Report HFAS Report 1672

Client Wigan Borough Council

Project Wigan Local Development Framework

Subject Core Strategy Transport Study

This Report	**M:\mods\dca\Wigan\2043-2 Wigan LDF Phase 2 modelling\A Project Management\3 Documentation\Study Report\Rep1672 Wigan LDF EIP Traffic Study v2.1.doc**		
Originator	David Affleck / Ed Atkinson / A Tomkinson		Check /
Version	Comments	Date	Approve
V0.5	Results summary updated. Executive Summary completed.	07.07.11	DA
V1.0	Issued report	08.07.11	DA
V1.1	Updates / corrections to chapters 2,6 and 10	15.07.11	DA
V2.0	Incorporates Wigan BC changes / corrections / update diagrams	26.07.11	DA

Contact	GMTU:	E-mail	Tel: (70 internal)
	David Affleck	david.affleck@tfgm.com	0161-244 1698
	Ed Atkinson	edward.atkinson@tfgm.com	0161-244 1419

Issued	Organisation	FAO
26.07.11	Wigan BC	Emma Barton, Damian Garner, Nick Clarke

C O N T E N T S

Page

Executive Summary

1. In January 2011, Wigan Borough Council commissioned the Greater Manchester Transportation Unit (GMTU) and Greater Manchester Passenger Transport Executive (GMPTE)[1] to undertake transport modelling to inform development of its Local Development Framework and upcoming Core Strategy Examination in Public. This followed on from an earlier comprehensive examination into the impacts of LDF development options and potential complementary transport infrastructure proposals, carried out by Wigan Borough Council and GMTU to understand the potential impacts of various scenarios and to determine their viability.

2. The latest work reported here involved the modelling of LDF development sites across the Wigan Borough, with the anticipated development on the designated Key Strategic Site, LDF Broad Locations and adopted UDP sites (Parsonage, Northleigh, Bickershaw, Pemberton Colliery, South of Wigan and East Lancashire Road Corridor housing) explicitly represented, alongside committed transport schemes. A primary aim of the work was to identify first-order highway impacts, but also to identify locational influences on mode split. The LDF period is 2011-2026, but given prevailing economic uncertainties, Wigan Council (in agreement with the Highways Agency) specified that this work should look initially at the period up to 2016.

Core Strategy Transport Modelling

3. The 2009 validation of the Greater Manchester SATURN Model carried out as part of the scheme appraisal for the Wigan Inner Relief Route (WIRR) scheme was used as a starting point for the Wigan LDF modelling. Analysis of modelled and observed flows on local roads crossing screenlines and cordons passing through Wigan indicated that the model replicated observed flows with a good level of accuracy. On the all-purpose network, the level of flow difference was small and the number of well-validated links was acceptable. The validation of the WIRR model is reported fully in GMTU Report 1630 (August 2010).

4. Given that the Highways Agency is a key stakeholder in the development of a robust examination into the impacts of the draft LDF Core Strategy, it was considered important that the model also reflected traffic flows and journey times on the local motorways with a good degree of accuracy. The primary concern of the Highways Agency would be any potential impact that the LDF proposals could have on the motorway network, particularly the M6 as it passes through the Wigan borough.

5. To address any concerns about the ability of the model to reflect motorway flows and journey times, we updated the model demand matrices with a further round of matrix estimation, particularly concentrating on the validation of traffic flows and journey times on M6 and M61.

6. Detailed results from the updated model validation are contained in Appendix 1 of this report. However, it must be stressed that this information should be considered as a supplement to the information contained in the full model development and validation report (GMTU Report 1630).

[1] GMTU and GMPTE were amalgamated on the 1st April 2011 within the newly formed Transport for Greater Manchester. Within TfGM, GMTU is now known as Highway Forecasting and Analytical Services (HFAS).

7. Following discussions with Wigan Borough Council and the Highways Agency, all parties agreed that the updated version of the 2009 WIRR SATURN model was a robust and reliable tool for this stage of the examination into the potential impacts of the Wigan LDF Core Strategy study.

8. Traffic growth to the forecast year of 2016 was estimated using forecasts from the Greater Manchester Forecasting Model (GMFM) released in September 2010. While this is often estimated using growth derived from the National Trip End Model (NTEM) projections, NTEM was the subject of review by the Department for Transport during the forecasting stage of this work. In light of the uncertainty regarding NTEM and given that the then definitive set of forecasts (v5.4) predated the worst of the economic downturn, it was agreed that the GMFM projections should be adopted.

9. Traffic growth for trips in the Wigan district was estimated by using GMFM forecasts of housing and employment for the district as alternative planning data in Tempro. GMFM data is only available at the district level, so this was used as a control total, split between standard Tempro areas weighted by the standard Tempro housing and employment totals for each area. The resulting growth up to 2016 was averaged over origins and destinations and adjusted to reflect fuel price and income adjustments.

10. Traffic growth for trips to/from other districts within Greater Manchester was derived in the same way using GMFM estimates of housing and employment as alternative planning data within TEMPRO, but applied at a district level.

11. For goods vehicles, growth to 2016 was estimated using rates from the National Transport Model (NTM).

Development Site Public Transport and Highway Trips

12. Traffic generation for the LDF development sites was estimated using trip rates from the TRICS trip generation database. It was agreed with Wigan Borough Council and the Highways Agency that it would not be practical to tailor the selection of TRICS sites used to estimate the trip rate at this early stage in the development of the sites, so all available sites for a particular land use were selected irrespective of location. This produced a set of standard trip rates for different land-uses that were agreed with the Highways Agency and applied for the examination of LDF proposals in all Greater Manchester Authority areas, including for this study. This ensured a consistent assessment approach was applied across Greater Manchester.

13. In accordance with the methodology agreed with Wigan Borough Council and the Highways Agency, GMTU also interrogated the TRICS database to determine the modal splits for a variety of land uses and site locations. The impact of location on mode choice was explored and a recommended set of mode choice splits was determined and agreed.

14. All trip rates and mode choice splits used for this analysis were reviewed and approved by the Highways Agency and their consultant, JMP Consultants Ltd.

15. The agreed person trip generation estimates by mode of travel are shown in Table 1.

16. It is clear from this table that there is considerable variation in the proportion of public transport trips generated by each of the sites. For instance, just over 22% of the person trip generation of

the Parsonage site is expected to use public transport during the morning peak hour, whereas only 4% of trips generated by the Pemberton Colliery site would be made by public transport.

17. It is important to stress that the mode choices shown in Table 1 are based on observations (from the TRICS database) at similar sites throughout the UK. Clearly, these mode choices could be influenced and improved by Travel Plan measures designed to encourage wider use of public transport, brought forward as part of the development of the sites.

Table 1 Draft Core Strategy Site Trip Generation Summary – 2016 Two Way Person Trips

Site / Location	Total Person Trips		PT Trips		Walk / Cycle Trips		Vehicle Trips	
	AM	PM	AM	PM	AM	PM	AM	PM
Chaddock Ln/Garret Hall (EM1A 9 / SP4.3)	157	143	28	24	15	14	114	105
Northleigh (SP3)	590	527	21	13	119	79	450	435
Parsonage (EM1A 6)	493	446	112	102	90	83	291	261
Bickershaw South (EM1G)	212	189	8	5	43	28	161	156
Pemberton Colliery (EM1A 30)	306	274	11	7	62	41	233	226
Pocket Nook (E Lancs Rd Corridor) (SP4.6)	111	100	4	2	23	15	84	83
Rothwell's Farm (E Lancs Rd Corridor) (SP4.6)	67	60	2	1	14	9	51	50
Stirrup's Farm (E Lancs Rd Corridor) (SP4.6)	100	90	4	2	20	13	76	75
South Wigan M6 J25 (SP4.5)	204	201	39	35	30	24	135	142

18. The distribution of trips generated by the LDF development sites in Wigan was estimated using the GMTU DEVTRIPS programme for highway trips. Public transport trips were distributed using a new PT-DEVTRIPS programme developed by GMTU in cooperation with GMPTE.

19. Following consultation with Wigan Borough Council, the following site access arrangements were assumed for each of the LDF development sites:

- **Chaddock Lane/ Garret Hall (EM1A 9 / SP4.3)** - Access from A572 Chaddock Lane in the vicinity of Chaddock Lane farm
- **Northleigh (SP3)** - Access from A578 Leigh Road midway between junctions with B5237 Smiths Lane and A577 Atherton Road
- **Parsonage (EM1A 6)** - Access from the A579 Atherleigh – A578 Wigan Road link (i.e. Parsonage Link Road)
- **Bickershaw South (EM1G)** - Access from Plank Lane (south side) in the vicinity of Bickershaw Lane

- **Pemberton Colliery (EM1A 30)** - Access from Smithy Brook Road and Little Lane
- **Pocket Nook (SP4.6)** - Access from A572 Newton Road (south side) via Pocket Nook Lane
- **Rothwell's Farm (SP4.6)** - Access from B5207 Lowton Road (north side) to the south of its junction with A573 in the vicinity of Rothwell's Farm
- **Stirrups Farm (SP4.6)** - Access from Stone Cross Lane (east side) to the south of its junction with Stone Cross Lane North
- **South Wigan M6 Junction 25 (SP4.5)** - Access (in only) from western side of A49 Warrington Road midway between M6 Junction 25 roundabout and Worthington Way; exit only via Wheatlea Road / Forton Road / Worthington Way junction.

Transport Impacts

20. Examination of network wide summary statistics showed that the step-change in network performance is from the 2009 base to the 2016 baseline (without the LDF development sites). The anticipated growth in traffic over the five-year period is expected to increase total travel time by all vehicles on the road network by between 19 and 23%, and total travel distance by between 12 and 15%.

21. Adding the Wigan LDF development sites has a small additional impact, further increasing total travel time and total travel distance by up to 0.5%. The amount of time spent by vehicles in transient and over-capacity queues is also expected to increase, but only by a small amount.

22. The highway traffic to/from each of the sites is expected to use the highway network as follows.

23. **Northleigh**: During the morning peak hour, the majority of the development traffic uses A578 Leigh Road to the north of the site (58% outbound and 68% inbound) while 14% uses Bickershaw Lane. The remainder goes towards Leigh via A578 and Nel Pan Lane. Similarly, in the evening peak hour, the majority of the site traffic again goes to/from the north on A578 Leigh Road (58% outbound and 60% inbound). Around 10% of traffic uses Bickershaw Lane, with the remainder going to/from Leigh using A578 and Nel Pan Lane.

24. **Bickershaw South**: During the morning peak hour, the majority of traffic generated by Bickershaw South goes to/from the east on Plank Lane towards Leigh (65%) while the remaining traffic (35%) goes to the west to/from Golborne and Lowton. The distribution of evening peak hour traffic is very similar, although a higher proportion of the traffic comes from / goes to the west (about 75%).

