Client **A6MARR Project Board**

Project **A6 To Manchester Airport Relief Road**

Subject **HFAS Report 1746A: SEMMMS8 Forecasting Report - APPENDICES**

This document contains the appendices for HFAS Report 1746.

This Report	**HFAS_1718A_SEMMMS8_ForecastingReport_appendices_V2.0.docx**		
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Version	Comments	Date	Approve
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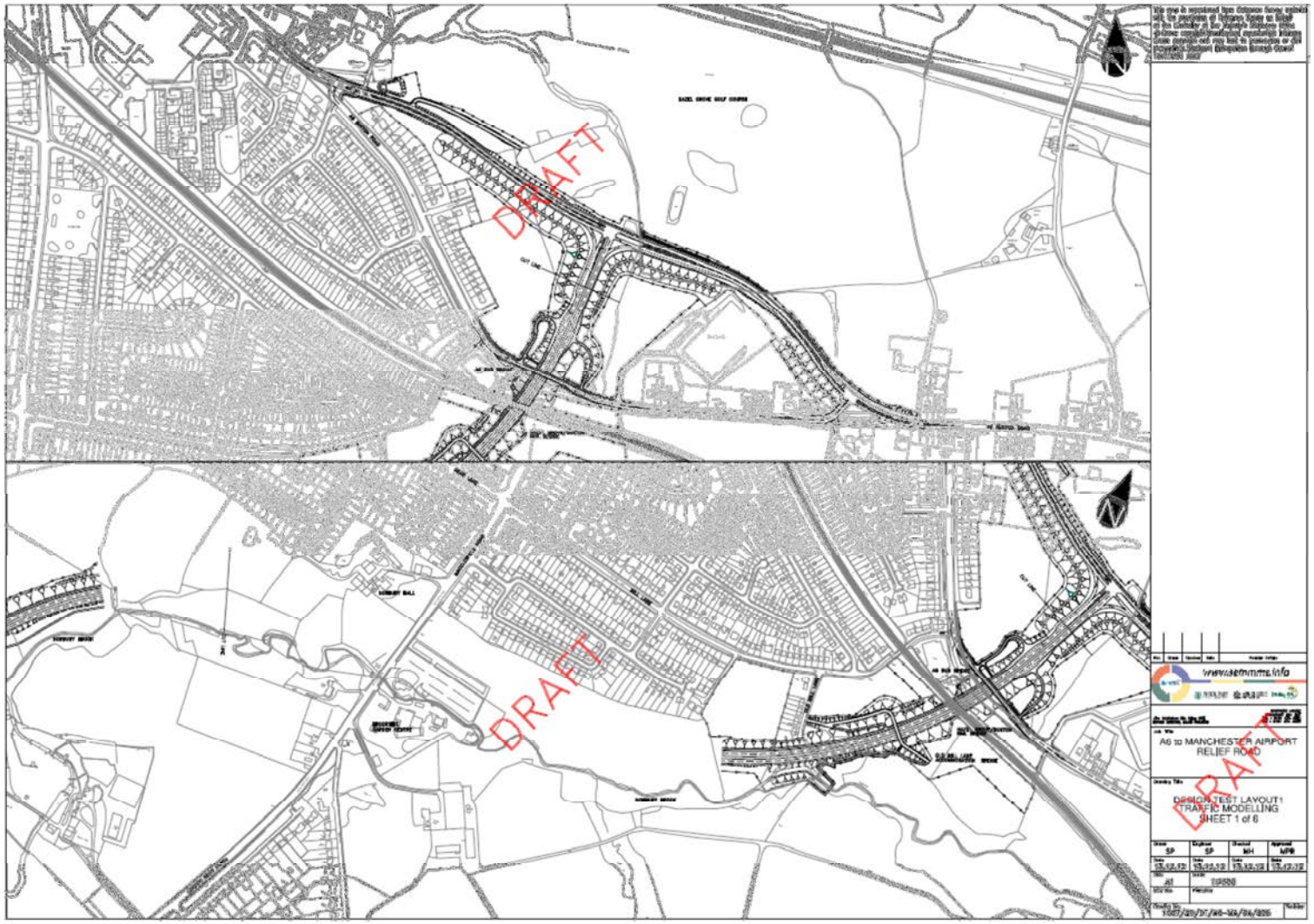
060913	Client, Akins	G Martin, R Kimber v1.0)

Appendix 1

A6MARR Scheme Plans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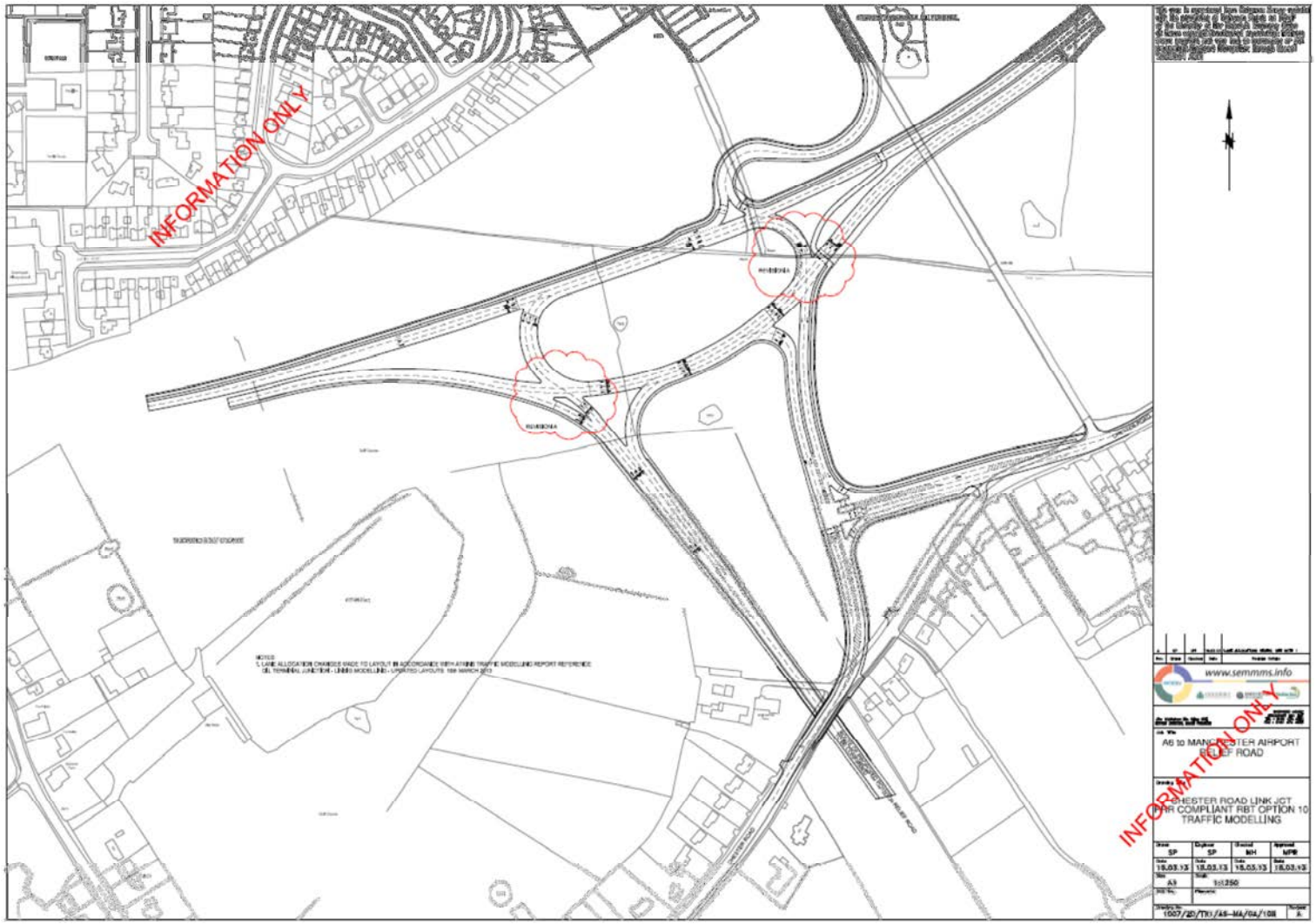
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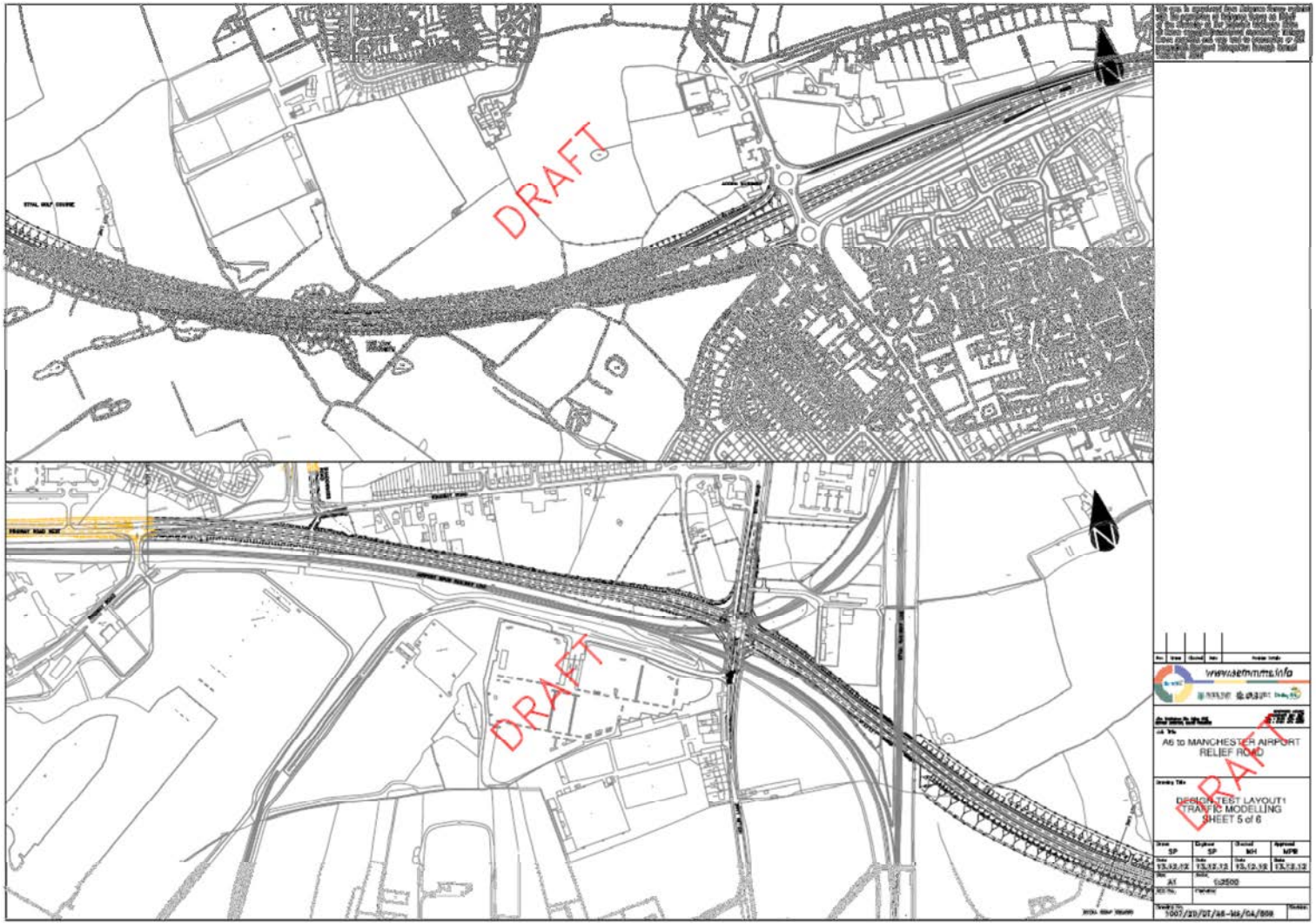
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Appendix 2

