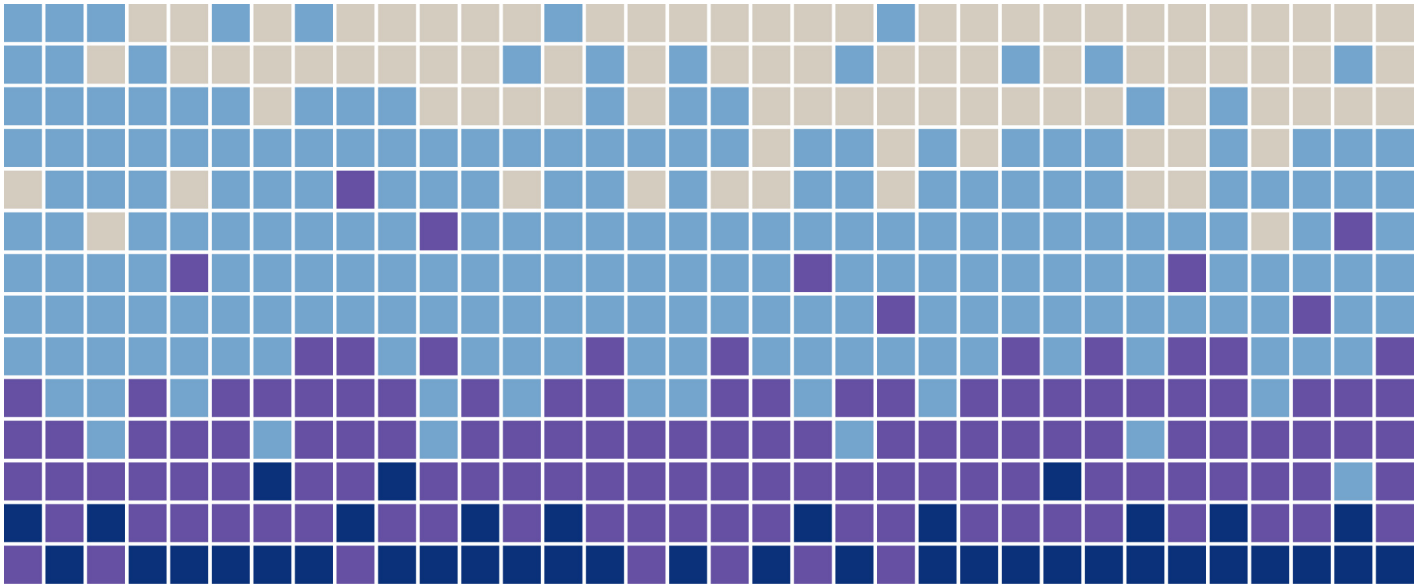


West Berkshire LDF – Phase 2 Assessment Newbury and Thatcham

West Berkshire Council

November 2009

QM

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
Remarks	Final	Final	Final	
Date	22/07/09	25/08/09	23/11/09	
Prepared by	Tom Beck	Tom Beck	Tom Beck	
Signature				
Checked by	Steve Salter	Steve Salter	Steve Salter	
Signature				
Authorised by	Peter Day	Steve Salter	Peter Day	
Signature				
Project number	11570223-TT4	11570223-TT4	11570223-TT4	
File reference	N:\West Berkshire LDF Support\TEXT\REPORTS\West Berkshire LDF 091119.doc			

WSP Development and Transportation
Mountbatten House
Basing View
Basingstoke
Hampshire
RG21 4HJ

Tel: +44 (0)1256 318800
Fax: +44 (0)1256 318700
http://www.wspgroup.com

Contents

Executive Summary

INTRODUCTION

WSP has been commissioned to assist in the investigation of the transport related impacts of delivering the Local Development Framework housing target for West Berkshire Council 2006 - 2026. The investigation is being conducted in two phases. Phase 1 of the Study undertook a review of the impact of potential strategic residential development locations across West Berkshire. This report covers Phase 2 of the Study, which includes a more detailed review of potential sites selected on the basis of transport and other key determining criteria.

STUDY OBJECTIVES

The objective of this study is to compare the impact of the alternative LDF development sites on the transport network in West Berkshire. The study has examined:

- The impact of each development site on the transport network and identification of key congestion hotspots
- Necessary transport mitigation measures to enable delivery of each site
- The viability of each site for inclusion within the preferred development scenario for the Core Strategy.

This study defines the preferred mix of development sites within the Newbury and Thatcham area and presents conclusions on the mitigation package required for each site.

STUDY APPROACH

A methodology has been adopted which integrates a highway model with a public transport model to assess the development impact. The traffic situation for 2006 and forecast for 2026 with committed development was assessed. Assumptions have been made around the trip characteristics of each development site, derived from TRICS trip rates. These rates have been reduced as a result of parking demand management measures, travel planning measures and walking and cycling measures. The impact of each new development on the highway network has been assessed considering the impact of sustainable transport measures.

STUDY RESULTS

The study has confirmed that there is a significant increase in congestion expected across the whole network as a result of overall background traffic growth between 2006 and 2026. This will mean that the majority of the network is over capacity by 2026.

Public transport services cover their costs for Sandleford Park (2000 household scenario) and North Newbury, but small amounts of funding support are required for Newbury Racecourse, Siege Cross Farm and Sandleford Park (1000 households).