25. **Pemberton Colliery**: During the morning peak hour about 55% of the Pemberton Colliery traffic uses A571 Billinge Road with 35% heading to/from Wigan town centre. The remaining traffic uses A49 Warrington Road mostly heading south. In the evening peak hour, the majority of traffic (77%) enters the site from Warrington Road.

26. **Pocket Nook**: During the morning peak hour, about 70% of the traffic generated by this site goes to/from the northeast on A572 Newton Road, with the remainder travelling southwest on the A580 East Lancashire Road. During the evening peak hour, the split is roughly the same with about 65% and 35% of traffic going to/from the northeast and southwest respectively.

27. **Rothwell's Farm**: During the morning peak hour, about 60% of the traffic generated by the Rothwell's Farm site goes to/from the south on B5207 Golborne Road, with 40% going to/from A580 East Lancashire Road via its junction with Stone Cross Lane. About 30% of traffic goes to/from the north using Lowton Road. During the evening peak hour, about 45% of traffic goes to/from the south, with about 30% using the A580 East Lancashire Road and the remainder using A573 Church Street, Ashton Road and Wigan Road.

28. **Stirrup's Farm**: During the morning peak hour, 56% of the traffic generated by this site uses Stone Cross Lane North and the A580 East Lancashire Road, with the remainder going west and north via Nook Lane (33%) and Cross Lane (12%). The evening peak hour distribution of Stirrup's Farm traffic is much the same as the morning peak hour distribution.

29. **South of Wigan (M6 Junction 25)**: During the morning peak hour, about 55% of the development site traffic goes to/from the south, mostly using the M6. The remaining 45% of the traffic goes to/from the north via B5238 Poolstock Lane and A49 Warrington Road. During the evening peak hour, the distribution of traffic entering/leaving this site is much the same as the morning peak hour distribution.

30. **Chaddock Lane / Garret Hall**: During the morning peak hour, about 65% of the traffic enters/departs the site using the A580 East Lancashire Road, mostly to/from the east. The remaining traffic arrives/departs from the east (about 15%) and west (about 15%) using A572 and Prince's Avenue. During the evening peak hour, about 60% of the development traffic arrives/departs from the east and west using A572, while about 40% uses the East Lancashire Road (mostly to/from the east).

31. **Parsonage**: During the morning peak hour the majority of the development traffic uses A579 Atherleigh Way, with about 10% to/from the south, and 56% (outbound) and 44% (inbound) to/from the north. About 20% of the traffic goes to/from the site from Leigh using A572 Twist Lane, while 17% is from the north, using A578 Wigan Road. The evening peak hour distribution is similar to the morning peak hour distribution.

32. A number of junctions operate over-capacity in the 2009 base year and there would be a modest increase in the number of junctions affected by increased congestion by 2016. However, comparing the distribution of the LDF development site traffic with the over-capacity junctions demonstrated that only a few of them were materially affected by development site traffic.

33. Overall, the growth in background traffic to 2016 is likely to have a greater impact on junction performance than the additional traffic generated by the LDF development sites. Nevertheless, the traffic generated by the sites is forecast to have a modest detrimental impact on a number of junctions, in particular:

    - **Northleigh and Parsonage** account for increased traffic volumes on A578 Leigh Road/Wigan Road and B5237 Bickershaw Lane resulting in a degradation in performance at the Leigh Road / Atherton Road signalised junction, Atherleigh Way / Twist Lane roundabout (evening peak hour) and A573 Warrington Road junctions with Bickershaw Lane and A58 Lily Lane.

    - **Bickershaw South** increases traffic flow on Plank Lane which impacts on the B5207 Golborne Road / Slag Lane junction (morning peak hour).

- Traffic generated by the **Chaddock Lane / Garret Hall** site is likely to have some impact on the A580 East Lancashire Road particularly at its junction with Chaddock Lane. There is also degradation in performance at the East Lancashire Road junctions with the A577 Common Road and B5258 Newearth Road, though increases in the background traffic flow are likely to have a greater impact at these junctions.

- **Pocket Nook, Stirrups Farm** and **Rothwell's Farm** housing sites are not likely to have a significant impact on the highway network given their relatively low trip generation. However, the combined traffic from these sites may have a detrimental impact on the A580 East Lancashire Road junctions with A572 Newton Road and B5207 Church Lane.

- The impact of traffic generated by the **M6 Junction 25 (South of Wigan)** site is primarily on the A49 Warrington Road / Worthington Way junction, which is forecast to experience some increase in delay in both peak hours. This traffic is also likely to have some impact on the Warrington Road / B5238 Poolstock Lane roundabout.

- The **Pemberton Colliery** site is forecast to significantly increase traffic on Little Lane and is likely to have some impact at junctions on the A49 Warrington Road.

34. There is further potential to examine the operation of particularly problematic junctions in more detail to identify the scale of improvements required to mitigate for the effects of the additional traffic. Mitigation measures could include introducing signal optimisation measures (i.e. MOVA or SCOOT control) at signalised junctions currently using fixed times. Where feasible, additional approach lanes may also be considered to improve capacity.

35. In some cases, the capacity problems may be such that only an unacceptable or unachievable junction improvement would be sufficient to resolve the capacity problems. In these cases, it would be possible to identify the particular sites generating the development traffic that is causing the problem and then determine suitable Travel Plan measures and additional PT provision to reduce the impact of vehicle trips generated by the site.

Emissions Modelling

36. Emissions were estimated using the EMIGMA Greater Manchester emissions database for the following pollutants:

- CO_2
- NO_X
- PM_{10}

37. Carbon dioxide emissions tend to rise over time as they are closely related to increases in vehicle kilometres. The 2016 carbon dioxide forecast suggested that the largest CO_2 emission increases (increases of between 15 and 20%) are forecast to be in the Abram, Wigan Central, Wigan West and Douglas wards.

38. Emissions of Nitrogen oxides (NO_x) tend to fall over time, reflecting improvements in engine efficiency. This was confirmed in the 2016 forecasts, which identified NO_X reductions of between 20 and 40% over large parts of the Wigan borough.

39. Emissions of PM_{10} particulates are affected both by increases in vehicle kilometres travelled and improvements in vehicle efficiency. PM_{10} emissions fall in the less built-up parts of the borough, but that they increase in Wigan town centre wards and along an east-west corridor running through the central part of the borough between Wigan and Leigh.

40. For the borough as a whole, carbon dioxide emissions are forecast to increase by just over 10% between 2009 and 2016, while both nitrogen oxides and PM_{10} particulates are anticipated to fall by 30% and just under 2% respectively.

Public Transport Trip Distribution

41. The public transport trips forecast to be generated by each of the LDF development sites were distributed using the newly developed PT-DEVTRIPS program. While this may provide a useful indication of what is possible in terms of PT trips, the model does not provide any indication of where people might wish to travel by public transport and therefore where there might be gaps in current/planned PT supply.

42. In order to establish a picture of what might be regarded as "suppressed" demand, the PT trips were also input to the standard highway-based DEVTRIPS program. The outputs from this can be regarded as providing an indication of where people would travel if PT services were provided.

43. The outputs from the PT and highway-DEVTRIPS runs for each of the LDF development sites are summarised below. For simplicity, we refer to areas which are groups of wards as follows:

Wigan Town Centre	Wigan Central, Wigan West and Douglas
Leigh	Leigh East, Leigh South and Leigh West
Atherton	Atherton and Atherleigh
Hindley	Hindley and Hindley Green

Site Public Transport Trip Distribution Summary

Bickershaw South (EM1G)

44. The Bickershaw South site is allocated for employment and housing uses, but it is anticipated that only some of the housing elements will be delivered by the 2016 forecast year. Based on the TRICS mode choice estimates described earlier, the Bickershaw site is expected to generate only 8 public transport trips during the morning peak hour. This is an exceptionally low figure, based as it is on the mode choice characteristics of other sites with similar land-uses and in similar locations. It suggests that very careful consideration should be given to suitable travel plan measures to encourage the use of more sustainable modes of transport as the site is brought forward.

45. Not surprisingly the majority of these trips are forecast to be to/from Leigh, which accounts for 52% and 43% of PT trips during the morning and evening peak hours respectively. Wigan Town Centre accounts for 6% and 12% of PT trips during the morning and evening peak hours respectively, which is probably indicative of poor public transport links between the site and Wigan Town Centre. Within the Wigan district the only other significant public transport origin/destination is Atherton, which accounts for 8% of trips during both the morning and evening peak hours.

Chaddock Lane / Garret Hall (EM1A 9 / SP4.3)

46. The Chaddock Lane / Garret Hall sites are proposed for housing and employment uses and are anticipated to generate 28 and 24 public transport trips during the morning and evening peak hours respectively. The site is located on the A572 with access to relatively high frequency bus services operating along this route.

47. During the morning peak hour, 51% of the public transport trips are anticipated to be to/from Wigan Town Centre, with much of the remainder (33%) accounted for by trips to/from outside the Wigan district. The site is particularly accessible from the districts of Salford and Manchester, which account for 17% and 10% respectively of the trips to/from the site during the morning peak hour. It is also interesting to note that 13% of public transport trips generated by the site would be to/from the Astley Mosley Common ward, which is the ward that the site is located in. However, given the relatively large size of this ward, this is to be expected.

48. During the evening peak hour there are far fewer public transport trips (only 2%) to/from Wigan Town Centre, suggesting that public transport linkages between the site and Wigan Town Centre may be poorer during this time period. The Manchester (33%), Salford (26%) and Bolton (8%) districts account for most of the public transport trips during the evening peak hour, which is a reflection of the site's close proximity to districts to the east of the Wigan. As was noted during the morning peak hour, 9% of public transport trips are expected to be within the Astley Mosley Common ward.

49. Although the Chaddock Lane / Garret Hall site is relatively close to Leigh, there are very few public transport trips between the site and Leigh (especially during the morning peak hour).

East Lancashire Road Corridor Housing Sites (SP4.6)

50. The location of the East Lancashire Road Corridor housing sites is as yet not fully determined, but could include development on Pocket Nook, Rothwell's Farm or Stirrup's Farm. For modelling purposes, we treated them as a single public transport origin/destination given their close proximity to each other and the uncertainty about which site would be brought forward.

51. The combined public transport trip generation from the three sites is low, with just 11 and 6 trips during the morning and evening peak hours respectively. The public transport provision along the East Lancashire Road corridor is currently relatively poor with no local bus services operating on the section of A580 through the Wigan borough. Even with a higher public transport demand at the sites, there would be very few public transport trips to/from districts outside Wigan. It suggests that very careful consideration should be given to suitable travel plan

measures to encourage the use of more sustainable modes of transport as the site is brought forward.