HFAS Briefing Note 2023-55-B01

Manchester Airport Assumptions

Client **SEMMMS Project Board**

Project **A6 to Manchester Airport Relief Road**

Subject **Modelling of Manchester Airport –SEMMMS8 Forecasting Assumptions**

This note outlines the assumptions to be made in modelling Manchester Airport in the SEMMMS8 SATURN Model and SEMMMS8 VDM. It updates/replaces GMTU Briefing Note 2023-00-B33.

This Note	**2023-55-B01-SEMMMS8 Mcr Airport Assumptions_v1.0.doc**		
Originator	David Nixon		Check /
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1.0	Final Version	091112	DN

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261012	Atkins, MVA	Robin Kimber; Alison Daniels – v0.3 for comment
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A6 to Manchester Airport Relief Road
Modelling of Manchester Airport – Forecasting Assumptions

1. Introduction

1.1 Transport for Greater Manchester Highways Forecasting and Analytical Services (TfGM HFAS) and MVA have been commissioned by the SEMMMS Project Board to update the SEMMMS SATURN traffic model and SEMMMS Variable Demand Model (SEMMMS VDM) respectively to reflect changes to planning assumptions and scheme design. The outputs from the updated models will inform further appraisal of the proposed A6 to Manchester Airport Relief Road. Both models require significant data inputs, a number of which relate specifically to Manchester Airport.

1.2 In September 2009, GMTU officers met representatives of Manchester Airport Group (MAG) and AECOM to discuss the information that GMTU considered necessary to adequately represent Manchester Airport in the SEMMMS transport models.

1.3 Subsequent meetings between the MAG, their consultants AECOM, and the modelling team represented by (the then) GMTU and Atkins sought to determine an "evidence base" for the Airport that would support modelling work for 2009, 2015 (the anticipated SEMMMS opening year at that time) and 2030 (SEMMMS design year) horizons. Based on the discussions at those meetings, a briefing note (GMTU Note 2023-00-B33) was produced setting out the assumptions to be applied to represent the Airport and associated developments in SEMMMS7B forecasts for 2015 and 2030.

1.4 Since the SEMMMS7B forecasts were completed:

- The opening year for the A6 to Manchester Airport Relief Road has changed to 2017, with the design year therefore becoming 2032;
- Forecasts of passenger growth at Manchester Airport have been updated;
- MAG have progressed the planning of the Airport City development;
- The Government has assigned the Airport and its surrounds Enterprise Zone status; and
- Work has commenced on the Metrolink Extension to Manchester Airport.

1.5 As a result, prior to commencing a new round of updated SEMMMS forecasting (SEMMMS8), a review of the previous assumptions made for Manchester Airport and its surrounds has been undertaken.

1.6 This note summarises the findings of the review and details the assumptions to be made for Manchester Airport in the SEMMMS8 forecasts.

2. Data Inputs

2.1 SEMMMS VDM will be used to determine future horizon overall levels of trip making by available travel modes. The model needs transport supply (infrastructure, frequencies etc) and demand (jobs and population) data, and information on respective travel costs.

2.2 SEMMMS SATURN provides the highway network infrastructure information and determines route choice and highway travel costs based on the highway travel demand under set scenarios, which in turn is derived iteratively by SEMMMS VDM. SEMMMS VDM also refers to Public Transport (PT) costs derived from a further, PT, model that completes the modelling suite. SEMMMS VDM determines travel mode splits derived via the highway and PT models and provides demand forecasts that feed back into them in order to iteratively identify balanced costs across the transport system.

2.3 Key inputs to SEMMMS VDM aside from network costs are information on current and envisaged land use, development and employment.

2.4 Key inputs to SEMMMS SATURN are the future topology of the network, its capacity, and traffic loading points (i.e. locations where traffic may be entering or leaving the network).

2.5 The two models operate on a zonal basis, with SEMMMS VDM using aggregations of SEMMMS SATURN model zones away from the schemes area of influence (AOI) and one-to-one correlations in the AOI , including the airport and its environs.

2.6 In order to meet Department for Transport requirements there is a need to develop:

- A core (most likely) scenario;
- A pessimistic scenario; and
- An optimistic scenario.

2.7 This means that a range of development and (possibly) infrastructure options will need to be identified.

2.8 The key assumptions relating to Manchester Airport are set out below.

3. Passenger Growth

3.1 Following discussions with MAG, it has been agreed that the future Airport passenger growth assumed for SEMMMS8 purposes will be as per the Department for Transport's UK Aviation Forecasts published in August 2011. These updated forecasts replace the UK Air Passenger and CO_2 Forecasts 2009 used in the SEMMMS7 forecasts.

3.2 The UK Aviation Forecasts provide future airport passenger numbers under three scenarios; providing low, central and high forecasts. The central forecasts take account of forecast changes in GDP, air fares (and through these, fuel and non-fuel costs) and "market maturity". The low and high forecasts are based on a range of sensitivity tests relating to variations in GDP, oil prices, air passenger duty and non-fuel costs, and the impacts of emission standards.

3.3 The projections for Manchester Airport are shown in Table 1 below. The figures in brackets are the previous (2009) forecasts. The central forecast will be used as the basis of the SEMMMS8 core forecasts. Low and high passenger forecasts will be applied in the pessimistic and optimistic scenarios respectively.

Table 1 UK Aviation Forecasts - Projections for Manchester Airport (Millions of Passengers per Annum)

Year	Low (Pessimistic)	Central (Core)	High (Optimistic)
2009 (2005)	18.6 (20)	18.6 (20)	18.6 (20)
2020 (2015)	25 (30)	25 (30)	30 (30)
2030	30 (40)	35 (45)	35 (45)

Notes:

Source: UK Aviation Forecasts, Department for Transport, August 2011, Tables G2 and G3

4. Airport Employee Growth

4.1 For modelling purposes we would ideally wish to know the number of person trips generated by workers at Manchester Airport in each of the forecast years and modelled time periods (0800-0900, an average interpeak hour between 1000 and 1500, and 1700-1800). However, these are understandably difficult figures to determine.

4.2 In previous demand modelling work in Greater Manchester (using GMSPM2 and SEMMMS7 VDM), the ratio of Airport site employees to passenger throughput has been assumed to remain unchanged from 2006 e.g. if passenger throughput doubles, Airport employees double.

4.3 In the absence of more detailed information, and following discussion with MAG, this assumption will again be adopted for SEMMMS8 forecasting.

5. Commercial Development Adjacent to Manchester Airport - Airport City and Manchester Business Park

5.1 An additional 5,000 jobs were assumed in GMSPM2 to reflect the development of the 'Airport City' site over the next 10-15 years. This figure was based on the planning consents for what were historically known as the Burford and Arlington (later Goodmans) development sites to the north of Manchester Airport.

5.2 The Burford site, which is now the proposed site of Airport City, was granted outline planning permission by MCC on April 2006 for the development of 50,000 square metres of office /business park (B1) type development.

5.3 The Arlington/Goodmans site has permission for 62,700 square metres of office/business park (B1) type development. This site is currently being developed as individual plots.

5.4 When the assumptions for the SEMMMS7 forecasts were being determined, MAG was still undertaking research into the feasibility of various development mixes for the Airport City site. Given the uncertainty regarding the nature of future development it was therefore assumed that the development assumptions for the Airport City/Burford and Arlington/Goodmans sites would be as per the permissions current at that time (April 2010).

5.5 Since Spring 2010:

- MAG has continued with planning of the Airport City site; and
- The Government has designated Manchester Airport and its surrounding area (including Airport City) as an Enterprise Zone.

5.6 The further planning of Airport City has resulted in a development which will be more mixed use in nature, rather than being predominantly B1 development. The accessibility of the site has also been reviewed and the development now being progressed will incorporate new links to the central rail station at the Airport.

5.7 At this time there remains a degree of uncertainty regarding the exact details of the new Airport City Development. Consequently, it was been decided that the SEMMMS7 assumptions should be carried forward to SEMMMS8. However, to provide reassurance as to the robustness of these assumptions, AECOM (on behalf of MAG) have carried out a review of the trip generation estimates for the development produced by MVA for use in the SEMMMS VDM. AECOMS findings are that the trip rates and resulting trip generation are indeed robust.

5.8 The designation of the Enterprise Zone will facilitate development of Airport City and other sites in the Airport area. Essentially it consists of a series of linked sites which will support/complement development of Airport City. However, it will also include areas to the west of Manchester Airport near the University Hospital of South Manchester (Wythenshawe Hospital) that will be developed to serve the health and biotech sectors.

