Report **HFAS Report 1718**

Client **SEMMMS Project Board**

Project **A6 To Manchester Airport Relief Road**

Subject **SEMMMS8b Design Freeze 6 Forecasting Report**

This Report describes the derivation of the scheme traffic forecasts used for the appraisal of the A6 to Manchester Airport Relief Road. The forecasts produced are for an assumed opening year of 2017 and for a design year of 2032, assuming three potential growth and highway infrastructure scenarios.

This Report	**HFAS_1718_SEMMMS8b_ForecastingReport_V1.0.docx**		
Originator	Michael Reese		Check /
Version	Comments	Date	Approve
V3.0	Final Version	091112	MR

Contact	HFAS:	E-mail	Tel:
	Michael Reese	michael.reese@tfgm.com	+44 (0) 161 244 1414
	Michael Atkinson	michael.atkinson@tfgm.com	+44 (0) 161 244 1610
	Riccardo Boncinelli	riccardo.boncinelli@tfgm.com	+44 (0) 161 244 1420
	David Nixon	david.nixon@tfgm.com	+44 (0) 161 244 1400

Issued	Organisation	FAO
261012	Atkins	R Kimber (v0.3 – Draft for comment)
091112	Atkins	R Kimber (v3.1 – Final Version)

C O N T E N T S

Page

Figures

Tables

Executive Summary

Overview

1. Transport for Greater Manchester (TfGM) Highways Forecasting and Analytical Services (HFAS) was appointed by the SEMMMS Project Board to develop WebTAG compliant traffic models for the appraisal of scheme options for the proposed A6 to Manchester Airport Relief Road. The development of the base demand and traffic assignment models was carried out in partnership with MVA Consultancy.

2. This report describes the derivation of SATURN model scheme traffic forecasts used for the appraisal of the proposed scheme. The results reported reflect the Design Freeze 6 version of the proposed scheme.

Traffic Forecasting

3. The Do-Minimum networks included schemes that will be brought forward in the Southern part of Greater Manchester and Northern Cheshire primarily as part of the National Infrastructure Plan, the Greater Manchester Transport Fund, or as part of the on-going development of Manchester Airport.

4. In line with WebTAG Unit 3.15.5, three Do-Minimum scenarios have been specified to represent uncertainty in the progression of developments, transport schemes and overall growth in the wider economy. These scenarios represented Pessimistic, Core and Optimistic assumptions about the future in each of the two forecast years of 2017 and 2032.

5. The resulting Do-Minimum networks were used for the detailed examination of scheme impacts and for the cost-benefit analysis reported later in this report, but they were also supplied to consultant MVA for the representation of highway supply in the SEMMMS8 variable demand model (SEMMMS VDM).

6. Do-Something networks (for the scheme) were built from the Do-Minimum networks and differed only in the respect that they had the A6 to Manchester Airport Relief Road scheme and associated mitigation measures coded into them.

Demand Forecasting

7. Demand forecasts were derived using a version of the Greater Manchester Strategy Planning Model (GMSPM2), a land use / transport interaction model covering the Greater Manchester area in detail and areas beyond in less detail. The work was carried out by MVA Consultancy, who provided HFAS with SEMMMS VDM demand forecasts for each of the two forecast years.

8. The methodology used to derive the Core forecasts involved:

- extracting population and employment forecasts from the work undertaken to assess the transport impacts of the Greater Manchester Local Development Frameworks;
- replacing the forecasts for Cheshire East, High Peak, Manchester and Stockport with revised forecasts based on planning data;
- incorporating forecasts for passenger and employee growth at Manchester Airport agreed with Manchester Airport Group (MAG);
- constraining the population and employment growth forecasts to the overall growth level implied by NTEM 6.2 at the district level within Greater Manchester and at the county level beyond; and
- applying the External Forecasting Model to produce forecasts of the future year travel demand for input to SEMMMS VDM from the population and employment forecasts.

9. A similar process was undertaken for the Pessimistic and Optimistic scenarios, using revised development assumptions that took into account uncertainty associated with each development, and adjusting the population and employment constraints from NTEM 6.2 according to the method recommended in TAG Unit 3.15.5.

10. Public transport fares were assumed to rise at 1% per annum above the growth in retail price index (RPI) between 2009 and the forecast years. This is in accordance with the DfT's guidance on changes in public transport fares (TAG Unit 3.15.4) and is based on regulated rail fares (TAG Unit 5.2.2).

11. Core scenario Do-Minimum forecasts showed that:

- Do-Minimum growth from the base to the forecast year input matrices reflected TEMPRO growth factors (10% for car and -4% for public transport at 2017);
- There is less growth forecast within the scheme Area of Influence(AOI) (7% at 2017 and 17% at 2032 for car) as there is relatively less development compared to other parts of Greater Manchester, most notably the Regional Centre;
- In the VDM output matrices, longer distance car trips are forecast to increase (in particular AOI to/from the Buffer/External area) and shorter trips (within AOI/Greater Manchester) to decrease relative to the input matrices, reflecting the relatively modest increase in vehicle operating costs over time due to improvements in vehicle efficiency relative to larger increases in value of time; and
- Forecast changes in mode share and average trip length are marginal between the 2009 base year and the 2017 and 2032 Do-Minimum forecasts; mode share for car within the whole model increases by 2% from the base to 2017 and by 4% to 2032.

12. Forecast year demand matrices for the SATURN model were supplied by MVA based on the VDM runs. Do-Minimum matrices were built using the GMTU program SPMFAC, which is an interface program to incorporate demand forecasts from the GMSPM (in this case the SEMMMS VDM) into the GM-SATURN model (or its derivatives). This program applied SEMMMS VDM growth factors to the 2009 validated base SEMMMS SATURN matrices to produce 1084 zone forecast year matrices.

13. This procedure was repeated for each of the five user classes and for the three growth scenarios to build both the 2017 and 2032 forecast year trip matrices.

14. Do-Something matrices were built by incorporating forecast Do-Minimum to Do-Something demand changes into the Do-Minimum trip matrices for each of the five user-classes. The resulting growth indicated that the variable demand effects resulting from the preferred scheme were very small across the SEMMMS8 SATURN model.

Forecast Year Assignments

15. Forecast year assignments of the SEMMMS SATURN model were run, optimising signals throughout the model in the Do-Minimum assignments and then carrying forward those changes to the Do-Something assignments. Further optimisation of signals on and in the vicinity of the A6 to Manchester Airport Relief Road scheme was then carried out on the Do-Something assignments.

16. The Design Manual for Roads and Bridges (DMRB) states that 'convergence is the key to robust economic appraisal' because, with a poorly converged base and/or test network, it is impossible to distinguish scheme effects from assignment 'noise'. Consequently, particular efforts were made to ensure that the networks were as highly converged as possible.

17. The DMRB criteria for an acceptable level of network convergence are that:

- the Delta statistic should be less than 1% on the final assignment
- at least 90% of links should have a flow that changes by less than 5% on the final 4 iterations.

18. The convergence criteria was based on % Gap and all assignments achieved levels of less than 0.077 and the corresponding % flows was greater than 98% in all scenarios, the Delta statistic was less than 0.018% in all scenarios.

19. The network statistics demonstrate a decrease in the amount of time spent in over capacity queues, travel time and travel distance in each time period for the Do-Something scenario compared to the Do-Minimum scenario in both 2017 and 2032. This is reflected in the overall network average speed, which increases and the total number of vehicles queued at the end of

the modelled hour, which generally decreases slightly between the Do-Minimum and the Do-Something.

20. These statistics demonstrate that there is an overall improvement in network performance in both test scenarios when compared against the Do-Minimum. In particular, the decrease in time spent in over-capacity queues.

21. In the wider area of influence, the number of junctions forecast to operate overcapacity reduces with the introduction of the scheme particularly in the areas directly to the North of the scheme in Wythenshawe and Heald Green.

22. The re-assignment impacts of the A6 to Manchester Airport Relief Road scheme have been evaluated using screenlines across the area of influence and plots showing the changes in actual flow as a result of the scheme. The outputs show that the A6 Buxton Road, A34 Handforth Bypass, A555 MAELR/SEMMMS and the M56 (south of junction 6) are forecast to have significant increases in flow. The local road network particularly to the North of the scheme is forecast to have a decrease in flow particularly on the A6 North of its junction with SEMMMS, B5166 Styal Road and the M56/M60 to the North of M56 Junction 6 (morning peak).

23. Journey times with the scheme in place are forecast to increase in both directions on the A6 Buxton Road (High Lane to Heaton Moor) up to approximately 5-6 minutes in 2032, the A523 Macclesfield Road (Prestbury to Hazel Grove) are forecast to increase in the Northbound direction in the morning and interpeak by approximately one minute and one to two minutes in the interpeak and evening peak in the Southbound direction.

24. The journey times on the rest of the routes are forecast to remain broadly neutral or decrease. However, with the scheme in place some journey times are forecast to increase for example on the A6 Buxton Road (High Lane to Heaton Moor) up to approximately 5-6 minutes in 2032. Journey times on the A523 Macclesfield Road (Prestbury to Hazel Grove) are forecast to increase in the Northbound direction in the morning and interpeak by approximately two minutes and one to minute in the interpeak and evening peak in the Southbound direction.

25. The Pessimistic scenario only includes transport schemes and developments with a high level of certainty. In terms of schemes, these were deemed to be identical to those assumed in the Core scenario and for public transport schemes Altrincham Interchange was excluded.

26. In comparison to the Core scenario, the levels of traffic crossing screenlines across the area of influence decreases slightly which is attributable to the lower levels of developments assumed in the Pessimistic scenario.

27. In comparison to the Core scenario, the screenlines with the greatest difference in crossing flows is screenline 1 (North of SEMMMS) and screenline 3 (East of the M56) where there are up to 500(pcus) fewer trips crossing a screenline than forecast in the Core scenario. This is mainly attributable to the proximity of the screenlines to the airport area and the assumptions regarding lower levels of development traffic in the airport area and the origin of potential employees which would be mainly located in the more densely populated areas of Greater Manchester.

28. The screenline to the South of SEMMMS is forecast to have up to 200(pcus) fewer trips and screenline 5 Disley to Bredbury remains broadly neutral.

29. In the pessimistic scenario, the journey times on the majority of the routes remains broadly neutral in comparison to the Core scenario in all time periods at 2017. In 2017, there are a couple of routes where the journey time is forecast to decrease by greater than 1 minute, which include the A555 MAELR Poynton to Manchester Airport (both directions), A5143/9 Hazel Grove to Cheadle Hulme and A34 East Didsbury to Alderley Edge

30. At 2032 the number of routes where journey times are forecast to decrease by greater than one minute (in comparison to the Core scenario) are more extensive. Some of the additional routes that are forecast to have faster journey times include the A523 Hazel Grove to Prestbury, A34 Alderley Edge to East Didsbury and A5102 Bramhall to Wilmslow

31. The Optimistic scenario includes more uncertain transport schemes and developments, and a higher level of population and employment growth. For the Optimistic scenario the Davenport Green development and associated highway works to the West of the Airport were included.

32. In 2017, the screenline crossing flows differences in comparison to the Core are quite small with the greatest changes in flow occurring in the vicinity of the Airport and Woodford which are major development sites. In 2032, the levels of traffic crossing each of the screenlines increases on nearly all screenlines in all scenarios. This is mainly attributable to significantly higher levels of forecast development traffic for the Optimistic scenario in the Manchester Airport area, parts of Cheshire (in particular Macclesfield) and High Peak.

33. In comparison to the Core scenario, the screenlines with the greatest difference in crossing flows are screenline 1 (North of SEMMMS), screenline 3 (East of the M56) where there are up to 1200(pcu's) additional trips crossing a screenline than forecast in the Core scenario. Screenline 5 (High Peak to Bredbury) is forecast to have lower increases in comparison to the Core scenario of up to approximately 100 to 250 pcu's.

34. Overall, the changes in flow in comparison to the Core scenario are significant with the maximum forecast differences being on the motorways, A34 Handforth Bypass, A555 MAELR/SEMMMS, the M60 and the A538 Altrincham Road/Prestbury Road.

35. In the optimistic scenario the journey times on approximately half of the routes are forecast to reduce in comparison to the Core scenario particularly in the morning and evening peak period. In 2017, the routes where the journey time is forecast to decrease by the greatest amount include the A5143/9 Hazel Grove to Cheadle Hulme, A555 MAELR Manchester Airport to Poynton and A34 Alderley Edge to East Didsbury

36. A number of routes are forecast to have higher journey times at 2017 most notably the A6 from High Lane to Heaton Moor with an increase of up to 3.5 minutes and the A523 Prestbury to Hazel Grove with an increase of up to approximately 2 minutes.

37. The forecast journey times at 2032 follow a similar pattern as at 2017 but in some cases such as on the A6 from High Lane to Heaton Moor with a forecast increase of approximately 5 minutes.

1. Introduction

1.1 In summer 2012, Transport for Greater Manchester Highways Forecasting and Analytical Services (TfGM HFAS) was commissioned by the SEMMMS Project Board (Cheshire East Council, Manchester City Council and Stockport Council) to develop traffic models for the appraisal of the proposed A6 to Manchester Airport Relief Road.

1.2 The development of the base demand and traffic assignment models was carried out in partnership with MVA Consultancy, with Atkins Transportation managing the modelling work on behalf of the client.

1.3 The report summarise the work undertaken to produce the traffic forecasts for scheme appraisal. It has seven main sections:

- Introduction;
- Description of the A6 to Manchester Airport Relief Road Scheme;
- Development of the forecast year highway networks;
- Demand forecasting;
- Forecast year scenarios;
- Scheme traffic impacts.

2. The A6 to Manchester Airport Relief Road

Description of the Scheme

2.1 A number of alternative scheme options were examined in the original A6 to Manchester Airport Relief Road study and subsequent modelling. Two potential phases of the scheme were identified by the local authorities, and were submitted to the DfT for consideration in 2007/08:

- A6 to Manchester Airport with Poynton Bypass; and
- A6 to Manchester Airport without Poynton Bypass (A6 to Manchester Airport Relief Road).

2.2 The version of the scheme used for traffic modelling is the scheme that received provisional scheme funding approval from the Department for Transport in 2008 (A6 to Manchester Airport without Poynton Bypass).

2.3 This scheme consists of a new 2-lane dual carriageway connecting the A6 South of Hazel Grove to Manchester Airport. The scheme bypasses Bramhall, Cheadle Hulme, Hazel Grove, Handforth, Poynton and Wythenshawe District Centres and Gatley and Heald Green Local Centres.

2.4 The proposed scheme will connect the A6 Buxton Road at Hazel Grove with Ringway Road, East of Manchester Airport. At Ringway Road, the scheme will connect with improvements to Ringway Road West:

- provided by TfGM as part of the Airport Metrolink Line between Ringway Road and Aviator Way; and
- provided by Manchester Airport Group as part of the Airport City North Development between Aviator Way and Outwood Lane/M56 Spur.

2.5 The scheme consists of approximately 10 Km of new dual two lane carriageway and eight new junctions, and will also incorporate the existing 4 km section of the A555 dual carriageway to the South of Bramhall. The alignment of the Relief Road is presented in **Figure 2.1.**

2.6 The new road starts from a signalised T-junction on a 1km long realigned section of the A6, Buxton Road South of Hazel Grove. Briefly, from East to West, the scheme:

- From the new A6 junction, passes under the existing Buxton Road, which crosses over the relief road on a new bridge designed for use by buses, cycles and pedestrians, and then goes under the Hazel Grove to Buxton railway line; after the railway the route passes between Norbury Brook and Ashbourne Road/Darley Road.

- At the A523 Macclesfield Road an at-grade signalised cross roads will be provided between Brookside garden centre and Norbury Hall (a locally listed building of archaeological interest);

- From Macclesfield Road the route runs to the North of Norbury Brook and South of the residential areas adjacent to Sheldon Road and Longnor Road before it crosses Norbury Brook at Mill Hill Hollow. The scheme when then continue in cutting to pass under Woodford Road, which would be raised in the vicinity of the Relief Road, and then on embankment over the West Coast Mainline (WCML) Railway.

- A signalised crossroads is proposed near Woodford Oil Storage Depot with a spur joining the Relief Road to Chester Road. The junction of the spur with Chester Road will be a signalised T-junction.

- At the A6102, Woodford Road a limited manoeuvre grade separated junction, with the Relief Road in cutting, will replicate the existing traffic movements at the junction. At this point the route passes through a gap in the housing on Woodford Road and joins the existing section of the A555. A pedestrian and cycle track will be created adjacent to the existing A555, and where the A555 crosses over the A34 there will be junction changes to better cater for the anticipated traffic flows. The existing layout of the roundabout with the A34 will remain but with signalisation of the entry arms.

- The existing A555 extends as far as the B5358, Wilmslow Road. The proposed scheme will pass under the B5358 and West facing slip roads will be added to the roundabouts that were built as part of the existing A555.

- Between Wilmslow Road and Styal Road the scheme follows a broadly Southwest-Northeast alignment, passing South of Heald Green. At Styal Road an at-grade signal controlled junction is proposed adjacent to the Airport Rail Spur and South of the existing Ringway Road junction. At this point the scheme is required to cross two rail lines.

- From West of Styal Road to Ringway Road the alignment is mainly on Manchester Airport Group (MAG) owned land. The junction of the scheme with Ringway Road will be a signalised T-Junction.

2.7 There are three rail crossings along the scheme, one of which is over the West Coast Main Line. A pedestrian and cycle route is proposed for the whole length including retrofitting new facilities to the 4km existing section of A555.

2.8 The cost of the scheme is estimated to be £290m (at 2010 Quarter 2 prices).

2.9 Although it is anticipated that construction of the scheme will be phased over a number of years, it is assumed that it will open to traffic in 2017.

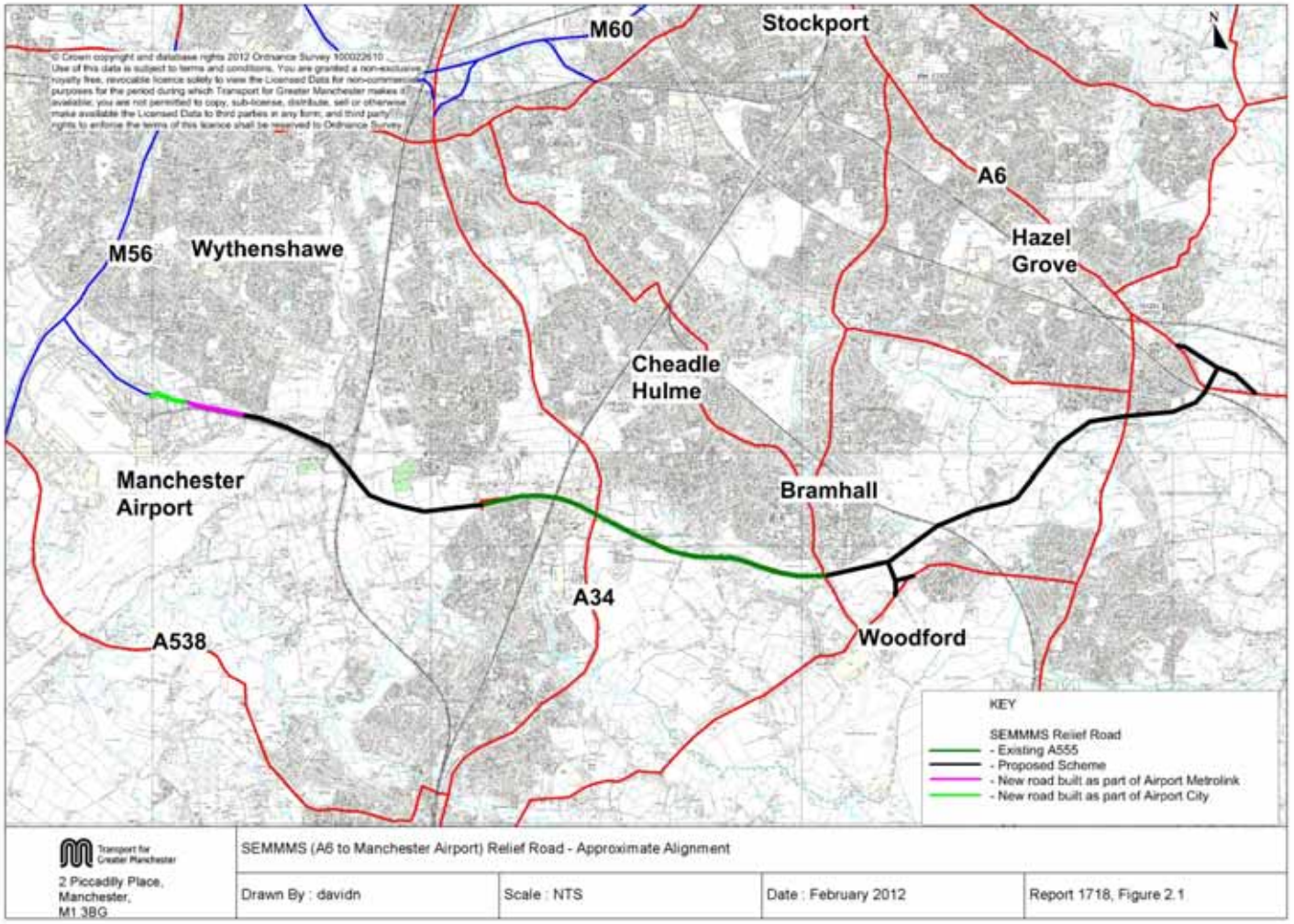
Mitigation Measures

2.10 It is recognised that building the A6 to Manchester Airport Relief Road will have an impact on the adjacent existing road network and that on some routes or locations mitigation measures will be required. The mitigation measures assumed in this tranche of modelling include:

- In Bramhall, additional lanes at the A5149 Ack Lane East/A5102 Bramhall Lane South/ A5102 Woodford Road roundabout with effective speed reduction to 16 Kph in the immediate vicinity of this junction;
- In Handforth, measures such that they result in a reduction in speed to 16Kph on Wilmslow Road in Handforth Town Centre and to 32Kph on Dean Road between Wilmslow Road and Dean Row Road;
- Stanley Green/Coppice Way –selective widening; and
- In Wythenshawe/Woodhouse Park, measures to achieve speed reductions to 25Kph in the area bounded by Simonsway to the North, Shadowmoss to the East, Manchester Airport to the South and the M56 to the West.
- Introduction of signalised crossing on A6 in Disley

Complementary Measures

2.11 Complementary highway measures at Poynton, High Lane, Heald Green and Hazel Grove are under consideration but have not been included in the modelling of the proposed scheme.


