model			Without Mitigation			DIFFERENCE			% DIFFERENCE		
	2012			2032								
	AM	IP	PM	AM	IP	PM	AM	IP	PM	AM	IP	PM
Total pcu Distance (km)	85,144	60,362	86,247	136,073	94,053	142,277	50,929	33,691	56,030	60%	56%	65%
Total pcu Time (hours)	1,591	1,053	1,610	2,728	1,815	3,344	1,138	762	1,734	72%	72%	108%
Total pcu Delay (hours)	300	128	301	655	367	1,171	355	239	870	118%	186%	289%
Average Speed (kph)	53.5	57.3	53.6	49.9	51.8	42.5	-3.6	-5.5	-11.1	-7%	-10%	-21%
Average Delay per pcu km (sec/km)	12.7	7.7	12.6	17.3	14.0	29.6	4.6	6.4	17.1	36%	83%	136%

### 3.3 Analysis of the Impact of Developments on the Network (Junctions and Links)

The impact of the traffic generated is focused on the key junctions that currently experience congestion and where development traffic increases the scale and duration of queuing. This includes the following:

- 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)

In order to assess the operation of these key junctions the volume to capacity (v/c) ratios have been examined.

Congleton's highway network is congested at peak times, a function of the limited number of river crossings and the convergence of several main roads in the town, this has resulted in the declaration of several Air Quality Management Areas. 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.

In general, the analysis shows more and larger delays in the morning and afternoon peaks as would be expected, with lesser delays in the inter-peak. As expected, junction delay also increases where new developments are in close proximity.

Without mitigation delays are forecast to increase at the A34 Rood Hill / A54 Rood Hill / A34 Clayton By-pass signalised junction, where delays of around 4 minutes per vehicle are forecast for the right turn movement from the A54 to A34 north turning movement in the AM peak.

The worst delays are forecast at the A34 West Road / A54 Holmes Chapel Road / A34 Newcastle Road / A534 Sandbach Road junction where delays of over 5 minutes are forecast on the A34 Newcastle road and A534 approaches in the AM peak.

The v/c ratio calculations indicate that the key junctions worsen compared to the existing situation. The consequence of this will be prolonged periods of queuing traffic at the main junctions with associated negative impacts on air quality and noise pollution.

### 4.1 Introduction

This section of the report compares the mitigation options, (the Low Cost option and the CLR) for Congleton with regard to a number of criteria.

### 4.2 Impact on Transport Users

a) Low Cost Option – this scheme has a modest impact on journey times across and within Congleton as assessed using the industry standard TUBA software as recommended by the Department for Transport (DfT). The benefits of the scheme have been quantified as follows:

- £47m (over a 60year appraisal period, in 2010 prices, discounted to 2010).

b) CLR – this scheme has a significant impact on journey times across and within Congleton. The TUBA assessment has quantified benefits as follows:

- £133m (over a 60year appraisal period, in 2010 prices, discounted to 2010).

Overall the CLR has a considerably greater impact on journey times.

The scheme benefits transport users across a wider area, including improved access to the strategic road network from Macclesfield in particular. The CLR therefore aligns closely with the scheme objective targeted at improving strategic transport linkages across the Borough in order to facilitate wider economic and transport benefits.

### 4.3 Impacts of Construction

The two schemes would be constructed in significantly different ways. Consequently the impacts of construction on residents and businesses would vary significantly.

The Low Cost option involves the upgrading of the existing highway network, with road widening and alterations to existing junctions. It is essential that the existing road network is kept operational for as much time as possible and that the impact of any road narrowing or closures is kept to a minimum. However, even if working time is limited to off peak hours and overnight closures, it is inevitable that there will be an extended period of disruption to traffic within Congleton. Where possible, traffic management will be removed at peak hours (for example by removing temporary traffic signals or opening up closed / narrowed lanes). There will be occasions when complete road closures will be required and extensive / long diversion routes followed.

Overall access for residents, and access to / from businesses would be significantly impacted by the traffic management and associated delays to traffic that would result from constructing the Low Cost option.

By contrast the preferred CLR scheme would have a much more limited impact on traffic operations as the majority of the new construction work is away from the existing highway network. The tie in points (linking the existing network to the new

link road) can be constructed with minimal impact on existing traffic. This is because the new junctions can be constructed adjacent to the existing road, with temporary road layouts in place for a limited time only. There would however potentially be a greater volume of construction related traffic including deliveries and movement of cut / fill material than with the “low” cost option. To mitigate this, restrictions could be put in place on the times that this traffic could be on the network and the routes to be used. The use of a new river crossing over the River Dane (built as part of the scheme) would allow much of the cut / fill material to be transported without using the existing highway network within Congleton.

QUADRO, the industry standard software programme recommended by the DfT for modelling the impact of delays during construction, has been used to assess the impacts of the proposed construction work on traffic operations in and around Congleton. The software is able to quantify the delay to vehicles associated with the construction work. The results of the QUADRO assessment for the Low Cost and preferred CLR scheme options are included in Appendix A.

In summary, the construction of the Low Cost Option has been calculated to generate considerable delays valued at approximately £22m (in 2010 prices, discounted to 2010) over the construction period. The delays would be significantly greater if construction also took place in the peak periods.

The extent of the disruption caused by constructing the Low Cost Option is likely to be very unpopular with the residents of Congleton and consequently the Low Cost option exhibits serious deliverability issues.

By contrast the CLR has been calculated to generate delays valued at less than £1m (in 2010 prices, discounted to 2010) over the construction period.

In conclusion, the CLR can be implemented with minimal impact on traffic operations during the construction phase, whilst the Low Cost Option imposes significant delay on traffic operations.

#### **4.4 Development Land Unlocked**

The Low Cost Option and the CLR are likely to unlock different amounts of land for development.

Further assessment of the outputs from the transport model, has identified issues with network capacity. The Low Cost Option provides additional capacity on the network compared to the situation without it. However the volume of traffic that is forecast to be generated by all the proposed development sites identified in the emerging Local Plan would still lead to a situation where key junctions on the network would be approaching capacity resulting in significant residual impacts.

In contrast, the CLR is able to accommodate all the traffic associated with the emerging Local Plan developments and operate satisfactorily in the opening year (2017). In the design year (2032) all junctions would operate within capacity, however the Waggon and Horses roundabout has limited reserve capacity.

## 4.5 Future-proofing

The Low Cost option provides no additional spare capacity in the highway network in 2032. Furthermore, and as is considered in section 5, not all of the development identified in the emerging Local Plan could be delivered if the Low Cost option was constructed. Appendix B includes SATURN model plots illustrating the impact of Local Plan developments on modelled links in the situation without the CLR (Do Minimum), the situation with the Low Cost option and the situation with the preferred CLR.

The Low Cost option results in an increase in the number of links that are over capacity from 28 links in the Do Minimum situation in 2032 to 47 links with the Low Cost scheme in place. This results from the junction improvements attracting more traffic into the A34 corridor between the Waggon and Horses and the West Heath gyratory.

The preferred CLR scheme provides additional road capacity that is able to accommodate the volume of traffic associated with the development land allocated in the emerging Local Plan. The number of overcapacity links reduces from 28 links without the scheme in 2032 to 24 links with the preferred CLR scheme. Even in the 2032 design year not all of the additional road space on the new link road is utilised.

Therefore the scheme is “future proofed” as it can potentially accommodate additional traffic associated with development that may come forward after 2032 in future revisions to the Local Plan.

## 4.6 Environmental Impact

The CLR reduces air and noise pollution in Congleton, as well as reducing severance issues for pedestrians and cyclists. It provides the opportunity to improve public realm and reallocate road space on the A34 corridor in particular to sustainable modes of travel.

The area around the Rood Hill traffic signals is currently declared as an Air Quality Management Area (AQMA). Consequently, it is important that any potential scheme would improve traffic flow in this area, and reduce queueing and delay to vehicles.

The preferred CLR scheme is forecast to transfer existing through traffic away from this junction. In addition it provides alternative access routes to development sites that allow much of the new traffic associated with these sites to avoid the key congested junctions within Congleton, including the AQMA.

By contrast the Low Cost option doesn't remove traffic from this part of the network. It provides additional capacity that is forecast to reduce delays at the junction compared to the Do Minimum situation.

A quantified environmental impact assessment has been undertaken for both the Low Cost Option and the CLR. The CLR would generate Noise and Air Quality benefits valued at approximately £4m (in 2010 prices, discounted to 2010) as a result of diverting traffic away from properties in Congleton. In contrast, the Low Cost Option actually generates a Noise and Air Quality dis-benefit as a result of attracting additional traffic to the centre of Congleton.