5.9 The scale of the EZ development may be considerable. However, little detail is yet available on development content or supporting infrastructure, and it has therefore been decided not to incorporate the EZ (other than for Airport City) in the current forecasts. If details are confirmed subsequently, sensitivity testing could be undertaken to determine the impacts of the proposals.

5.10 Table 2 shows the assumed levels of development and employment at Airport City and Arlington/Goodmans in 2009, 2017 and 2032. The employment estimates are based on data from business park and office developments on the TRICS Traffic Generation Database.

5.11 For the SEMMMS modelling, core pessimistic and optimistic scenarios have been identified. The scenarios assume:

- For Airport City (Burford), that the site is fully developed and occupied by 2032; development/occupation by 2017 is assumed to be 50%, 25% and 75% under core, pessimistic and optimistic scenarios respectively
- For Arlington/Goodmans, that the site is fully developed by 2032 development/occupation by 2017 is assumed to be 66%, 50% and 100% under core, pessimistic and optimistic scenarios respectively. These figures reflect the fact that about a quarter of the permitted floorspace is currently built and occupied (by Cuzzons, Regus and Ericcson).

Table 2 Estimated Jobs on the Airport City and Goodmans Developments						
	Airport City/Burford			Goodmans		
	Core	Pessimistic	Optimistic	Core	Pessimistic	Optimistic
Permitted Floorspace (B1)	50,000	50,000	50,000	62,700	62,700	62,700
Occupied 2009	0	0	0	17,065	17,065	17,065
Occupied 2017	25,000	12,500	37,500	41,800	31,350	62,700
Occupied 2032	50,000	50,000	50,000	62,700	62,700	62,700
Jobs 2009	0	0	0	806	806	806
Jobs 2017	1180	590	1770	1970	1480	2960
Jobs 2032	2360	2360	2360	2960	2960	2960

6. Other Commercial Development Adjacent to Manchester Airport – Davenport Green

6.1 MAG has drawn attention to the potential development of the Davenport Green site to the west of the M56 but accessed by Thorley Lane/Runger Lane to the east of the motorway.

6.2 This site was earmarked for a development of up to 93,000 square metres of B1 floorspace and until recently had outline planning consent for a first phase of 46,450 square metres. This permission has now lapsed and Trafford MBC (in whose area the site lies) have recently changed the B1 allocation to 'countryside' in their LDF. This change does not however preclude future development of the site as part of the wider Airport Enterprise Zone.

6.3 A further issue in determining the future development of the Davenport Green site is that of Metrolink. Discussions with MCC confirm that the completion of the Wythenshawe Loop Metrolink extension was a key factor in making the Davenport Green site viable. However, plans for the western side of the loop, which would have served Davenport Green have now been dropped.

6.4 In the light of the uncertainty surrounding the timing and nature of development at Davenport Green we do not consider it necessary to incorporate Davenport Green in the core SEMMMS forecasts. However, we will include the Davenport Green site within the SEMMMS8 Optimistic scenario.

6.5 As with other developments the number of trips generated by the development and their modal split will be estimated within the VDM based on the number of jobs. Using the jobs/floorspace ratios determined from TRICS and used in the calculation of jobs at the Airport City and Goodmans sites we will assume:

- 25% development/occupation of previously consented floorspace (11, 600 sq m) by 2017, creating 550 jobs;
- 100% development/occupation of previously consented floorspace (46,450 sq m) by 2032, creating 2,200 jobs.

7. Derivation of Modal Split

7.1 For most trips there are generally a choice of modes i.e. car, bus, heavy rail, Metrolink, cycle and walk.

7.2 MAG has set a target of 40% of trips to and from Manchester Airport being by non-car modes. The Airport Masterplan states that this will be achieved by:

- Promotion of public transport;
- Developing a mix of off site "park and ride" and on site parking;
- Discouraging "kiss and fly" and taxi use; and
- Use of demand management techniques.

7.3 The measures identified by MAG under these general headings are set out in the Airport's Ground Transport Plan. The key measures are summarised below.

Roads

- Demand management of road traffic, focusing on reducing the number of vehicle trips per passenger; MAG have indicated that a key aspect of the demand management will be the introduction of a £2 access charge for vehicles entering the Airport area between 2017 and 2032;
- Explore opportunities to develop dedicated high-occupancy vehicle or bus lanes on strategic airport approach roads; and
- Use of technology to provide improved driver information, and the introduction of Active Traffic Management measures.

Parking

- Accommodate growth in short stay parking within the central terminal area;
- Discourage use of the car by employees through relocation of long stay staff spaces to the periphery of the Airport and incentive schemes; and
- Develop strategic park and ride sites.

Rail

- Complete the third rail platform at the interchange (now open);
- Increase capacity on Transpennine routes through lengthening trains and improving frequencies;
- Add new services to the Midlands and North Wales; and
- For the longer term, review the feasibility of new infrastructure in the Manchester Hub and support improvements, and work with Network Rail et al to develop a western rail link.

Coach

- Develop new coach links into under-served PT markets such as Merseyside, North Wales and Central and East Lancashire; and
- Increase frequencies and reliability on existing routes; this is linked to the development of bus only lanes on key sections of the strategic road network.

Bus

- Work with operators and Transport for Greater Manchester to improve service provision;
- Take full advantage of SEMMMS Quality Bus Corridor Improvements;
- Develop new demand responsive and early/late services; and
- For the longer term, work to improve bus access to rail and tram stops with services to GM.

Metrolink

- Complete the Airport Metrolink Link.

Walking and Cycling

- Improve local cycle routes, including the Airport Orbital Cycleway; and

- Ensure provision of cycle parking facilities across the Airport.

7.4 For previous strategic modelling in Greater Manchester, the modal split of trips to/from Manchester Airport has been derived within the demand model and reflected the supply and cost of the various alternative modes available to the trip maker. No attempt was made to impose the specific modal split targets set out in the Airport Masterplan and Ground Transport Plan. We will adopt the same approach for SEMMMS modelling.

7.5 The modelling will seek to incorporate those measures outlined above which are clearly defined and that can be represented in the VDM and/or SATURN models. By far the most significant impacts on modal split will be those resulting from the proposed access charge and the completion of the Airport Metrolink line.

7.6 Within SEMMMS VDM it will therefore be assumed that for core modelling:

- A £2 (at 2009 prices) access charge will be implemented at a point between 2017 and 2030; this will also be modelled explicitly in the SATURN model at 2030
- Airport Metrolink is open by 2017; frequencies and interchange opportunities (e.g. in the City Centre) will be confirmed with TfGM.

7.7 Many of the other improvements referred to in the GTP and Need for Land – particularly those affecting heavy rail – are not yet defined sufficiently to permit modelling and/or are not yet committed. Similarly, although the Public Transport model being built as part of the SEMMMS VDM will be capable of modelling improvements to service provision/frequencies (bus and rail), to do so would require such changes to be clearly specified. The impact on modal split of such changes within the VDM is likely to be marginal.

Freight Vehicle Movements

7.8 The Cargo Centre located off Runger Lane is a significant generator of goods vehicle movements. However, many of these movements occur outside the normal traffic peak periods.

7.9 MAG has plans to significantly expand floorspace for airlines, freight forwarders etc. However, the impact of these plans on freight vehicle movements is unclear. It is also unclear which sites will be subject to development for freight purposes. It is likely that a significant amount of the new development will be located on the Oak Farm site west of the current Cargo Centre and adjacent to the A538 Wilmslow Road.

7.10 Discussions with the Airports traffic consultants, AECOM, suggest that there is little concrete information available on future growth in good vehicle movements. Therefore at AECOMs

suggestion, the forecasts used for development of the layouts for the Blue and Yellow works some 4-5 years ago will be used to determine the levels of growth assumed for the Cargo Centre. These forecasts were based on 2005 flows and projected forward to 2011. The levels of growth indicated by these (PCU) flows are:

- A 64% increase in inbound traffic between 0800 and 0900
- A 49% increase in outbound traffic between 0800 and 0900
- A 45% increase in inbound traffic between 1700 and 1800
- An 84% increase in outbound traffic between 1700 and 1800

7.11 These figures are (and were at the time of the Blue/Yellow works forecasting) recognized as being extremely robust, although clearly as they are PCU flows they represent growth in trips for all purposes and by all vehicle types. It should also be noted that the figures include vehicle trips associated with the aircraft maintenance area that is also accessed off Avro Way. Growth in inbound trips in the morning and outbound trips in the evening will include a substantial number of commute trips by employees. However, the growth in outbound traffic in the morning and inbound traffic in the evening is more likely to be due to goods traffic.

7.12 In its "Need for Land" document MAG suggests that the land set aside for cargo use will increase by between 33% and 83% by 2030 (24 Ha to 32-44 Ha). The same document quotes floorspace figures of 79,617 sq m at 2013 and 120,000 sq m at 2030, an increase of 51%. However, the document suggests that a substantial amount of the growth will occur in the Oak Farm and Sun Bank Lane areas rather than on the existing Cargo Centre site.

7.13 Given MAG's wish to be as consistent as possible with the forecasts already produced for the Blue and Yellow Works, for the SEMMMS Central forecasts we will assume:

- 49% and 45% growth in goods traffic to/from the Cargo Centre (zone 288) in 2017 AM and PM peak hours respectively
- 49% growth in the 2017 interpeak goods traffic to/from the Cargo Centre (based on the AM peak outbound growth from the Blue/Yellow works forecasts i.e. the higher of the peak figures)
- 51% growth in goods traffic to/from the Cargo Centre between 2017 and 2032 (all periods) in line with the Airport's projected growth (2013 to 2030) in floor area; this will be a robust estimate as it will assume that the level of floor area growth is reflected directly in the growth of goods vehicle movements.

7.14 For all other Airport zones, goods vehicle trips will be assumed to grow in line with NTM forecasts to 2017 and 2032.

7.15 As with the Development at Airport City and within the Enterprise zone, if further details of the location and scale of future air freight-related development becomes available this could be incorporated into later sensitivity tests.

Car Parking

7.16 "The Need for Land" outlines MAG's future parking requirements in some detail. Based on an airport passenger throughput of 40 mppa in 2030, it is estimated that there will be a requirement for between 18,000 and 32,400 additional car park spaces for passenger use, and around 4,400 additional spaces for staff use. The precise requirements will clearly be based on the extent to which the modal shift from private car to public transport can be achieved.