M60
Stockport
A6
Hazel Grove
M56
Wythenshawe
Cheadle Hulme
Manchester Airport
Bramhall
A34
A538
Woodford
KEY
SEMMMS Relief Road
- Existing A555
- Proposed Scheme
- New road built as part of Airport Metrolink
- New road built as part of Airport City
Transport for Greater Manchester
2 Piccadilly Place, Manchester, M1 3BG
SEMMMS (A6 to Manchester Airport) Relief Road - Approximate Alignment
Drawn By : davidn
Scale : NTS
Date : February 2012
Report 1718, Figure 2.1

3. Development of Forecast Year Highway Networks

3.1 The Do-Minimum networks for 2017 and 2032 were derived from the base year (2009) SEMMMS8 network. The starting network therefore contained a representation of the network structure in the base year together with traffic signal data provided by the GM traffic signals unit, Greater Manchester Urban Traffic Control (GMUTC). Further information on the content and construction of the base year networks can be found in the SEMMMS8 LMVR.

3.2 Atkins made contact with the relevant local authorities, the Highways Agency and Manchester Airport in order to ascertain which highway schemes should be included in the Do-Minimum networks at 2017 and 2032. A package of schemes deemed to be "committed" was added to the base year network to create the new network for 2017 and 2032. To be included in this package, a scheme had to meet one or more of the following criteria:

- Scheme completed since 2009;
- Scheme construction in progress;
- Scheme funding allocated;
- Scheme is part of the Highways Agency programme; and
- Scheme likely to be completed by the forecast year(s).

3.3 HFAS subsequently coded these schemes into the validated base year SATURN assignment networks and provided them to MVA for inclusion in the SEMMMS8 Variable Demand Model (VDM).

3.4 In line with WebTAG Unit 3.15.5, three Do-Minimum scenarios have been modelled to represent uncertainty in the progression of developments, transport schemes and overall growth in the wider economy. These scenarios represented Pessimistic, Core and Optimistic assumptions about the future in each of the two forecast years of 2017 and 2032.

3.5 **Table 3.1** lists highway schemes identified that are either within the Core Area of Influence or outside the Area of Influence but could affect or be affected by the A6 to Manchester Airport Relief Road Scheme in each of the forecast years and development scenario. Scheme locations are shown in **Figure 3.1**.

3.6 Besides adding these schemes, the traffic signal timings in the networks were "optimised" after convergence of the initial traffic assignment, and then subjected to a further traffic assignment convergence; automatic SATURN procedures were used to adjust the green times and offset times to minimise delays. This was done to reflect the adjustment of signals that inevitably occurs as traffic flows change over time, as well as the continuing rollout of demand-responsive control mechanisms such as SCOOT and MOVA.

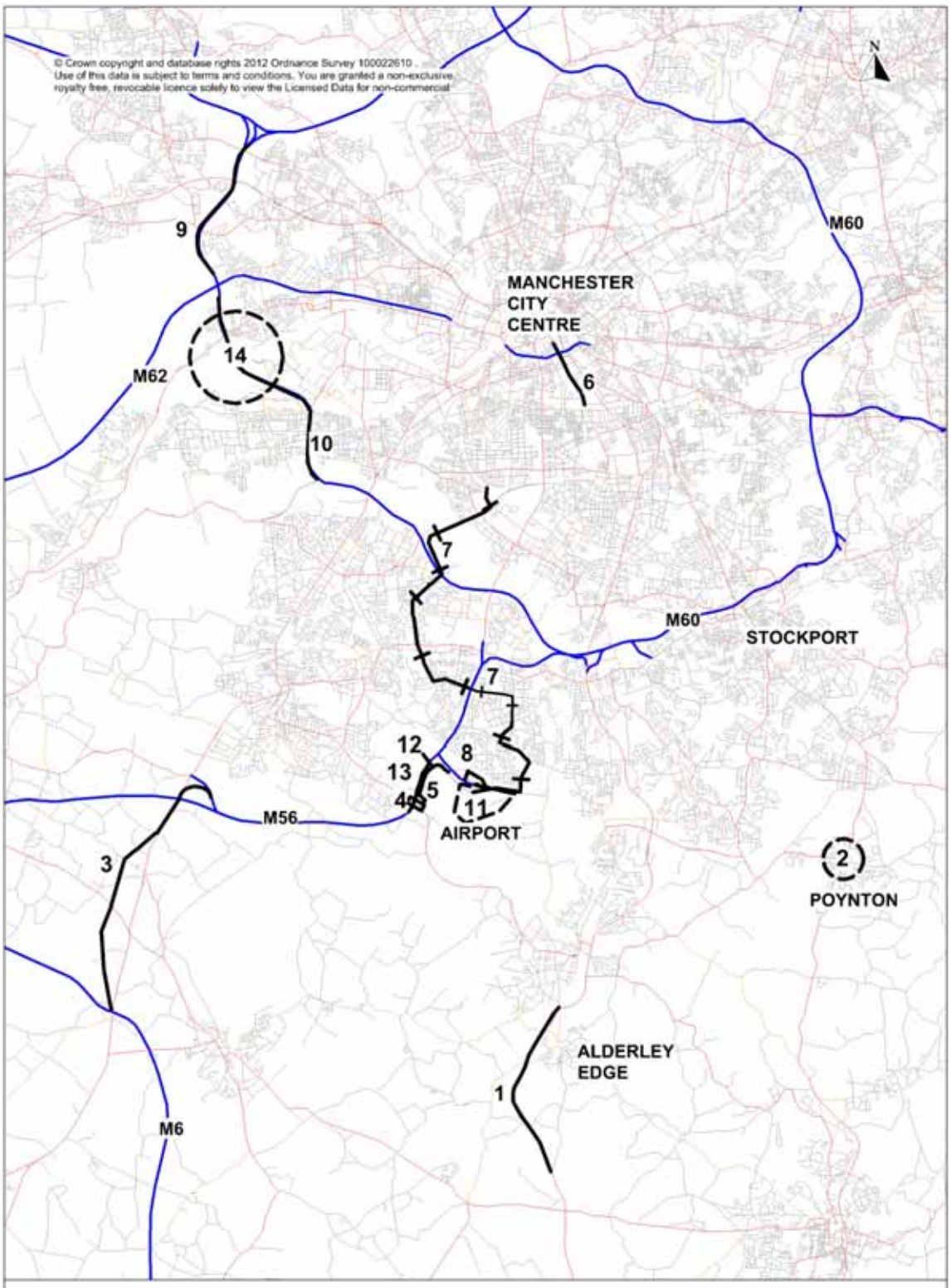
3.7 Bus service and frequency data were left unaltered from 2009 because there was no information available on future changes. While a number of Quality Bus Corridor (QBC) routes are being

implemented or planned in GM, in many cases the QBC measures are still in development and are insufficiently well specified to incorporate them in the model.

Table 3.1: SEMMMS Do-Minimum Highway Scheme Assumptions

Highway Scheme	Status	Pessimistic		Core		Optimistic	
		2017	2032	2017	2032	2017	2032
Alderley Edge Bypass (1)	Complete	✓	✓	✓	✓	✓	✓
Poynton Village Centre Enhancements (2)	Complete	✓	✓	✓	✓	✓	✓
A556 Knutsford to Bowdon Improvement (3)	NIP Scheme	✓	✓	✓	✓	✓	✓
Manchester Airport Blue Works (M56 Junction 6) (4)	Triggered by Airport passenger throughput [1]	✓	✓	✓	✓	✓	✓
Manchester Airport Yellow Works (Runger Lane) (5)	Triggered by Airport passenger throughput[1]	✓	✓	✓	✓	✓	✓
Cross City Bus Package (Oxford Road/Wilmslow Road) (6)	NIP Scheme	✓	✓	✓	✓	✓	✓
Metrolink Phase 3B (Chorlton - Manchester Airport) (7)	Under Construction	✓	✓	✓	✓	✓	✓
Airport City Infrastructure (8)	Allocated Funding	✓	✓	✓	✓	✓	✓
M60 Junction 12 to 15 Widening (9)	NIP Scheme	✓	✓	✓	✓	✓	✓
M60 Junction 8 to 12 Managed Motorway Scheme (10)	NIP Scheme	✓	✓	✓	✓	✓	✓
Manchester Airport Demand Management (11)	MAG Ground Transport Plan	✓	✓	✓	✓	✓	✓
Davenport Green Access Roads (12)	Development related	-	-	-	-	✓	✓
Manchester Airport Red Works (M56 Junction 5 to 6) (13)	Triggered by Airport passenger throughput[1]	-	✓	-	✓	-	✓
Western Gateway Infrastructure Scheme (Full WGIS) (14)	Privately Funded[2]	-	✓	-	✓	-	✓

Note:
Numbers in brackets refer to Figure 3.1
[1] Scheme to be provided/funded by Manchester Airport.
[2] Promoted by Peel as part of Port Salford development; funded largely by Peel with contribution from Regional Growth Fund
NIP = National Infrastructure Package


© Crown copyright and database rights 2012 Ordnance Survey 100022610 .
Use of this data is subject to terms and conditions. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial
N
M60
MANCHESTER CITY CENTRE
M62
M60
STOCKPORT
M56
AIRPORT
POYNTON
ALDERLEY EDGE
M6
9
14
10
6
7
7
12
13
4
5
8
11
3
2
1
Do-Minimum Highway Scheme Assumptions
Transport for Greater Manchester
2 Piccadilly Place, Manchester, M1 3BG
Drawn By : davidn
Date : February 2012
Scale : NTS
Report 1718, Figure 3.1

4. Demand Forecasting

4.1 Demand forecasts were derived using the SEMMMS Variable Demand Model (SEMMMS VDM). This is a version of the Greater Manchester Strategy Planning Model (GMSPM2), a land use / transport interaction model covering the Greater Manchester area in detail and areas beyond in less detail. The work was undertaken by MVA Consultancy, who provided TfGM HFAS with SEMMMS VDM demand forecasts for each of the two forecast years. MVA's report on the forecasting is included as **Appendix 1** to this document but the main points from the forecasting are summarised in this section.

Forecast Year Scenarios

4.2 In line with Transport Analysis Guidance (TAG) Unit 3.15.5, three growth scenarios were modelled, to reflect local and national uncertainty in economic and demographic change over time:

- A Pessimistic scenario, where only transport schemes and developments with a high level of certainly were included, and a lower level of population and employment growth;
- A Core scenario, where transport schemes and developments considered to be most likely were included, and central levels of population and employment growth;
- An Optimistic scenario, which includes more uncertain transport schemes and developments, and a higher level of population and employment growth.

4.3 Outputs from the SEMMMS VDM were provided for each of the three scenarios above for the anticipated scheme opening year (2017) and its design year (2032).

Future Year Growth Assumptions

4.4 Assumptions on population and employment growth used to derive the Core forecasts came from a variety of sources, namely :

- The relevant planning departments in High Peak, Cheshire East, Manchester, Stockport, Trafford for specific developments included in their Local Development Frameworks;
- Manchester Airport Group (MAG) for passenger and employee growth and development at and around Manchester Airport;
- Local Development Framework datasets for developments elsewhere in Greater Manchester;
- The National Trip End Model (NTEM) dataset 6.2 forecasts; and
- The National Transport Model forecasts (for freight traffic).

4.5 The methodology used to derive the Core forecasts involved:

- extracting population and employment forecasts from the work undertaken to assess the transport impacts of the Greater Manchester Local Development Frameworks

- replacing the GM LDF forecasts for Manchester, Stockport and Trafford with revised forecasts based on the District planning data;
- overwriting NTEM forecasts for High Peak and Cheshire East with revised forecasts based on local planning data;
- constraining the population and employment growth forecasts to the overall growth level implied by NTEM 6.2 at the district level within Greater Manchester the pre-2009 district level for Cheshire East and at the county level elsewhere; and
- applying the External Forecasting Model to produce forecasts of the future year travel demand for input to SEMMMS VDM from the population and employment forecasts.

4.6 A similar process was undertaken for the Pessimistic and Optimistic scenarios, using revised development assumptions from various planning authorities that took into account uncertainty associated with each development, and adjusting the population and employment constraints from NTEM 6.2 according to the method recommended in TAG Unit 3.15.5. Full details of assumed growth in population and employment are presented in **Appendix 1**.

4.7 Freight growth for all three scenarios was applied uniformly across the whole SEMMMS VDM using data from the National Transport Model 2009 forecasts. This resulted in no difference in freight growth between the three scenarios.

Manchester Airport

4.8 Manchester Airport is a significant trip attractor within the Area of Influence of the A6 to Manchester Airport Relief Road. Situated at the Western end of the scheme future growth in passenger and employee travel would be expected to have significant impact on scheme appraisal. The Manchester Airport Assumptions note is included in **Appendix 2**.

4.9 The zoning system at Manchester Airport within the SEMMMS8 SATURN and PT-TRIPS assignment models were highly disaggregate in order to improve accuracy of network loading in the assignment models. MVA considered this level of aggregation inappropriate for demand response modelling as air travellers' response to changing Airport access costs is best thought of in terms of the whole journey from home to the check-in desk, rather than to a particular car park or public transport terminus. For this reason a single demand model zone was used within the demand model to represent demand to/from Manchester Airport terminals.

4.10 Manchester Airport Group (MAG) proposes to continue to apply increased demand management measures at Manchester Airport aimed at managing the number of car journeys. These measures are largely likely to be through car parking policy, increased charges and controls on free passenger drop-off and pick-up and will be aimed at encouraging further behaviour change and mode shift from car to public transport. Whilst specific proposal have not been agreed at the moment, MAG has a is a track record in implementing such demand management measures. For example, there is no longer any free passenger pick-up facility at Terminals 1 or 2 and drivers

have to park in one of the paid car parks to wait for arriving passengers. In order to reflect the impact of such future demand management measures on car journeys to the Airport, it was agreed with MAG and the project team that a nominal £2 congestion charge would be included within the traffic models, applied at the access roads to the three passenger termini in the scheme opening year. The future year forecasts included within this report therefore include this charge in all do-minimum and do-something scenarios.

4.11 Further, special treatment was given to passenger and employee trips to/from Manchester Airport in SEMMMS VDM. These trips were allocated to a separate set of demand segments, in order that variant choice responses could be imposed on this demand from those used across the rest of the model. Choice response associated with these Airport demand segments has been restricted to mode choice, as distributional and time of day responses to changing access travel cost are likely to impact on passengers and employees travelling to an Airport.

4.12 Separating travel to/from Manchester Airport from the other demand segments facilitated the application of differential growth to this demand, from that applied to the rest of the model. For the Core scenario forecasts of passenger numbers were obtained from the UK Air Passenger Forecasts (central scenario). These forecasts are shown in **Table 4.1**.

4.13 Interpolation of these forecasts gave rise to a forecast of passenger demand of 18.6 mppa at 2009. Appropriate growth factors were subsequently derived for growth in passengers from 2009 to 2017 and 2009 to 2030.

4.14 Growth in employment (commute trips) at Manchester Airport was assumed to increase by the same ratio as that of passengers.

Table 4.1 Growth in Air Passengers at Manchester Airport Under the Core Scenario

Year	Million passenger per annum
2009	18.6
2017 (Interpolated)	23.1
2020	25.0
2030	35.0
2032 (Interpolated)	31.1

Source: UK Aviation Forecasts, Department for Transport, August 2011

Supply Assumptions

4.15 The highway schemes included in each forecast year for each scenario were identified by the SEMMMS Project Board, as previously discussed in Chapter 3 and summarised in Table 3.1 of this report. Additionally, a number of key public transport schemes were included in each scenario based on the likelihood of their delivery in each year. These public transport schemes are summarised in **Table 4.2**.

Table 4.2 SEMMMS VDM Public Transport Scheme Specification

Highway Scheme	Status	Pessimistic		Core		Optimistic	
		2017	2032	2017	2032	2017	2032
Metrolink: Chorlton - Manchester Airport	Under Construction	✓	✓	✓	✓	✓	✓
Metrolink: Droylsden to Ashton	Under Construction	✓	✓	✓	✓	✓	✓
Metrolink: Chorlton to East Didsbury	Under Construction	✓	✓	✓	✓	✓	✓
Leigh-Salford-Manchester Busway	Under Construction	✓	✓	✓	✓	✓	✓
Metrolink Second City Crossing	Approved Route; TWAO application - 2012	✓	✓	✓	✓	✓	✓
Altrincham Interchange	Planning application approved	-	✓	✓	✓	✓	✓

Note:
NIP = National Infrastructure Package

4.16 Public transport fares were assumed to rise at 1% per annum above the growth in retail price index (RPI) between 2009 and the forecast years. This is in accordance with the DfT's guidance on changes in public transport fares and is based on increases in regulated rail fares (TAG Units 3.15.4 and 5.2.2).

4.17 Values of time for input to the demand and assignment models have been derived using data from TAG 3.5.6 for the base year, 2017 and 2032.

4.18 Vehicle operating costs for input to the demand and assignment models have been derived using data from TAG 3.5.6 for the base year, 2017 and 2032.

4.19 The SATURN networks containing the preferred A6 to Manchester Airport Relief Road Relief Road scheme, provided by HFAS, were used as inputs directly into the SEMMMS VDM.

SEMMMS Variable Demand Model Tests Run

4.20 As a result of the three growth scenarios and the with and without scheme tests, and two forecast years, demand forecasts for 13 tests were created, as summarised in **Table 4.3**.

Table 4.3 SEMMMS VDM Tests Run

Scenario	Test	Year
Base	Base	2009
Pessimistic	Do-Minimum	2017
		2032
	Do-Something	2017
		2032
Core	Do-Minimum	2017
		2032
	Do-Something	2017
		2032
Optimistic	Do-Minimum	2017
		2032
	Do-Something	2017
		2032

4.21 For presentation purposes outputs have been collated to allow presentation on a 4x4 sector system and a 16x16 sector system. The 4x4 system is the SEMMMS Area of Influence, Rest of Greater Manchester, Buffer and External areas of the model. The sixteen sector system is shown as **Figure 4.1**. These sectors are referred to in the summary of results that follows.

Figure 4.1 – 16 Sector System

Core Scenario Do-Minimum VDM Forecasts

4.22 Under the Core scenario Do-Minimum growth from the base to the forecast year input matrices reflected TEMPRO growth factors (10% for car and -4% for public transport at 2017). There is less growth within the SEMMMS AOI (7% at 2017 and 17% at 2032 for car) as there is relatively less development compared to other parts of Greater Manchester, most notably the Regional Centre.

4.23 The Core Do-Minimum output matrices show an increase in longer distance car trips (in particular AOI to/from the Buffer/External area) and a decrease in shorter trips (within AOI/Greater Manchester) relative to the input matrices. This reflects the relatively modest increase in vehicle operating costs over time due to improvements in vehicle efficiency relative to larger increases in value of time.

4.24 The changes in mode share and average trip length are marginal between the 2009 base year and the 2017 and 2032 Do-Minimum forecasts. Mode share for car within the whole model increases by 2% from the base to 2017 and by 4% to 2032.

Core Scenario Do-Something Scheme VDM Forecasts

4.25 The Core Do-Something scheme is forecast to produce negligible changes in demand relative to the respective Do-Minimum when viewed on the basis of the 4x4 sector system. There are small increases in car demand from the AOI to the buffer area at the expense of public transport.

4.26 Consideration of the distributional effects of the scheme indicates that there are forecast to be modest reductions on some (16x16) sector pairs (<4%) as a result of the scheme. The largest increases can be seen on the following sector pairs:

- Manchester Airport – East of Greater Manchester (9% at 2017 and 8% at 2032);
- Cheadle & Wilmslow - East of Greater Manchester (20% at 2017 and 17% at 2032);
- East of Greater Manchester – Cheadle & Wilmslow (19% at 2017 and 17% at 2032);
- East of Greater Manchester – Manchester Airport (10% at 2017 and 9% at 2032); and
- West of Greater Manchester – Stockport (11% at 2017 and 11% at 2032).

4.27 These are all movements that cross the AOI and which will benefit through improved journey times as a result of the scheme.

4.28 As one would expect the changes in mode share and average trip length are marginal between the 2017 and 2032 Do-Minimum and Do-Something scheme forecasts respectively.

Optimistic Scenario Do-Minimum VDM Forecasts

4.29 Growth from the base to the forecast year input Optimistic matrices again reflects TEMPRO growth factors (10% and -4% for car and public transport respectively at 2017). There is less growth within the AOI (8% at 2017 and 16% at 2032 for car) as there is relatively less development compared to other parts of Greater Manchester, most notably the Regional Centre.

4.30 The forecast year input matrices are of approximately the same size for the Core, Pessimistic and Optimistic scenarios, because although the amount of development trips varies, the overall trip-ends are controlled to NTEM forecasts.