The required pedestrian and cycle improvements for each site can be delivered without significant cost and can be delivered within relatively short timescales.

STUDY CONCLUSIONS

Due to the proximity of the development sites to Newbury town centre, developing a discrete set of mitigation packages for each site is not the most effective way of delivering cost effective highway solutions for large new development sites.

There are a number of requirements for highway mitigation which benefit all of the development sites as well as Newbury as a whole. These common requirements are best taken forward as a package, since they then form the foundation for a robust financial contributions policy. The common requirements for the mitigation include:

- The need for additional highway capacity since the current network is at full stretch. The provision of some of this capacity can be achieved through shifting car journeys to other modes and modifications to road alignments, lane widths and junction types. When capacity ceilings are reached with these interventions it is considered necessary to provide additional highway capacity linking the A4 and A339 ;
- Consistency of junction type along A339 to enable more effective flow management; with junctions managed through a common management system;
- Appropriate provision of bus priority along the A339 to enable effective provision of improved bus services;
- Effective traffic management at gateways into the town and on routes accessing the A339 to deter rat running by through traffic.

A careful balance is required between providing additional highway capacity and demand management of the existing highway. Providing additional highway capacity will benefit most new development coming forward within the Newbury area. There will be an opportunity to share the costs of new highway infrastructure across all new development.

STUDY RECOMMENDATIONS

The above measures should be supported by site specific public transport services, and when highway mitigation and sustainable transport measures are considered together, the following locations and sizes of development sites are recommended:

- Racecourse (1500 homes);
- Sandleford Park (1000 homes);
- North Newbury (1000 homes)

NEXT STEPS

The implications of the new development sites could be understood in greater detail by separately testing each site with and without additional highway capacity between the A4 and A339.

Further analysis can provide:

- Confirmation of the recommended mitigation packages for each site;
- Testing agreed highway mitigation packages within combined highway and public transport model;
- Costings of the recommended measures;

The above elements will provide the basis for completing the sound and robust evidence base as part of West Berkshire's Core Strategy. The modelling and assessment work undertaken for the LDF will also provide valuable input to the development of the West Berkshire Transport Vision.

1 Introduction

1.1 BACKGROUND

1.1.1 All Planning Authorities in England have to produce a Local Development Framework (LDF) comprising a number of documents which outline the spatial planning strategy for their local area. The Core Strategy is the central document of the LDF development. Policies and proposals in the Core Strategy must be based on a robust evidence base and will be tested at Examination in Public (EIP) prior to adoption by the Local Authority.

1.1.2 The West Berkshire Core Strategy will set out the spatial vision and overarching strategy for the district up to 2026. It also seeks to identify strategic development sites which are essential to delivering the spatial vision for West Berkshire. The site selection process must be based on a wide range of evidence including not just transportation issues but also issues associated with the ability to deliver development sites...

1.1.3 To this end, WSP has been commissioned to assist in the investigation of the transport related impacts of delivering the Local Development Framework housing target for West Berkshire Council. The investigation is being conducted in three phases. Phase 1 of the Study undertook a review of the impact of sixteen potential residential development locations across West Berkshire. Phase 2 of the study includes a more detailed review of potential sites selected as preferred options on the basis of transport and other key determining criteria. A further phase (Phase 3) will provide a detailed assessment of preferred site mitigation measures and the timescale for their delivery. This report summarises the Phase 2 assessment.

1.1.4 The methodologies used in both the Phase 1 and Phase 2 assessments have been discussed with key stakeholders, including the Highways Agency.

1.1.5 PPS12 explains that the LDF must be based on a “robust and credible evidence base” which is appropriate to the level of planning. This will enable the LPA (Local Planning Authority) to develop an effective core strategy which is

- Deliverable
- Flexible
- Able to be monitored

1.1.6 This report forms one of a suite of background documents which will inform the Strategic Environmental Assessment and therefore inform the selection of “the most appropriate strategy” when considered against reasonable alternatives.

1.2 STUDY OBJECTIVES

1.2.1 The objective of this study is to compare the impact of alternative LDF development sites on the transport network in West Berkshire. The study will examine:

- The impact of each development site on the transport network and identification of key congestion hotspots
- Necessary transport mitigation measures to enable delivery of each site
- The viability of each site for inclusion within the preferred development scenario for the Core Strategy.

1.2.2 The study will also define the preferred mix of development sites within the Newbury and Thatcham area and present conclusions on the mitigation package required for each site.