## 4.7 Wider Impacts

Wider impacts of the possible options have been considered qualitatively.

As discussed previously, the Low Cost option does not provide the comprehensive solution to the identified current and development related traffic issues that the preferred CLR scheme does.

The Low Cost option does not reduce traffic levels on roads within Congleton compared to the Do Minimum in both the opening and design years. Consequently, the Low Cost option does not alleviate the identified severance issues which currently impact pedestrians and cyclists.

In contrast, the preferred CLR scheme provides the opportunity to reallocate road space to other road users and improve crossing facilities on the A34 for vulnerable road users.

The preferred CLR scheme is also anticipated to encourage and facilitate the regeneration of Congleton town centre as traffic is discouraged from using roads closer to the town centre (such as Mill Street, West Street and Antrobus Street) to avoid delays on the A34 Clayton bypass that are forecast in the Do Minimum situation. Subsequently the preferred CLR scheme will make Congleton town centre a more attractive location for businesses to invest.

The GVA Assessment results reported in the Economic Assessment Report (February 2014) calculated that a link road of Congleton could result in an increase in GVA to the local economy, which can be directly related to the impacts of the transport scheme, of £1.153bn over the 60 year appraisal period.

This is a 'net' GVA figure, and incorporates the impacts of the potential redistribution of jobs from other areas. This equates to a benefit of around £19m per year in a DfT price base of 2010 (based on the total number of jobs in 2077).

The Low Cost Option would not generate the same scale of GVA benefits due to the fact that it would not unlock the same scale of development land.

## 4.8 Scheme Costs

The Low Cost option is clearly by definition a significantly cheaper scheme to deliver than the preferred CLR scheme.

Estimates of the scheme costs have been derived based on the best current understanding available of the construction method, preparation costs, material costs, land costs and compensation costs.

Following an extensive costing exercise which was completed in December 2015, a revised scheme cost estimate has been derived for the Preferred Option. This exercise estimated the outturn scheme costs for the Preferred Option to be £85.2m.

The most significant additional costs for the preferred CLR scheme relate to the provision of a new road bridge across the River Dane. In addition this option involves the construction of new road across largely agricultural land that needs to be purchased. There is also the potential for a number of compensation claims from households close to the new road.

By contrast the Low Cost option has much lower material costs, negligible land costs and potentially lower compensation costs. There is however likely to be a need to divert statutory undertakers equipment at considerable cost. This option will also require extensive traffic management that is expected to be moved on a regular basis.

The scheme costs for the Low Cost option have been refined recently. The *Congleton Link Road Low Cost Estimate Summary Report (October 2015)* estimate the outturn scheme costs for the Low Cost option to be £10.6m.

#### **4.9 Funding Sources**

The preferred CLR scheme has provisionally secured funding from the Local Growth Fund to the value of approximately £45m. This is subject to the submission of a satisfactory business case and demonstration of the scheme's value for money.

The remainder of the funding for the preferred CLR scheme would be derived locally. It is anticipated that developer contributions would be the most significant source of this funding.

Funding for the Low Cost option has not been secured. However it would be likely to be met in part by developer contributions.

# 5

## Operational impacts of Preferred CLR and Low Cost mitigation options

### 5.1 Preferred CLR mitigation option

As noted in in section one the CLR would be the preferred mitigation option. Figure D-1 in Appendix D illustrates the proposed CLR scheme.

**Table 5-1** illustrates the overall model performance summary statistics for the year 2032. The table is based on the December 2015 update to the core plus matrices (i.e. including the Local Plan development). The without mitigation situation is compared to the situation with mitigation. A reduction in time and delay can be considered to be an improvement, whilst for speed an increase suggests an improvement. In the table, Yellow shading indicates limited or no change compared to the without mitigation situation. Green indicates an improvement (darker green indicates the greatest improvement).

The table shows that the CLR successfully reduces delay across all time periods, with average speed increased and delay per pcu km significantly reduced.

**Table 5-1: 2032 Overall model performance statistics comparing the situation without mitigation (Do Minimum) with CLR preferred mitigation scheme (Do Something) with Local Plan development.**

Year : 2032	Without Mitigation			With mitigation			DIFFERENCE			% DIFFERENCE		
	CLR Preferred mitigation											
	AM	IP	PM	AM	IP	PM	AM	IP	PM	AM	IP	PM
Total pcu Distance (km)	136,073	94,053	142,277	135,409	94,971	140,497	-664	917	-1,780	0%	1%	-1%
Total pcu Time (hours)	2,728	1,815	3,344	2,497	1,685	2,698	-231	-130	-646	-8%	-7%	-19%
Total pcu Delay (hours)	655	367	1,171	502	252	608	-153	-115	-564	-23%	-31%	-48%
Average Speed (kph)	49.9	51.8	42.5	54.2	56.4	52.1	4.3	4.6	9.6	9%	9%	23%
Average Delay per pcu km (sec/km)	17.3	14.0	29.6	13.3	9.6	15.6	-4.0	-4.5	-14.1	-23%	-32%	-47%

It should be particularly noted that the CLR makes things operationally better for several key junctions in Congleton in the 2032 Design Year compared to the existing 2012 situation. Delays would be reduced compared to the existing (2012) situation at the A34 West Road / West Street / A34 Clayton By-pass roundabout and the A34 West Road / A34 Newcastle Road / A534 Sandbach Road / A54 Holmes Chapel Road roundabout in the PM peak.

**Table 5-2** and **Table 5-3** include statistics for the CLR that demonstrate that the CLR would improve conditions at all the key junctions compared to the Do Minimum (without mitigation) in 2032. This provides an opportunity to improve conditions for pedestrians and cyclists along the corridor and will improve access to /from the town centre for all road users (car, commercial vehicles, buses, pedestrians and cyclists).

As can be seen in **Table 5-2** and **Table 5-3**, the CLR 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.



**Table 5-2: 2032 AM peak Junction operation analysis (v/c ratios comparing do minimum with preferred CLR mitigation scheme) with Local Plan development.**

Overall junction operation	AM peak (0800-0900)	
	v/c ratio for junction	
Junction	Without mitigation	With CLR mitigation
A34 Rood Hill / A54 Rood Hill / A34 Clayton By-pass	0.92	0.81
A34 Clayton By-pass / Barn Road	0.84	0.84
A34 West Road / West Street / A34 Clayton By-pass	0.68	0.57
A34 West Road / A54 Holmes Chapel Road / A34 Newcastle Road / A534 Sandbach Road	0.86	0.9

**Table 5-3: 2032 PM peak Junction operation analysis (v/c ratios comparing do minimum with preferred CLR mitigation scheme) with Local Plan development.**

Overall junction operation	PM peak (1700-1800)	
	v/c ratio for junction	
Junction	Without mitigation	With CLR mitigation
A34 Rood Hill / A54 Rood Hill / A34 Clayton By-pass	0.77	0.78
A34 Clayton By-pass / Barn Road	0.88	0.91
A34 West Road / West Street / A34 Clayton By-pass	0.67	0.61
A34 West Road / A54 Holmes Chapel Road / A34 Newcastle Road / A534 Sandbach Road	0.8	0.8

## 5.2 Alternative Low Cost option mitigation

Should the delivery of the CLR scheme be delayed, an alternative (sub optimal) local mitigation strategy referred to as the “Low Cost option” has been developed.

This section presents summary results of the traffic modelling.

A package of measures including upgrades to key junctions with localised widening to 2 lanes in each direction would increase capacity at these junctions. The location of the proposed improvements is illustrated in Figures D-2 and D-3 in Appendix D. These improvements 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.

The Low Cost option does not deliver the wider network improvements of the new link road and has a detrimental impact on noise and air quality (as existing roads are widened in more densely populated areas).

However, the Low Cost option does offer some traffic benefits, providing sufficient additional capacity to deliver some of 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.

The full list of improvements is as follows:

1. A34 Rood Hill / A54 Rood Hill / A34 Clayton by-pass signals increased capacity by widening A34 to two lanes through the junction in each direction with a right turn lane maintained to the A54 Rood Hill.
2. A34 Clayton by-pass / Barn Road / Belgrave Avenue roundabout, widen A34 approaches to 2 lanes.
3. A34 Clayton by-pass / Dane Street new traffic signals and one way link to provide access to West Street associated with 4).
4. A34 West Road / Obelisk Way / A34 Clayton By-pass / West Street roundabout – closure of the exits onto West Street and Davenport street with alternative route provide via new signals at Dane Street off the A34 Clayton by-pass and widening of the A34 entries and exits to provide 2 lanes through the junction.
5. A34 West Road / A34 Newcastle Road / A534 Sandbach Road / A54 Holmes Chapel Road roundabout – widening of the A34 Newcastle Road approach to 2 lanes.