4.31 In 2032, many sectors see a slight reduction in the levels of car growth between the Core and Optimistic scenarios most noticeably in the Knutsford and Northwich district where growth is 8% lower in the optimistic scenario. This could be attributable to highway congestion operating to constrain car demand within the model to a greater extent in 2032 than 2017 with demand switching to PT. Also, trip end growth was constrained to TEMPRO district level and in districts which contain higher numbers of development trips we see a decrease in parts of the district without.

4.32 The largest growth in car trips is forecast to be from Manchester Airport. The growth in trips is significantly higher in the Optimistic scenario than in the Core scenario for the Manchester

Airport (both years) and Macclesfield (2032) sectors, as these sectors see the highest growth in development trips between the Core and the Optimistic scenarios.

4.33 In 2032, many sectors see a slight reduction (1-5% points) in the levels of car growth between the Core and the Optimistic scenarios. There are two possible reasons for this. Firstly, highway congestion operates to constrain car demand within the model to a greater extent at 2032 than at 2017, causing some demand to switch to PT. Secondly, trip end growth was controlled to NTEM 6.2 forecasts at a TEMPRO level. Thus in districts which contain higher numbers of development trips there will be a decrease in trips in those parts of the district without development trips.

Optimistic Scenario Do-Something Scheme VDM Forecasts

4.34 As with the Core scenario, under the Optimistic scenario the scheme is forecast to produce negligible changes in demand relative to the respective Do-Minimum when viewed on the basis of the 4x4 sector system. Again there are small increases in car demand from the AOI to the buffer area at the expense of public transport.

4.35 As regards distribution, there are forecast to be modest reductions on some sector pairs (<4%) where trips are redistributed as a result of the scheme. The largest increases can be seen on the following sector pairs:

- Manchester Airport – East of Greater Manchester (9% at 2017 and 9% at 2032);
- Cheadle & Wilmslow - East of Greater Manchester (21% at 2017 and 19% at 2032);
- East of Greater Manchester – Cheadle & Wilmslow (20% at 2017 and 18% at 2032);
- East of Greater Manchester – Manchester Airport (9% at 2017 and 9% at 2032); and
- West of Greater Manchester – Stockport (10% at 2017 and 11% at 2032).

4.36 These changes are very similar to those seen in the Core scenario and again reflect movements that cross the AOI, which will benefit through improved journey time as a result of the scheme.

4.37 The changes in mode share and average trip length are marginal between the 2017 and 2032 Optimistic Do-Minimum and Do-Something scheme forecasts respectively.

Pessimistic Scenario Do-Minimum VDM Forecasts

4.38 Growth from the base to the forecast year Pessimistic scenario input matrices reflects TEMPRO growth factors (10% for car and -4% for public transport at 2017). There is less growth within the SEMMMS AOI (8% at 2017 and 16% at 2032 for car) as there is relatively less development compared to other parts of Greater Manchester, most notably the Regional Centre.

4.39 There is a small decrease in car trips between the Pessimistic scenario input and output matrices in 2032. Increases in congestion mean that some car trips switch to PT or Walk/Cycle modes.

4.40 The largest forecast growth in car trips is from Manchester Airport and the Manchester district as this is where the majority of the developments are situated. In both forecast years the growth in trips is significantly lower in the Pessimistic scenario than in the Core scenario for the Manchester Airport sector, which is in line with the assumed lower occupancy levels at the Airport City development in the Pessimistic scenarios.

Pessimistic Scenario Do-Something Scheme VDM Forecasts

4.41 As with the Core and Optimistic scenarios, the scheme is forecast to produce negligible changes in demand relative to the respective Do-Minimum when viewed on the basis of the 4x4 sector system. There are small increases in car demand from within the AOI and from the AOI to the buffer area at the expense of public transport.

4.42 The distributional effects of the scheme under the Pessimistic scenario are very similar to those observed under Core and Optimistic scenarios. The only additional sector pair displaying relatively large increases in movements is Stockport to the West of Greater Manchester (10% at 2017 and 11% at 2032).

4.43 Again, changes in mode share and average trip length are forecast to be marginal between the 2017 and 2032 Do-Minimum and Do-Something scheme forecasts respectively.

5. Forecast Year Scenarios

5.1 This section of the report summarises the production of the forecast year scenarios for the do-something scheme and the lower cost alternative. It describes:

- assumptions about the progress of proposed developments in the vicinity of the scheme
- generalised costs used in the assignment process
- the strategy used for assigning forecast year networks (Do-Minimum and Do-Something); and
- the levels of convergence achieved for all assignments.

Development Assumptions

5.2 The data collection process involved engaging with the various stakeholders to introduce the uncertainty log concept and the nature of the data which we required to enable the uncertainty logs to be compiled. The stakeholder parties included;

- Cheshire East Council
- High Peak Borough Council
- Transport for Greater Manchester (TfGM)
- Highways Agency (HA)
- Manchester Airport Group
- Manchester City Council
- Stockport Metropolitan Council; and
- Trafford Council.

5.3 Information was collected for developments which were likely to be implemented by the opening and design years of 2017 and 2032 respectively. The information received was reviewed and where necessary, alterations were undertaken and, or additional information requested, to ensure the most up to date data was collated in a format appropriate for the purposes of the uncertainty log and alternative scenario creation.

5.4 As the number of development sites is extensive and covering five districts they have not been detailed in this report but are reported in detail in Atkins uncertainty log which is available on request.

5.5 As previously stated, Demand forecasts were derived using the SEMMMS Variable Demand Model (SEMMMS VDM). The work was undertaken by MVA Consultancy, who provided TfGM HFAS with SEMMMS VDM demand forecasts for each of the two forecast years for the Core, Optimistic and Pessimistic scenarios.

5.6 **Table 5.1** and **Table 5.2** summarise total pcu tripends in the 2017 and 2032 forecast year Do-Minimum and Do-Something matrices for each of the scenarios.

Table 5.1: SEMMMS 8 Forecasts - Matrix Totals - 2017											
Time Period	**User Class**	**Do-Minimum Core**	**Do-Minimum Optimistic**	**Core Minus Optimistic**	**Do-Minimum Pessimistic**	**Core Minus Pessimistic**	**Do-Something Core**	**Do-Something Optimistic**	**Core Minus Optimistic**	**Do-Something Pessimistic**	**Core Minus Pessimistic**
		Grand Totals	**Grand Totals**	**Difference**	**Grand Totals**	**Difference**	**Grand Totals**	**Grand Totals**	**Difference**	**Grand Totals**	**Difference**
AM Peak Hour	**Car Commute**	625,351	627,532	**-2,181**	625,094	**258**	625,437	627,620	**-2,183**	625,176	**260**
	Car Employers Business	58,319	58,257	**62**	58,356	**-37**	58,326	58,263	**63**	58,360	**-34**
	Car other	760,918	760,679	**239**	760,253	**665**	761,040	760,695	**345**	760,287	**753**
	LGVs	48,070	48,070	**0**	48,113	**-44**	48,070	48,070	**0**	48,113	**-44**
	OGVs	34,242	34,242	**0**	34,244	**-3**	34,242	34,242	**0**	34,244	**-3**
	Total	1,526,900	1,528,779	**-1,880**	1,526,060	**840**	1,527,114	1,528,890	**-1,776**	1,526,181	**933**
Average Inter Peak Hour	**Car Commute**	169,081	169,961	**-880**	168,813	**269**	169,094	169,983	**-889**	169,081	**13**
	Car Employers Business	46,134	46,299	**-165**	46,131	**3**	46,137	46,302	**-165**	46,134	**3**
	Car other	808,683	810,891	**-2,208**	808,765	**-82**	808,671	810,821	**-2,150**	808,683	**-12**
	LGVs	47,374	47,374	**0**	47,417	**-44**	47,374	47,374	**0**	47,374	**0**
	OGVs	38,037	38,037	**0**	38,044	**-7**	38,037	38,037	**0**	38,037	**0**
	Total	1,109,309	1,112,562	**-3,253**	1,109,170	**139**	1,109,313	1,112,516	**-3,204**	1,109,309	**4**
PM Peak Hour	**Car Commute**	515,910	519,984	**-4,074**	514,469	**1,441**	515,996	520,084	**-4,088**	515,910	**86**
	Car Employers Business	54,311	54,312	**-1**	54,306	**4**	54,315	54,316	**-2**	54,311	**4**
	Car other	733,501	736,713	**-3,212**	733,185	**316**	733,572	736,732	**-3,160**	733,497	**75**
	LGVs	41,450	41,450	**0**	41,479	**-29**	41,450	41,450	**0**	41,450	**0**
	OGVs	17,750	17,750	**0**	17,751	**-1**	17,750	17,750	**0**	17,750	**0**
	Total	1,362,921	1,370,208	**-7,287**	1,361,190	**1,731**	1,363,082	1,370,332	**-7,250**	1,362,917	**165**

Table 5.2: SEMMMS 8 Forecasts - Matrix Totals - 2032											
Time Period	**User Class**	**Do-Minimum Core**	**Do-Minimum Optimistic**	**Core Minus Optimistic**	**Do-Minimum Pessimistic**	**Core Minus Pessimistic**	**Do-Something Core**	**Do-Something Optimistic**	**Core Minus Optimistic**	**Do-Something Pessimistic**	**Core Minus Pessimistic**
		Grand Totals	**Grand Totals**	**Difference**	**Grand Totals**	**Difference**	**Grand Totals**	**Grand Totals**	**Difference**	**Grand Totals**	**Difference**
AM Peak Hour	**Car Commute**	685,107	687,703	**-2,596**	684,448	**659**	684,983	687,649	**-2,666**	684,277	**706**
	Car Employers Business	60,330	62,187	**-1,857**	60,253	**77**	60,333	62,195	**-1,862**	60,257	**76**
	Car other	847,934	848,250	**-317**	847,491	**443**	848,144	848,575	**-431**	847,647	**497**
	LGVs	66,944	66,944	**0**	66,944	**0**	66,944	66,944	**0**	66,944	**0**
	OGVs	38,198	38,198	**0**	38,198	**0**	38,198	38,198	**0**	38,198	**0**
	Total	1,698,513	1,703,282	**-4,770**	1,697,334	**1,179**	1,698,602	1,703,561	**-4,959**	1,697,323	**1,279**
Average Inter Peak Hour	**Car Commute**	190,516	192,480	**-1,963**	190,104	**413**	190,515	192,503	**-1,989**	190,078	**437**
	Car Employers Business	50,227	50,925	**-698**	50,124	**104**	50,222	50,920	**-699**	50,119	**103**
	Car other	931,414	934,936	**-3,522**	930,221	**1,193**	931,273	934,871	**-3,597**	930,007	**1,266**
	LGVs	65,978	65,978	**0**	65,978	**0**	65,978	65,978	**0**	65,978	**0**
	OGVs	42,468	42,468	**0**	42,468	**0**	42,468	42,468	**0**	42,468	**0**
	Total	1,280,603	1,286,786	**-6,183**	1,278,894	**1,709**	1,280,455	1,286,740	**-6,285**	1,278,650	**1,806**
PM Peak Hour	**Car Commute**	568,079	573,738	**-5,659**	566,980	**1,099**	567,992	573,741	**-5,748**	566,849	**1,143**
	Car Employers Business	56,775	57,605	**-830**	56,709	**66**	56,771	57,608	**-837**	56,709	**62**
	Car other	828,279	826,516	**1,762**	826,838	**1,441**	828,364	826,796	**1,568**	826,911	**1,453**
	LGVs	57,701	57,701	**0**	57,701	**0**	57,701	57,701	**0**	57,701	**0**
	OGVs	19,822	19,822	**0**	19,822	**0**	19,822	19,822	**0**	19,822	**0**
	Total	1,530,655	1,535,382	**-4,727**	1,528,050	**2,606**	1,530,651	1,535,668	**-5,017**	1,527,992	**2,659**

Generalised Cost Parameters

5.7 The generalised cost parameters used in the assignment process are derived using an Excel spreadsheet prepared by MVA for the TIF study. They are consistent with data taken from TAG Unit 3.5.6 (April 2011).

5.8 User inputs to the spreadsheet consist of:

- Average network speed, used in the calculation of vehicle operating costs; and
- Proportions of distance travelled by each of three car-based user classes (i.e. commute, employers business and other) as output from a five user class assignment; these are used in the calculation of the cost parameters for the all-car user class (i.e. as a weight).

5.9 All other inputs (e.g. values of time, fuel consumption parameters and fuel costs, fuel price growth rates etc) were taken directly from the appropriate section of WebTAG.

5.10 The 2017 and 2032 values of time (pence per minute – PPM) and distance (pence per kilometre – PPK) as output from the spreadsheet and used in the assignments are shown in **Table 5.3** below.

Table 5.3 Generalised Cost Parameters Used in the Forecast Assignments

Period	User Class	2017		2032	
		PPM	PPK	PPM	PPK
AM Peak Hour	Commuting Car	10.94	5.65	13.05	4.16
	Employer's Business Car	49.52	11.72	61.97	10.48
	Other Car	15.14	5.65	17.53	4.16
	LGV	19.42	12.07	24.38	11.79
	OGV	16.85	41.30	21.25	42.86
Inter-Peak Hour	Commuting Car	10.94	5.30	13.05	3.90
	Employer's Business Car	49.52	10.85	61.97	9.69
	Other Car	15.14	5.30	17.53	3.90
	LGV	19.42	11.67	24.38	11.39
	OGV	16.85	37.47	21.25	38.89
PM Peak Hour	Commuting Car	10.94	5.65	13.05	4.16
	Employer's Business Car	49.52	11.72	61.97	10.48
	Other Car	15.14	5.65	17.53	4.16
	LGV	19.42	12.07	24.38	11.79
	OGV	16.85	41.30	21.25	42.86

Forecast Year Assignments

5.11 Forecast year assignments of the SEMMMS SATURN model were run differently for Do-Minimum and Do-Something networks. Do-Minimum tests were assigned in the following way:

- assign Do-Minimum network with corresponding Do-Minimum matrix
- optimise traffic signal green splits and offsets across the full modelled area; and
- re-assign incorporating the optimised traffic signal settings.
-

5.12 Do-Something tests by contrast, were assigned in the following way:

- incorporate optimised traffic signal settings from the Do-Minimum network at common junctions across the full modelled area
- assign updated network with corresponding Do-Something matrix
- optimise traffic signal green splits and offsets on and in the schemes area of influence; and
- re-assign incorporating the optimised traffic signal settings.

5.13 The full model assignments were then cordoned before economic appraisal of the schemes was undertaken. This was done:

- to speed up model run times while fine-tuning scheme performance (for example testing different traffic signal green splits and staging arrangements)
- to improve run times for the economic appraisal programs TUBA and COBA; and
- to reduce the possibility of including user benefits accruing in areas remote from the scheme as a result of assignment 'noise'.

5.14 The design drawings for SEMMMS Design Freeze 6 are contained in **Appendix 3**

Forecast Year Assignment Convergence

5.15 The Design Manual for Roads and Bridges (DMRB) states that 'convergence is the key to robust economic appraisal' because, with a poorly converged base and/or test network, it is impossible to distinguish scheme effects from assignment 'noise'. Consequently, particular efforts were made to ensure that the networks were as highly converged as possible.

5.16 The DMRB criteria for an acceptable level of network convergence are that:

- the Delta statistic should be less than 1% on the final assignment; and
- at least 90% of links should have a flow that changes by less than 5% on the final 4 iterations.

5.17 For this work, we adopted a tighter convergence criteria than required by DMRB, requiring the perecentage Gap to be less than 0.08. **Table 5.4** summarises the convergence statistics for all scenarios and shows that all model assignments are extremely well converged.

Table 5.4: SEMMMS8 Convergence Statistics

Scenario	Year	Test	AM Peak Hour					Average Inter-Peak Hour					PM Peak Hour				
			Delta	% Gap for Iteration		% Flows for Iteration		Delta	% Gap for Iteration		% Flows for Iteration		Delta	% Gap for Iteration		% Flows for Iteration	
				N	N-4	N	N-4		N	N-4	N	N-4		N	N-4	N	N-4
Core	2017	Do-Min	0.016	0.028	0.024	98.4	98.1	0.007	0.008	0.007	98.9	98.7	0.033	0.051	0.051	94.5	94.3
		Do-Som	0.012	0.020	0.026	97.6	97.3	0.005	0.011	0.007	98.9	98.7	0.044	0.068	0.079	92.9	91.3
	2032	Do-Min	0.015	0.028	0.028	98.9	98.8	0.009	0.013	0.014	99.0	98.3	0.033	0.075	0.075	97.2	96.6
		Do-Som	0.020	0.024	0.026	98.6	98.6	0.011	0.015	0.013	98.8	98.4	0.039	0.056	0.068	96.7	96.2
Pessimistic	2017	Do-Min	0.016	0.026	0.026	97.5	97.1	0.008	0.012	0.009	99.0	98.5	0.031	0.050	0.074	95.1	94.3
		Do-Som	0.017	0.027	0.025	97.5	97.4	0.005	0.012	0.009	98.9	98.5	0.030	0.073	0.058	95.3	93.7
	2032	Do-Min	0.016	0.024	0.026	98.7	98.7	0.010	0.015	0.014	98.6	98.6	0.045	0.077	0.078	96.2	95.6
		Do-Som	0.017	0.027	0.028	98.8	98.3	0.010	0.015	0.013	99.0	98.9	0.048	0.074	0.071	96.5	96.0
Optimistic	2017	Do-Min	0.018	0.023	0.025	97.5	97.7	0.006	0.013	0.011	99.0	98.8	0.036	0.075	0.056	95.2	94.6
		Do-Som	0.015	0.027	0.024	97.9	97.7	0.007	0.012	0.009	99.0	98.7	0.026	0.053	0.061	95.1	95.2
	2032	Do-Min	0.017	0.025	0.026	98.8	98.3	0.010	0.012	0.014	98.8	98.6	0.041	0.067	0.072	96.1	95.6
		Do-Som	0.016	0.029	0.027	98.9	98.9	0.010	0.013	0.015	98.5	98.1	0.037	0.060	0.068	96.2	95.8

6. A6 to Manchester Airport Relief Road Traffic Impacts

6.1 This section of the report summarises the main traffic impacts of the Core, Optimistic and Pessimistic variants of the A6 to Manchester Airport Relief Road scheme, in terms of:

- impact on overall network performance
- broad re-assignment impacts
- changes in journey times.

Junction Operation

6.2 All junctions along the proposed scheme have been assessed at various stage of the design process both within the SATURN model and in junction models such as LINSIG. This work has indicated that the junctions will operate within capacity in the opening year of 2017. Detailed assessments will be repeated following completion of the public consultation process and reflecting any consequent change in scheme design.

Overall Network Performance

6.3 **Table 6.1** summarises the network performance statistics for the Do-Minimum (DM) and Do-Something (DS) scenarios. Briefly, these statistics are aggregated over the whole modelled area (for the modelled peak-hour and the period after the peak-hour to allow the completion of any trips delayed by queues or congestion) and represent the following:

- **Over-Capacity Queues** – this is the time spent in queues resulting from turning movements in excess of capacity, resulting in the build-up of a permanent queue that is unable to clear in a single signal cycle;
- **Total Travel Time** – this is the sum of the time spent in transient and over-capacity queues plus the link cruise time;
- **Travel Distance** – this is the total distance travelled by all vehicles during the modelled hour; and
- **Average Speed** – this is simply the total distance divided by the total travel time.

6.4 The statistics shown in **Table 6.1** demonstrate a decrease in the amount of time spent in over capacity queues and travel in each time period in the DS scenario compared to the DM scenario in both 2017 and 2032. This is reflected in the overall network average speed, which increases and the total number of vehicles queued at the end of the modelled hour, which generally decreases slightly between the DM and the DS.

6.5 These statistics demonstrate that there is an overall improvement in network performance in both test scenarios when compared against the Do-Minimum. In particular, the decrease in time spent in over-**capacity.**

Table 6.1: SEMMMS8 SATURN Model – Network Simulation Summary Statistics										
Year	Network Data	AM			IP			PM		
		DM	DS	Diff (DS-DM)	DM	DS	Diff (DS-DM)	DM	DS	Diff (DS-DM)
Core										
2017	Over capacity queuing (pcu hours)	8,154	7,696	-457	1,042	1,066	24	7,924	7,835	-89
	Total travel time (pcu hours / hour)	134,243	133,329	-914	83,978	83,946	-33	138,424	137,967	-458
	Total travel distance (km / hr)	4,595,658	4,610,000	14,343	3,586,523	3,597,649	11,126	4,713,253	4,728,756	15,503
	Average network speed (km/hr)	34.2	34.6	0.40	42.7	42.9	0.20	34	34.3	0.30
2032	Permanent queuing (pcus)	20,769	19,486	-1,283	3,113	3,022	-91	21,544	20,844	-700
	Total travel time (pcu hours per hour)	176,037	107,641	-68,395	107,753	107,641	-112	180,901	180,419	-482
	Total distance travelled (km per hr)	5,275,222	5,303,496	28,274	4,246,274	4,271,114	24,840	5,380,912	5,408,478	27,566
	Average network speed (km/hr)	30.0	30.3	0.30	39.4	39.7	0.30	29.7	30	0.30
Pessimistic										
2017	Over capacity queuing (pcu hours)	7,563	7,200	-363	992	976	-16	7,326	7,208	-118
	Total travel time (pcu hours / hour)	132,681	131,899	-782	82,691	82,631	-60	135,597	135,581	-16
	Total travel distance (km / hr)	4,565,778	4,579,961	14,184	3,538,821	3,549,012	10,091	4,654,945	4,674,353	19,409
	Average network speed (km/hr)	34.4	34.7	0.3	42.8	42.9	0.1	34.3	34.5	0.2
2032	Permanent queuing (pcus)	18,181	17,178	-1,003	2,463	2,380	-84	19,165	18,385	-780
	Total travel time (pcu hours per hour)	171,873	170,325	-1,548	104,314	104,028	-286	175,967	174,564	-1,403
	Total distance travelled (km per hr)	5,222,140	5,237,978	15,838	4,162,387	4,174,673	12,286	5,304,197	5,317,643	13,447
	Average network speed (km/hr)	30.4	30.8	0.4	39.9	40.1	0.2	30.1	30.5	0.4
Optimistic										
2017	Over capacity queuing (pcu hours)	7,792	7,363	-429	1,013	972	-41	8,142	7,791	-351
	Total travel time (pcu hours / hour)	134,056	133,301	-755	83,688	83,599	-89	139,244	138,273	-951
	Total travel distance (km / hr)	4,598,350	4,612,802	14,452	3,573,940	3,584,203	10,263	4,714,209	4,727,435	13,227
	Average network speed (km/hr)	34.3	34.6	0.3	42.7	42.9	0.2	33.9	34.2	0.3
2032	Permanent queuing (pcus)	19,170	18,200	-970	2,638	2,479	-159	20,456	19,731	-725
	Total travel time (pcu hours per hour)	174,868	173,461	-1,407	105,943	105,656	-286	179,696	178,290	-1,406
	Total distance travelled (km per hr)	5,276,456	5,295,474	19,018	4,210,909	4,225,287	14,378	5,355,094	5,367,679	12,585
	Average network speed (km/hr)	30.2	30.5	0.3	39.7	40.0	0.3	29.8	30.1	0.3

6.6 **Tables 6.2** to **6.3** below summarise the performance of major junctions in the scheme area of influence at 2017 and 2032 for the morning and evening peak hours. Again, the performance figures are based on the worst turn at each junction, i.e. If a junction has a single turn in excess of 100% it is placed in the VCR>100% category.