52. Wigan and Leigh account for the majority of the public transport demand generated by the site during both peak hours suggesting that current service provision is adequate between the sites and Wigan and Leigh Town Centres.

Northleigh (SP3)

53. The Northleigh site is proposed for a mixture of housing and employment uses, but it is anticipated that only a portion of the housing allocation will be brought forward by 2016. Based on this land use and the site location, the site is only forecast to generate between 13 and 22 two-way peak hour public transport trips. This is a very low figure, given the scale of the development. It suggests that very careful consideration should be given to suitable travel plan measures to encourage the use of more sustainable modes of transport as the site is brought forward.

54. As would be expected, the majority of the public transport trips generated by the site would be to/from Leigh and Wigan Town Centre, which would account for between 56 and 60% of the site public transport trips.

Parsonage (EM1A 6)

55. The Parsonage site is proposed for a mixture of uses, but with an emphasis on employment uses. From the trip generation work described earlier in this report, it is anticipated that the site would generate more significant volumes of public transport trips.

56. The site is located relatively close to the centre of Leigh town centre and benefits from the regular bus services that radiate from town centre. As would be expected, the most important origin / destination for the site's public transport trips is to/from the Leigh wards, which account for approximately 45% of the peak hour public transport trips. Approximately 18% of the site's public transport trips are expected to go to/from Wigan town centre, while a further 8% are expected to go to/from Atherton. As many as 10-12% of the site's public transport trips are expected to go to/from areas outside the Wigan borough.

57. The higher volumes of public transport trips generated by the Parsonage development could put some stress on the local public transport network, particularly on services within the Leigh wards, but also between the site and Wigan town centre. These impacts would have to be examined in more detail as the development of the site is progressed.

Pemberton Colliery (EM1A 30)

58. The Pemberton Colliery site is proposed for employment and housing uses, but it is anticipated that only some of the housing elements will be delivered by the 2016 forecast year. Based on the public transport trip generation estimates detailed earlier in this report, the site will only generate a very small number of public transport trips by 2016. However, given that the site is adjacent to A49 Warrington Road, which has high frequency bus services serving a variety of

destinations and it is also close to Pemberton rail station, the site has the potential for public transport to take a higher share of the total trips generated by the site.

59. Unsurprisingly, the majority of the public transport trips generated by the site would be to/from Wigan town centre wards (53 to 62%). Approximately 9% would go to/from the Pemberton ward and a further 9 to 12% to/from the Worsley Mesnes ward.

South of Wigan, M6 Junction 25 (SP4.5)

60. This site is proposed for employment uses, particularly warehousing and distribution. It is expected to generate between 35 and 39 peak hour two-way public transport trips in 2016. Approximately 30% of these trips would be to/from Wigan town centre, while a further 11-20% would be to/from the Winstanley and Worsley Mesnes wards. Perhaps surprisingly, only between 5 and 12 % of the public transport trips would be to/from the Ashton and Bryn wards.

Summary

61. This study examined the potential transport impacts of development on LDF sites up to 2016. Given that this is only a forecast for the next five years, the amount of development anticipated on the sites is relatively restricted. The analysis demonstrated that the traffic generated by these sites would cause some deterioration in the operation of a number of junctions in the vicinity of the sites, but that the volumes of traffic generated were not sufficient to cause wider congestion and capacity problems.

62. The majority of the sites identified in the draft Core Strategy are reliant on the bus services that radiate on routes out of Wigan and Leigh town centres. The only exception to this is the Pemberton Colliery site, which is also served by Pemberton rail station, giving access to rail services between Wigan and Kirby (plus connections to Liverpool). Although there is a relatively good network of bus services operating on the main routes across the Wigan borough, some of the sites have poor public transport linkages to the borough's town centres.

63. With the exception of the Parsonage site, the remaining sites are expected to generate low numbers of public transport trips. The Parsonage site is expected to generate approximately 100 peak hour two-way public transport trips, which may require some limited improvements to capacity on nearby public transport routes.

64. The public transport catchment areas for the sites are largely restricted to the Wigan borough and the analysis demonstrates that there would be few new public transport trips to/from areas outside the district. The only real exception to this is the Chaddock Lane / Garret Hall site, which due to its location close to the borough boundary would generate some new public transport trips to/from surrounding districts.

65. Measures to encourage greater public transport usage at these sites and a detailed examination of any potential capacity issues related to increased passenger numbers should be addressed as part of the site specific travel plans developed as the sites are brought forward.

1. Introduction

1.1 In January 2011, Wigan Council commissioned Greater Manchester Transportation Unit (GMTU) and Greater Manchester Passenger Transport Executive (GMPTE) to undertake transport modelling to inform development of its Local Development Framework and upcoming Core Strategy Examination in Public.

1.2 This report describes the assumptions made in the modelling process and its outcomes. This work is the result of collaboration between Wigan Borough Council and the Highways Agency. Key assumptions and inputs were discussed and agreed by all parties as the study progressed.

1.3 The report is divided into eight sections, as follows:

- Chapter 1 introduces the report
- Chapter 2 describes the background to the study
- Chapter 3 describes the development assumptions
- Chapter 4 describes the 2009 base model and its validation
- Chapter 5 describes how traffic growth to the forecast year was estimated
- Chapter 6 summarises the trip generation and mode split of the Key Strategic Sites
- Chapter 7 deals with trip distribution
- Chapter 8 describes the highway and public transport schemes added at 2016
- Chapter 9 summarises the highway modelling results
- Chapter 10 summarises the results of EMIGMA emissions modelling.
- Chapter 11 outlines the results of public transport modelling.

1.4 This report was originally drafted by GMTU, which has now become Transport for Greater Manchester (TfGM) Highways Forecasting and Analytical Services. The GMPTE, which has provided inputs on the examination of public transport impacts, is also now part of TfGM. The name of GMTU has been retained in this report as most of the study was completed under the auspices of that Unit.

2. Background

The Purpose of the Local Development Framework Core Strategy

2.1 The Wigan Local Development Framework (LDF) is made up of a number of documents that in combination deal with the spatial planning issues that will affect the Borough over the next 15 years. It will address issues such as where new houses should be built; where new businesses and jobs should be located and developed; what improvements should be made to transport and community infrastructure to service this new development; and the areas that should be safeguarded from development and improved for recreation and environmental reasons.

2.2 The core strategy provides the strategic framework against which decisions about the use of land can be planned. It does not restate national planning guidance, but instead provides the local expression of the higher-level strategies. It also sets a monitoring and implementation framework that will be kept up to date. This will measure the effectiveness of the policies in the LDF, and will signal if any changes need to be made to any of the policies to enable the vision to be delivered.

The LDF Phase 1 Transport Study

2.3 In 2009, the MVA Consultancy and GMTU were commissioned by the Greater Manchester LDF Steering Group to undertake a study to investigate the potential impacts on transport networks of the LDF core spatial strategies for each of the districts in Greater Manchester.

2.4 The approach adopted for the study involved using the land use and transport forecasting models that have been developed for the Greater Manchester area, namely:

- The Greater Manchester Strategy Planning Model (GMSPM2) and its associated Delta Land-Use Model
- The Greater Manchester Public Transport Model (GMSPM2-PT); and
- The Greater Manchester SATURN traffic model.

2.5 The models assumed levels of economic growth consistent with the Association of Greater Manchester Authorities' (AGMA) Accelerated Growth Scenario (AGS), along with development of the sites and allocations contained within the emerging Local Development Frameworks.

2.6 The outputs from this study were used to inform the further development of the LDF strategies by showing how the resulting travel demand changes imposed stresses on the transport network. The outputs considered the impacts both locally and in neighbouring areas, and highlighted where investment in the transport network would be required to achieve the core strategy or where a revision to that strategy would be required.

Wigan Transport Infrastructure Options Sifting

2.7 The LDF Phase 1 Study looked at combined impacts of proposals across Greater Manchester, individual developments being incorporated in general growth projections. In parallel with the Phase 1 work and in preparation for the Phase 2 study reported here, Wigan Council and GMTU carried out extensive detailed traffic modelling of LDF development options and complementary transport infrastructure proposals to understand the potential impacts of various scenarios and to determine their viability.

2.8 This work concentrated on an examination of new highway infrastructure schemes that could mitigate the potential detrimental effect of future development proposed within the Core Strategy, in particular on the Key Strategic Site and the Broad Locations. This included an assessment of the potential costs of the schemes and any constraints on their delivery.

2.9 Transport modelling, carried out by GMTU, highlighted the parts of the borough's transport network that would suffer from unacceptable levels of congestion by 2026 if all the development proposed in the Core Strategy and by adjacent districts were to be implemented.

2.10 Numerous combinations of new highway infrastructure packages were examined to assess what positive impact they would have on the borough's transport network. After an extensive sifting process, three packages of improvements were identified, referred to as options 3, 3A and 3B. Table 2.1 shows the schemes included in each of these scenarios, along with their estimated construction costs.

2.11 The impact of these packages was examined by comparing scenarios with and without the infrastructure packages assuming 2026 traffic levels, including traffic generated by the LDF development sites. This work demonstrated that:

- Option 3 would reduce network-wide travel time by 6.8% during the morning peak hour and by 6.2% during the evening peak hour
- Option 3A would reduce network-wide travel time by 3.8% during the morning peak hour and by 3.3% during the evening peak hour
- Option 3B would reduce network-wide travel time by 5.0% during the morning peak hour and by 3.8% during the evening peak hour.

2.12 This work concluded that while Option 3 is the most extensive and highest cost package, it would offer only marginally better benefits than either of the other two options, which themselves would only offer modest reductions in overall travel time. Additionally, none of these options would restore network performance back to 2011 levels.

2.13 Whilst the building of some new roads to deal with specific issues in certain parts of the borough may be desirable, evidence from this option sifting indicated that a major road building programme across the whole borough (akin to Option 3) would not deliver the required improvements to mitigate potential detrimental impacts of future development proposals. It was also noted that there would be little prospect of obtaining the funding to deliver such a strategy within the lifetime of the Core Strategy.