**Table 5-4** overleaf demonstrates that in the peak periods delay is generally reduced compared to the do minimum and average delay per pcu kilometre is reduced with the Low Cost option mitigation scheme (for the Inter peak and PM peak). The yellow shading indicates limited or no change compared to the without mitigation situation. Orange indicates a slight deterioration. Green indicates an improvement (darker green indicates the greatest improvement).

**Table 5-4 : 2032 Overall model performance statistics comparing the situation without mitigation (Do Minimum) with Low Cost option mitigation scheme (Do Something) with Local Plan development.**

Year : 2032	Without Mitigation			With mitigation			DIFFERENCE			% DIFFERENCE		
	AM	IP	PM	AM	IP	PM	AM	IP	PM	AM	IP	PM
	<b>Low cost option</b>											
Total pcu Distance (km)	136,073	94,053	142,277	136,084	94,639	140,955	11	586	-1,322	0%	1%	-1%
Total pcu Time (hours)	2,728	1,815	3,344	2,732	1,784	3,294	4	-31	-50	0%	-2%	-1%
Total pcu Delay (hours)	655	367	1,171	656	322	1,135	1	-45	-36	0%	-12%	-3%
Average Speed (kph)	49.9	51.8	42.5	49.8	53.0	42.8	-0.1	1.2	0.3	0%	2%	1%
Average Delay per pcu km (sec/km)	17.3	14.0	29.6	17.4	12.3	29.0	0.0	-1.8	-0.6	0%	-13%	-2%

The overall impact is modest, with a neutral impact on overall conditions in the AM peak and modest improvements in the inter peak and PM peak.

The following tables indicate how well the key junctions operate with the Low Cost Option in place in 2032 with the proposed level of development from the Local Plan Strategy. The table is based on the December 2015 update to the core plus matrices (i.e. including the Local Plan development).

As before, red shading indicates a v/c over 0.85 where reserve capacity is limited and queuing can be expected at peak hours. Green shading indicates a v/c that is below 0.85 suggesting that the junction will generally operate without delay.

**Table 5-5** and **Table 5-6** show that the Low Cost option generally leads to a worsening of the operation of the key junctions, as a result of attracting more traffic into the corridor. The only junction that is forecast to experience an improvement is the A34 West Road / West Street / Clayton by-pass roundabout. As a consequence of the closure of the exit onto West Street and new access via Dane Street, more traffic in the eastbound direction uses the A34 Clayton by-pass. At the A34 West Road / West Street junction conflicting traffic movements are minimised.

**Table 5-5 : AM peak Junction operation analysis (v/c ratios comparing situation without mitigation with situation with Low cost option mitigation) with Local Plan development.**

Overall junction operation	AM peak (0800-0900)	Year : 2032
	v/c ratio for junction	
Junction	Without mitigation	With low cost option mitigation
A34 Rood Hill / A54 Rood Hill / A34 Clayton By-pass	0.92	0.94
A34 Clayton By-pass / Barn Road	0.84	0.91
A34 West Road / West Street / A34 Clayton By-pass	0.68	0.6
A34 West Road / A54 Holmes Chapel Road / A34 Newcastle Road / A534 Sandbach Road	0.86	0.95
Online Junction	N/A	0.89

**Table 5-6 : PM peak Junction operation analysis (v/c ratios comparing situation without mitigation with situation with on line mitigation) with Local Plan development.**

Overall junction operation	PM peak (1700-1800) v/c ratio for junction	Year : 2032
Junction	Without mitigation	With low cost option mitigation
A34 Rood Hill / A54 Rood Hill / A34 Clayton By-pass	0.77	0.92
A34 Clayton By-pass / Barn Road	0.88	0.91
A34 West Road / West Street / A34 Clayton By-pass	0.67	0.59
A34 West Road / A54 Holmes Chapel Road / A34 Newcastle Road / A534 Sandbach Road	0.8	0.92
Online Junction	N/A	0.76

Traffic would be unable to “rat run” on streets close to the town centre in an eastbound direction. This is because traffic would not be able to turn right at the A34 West Road / West Street / A34 Clayton by-pass roundabout to get from the A34 West Road to the A54 Mountbatten Way, which would lead to a significant improvement in the operation of the West Road / West Street / Clayton by-pass roundabout. There would however be new delays for westbound traffic on the A34 at the new signalised junction that provides access to West Street via an upgraded Dane Street. This new road layout also puts increased pressure on the Barn Road roundabout and the Rood Hill traffic signals. In spite of a significant increase in capacity the v/c ratio overall is 0.94 at Rood Hill in the AM peak, with queues on the A54 Rood Hill approach greatest. Barn Road would also experience queues in the PM peak in particular, as this would be the only entry / exit from developments adjacent to the Congleton Business Park.

Feedback from the Local Plan consultation has identified existing congestion as an issue that requires improvement. With the Low Cost option on-line improvements, these delays would remain at most junctions and there will be a reduction in route choice.

### 5.3 Comparison of CLR and Low Cost option with regard to average delay and speed statistics for 2032 compared to existing (2012) situation

**Table 5-7** compares the average delay per pcu kilometre travelled in the current situation (“base year”) across the modelled area, with the situations with Low Cost option mitigation and the preferred CLR scheme. Red shading indicates a significant increase (greater than 4 seconds per km), orange a modest increase (between 1 and 4 seconds per km), and yellow a small increase (less than 1 second per km), compared to the current situation.

The key conclusion is that the CLR limits the increase in delay, to a significantly smaller amount than the Low Cost option which makes delay significantly worse than it is currently, particularly in the PM peak.

**Table 5-7 : Comparison of average delay per pcu km (secs per km) across the network between base year (2012) and 2032 (including Local Plan development) with Low Cost option and CLR preferred mitigation schemes**

	Average delay 2012	Average delay 2032 Low cost option	Average delay 2032 CLR Preferred
AM	12.7	17.4	13.3
IP	7.7	12.3	9.6
PM	12.6	29.0	15.6

**Table 5-8** compares the average speed in the current situation (“base year”) across the modelled area with the future situations with Low Cost option and the preferred CLR scheme in 2032. Red shading indicates a significant reduction, green an increase, and orange indicates a slight reduction, compared to the current situation.

The average speeds in 2032 with the CLR preferred CLR scheme in place are comparable to the base (2012). However, the average speeds in 2032 with the Low Cost option in place are significantly slower than the base (2012). It should be noted that this is a network wide statistic – and for key movements (such as cross Congleton traffic), journey times would be improved by the preferred CLR.

**Table 5-8 : Average Speed across the network comparison between base year (2012) and 2032 with alternative mitigation schemes**

	Average speed 2012	Average speed 2032 Low cost option	Average speed 2032 CLR Preferred
AM	53.5	49.8	54.2
IP	57.3	53.0	56.4
PM	53.6	42.8	52.1

## 5.4 How would mitigation be planned/resourced?

The Preferred CLR scheme and Low Cost option are included in the Local Infrastructure Delivery Plan and would be part funded through the Community Infrastructure Levy (CIL) and developer contributions.

£45 million funding for the CLR has been secured in principle from central government funding, via the Strategic Economic Partnership. Further funding opportunities will be pursued as they arise. It is well placed to find funding from future funding sources. Developer funding and other contributions will make up the balance of funding.

### **Affordability / Deliverability Assessment of the Mitigation Options**

#### **1) Congleton Link Road**

Following an extensive costing exercise which was completed in December 2015, a revised scheme cost estimate has been derived for the Preferred Option. This exercise estimated the outturn scheme costs for the Preferred Option to be £85.2m.

In addition to facilitating the proposed new development, it should be noted that the new link also improves connectivity across the Borough with journey times from Macclesfield to the M6 motorway via Junction 17 improved. On this basis there is a strong argument that CIL funding from across the Borough could be used to part fund the new link if necessary.

#### **2) Low Cost option**

If the CLR cannot be delivered for other reasons such as not navigating the various statutory procedures; a sub optimal local mitigation strategy (a "Low Cost option") has been developed; given the scale of residual congestion in this situation, it is considered that this solution could not support the full scale of growth proposed.