6.7 It should be noted that SATURN is a strategic modelling toll and not a detailed junction capacity / operational assessment tool. So whilst SATURN may report over-capacity, the model results would need to be subject to a junction capacity assessment using appropriate junction modelling software (such as LINSIG) to establish if a capacity issue exists. When a preferred scheme is chosen (following the Public Consultation exercise) any junctions adjacent to the new relief road that show capacity issues, will be subject to a detailed operational assessment using the appropriate junction modelling tool.

Table 6.2 – Junction Performance in the SEMMMS Area of Influence in 2017

Junction Control	Morning Peak Hour				Evening Peak Hour			
	Do-Minimum		Do-Something		Do-Minimum		Do-Something	
	At Capacity	Over Capacity	At Capacity	Over Capacity	At Capacity	Over Capacity	At Capacity	Over Capacity
	V/C = 85 -100%	V/C > 100%	V/C = 85 -100%	V/C > 100%	V/C = 85 -100%	V/C > 100%	V/C = 85 -100%	V/C > 100%
Signals	56	26	50	26	55	20	47	20
Roundabouts	9	6	4	4	5	6	5	2
Total	**97**		**84**		**86**		**74**	

6.8 **Table 6.2** shows that in 2017 the introduction of the SEMMMS scheme is forecast to result in a reduction in the number of junctions (both signalised and roundabouts) with a turn that is operating at overcapacity (VC >100%) from 32 to 30 and for junctions operating at capacity (VC 85-100%) from 65 to 54 in the morning peak hour. In the evening peak hour, the number of junctions with a turn that is operating at overcapacity (VC >100%) is forecast to fall from 26 to 22 and for junctions operating at capacity (VC 85-100%) from 60 to 52.

Table 6.3 – Junction Performance in the SEMMMS Area of Influence in 2032

Junction Control	Morning Peak Hour				Evening Peak Hour			
	Do-Minimum		Do-Something		Do-Minimum		Do-Something	
	At Capacity	Over Capacity	At Capacity	Over Capacity	At Capacity	Over Capacity	At Capacity	Over Capacity
	V/C = 85 -100%	V/C > 100%	V/C = 85 -100%	V/C > 100%	V/C = 85 -100%	V/C > 100%	V/C = 85 -100%	V/C > 100%
Signals	67	47	55	44	66	43	67	37
Roundabouts	8	11	9	7	2	14	2	6
Total	**133**		**115**		**125**		**112**	

6.9 **Table 6.3** shows that in 2032 the introduction of the A6 to Manchester Airport Relief Road scheme is forecast to result in a reduction in the number of junctions (both signalised and roundabouts) with a turn that is operating at overcapacity (VC >100%) from 58 to 51 and for

junctions operating at capacity (VC 85-100%) from 75 to 64 in the morning peak hour. In the evening peak hour, the number of junctions with a turn that is operating at overcapacity (VC >100%) is forecast to fall from 57 to 43 and for junctions operating at capacity (VC 85-100%) there is a slight increase from 68 to 69.

Scheme Re-Assignment Impacts

6.10 The analysis of the traffic impacts of the A6 to Manchester Airport Relief Road scheme is based on an analysis of traffic flows crossing five screenlines across the study area. The screenlines are illustrated in **Figure 6.1.**

Screenline 1 North of Scheme Screenline to intercept North-South traffic movements through in the Northern area of influence. It extends from the M56 between Junctions 4 and 5 in the East to the A5102 Woodford Road in the West.

Screenline 2 South of Scheme Screenline to intercept North-South traffic movements through the Southern area of influence. It extends from Disley in the East to Wilmslow in the West.

Screenline 3 East of M56 Screenline to intercept North-South traffic movements through the Western area of influence. It extends from the A538 Wilmslow Road in the South to the M60 in the North.

Screenline 4 East of A34 Screenline to intercept North-South traffic movements through the central area of influence. It extends from the A560 Stockport Road in the North to the A5102 Woodford Road in the South.

Screenline 5 High Peak to Bredbury Screenline to intercept East-West traffic movements through the central area of influence. It extends from the A560 Stockport Road East in the North to A6 Buxton Road in the South.

6.11 **Tables 6.4 to 6.8** summarise 2017 and 2032 actual flows (in pcus) on all links crossing Screenlines 1 to 5 respectively in the Do-Minimum and Do-Something scenarios.

6.12 **Table 6.4** shows that in the Northbound direction flows are forecast to increase on the A5102 Woodford Road, A34 Handforth Bypass in all time periods at 2017 and 2032 and on the B5166 Styal Road in all time periods with the exception of the 2017 morning peak in 2017 and 2032. The remaining links are forecast to remain broadly neutral or to reduce particularly on the B5358 Wilmslow Road, Finney Lane and Moss Lane in all time periods in both forecast years.

6.13 In the Southbound direction, flows are forecast to significantly increase on the A34 Handforth Bypass and Gil Bent Road in all time periods at 2017 and 2032 and on Shadowmoss Road particularly in the evening peak. The flows are forecast to remain broadly neutral or decrease particularly on the B5358 Wilmslow Road, Finney Lane, St Ann's Road and the B5166 Styal Road. Overall, the forecast change in flow across the screenline in either direction ranges from -4% to -11% in any one time period and forecast year.

6.14 **Table 6.5** shows that in both directions flows are forecast to significantly increase on the A6 Buxton Road in Disley for all time periods in 2017 and 2032.The A34 Wilmslow Bypass is forecast to have increases in traffic particularly in 2017 and the B5166 Manchester Road in the 2032 morning and interpeak. The remaining links are forecast to remain broadly neutral or to reduce particularly on the A5102 Hough Lane, Lees Lane and the A523 Macclesfield Road in the majority of time periods at 2017 and 2032. Overall, the forecast change in flow across the screenline in either direction ranges from 0% to +5% in any one time period and forecast year.

6.15 **Table 6.6** shows that in the both directions flows are forecast to significantly increase on the M56 Spur with the maximum increase of 902 pcus in the Westbound direction in the 2017 morning peak The remaining links are forecast to remain broadly neutral or to reduce particularly on the M56-M60 link where traffic is forecast to decrease by up to 305 pcus. Overall, the forecast change in flow across the screenline in either direction ranges from +3% to -4% in any one time period and forecast year.

6.16 **Table 6.7** shows that in the Eastbound direction flows are forecast to significantly increase on the A555 MAELR and decrease on the A5102 Woodford Road and Councillor Lane. In the Westbound direction, flows are forecast to significantly increase on the A555 MAELR, B5094 Stanley Road. Overall, the forecast change in flow across the screenline in either direction ranges from +1% to +19% in any one time period and forecast year.

6.17 **Table 6.8** shows that in the both directions flows are forecast to significantly increase on the A6 Buxton Road with a decrease in forecast flow particularly on Windlehurst Road in 2032. Overall, the forecast change in flow across the screenline in either direction ranges from -1% to +5% in any one time period and forecast year.

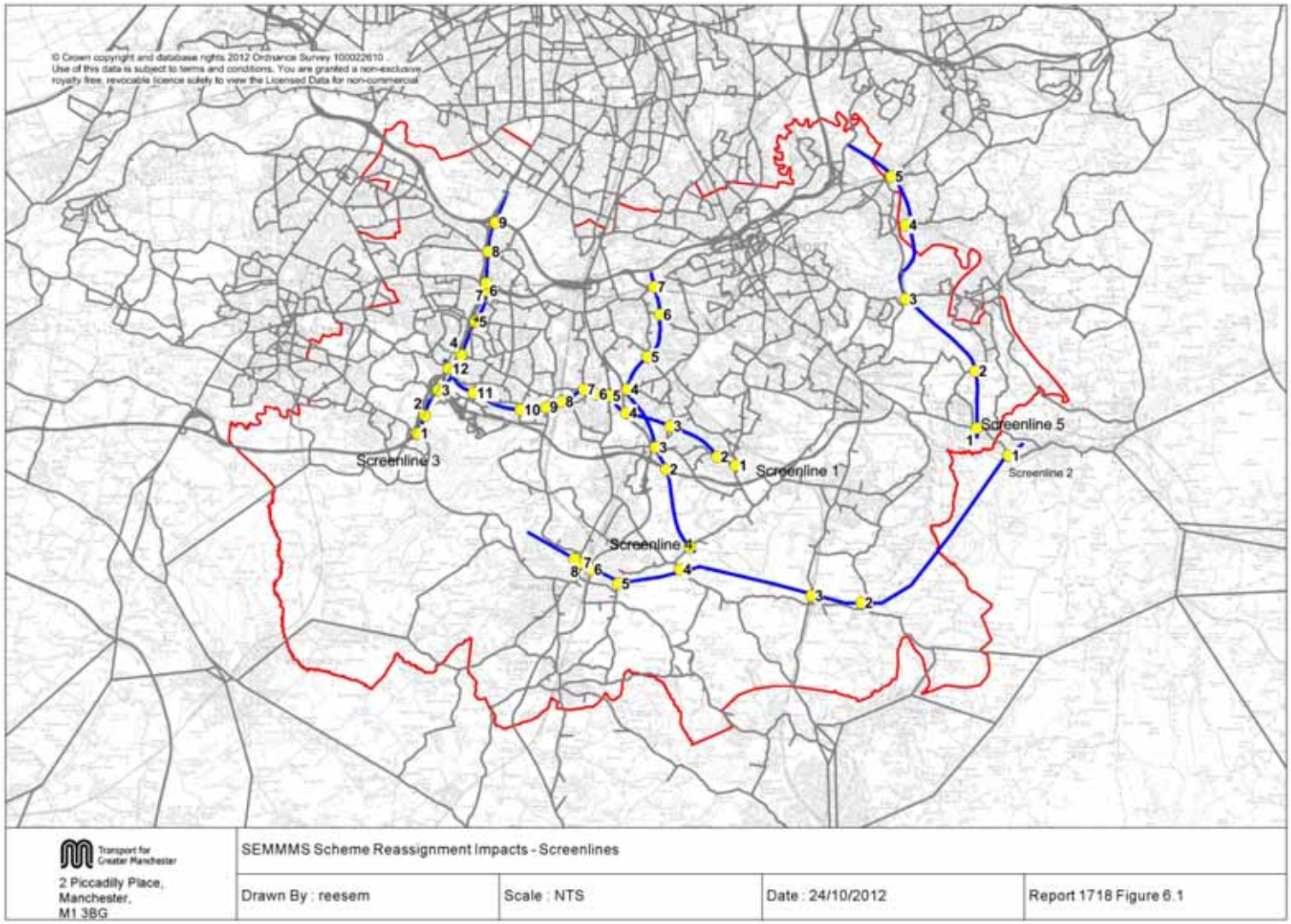

© Crown copyright and database rights 2012 Ordnance Survey 100022610.
Use of this data is subject to terms and conditions. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial
Screenline 3
Screenline 1
Screenline 4
Screenline 5
Screenline 2
Transport for Greater Manchester
2 Piccadilly Place, Manchester, M1 3BG
SEMMMS Scheme Reassignment Impacts - Screenlines
Drawn By : reesem
Scale : NTS
Date : 24/10/2012
Report 1718 Figure 6.1

Table 6.4: SEMMMS Screenline 1 North of SEMMMS Screenline - Crossing Flows in pcu's

Crossing Links	Time Period	Northbound								Southbound							
		2017				2032				2017				2032			
		DM	DS	Diff	% Diff	DM	DS	Diff	% Diff	DM	DS	Diff	% Diff	DM	DS	Diff	% Diff
1. A5102 Woodford Road	AM	638	668	30	5%	556	824	268	48%	1082	824	-259	-24%	1080	1080	0	0%
2. Moss Lane		149	117	-32	-22%	153	106	-46	-30%	317	209	-108	-34%	361	332	-29	-8%
3. Gil Bent Road		611	549	-62	-10%	610	516	-94	-15%	637	859	222	35%	597	985	388	65%
4. A34 Handforth Bypass		2390	2718	328	14%	2388	3032	644	27%	2366	2635	269	11%	2481	2774	294	12%
5. B5358 Wilmslow Road		938	723	-215	-23%	1135	758	-377	-33%	690	433	-256	-37%	785	469	-316	-40%
6. Finney Lane East		703	575	-128	-18%	629	590	-39	-6%	756	495	-261	-35%	1014	630	-384	-38%
7. St Anns Road North		457	391	-67	-15%	346	412	66	19%	374	253	-120	-32%	623	289	-335	-54%
8. Finney Lane West		1187	633	-554	-47%	1455	933	-522	-36%	820	543	-278	-34%	486	605	119	25%
9. B5166 Styal Road		726	907	181	25%	892	999	107	12%	1026	769	-258	-25%	1066	1027	-39	-4%
10. Shadowmoss Road		404	94	-311	-77%	487	143	-344	-71%	140	126	-14	-10%	132	155	23	17%
11. Selstead Road		334	346	12	4%	390	439	49	12%	273	248	-25	-9%	754	538	-216	-29%
12. M56		5875	5734	-140	-2%	6701	6418	-284	-4%	6631	6349	-282	-4%	7442	7238	-204	-3%
Total		**14412**	**13454**	**-958**	**-7%**	**15742**	**15170**	**-572**	**-4%**	**15112**	**13742**	**-1369**	**-9%**	**16821**	**16122**	**-699**	**-4%**
1. A5102 Woodford Road	IP	595	657	61	10%	781	805	23	3%	639	451	-189	-30%	814	641	-172	-21%
2. Moss Lane		221	211	-11	-5%	259	231	-28	-11%	214	187	-27	-13%	271	203	-68	-25%
3. Gil Bent Road		337	376	39	12%	374	445	72	19%	415	491	75	18%	540	599	60	11%
4. A34 Handforth Bypass		1927	2006	79	4%	2207	2462	255	12%	2000	1978	-22	-1%	2290	2389	99	4%
5. B5358 Wilmslow Road		635	640	5	1%	751	687	-64	-9%	483	615	132	27%	596	670	75	13%
6. Finney Lane East		672	557	-115	-17%	734	643	-90	-12%	580	442	-138	-24%	576	456	-120	-21%
7. St Anns Road North		193	192	-1	0%	150	188	38	25%	269	197	-72	-27%	371	201	-170	-46%
8. Finney Lane West		851	411	-440	-52%	970	443	-528	-54%	863	524	-339	-39%	897	626	-271	-30%
9. B5166 Styal Road		639	649	9	1%	862	834	-27	-3%	606	486	-120	-20%	883	590	-293	-33%
10. Shadowmoss Road		159	38	-122	-76%	252	63	-189	-75%	130	52	-78	-60%	79	66	-13	-16%
11. Selstead Road		164	144	-20	-12%	226	160	-65	-29%	118	137	19	16%	336	141	-195	-58%
12. M56		5203	5120	-83	-2%	6379	5907	-472	-7%	4986	4919	-67	-1%	6083	5580	-502	-8%
Total		**11596**	**11000**	**-597**	**-5%**	**13944**	**12869**	**-1075**	**-8%**	**11304**	**10479**	**-825**	**-7%**	**13735**	**12164**	**-1572**	**-11%**

Table 6.4 Continued: SEMMMS Screenline 1 North of SEMMMS Screenline - Crossing Flows in pcu's																	
Crossing Links	**Time Period**	**Northbound**								**Southbound**							
		2017				**2032**				**2017**				**2032**			
		DM	**DS**	**Diff**	**% Diff**	**DM**	**DS**	**Diff**	**% Diff**	**DM**	**DS**	**Diff**	**% Diff**	**DM**	**DS**	**Diff**	**% Diff**
1. A5102 Woodford Road	**PM**	732	927	195	27%	852	980	128	15%	792	692	-100	-13%	890	849	-41	-5%
2. Moss Lane		272	247	-26	-9%	264	230	-34	-13%	482	167	-315	-65%	515	275	-239	-46%
3. Gil Bent Road		516	486	-30	-6%	562	627	65	11%	408	605	197	48%	488	711	223	46%
4. A34 Handforth Bypass		2409	2681	272	11%	2601	2898	297	11%	2949	3280	331	11%	2947	3179	232	8%
5. B5358 Wilmslow Road		778	708	-69	-9%	794	733	-61	-8%	852	650	-202	-24%	711	850	139	20%
6. Finney Lane East		865	583	-282	-33%	630	676	46	7%	663	471	-191	-29%	690	521	-169	-25%
7. St Anns Road North		240	203	-37	-16%	293	244	-49	-17%	504	187	-317	-63%	634	207	-427	-67%
8. Finney Lane West		917	447	-470	-51%	1029	525	-504	-49%	954	766	-188	-20%	753	953	200	27%
9. B5166 Styal Road		1056	881	-175	-17%	988	1168	181	18%	1050	822	-228	-22%	1441	983	-458	-32%
10. Shadowmoss Road		236	123	-113	-48%	353	183	-170	-48%	101	182	81	80%	114	218	104	92%
11. Selstead Road		441	446	5	1%	552	574	23	4%	224	212	-12	-5%	599	476	-123	-21%
12. M56		6140	6058	-82	-1%	7547	7398	-149	-2%	6384	6169	-216	-3%	6786	6655	-132	-2%
Total		**14602**	**13789**	**-813**	**-6%**	**16464**	**16237**	**-227**	**-1%**	**15363**	**14204**	**-1159**	**-8%**	**16569**	**15877**	**-691**	**-4%**

Table 6.5 SEMMMS Screenline 2 South of SEMMMS - Crossing Flows in pcu's

Crossing Links	Time Period	Northbound								Southbound							
		2017				2032				2017				2032			
		DM	DS	Diff	% Diff	DM	DS	Diff	% Diff	DM	DS	Diff	% Diff	DM	DS	Diff	% Diff
1. A6 Market Street	AM	119	72	-47	-40%	58	95	37	64%	116	139	23	20%	74	63	-11	-15%
2. A6 Buxton Road		680	907	227	33%	865	885	20	2%	576	756	180	31%	733	893	160	22%
3. Roundy Lane		10	9	0	-4%	18	37	19	111%	17	14	-2	-14%	41	35	-5	-13%
4. A523 London Road		640	606	-34	-5%	778	747	-31	-4%	929	795	-134	-14%	1035	1042	7	1%
5. Lees Lane		1167	1161	-6	-1%	1176	1184	8	1%	901	1012	111	12%	1037	950	-87	-8%
6. A5102 Hough Lane		500	359	-142	-28%	656	467	-189	-29%	718	688	-30	-4%	1019	1004	-14	-1%
7. A34 Wilmslow Bypass		1461	1743	282	19%	1551	1915	364	23%	2090	2004	-86	-4%	1972	1901	-71	-4%
8. B5166 Manchester Road		910	872	-38	-4%	1051	994	-57	-5%	578	693	115	20%	489	798	309	63%
9. Cliff Road		2	2	0	0%	2	2	0	1%	578	493	-85	-15%	646	697	51	8%
Total		**5490**	**5732**	**242**	**4%**	**6155**	**6326**	**171**	**3%**	**6502**	**6594**	**91**	**1%**	**7046**	**7385**	**339**	**5%**
1. A6 Market Street	IP	151	155	3	2%	134	35	-99	-74%	238	318	79	33%	188	189	1	1%
2. A6 Buxton Road		477	599	122	25%	537	829	291	54%	393	513	119	30%	567	753	186	33%
3. Roundy Lane		13	11	-1	-10%	12	14	2	20%	10	10	0	3%	9	14	5	48%
4. A523 London Road		420	386	-34	-8%	614	512	-102	-17%	420	418	-1	0%	648	565	-83	-13%
5. Lees Lane		695	683	-12	-2%	1101	901	-200	-18%	665	681	15	2%	791	739	-52	-7%
6. A5102 Hough Lane		361	169	-192	-53%	477	247	-230	-48%	233	141	-92	-40%	386	231	-155	-40%
7. A34 Wilmslow Bypass		1550	1824	274	18%	1375	1983	607	44%	1643	1548	-95	-6%	1780	1980	200	11%
8. B5166 Manchester Road		607	483	-124	-20%	907	656	-250	-28%	477	549	72	15%	499	572	73	15%
9. Cliff Road		2	2	0	0%	2	2	0	0%	105	79	-26	-25%	316	128	-188	-60%
Total		**4275**	**4311**	**36**	**1%**	**5159**	**5179**	**21**	**0%**	**4184**	**4256**	**73**	**2%**	**5185**	**5170**	**-15**	**0%**