1.3 REPORT STRUCTURE

1.3.1 The remainder of this report provides details on how the Phase 2 study has been progressed, it includes:

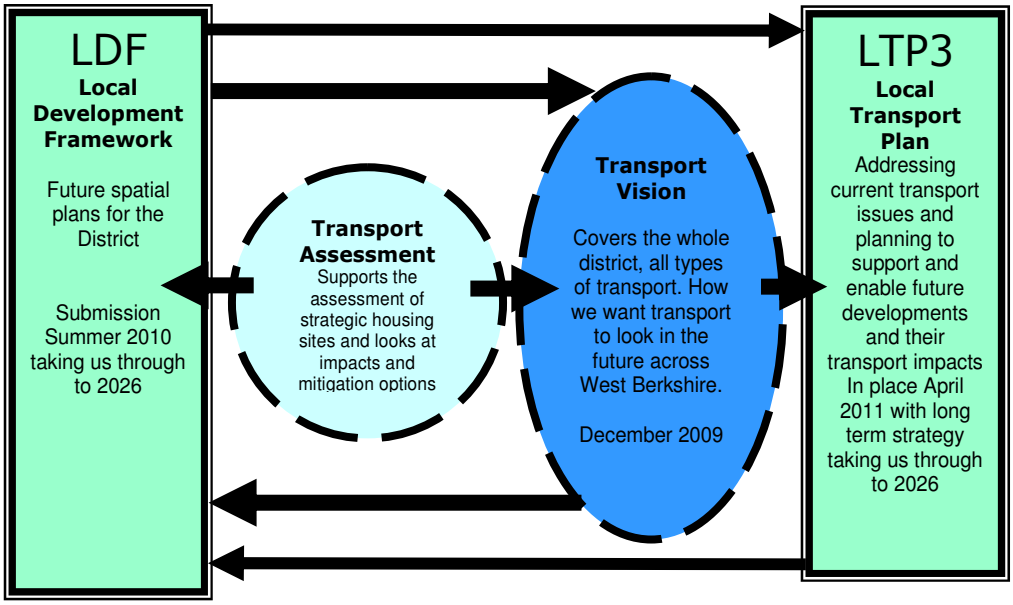
- Chapter 3 – Assessment Framework discusses the assumptions upon which forecast traffic, trip generation and distribution for sites were determined. It also describes the framework for the assessment of development impact on the traffic network;
- Chapter 4 – Development Impact without Mitigation; analysis of modelling results for development sites.
- Chapter 5 – Sustainable Transport Mitigation Measures; identifies the public transport, walk and cycle improvements proposed to serve each of the LDF development sites.
- Chapter 6 – Development Impact with Sustainable Transport Mitigation Measures; tests the benefits of proposed sustainable mitigation measures using the Public Transport Model.
- Chapter 7 – Outline of Highway Mitigation Measures; identifies potential highway mitigation measures;
- Chapter 8 to 11 - Summary of Mitigation Packages; these chapters summarise the package of mitigation measures for each LDF development site;
- Chapter 12 – Summary and recommendations of the study

2 Study Context

2.1 INTRODUCTION

2.1.1 This study is intended as a strategic exercise to enable comparison of identified LDF development sites. This builds on the initial assessment of potential development clusters undertaken in Phase 1, which was undertaken during 2008. The transport assessment has been prepared with due consideration of the relevant policies in the South East Plan (May 2009) as applicable to West Berkshire and the Highways Agency guidance on LDF Transport Assessment (Circular 2/07: Planning and the Strategic Road Network, Highways Agency, 2007). Figure 2.1 below sets out how the LDF Assessment relates to work being undertaken by West Berkshire on Local Transport Plan 3 (LTP3) and its Transport Vision.

Figure 2.1 Interrelationship between West Berkshire Strategic Planning Documents



2.1.2 West Berkshire Council has been set a target, as set out in the South East Plan, for the delivery of at least 10,500 new dwellings within the district by 2026. The Council has taken a policy decision to deliver some of the new development through sustainable urban extensions (developments of 500 or more dwellings). The Council has recommended that a proportion of this new housing be provided as part of a sustainable urban extension to Newbury and Thatcham. Smaller scale housing allocations (under 500 homes) will be identified later in the LDF through the Site Allocations and Delivery Development Plan Document (DPD).

2.1.3 Accommodating this level of new development will have implications for the local and strategic highway network, the level of investment in travel demand management and, potentially, new infrastructure that may be required to mitigate the transport impacts associated with new development. The way in which this new development is accommodated will take account of a number of pieces of guidance which have been used to inform the recommendations made as part of this study:

- Masterplanning checklists for Sustainable Transport in new developments, *Campaign for Better Transport*, September 2008

- DfT Circular 02/2007 issued on 7 March 2007 covering Planning and the Strategic Road Network
- Best Practice in Urban Extensions and New Settlements, A Report on emerging good practice, *TCPA 2007*

2.1.4 The Council is currently considering the employment land use allocation and the relationship of housing to employment. This will take account of the guidance on employment within the Regional Spatial Strategy to ensure that West Berkshire's designations for employment land use are in keeping with those for the region.

2.1.5 This study considers the situation within West Berkshire; it does not assess the traffic impact of developments in neighbouring authority areas. There is an obligation for all districts to undertake their own LDF transport assessment, and such studies are being undertaken within bordering local authorities. It is beyond the scope of this study to combine neighbouring assessments at this stage, given the nature of the Core Strategy, and the fact that a number of broad development options will be consulted upon. However, this study will examine any significant traffic impacts outside West Berkshire caused by developments within the study area.

2.1.6 There is also liaison with neighbouring authorities in order to discuss important cross-boundary issues. These discussions will identify any major impacts of which the different LDF Core Strategies will need to take account. Any transport issues from neighbouring authorities emerging within the timescales of the preparation of West Berkshire's Core Strategy will be considered within any assessment work following this study.