The scheme costs for the Low Cost option have been refined recently. The *Congleton Link Road Low Cost Estimate Summary Report (October 2015)* estimate the outturn scheme costs for the Low Cost option to be £10.6m.

The cost of moving statutory undertakers equipment and potential compensation for householders living on the upgraded route, have been estimated but is likely to increase as more information becomes known. For example the extent and volume of gas, electric and communications infrastructure may be much greater than might normally be anticipated resulting in higher costs to move them. Compensation costs will require a more detailed assessment before a formal Business Case submission could be produced.

Funding would be expected to be secured from developers via the CIL, it is considered that the scheme lacks the transformative economic and transport merits to attract external funding.

Deliverability of the low cost option will be reliant on large scale temporary traffic management arrangements which are likely to cause significant disruption and delay to the town network for a prolonged period.

Finally, unlike the link road scheme, improvements to the existing road network do not leave any further 'headroom' for longer term development aspirations.

## 5.5 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. An Early Appraisal Sifting Tool assessment was undertaken to consider a range of potential schemes that might address the identified transport issues in Congleton. The result of this exercise was the conclusion that the CLR was the only viable solution that met all the identified scheme objectives.

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 could 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 Low Cost option 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.

## 5.6 Recommended mitigation strategy for Congleton and acceptability of the proposed development strategy:

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 and, is well developed.

Traffic modelling work suggests that the Low Cost option is not likely to provide sufficient capacity to accommodate all the proposed amount of development. The Low Cost option also does not address all the existing transport issues in the town including severance, air quality and noise issues. Localised problems may increase

at some locations and the scheme requires limiting movements at certain junctions. The Low Cost option needs to be delivered in its' entirety in order to provide the necessary enhancements in capacity to accommodate even a reduced amount of development related traffic. The acceptability of the low cost option to the public has not yet been fully tested; the proposed link road is well supported.

The optimum location for development in Congleton was considered to be to the north of the town. The CLR facilitates access northwards towards Manchester on the A34 and west towards the M6 (providing strategic links to the wider North West, West Midlands and Southern England) and provides an element of 'future proofing' for the road network.



### 6.1 Summary

This report has presented the latest available evidence in order to consider the following;

What highway schemes have been implemented during 2015 and what schemes are proposed?

What are the predicted impacts of proposed Local Plan developments on the Do minimum Highway network (without mitigation)?

What are the proposed mitigation measures to address these impacts?

What are the relative merits of the Preferred CLR scheme and the Low Cost option against the following criteria? ;

- Impact on Transport Users
- Impacts of Construction
- Development Land Unlocked
- Future proofing
- Environmental Impact
- Wider Impacts
- Scheme Costs
- Funding sources

What are the operational impacts of the Preferred CLR scheme and the Low Cost mitigation options?

How would mitigation be planned / resourced?

What is the recommended mitigation strategy for Congleton and what is the acceptability of the proposed mitigation strategy?

### 6.2 Conclusions

Only limited improvements to the highway network have been implemented or are proposed as a “Do Minimum” (without mitigation) situation.

Without mitigation the Do Minimum highway network is inadequate to accommodate all the proposed development in the Local Plan.

The preferred mitigation scheme is the Congleton Link Road to the north of Congleton. An alternative ‘low cost’ option of improving the existing roads has been assessed.

The preferred CLR scheme has a considerably greater impact on reducing journey times across and within Congleton than the Low Cost option. The TUBA assessment results show that the preferred CLR scheme would deliver £133m of travel time savings (over a 60year appraisal period, in 2010 prices, discounted to

2010) which is approximately 3 times higher than the £47m of travel time savings that would be delivered by the Low Cost option.

The construction of the Low Cost option would not be possible without significant impacts on traffic movements within Congleton over the construction period. The QUADRO assessment results show that the Low Cost option would generate delays valued at £22m (in 2010 prices, discounted to 2010). In contrast, the preferred CLR scheme could be implemented with minimal impact on traffic operations during the construction phase. Consequently, the delays generated by the preferred CLR scheme are valued at £1m (in 2010 prices, discounted to 2010) over the construction period.

The preferred CLR scheme also supports economic development by opening up land to the north of the town (as proposed in the emerging Local Plan) and encouraging regeneration of the town centre. A number of sites identified in the Cheshire East's emerging Local Plan could not be delivered without the preferred CLR scheme, as there are land ownership issues that mean access to these sites from the existing highway network would not be possible.

The preferred CLR scheme provides "future proofing" as it provides additional capacity for potential additional development beyond the development outlined in the emerging Local Plan strategy (i.e. post 2030). Since the Low Cost option does not provide sufficient capacity for all the development identified in the emerging Local Plan strategy, it clearly doesn't allow for any additional development post 2030.

The area around the Rood Hill traffic signals is currently declared as an Air Quality Management Area (AQMA). The preferred CLR scheme is expected to deliver considerable environmental benefits with regard to air quality and noise which the Low Cost option will not provide.

In addition to the transport benefits, the preferred CLR scheme would deliver wider impact benefits for other road users (including vulnerable road users and public transport users) in terms of reduced severance. Furthermore, the preferred CLR scheme is also anticipated to encourage and facilitate the regeneration of Congleton town centre by reducing congestion and subsequently making Congleton town centre a more attractive location for businesses to invest.

The Low Cost option is clearly by definition a significantly cheaper scheme to deliver than the preferred CLR scheme. The latest available outturn scheme costs estimate the Low Cost option at £10.6m and the preferred CLR scheme at £85.2m.

The preferred CLR scheme has provisionally secured funding from the Local Growth Fund to the value of approximately £45m.

The CLR successfully reduces delay across all time periods, with average speed increased and delay per pcu km significantly reduced.

The CLR 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.

The overall impact of the Low Cost option is modest, with a neutral impact on overall conditions in the AM peak and modest improvements in the inter peak and PM peak.

The Low Cost option generally leads to a worsening of the operation of the key junctions, as a result of this option attracting more traffic into the corridor.

At the network wide level the key conclusion is that the CLR mitigates the impacts of local growth and limits the increase in delay. The Low Cost option cannot offer the same level of mitigation (with the same level of development) and congestion remains significantly higher than current levels.

£45 million funding for the CLR has been secured in principle from central government funding, via the Strategic Economic Partnership. Further funding opportunities will be pursued as they arise.

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 and, is well developed.

Traffic modelling work indicates that the Low Cost option is not likely to provide sufficient capacity to accommodate all the proposed amount of development. There are question marks about the deliverability of the scheme and the public acceptance is untested. The Low Cost option can only be delivered through a programme of long-term, temporary traffic management arrangements which will constrain traffic networks for long periods. Overall, the impact, deliverability, public acceptance and scope of the Low Cost option is insufficient to allow an acceptable future level of network performance in Congleton.

## Appendix A QUADRO Assessment Results

**Summary of the QUADRO Results**

**Table 1 - Construction Delay Summary**

Scenario	Key Assumptions	User Delay Disbenefits during Construction (£)
Preferred Option	Assumes traffic management in place 24hrs a day.	<b>-£723,934</b>
Low Cost Option - assuming off-peak working only (1000-1600, 7 days per week)	Assumes traffic management in place 1000-1600 seven days a week.  Signed diversion route is a long route via A535 Holmes Chapel Road. Where alternative shorter diversion route is available in central Congleton, it is assumed half of traffic uses this rather than the signed diversion.	<b>-£22,550,577</b>

**Table 2 - Maintenance Delay Summary**

Scenario	Key Assumptions	User Delay benefits during Maintenance (£)
Preferred Option	The benefits for the preferred option are the cost for the preferred option - the cost for the do minimum. Existing route: Assumes a full closure of road every 15 years from 2019 between 10.00 and 15.00 in both directions New Link Road: assumes a full closure of road every 15 years from 2034 between 10.00 and 15.00 in both directions Existing bridge: assumes a full closure in 2050 for 4 weeks, 24 hr per day New bridge: assumes a full closure in 2060 for 4 weeks 24 hrs per day	<b>£1,318,325</b>
Low Cost Option	The benefits for the low cost option are the cost for the low cost option - the cost for the do minimum. Existing route: Assumes a full closure of the the road every 15 years from 2034 between 10.00 and 15.00 in both directions Existing bridge: Assumes a full closure of bridge in 2050, 24 hours per day for 4 weeks	<b>£591,992</b>

**Table 3 - Total Construction and Maintenance Benefits for each scenario**

Scenario	Total Benefits
Preferred Option total	<b>£594,391</b>
Low Cost Option assuming off peak working only	<b>-£21,958,585</b>

**Table 4 Summary of Construction Disbenefits for the Preferred Option**

Assumptions:

24hr working

Section:

Delay cost (£)

<b>Section 1</b>	Tie-in between new road and A534	<b>£150,820</b>
<b>Section 1</b>	Tie-in between new road and A54	<b>£87,671</b>
<b>Section 7</b>	Tie-in between new road and A34	<b>£237,431</b>
<b>Section 8</b>	Tie-in between new road and A536	<b>£248,012</b>
<b>TOTAL</b>		<b>£723,934</b>

**Table 6 - Summary of Construction disbenefits for the Low Cost Option assuming off peak working only**

Assumptions:

Traffic Management is in place 1000-1600, 7 days a week (except Section 6 where traffic management is in place on bridge 24hrs)

Where both long and short diversions available (i.e. for links in central Congleton), an average of the delays between these two scenarios is used.