7.17 However, in addition to a requirement for additional spaces, there will be a need to relocate some car parking to facilitate the expansion of apron areas. This will particularly impact on the long stay car parks situated off Sydney Avenue (near Terminal 2) and Ringway Road (east of Terminal 3).

7.18 Following discussion with MAG, for SEMMMS modelling we will assume that:

- Long stay parking displaced from the Sydney Avenue area will be relocated to Oak Farm
- Long stay parking displaced from the Ringway Road area will be relocated to land north of Ringway Road and east of Shadow Moss Road.

7.19 Short stay parking within the central terminal area will be assumed to expand to meet demand.

7.20 As suggested by MAG, privately run parking in the Moss Lane area (SATURN Zone 1080) will be assumed to remain at current levels (i.e. no growth will be assumed).

Highway Schemes

7.21 For Core modelling we will assume a number of committed or likely highway schemes in the vicinity of Manchester Airport, namely:

- The "Rainbow Works" package of schemes (Blue, Yellow and Red works);
- The proposed realignment of Ringway Road between Ringway Road West and Terminal 3

7.22 The "Rainbow Works" consist of:

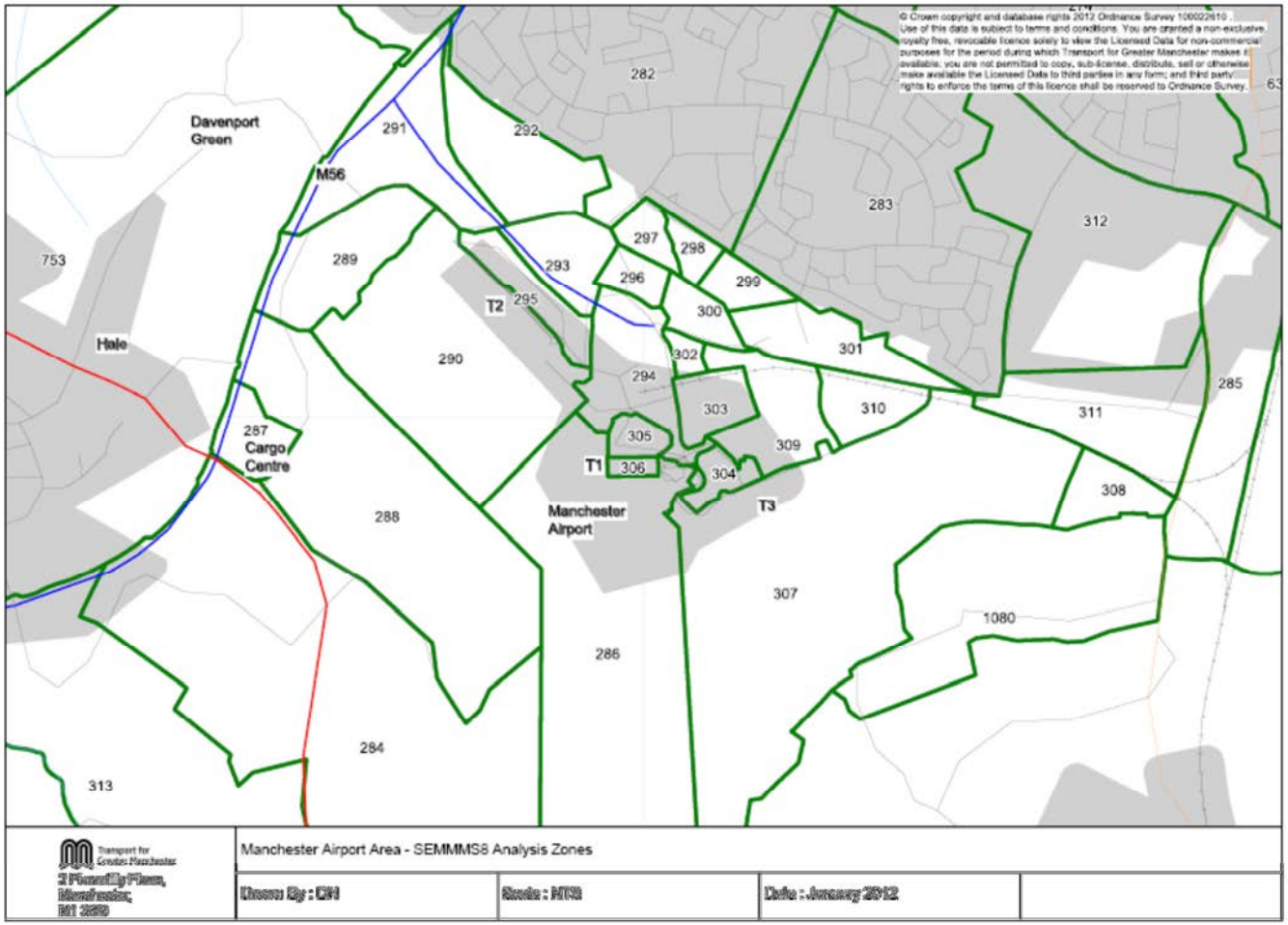
- The improvement of M56 Junction 6 (Blue Works)
- The realignment and improvement of Runger Lane and Thorley Lane between M56 Junction 6 and Terminal 2 and improvements to the M56 westbound on-slip (Yellow Works); and
- The improvement to dual-five lane standard of the M56 between Junctions 5 and 6 (Red Works).

7.23 These can be regarded as committed schemes as they are requirements of the planning permission for Terminal 2 or Runway 2.

7.24 MAG has advised that the Blue and Yellow works are likely to be in place by 2017, based on current forecasts of passenger growth. The Red Works will follow, being open by 2032

7.25 The proposed realignment of Ringway Road is tied to the intention to expand the apron area around Terminal 3. This would require Ringway Road to be realigned to the north. We believe this to be a committed scheme. We will assume that this realignment is complete by 2017. The road will be assumed to be constructed to 7.3m wide, all-purpose single carriageway standard.

7.26 In addition to the above, the original (lapsed) planning permission for the Davenport Green development incorporated conditions relating to capacity improvements on the M56 eastbound and westbound off-slips and improvements/changes to the operation of the Runger Lane/Thorley Lane junction. The improvements to the westbound off-slip are effectively covered by the Red Works. The improvements to the eastbound off-slip and Runger Lane/Thorley Lane junction will be incorporated (alongside the development) in the Optimistic scenario networks only.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Manchester Airport Area - SEMMMS8 Analysis Zones

Appendix 3

MVA Technical Note 16

A6 to Manchester Airport Relief Road

Forecasting Note

Forecasting Note

Project Title:	A6 to Manchester Airport Relief Road
MVA Project Number:	C3A581
Subject:	Core Scenario Forecasts – Design Freeze 7
Note Number:	16 Version: 9
Author(s):	Pete Kidd, Alison Daniels and Matt Driver
Reviewer(s):	Nick Benbow and David Nixon (TfGM HFAS)
Date:	5th September 2013

1 Introduction

1.1 A consortium of local authorities (Stockport Metropolitan Borough Council, Manchester City Council and Cheshire East Council) and Manchester Airport Group has been working to prepare a submission to DfT for part-funding of the A6 to Manchester Airport Relief Road (A6MARR, see Figure 1.1). The scheme is based on the recommendations of the South East Manchester Multi Modal Strategy (SEMMMS) commissioned by central government in 1998, which highlighted a number of transport improvement opportunities that would benefit the local area. The relief road was a key element of that strategy and is designed to improve surface access to, from and between Manchester Airport and local town and district centres and employment sites, reduce the impact of traffic congestion on communities in Stockport, South Manchester and Northeast Cheshire, regenerate these communities through reduced severance and improved accessibility, and provide an improved route for freight.

1.2 The proposed scheme will connect the A6 at Hazel Grove with the M56 at Manchester Airport. It consists of approximately 10 Km of new dual two lane carriageway and seven new junctions, and will also incorporate the existing 4 km section of the A555 dual carriageway to the south of Bramhall.

1.3 MVA Consultancy was first commissioned in February 2010 to construct a transport model system fit for the purpose of providing modelling inputs for a Major Scheme Business Case (MSBC) of A6MARR to the Department for Transport (DfT). This system has been developed and subsequently used to provide demand forecasts of A6MARR, as well as inputs for operational, economic and environmental analyses. MVA considers this system fit for the purpose of assessing the impacts of A6MARR and a primary consideration during the

preparation of this note has been to demonstrate how the system complies with the DfT modelling requirements, as set out in the Transport Analysis Guidance (TAG).

1.4 SEMMMS VDM has been used to produce forecasts of the preferred scheme for an opening year of 2017 and design year of 2032. In January 2013 MVA were asked to produce a new set of forecasts for a revised version of the A6MARR scheme known as Design Freeze 7 (DF7) and incorporating some small improvements to the model system. This note reports on the assumptions made and the outturn results for these forecasts, which are very similar to those in the previous forecasts.

1.5 This technical note is structured as follows:

- land use and demographic assumptions;
- supply assumptions;
- treatment of Manchester Airport;
- do minimum forecasts for core scenario;
- preferred scheme forecasts for core scenario; and
- Appendix A public transport do minimum scheme details.