2.2 SUMMARY OF PHASE 1 FINDINGS

2.2.1 The Phase 1 study examined the suitability of 16 clusters within West Berkshire as potential sites for new residential development. The Phase 1 study formed the transport component of the wider sustainability appraisal and within it the sites were assessed using a series of highway and sustainable mode criteria to provide a ranking of the suitability of these clusters for development.

2.2.2 Potential locations for residential development were identified by West Berkshire Council, and their suitability for development has been assessed using existing datasets and traffic models developed on behalf of the Council, and set against:

- A qualitative audit of clusters in terms of potential to support and encourage sustainable travel patterns; and
- The impact of potential residential development trips on the road network.

2.2.3 The results of the assessment indicate that those areas most suited for development in the Newbury and Thatcham area are those which are closest to existing centres, (notably Newbury Town Centre),. A summary of the assessment results from Phase 1 is illustrated in Table 2.1 below:

Table 2.1 Combined Ranking of Clusters from Phase 1 Assessment

ID	Cluster	Number of households	QUALITATIVE ASSESSMENT								QUANTITATIVE ASSESSMENT						TOTAL SCORE
			Congestion		Accessibility		Public Transport			Sub-Total	Impact on Road Network					Sub-Total	
			Road Improvements	Proximity to Walk/Cycle Route Network	PT/Walk Access to Major & District Centre	Provision of Local Facilities	Proximity to Rail Stations	Potential for Bus Improvements	LTP Identified Public Transport Improvements		Network Performance	Congestion on Key Links	Journey Times on Local Routes	Journey Times on Strategic Routes	Local Re-assignment		
P	Newbury & Thatcham Gap	750	0	2	2	2	1	2	0	9	0	0	-1	0	-1	-2	7
K	Theale - Near Junction 12	500	0	2	2	2	1	1	0	8	0	0	-1	0	0	-1	7
L	Tilehurst - Turnhams Farm	800	0	2	2	1	0	2	0	7	0	0	-1	0	0	-1	6
B	South Newbury - Rugby Club	1200	0	2	1	2	1	2	0	8	0	0	-2	0	-1	-3	5
G	Newbury Racecourse	1400	0	2	1	2	1	2	0	8	-2	0	-1	0	-1	-4	4
N	Thatcham - Siege Cross Farm	1000	0	2	1	1	1	2	0	7	0	0	-1	0	-2	-3	4
O	Thatcham - North of Bowling Green Road	500	0	2	1	2	0	1	0	6	0	0	-1	0	-2	-3	3
E	Greenham	500	0	2	0	2	1	2	0	7	-2	0	-1	0	-2	-5	2
A	North Newbury	1500	0	1	1	2	1	2	0	7	-1	-1	-1	-1	-1	-5	2
I	Hungerford	500	0	1	2	2	1	-2	0	4	-1	0	-1	0	0	-2	2
F	West Newbury	1000	0	2	0	2	1	2	0	7	-2	0	-2	0	-2	-6	1
H	North Tadley - Silchester Road	500	0	0	1	1	-2	2	0	2	0	0	-1	0	0	-1	1
C	South Newbury - Sandleford Park	2500	0	1	0	2	0	2	0	5	-2	0	-2	0	-2	-6	-1
M	Kennet Valley Park	7500	0	2	1	0	0	2	0	5	-2	-1	-2	-1	-2	-8	-3
D	South Newbury - Wash Water	500	0	0	0	1	0	-2	0	-1	0	0	-1	0	-2	-3	-4
J	Hermitage - Denison Barracks	500	0	0	0	0	-2	-2	0	-4	0	0	-1	0	-1	-2	-6

2.2.4 From the above table it can be seen that on purely transport grounds the preferred locations for residential developments in Newbury and Thatcham are:

- Newbury and Thatcham Gap
- South Newbury – Rugby Club (Forms part of the Sandleford Park Site)
- Newbury Racecourse
- Thatcham – Siege Cross Farm
- Thatcham – North of Bowling Green Road
- Greenham
- North Newbury

2.2.5 This Phase 2 study was undertaken as a separate study on Newbury and Thatcham. Potential development sites within the eastern area have been looked at separately.

2.2.6 More details on the selection of preferred sites for residential development are provided in West Berkshire's "Options for the Future, Combined Strategic Housing Sites Appraisal Document" (April 2009).

2.3 SUMMARY OF LDF PREFERRED SITES

2.3.1 Following the outcomes of the Phase 1 transport study and additional aspects of the sustainability appraisal, Newbury Racecourse was identified as a preferred site for strategic development and sites at North Newbury, Sandleford, and Siege Cross were considered as reserve sites in the Core Strategy Preferred Options document. Therefore the following sites within the Newbury and Thatcham area were identified as needing further analysis to confirm their suitability as sites for new development:

- Newbury Racecourse
- Sandleford Park
- Siege Cross Farm (Thatcham)
- North Newbury

2.3.2 The location of each major potential residential development site is illustrated in Figure 2.2 below and Figure 2.3 in the Figures Section at the end of the report.

2.3.3 West Berkshire Council has therefore commissioned this Phase 2 LDF study to examine each of the above sites in turn. Comments from the Highways Agency on the Phase 1 Study have helped to clarify the approach for Phase 2.