Section:	Delay cost (£)	
<b>Section 2</b>	Re-laying of A34 between Waggon and Horses roundabout and Mereside Avenue (two-way section of road only)	£1,428,193
<b>Section 3</b>	Widening of A34 between Mereside Avenue and West Street roundabout	£9,412,710
<b>Section 5</b>	Widening of A34 between West Street roundabout and Dane Street	£1,022,699
<b>Section 6</b>	Widening of A34 over River Dane bridge	£1,411,065
<b>Section 7</b>	Widening of A34 between River Dane bridge and Barn Road roundabout (Tesco's)	£803,416
<b>Section 9</b>	Widening A34 between Barn Road roundabout (Tesco's) and A54 junction	£1,233,682
<b>Section 11</b>	Widening of A34 west of A54 junction	£7,238,813
<b>TOTAL</b>		<b>£22,550,577</b>

**Table 7 - Summary of Maintenance benefits for the Do Minimum Option**

	Description	Road Type	Route Length (km)	Site Length (km)	TM Type	Diversion	Div Length (km)	Year of Work and Duration	2017 AADT (OY)	2032 AADT (DY)	Flow on diversion 2017	Flow on diversion 2032	QUADRO result
<b>Section 1</b>	Maintenance of A54 between Sandy Lane junction and A34 New Castle Rd junction	S2	10.8	1.9	Full closure of the road between 10:00 and 15:00 hours (both directions)	Long diversion via A535 at Holmes Chapel /A537 by Astle /A34 back into Congleton	23.540	Between 10:00 and 15:00 hours on the following days 2019-13 days ,2034-8 days ,2049- 23 days ,2064- 23 days	7,503	7,669	10,778	12,432	£542,068
<b>Section 2</b>	Maintenance of A34 between New Castle Rd junction and West Street roundabout	S2	10.8	0.6	Full closure of the road between 10:00 and 15:00 hours (both directions)	Long diversion via A535 at Holmes Chapel /A537 by Astle /A34 back into Congleton	23.540	Between 10:00 and 15:00 hours on the following days 2019-4 days ,2034-2 days ,2049- 7 days ,2064-7 days	36,601	34,829	10,778	12,432	£816,768
<b>Section 3</b>	Maintenance of A34 between West Street roundabout and A54 junction including the bridge over River Dane	S2	0.7	0.7	Full closure of the road between 10:00 and 15:00 hours (both directions)	Short diversion via West St /Antrobus St /A54	1.040	Between 10:00 and 15:00 hours on the following days: 2019-5 days ,2034-3 days ,2049- 8 days ,2064- 8 days	22,304	23,194	18,240	18,240	£54,584
<b>Section 4</b>	Maintenance of A34 east of A54 junction	S2	10.9	0.3	Full closure of the road between 10:00 and 15:00 hours (both directions)	Long diversion via A535 at Holmes Chapel /A537 by Astle /A34 back into Congleton	23.540	Between 10:00 and 15:00 hours on the following days: 2019-2 days ,2034-1 days ,2049-4 days ,2064-4 days	34,227	33,778	10,778	12,432	£461,916
<b>Bridge Maint</b>	Maintenance of bridge over River Dane: A34 crosses the River Dane as a single carriageway road as in the existing situation	S2	0.6	0.1	Full closure of the bridge	Via West St /Antrobus St /A54	1.04	24 hrs per day, 7 days / week for 4 weeks in 2040	21,919	23,848	18,240	18,240	£159,219
													£2,034,555



Table 8 - Summary of Maintenance benefits for the Preferred Option

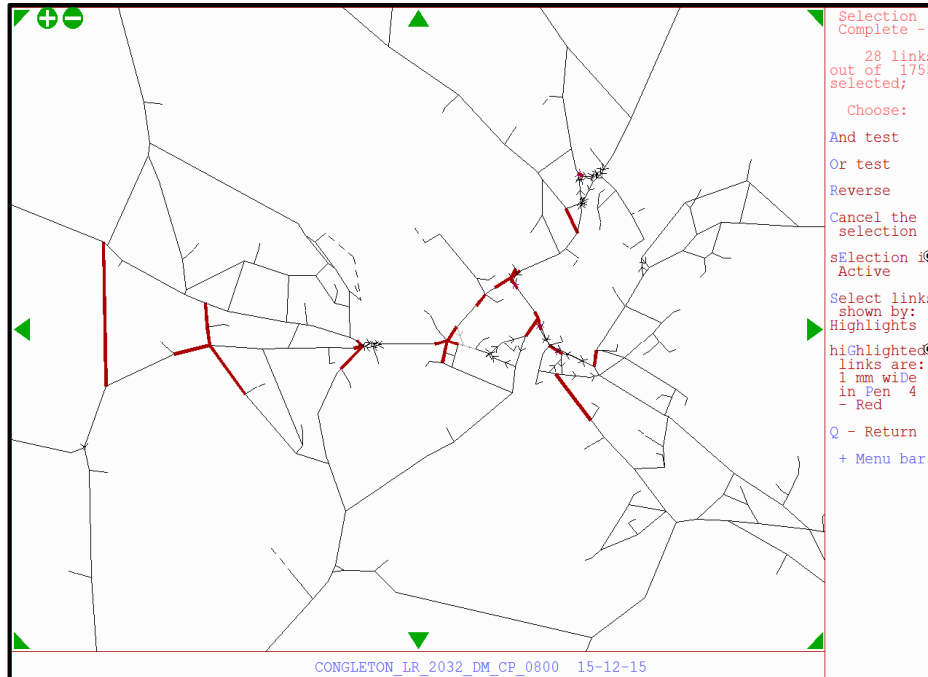
		Description	Road Type	Route Length (km)	Site Length (km)	TM Type	Diversion	Div Length (km)	Duration of Work	2032 AADT (DY)	Flow on diversion 2017	Flow on diversion 2032	QUADRO result
Existing road	Section 1	Maintenance of A54 between Sandy Lane junction and A34 Newcastle Rd junction	single	3.5	1.9	Full closure of the road between 10:00 and 15:00 hours (both directions)	Via Congleton Link Road	4.98	Between 10:00 and 15:00 hours on the following days: 2019-13 days ,2034-8 days ,2049- 23 days ,2064- 23 days	8,695	10,534	13,056	£95,113
	Section 2	Maintenance of A34 between Newcastle Rd junction and West Street roundabout	single	3.5	0.6	Full closure of the road between 10:00 and 15:00 hours (both directions)	Via Congleton Link Road	4.98	Between 10:00 and 15:00 hours on the following days: 2019-4 days ,2034-2 days ,2049- 7 days ,2064-7 days	29,146	10,534	13,056	£139,954
	Section 3	Maintenance of A34 between West Street roundabout and A54 junction including the bridge over River Dane	single	3.5	0.7	Full closure of the road between 10:00 and 15:00 hours (both directions)	Via Congleton Link Road	4.98	Between 10:00 and 15:00 hours on the following days: 2019-5 days ,2034-3 days ,2049- 8 days ,2064- 8 days	15,125	10,534	13,056	£67,637
	Section 4	Maintenance of A34 east of A54 junction	single	3.5	0.3	Full closure of the road between 10:00 and 15:00 hours (both directions)	Via Congleton Link Road	4.98	Between 10:00 and 15:00 hours on the following days: 2019-2 days ,2034-1 days ,2049-4 days ,2064-4 days	24,458	10,534	13,056	£55,621
	New Congleton Link Road	Maintenance of New Congleton Link Road	single	4.6	4.6	full closure of new Congleton Link Road between 10:00 and 15:00 hours (both directions)	Via Existing road (sections 1,2,3,4)	5.22	Between 10:00 and 15:00 hours on the following days: 2034-35 days ,2049-20 days ,2064- 60 days	13,118	13,770	15,526	£136,896
	Bridge Maint - existing bridge		single	4.7	0.1	Full closure of the existing single CW bridge in 2050	Via Congleton Link Road	4.978	24 hrs per day, 7 days a week for 4 weeks during 2050	15,125	10,534	13,056	£132,750
	Bridge Maint - new bridge on bypass		single	4.6	0.1	Full closure of new single CW bridge in 2060	Via Existing road (sections 1,2,3,4)	5.22	24 hrs per day, 7 days/week for 4 weeks during 2060	13,118	13,770	15,526	£88,259
													£716,230