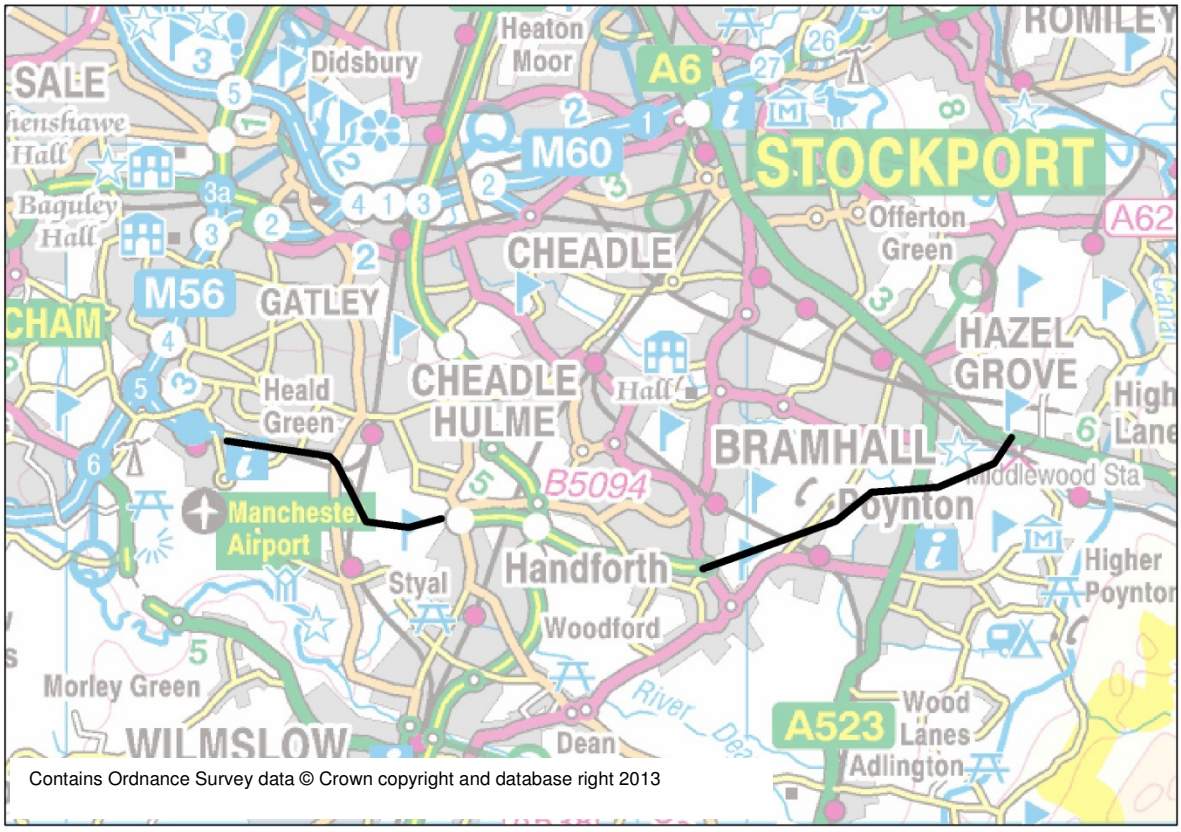

Figure 1.1 A6 to Manchester Airport Relief Road

2 Land Use and Demographic Assumptions

2.1 The requirement of the Department for Transport is that major transport schemes such as A6MARR are assessed for each of an opening year (assumed to be 2017 for A6MARR) and design year (15 years after opening, i.e. 2032.

2.2 The work to define land use assumptions for the A6MARR forecasting exercise has focussed on an Area of Influence (AofI) of the scheme as shown in Figure 2.1. The AofI was defined using preliminary versions of the SEMMMS7 SATURN model to determine the geographic area over which A6MARR had a significant impact on traffic route choice. In fact land use assumptions were derived across a slightly wider area than the AofI covering the whole of Stockport, Trafford, Cheshire East and part of Manchester City authorities. (This definition of the AofI was used in developing the zone system for the demand model, which is identical within the AofI to the zone system used for the assignment models. It is worth noting however that HFAS later produced an updated definition of the AofI, for which highway assignment validation was focussed).

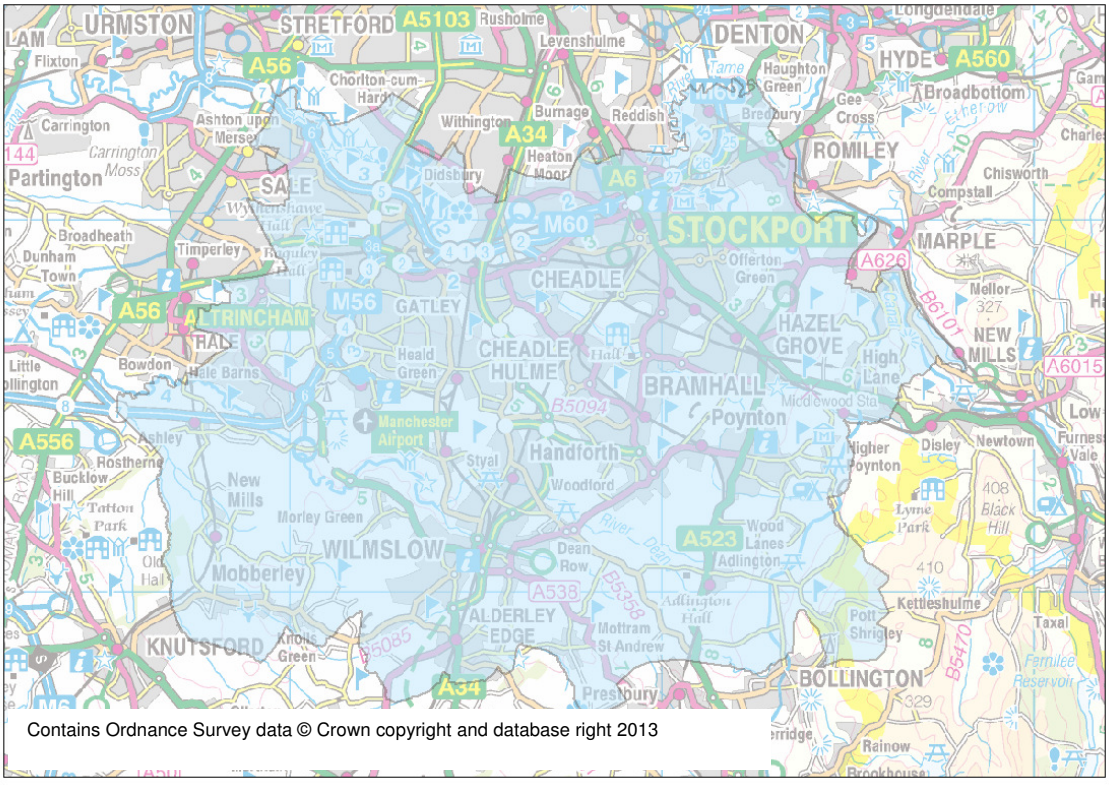

Figure 2.1 A6MARR Relief Road Area of Influence

2.3 Future year growth assumptions have been derived using data from a variety of sources:

- planning data from Local Authorities which partly lie in the AofI;
- data provided by Manchester Airport;

- National Trip End Model (NTEM) 6.2; and
- The National Transport Model (NTM).

2.4 Representatives of the consultant Atkins met with planning officers from Stockport, Manchester City, Cheshire East and Trafford councils to understand their aspirations for future development across their authorities. Manchester City Council was asked to provide information about future developments for the section of their authority lying within the AofI of A6MARR (see Figure 2.2). Atkins used this information to develop an uncertainty log (as specified in TAG 3.15.5) setting out the likelihood that each development would come to fruition by 2017 and also 2032.

2.5 In 2009 David Simmonds Consultancy met with all 10 authorities of Greater Manchester, enabling future land use forecasts to be developed for work associated with the Local Development Framework (LDF). Data from these forecasts was used to alter the distribution of travel across Greater Manchester over time in line with Local Authority plans, for zones in Greater Manchester not covered by the detailed uncertainty log.

2.6 Production and attraction travel growth was constrained to NTEM 6.2 forecasts as required by DfT, at the Local Authority district level within Greater Manchester and Cheshire East and at the county level beyond.

2.7 HFAS and Atkins met with Manchester Airport Group (MAG) to understand their expectations for future passenger growth and employment growth both within the airport itself and on adjacent development sites being promoted by MAG. These assumptions were subsequently included in SEMMMS VDM forecasts.

2.8 Light and other goods vehicles are represented in the SEMMMS VDM base model. Growth forecasts from the National Transport Model (NTM) were applied to these freight matrices.

Developments

2.9 Following consultation with Stockport, Manchester City, Cheshire East and Trafford, Atkins developed an uncertainty log detailing the likelihood of future developments within the Area of Influence coming to fruition by 2017 and 2032. Consistent with TAG 3.15.5, schemes were categorised as:

- hypothetical;
- reasonably foreseeable;
- more than likely; and
- near certain.

2.10 Near certain and more than likely developments were included in the modelled scenario. MVA then constructed travel patterns for these developments exogenously to the SEMMMS VDM model, which were input to the future year demand matrices at the trip generation stage. Trip

rates for different types of land use were identified from the TRICS database by mode and time period for each development. The SEMMMS consortium required that 85th percentile trip rates were used to provide flows which provided a robust assessment of the operation of the road scheme. These trip ends were disaggregated into the SEMMMS VDM segments using purpose and car availability splitting factors, derived from the base shares of zones identified as having similar land use. Finally, distributions were applied to the trip ends, making use of purpose specific base year trip distributions associated with neighbouring zones.

LDF Growth

2.11 A detailed uncertainty log and subsequently representative travel patterns were derived for future developments for zones within the AofI of A6MARR as described above. By definition the accuracy of modelling in the AofI is of most importance to the appraisal of the scheme. However it was important to include some representation of changes to future land use across the county of Greater Manchester, in particular considering the proximity of the Regional Centre of Manchester City Centre to the AofI.

2.12 Previous work by MVA and David Simmonds Consultancy using GMSPM2 to represent the Local Development Framework provided a readily available dataset for redistributing trips across the rest of Greater Manchester, not just within the AofI. Growth factors were applied to production and attractions trip ends for zones within Greater Manchester (beyond the AofI of the scheme) based on forecasts of changes in trip making due to net gain in dwellings, office floor space and industrial floor space.

NTEM Growth

2.13 When creating the future year demand matrices input to SEMMMS VDM, changes were first made to the travel patterns associated with the developments within the AofI included in the uncertainty log. The information from the GMSPM2 LDF forecasts was then used to adjust travel patterns across the rest of Greater Manchester, but not within the AofI.

2.14 In a final step, trip end growth was controlled on to NTEM 6.2 forecasts. This was undertaken at the district level within Greater Manchester, the pre-April 2009 Cheshire East districts[1] and at the county level beyond (East Midlands, Derbyshire, Yorkshire, Lancashire and Merseyside). Growth for the 15 external zones was controlled to the NTEM growth forecast for Great Britain as a whole.

2.15 NTEM trip end growth factors were applied separately for productions and attractions, disaggregated by mode, purpose and household car availability.

Manchester Airport

[1] Cheshire County Council and six borough councils were abolished in April 2009 and replaced by two unitary authorities. The new Cheshire East Council covers the area of the old Macclesfield, Crewe and Nantwich, and Congleton borough councils.