Table 6.5 Continued: SEMMMS Screenline 2 South of SEMMMS - Crossing Flows in pcu's

Crossing Links	Time Period	Eastbound								Westbound							
		2017				2032				2017				2032			
		DM	DS	Diff	% Diff	DM	DS	Diff	% Diff	DM	DS	Diff	% Diff	DM	DS	Diff	% Diff
1. A6 Market Street	PM	60	26	-34	-56%	59	77	19	31%	137	113	-24	-17%	120	94	-26	-22%
2. A6 Buxton Road		500	655	155	31%	629	658	29	5%	789	1025	236	30%	921	1111	190	21%
3. Roundy Lane		117	106	-11	-10%	263	143	-119	-45%	8	8	0	-2%	11	11	0	2%
4. A523 London Road		669	610	-59	-9%	675	727	52	8%	704	638	-66	-9%	863	817	-46	-5%
5. Lees Lane		1173	1084	-89	-8%	1177	1199	22	2%	923	898	-25	-3%	1026	1160	134	13%
6. A5102 Hough Lane		811	695	-116	-14%	997	927	-71	-7%	322	304	-18	-6%	503	418	-85	-17%
7. A34 Wilmslow Bypass		2066	2099	34	2%	1981	2118	136	7%	1888	2023	134	7%	1722	1967	245	14%
8. B5166 Manchester Road		926	1117	191	21%	1012	1217	205	20%	505	474	-31	-6%	639	580	-59	-9%
9. Cliff Road		2	3	0	24%	2	2	0	13%	496	325	-172	-35%	729	478	-251	-34%
Total		**6323**	**6395**	**72**	**1%**	**6795**	**7068**	**273**	**4%**	**5772**	**5807**	**35**	**1%**	**6534**	**6635**	**102**	**2%**

Table 6.6: SEMMMS Screenline 3 East of M56 - Crossing Flows in pcu's

Crossing Links	Time Period	Eastbound								Westbound							
		2017				2032				2017				2032			
		DM	DS	Diff	% Diff	DM	DS	Diff	% Diff	DM	DS	Diff	% Diff	DM	DS	Diff	% Diff
1. A538 Wilmslow Road	AM	1299	1303	4	0%	1565	1527	-38	-2%	1403	1425	22	2%	1686	1817	131	8%
2. Runger Lane		542	672	131	24%	660	734	74	11%	301	364	63	21%	402	422	20	5%
3. M56 Spur		3280	3672	392	12%	4076	4639	563	14%	2040	2942	902	44%	2835	3588	753	27%
4. Simonsway		1159	1166	6	1%	1142	1299	157	14%	1107	1005	-101	-9%	1155	1109	-46	-4%
5. Hollyhedge Road		959	923	-36	-4%	1096	1084	-12	-1%	754	684	-70	-9%	950	894	-57	-6%
6. M56-M60 Link		2808	2589	-219	-8%	3102	2851	-251	-8%	3180	2937	-242	-8%	2983	2941	-42	-1%
7. A560 Altrincham Road		1404	1431	27	2%	1439	1442	3	0%	1400	1370	-29	-2%	1437	1422	-15	-1%
8. B5167 Palatine Road		1145	1154	8	1%	1103	1094	-10	-1%	895	880	-15	-2%	1092	1077	-15	-1%
9. M60		4211	4104	-107	-3%	4641	4663	22	0%	7129	7184	55	1%	7893	7955	62	1%
Total		**16807**	**17014**	**207**	**1%**	**18826**	**19333**	**508**	**3%**	**18208**	**18792**	**584**	**3%**	**20433**	**21225**	**792**	**4%**
1. A538 Wilmslow Road	IP	637	547	-91	-14%	770	686	-84	-11%	1274	1297	24	2%	1580	1584	4	0%
2. Runger Lane		288	339	51	18%	384	440	56	15%	268	341	73	27%	371	355	-16	-4%
3. M56 Spur		1901	2334	432	23%	2689	2491	-198	-7%	1774	2214	440	25%	2635	2474	-161	-6%
4. Simonsway		842	808	-34	-4%	870	872	2	0%	1021	885	-137	-13%	1073	1006	-66	-6%
5. Hollyhedge Road		598	583	-15	-2%	745	715	-30	-4%	514	535	20	4%	689	668	-21	-3%
6. M56-M60 Link		2488	2402	-87	-3%	3051	2746	-305	-10%	2397	2298	-98	-4%	2804	2569	-235	-8%
7. A560 Altrincham Road		1165	1163	-2	0%	1305	1299	-5	0%	1161	1127	-34	-3%	1320	1277	-44	-3%
8. B5167 Palatine Road		873	861	-12	-1%	1042	984	-58	-6%	941	959	18	2%	1033	1026	-8	-1%
9. M60		3077	3049	-28	-1%	3609	3633	23	1%	4914	4968	54	1%	5927	5922	-5	0%
Total		**11870**	**12086**	**215**	**2%**	**14463**	**13865**	**-599**	**-4%**	**14264**	**14624**	**360**	**3%**	**17432**	**16881**	**-551**	**-3%**

Table 6.6 Continued: SEMMMS Screenline 3 East of M56 - Crossing Flows in pcu's

Crossing Links	Time Period	Eastbound								Westbound							
		2017				2032				2017				2032			
		DM	DS	Diff	% Diff	DM	DS	Diff	% Diff	DM	DS	Diff	% Diff	DM	DS	Diff	% Diff
1. A538 Wilmslow Road	PM	718	681	-37	-5%	808	839	32	4%	2112	2045	-67	-3%	2677	2744	67	2%
2. Runger Lane		454	514	60	13%	453	459	6	1%	422	498	76	18%	657	706	49	7%
3. M56 Spur		2082	2645	563	27%	2412	2993	581	24%	2525	3177	652	26%	3577	4019	442	12%
4. Simonsway		943	1006	63	7%	1033	1060	27	3%	1242	1172	-70	-6%	1221	1189	-33	-3%
5. Hollyhedge Road		871	907	35	4%	1006	1088	82	8%	849	910	61	7%	955	946	-9	-1%
6. M56-M60 Link		2475	2376	-99	-4%	2963	2755	-208	-7%	2762	2624	-138	-5%	2953	2781	-172	-6%
7. A560 Altrincham Road		1123	1005	-118	-11%	1224	1150	-74	-6%	1258	1211	-47	-4%	1309	1258	-52	-4%
8. B5167 Palatine Road		1222	1282	60	5%	1284	1332	48	4%	963	903	-60	-6%	1001	935	-67	-7%
9. M60		4606	4571	-35	-1%	5098	5004	-93	-2%	6624	6685	60	1%	7237	7425	188	3%
Total		**14496**	**14986**	**491**	**3%**	**16280**	**16682**	**401**	**2%**	**18758**	**19224**	**466**	**2%**	**21589**	**22003**	**414**	**2%**

Table 6.7 SEMMMS Screenline 4 East of A34 - Crossing Flows in pcu's

Crossing Links	Time Period	Eastbound								Westbound							
		2017				2032				2017				2032			
		DM	DS	Diff	% Diff	DM	DS	Diff	% Diff	DM	DS	Diff	% Diff	DM	DS	Diff	% Diff
1. A5102 Woodford Road	AM	840	616	-224	-27%	1185	987	-198	-17%	871	833	-37	-4%	1325	1114	-212	-16%
2. A55 MAELR		718	1995	1277	178%	984	2264	1279	130%	1494	2690	1196	80%	1590	3095	1506	95%
3. B5094 Stanley Road		1089	904	-185	-17%	806	922	116	14%	1492	1592	100	7%	1388	1737	349	25%
4. Etchells Road		548	578	30	6%	517	562	45	9%	798	732	-66	-8%	896	788	-108	-12%
5. A5149 Cheadle Road		590	577	-13	-2%	574	631	57	10%	757	626	-131	-17%	991	778	-213	-22%
6. Councillor Lane		589	542	-47	-8%	806	695	-111	-14%	606	521	-85	-14%	712	612	-100	-14%
7. A560 Stockport Road		1272	1375	103	8%	1425	1458	34	2%	1900	1871	-30	-2%	1935	1909	-26	-1%
Total		**5646**	**6588**	**941**	**17%**	**6297**	**7519**	**1223**	**19%**	**7917**	**8864**	**947**	**12%**	**8837**	**10032**	**1196**	**14%**
1. A5102 Woodford Road	IP	494	292	-202	-41%	1128	520	-608	-54%	369	359	-10	-3%	778	549	-228	-29%
2. A55 MAELR		842	1735	892	106%	1145	1930	784	68%	848	1450	601	71%	1322	1744	423	32%
3. B5094 Stanley Road		692	736	45	6%	761	802	41	5%	795	886	91	11%	1003	1052	49	5%
4. Etchells Road		579	530	-50	-9%	600	576	-24	-4%	596	535	-61	-10%	650	580	-70	-11%
5. A5149 Cheadle Road		427	388	-39	-9%	452	421	-31	-7%	477	427	-50	-10%	508	513	5	1%
6. Councillor Lane		459	436	-22	-5%	546	493	-53	-10%	313	314	1	0%	393	388	-4	-1%
7. A560 Stockport Road		1165	1116	-49	-4%	1412	1380	-32	-2%	1497	1399	-98	-7%	1721	1658	-63	-4%
Total		**4657**	**5232**	**575**	**12%**	**6044**	**6122**	**78**	**1%**	**4897**	**5370**	**473**	**10%**	**6374**	**6486**	**112**	**2%**
1. A5102 Woodford Road	PM	1253	917	-336	-27%	1497	1239	-258	-17%	517	543	25	5%	959	903	-57	-6%
2. A55 MAELR		1187	2896	1709	144%	1410	3228	1818	129%	1181	1731	550	47%	1355	1897	542	40%
3. B5094 Stanley Road		1513	1146	-367	-24%	1517	1202	-315	-21%	771	967	197	26%	933	1117	184	20%
4. Etchells Road		736	705	-31	-4%	791	751	-40	-5%	639	562	-77	-12%	633	613	-21	-3%
5. A5149 Cheadle Road		600	581	-19	-3%	644	635	-9	-1%	599	529	-70	-12%	717	597	-120	-17%
6. Councillor Lane		785	649	-136	-17%	815	698	-117	-14%	390	386	-4	-1%	481	460	-20	-4%
7. A560 Stockport Road		1419	1444	25	2%	1420	1432	12	1%	1804	1828	24	1%	1927	1967	39	2%
Total		**7494**	**8339**	**845**	**11%**	**8095**	**9185**	**1091**	**13%**	**5900**	**6546**	**646**	**11%**	**7007**	**7554**	**547**	**8%**

Table 6.8 SEMMMS Screenline 5 High Peak to Bredbury - Crossing Flows in pcu's

Crossing Links	Time Period	Eastbound								Westbound							
		2017				2032				2017				2032			
		DM	DS	Diff	% Diff	DM	DS	Diff	% Diff	DM	DS	Diff	% Diff	DM	DS	Diff	% Diff
1. A6 Buxton Road	AM	987	1177	190	19%	1118	1221	102	9%	928	1083	155	17%	1050	969	-81	-8%
2. Windlehurst Road		347	403	55	16%	528	474	-53	-10%	539	513	-26	-5%	550	537	-13	-2%
3. A626 Stockport Road		715	680	-35	-5%	853	882	28	3%	1124	1247	123	11%	1335	1427	91	7%
4. Otterspool Road		844	825	-19	-2%	945	966	21	2%	810	778	-32	-4%	963	983	20	2%
5. B6104 Stockport Road		719	785	66	9%	888	1041	154	17%	828	871	43	5%	802	832	30	4%
6. A560 Stockport Road East		504	443	-62	-12%	721	629	-92	-13%	706	695	-12	-2%	775	777	2	0%
Total		**4116**	**4312**	**196**	**5%**	**5052**	**5213**	**161**	**3%**	**4936**	**5187**	**251**	**5%**	**5475**	**5525**	**50**	**1%**
1. A6 Buxton Road	IP	832	1014	182	22%	971	1123	152	16%	804	920	115	14%	868	1049	181	21%
2. Windlehurst Road		225	232	7	3%	273	267	-5	-2%	215	194	-20	-9%	242	207	-35	-14%
3. A626 Stockport Road		834	833	-1	0%	1027	994	-33	-3%	806	856	49	6%	1064	1096	32	3%
4. Otterspool Road		707	683	-24	-3%	847	826	-21	-3%	806	781	-26	-3%	1001	970	-31	-3%
5. B6104 Stockport Road		659	658	-1	0%	720	732	12	2%	618	627	9	2%	730	747	17	2%
6. A560 Stockport Road East		629	638	9	1%	779	769	-9	-1%	720	711	-10	-1%	850	844	-6	-1%
Total		**3886**	**4057**	**171**	**4%**	**4618**	**4712**	**94**	**2%**	**3970**	**4088**	**118**	**3%**	**4756**	**4914**	**158**	**3%**
1. A6 Buxton Road	PM	1135	1313	178	16%	1252	1359	107	9%	797	891	94	12%	909	890	-19	-2%
2. Windlehurst Road		444	410	-33	-8%	464	437	-27	-6%	193	139	-53	-28%	347	281	-66	-19%
3. A626 Stockport Road		1393	1250	-143	-10%	1495	1495	0	0%	1163	1229	65	6%	1182	1223	41	3%
4. Otterspool Road		751	700	-52	-7%	1021	952	-69	-7%	1059	997	-62	-6%	1129	1092	-37	-3%
5. B6104 Stockport Road		996	1117	120	12%	1108	1149	41	4%	587	595	8	1%	647	677	31	5%
6. A560 Stockport Road East		1237	1176	-60	-5%	1136	1218	82	7%	823	798	-25	-3%	952	952	-1	0%
Total		**5956**	**5966**	**10**	**0%**	**6476**	**6610**	**134**	**2%**	**4622**	**4649**	**27**	**1%**	**5166**	**5114**	**-52**	**-1%**

Flow Differences

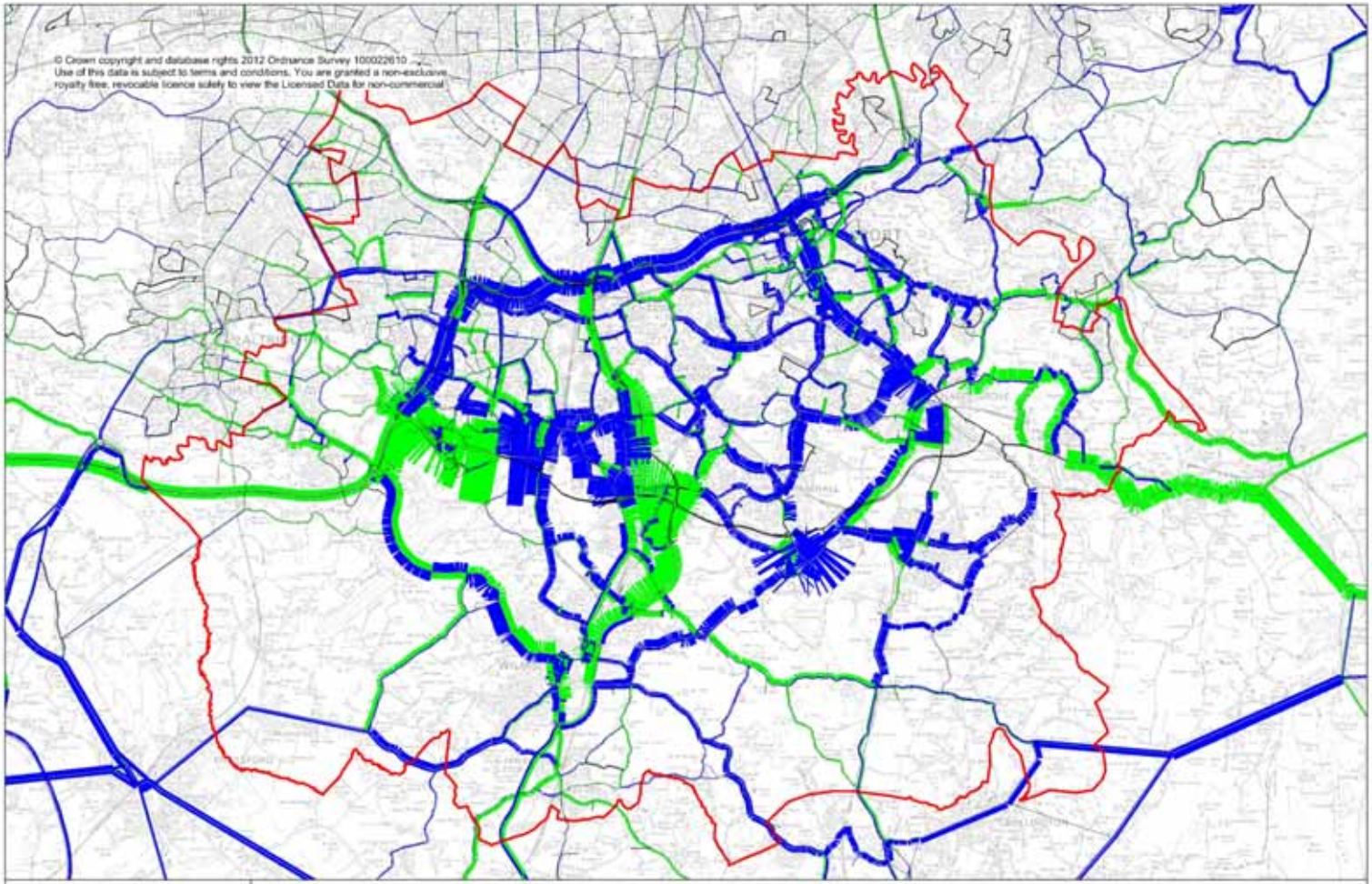
6.18 **Figures 6.2 to 6.7** show forecast changes in flow between the Do-Minimum and the Do-Something and scenario for the 2017 and 2032 morning, interpeak and evening peak hours within the schemes area of influence. The plots show flow differences represented by variable width bands, where the width of the band is proportional to the magnitude of the change. Increases in actual flows are shown in green and decreases in blue.