**Table 9 - Summary of Maintenance benefits for the Low Cost Option**

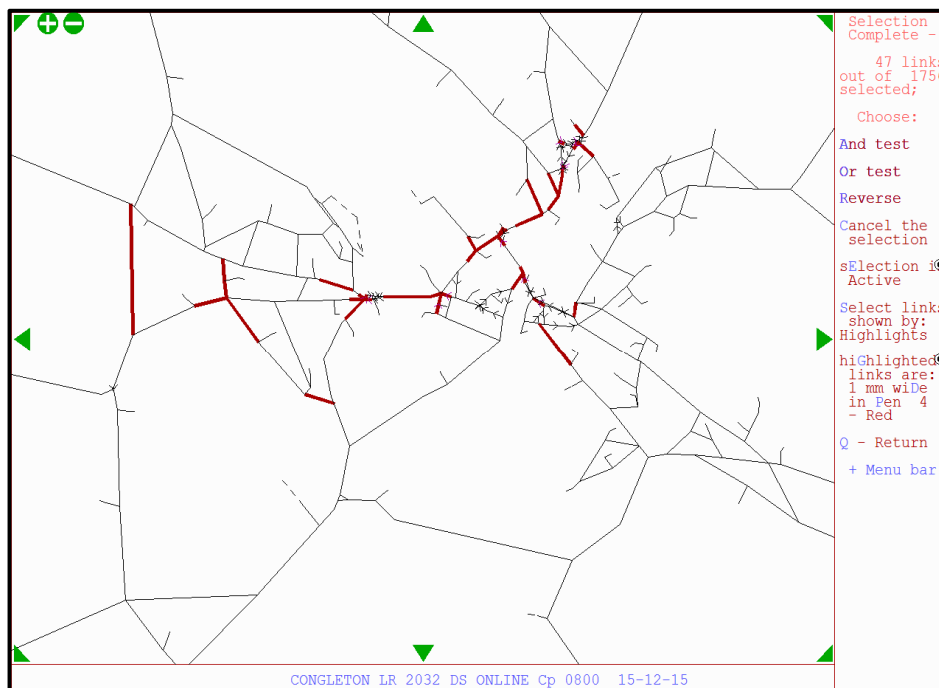
	Description	Road Type	Route Length (km)	Site Length (km)	TM Type	Diversion	Div Length (km)	Year of Work	2017 AADT (OY)	2032 AADT (DY)	Flow on diversion 2017	Flow on diversion 2032	QUADRO result
<b>Section 1</b>	Maintenance of A54 between Sandy Lane junction and A34 Newcastle Rd junction	S2	10.8	1.9	Full closure of the road between 10:00 and 15:00 hours (both directions)	long diversion via A535 at Holmes Chapel /A537 by Astle /A34 back into Congleton	23.54	Between 10:00 and 15:00 hours on the following days: 2034-8 days, 2049- 23 days, 2064- 23 days	7,238	8,102	10,946	12,514	£399,668
<b>Section 2</b>	Maintenance of A34 between Newcastle Rd junction and West Street roundabout	S2	10.8	0.6	Full closure of the road between 10:00 and 15:00 hours (both directions)	long diversion via A535 at Holmes Chapel /A537 by Astle /A34 back into Congleton	23.54	Between 10:00 and 15:00 hours on the following days: 2034-2 days , 2049- 7 days, 2064-7 days	37,095	40,199	10,946	12,514	£558,990
<b>Section 3</b>	Maintenance of A34 between West Street roundabout and A54 junction including the bridge over River Dane	S2	0.7	0.7	Full closure of the road between 10:00 and 15:00 hours (both directions)	short diversion via West St /Antrobus St /A54	1.04	Between 10:00 and 15:00 hours on the following days: 2034-3 days , 2049- 8 days , 2064- 8 days	28,303	32,807	18,240	18,240	£27,468
<b>Section 4</b>	Maintenance of A34 east of A54 junction	Single	10.9	0.3	Full closure of the bridge between 10:00 and 15:00 hours (both directions)	Long diversion via A535 at Holmes Chapel /A537 by Astle /A34 back into Congleton	23.54	Between 10:00 and 15:00 hours on the following days: 2034-1 days, 2049-4 days, 2064-4 days	32,473	35,341	10,946	12,514	£340,010
<b>Bridge Maint</b>	Maintenance of bridge over River Dane: A34 crosses the River Dane as a single carriageway road as in the existing situation	Single	0.6	0.1	Full closure of the bridge	via West St /Antrobus St /A54	1.04	4 weeks, 24 hrs per day , 7 days/week in 2050	28303	32807	18240	18240	£116,427
													<b>£1,442,563</b>

# Appendix B SATURN plots illustrating the impact of Local Plan developments on links

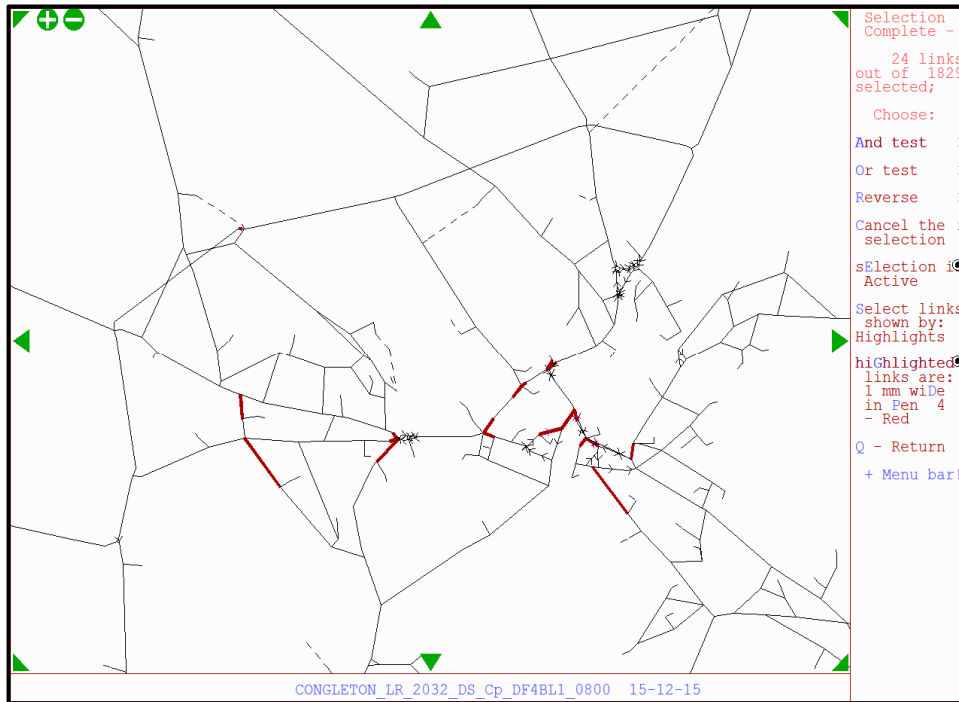
**Overcapacity links in 2032 AM peak Do Minimum with Local Plan Developments**