2.16 Manchester Airport is a significant trip attractor within the AofI of A6MARR. Situated at the western end of the scheme future growth in passenger and employee travel would be expected to have a significant impact on scheme appraisal. HFAS and Atkins therefore met with representatives of MAG to understand their view on future changes to travel demand at the Airport. HFAS produced a note documenting the assumptions which would be included in forecasts, and these were agreed with MAG through further liaison.

2.17 The zoning system at Manchester Airport developed for 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 zone was used within the demand model to represent demand to/from Manchester Airport terminals (see Figure 2.2).

2.18 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 different 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 unlikely to impact on passengers and employees travelling to an Airport. For example air passengers have a very restricted set of airport choices, and time of day choice is strongly influenced by flight schedules.

2.19 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. Forecasts of passenger numbers were obtained from the UK Air Passenger Forecasts (central scenario). These forecasts are shown in Table 2.2.

2.20 Interpolation of these forecasts gave rise to a forecast of passenger demand of 18.6 million passengers per annum (mppa) in 2009. Appropriate growth factors were subsequently derived for growth in passengers, and hence passenger surface access trips, from 2009 to 2017 and 2009 to 2032.

Table 2.1 Growth in air passengers at Manchester Airport

Year	mppa	Index
2009	18.6	100
2017 (interpolated value)	23.1	124
2020	25.0	---
2030	35.0	---

2032 (interpolated value)	37.4	201

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

2.21 Growth in all person trips to and from Manchester Airport was assumed to increase by the same ratio as that of passengers. This assumption implies that the number of employees at the airport would increase in the same proportion as air patronage. MAG have reviewed these assumptions and agreed that they are reasonable.

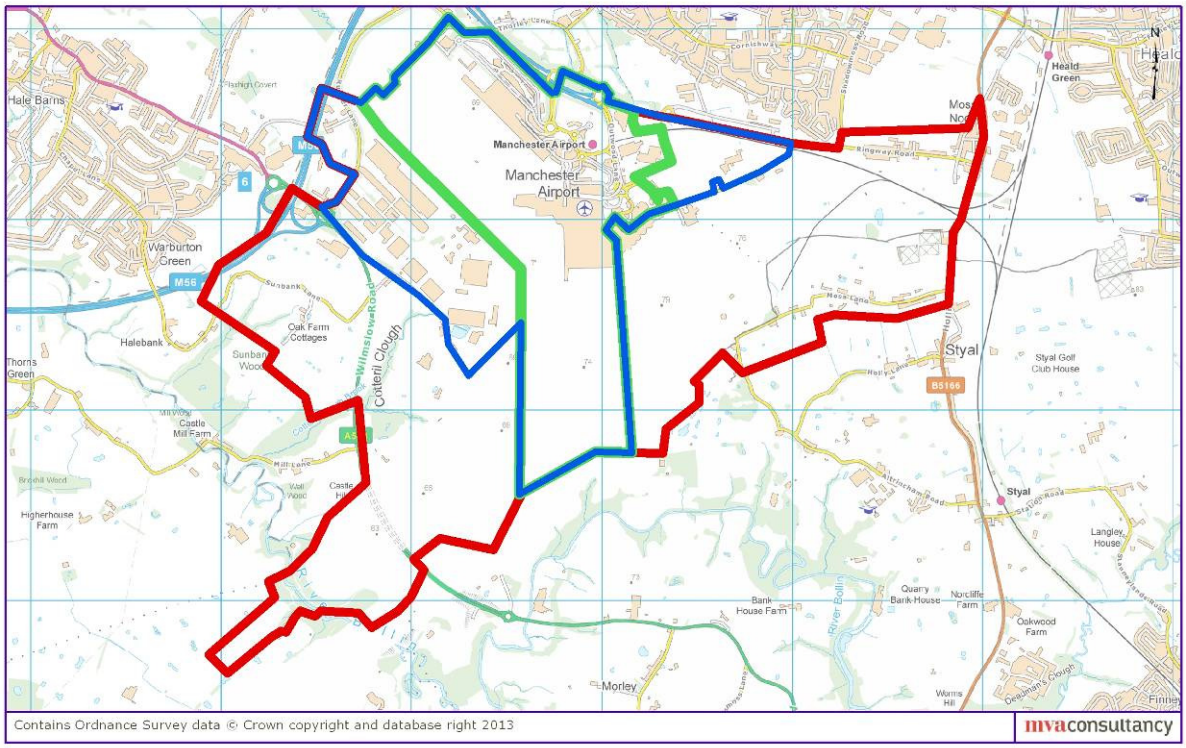

Figure 2.2 Manchester Airport Boundaries: Zones bounded by the RED line are included in the separate Airport demand segments. The BLUE line defines the demand management area and the GREEN line defines the terminal zones for which demand has been aggregated to a single zone and a mode split model is applied.

Freight Growth

2.22 Freight growth was applied uniformly across the whole model using data from the National Transport Model (NTM) 2009. The growth factors are shown in Table 2.3.

Table 2.2 Goods vehicle growth factors

Year	Goods vehicle type	Growth Factor (from 2009)
2017	LGV	1.19
	OGV	1.04
2032	LGV	1.65
	OGV	1.16

2.23 Separate goods vehicle trip end growth constraints were applied to Manchester Airport's cargo terminal (SEMMMS8 zone 288, SEMMMS VDM zone 25). Details of these growth factors are

given in section 4 of this note which provides more detail about forecasting of travel demand at Manchester Airport.

3 Supply Assumptions

3.1 Each highway and public transport (PT) scheme is determined to be either hypothetical, reasonable foreseeable, more than likely or near certain in 2017 and 2032. Table 2.1 above shows the allocation of schemes to scenarios.

Highway

3.2 Atkins made contact with the relevant local authorities and the Highways Agency in order to understand which highway schemes should be included in the do minimum networks at 2017 and 2032. HFAS subsequently coded these schemes on to the base year SATURN assignment networks and provided them to MVA for inclusion in the SEMMMS VDM.

3.3 The following highway schemes are included in the 2017 (do minimum and preferred scheme) networks. A556 Knutsford to Bowdon Improvements;

- M60 J12-15 widening;
- M60 J8 to 12 Managed Motorway Scheme (assumed to operate in morning and evening peak periods);
- Cross City Bus (Oxford Road);
- Highway impacts of Metrolink Phase 3B (Chorlton – Airport);
- Airport City Infrastructure;
- Manchester Airport Blue works (M56 J6);
- Manchester Airport Yellow works (Runger Lane);
- Poynton town centre enhancements; and
- Alderley Edge bypass (completed after the model base year).

3.4 The following additional schemes were determined to be near certain by 2032 and so are included in the 2032 do minimum and preferred scheme networks:

- Manchester Airport Red works (M56 J5-6 widening); and
- Western Gateway Infrastructure Scheme (WGIS) – full.

Public Transport Schemes

3.5 TfGM, Research & Intelligence provided the SEMMMS modelling team with a perspective on the likelihood that prospective public transport schemes will come to fruition across Greater

Manchester in 2017 and 2032. The list of schemes and their likelihood of completion is shown in Table 3.1.

Table 3.1 Likelihood of Completion of PT Schemes at 2017 and 2032

Scheme	2017	2032
Metrolink: Chorlton to East Didsbury	Near Certain[2]	Near Certain
Metrolink: Droylsden to Ashton	Near Certain	Near Certain
Leigh-Salford-Manchester Busway	Near Certain	Near Certain
Airport and 2CC - Metrolink	Near Certain	Near Certain
Altrincham Interchange	Near Certain	Near Certain
Elements of Cross City Bus Package	Near Certain[3]	Near Certain
Park and Ride in Greater Manchester	50% NC 50% MTL	50% NC 50% MTL
Fund contributions to stations	50% NC 50% MTL	50% NC 50% MTL
Metrolink - Trafford Park	Hypothetical	Hypothetical
Stockport Interchange	Hypothetical	Hypothetical

Source: TfGM Research + Intelligence

3.6 The modelled scenario includes those schemes which are near certain or more than likely to come to fruition by 2017 or 2032. However, the park and ride schemes and funding contributions to stations are not included in the scenario definition as no scheme specifications were available.

3.7 Following the discussions with MAG, the Metrolink extension to Manchester Airport was assumed more than likely for both the opening and design years. Completion of this scheme is a high priority for Manchester Airport, is a key element in the Airports Ground Transport Plan and construction is currently ongoing.

3.8 Hence, the PT schemes included in the opening and design years are:

[2] Funding for the Chorlton to East Didsbury and Droylsden to Ashton Metrolink extensions were confirmed by the Chancellor of the Exchequer in the 22nd June 2010 Emergency Budget.

[3] Funding confirmed by DfT in December 2011.

- Metrolink: Chorlton to East Didsbury;
- Metrolink: Droylsden to Ashton;
- Metrolink: Airport and 2CC;
- Leigh-Salford-Manchester Busway; and
- Altrincham Interchange.

3.9 Further details of the coding of these schemes are available in Appendix A. These schemes were coded by MVA based on coding from previous modelling work. Bus services were adjusted to fit the revised networks following the addition of the highway schemes.

Public Transport Fares

3.10 Public transport fares have been assumed to rise at 1% per annum above the growth in RPI between 2009 and 2017 and 2032. This is in line with the Department for Transports' guidance on changes in public transport fares, and is based on increases in regulated rail fares (TAG 3.15.4, 5.2.2).

3.11 It is assumed that the current ticketing options available to passengers of all modes are those that would be available in the future, as is implicitly assumed in the fare tables.

Values of Time

3.12 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.

Vehicle Operating Costs

3.13 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.

Definition of Preferred Scheme

3.14 The preferred scheme that has been assessed in these forecasts is that of Design Freeze 7. It has been represented as a two lane dual carriageway with a mixture of grade separated and at-grade junctions. The key junctions are:

- B5166 Styal Road – signalised;
- B5358 Wilmslow Road – grade separated;
- A34 Kingsway / Handforth Bypass – grade separated;
- A5102 Woodford Road - grade separated;
- Bramhall Oil Terminal – signalised;
- A523 Macclesfield Road – signalised; and

- A6 Buxton Road – signalised.

3.15 The scheme also includes upgrading the existing Ringway Road West from Shadow Moss Road to the M56 spur at the airport from 2-lane single carriageway to dual 2-lane road.