Table 2.1 Complementary Transport Infrastructure Scheme Cost Estimates and Option Combinations

Ref	Scheme Description	Estimated Cost (£m)	Option 3	Option 3A	Option 3B
1	A577 Ormskirk Road – Spring Road Link	5.692	Y	Y	Y
2	Spring Road, Walthew House Lane, Challenge Way & Stadium Way Improvement	1.724	Y	Y	Y
3	Wigan Inner Relief Route	25.661	Y	Y	Y
4	A49 Wallgate / Pottery Road Gyratory Diversion (Saddle Link Road)	10.705	Y	Y	Y
5	M6 Junction 26 – A571 Billinge Road Link (Wigan South Central Link Road)	8.445			
6	A571 Billinge Road – A49 Warrington Road Link (Pemberton Colliery Link Road)	1.385	Y	Y	Y
7	A49 Warrington Road – Chapel Lane Link (A49 Diversion, including Wigan Town Centre Link Road)	23.270	Y	Y	Y
8	Wigan Town Centre Link Road – A573 Warrington Road Link	13.333	Y		
9	A573 Warrington Road Diversion	2.065	Y		
10	A573 Warrington Road – A58 Liverpool Road Link	10.859	Y		
11	A58 Liverpool Road – A578 Leigh Road Link	8.984	Y	Y	Y
12	A578 Leigh Road – A579 Atherleigh Way	7.228	Y		Y
13	A58 Liverpool Road – Bickershaw Link	5.818			
14	Bickershaw Link – A578 Leigh Road Link	5.364			
15	A578 Leigh Road – A577 Corner Lane Link	2.905		Y	
17	A579 Atherleigh Way – A578 Twist Lane Link	5.102	Y		
18	A579 Atherleigh Way – A578 Wigan Road Link (Parsonage Link Road)	5.126	Y	Y	Y
19	A579 Bolton Road – A577 Tyldesley Road Link	5.203	Y	Y	Y
20	A572 Chaddock Lane – A577 Mosley Common Road Link	3.798	Y	Y	Y
21	A49 Wigan Road – A58 Bolton Road Link (Southern Alignment)	6.550	Y	Y	Y
22	A49 Wigan Road (M6 Jn-25) – A58 Bolton Road Link (Northern Alignment)	12.588			
	Total Cost of Option (£m)		**136.685**	**101.003**	**105.326**

Note: Some schemes shown above were considered in options 1 and 2. In a number of cases they were found to have limited benefits and excluded from Options 3, 3A and 3B.

2.14 Since this work was carried out, there have been a number of changes to the Core Strategy, including the removal of a potential development site at The Bell and its replacement with an employment site south of Wigan at M6 Junction 25. There has also been a refocusing of housing development, with a new broad location identified along the East Lancashire Road corridor.

2.15 These changes necessitated the further phase of transport modelling described in this report as the LDF Phase 2 study. This work was also to consider multi-modal impacts of the development proposals and any opportunities to reduce the impact of the sites in terms of their car traffic trip generation.

The LDF Phase 2 Transport Study

2.16 To develop the Core Strategy further and in preparation for the Examination in Public and the site allocation stage of LDF development, a more detailed transport assessment was required to identify in more detail the impacts of the draft strategy.

2.17 The Phase 2 Study (the subject of this report) involved a more detailed examination of the LDF land-use proposals with the Key Strategic Sites represented explicitly, alongside committed transport schemes. A primary aim of this phase of work was to identify locational influences on mode split and land use density and the consequent first-order highways impacts. The LDF period is 2011-2026 but given prevailing economic uncertainties, Wigan Council specified that the Phase 2 Study should look initially at the period up to 2016.

2.18 The Phase 2 Study uses the highways and public transport components from the GM models suite. Given reduced economic activity and proximity to the LDF start in FY 2011/12, available base year models provided an adequate reference case. For highways analysis for example, the recently developed 2009 Wigan version of the Greater Manchester Saturn Model as a proxy for 2011 avoided the need to identify (likely small) development changes between the model validation year and 2011. Therefore, the study concentrated on changes between 2011 and 2016 as a result of implementation of the LDF Core Strategy and supporting highway infrastructure changes.

3. Draft Core Strategy Housing and Employment Development

3.1 Wigan's LDF Core Strategy tabulates new housing and employment development proposals for 2008/9 to 2010/11 and then in five-year increments for the LDF period up to 2026. Following discussions between Wigan Borough Council and the Highways Agency, it was agreed that this work should concentrate on examination into the potential impacts of development proposals in the period up to 2016. Impacts in later years will be considered at the Land Allocations stage of the LDF development process.

3.2 Table 3.1 shows the housing and employment sites included in the analysis along with the anticipated level of development by 2016.

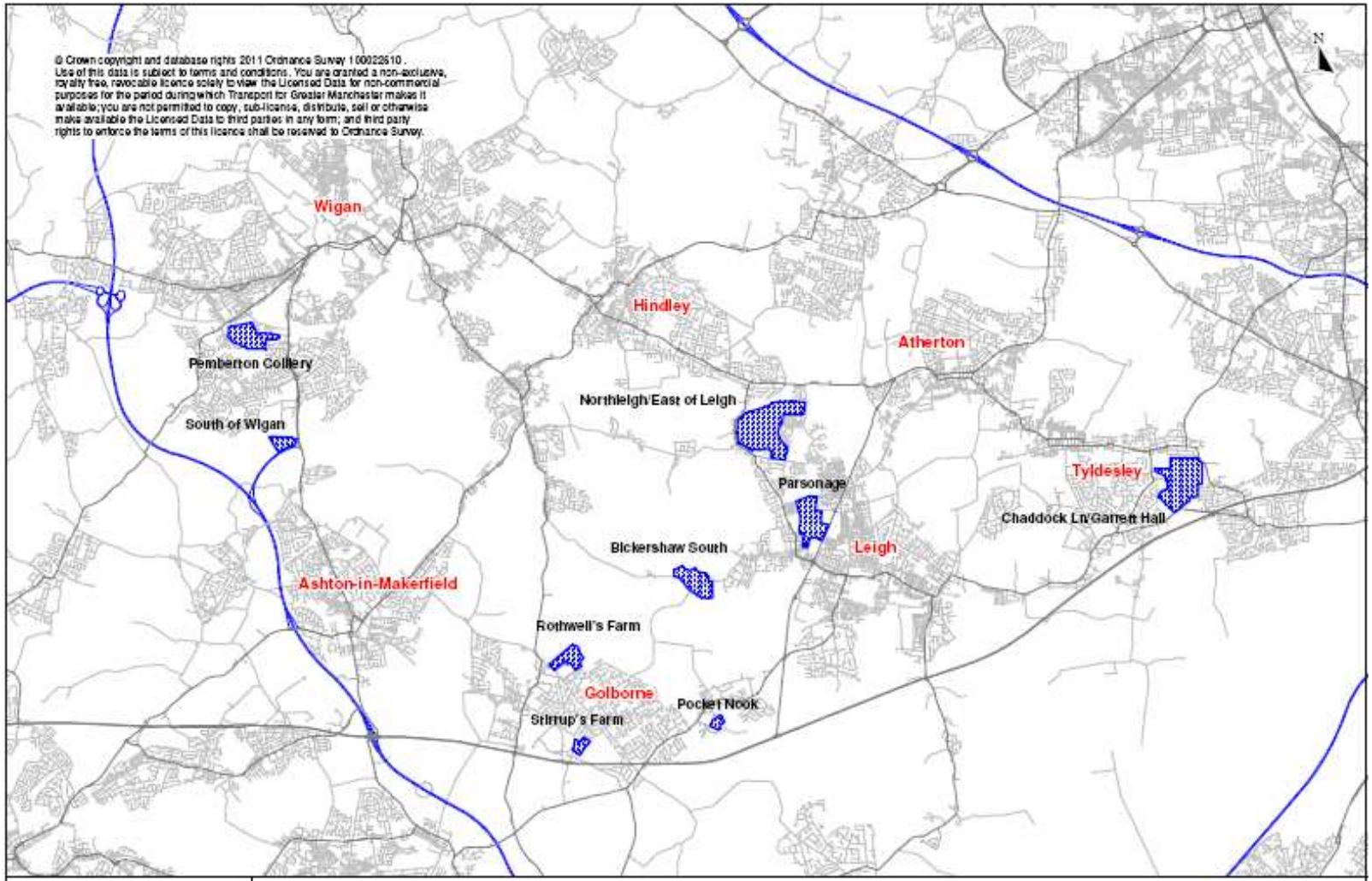
Table 3.1 Draft Core Strategy – Assumed 2016 Site Development Schedule

Site Description	Development Description	TRICS Category	GFA (m^2) / Number of Units
Chaddock Lane / Garret Hall (EM1A 9 / SP4.3)	Offices	02/A	5,550
	Industrial Units	02/C	1,720
	Warehousing (Commercial)	02/F	2,580
Northleigh (SP3)	Housing – Privately Owned	03/A	530
Parsonage (EM1A 6)	Offices	02/A	13,750
	Industrial Units	02/C	8,850
	Warehousing (Commercial)	02/F	4,200
	Housing – Privately Owned	03/A	80
Bickershaw South (EM1G)	Housing	03/A	190
Pemberton Colliery (EM1A 30)	Housing	03/A	275
Pocket Nook (SP4.6)	Housing	03/A	100
Rothwell's Farm (SP4.6)	Housing	03/A	60
Stirrup's Farm (SP4.6)	Housing	03/A	90
South of Wigan M6 J25 (SP4.5)	Offices	02/A	5,000
	Warehousing (Commercial)	02/F	25,000

3.3 A number of sites included in the analysis, at Parsonage, Bickershaw South, Chaddock Lane and Pemberton Colliery, are sites designated in the adopted UDP. The only site in the draft LDF Core Strategy is the Northleigh site. The remaining developments are all broad locations for new development. In particular, the schedule of development in Table 3.1 includes

development on three housing sites in the East Lancashire Road corridor. It is anticipated that the site(s) for housing development in this corridor will be selected from one or more of these three site options following further detailed examination into their suitability. For brevity, all are referred to as sites in the remainder of this report.

3.4 The locations of the sites are shown in Figure 3.1.


© Crown copyright and database rights 2011 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 purposes for the period during which Transport for Greater Manchester makes it available; you are not permitted to copy, sub-license, distribute, sell or otherwise make available the Licensed Data to third parties in any form; and third party rights to enforce the terms of this licence shall be reserved to Ordnance Survey.
N
Wigan
Hindley
Atherton
Pemberton Colliery
Northleigh/East of Leigh
South of Wigan
Parsonage
Tyldesley
Chaddock Ln/Garrett Hall
Leigh
Bickershaw South
Ashton-in-Makerfield
Rothwell's Farm
Golborne
Pocket Nook
Shrrup's Farm
Transport for Greater Manchester
2 Piccadilly Place, Manchester, M1 3BG
Wigan LDF Core Strategy: 2016 Development Site Locations
Drawn By : E Atkinson
Scale : NTS
Date : July 2011
Figure 3.1

4. Wigan LDF Draft Core Strategy Transport Modelling

Overview

4.1 The modelling work undertaken for the Phase 2 Study was carried out to provide robust "first order" indications of the likely transport impacts of the traffic generated by the LDF development sites in 2016.