**Overcapacity links in 2032 AM peak Do Something (Low Cost option) with Local Plan Developments**



### Overcapacity links in 2032 AM peak Do Something (CLR) with Local Plan Developments

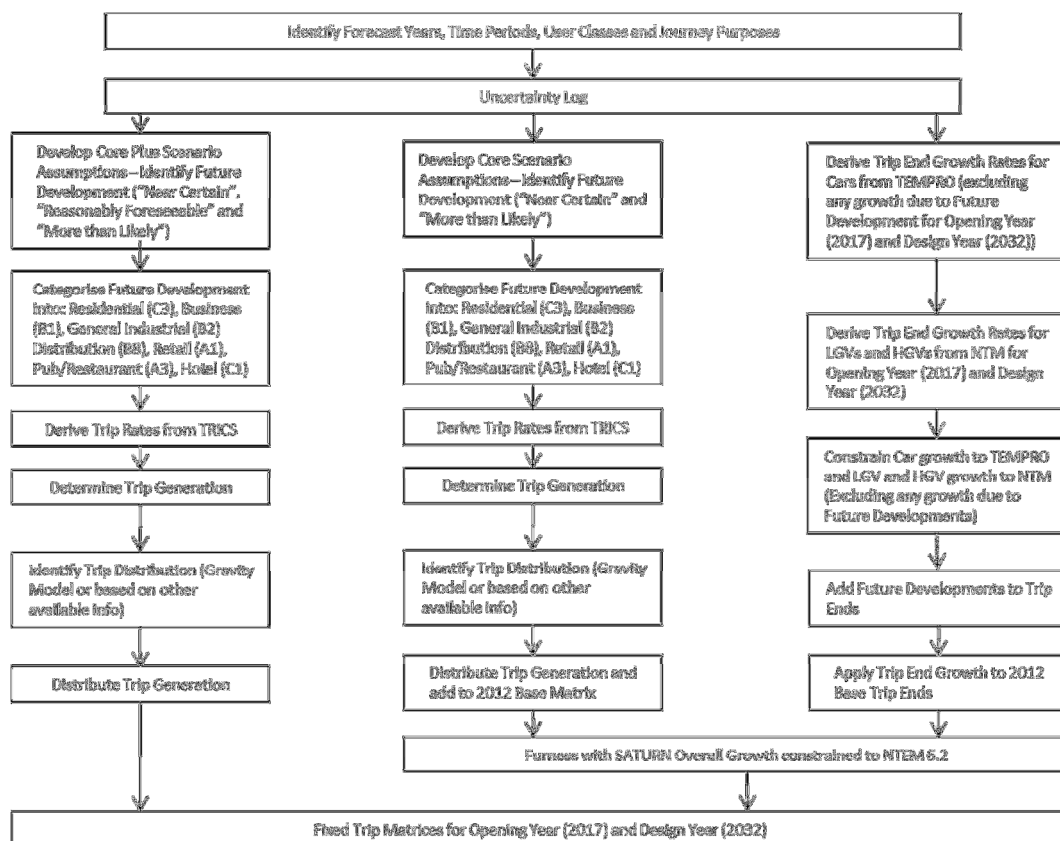


## Appendix C Forecast Trip Growth Methodology

This section is extracted from Section 5 of the TFR. Forecast Growth Matrices (for the Core and Core plus scenarios) were developed using the Uncertainty Log (as included in the Traffic Forecasting Report).

Figure C-1 shows the methodology used to develop the forecast demand matrices for the Core scenario using a combination of traffic growth factors and development traffic.

**Figure C-1 - Flow Diagram showing Forecast Trip Matrix Development (Core scenario)**



### NTEM and the National Transport Model (NTM)

The most recent National Trip End Model (NTEM) Version 6.2 has been used to derive growth forecasts for cars, with the model growth constrained to the relevant NTEM growth. The National Transport Model (NTM) has been used to derive growth forecasts for LGVs and HGVs based on RTF 2015.

Key employment and residential developments have been identified in the Uncertainty Log from adopted and emerging Core Strategies and are included in the Traffic Forecasting Report. Full details of how the specific key developments in the Uncertainty Log have been converted to trips for inclusion in the forecast matrices are shown later in this report.

## Development of Core matrix

The approach outlined in figure C-1 was used to develop the Core matrix. Guidance states that the forecast trip end growth should be consistent with TEMPRO at the study area level in order to allow consistency between various geographical locations when assessing transport proposals. To accord with this the growth in demand between the base year and the forecast years was derived using three datasets:

- National Trip End Model (NTEM) forecasts using dataset v6.2 extracted using TEMPRO software v6.2.
- National Traffic Model (NTM) Dataset 2015
- Local planning data as described in the Uncertainty Log.

The growth forecasts for cars were calculated using TEMPRO v6.2 to extract the data from NTEM dataset v6.2. The growth forecasts for LGVs and HGVs were calculated using RTF 2015.

The local planning data specified in the Uncertainty Log was converted to trips using the TRICS trip rates. These trips from the future development allocations have been assigned to individual zones, as follows:

- Information available from the Uncertainty Log has been used to support the zoning process.
- All development trips have been assigned to single zones (though in some cases the largest developments have been assumed to be split equally between two adjacent zones).

The following methodology has been used to distribute the generated traffic:

- For all sites a reasonable distribution was taken from a nearby zone in the traffic model,
- A simple gravity model has been produced to determine the likely distribution of traffic to/from future developments in South Macclesfield and Biddulph because these developments are peripheral to the main model area and do not have suitable “parent” zones from which a distribution could be derived.

The distributed Uncertainty Log trips form a development matrix for each user class and therefore a set of origin and destination trip ends. To avoid double counting the housing and employment trip generations with NTEM growth they have been included in the NTEM constraint process to calculate a single set of trip ends which are constrained to NTEM. The trip ends are used for furnishing of the base matrix to produce the forecast matrices.

## Core Plus Matrix Development

Additional trips, as a result of local development (to be allocated in the new local plan) , that were not included in the Core Scenario due to the development trips not being included in NTEM or NTM were incorporated into the trip growth development process.

An Uncertainty Log (included in the forthcoming Traffic Forecasting Report) was produced for these local developments and similarly to the Core Matrix development, “Near Certain” and “More than Likely” developments were included. The additional local developments that were included in the forecast growth matrices for the Core plus scenario were classified as “reasonably foreseeable”. Note that the number of units / size of units listed relate to the anticipated situation

for 2032 (i.e. completed housing units and employment land developed). Only limited development is anticipated in the scheme's opening year.

As for the Core scenario local planning data specified in the Uncertainty Log for the Core Plus scenario was converted to trips using the TRICS trip rates. These trips from the future development allocations have been assigned to individual zones, as follows:

- Information available from the Uncertainty Log has been used to support the zoning process.
- all development trips have been assigned to single zones (though in some cases the largest developments have been assumed to be split equally between two adjacent zones).

As for the Core scenario the following methodology has been used to distribute the generated traffic:

- for all sites a reasonable distribution was taken from a nearby zone in the traffic model.

### Trip Matrix Comparisons

Table C-1 shows the base year 2012 modelled trip totals for each user class and compares these values to the forecasted modelled trip totals (with the core plus scenario) in the opening year 2017.

User Class	2012			2017			% Growth		
	AM	IP	PM	AM	IP	PM	AM	IP	PM
Car Commute	4434	920	4692	4917	1016	5189	10.9%	10.5%	10.6%
Car Business	709	790	786	792	886	877	11.8%	12.1%	11.5%
Car Other	3070	4336	4068	3369	4793	4505	9.7%	10.5%	10.7%
LGV	775	812	444	854	896	490	10.3%	10.3%	10.3%
HGV	393	374	144	396	377	146	0.7%	0.7%	0.7%
<b>Total</b>	<b>9381</b>	<b>7233</b>	<b>10136</b>	<b>10328</b>	<b>7968</b>	<b>11206</b>	<b>10.1%</b>	<b>10.2%</b>	<b>10.6%</b>

**Table C-1 – 2017 Core and Base Year (2012) Matrix Comparisons**

Table C-2 shows the significant growth increase in the number of trips, by around 50% for LGVs, when comparing 2032 total trips (with the core scenario) to base year 2012 trips. This in line with expectations.