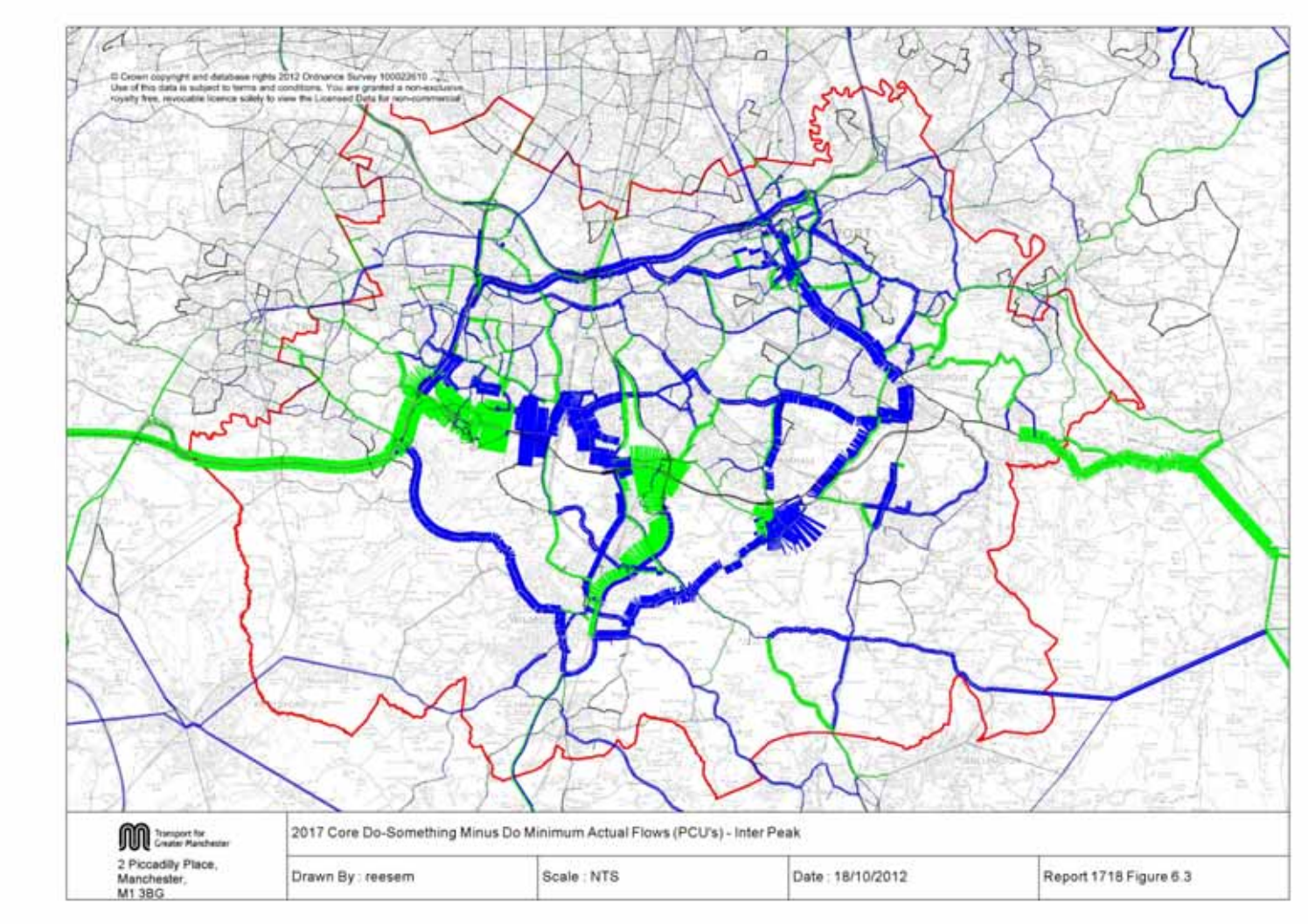
6.19 As expected, the most significant forecast increases in flow within the area of influence as a result of the scheme are on:

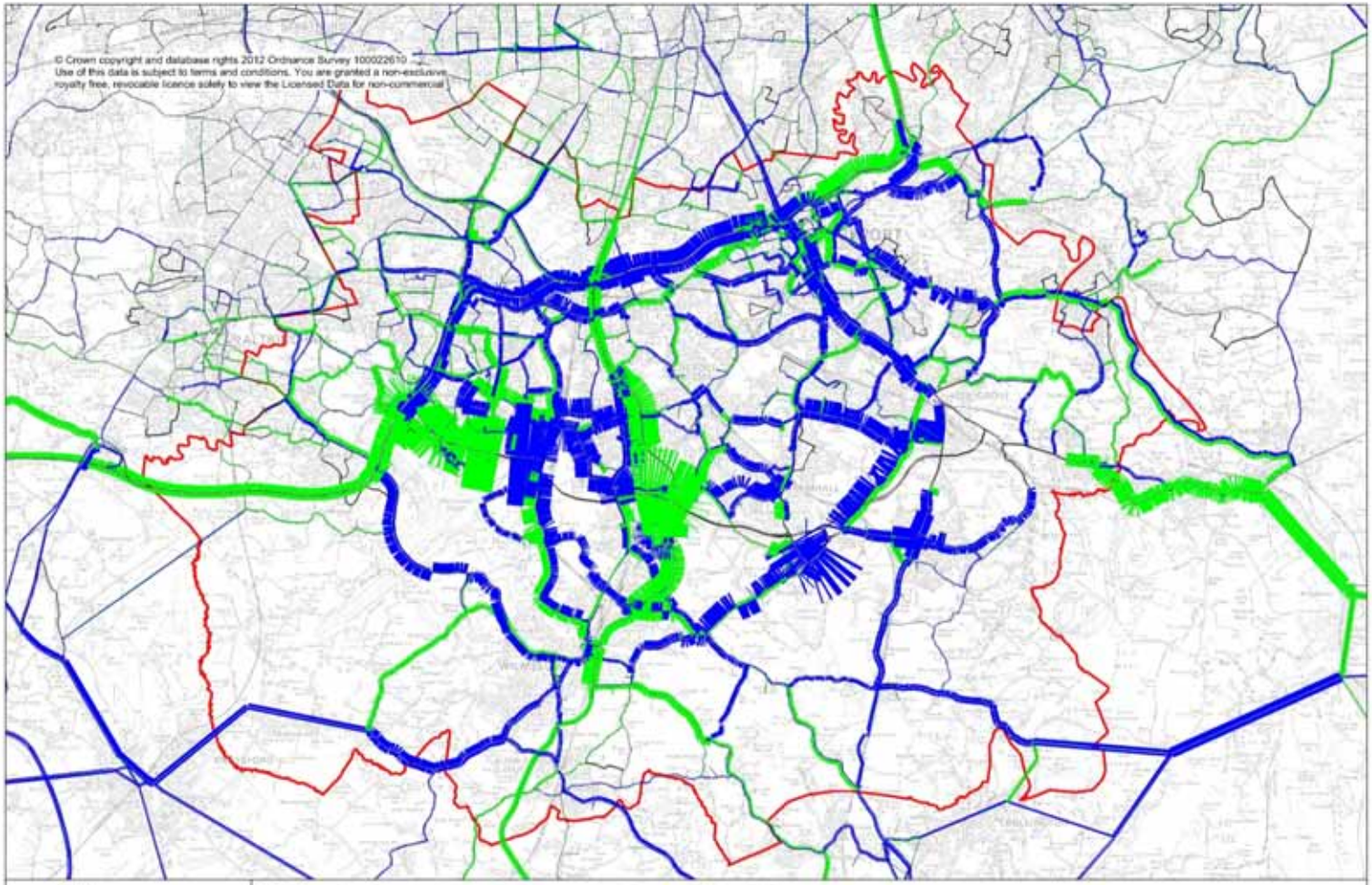
- A6 Buxton Road (South of its junction with SEMMMS)
- A555 MAELR
- M56 South of Junction 5 and M56 Spur
- A34 Handforth/Wilmslow Bypass Up to the M60.

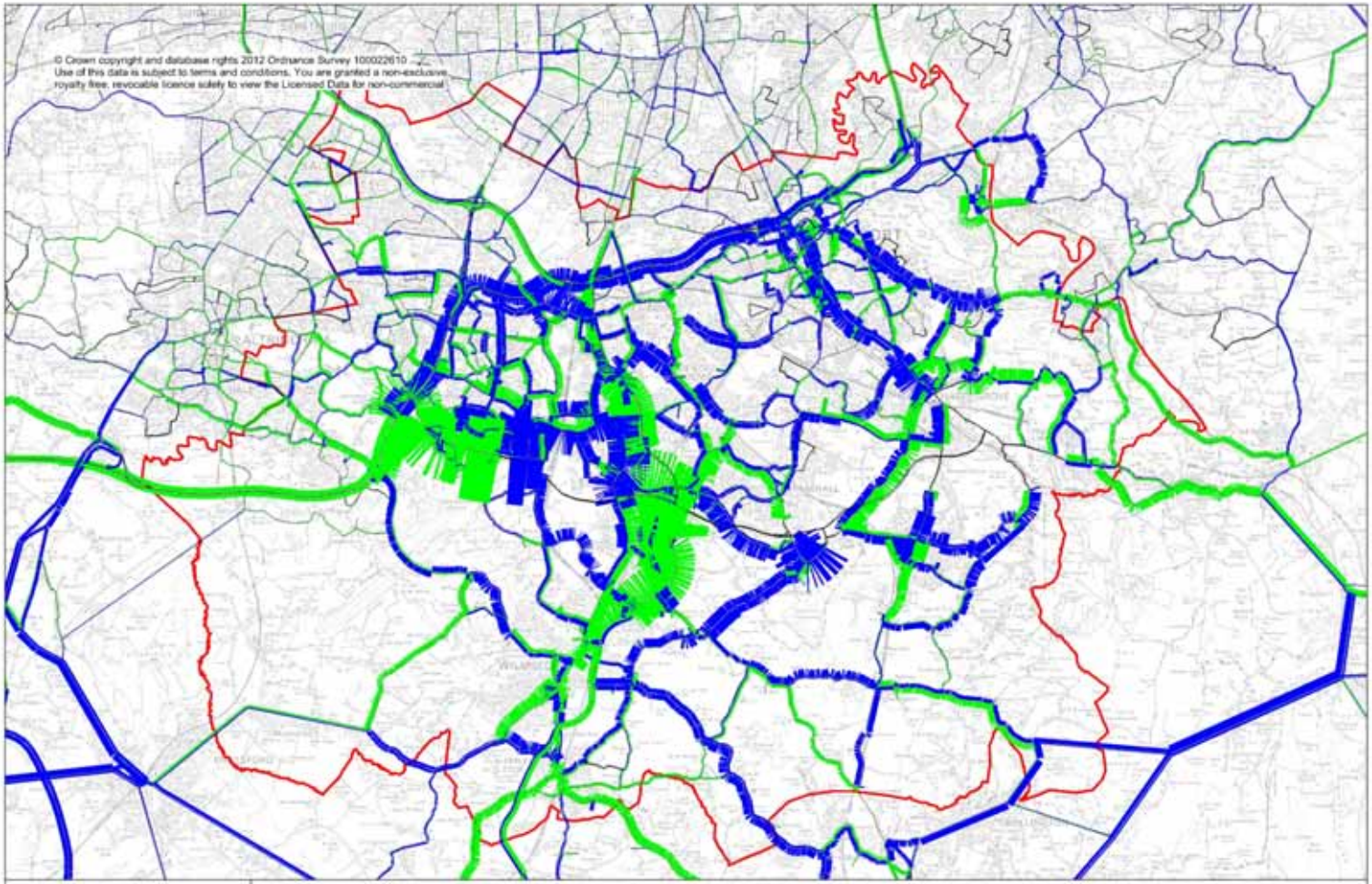
6.20 The most significant forecast decreases in flow occur on the local road network in the Heald Green and Wythenshawe area and Bramhall to the North of the scheme. Other routes with significant decreases in flow as a result of the scheme include:

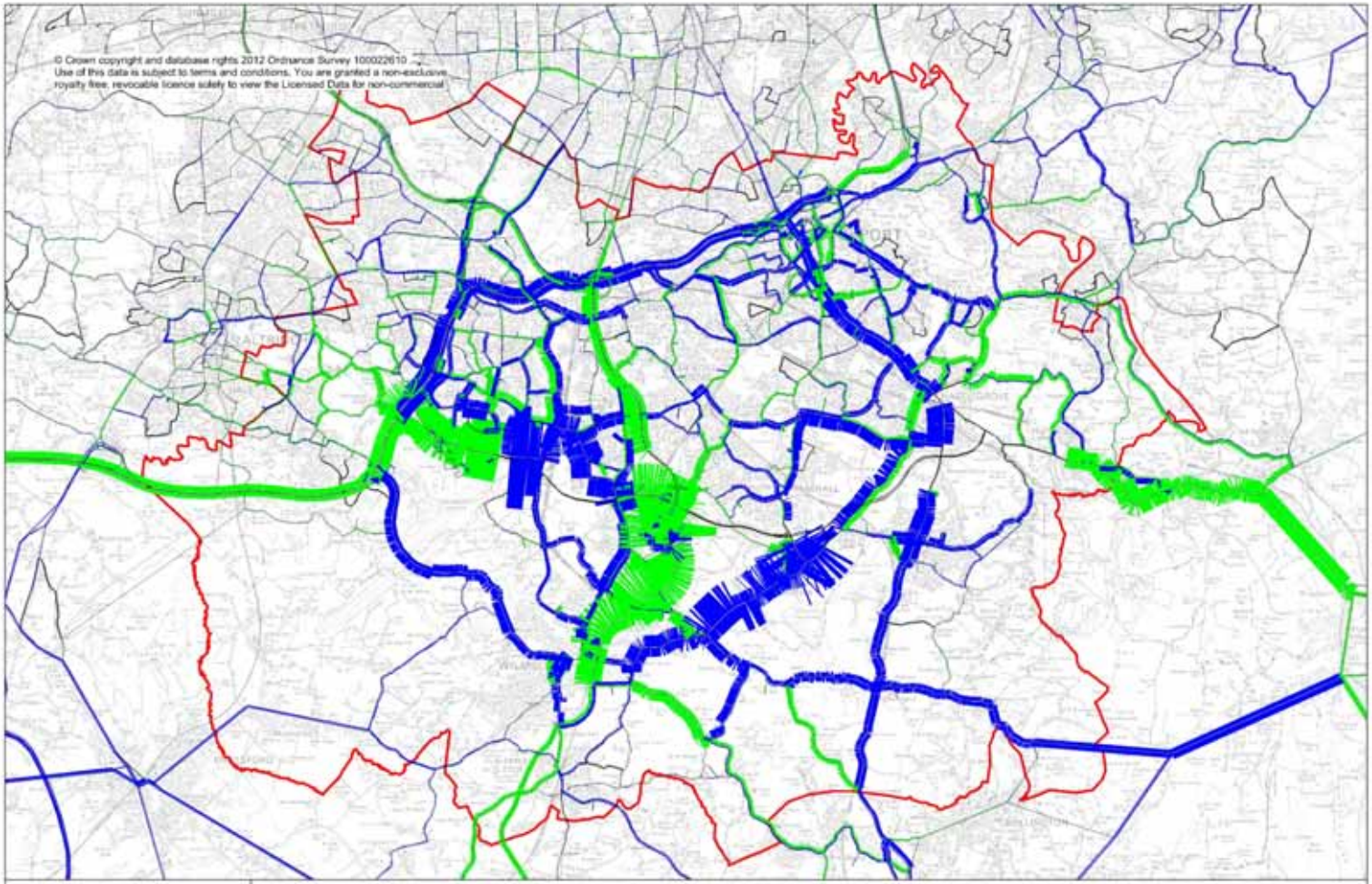
- M60 and M56 (North of Junction 5) AM Peak Only
- A5102 Woodford Road
- A538 Wilmslow Road
- A6 North of its junction with SEMMMS
- Bramhall Moor Lane
- A523 Macclesfield Road.

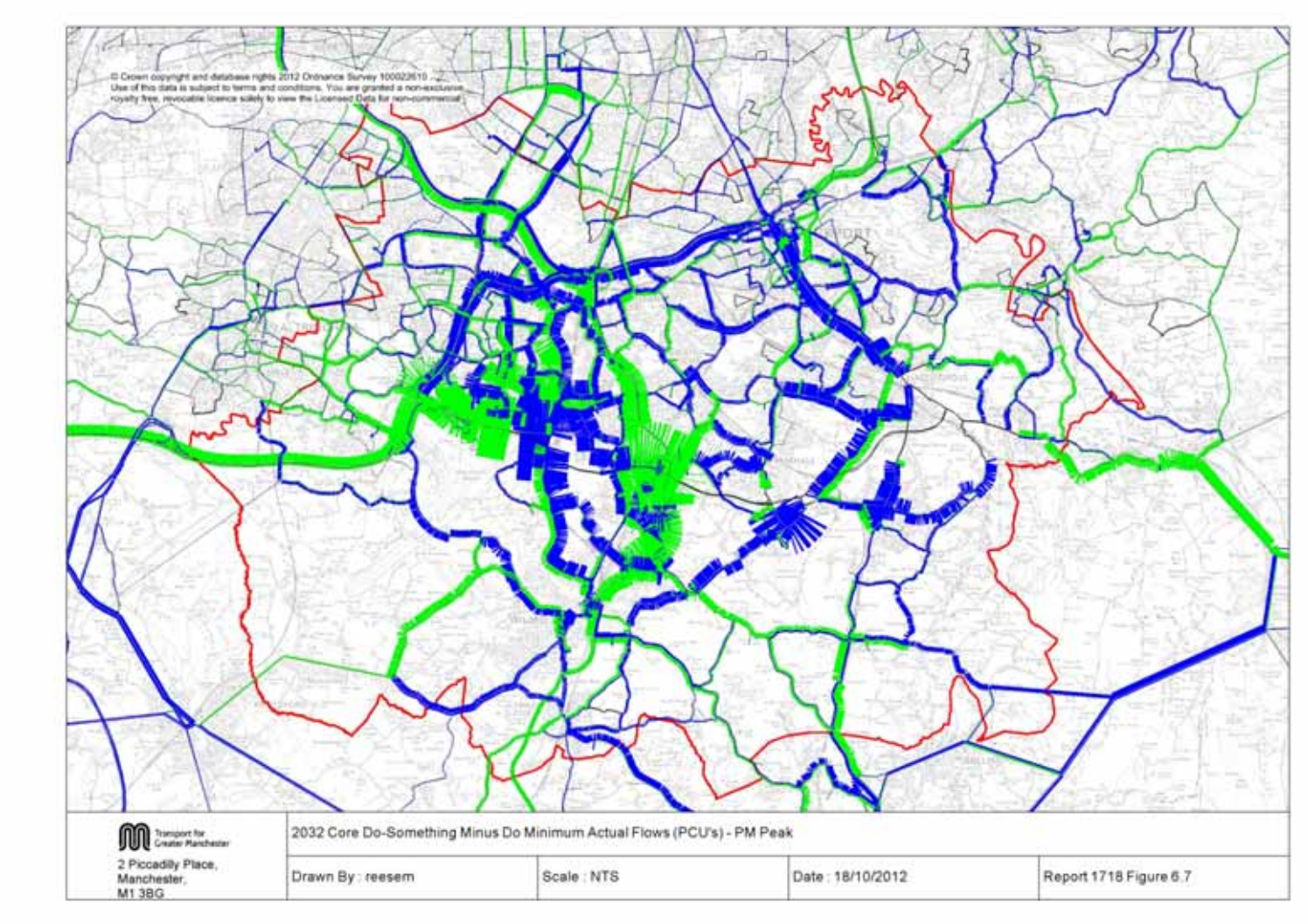

© Crown copyright and database rights 2012 Ordnance Survey 100022610
Use of this data is subject to terms and conditions. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial
Transport for Greater Manchester
2 Piccadilly Place, Manchester, M1 3BG
2017 Core Do-Something Minus Do Minimum Actual Flows (PCU's) - AM Peak
Drawn By : reesem
Scale : NTS
Date : 18/10/2012
Report 1718 Figure 6.2


© Crown copyright and database rights 2012 Ordnance Survey 100022610
Use of this data is subject to terms and conditions. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial
Transport for Greater Manchester
2 Piccadilly Place, Manchester, M1 3BG
2017 Core Do-Something Minus Do Minimum Actual Flows (PCU's) - Inter Peak
Drawn By : reesem
Scale : NTS
Date : 18/10/2012
Report 1718 Figure 6.3


© Crown copyright and database rights 2012 Ordnance Survey 100022610
Use of this data is subject to terms and conditions. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial
Transport for Greater Manchester
2 Piccadilly Place, Manchester, M1 3BG
2017 Core Do-Something Minus Do Minimum Actual Flows (PCU's) - PM Peak
Drawn By : reesem
Scale : NTS
Date : 18/10/2012
Report 1718 Figure 6.4


© Crown copyright and database rights 2012 Ordnance Survey 100022610
Use of this data is subject to terms and conditions. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial
Transport for Greater Manchester
2 Piccadilly Place, Manchester, M1 3BG
2032 Core Do-Something Minus Do Minimum Actual Flows (PCU's) - AM Peak
Drawn By : reesem
Scale : NTS
Date : 18/10/2012
Report 1718 Figure 6.5


© Crown copyright and database rights 2012 Ordnance Survey 100022610
Use of this data is subject to terms and conditions. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial
Transport for Greater Manchester
2 Piccadilly Place, Manchester, M1 3BG
2032 Core Do-Something Minus Do Minimum Actual Flows (PCU's) - Inter Peak
Drawn By : reesem
Scale : NTS
Date : 18/10/2012
Report 1718 Figure 6.6


© Crown copyright and database rights 2012 Ordnance Survey 100022610
Use of this data is subject to terms and conditions. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial
Transport for Greater Manchester
2 Piccadilly Place, Manchester, M1 3BG
2032 Core Do-Something Minus Do Minimum Actual Flows (PCU's) - PM Peak
Drawn By : reesem
Scale : NTS
Date : 18/10/2012
Report 1718 Figure 6.7

Journey Time Impacts

6.21 **Table 6.9** lists the journey time routes in the area of influence of the A6 to Manchester Airport Relief Road scheme and illustrated in **Figure 6.8.** The journey time data from the AM, IP and PM peak-hour 2017 and 2032 Core Do-Minimum and Do-Something for fifteen routes in each direction are summarised in **Table 6.10** and **Table 6.11** for 2017 and 2032 respectively. Differences in travel time (Do-Minimum to Do-Something) greater than plus 30 seconds are highlighted in red and greater than minus 30 seconds in green

6.22 The tables indicate that with the A6 to Manchester Airport Relief Road scheme in place journey times are forecast to increase in both directions on the A6 Buxton Road (High Lane to Heaton Moor) up to approximately 5-6 minutes in 2032.

6.23 Journey times on the A523 Macclesfield Road (Prestbury to Hazel Grove) are forecast to increase in the Northbound direction in the morning and interpeak by approximately two minutes and one to minute in the interpeak and evening peak in the Southbound direction.

6.24 The journey times on the rest of the routes are forecast to remain broadly neutral or decrease. The maximum forecast decreases in journey times occur on:

- B5166 Northenden to Wilmslow -2 minutes 30 seconds (2032 AM Peak)
- A5102 Bramhall to Wilmslow -3 minutes 20 seconds (2032 AM Peak)
- A34 East Didsbury to Alderley Edge – 2 minutes 48 seconds (2032 PM Peak)
- A555 MAELR Manchester Airport to Poynton – 9 minutes 42 seconds (2032 PM Peak)
- A5143/9 Hazel Grove to Cheadle Hulme – 6 minutes 36 seconds (2032 AM Peak)
- A523 Hazel Grove to Prestbury – 3 minutes 30 seconds (2032 AM Peak)
- Cheadle Heath to Heald Green – 3 minutes 30 seconds(2032 AM Peak)
- A5143 Cheadle Hulme to Hazel Grove – 3 minutes 24 seconds (2032 PM Peak).