4.2 For highways, the process consisted of:

- Reviewing and improving the validation of motorway flows and journey times of the 2009 Wigan Inner Relief Route SATURN traffic model and reporting the findings
- Applying growth to create 2016 trip matrices based primarily on GMFM projections
- Estimating the trip generation and modal split of the LDF development sites using TRICS data
- Estimating the distribution of generated vehicle trips using the GMTU DEVTRIPS programme
- Updating the highway networks to 2016 by adding committed schemes
- Converging the models and reporting the results.

4.3 For public transport the process consisted of:

- Writing a public transport version of the DEVTRIPS programme, using generalised cost and distribution information from the GMPTE's GMSPM2-PT model
- Estimating LDF development site public transport demands using TRICS data
- Distributing the forecast trips using PT-DEVTRIPS
- Examining and reporting the site related public transport desire lines.

Highway Modelling

4.4 The development and calibration of the 2009 Wigan version of the Greater Manchester SATURN Model was completed in August 2010. The Wigan SATURN model is a variant of the Greater Manchester SATURN Model (GMSM) with network and zonal alterations to improve the representation of travel patterns in the Wigan area. It includes new origin-destination data collected at roadside interview survey sites in and around Wigan town centre during March 2010.

4.5 What follows provides an overview of the model and a summary of the key elements in its development. The development of the 2009 Wigan SATURN Model is fully documented in the Data Collection and Surveys Report (GMTU Report 1635, August 2010) and the Model Development and Validation Report (GMTU Report 1630, August 2010).

Model History

4.6 The Greater Manchester SATURN Model was originally developed in Summer 2006 as part of a suite of inter-connected models to support the Greater Manchester Transport Innovation Fund (TIF) bid. These models comprised:

- The Greater Manchester Strategy Planning Model, (GMSPM), which was developed by MVA and David Symonds Consultancy, and which provides forecast year travel demand matrices for the GMPT and SATURN models
- The Greater Manchester Public Transport model, (GMPT), which was developed by MVA and GMPTE, and which provides PT travel cost data for input to the GMSPM
- The Greater Manchester SATURN Model, (GMSM), which was developed by GMTU and MVA, and which provides highway travel costs for input to the GMSPM and link speeds for input to the GMPT model.

4.7 In addition to its role as a detailed traffic assignment model for the GMSPM, the GMSM is a source of traffic speed and flow data for input to the Atmospheric Emissions Inventory for Greater Manchester (EMIGMA). The model also forms the basis of the Unit's Development Trip Distribution model DEVTRIPS and provides inputs to the Accessibility Planning Model ACCESSION.

Model Coverage

4.8 Separate versions of the model are maintained for the morning peak hour 0800-0900, the evening peak hour 1700-1800 and an average inter-peak hour for the time period 1000-1530. Geographically, the model is focussed on Greater Manchester, although it does extend to cover all of Great Britain, albeit in less detail with increasing distance from the county boundary.

4.9 The modelled area for the standard GM Saturn Model is split into 993 zones, comprising 864 zones inside Greater Manchester, 84 of which lie within Wigan, and 129 zones outside the county. The zones inside the county are the most detailed, formed by splitting local authority wards into areas with similar trip making characteristics. The zones outside the county are generally larger, becoming increasingly large with increasing distance from the county boundary.

4.10 For the WIRR version of this model, zones within the Wigan Borough were checked and existing zones were disaggregated to better represent key traffic generators, such as town centre car parks and individual large retail / employment developments.

4.11 The additional zoning within the area of interest resulted in an increase in the number of zones in the WIRR SATURN model to 1083 analysis zones.

Model Components

4.12 The model has two main components comprising:

- highway networks, which represent the roads and junctions used by traffic and bus services
- trip matrices, which represent the demand for travel and the flow of vehicles between the zones in the model.

4.13 The **highway networks** that are used with the model represent all roads of traffic significance within Greater Manchester, including all motorways, A-roads and B-roads. The networks also include all of the yellow coloured roads on the Ordnance Survey's Landranger maps of the area, and all roads carrying known bus services. The network outside the county is represented in much less detail, and becomes increasingly less dense with increasing distance from the county boundary.

4.14 The **GMSM trip matrices** contain representations of all vehicle trips with an origin or destination inside Greater Manchester, and all external-to-external trips that cross the county boundary. The matrices also include partial representations of other external-to-external trips that do not enter Greater Manchester, but which are required by the GMSPM to produce generalised cost responses in the buffer network.

4.15 Separate matrices are maintained for car, Light Goods Vehicle (LGV) and Other Goods Vehicle (OGV) trips, for the morning peak hour (0800-0900), the evening peak hour (1700-1800) and an average inter-peak hour for the period 1000-1530.

LDF Modelling Validation Update

4.16 As a result of the model development work that took place during the spring and summer of 2010, the WIRR model already validated well on the all-purpose highway network in the Wigan borough. However, given that the Highways Agency is a key stakeholder in the development of a robust examination into the impacts of the draft LDF Core Strategy, it was considered important that the model also reflected traffic flows and journey times on the local motorways with a good degree of accuracy. The primary concern of the Highways Agency would be any potential impact that the LDF proposals could have on the motorway network, particularly the M6 as it passes through the Wigan borough.

4.17 To address any concerns about the ability of the model to reflect motorway flows and journey times, we updated the model demand matrices with a further round of matrix estimation, particularly concentrating on the validation of traffic flows and journey times on:

- Sections of the M6 lying in the Wigan borough between Junctions 24 and 27

- Sections of the M61 running close to and parallel with the Wigan borough boundary between Junctions 4 and 6.

4.18 Recent (2008 and 2009) ATC count data (split into the individual vehicle classes; car, LGV, OGV) from these sections of motorway was used for the updated matrix estimation exercise. Matrix estimation was run for the inter-peak, morning and evening peak-hour modelled time periods.

4.19 Detailed results from the updated model validation are contained in Appendix 1. However, it must be stressed that this information should be considered as a supplement to the information contained in the full model development and validation report (GMTU Report 1630, August 2010).

4.20 The additional run of matrix estimation using observed flow data on both the M6 and M61 motorways considerably improved the validation of motorway flows compared to the original Wigan model, while overall validation across Wigan generally remained unaffected and in some instances, actually improved.

4.21 The resulting journey time validation on both the M6 and M61 was good, with the majority of modelled journey times closely matching observed times in each of the three modelled time periods.

4.22 Following discussions with Wigan Borough Council and the Highways Agency, all parties agreed that the updated version of the 2009 Wigan SATURN model was a robust and reliable tool for this stage of the examination into the potential impacts of the Wigan LDF Core Strategy study.

5. Forecast Traffic Growth

Overview

5.1 For highway modelling, the convention is to use growth derived from the National Trip End Model (NTEM) projections via the TEMPRO programme. However, at the time that this work started, NTEM was under review by the Department for Transport's ITEA Division. NTEM dataset version 5.4, which was released in November 2008, was expected to remain the definitive version until at least April 2011.

5.2 In light of the uncertainty regarding NTEM and given that the then definitive set of forecasts (v5.4) predated the worst of the economic downturn, it was agreed that the GMFM projections should be adopted to estimate traffic growth.

Growth in Car Trips to/from Wigan

5.3 Traffic growth for trips in the Wigan district was estimated by using GMFM forecasts of housing and employment for the district as alternative planning data in Tempro. GMFM data is only available at the district level, so this was used as a control total, split between standard Tempro areas weighted by the standard Tempro housing and employment totals for each area. The resulting growth up to 2016 was averaged over origins and destinations and adjusted to reflect fuel price and income adjustments. The resulting growth factors are shown in Table 5.1.

Table 5.1 Wigan LDF (Phase 2b): GMFM Based Percentage Growth from 2009 to 2016 Within the Wigan District (By TEMPRO Zones)

TEMPRO Area	Morning Peak	Inter Peak	Evening Peak
Rural	15.6%	17.0%	16.0%
Leigh	15.7%	17.2%	15.9%
Abram	15.7%	16.6%	15.6%
Ashton-in-Makerfield	14.1%	15.4%	14.2%
Golborne	14.0%	15.3%	14.2%
Appley Bridge	13.5%	14.3%	13.3%
Shevington	15.2%	16.2%	15.2%
Aspull	13.4%	14.5%	13.3%
Tyldesley	14.0%	15.1%	14.0%
Hindley	15.4%	16.8%	15.6%
Atherton	16.3%	17.7%	16.5%
Wigan	13.6%	15.2%	13.9%
Standish	14.1%	15.4%	14.3%
Ince-in-Makerfield	13.5%	14.7%	13.6%
Orrell	14.3%	15.8%	14.5%

Growth in Car Trips For Trips to/from Other Districts within GM

5.4 Traffic growth for trips to/from other districts within Greater Manchester was again derived using GMFM estimates of housing and employment as alternative planning data within TEMPRO, but applied at a district level (Table 5.2).

Table 5.2 GMFM Housing & Employment Forecasts (2009 to 2016) by GM District

TEMPRO Area	Housing			Employment		
	2009	2016	Increase from 2009 to 2016	2009	2016	Increase from 2009 to 2016
Bolton	112,813	118,087	5,274	119,170	121,813	2,643
Bury	77,393	81,663	4,270	72,326	74,326	2,000
Manchester	209,186	230,759	21,574	323,943	361,260	37,318
Oldham	90,448	94,393	3,945	85,825	87,143	1,318
Rochdale	86,140	90,439	4,299	82,291	84,402	2,111
Salford	99,483	105,205	5,722	126,823	134,883	8,060
Stockport	124,281	131,041	6,760	149,302	154,788	5,487
Tameside	94,452	101,021	6,569	78,163	77,897	-266
Trafford	94,627	101,045	6,418	131,178	141,105	9,926
Wigan	132,718	141,036	8,318	111,191	114,159	2,969
Total	1,121,541	1,194,689	73,148	1,280,211	1,351,776	71,565

5.5 The growth factors for origins and destinations were averaged and subsequently adjusted to reflect fuel price and income adjustments to 2016. The final growth factors applied for each district (excluding Wigan) within Greater Manchester are shown in Table 5.3.

Table 5.3 GMFM Based Percentage Traffic Growth (to 2016) in Other GM Districts			
District	**AM**	**IP**	**PM**
Bolton	13.0%	13.5%	13.0%
Bury	13.5%	14.0%	13.4%
Manchester	22.6%	20.8%	21.6%
Oldham	14.2%	14.9%	14.4%
Rochdale	15.0%	16.1%	15.3%
Salford	16.2%	16.2%	16.0%
Stockport	14.7%	15.5%	14.9%
Tameside	13.5%	14.5%	13.9%
Trafford	16.3%	15.6%	15.9%

Growth in Car Through-Trips

5.6 While the GMFM provides a good estimate of growth in trips to, from and within Greater Manchester and the wider City Region, it would not be appropriate to apply the same growth to trips (specifically road traffic) passing through Greater Manchester on, for example, the motorway network.