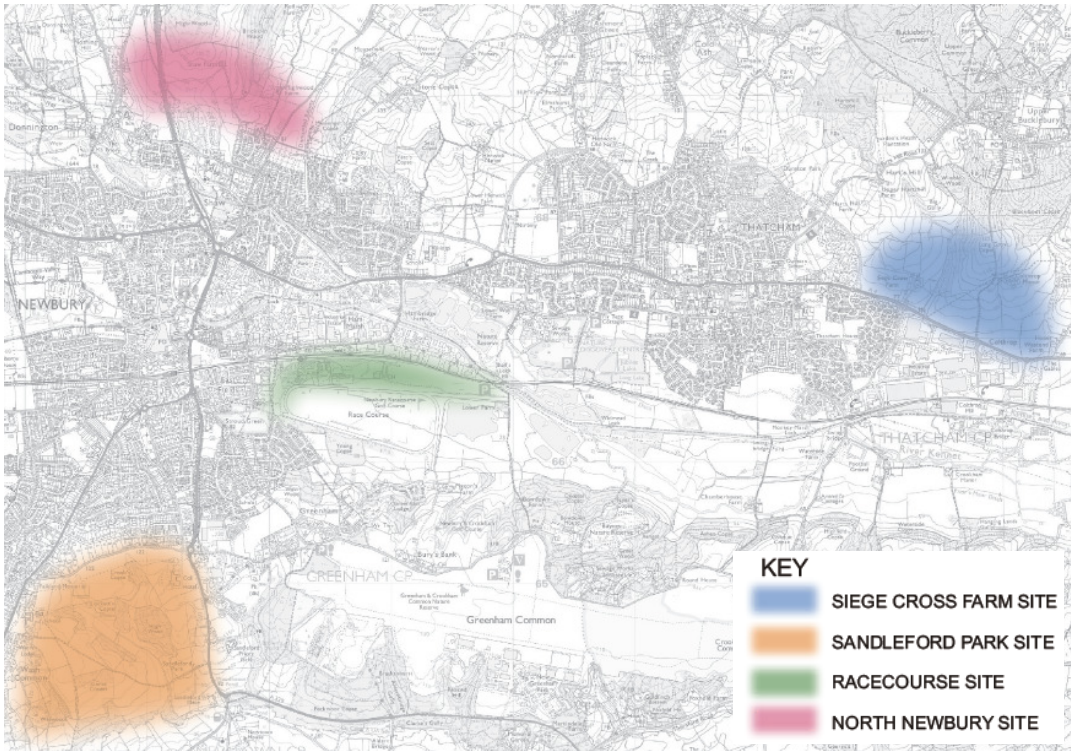
2.3.4 The SATURN model which was used in Phase 1 has been updated for Phase 2 and a new forecast year of 2026 at the end of the plan period has been created. The 2026 forecast year includes post 2006 housing development including:

- Development completed in 2007 and 2008
- Planning permissions which have been granted since 2006
- Deliverable and developable sites identified in the Draft Strategic Housing Land Availability Assessment (SHLAA) March 2009

2.3.5 Additionally a windfall allowance for unidentifiable sites towards the end of the plan period has been incorporated into the model through TEMPRO forecasts

2.3.6 Consented employment sites for the period 2006 to 2026 are listed in section 3.2.

Figure 2.2 Location of LDF Development Sites



2.4 SUMMARY

2.4.1 The Phase 1 study provided an assessment of the relative merits of residential development in transport terms, at different locations within West Berkshire. In addition, the assessment determined the likely impact of potential development on the strategic road network within the district boundary. This was also complemented by assessing the potential for non car mode improvements to benefit public transport users, pedestrians and cyclists

2.4.2 The Highways Agency have been fully engaged during the development of this study. They have approved the approach and findings of Stage 1 of the study, and the approach for Stage 2 of the study following a meeting with key officers in July 2009.

2.4.3 The Phase 2 study provides a more in depth analysis of specific development sites. It will consider the impact of strategic development at these sites on the highway network, and the impact of sustainable transport mitigation measures. The report outlines the type of highway mitigation measures likely to be required, which will form the basis of discussion with West Berkshire Council prior to testing of these mitigation measures using the model.

3 Assessment Framework

3.1 SUMMARY OF APPROACH

3.1.1 A relative assessment of the merits of the potential LDF development sites has been undertaken against a range of qualitative and quantitative assessment criteria in the Phase 1 LDF transport assessment. Within this study the focus is to assess in more detail the potential mitigation measures that it is envisaged will be required to assist in delivery of the preferred sites. From this assessment it will be possible to evaluate the suitability of each site for inclusion in the LDF Core Strategy in transport terms.