Table 6.9 Journey Time Route Descriptions			
Route No.	**Description**	**Direction**	**Route Length (Modelled km)**
1	A6 High Lane to Heaton Moor	NW	8.7
	A6 Heaton Moor to High Lane	SE	8.7
2	A537 Knutsford to Macclesfield	E	16.4
	A537 Macclesfield to Knutsford	W	16.4
3	B5085 Knutsford to Alderley Edge	E	10.2
	B5085 Alderley Edge to Knutsford	W	10.2
4	B5087 Macclesfield to Alderley Edge	NW	6.6
	B5087 Alderley Edge to Macclesfield	SE	6.6
5	M56 Manchester Airport to West Didsbury	N	7.3
	M56 West Didsbury to Manchester Airport	S	6.8
6	B5166 Wilmslow to Northenden	N	10
	B5166 Northenden to Wilmslow	S	10
7	M56 J8 to J5	E	8.3
	M56 J5 to J8	W	8.3
8	A5102 Wilmslow to Bramhall	NE	7.6
	A5102 Bramhall to Wilmslow	SW	7.6
9	A34 Alderley Edge to East Didsbury	N	14.5
	A34 East Didsbury to Alderley Edge	S	14.4
10	A523 Prestbury to Hazel Grove	N	10
	A523 Hazel Grove to Prestbury	S	10
11	A555 MAELR Poynton to Manchester Airport	W	13.9
	A555 MAELR Manchester Airport to Poynton	E	13.7
12	A538 Prestbury to Hale	NW	22
	A538 Hale to Prestbury	SE	22.2
13	M60 J6 to J24	AC	17
	M60 J24 to J6	CW	17
14	Heald Green to Cheadle Heath	NE	5.2
	Cheadle Heath to Heald Green	SW	5.2
15	A5149/3 Cheadle Hulme to Hazel Grove	E	5.8
	A5143/9 Hazel Grove to Cheadle Hulme	W	5.8

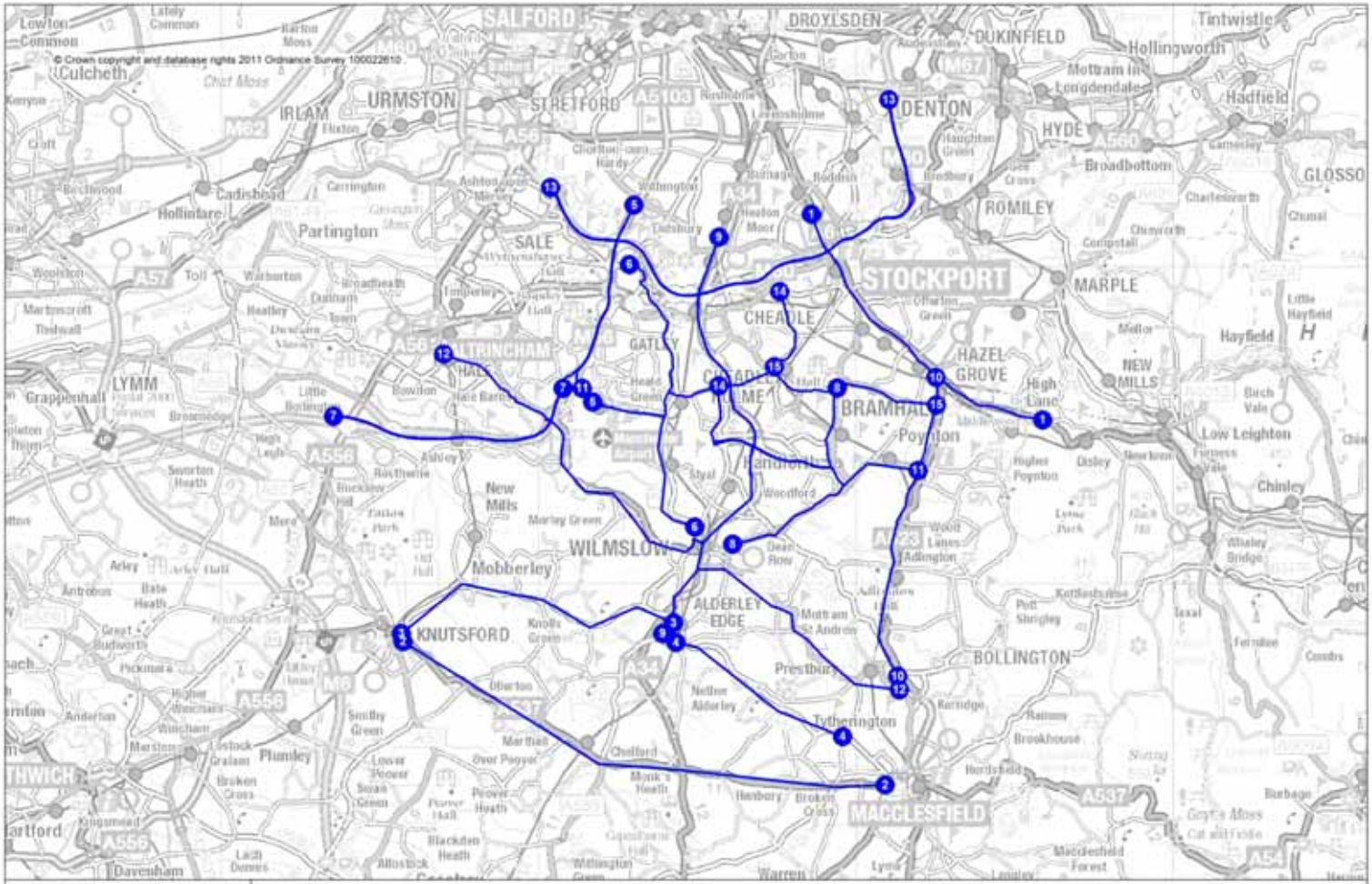

© Crown copyright and database rights 2011 Ordnance Survey 100022610
SALFORD
DROYLSDEN
DUKINFIELD
Tintwistle
Hollingworth
Hadfield
Glossop
URMSTON
STRETFORD
DENTON
HYDE
Broadbottom
Cadishead
Partington
SALE
ROMILEY
STOCKPORT
MARPLE
Hayfield
CHEADLE
GATLEY
HALE
ALTRINCHAM
HAZEL GROVE
NEW MILLS
LYMM
BRAMHALL
Poynton
Low Leighton
Chinley
New Mills
WILMSLOW
Mobberley
ALDERLEY EDGE
KNUTSFORD
BOLLINGTON
Prestbury
Tytherington
MACCLESFIELD
Plumley
Davenham
SEMMMS7C Journey Time Routes
2 Piccadilly Place, Manchester, M1 3BG
Drawn By : Michael A
Scale : NTS
Date : September 2011
Report 1718 Figure : 6.8

Table 6.10: 2017 Forecast Journey Times

Route	Distance	AM Peak			Inter Peak			PM Peak		
		Do-Minimum Time (minutes)	Do-Something Time (minutes)	Difference (minutes)	Do-Minimum Time (minutes)	Do-Something Time (minutes)	Difference (minutes)	Do-Minimum Time (minutes)	Do-Something Time (minutes)	Difference (minutes)
1	8.7	26.9	30.1	3.2	21.8	23.1	1.3	25.0	28.1	3.1
	8.7	24.2	25.8	1.6	21.1	22.1	1.1	26.5	27.5	1.0
2	16.4	21.1	20.8	-0.3	19.9	19.9	0.0	20.4	20.3	-0.1
	16.4	20.5	20.3	-0.2	19.9	19.9	0.0	20.7	20.6	-0.1
3	10.2	14.7	14.5	-0.2	12.7	12.6	-0.1	13.8	13.6	-0.2
	10.2	13.9	13.8	-0.1	12.7	12.7	0.0	14.1	13.9	-0.2
4	6.6	6.9	6.9	0.0	6.5	6.5	0.0	6.8	6.8	0.0
	6.6	6.8	6.8	0.0	6.4	6.4	0.0	6.8	6.8	0.0
5	7.3	7.3	7.3	0.0	6.2	6.2	0.0	7.7	7.7	0.0
	6.8	7.3	7.4	0.0	6.0	6.1	0.0	7.4	7.3	0.0
6	10	16.2	17.2	0.9	14.3	15.1	0.8	16.3	17.5	1.2
	10	18.2	18.2	0.0	13.4	14.2	0.8	15.4	16.4	1.0
7	8.3	7.4	7.7	0.3	4.7	4.8	0.1	5.9	6.1	0.2
	8.3	7.0	7.3	0.3	5.4	5.5	0.1	9.4	9.8	0.4
8	7.6	11.3	11.3	0.0	9.4	9.9	0.5	11.4	11.6	0.2
	7.6	11.3	10.9	-0.4	9.4	9.5	0.1	11.1	11.0	0.0
9	14.5	24.6	23.2	-1.4	16.0	15.8	-0.2	22.8	22.4	-0.4
	14.4	25.2	23.9	-1.4	15.3	15.4	0.2	21.7	20.6	-1.1
10	10	16.9	18.9	2.1	15.3	17.0	1.7	19.8	21.2	1.4
	10	18.9	17.7	-1.1	14.8	15.6	0.8	15.5	16.3	0.8
11	13.9	23.7	21.9	-1.8	17.6	18.3	0.7	20.2	20.9	0.7
	13.7	22.2	21.1	-1.1	17.4	18.7	1.3	23.4	20.4	-3.0
12	22	36.4	35.3	-1.1	29.6	29.0	-0.7	32.8	31.9	-0.9
	22.2	37.2	34.9	-2.2	30.3	29.9	-0.3	35.5	34.2	-1.3
13	17	17.6	17.0	-0.6	13.6	13.4	-0.2	19.8	19.8	-0.1
	17	17.2	16.9	-0.3	12.9	12.8	-0.1	15.7	15.6	-0.1
14	5.2	15.2	14.3	-0.9	10.0	10.0	0.0	12.4	12.4	0.0
	5.2	14.0	12.7	-1.3	11.2	10.8	-0.4	13.7	13.1	-0.6
15	5.8	13.3	12.3	-1.1	10.1	10.0	-0.2	12.9	11.6	-1.3
	5.8	17.7	13.5	-4.3	10.2	10.0	-0.2	13.3	12.1	-1.2

Table 6.11: 2032 Forecast Journey Times

Route	Distance	AM Peak			Inter Peak			PM Peak		
		Do-Minimum Time (minutes)	Do-Something Time (minutes)	Difference (minutes)	Do-Minimum Time (minutes)	Do-Something Time (minutes)	Difference (minutes)	Do-Minimum Time (minutes)	Do-Something Time (minutes)	Difference (minutes)
1	8.7	30.1	33.5	3.3	22.8	25.1	2.4	27.0	30.5	3.6
	8.7	26.2	28.3	2.1	22.7	22.9	0.2	30.5	30.3	-0.2
2	16.4	23.5	23.0	-0.5	20.7	20.5	-0.1	22.3	22.0	-0.3
	16.4	22.9	22.5	-0.4	20.5	20.5	-0.1	22.4	22.3	-0.1
3	10.2	16.1	15.8	-0.3	13.0	13.1	0.1	14.6	14.6	0.1
	10.2	14.8	14.7	-0.1	12.8	12.8	0.0	14.6	14.5	-0.1
4	6.6	6.9	6.9	0.0	6.5	6.5	0.0	6.9	6.9	0.0
	6.6	6.8	6.8	0.0	6.4	6.4	0.0	6.8	6.8	0.0
5	7.3	8.0	7.9	-0.1	7.0	6.8	-0.1	9.6	9.4	-0.2
	6.8	8.4	8.4	0.0	6.7	6.7	0.0	7.9	7.9	0.0
6	10	17.3	17.5	0.2	14.9	15.7	0.7	20.1	18.2	-1.9
	10	22.8	20.4	-2.5	13.6	14.4	0.8	17.2	17.4	0.2
7	8.3	9.4	10.0	0.6	5.4	5.6	0.2	6.9	7.4	0.5
	8.3	8.2	9.3	1.2	6.3	6.4	0.2	12.5	13.1	0.6
8	7.6	13.4	11.6	-1.9	9.7	10.0	0.3	13.9	12.2	-1.8
	7.6	14.6	11.3	-3.3	10.1	9.5	-0.5	13.8	11.5	-2.3
9	14.5	28.5	25.6	-3.0	19.0	17.8	-1.2	28.4	26.3	-2.1
	14.4	31.7	29.2	-2.5	17.9	16.8	-1.1	27.5	24.7	-2.8
10	10	19.5	20.6	1.1	15.9	17.7	1.8	22.2	22.2	0.0
	10	23.3	19.8	-3.5	15.1	15.8	0.7	17.0	17.3	0.3
11	13.9	25.6	22.9	-2.8	18.4	18.8	0.4	21.6	21.7	0.1
	13.7	27.6	22.2	-5.4	19.0	18.8	-0.2	31.5	21.9	-9.7
12	22	38.7	38.1	-0.5	31.0	30.3	-0.6	35.6	33.3	-2.3
	22.2	41.5	38.6	-2.9	31.5	30.9	-0.6	40.9	38.0	-2.9
13	17	22.1	21.2	-0.9	16.7	16.4	-0.2	24.6	24.6	0.1
	17	20.1	19.9	-0.2	14.7	14.6	-0.1	17.8	17.8	0.0
14	5.2	16.7	15.4	-1.4	10.3	10.3	0.0	13.3	13.2	-0.1
	5.2	16.6	13.3	-3.3	11.7	11.1	-0.6	15.0	13.5	-1.5
15	5.8	16.0	13.1	-2.9	11.6	10.2	-1.4	15.8	12.4	-3.4
	5.8	21.3	14.7	-6.6	11.0	10.3	-0.7	14.6	12.5	-2.1

Pessimistic Scenario

6.25 The Pessimistic scenario only includes transport schemes and developments with a high level of certainty. In terms of schemes, these were deemed to be identical to those assumed in the Core scenario and for public transport schemes Altrincham Interchange was excluded.

6.26 **Appendix 4** contains the crossing flows for the five screenlines as detailed earlier in the report. Overall, the levels of traffic crossing each of the screenlines decreases which is attributable to the lower levels of developments assumed in the Pessimistic scenario.

6.27 In comparison to the Core scenario, the screenlines with the greatest difference in crossing flows is screenline 1 (North of SEMMMS) and screenline 3 (East of the M56) where there are up to 500(pcus) fewer trips crossing a screenline than forecast in the Core scenario. This is mainly attributable to the proximity of the screenlines to the airport area and the assumptions regarding lower levels of development traffic in the airport area and the origin of potential employees which would be mainly located in the more densely populated areas of Greater Manchester.

6.28 The screenline to the South of SEMMMS is forecast to have up to 200(pcus) fewer trips and screenline 5 Disley to Bredbury remains broadly neutral.

6.29 **Figures 6.9 to 6.11** show the difference in flow for the Pessimistic compared to the Core scenario for the 2032 Do-Something scenario, the corresponding plots for the 2017/2032 Do-Minimum and 2032 Do-Something are contained in **Appendix 5.** The plots show flow differences represented by variable width bands, where the width of the band is proportional to the magnitude of the change. Increases in flow in the Pessimistic scenario are shown in green and decreases in blue.

6.30 Overall, the changes in flow in comparison to the Core scenario are small with the maximum forecast differences being on the motorways and the A538 Altrincham Road/Prestbury Road and London Road. There are small increases on the minor road network in the area of influence but these are generally less than 50 pcus.

6.31 The Pessimistic scenario journey times for the fifteen routes in the area of influence are detailed in **Appendix 6**. Overall, the journey times on the majority of the routes remains broadly neutral in comparison to the Core scenario in all time periods at 2017. In 2017, there are a couple of routes where the journey time is forecast to decrease by greater than 1 minute, these include:

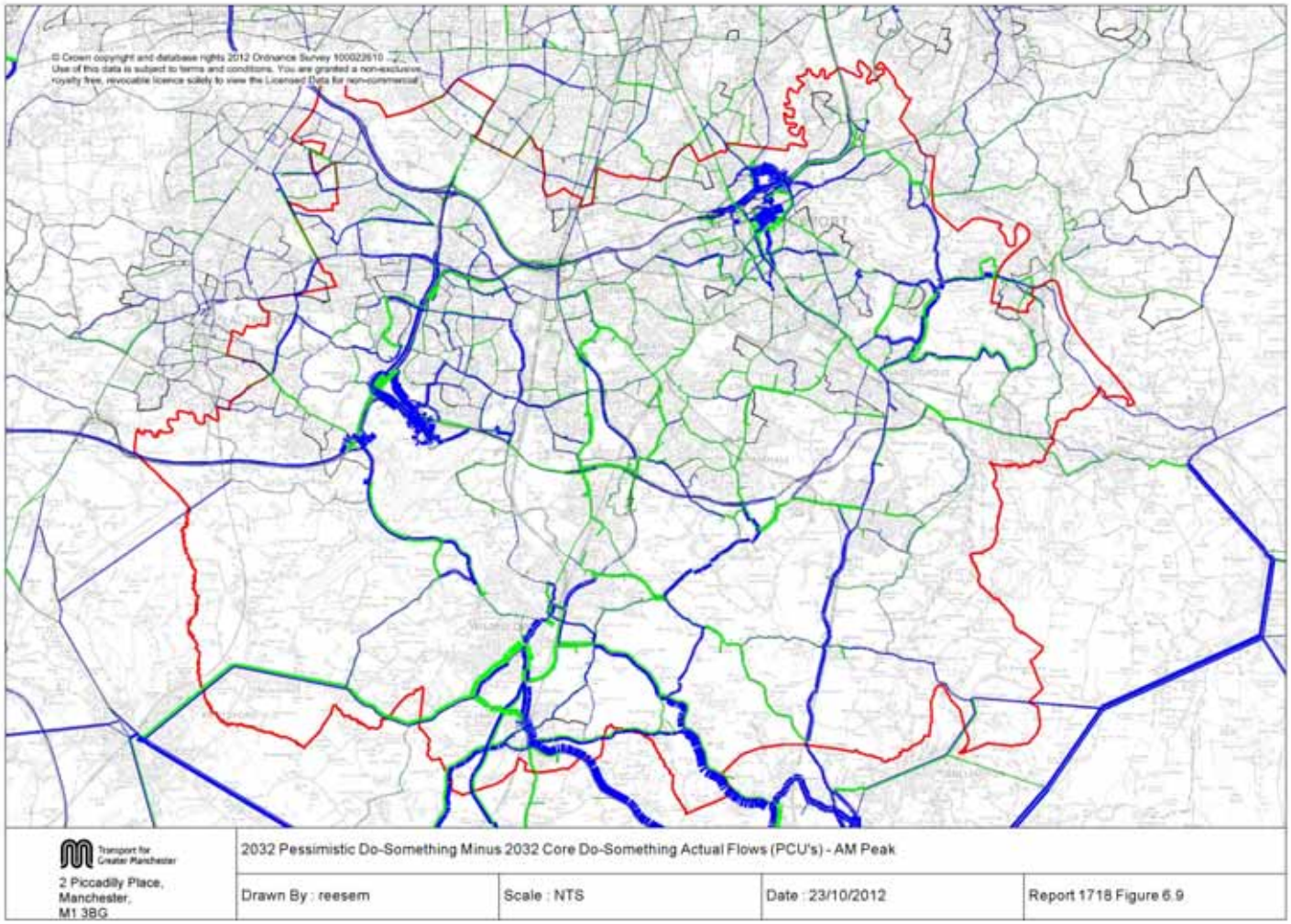
- A555 MAELR Poynton to Manchester Airport
- A555 MAELR Manchester Airport to Poynton
- Cheadle Heath to Heald Green

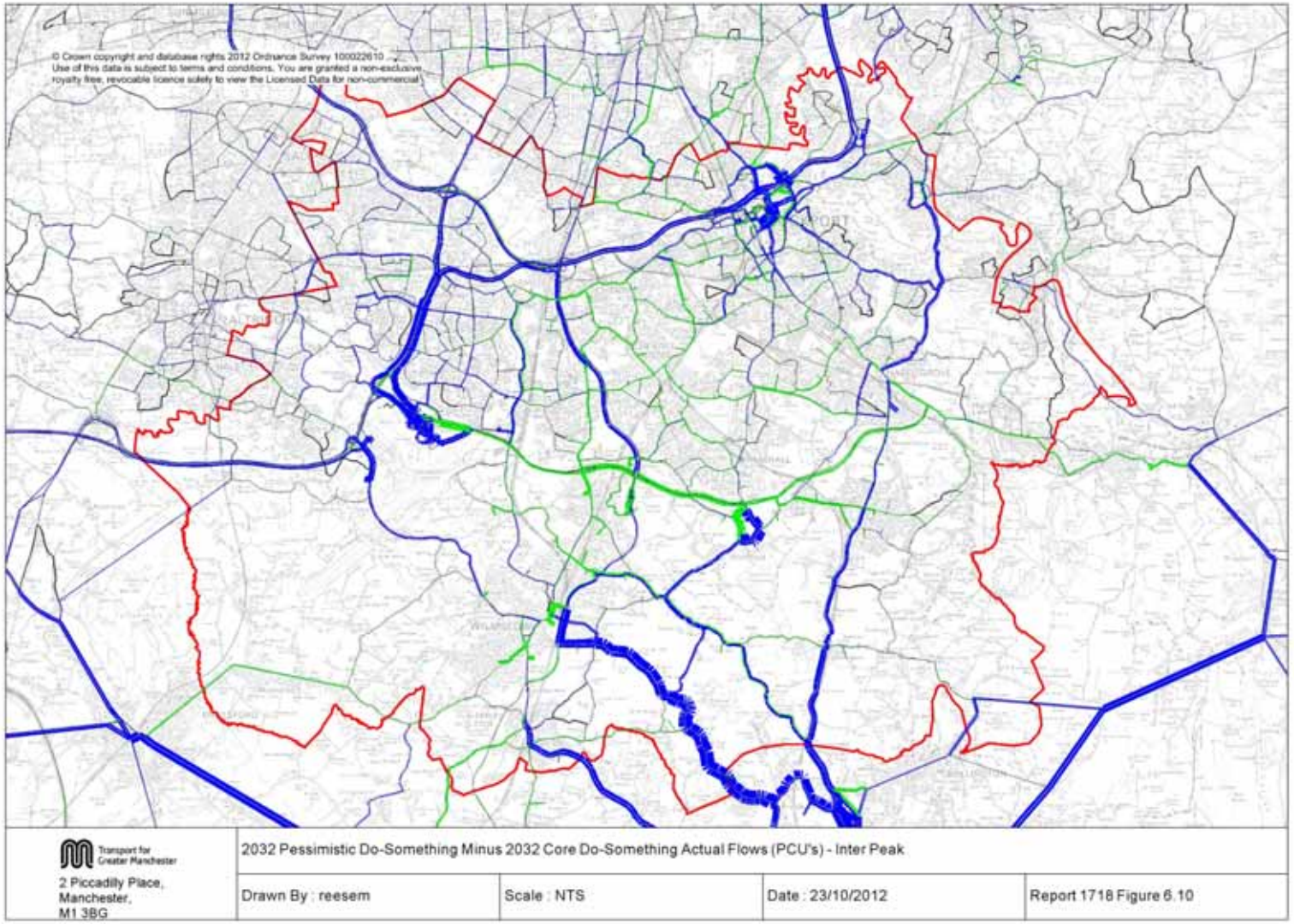
- A5143/9 Hazel Grove to Cheadle Hulme
- A538 Hale to Prestbury
- A34 East Didsbury to Alderley Edge