5.7 For trips between origins and destinations outside of Greater Manchester, NTEM-based trip rates for the Northwest region were generated using TEMPRO and were adjusted for forecast changes in fuel prices and income up to 2016. This resulted in growth rates to 2016 of 14.6% for the morning peak hour, 15.4% for the inter-peak hour and 14.7% for the evening peak hour.

Growth in Goods Vehicle Traffic

5.8 As neither GMFM nor TEMPRO produce growth rates for goods vehicles, National Transport Model (NTM) growth rates were applied to estimate growth to 2016.

5.9 The growth for rigid goods vehicles from 2009 to 2016 is approximately 4%, whilst the growth in articulated good vehicle traffic is significantly lower at 0.5%.

5.10 The NTM does not detail growth in Light Goods Vehicle traffic. The level of growth for Light Goods Vehicles was approximated from modelling work undertaken for the latest Greater Manchester Local Transport Plan (LTP3). The level of LGV growth within GM was derived using the Greater Manchester Strategy Planning Model and approximated to 15% in all time periods.

Final 2016 Matrices

5.11 The final 2016 matrices were created by adjusting the growth in general traffic downwards, such that when the traffic generated by the LDF development sites was added into the matrices, growth remained as forecast by the processes outlined above. This is a standard technique applied by GMTU and it avoids potential double-counting of the impact of traffic growth related to specific development sites. Table 5.4 shows total trips by vehicle type in the 2009 matrices, in the downward adjusted 2016 matrices (referred to as Baseline) and the final 2016 matrices including all traffic generate by the LDF development sites.

Table 5.4 Baseline and With-Strategic Locations Total Trips (3 user Classes)

Time Period	Scenario	Car	LGV	OGV	Total
AM	2009 Base	1219875	39831	31384	1291090
	2016 Baseline	1395689	45737	32201	1473627
	2016 With Strategic locations	1396835	45795	32272	1474902
PM	2009 Base	1119367	34618	15940	1169925
	2016 Baseline	1281879	39745	16331	1337955
	2016 With Strategic locations	1282998	39799	16370	1339167

6. LDF Development Site Trip Generation and Mode Choice

Person Trip Rates and Trip Generation

6.1 Following the methodology agreed with Wigan Borough Council and the Highways Agency, GMTU calculated the person trip generation of each of the LDF Development Sites using trip rates consistent with rates agreed for wider application in the examination of draft Core Strategy proposals across Greater Manchester.

6.2 These trip rates were derived from data in the TRICS Database. TRICS is the standard system of trip generation and analysis used in the UK. It is a database system that allows users to establish potential levels of trip generation for a wide range of development and location scenarios, and is widely used as part of the planning application process by both developers' consultants and local authorities.

6.3 Following the agreements reached as part of the development of LDF proposals for other Greater Manchester districts, the TRICS analysis consisted of a "blanket" assessment, selecting all available sites for a particular land use regardless of location. This approach was intended to provide a set of statistically robust trip rates and to ensure that a consistent assessment approach was applied to all developments.

6.4 For Wigan's Development Sites, trip rates were required for the following four land use categories (the number of sites used in the TRICS assessment is shown in brackets):

- Housing - Privately Owned (81 sites)
- B1 Office Development (58 sites)
- B2 Industrial Units (16 sites)
- B8 Warehousing (5 sites).

6.5 The agreed generic trip rates applied to the Wigan LDF Development Sites are summarised in Table 6.1 below.

Table 6.1 GM Agreed LDF Core Strategy Person Trip Generation Rates by Land-Use

Use Class	Land Use	TRICS Category	Morning Peak		Evening Peak	
			In	Out	In	Out
C3	Housing –Privately Owned	03/A	0.243	0.871	0.616	0.379
B1	Office	02/A	2.269	0.250	0.263	2.023
B2	Industrial Units	02/C	0.412	0.090	0.055	0.365
B8	Warehousing (commercial)	02/F	0.244	0.069	0.088	0.259

Note: Rates are person trip rates per 100 m^2 GFA for employment uses and per Unit for residential uses

Mode Choice Estimates

6.6 These trip rates were used to calculate the total number of person trips that would be generated by each of the development sites. However, a critical element in the forecasting was the determination of the modal split of trips generated by anticipated development on the sites.

6.7 Again, following a method agreed with Wigan Borough Council and the Highways Agency, GMTU used the TRICS trip generation database to determine the modal splits for a variety of land-use types. In this case, the impact of location on mode choice was explored and incorporated into the mode choice estimate.

6.8 We estimated the likely split between transport modes of new trips generated by the land-uses proposed for the LDF Development Sites to determine the proportion of the total site person trip generation arriving/departing:

- By public transport (bus, rail, Metrolink)
- As pedestrians or cyclists
- As occupants of a private vehicle.

6.9 Differentiating between modes required the use of TRICS multi-modal surveys. While the number of such surveys available on TRICS is increasing, poor sample size can be a problem, particularly when trying to subdivide land use types using locational characteristics.

6.10 Due to the small number of multi-modal sites in some land use categories and in order to minimise the number of sub divisions between categories, where possible we combined sites with different locational characteristics. However, this was only done where the modal split characteristics were found to be similar.

6.11 For each land-use, the split of all vehicles between heavy goods/ public service vehicles and cars/light goods vehicles was also estimated.

6.12 Table 6.2 shows the estimated percentage mode split of person trips for the land-uses types shown above and for a variety of site location categories (based on TRICS standard site location categories).

Table 6.2 Draft Core Strategy Development Mode Split Assumptions by Land Use / Location

Time Period	Land Use		Location	PT	Walk / Cycle	Vehicles	Total
Morning Peak	C3 Housing – Privately Owned	03/A	Town Centre	7.2	19.1	73.7	100.0
			Edge of Town Centre	7.2	19.1	73.7	100.0
			Suburban Area	3.6	20.2	76.2	100.0
			Edge of Town	3.6	20.2	76.2	100.0
	B1 Office	02/A	Town Centre	48.2	20.4	31.4	100.0
			Edge of Town Centre	30.3	19.3	50.4	100.0
			Suburban Area	20.0	9.2	70.8	100.0
			Edge of Town	7.0	7.1	85.9	100.0
	B2 Industrial Units	02/C	Town Centre	1.2	12.1	86.7	100.0
			Edge of Town Centre	1.2	12.1	86.7	100.0
			Suburban Area	1.0	12.1	86.9	100.0
			Edge of Town	0.6	5.5	93.9	100.0
	B8 Warehousing commercial	02/F	Town Centre	1.9	8.1	90.0	100.0
			Edge of Town Centre	1.9	8.1	90.0	100.0
			Suburban Area	1.9	8.1	90.0	100.0
			Edge of Town	1.9	8.1	90.0	100.0
Evening Peak	C3 Housing – Privately Owned	03/A	Town Centre	4.8	24.3	70.9	100.0
			Edge of Town Centre	4.8	24.3	70.9	100.0
			Suburban Area	2.4	14.9	82.7	100.0
			Edge of Town	2.4	14.9	82.7	100.0
	B1 Office	02/A	Town Centre	51.1	22.4	26.5	100.0
			Edge of Town Centre	30.3	18.8	50.9	100.0
			Suburban Area	18.8	9.9	71.3	100.0
			Edge of Town	7.0	8.0	85.0	100.0
	B2 Industrial Units	02/C	Town Centre	8.0	11.6	80.4	100.0
			Edge of Town Centre	8.0	11.6	80.4	100.0
			Suburban Area	0.8	10.1	89.1	100.0
			Edge of Town	1.8	7.5	90.7	100.0
	B8 Warehousing commercial	02/F	Town Centre	0.3	4.0	95.7	100.0
			Edge of Town Centre	0.3	4.0	95.7	100.0
			Suburban Area	0.3	4.0	95.7	100.0
			Edge of Town	0.3	4.0	95.7	100.0

6.13 Each site's location was classified as follows (using standard TRICS location categories, Table 6.3) to determine the mode choice split applied and the resulting site person trip generations by access mode are shown in Table 6.4.

- Chaddock Ln/Garret Hall (EM1A 9 / SP4.3) – Suburban Area
- Northleigh (SP3) – Suburban
- Parsonage (EM1A 6) – Edge of Town Centre
- Bickershaw South (EM1G) – Edge of Town
- Pemberton Colliery (EM1A 30) – Suburban Area
- Pocket Nook (SP4.6) – Edge of Town
- Rothwell's Farm (SP4.6) – Edge of Town
- Stirrup's Farm (SP4.6) – Edge of Town
- South Wigan M6 J25 (SP4.5) – Edge of Town.

Table 6.3 TRICS Location Definitions

Town Centre	Within the central core area of the heart of the town/city (e.g. the primary shopping area), as defined in the local development plan (if appropriate).
Edge of Town Centre	For retail, a location within easy walking distance (i.e. up to 300 metres) of the central primary shopping area, often providing parking facilities that serve the centre as well as the site, thus enabling one trip to serve several purposes. For other uses, the edge-of-centre radius from the town/city centre may be more extensive, based on how far people would be prepared to walk. For offices this may be outside the town centre but in the urban area within 500m of a public transport interchange. Local topography and barriers will affect pedestrians' perceptions of easy walking distance. Examples of barriers include crossing major roads and car parks. The perceived safety of the route and strength of the attraction of the town centre are also relevant.
Suburban Area	An area outside the edge of the town/city centre, but not at the town/city's physical edge. This can encompass a wide range of physical locations within a town/city. Suburban Area sites can range from busy built-up areas near the centre of town (but outside of the Edge of Town Centre radius), to leafy suburbs far from the centre. Due to their range, Suburban Area sites can also have a wide range of location sub-categories.
Edge of Town	At the physical edge of the town/city, where the town/city meets the countryside. The actual physical distance from the site to the beginning of the countryside can vary proportionately to the size of the town/city.

Table 6.4 Draft Core Strategy Site Trip Generation Summary – 2016 Two Way Person Trips

Site / Location	Total Person Trips		PT Trips		Walk / Cycle Trips		Vehicle Trips	
	AM	PM	AM	PM	AM	PM	AM	PM
Chaddock Ln/Garret Hall (EM1A 9 / SP4.3)	157	143	28	24	15	14	114	105
Northleigh (SP3)	590	527	21	13	119	79	450	435
Parsonage (EM1A 6)	493	446	112	102	90	83	291	261
Bickershaw South (EM1G)	212	189	8	5	43	28	161	156
Pemberton Colliery (EM1A 30)	306	274	11	7	62	41	233	226
Pocket Nook (SP4.6)	111	100	4	2	23	15	84	83
Rothwell's Farm (SP4.6)	67	60	2	1	14	9	51	50
Stirrup's Farm (SP4.6)	100	90	4	2	20	13	76	75
South Wigan M6 Junction 25 (SP4.5)	204	201	39	35	30	24	135	142

6.14 All trip rates and mode choice splits used for this analysis were reviewed and approved by the Highways Agency and their consultant, JMP Consultants Ltd.