3.1.2 To undertake this more detailed assessment a set of traffic modelling tools will be used, which are:

- Newbury and Thatcham Highway traffic model (SATURN) – to assess highway conditions
- Newbury and Thatcham Public Transport model (VISUM) – to determine modal shift between public transport and private vehicles

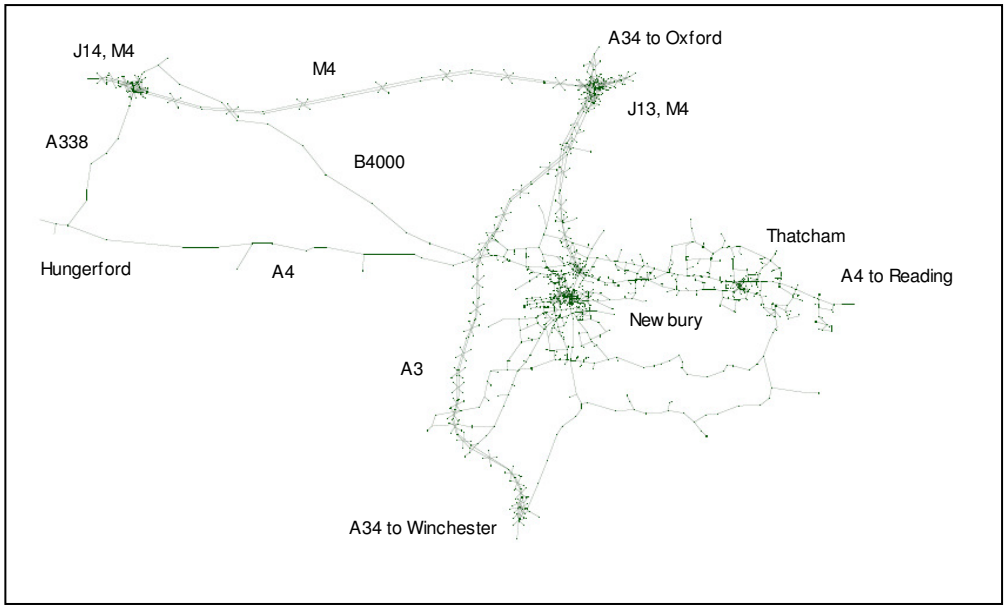
3.1.3 This section describes each of the models referenced above and how they have been developed to ensure they provide a robust evidence base. In addition, details are provided on how the models are used in combination to assess forecast scenarios of development related growth in trips, and the assessment criteria to determine the need for mitigation measures.

TRAFFIC MODELS NEWBURY AND THATCHAM

HIGHWAY MODEL (SATURN)

3.1.4 A SATURN traffic model was developed for the AM and PM peak periods for the Newbury and Thatcham area in 2005 for the highway network. It was then subsequently updated to a revised base year of 2006 to ensure accurate representation of trip patterns following substantive changes to the transport network including completion of works at M4 Junction 13 undertaken by the Highways Agency. Details on the development of the traffic model are provided in the "Local Model Validation Report" (LMVR) published by WSP on behalf of the Council (West Berkshire LDF Phase 2 Assessment Newbury and Thatcham, Local Model Validation Report). This model has been used since its development to assess the impact of proposed new developments and in particular was the evidence upon which the quantitative assessments undertaken in the Phase 1 Transport Study were based. The extent of the network coverage for this model is illustrated in Figure 3.1.

Figure 3.1 – Original Newbury and Thatcham Traffic Model Area Coverage



3.1.5 In development of the LDF Core Strategy the importance of trips to and from other urban centres outside of the model was recognised. Therefore it was agreed that the model coverage should be extended to include more specific definition of trip generating/attracting locations across the sub-region that are relevant to the Newbury and Thatcham area. This would allow more explicit modelling of ultimate trip ends and also assist in subsequent development of the Long Term Transport Vision for West Berkshire, currently under development and due for completion in early 2010.

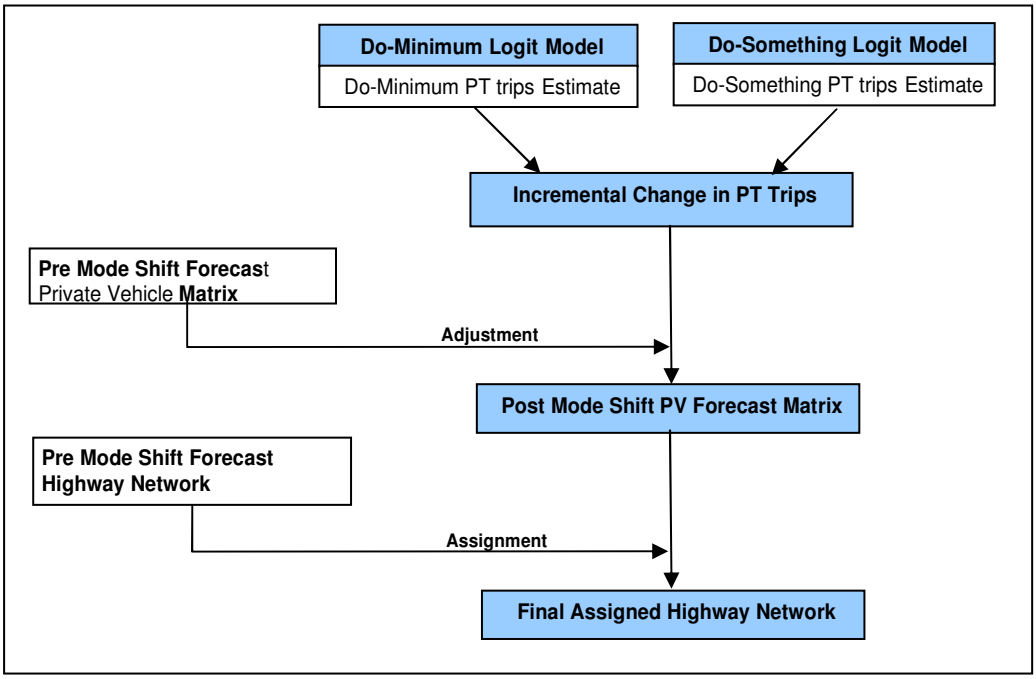
3.1.6 The model was extended through reference back to source Roadside Interview data used in development of the original model to determine the split of traffic on the entry/exit points of the original model to their ultimate trip end. Details on the approach adopted and the performance of the model in comparison to model convergence requirements are provided in the LMVR (West Berkshire LDF Phase 2 Assessment Newbury and Thatcham, Local Model Validation Report).