4 Treatment of Manchester Airport

4.1 Following their discussions with MAG, HFAS produced a note "*Modelling of Manchester Airport – Forecasting Assumptions*", which set out what assumptions would be made in SEMMMS VDM with regard to future travel to/from Manchester Airport and likely infrastructure enhancements.

4.2 The passenger and airport related employee assumptions were covered in Section 2 of this note.

4.3 Figure 4.1 shows the zones around Manchester Airport, some of which are discussed in the following sections.

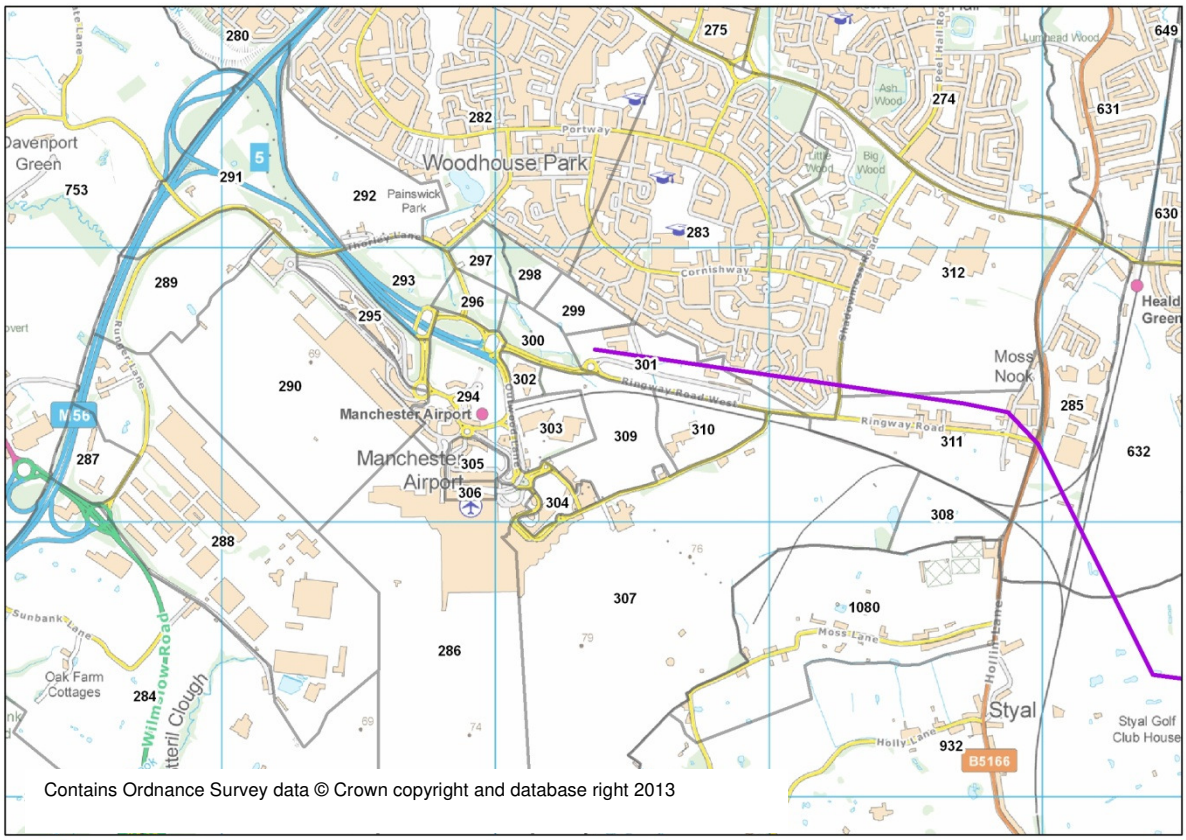

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Figure 4.1 Manchester Airport Assignment Model Zones

Freight

4.4 Goods vehicle growth forecasts were calculated based on a combination of previous demand forecasts for the Blue/Yellow works and floor space figures taken from MAG's "*The Need for Land*" document (June 2010)[4]. The final assumptions which were applied to both light and other goods were:

- 49% and 45% growth in goods traffic to/from the Cargo Centre (SEMMMS8 zone 288, SEMMMS VDM zone 25) between 2009 and 2017 for AM and PM peak hours respectively;
- 49% growth between 2009 and 2017 for the inter peak goods traffic to/from the Cargo Centre (based on the AM peak outbound growth from the Blue/Yellow works forecasts i.e. the higher of the peak figures); and
- 51% growth in goods traffic to/from the Cargo Centre between 2017 and 2032 (all periods) in line with the Airport's projected growth (2013 to 2030) in floor area; this will be a robust estimate as it will assume that the level of floor area growth is reflected directly in the growth of goods vehicle movements.

4.5 For all other Airport zones, goods vehicle trips were assumed to grow in line with NTM forecasts to 2017 and 2032 (see section 2 of this note).

Parking

4.6 It is estimated that by 2032 there will be a need for an additional 18,000 to 32,400 additional car park spaces for passenger use and approximately 4,400 spaces for staff use (source: "*The Need for Land*" – MAG). Furthermore, it is anticipated that some existing long stay car parks will need to be relocated to allow expansion of the apron areas.

4.7 Following discussion with MAG, the following assumptions have been made:

- Long stay parking displaced from the Sydney Avenue area (SEMMMS8 zone 289, SEMMMS VDM zone 26) will be relocated to Oak Farm (SEMMMS8 zone 284, SEMMMS VDM zone 21).
- Long stay parking displaced from the Ringway Road area (SEMMMS8 zone 309 and 310, SEMMMS VDM zone 46 and 47) will be relocated to land north of Ringway Road and east of Shadow Moss Road (SEMMMS8 zone 311, SEMMMS VDM zone 48). The new car park is in the area covered by zone 312, however the connections for zone 311 are a good representation for the car park, and connect into Ringway Road between the junctions with Shadow Moss Lane and Hollin Lane.
- Short stay parking within the central terminal area will be assumed to expand to meet demand. Growth in trips to the airport terminals has been allocated to the zones representing the short stay parking areas whilst the zones representing the pick up and drop off areas have been assumed to remain constant.

[4] http://www.manchester.gov.uk/download/13737/manchester_airport-the_need_for_land

4.8 As suggested by MAG, privately operated Airport-related car parks in the Moss Lane area (SEMMMS8 Zone 1080, SEMMMS VDM zone 190) will be assumed to remain at current levels (i.e. no growth over time).

Non-flight Related Airport Developments

4.9 There are two commercial developments for Manchester Airport to be included in future year forecasts under all three scenarios. These are:

- Airport City (formerly know as the Burford site); and
- Manchester Business Park (formerly know as the Arlington/Goodmans site).

4.10 The following assumptions have been made for the developments:

- For Airport City (Burford), it is assumed that the site is fully developed and occupied by 2032; development/occupation by 2017 is assumed to be 50%.
- For Arlington/Goodmans, that the site is fully developed by 2032 development/occupation by 2017 is assumed to be 66%. These figures reflect the fact that about a quarter of the permitted floorspace is currently built and occupied (by Cuzzons, Regus and Ericcson).

Table 4.1 Estimated Floorspace and Jobs on the Airport City and Goodmans Development Sites

	Airport City / Burford	Goodmans / Arlington
Permitted Floorspace (B1)	50,000	62,700
Occupied 2009	0	17,065
Occupied 2015	25,000	41,800
Occupied 2030	50,000	62,700
Jobs 2009	0	806
Jobs 2015	1,180	1,970
Jobs 2030	2,360	2,960

Mode Shares

4.11 MAG has set a target of 40% of trips to and from Manchester Airport being by non-car modes. The Airport Masterplan states that this will be achieved by:

- promotion of public transport;
- completion of the Airport extension to the Metrolink network;
- developing a mix of off site park-and-ride and on site parking;
- discouraging "kiss and fly" and taxi use; and
- use of demand management techniques designed to discourage private vehicles entering the airport area.

4.12 The Airport Metrolink extension and demand management measures have been incorporated in each scenario within SEMMMS VDM, such that increases in the cost of car trips to/from the airport relative to other modes will lead to reduction in mode share for car. However SEMMMS VDM does not aim to explicitly meet the 40% mode share target for non car trips set by Manchester Airport. Rather the calibrated VDM predicts mode choice (along with destination choice and time-of-day choice) based on the generalised cost of each alternative.

4.13 Demand to and from Manchester Airport is modelled in separate demand segments to the rest of the model, allowing only mode split changes to be modelled, i.e. no distribution or macro time of day response to cost changes. This ensures that the increase in cost of car travel to/from the airport can only result in a modal switch rather than a destination or time of day switch.

5 Forecast Model Convergence

5.1 As shown in Table 5.1 all of the forecast models reach a good level of convergence based on the the DfT %Gap statistic (TAG 3.10.4, 1.5), which states that a value of 0.2% should be achieved. For both the 2017 and 2032 tests the GAP statistic is less than 0.2%. This is an improvement on previous forecasts as it was decided to run the 2032 tests for a further 2 loops at the expense of additional run time.

Table 5.1 GAP Statistics

	2017	2032
Do-Minimum	0.113	0.184
Do-Something	0.111	0.185

6 Forecasts

6.1 An EXCEL workbook has been prepared to accompany this note containing summaries of 2009 base year trip making as well as 2017 and 2032 future year input and outturn trip matrices:

- TN16 v9 – A6MARR Core Forecasts DF7.xls;

6.2 The matrices input to the VDM reflect changes in land use, income and car ownership. The outturn matrices produced by the VDM additionally reflect the impacts of changes in the generalised costs of travel.

6.3 Data is presented on a 4x4 sector system and a 16x16 sector system. The 4x4 system is the Area of Influence, Rest of Greater Manchester, Buffer and External areas of the model. The sixteen sector system is shown as Figure 6.1.