6.15 It is clear from this table that there is considerable variation in the proportion of public transport trips generated by each of the sites. For instance, just over 22% of the person trip generation of the Parsonage site is expected to use public transport during the morning peak hour, whereas only 4% of trips generated by the Pemberton Colliery site would be made by public transport.

6.16 It is important to stress that the mode choices shown in Table 6.4 are based on observations (from the TRICS database) at similar sites throughout the UK. Clearly, these mode choices could be influenced and improved by Travel Plan measures designed to encourage wider use of public transport, brought forward as part of the development of the sites.

7. LDF Development Site Trip Distribution

7.1 The distribution of trips generated by the Wigan LDF Development Sites was estimated using GMTU's DEVTRIPS programme for highway trips and a new PT-DEVTRIPS program for public transport trips.

Highway Trips – DEVTRIPS

7.2 Given estimates of the numbers of vehicles entering and leaving a planned development, DEVTRIPS estimates their origins and destinations, the modelled trip lengths and modelled turning movements at selected junctions in the highway network.

7.3 The program can be used to model car and commercial vehicle trips made during the morning and evening peak hours (and an average inter-peak hour) for six development types:

- Retail
- Office/'High Tech' Business
- Industrial
- Education
- Leisure
- Residential.

7.4 DEVTRIPS uses user-supplied estimates of the numbers of trips entering and leaving the development to create synthetic matrices of generated trips. These matrices are 994 zone vehicle trip matrices, based on the zoning system developed for the Greater Manchester Saturn Model (but as the WIRR model used for this study is a derivative of that model, the results can be readily adjusted to the 1083 zoning system). Within the matrices, zones 1 to 993 correspond to zones in the GMSM, whilst zone 994 represents the development site.

7.5 The matrices are built using a catchment area technique. Briefly, this is a two- stage process that involves coding a representation of the site into the present day highway network and using the assignment model to allocate zones to a series of five-minute travel bands from the site.

7.6 Trips are split between the zones in the travel bands using zone based demographic data from two sources:

- 2001 Census of Population
- 2005 GMSM trip matrices.

7.7 The type of data that is used in this procedure depends on the type of development and the time period that is being modelled, but includes information such as the number of car owning households in each zone and the number of car driver journey to work trips beginning in each zone.

7.8 Trips are split pro-rata to the attribute value of each zone expressed as a fraction of the total attribute value of the travel band in which the zone lies.

Public Transport Trips – PT-DEVTRIPS

7.9 PT Devtrips was developed by GMTU to model the distribution of public transport trips generated by new development proposals within Greater Manchester. The application was written to assist with modelling public transport trips for the Greater Manchester Local Development Framework (LDF) core strategies, and the impacts of the newly generated trips on the local transport network.

7.10 Given estimates of the numbers of trips to and from a planned development site, PT Devtrips can be used to model the origin and destination zones of the generated trips.

7.11 The public transport version of the Devtrips program can be used to model the spatial distribution of public transport generated trips for the same land-use types and time periods as the highway version of the program.

7.12 The program uses user-supplied estimates of the numbers of trips to and from the development site to create synthetic matrices of generated trips. The output matrices are saved as 1141 zone person trip matrices, compatible with GMPTE's public transport model zoning system. Within the matrices, zones 1 to 1140 correspond to zones in the public transport model, whilst zone 1141 is used to represent the new development site.

7.13 The matrices are built using a catchment area technique with the following four-stage process that involves:

- Using generalised cost data from GMPTE's PT model to determine the travel cost from the new development to each of the zones in the modelled area
- Allocating the zones to a series of 10 minute travel bands from the site
- Estimating the proportion of trips to and from each of the travel bands using calculated trip cost distributions for associated 'parent zones'
- Distributing the trips to and from each of the travel bands amongst their constituent zones using zonal attribute data that reflects the level of activity in each zone.

8. Infrastructure Assumptions

Committed Schemes

8.1 For the modelled area as a whole, there is a need to represent in the highway network those highway schemes assumed open to traffic by 2016.

8.2 The Government's Comprehensive Spending Review, which reported in October 2010, identified a number of major highway and public transport schemes likely to be progressed over the next four years. In addition, there are a number of local highway schemes that are also likely to be completed during this period.

8.3 Following consideration of the CSR and other documents, the following highway schemes were assumed to be "committed" at 2016:

- M60 J12-15 widening
- M60 J8-J12 MMS
- M62 J18-20 MMS
- A556 realignment/improvement
- Alderley Edge Bypass (opened 2010)
- Blue (M56 J6) and Yellow Works (Runger Lane/Thorley Lane realignment/improvement) (Manchester Airport Western Approach Roads).

8.4 It is worth noting that none of these schemes are likely to have any material impact on the Wigan Borough so the composition of this list would not be expected to have any impact on the results of the analysis described later in this report.

8.5 On the local network within Wigan, Wigan Borough Council specified two schemes that they expected to be completed by the 2016 forecast year; the Wallgate – Pottery Road Diversion (Saddle Junction Link Road); and the A579 Atherleigh Way – A578 Wigan Road Parsonage Link.

8.6 Within the PT model, the public transport schemes to be included at 2016 included:

- Metrolink to Chorlton and to East Didsbury
- Metrolink to Droylsden and Ashton
- Metrolink to Rochdale and Oldham
- Metrolink to Manchester Airport
- Rochdale Bus Station
- Altrincham Interchange

- Bolton Interchange.

Development Access Arrangements

8.7 For the purposes of this study, each key strategic site was represented by a single development "zone", with a limited number of loading points for traffic entering and leaving the zone from the adjacent road network.

8.8 Following consultation with Wigan Borough Council, the following loading points were assumed for each of the Key Strategic Sites:

- **Chaddock Lane/ Garret Hall (EM1A 9 / SP4.3)** - Access from A572 Chaddock Lane in the vicinity of Chaddock Lane farm
- **Northleigh (SP3)** - Access from A578 Leigh Road midway between junctions with B5237 Smiths Lane and A577 Atherton Road
- **Parsonage (EM1A 6)** - Access from the A579 Atherleigh – A578 Wigan Road link (i.e. Parsonage Link Road)
- **Bickershaw South (EM1G)** - Access from Plank Lane (south side) in the vicinity of Bickershaw Lane
- **Pemberton Colliery (EM1A 30)** - Access from Smithy Brook Road and Little Lane
- **Pocket Nook (SP4.6)** - Access from A572 Newton Road (south side) via Pocket Nook Lane
- **Rothwell's Farm (SP4.6)** - Access from B5207 Lowton Road (north side) to the south of its junction with A573 in the vicinity of Rothwell's Farm
- **Stirrups Farm (SP4.6)** - Access from Stone Cross Lane (east side) to the south of its junction with Stone Cross Lane North
- **South Wigan M6 Junction 25 (SP4.5)** - Access (in only) from western side of A49 Warrington Road midway between M6 Junction 25 roundabout and Worthington Way; exit only via Wheatlea Road / Forton Road / Worthington Way junction.

9. Anticipated Network Performance

Overall Network Performance

9.1 Table 9.1 summarises network wide summary statistics for the 2009 Base and 2016 Wigan LDF scenarios for the morning and evening peak hours. The statistics relate to the whole of the SATURN model simulation area i.e. the whole of Greater Manchester.

9.2 The anticipated growth in traffic over the five-year period is anticipated to increase total travel time by all vehicles on the road network by 22 to 23%, and total travel distance by 12%.

Table 9.1 Wigan LDF Draft Core Strategy – 2016 Network-wide Summary Statistics

Peak Hour	Scenario	Transient Queues (A)		Over Capacity Queues (B)		Cruise Time (C)		Travel Time (A+B+C)		Travel Distance		Average Speed	
		(pcu.hrs)	% Change	(pcu.hrs)	% Change	(pcu.hrs)	% Change	(pcu.hrs)	% Change	(pcu.km)	% Change	(kph)	% Change
AM	2009 Base	31,277	-	6,806	-	75,067	-	113,150	-	4,049,960	-	35.8	-
	2016 LDF	39,155	25.2%	12,224	79.6%	86,698	15.5%	138,077	22.0%	4,535,946	12.0%	32.9	-8.1%
PM	2009 Base	30,881	-	7,936	-	72,724	-	111,542	-	4,097,127	-	36.7	-
	2016 LDF	39,719	28.6%	14,371	81.1%	83,915	15.4%	138,006	23.7%	4,592,323	12.1%	33.3	-9.3%

Traffic Flows Impacts - Overview

9.3 The following section describes the distribution of highway traffic to/from each of the sites onto the highway network for each site in turn. This is based on the distribution of traffic estimated using DEVTRIPS (described earlier in this report). Figures 9.1 – 9.18 in Appendix 2 show the percentage traffic distribution for each development site during the morning and evening peak hours.

9.4 **Northleigh** (Figures 9.1 – 9.2): During the morning peak hour, the majority of the development traffic uses A578 Leigh Road to the north of the site (58% outbound and 68% inbound) while 14% uses Bickershaw Lane. The remainder goes towards Leigh via A578 and Nel Pan Lane. Similarly, in the evening peak hour, the majority of the site traffic again goes to/from the north on A578 Leigh Road (58% outbound and 60% inbound). Around 10% of traffic uses Bickershaw Lane, with the remainder going to/from Leigh using A578 and Nel Pan Lane.

9.5 **Bickershaw South** (Figures 9.3 – 9.4): During the morning peak hour, the majority of traffic generated by Bickershaw South goes to/from the east on Plank Lane towards Leigh (65%) while the remaining traffic (35%) goes to the west to/from Golborne and Lowton. The distribution of evening peak hour traffic is very similar, although a higher proportion of the traffic comes from / goes to the west (about 75%).

9.6 **Pemberton Colliery** (Figures 9.5 – 9.6): During the morning peak hour about 55% of the Pemberton Colliery traffic uses A571 Billinge Road with 35% heading to/from Wigan town centre. The remaining traffic uses A49 Warrington Road mostly heading south. In the evening peak hour, the majority of traffic (77%) enters the site from Warrington Road.

9.7 **Pocket Nook** (Figures 9.7 – 9.8): During the morning peak hour, about 70% of the traffic generated by this site goes to/from the northeast on A572 Newton Road, with the remainder travelling southwest on the A580 East Lancashire Road. During the evening peak hour, the split is roughly the same with about 65% and 35% of traffic going to/from the northeast and southwest respectively.