User Class	2012			2032			% Growth		
	AM	IP	PM	AM	IP	PM	AM	IP	PM
Car Commute	4434	920	4692	5340	1105	5633	20.4%	20.1%	20.0%
Car Business	709	790	786	877	993	968	23.8%	25.7%	23.1%
Car Other	3070	4336	4068	3848	5586	5154	25.3%	28.8%	26.7%
LGV	775	812	444	1178	1235	676	52.1%	52.1%	52.1%
HGV	393	374	144	433	412	159	10.1%	10.1%	10.1%
<b>Total</b>	<b>9381</b>	<b>7233</b>	<b>10136</b>	<b>11676</b>	<b>9331</b>	<b>12590</b>	<b>24.5%</b>	<b>29.0%</b>	<b>24.2%</b>

**Table C-2 -2032 Core and Base Year (2012) Matrix Comparisons**

**Appendix D Plans of potential mitigation schemes**

**Figure D-1 Preferred Congleton Link Road mitigation scheme**





Figure D-2 Low Cost option mitigation scheme (full extent)

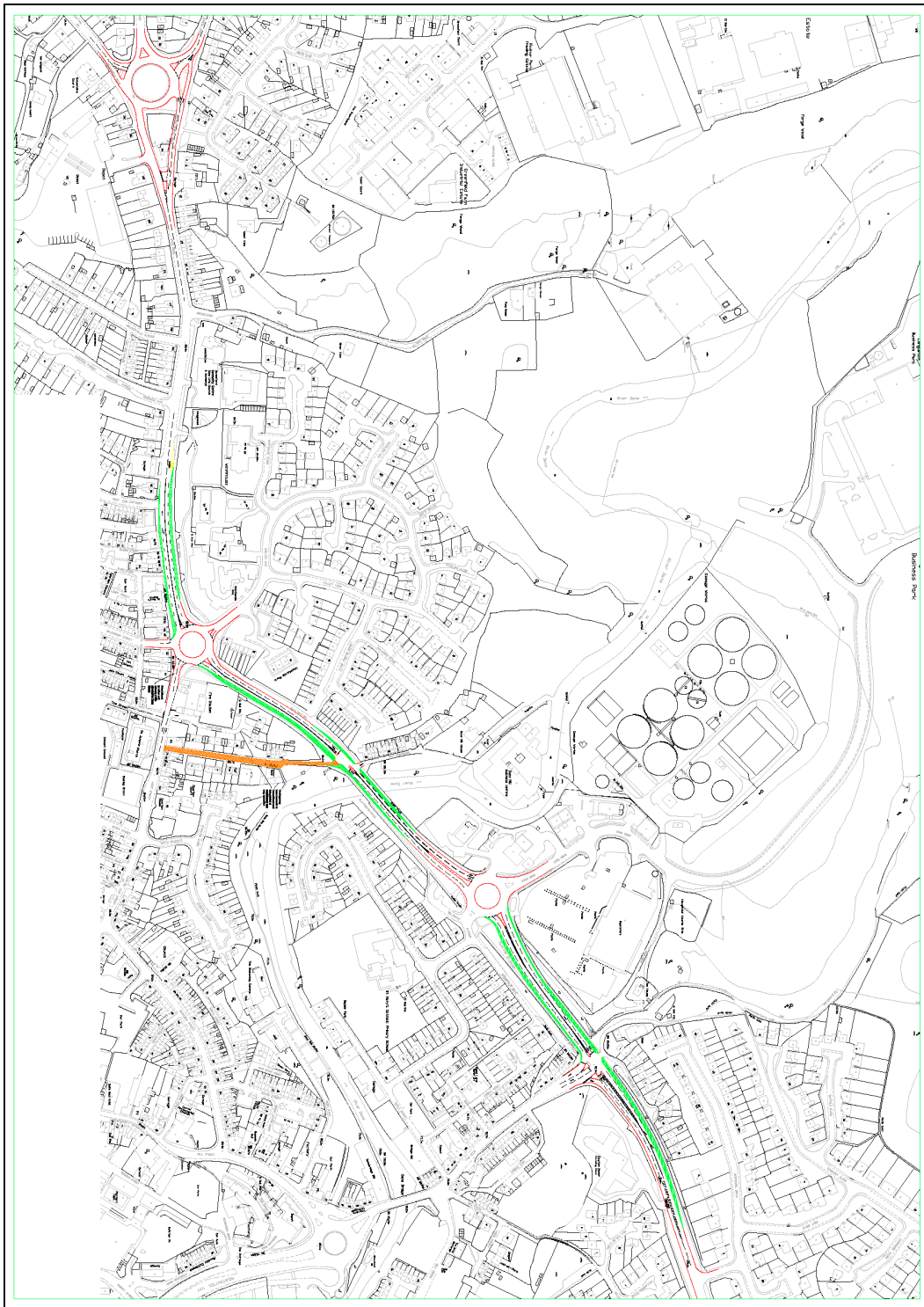
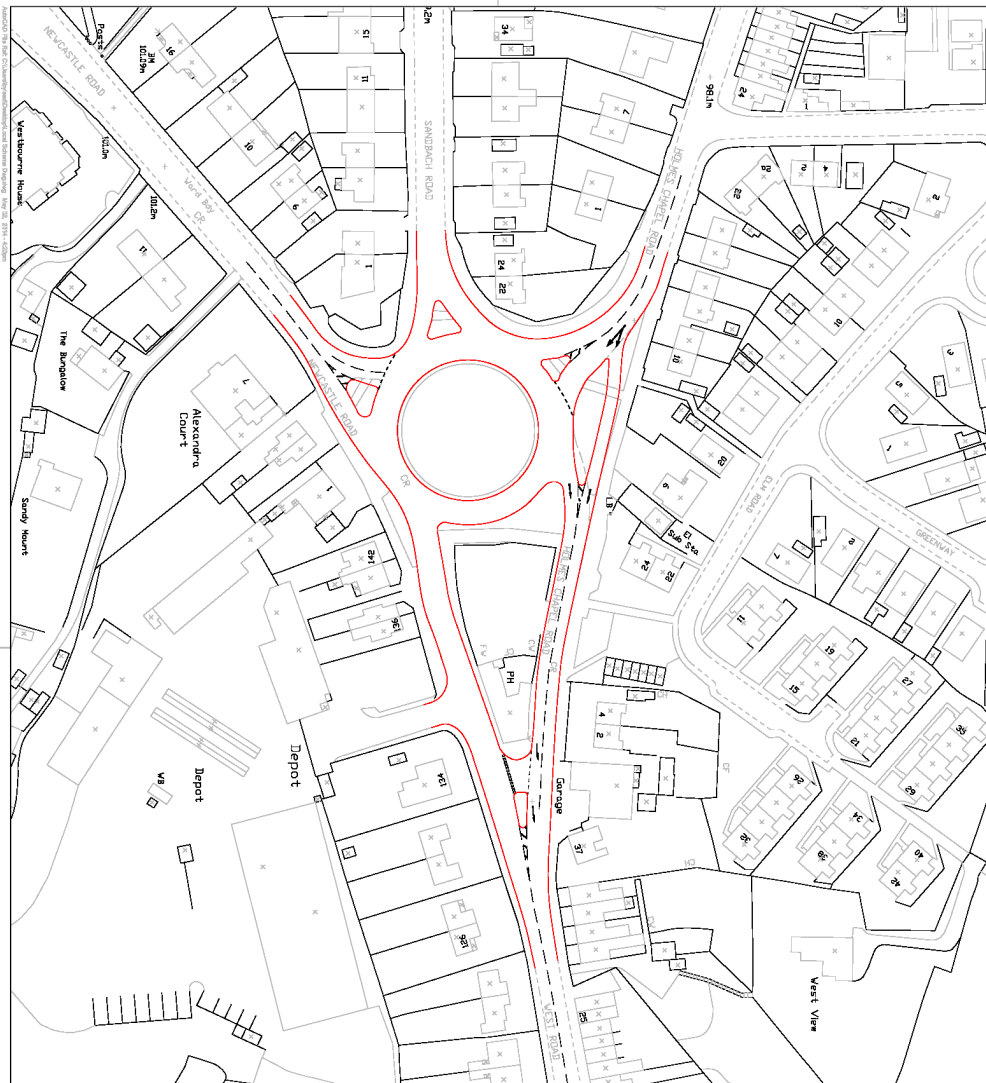


Figure D-3 Low Cost option mitigation scheme (A34 Newcastle Road / A534 Sandbach Road / A54 Holmes Chapel Road, detailed drawing)



**Cheshire East Council Highways**

**A34 / A54 / A534 Roundabout**

Completion

0 Original  
0 Current  
0 Proposed

0 MAY 2014

0

THIS IS A CONSULTATION PLAN. CHESHIRE EAST COUNCIL HAS MADE IT AVAILABLE IN CONSULTATION AND TO A REPRESENTATIVE SAMPLE OF QUALITY CONSULTANTS. CHESHIRE EAST COUNCIL HAS MADE IT AVAILABLE IN CONSULTATION AND TO A REPRESENTATIVE SAMPLE OF QUALITY CONSULTANTS. CHESHIRE EAST COUNCIL HAS MADE IT AVAILABLE IN CONSULTATION AND TO A REPRESENTATIVE SAMPLE OF QUALITY CONSULTANTS.

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