PUBLIC TRANSPORT MODEL

3.1.7 The model consists of two absolute logit models. The first is a 'do-minimum' model which produces a direct estimate of the number of trips choosing to travel by the existing public transport services. The second model, 'do-something', estimates the number of trips attracted by the alternative pubic transport provision. Both of these absolute logit models produce estimates for the number of trips travelling by public transport. The difference is then calculated that gives a final estimate of trips shifting to public transport as a result of change in public transport provision. The model then adjusts the original forecast highway matrix (by applying the difference calculated at the previous stage) to produce the final forecast matrix which is then reassigned onto the network.

3.1.8 The general representation of the public transport model is given in Figure 3.2

Figure 3.2 Public Transport (PT) Model Structure



3.1.9 An integral element of the LDF transport assessment is to determine the impact of proposed mitigation measures, which is expected to include a substantial investment in public transport services. These are not explicitly modelled in the SATURN highway model. To enable their assessment, a VISUM traffic model has been developed that accounts for rail and bus based trips and allows modal shift to be accurately determined using an incremental logit based approach.

3.1.10 The VISUM model extent mirrors that of the SATURN model shown in Figure 3.1 above. Within the model a representation is provided of public transport uses through the following:

- Definition of existing public transport routes
- Identification of bus stops and rail stations
- Inclusion of average public transport fares across the network modelled

3.1.11 As an incremental model has been adopted following earlier completion of the SATURN highway model it has not been necessary to validate the Public Transport model to existing conditions. Instead, the goodness of fit is determined by compliance with model performance criteria defined in the DfT's WebTAG guidance to traffic model development. The intended use of the model is to assess the quantum of trips generated by new land uses that will use public transport and also to assess the impact of new public transport services on existing and new land uses.

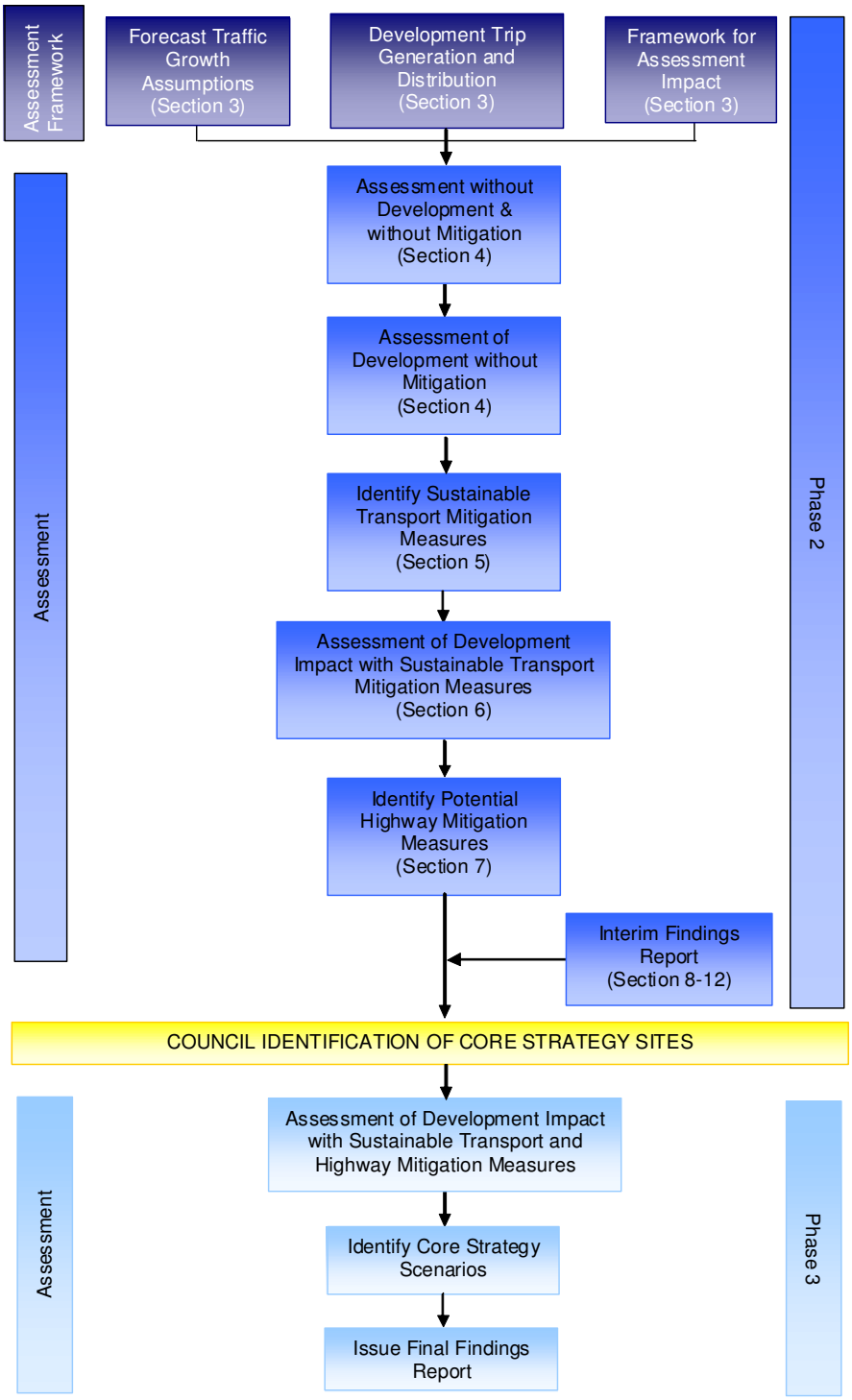
3.1.12 When considering the impact of new bus routes on overall public transport mode shares, the public transport model can be used to understand the modal shift from highway trips to bus. This excludes the impact of total public transport take up, the remainder of which consists of those who are captive to bus use (for example through not owning a car).