9.8 **Rothwell's Farm** (Figures 9.9 – 9.10): During the morning peak hour, about 60% of the traffic generated by the Rothwell's Farm site goes to/from the south on B5207 Golborne Road, with 40% going to/from A580 East Lancashire Road via its junction with Stone Cross Lane. About 30% of traffic goes to/from the north using Lowton Road. During the evening peak hour, about 45% of traffic goes to/from the south, with about 30% using the A580 East Lancashire Road and the remainder using A573 Church Street, Ashton Road and Wigan Road.

9.9 **Stirrups Farm** (Figures 9.11 – 9.12): During the morning peak hour, 56% of the traffic generated by this site uses Stone Cross Lane North and the A580 East Lancashire Road, with the remainder going west and north via Nook Lane (33%) and Cross Lane (12%). The evening peak hour distribution of Stirrups Farm traffic is much the same as the morning peak hour distribution.

9.10 **South of Wigan (M6 Junction 25)** (Figures 9.13-9.14): During the morning peak hour, about 55% of the development site traffic goes to/from the south, mostly using the M6. The remaining 45% of the traffic goes to/from the north via B5238 Poolstock Lane or A49 Warrington Road. During the evening peak hour, the distribution of traffic entering/leaving this site is much the same as the morning peak hour distribution.

9.11 **Chaddock Lane / Garret Hall** (Figures 9.15-9.16): During the morning peak hour, about 65% of the traffic enters/departs the site using the A580 East Lancashire Road, mostly to/from the east. The remaining traffic arrives/departs from the east (about 15%) and west (about 15%) using A572 and Prince's Avenue. During the evening peak hour, about 60% of the development traffic arrives/departs from the east and west using A572, while about 40% uses the East Lancashire Road (mostly to/from the east).

9.12 **Parsonage** (Figures 9.17 – 9.18): During the morning peak hour the majority of the development traffic uses A579 Atherleigh Way, with about 10% to/from the south, and 56% (outbound) and 44% (inbound) to/from the north. About 20% of the traffic goes to/from the site from Leigh using A572 Twist Lane, while 17% is from the north, using A578 Wigan Road. The evening peak hour distribution is similar to the morning peak hour distribution.

Junction Performance

9.13 The worst performing signal controlled and roundabout junctions (or severely overcapacity) junctions in the 2009 Base and 2016 scenarios were identified using the following criteria:

- Approaching capacity (shown on diagrams in blue) – V/C between 85% and 100%
- Over capacity (shown on diagrams in red) – V/C over 100%

9.14 The V/C percentage is the ratio of the actual volume of traffic divided by the maximum capacity for individual turning movements at a junction. A turning movement is considered to be approaching capacity when the V/C exceeds 85% and is over capacity when the V/C exceeds 100%, resulting in permanent queuing and delay.

9.15 **2009 Base** (Figures 9.19 – 9.20): There are 30 overcapacity signalised junctions and 5 overcapacity roundabouts in the morning peak hour, while during the evening peak hour there are 27 over capacity signalised junctions and 10 overcapacity roundabouts. In both cases these junctions are spread across the Wigan borough with clusters in the main urban centres such as Wigan town centre, Leigh and Atherton. A number of the over-capacity junctions are common to both the morning and evening peak hours, including:

- A580 East Lancashire Road junctions with A577 Mosley Common Road, A572 Chaddock Lane, A574 Warrington Road, B5207 Church Lane and A573 Warrington Road
- A577 Manchester Road / A5082 Hough Lane, Tyldesley
- A6 Manchester Road / A5082 Armitage Avenue, Little Hulton
- A577 Tyldesley Road / Hamilton Street
- A579 Atherleigh Way / B5235 Lovers Lane
- A577 Wigan Road / B5235 Lovers Lane
- A577 Atherton Road / A578 Leigh Road
- A577 Atherton road / A58 Liverpool Road

- A49 Warrington Road / Worthington Way
- A49 Warrington Road / B5238 Poolstock Lane
- B5238 Poolstock Lane / St Paul's Avenue / Carr Lane
- A49 Wallgate / Pottery Road
- A49 Central Park Way / Greenough Street
- A49 Preston Road /A5209 School Lane / B5239 Rectory Lane.

9.16 Some of the above junctions are only over capacity on a single turning movement, whereas others are over capacity on one or more arms. The majority of the capacity issues appear to be on the main highway links through the Wigan district including the A580, A49 and A577.

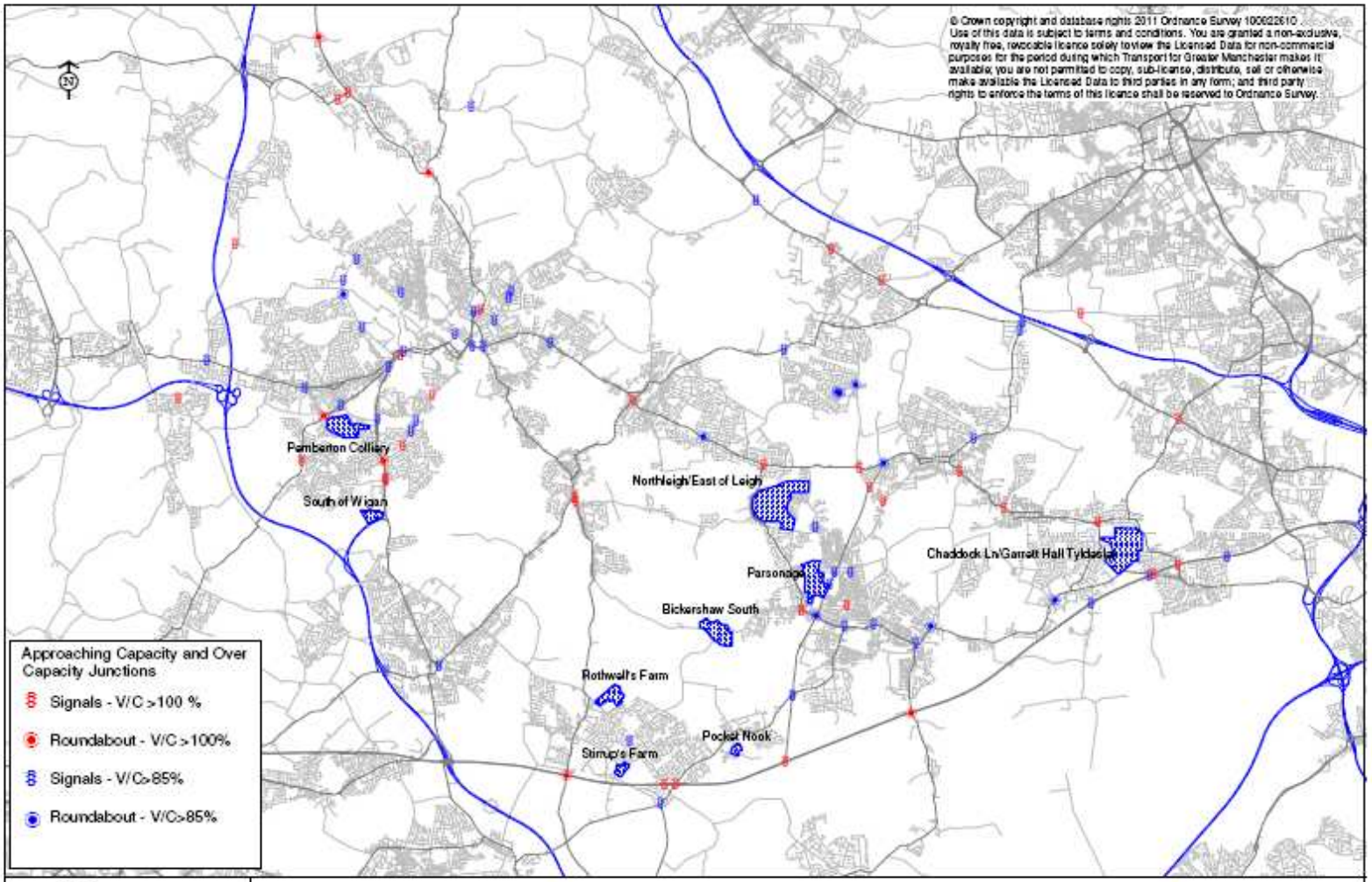
9.17 **2016 Forecast** (Figures 9.21 – 9.22): Overall the junction performance plots suggest that the inclusion of the development traffic from the LDF development sites and the growth in background traffic does not have a large detrimental impact during the 2016 morning and evening peak hours. Despite the increase in traffic volumes, there are still 30 overcapacity signalised junctions in the morning peak hour. This is partly because the green time at all the signalised junctions has been optimised in the SATURN model to maximise capacity. In reality, this is likely to be achieved by the wider introduction of SCOOT and MOVA control at groups of junctions or at single isolated junctions, which will offset at least some of the potential deterioration cause by the additional traffic in 2016.

9.18 A further five roundabouts are forecast to be operating over-capacity by the 2016 morning peak hour, including the roundabouts at the junctions of A579 Atherleigh Way / A572 Twist Lane, A572 Manchester Road / Holden Road / Green Lane, and A579 Atherleigh Way / A577 Wigan Road.

9.19 During the 2016 evening peak hour there are anticipated to be 32 over-capacity signal controlled junctions and 14 over-capacity roundabouts, representing a slight deterioration in junction performance compared to the 2009 Base. Junctions of particular note that are anticipated to suffer a deterioration in performance include:

- A580 East Lancashire Road / B5258 Newearth Road
- A580 East Lancashire Road / A572 Newton Road
- A577 Tyldesley Road / Shakerley Road
- A573 Warrington Road / B5237 Bickershaw Lane
- A49 Warrington Road / A577 Ormskirk Road

9.20 In a number of cases, the deterioration in performance at junctions can be attributed to the wider growth in background traffic rather than to the traffic generated by the LDF sites. This is discussed in more detail later in this chapter.


© Crown copyright and database rights 2011 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 purposes for the period during which Transport for Greater Manchester makes it available; you are not permitted to copy, sub-license, distribute, sell or otherwise make available the Licensed Data to third parties in any form; and third party rights to enforce the terms of this licence shall be reserved to Ordnance Survey.
Pemberton Colliery
South of Wigan
Northleigh/East of Leigh
Parsonage
Chaddock Ln/Garratt Hall Tyldesley
Bickershaw South
Rothwell's Farm
Stirrup's Farm
Pocket Nook
Approaching Capacity and Over Capacity Junctions
Signals - V/C >100 %
Roundabout - V/C >100%
Signals - V/C>85%
Roundabout - V/C>85%
Transport for Greater Manchester
2 Piccadilly Place, Manchester, M1 3BG
Wigan LDF 2009 Base - AM Peak-hour: Approaching and Over Capacity Junctions
Drawn By : E Atkinson
Scale : NTS
Date : June 2011
Figure 9.19