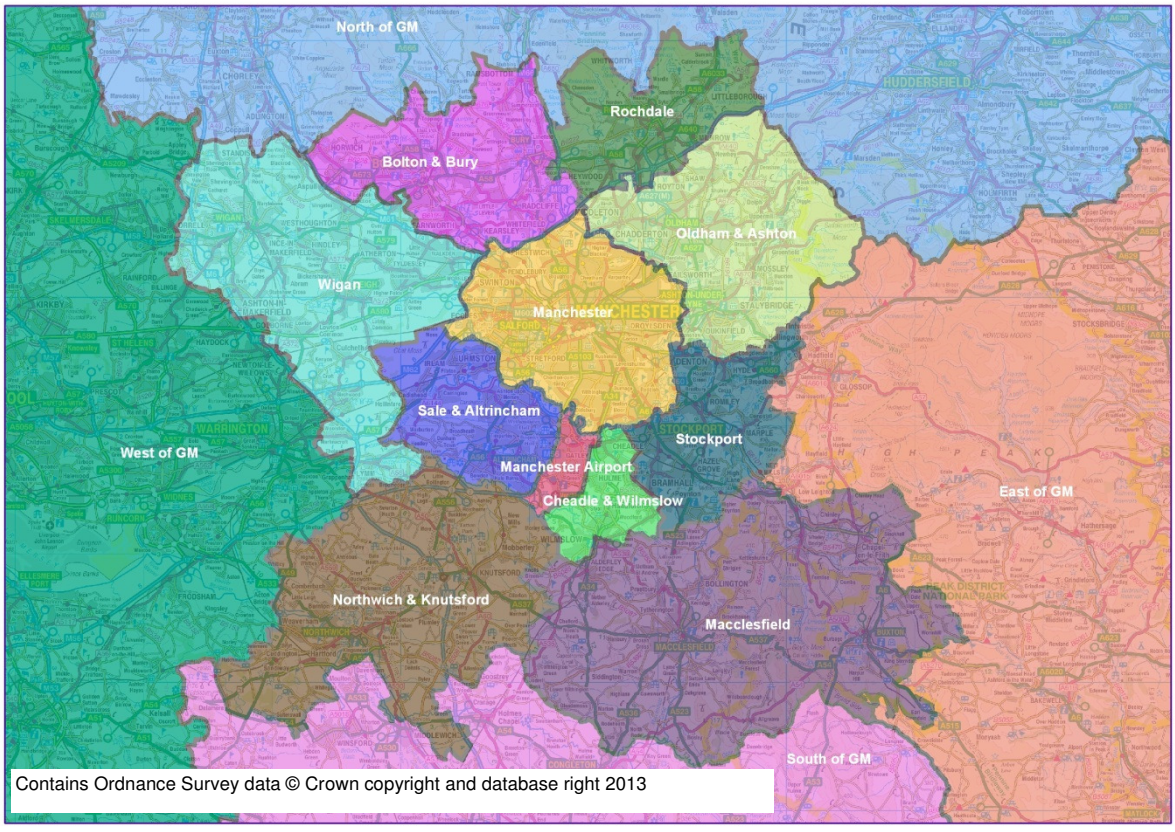

Figure 6.1 – 16 Sector System

Core Scenario Do Minimum Forecasts

6.4 In this section, we describe the headline transport outturns of the Core scenario do minimum forecasts at 2017 and 2032.

6.5 Table 6.1 shows the percentage changes relative to the base matrices of the unconstrained input matrices and congestion constrained outturn demand matrices for the do minimum forecasts at 2017 and 2032. Highway congestion operates to constrain car demand within the model both at 2017 and 2032, with demand switching to PT.

Table 6.1 All day trip changes relative to the 2009 base model for the do minimum, 2017 and 2032 input and output whole model demand matrices – Core scenario

	Car	PT	Walk/Cycle
2009 Base Year Trips	23,033,671	3,210,156	11,249,688
2017 Unconstrained Input Matrix	10.1%	-3.9%	-0.7%
2017 Do Minimum Output Matrix	9.7%	-1.1%	-0.6%
2032 Unconstrained Input Matrix	23.2%	-3.3%	2.3%
2032 Do Minimum Output Matrix	23.5%	0.0%	0.9%

6.6 Growth from the base to the forecast year input matrices reflects TEMPRO growth factors (10% for car and -4% for PT at 2017). There is less growth within the AofI (6% at 2017 and 13% at 2032 for car) as there is relatively less development compared to other parts of Greater Manchester, most notably the Regional Centre.

6.7 The do minimum output matrices show an increase in longer distance car trips (in particular AofI <> Buffer/External) and a decrease in shorter trips (within AOfI/GM) 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.

6.8 As one would expect 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 5% to 2032.

6.9 Changes in total car trips from each sector are shown in Table 6.2. It can be seen from the spreadsheet that the matrices are symmetrical and hence the trends shown are representative of all trips to/from each sector. The largest growth is in trips from Manchester Airport and the Manchester district as this is where the majority of the developments are situated.

Table 6.2 All Day Car Trip changes by sector

Sector	Base Trips from Sector	Change to 2017 Do Minimum	Change to 2032 Do Minimum
Manchester Airport	124,640	20%	51%
Cheadle & Wilmslow	276,449	4%	10%
Stockport	527,654	8%	21%
Sale & Altrincham	483,997	7%	20%
Manchester	1,607,445	13%	27%
Knutsford & Northwich	231,971	6%	13%
Macclesfield	306,023	10%	26%
Wigan	935,434	9%	21%
Bolton & Bury	798,760	5%	9%
Rochdale	380,374	7%	1%
Oldham & Ashton	798,315	9%	25%
North of GM	7,431,429	12%	31%
East of GM	3,274,880	11%	26%
South of GM	1,650,207	8%	20%
West of GM	4,180,905	7%	14%
External	25,189	14%	41%
Total	**23,033,671**	**10%**	**23%**

6.10 In summary, the sector to sector trip matrices by mode presented in the spreadsheet show plausible changes in the demand relative to the base model for the 2017 and 2032 do minimum forecasts. The unconstrained demand matrices input to SEMMMS VDM have been

controlled to NTEM 6.2 forecasts at the district level within Greater Manchester and Cheshire East and at the county level beyond.

6.11 The results presented in this section for the do minimum forecast are almost identical to those presented in the previous version of this note for Design Freeze 6. This is to be expected since there have only been very minor changes to the inputs to the do minimum tests for the DF7 work.

Preferred Scheme Forecasts

6.12 In this section, we describe the headline transport outturns of the preferred scheme forecasts at 2017 and 2032.

6.13 As one would expect the scheme produces 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 AofI to the buffer area at the expense of PT.

6.14 Distributional effects of the scheme can be seen by looking at the 16x16 sector changes from the do minimum. There are modest reductions in car trips on some sector pairs (<4%) where trips are redistributed as a result of the scheme. The largest percentage increases can be seen on the following sector pairs:

- Manchester Airport – East of GM (10% at 2017 and 11% at 2032);
- East of GM – Manchester Airport (11% at 2017 and 11% at 2032);
- Cheadle & Wilmslow - East of GM (24% at 2017 and 20% at 2032);
- East of GM – Cheadle & Wilmslow (22% at 2017 and 19% at 2032);
- West of GM – Stockport (13% at 2017 and 13% at 2032);
- Stockport – West of GM (12% at 2017 and 13% at 2032);
- Knutsford & Northwich – East of GM (16% at 2017 and 12% at 2032); and
- East of GM – Knutsford & Northwich (13% at 2017 and 10% at 2032).

6.15 As can be seen from the sector map these are all movements that cross the AofI, which will benefit through improved journey time as a result of the scheme. In addition to the sector pairs listed above, there are also some significant absolute increases in car trips (albeit with smaller percentage increases) on movements within the AoI which will make use of the scheme (e.g. Stockport to Manchester Airport, Cheadle/Wilmslow to Sale/Altrincham).

6.16 As one would expect the changes in mode share and average trip length are marginal between the 2017 and 2032 do minimum and preferred scheme forecasts respectively.

6.17 In summary, the changes in 16x16 sector to sector car trip matrices for the scheme are in the appropriate geographical locations and are of a sensible order. The most significant sector to

sector increases identified above are slightly (2-3% points) larger than those reported in the previous version of this note for the DF6 forecasts.

7 Appendix A: Public Transport Do Minimum Scheme Details

Metrolink

7.1 The committed Metrolink Capacity and Renewals programme and the Phase 3a extensions to the network were included in the Do Minimum strategies at both 2017 and 2032. The Capacity and Renewals work began in 2007 and work on the construction of the Phase 3a extensions is well progressed, with phased openings between 2010 and winter 2013/14. Representation is included of the Metrolink extensions from Chorlton to East Didsbury, Droylsden to Ashton, and Media City to Cornbrook.

7.2 The Metrolink extension to Manchester Airport is included in both 2017 and 2032. Introduction of the Metrolink extension requires the second city crossing to be implemented in order to accommodate the number of trams that will then be accessing Manchester City Centre. MVA has assumed the following schedule of Metrolink services which reflects assumptions previously agreed with GMPTE, Research and Intelligence and used for forecasts on their behalf.

Table 7.1 Metrolink Service Patterns Including Manchester Airport Extension

Service	Via	Trams per Hour
Bury to Altrincham	Mosley Street	5
Bury to Ashton	Piccadilly	5
Altrincham to Ashton	Piccadilly	5
Piccadilly to Eccles		5
Shaw to Airport	Oldham Town Centre and 2CC	5
Rochdale Station to Airport	Oldham Town Centre and 2CC	5
Media City to Piccadilly		5
East Didsbury to Victoria	2CC	10

Bus

7.3 Bus service patterns and frequencies have been assumed to be unchanged from those in the modelled base year of 2009.

7.4 In addition elements of the Cross City Bus Package and the Leigh Salford Manchester guided bus way scheme are included in both 2017 and 2032.

Table 7.2 Cross City Bus Service Frequency (buses per hour)

Line	AM	IP	PM	Evening
Manchester Royal Infirmary and Leigh	4	3	4	2
Manchester Royal Infirmary and Atherton	4	3	4	2
Manchester Royal Infirmary and Middleton	6	6	6	2
Parrs Wood and Pendelton	6	6	6	2
Christie Hospital and Pendleton	6	6	6	2

7.5 A service frequency of 6 services per hour in each direction has been assumed for the Leigh Salford Manchester guided bus way scheme

Rail

7.6 Rail service patterns and frequencies have been assumed to be unchanged from those in the base year of 2009.

Interchanges

7.7 Altrincham Interchange has been represented through a set of explicit generalised cost adjustments. The best available assumptions were those which were previously agreed with GMPTE and used in modelling of the Transport Innovation Fund bid and later work on Greater Manchester Scheme Prioritisation. All trips interchanging between Metrolink and other public transport sub-modes in the A6MARR public transport base model received a -1.52 minute adjustment. Trips interchanging from bus to bus received a -1.22 minute adjustment.