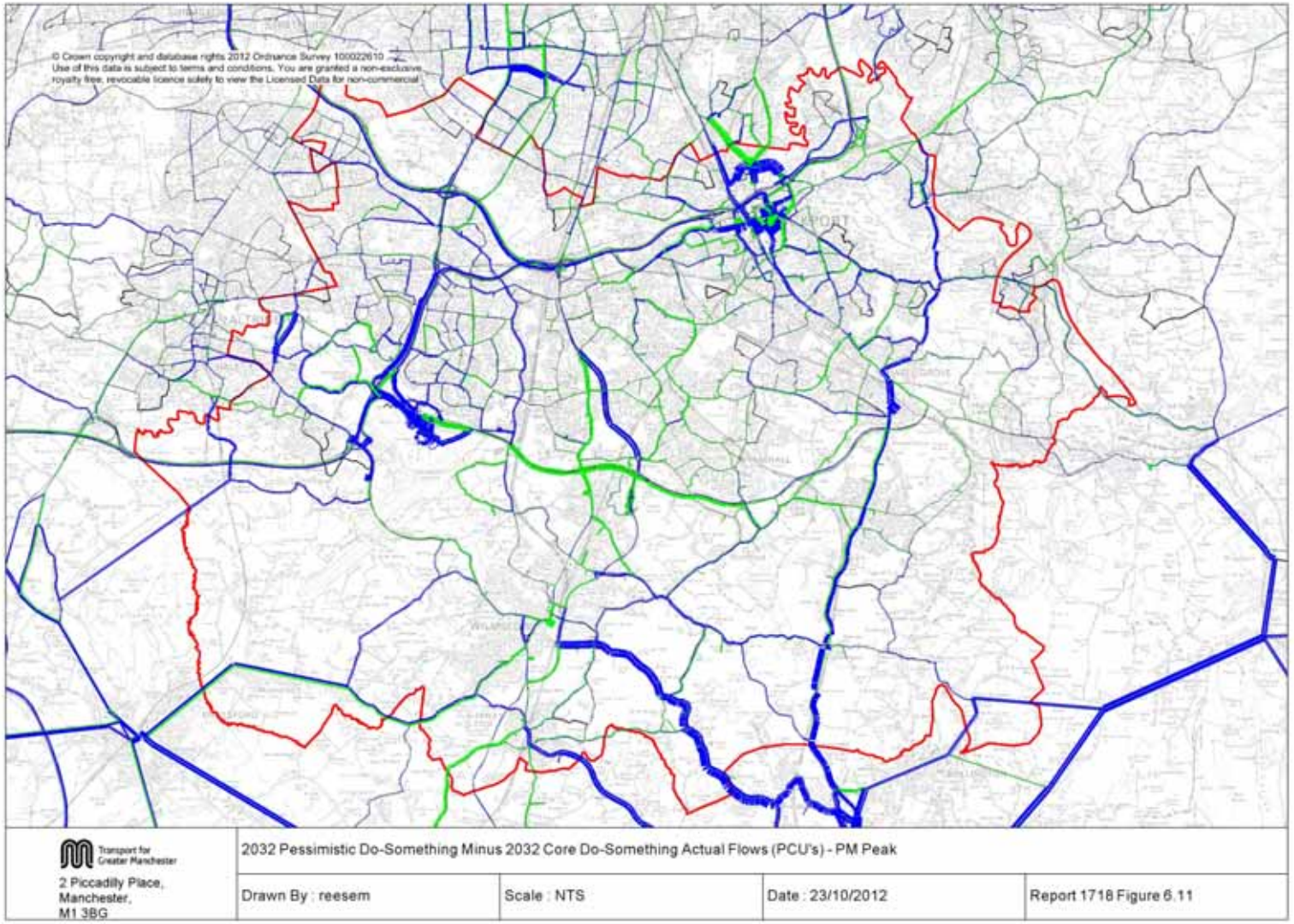
6.32 At 2032 the number of routes where journey times are forecast to decrease by greater than one minute (in comparison to the Core scenario) are more extensive. Some of the additional routes that are forecast to have faster journey times include:

- A523 Hazel Grove to Prestbury
- A34 Alderley Edge to East Didsbury
- A5102 Bramhall to Wilmslow
- B5166 Wilmslow to Northenden
- A538 Prestbury to Hale.

.


© Crown copyright and database rights 2012 Ordnance Survey 100022610
Use of this data is subject to terms and conditions. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial
Transport for Greater Manchester
2 Piccadilly Place, Manchester, M1 3BG
2032 Pessimistic Do-Something Minus 2032 Core Do-Something Actual Flows (PCU's) - AM Peak
Drawn By : reesem
Scale : NTS
Date : 23/10/2012
Report 1718 Figure 6.9


© Crown copyright and database rights 2012 Ordnance Survey 100022610
Use of this data is subject to terms and conditions. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial
Transport for Greater Manchester
2 Piccadilly Place, Manchester, M1 3BG
2032 Pessimistic Do-Something Minus 2032 Core Do-Something Actual Flows (PCU's) - Inter Peak
Drawn By : reesem
Scale : NTS
Date : 23/10/2012
Report 1718 Figure 6.10


© Crown copyright and database rights 2012 Ordnance Survey 100022610
Use of this data is subject to terms and conditions. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial
Transport for Greater Manchester
2 Piccadilly Place, Manchester, M1 3BG
2032 Pessimistic Do-Something Minus 2032 Core Do-Something Actual Flows (PCU's) - PM Peak
Drawn By : reesem
Scale : NTS
Date : 23/10/2012
Report 1718 Figure 6.11

Optimistic Scenario

6.33 The Optimistic scenario includes more uncertain transport schemes and developments, and a higher level of population and employment growth. For the Optimistic scenario the Davenport Green development and associated highway works to the West of the Airport were included.

6.34 **Appendix 7** contains the crossing flows for the five screenlines as detailed earlier in the report. Overall, at 2017 the differences are quite small with the greatest changes in flow occurring in the vicinity of the Airport and Woodford which are with major development sites. In 2032, the levels of traffic crossing each of the screenlines increases on nearly all screenlines in all scenarios. This is mainly attributable to significantly higher levels of forecast development traffic for the Optimistic scenario in the Manchester Airport area, parts of Cheshire (in particular Macclesfield) and High Peak.

6.35 In comparison to the Core scenario, the screenlines with the greatest difference in crossing flows are screenline 1 (North of SEMMMS), screenline 3 (East of the M56) where there are up to 1200(pcu's) additional trips crossing a screenline than forecast in the Core scenario.

6.36 Screenline 5 (High Peak to Bredbury) is forecast to have lower increases in comparison to the Core scenario of up to approximately 100 to 250 pcu's.

6.37 **Figures 6.12 to 6.14** show the difference in flow for the Optimistic compared to the Core scenario for the 2032 Do-Something scenario, the corresponding plots for the 2017/2032 Do-Minimum and 2032 Do-Something are contained in **Appendix 8.**

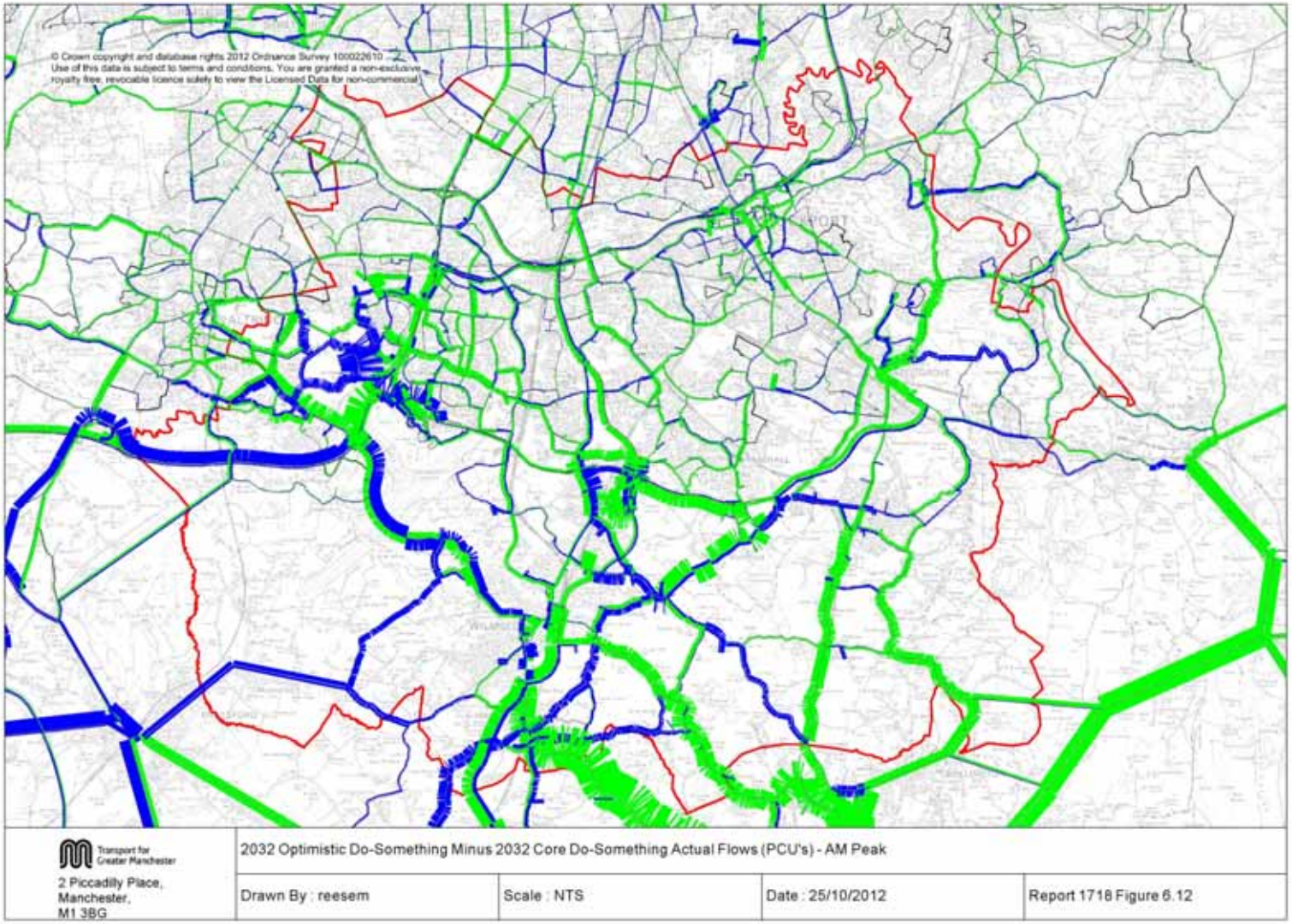
6.38 Overall, the changes in flow in comparison to the Core scenario are significant with the maximum forecast differences being on the motorways, A34 Handforth Bypass, A555 MAELR/SEMMMS, the M60 and the A538 Altrincham Road/Prestbury Road.

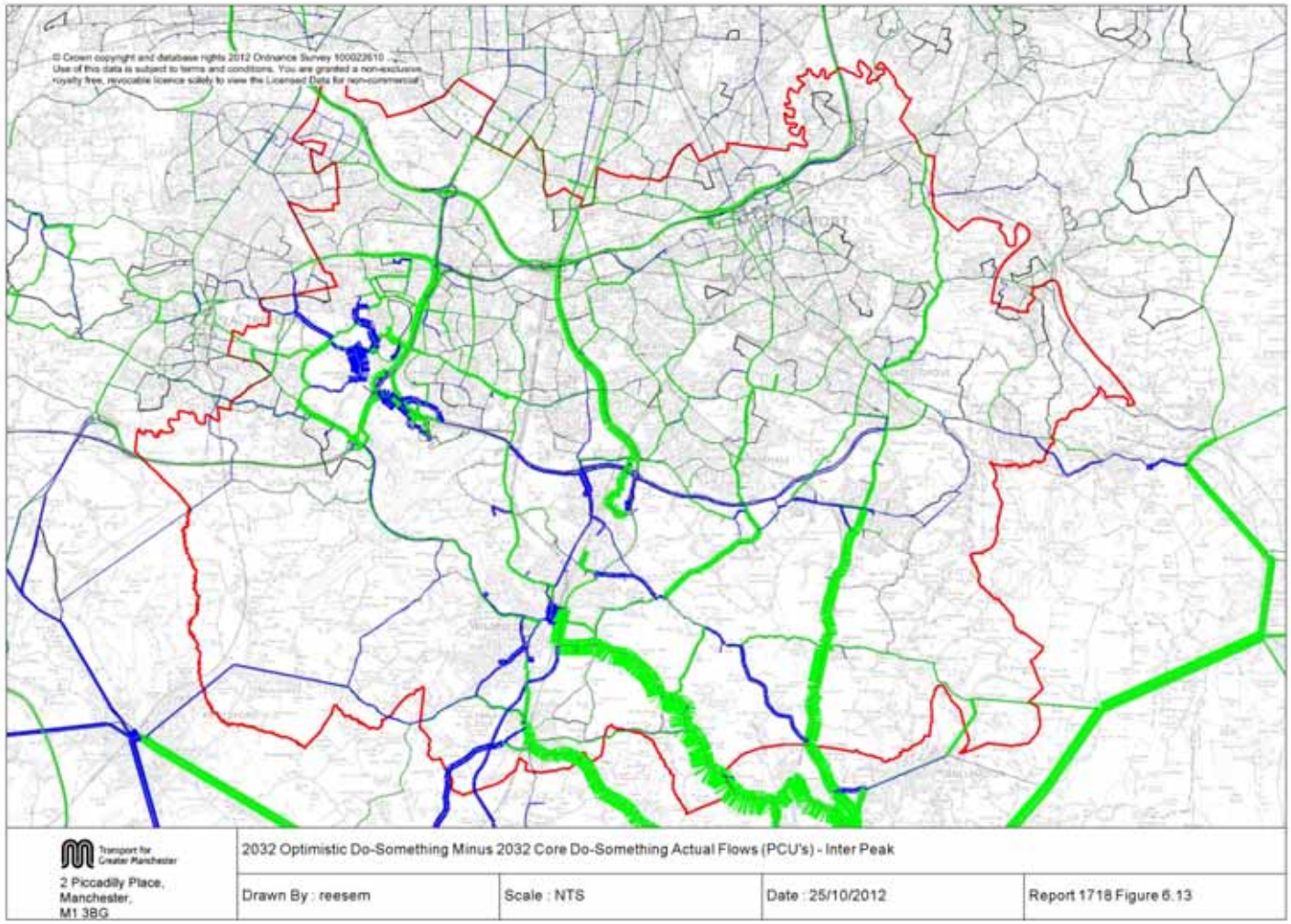
6.39 The Optimistic scenario journey times for the fifteen routes in the area of influence are detailed in **Appendix 9**. Overall, the journey times on approximately half of the routes are forecast to reduce in comparison to the Core scenario particularly in the morning and evening peak period.. In 2017, the routes where the journey time is forecast to decrease by the greatest amount include:

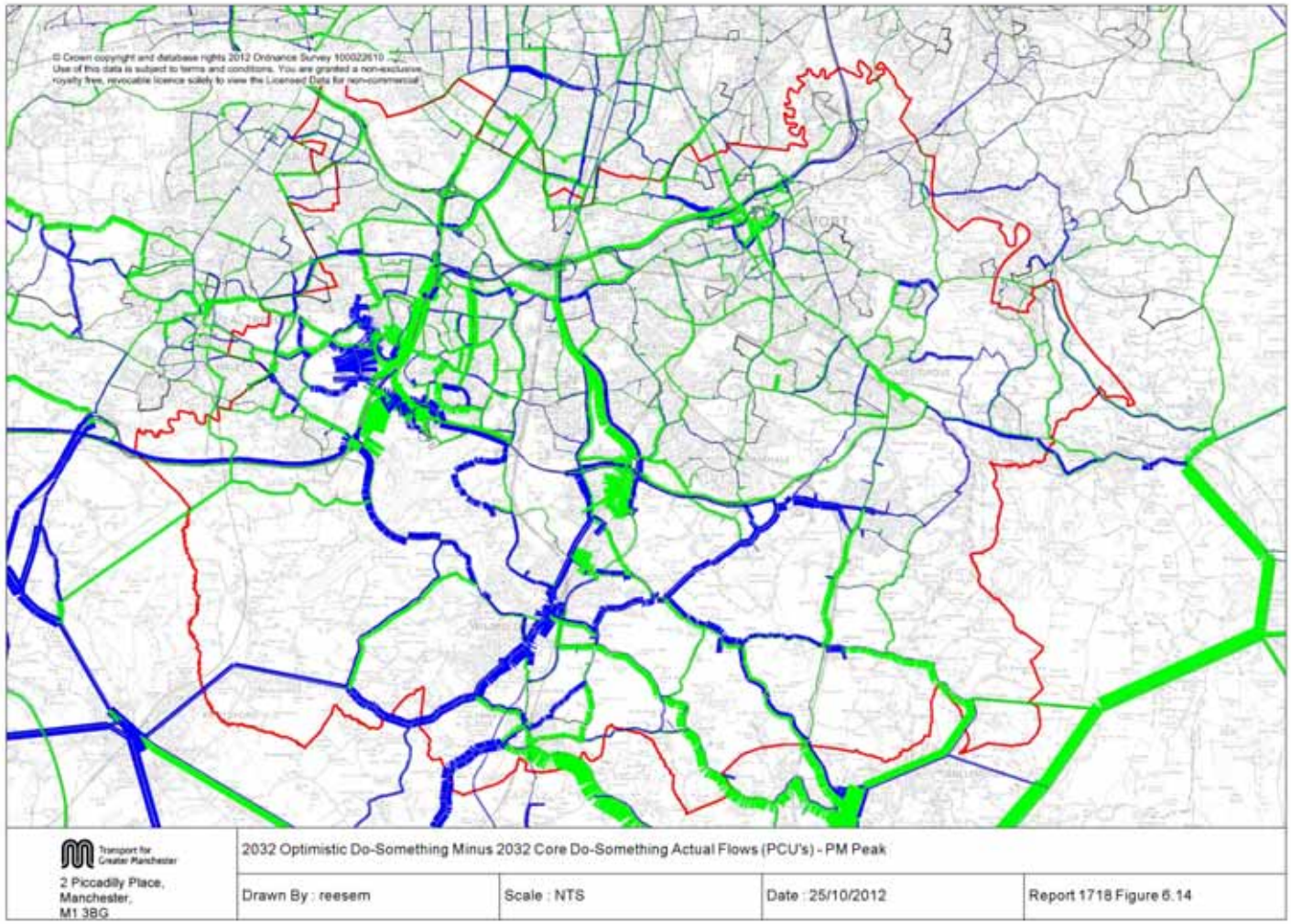
- A5143/9 Hazel Grove to Cheadle Hulme
- A55 MAELR Manchester Airport to Poynton
- Cheadle Heath to Heald Green
- A34 Alderley Edge to East Didsbury
- A538 Prestbury to Hale.

6.40 A number of routes are forecast to have higher journey times at 2017 most notably the A6 from High Lane to Heaton Moor with an increase of up to 3.5 minutes and the A523 Prestbury to Hazel Grove with an increase of up to approximately 2 minutes.

6.41 The forecast journey times at 2032 follow a similar pattern as at 2017 but in some cases such as on the A6 from High Lane to Heaton Moor with a forecast increase of approximately 5 minutes.


© Crown copyright and database rights 2012 Ordnance Survey 100022610
Use of this data is subject to terms and conditions. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial
Transport for Greater Manchester
2 Piccadilly Place, Manchester, M1 3BG
2032 Optimistic Do-Something Minus 2032 Core Do-Something Actual Flows (PCU's) - AM Peak
Drawn By : reesem
Scale : NTS
Date : 25/10/2012
Report 1718 Figure 6.12


© Crown copyright and database rights 2012 Ordnance Survey 100022610
Use of this data is subject to terms and conditions. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial
Transport for Greater Manchester
2 Piccadilly Place, Manchester, M1 3BG
2032 Optimistic Do-Something Minus 2032 Core Do-Something Actual Flows (PCU's) - Inter Peak
Drawn By : reesem
Scale : NTS
Date : 25/10/2012
Report 1718 Figure 6.13


© Crown copyright and database rights 2012 Ordnance Survey 100022610
Use of this data is subject to terms and conditions. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial
Transport for Greater Manchester
2 Piccadilly Place, Manchester, M1 3BG
2032 Optimistic Do-Something Minus 2032 Core Do-Something Actual Flows (PCU's) - PM Peak
Drawn By : reesem
Scale : NTS
Date : 25/10/2012
Report 1718 Figure 6.14