3.1.13 The full specification of the public transport model is provided in Appendix B.

ASSESSMENT APPROACH

3.1.14 The assessment approach is summarised in Figure 3.3 and described below.

Figure 3.3 – Assessment Approach Flow Chart



3.1.15 The methodology which has been developed to assess the development sites falls into the following distinct parts –

- An assessment framework explaining how we will review forecast traffic growth assumptions about development trip generation and distribution, and how we will assess the impact of the new development sites.
- Assessment will first take place on the impact of development without mitigation. Sustainable transport mitigation measures will then be identified for each site and the benefit of public transport mitigation measured.
- Identification of potential highway mitigation measures for each site will also be identified as part of the Phase 2 assessment.
- The Phase 2 report will conclude with a summary of Interim Findings and a description of the proposed mitigation package for each LDF development site.

3.1.16 As indicated in Figure 3.3, the modelling of proposed highway mitigation measures will not be undertaken within this assessment, but within the Phase 3 assessment. The Phase 3 assessment will enable the identification of a preferred core strategy delivery package. The Eastern Urban Area will be covered in separate assessments.

MODELLING SCENARIOS

3.1.17 Using the above methodology, the following scenarios will be modelled as part of the LDF Phase 2 Assessment for the Newbury and Thatcham area:

- Scenario 1 – Newbury Racecourse (1,500 households), With through traffic and with link to A339
- Scenario 2 – Newbury Racecourse (1,500 households), Without through traffic
- Scenario 3 – Sandleford Park (1,000 households)
- Scenario 4 – Sandleford Park (2,000 households)
- Scenario 5 – Siege Cross Farm (1,000 households)
- Scenario 6 – North Newbury (1,000 households)

3.1.18 Growth forecast for the existing built up area of Newbury and Thatcham through planning commitments, SHLAA, and background traffic growth from TEMPRO has been included.

3.1.19 Each of the above scenarios will first be modelled without public transport improvements and then with public transport improvements.

3.2 FORECAST TRAFFIC GROWTH ASSUMPTIONS

FORECAST MATRICES

3.2.1 As part of the original development of the Newbury and Thatcham Traffic Model, forecast year matrices for 2011 and 2016, AM and PM peak hours were developed. The forecasts are based on the validated 2006 base model, with projections to forecast years based on local growth factors derived from the "TEMPRO National Trip End Model" database. A "Forecast Matrix" has now been produced for the year 2026.

3.2.2 On commencement of this study it was agreed with the Council that the existing forecast matrices should provide the base for assessment of potential LDF residential development sites. However, in subsequent phases of more detailed assessment of impacts associated with the LDF additional detail on more recently consented developments was required. The list of consented developments which have been agreed with West Berkshire and upon which the assessment has been based is provided below.

Consented Developments

Employment/Leisure

- Kennet Shopping Centre – Cinema
- Sainsburys Store Extension
- Parkway
- New Greenham Park
- Faraday Plaza
- Newbury Business Park
- Household Waste Recycling Centre, Abbotswood.
- New Stryker HQ, SSE Depot, Hambridge Road
- Kingsland Shopping Centre redevelopment for retail and residential
- B1, B2 & B8 redevelopment of Plenty Site, Hambridge Road, Newbury
- B1 Office development, Hays site, Arlington Business Park
- Retail, Pincents Lane

Residential

3.2.3 Consented sites with more than 80 households have been included. This figure is taken from "DfT Guidance on Transport Assessments" which states that a transport assessment is required for developments with more than 80 households. The portion of each development which was implemented after 2006 has been identified for each site. The sites include:

- Land at Deadman's Lane, Greenham – 107 households since 2006
- Hermitage (Forest Edge) – 209 households
- Purley (Woodlands) – 108 households

- Kennet Heath – 393 households
- Theale (The Green) – 350 households

FORECAST NETWORKS

3.2.4 The forecast Do Minimum networks include all currently committed schemes as at April 2009 which are due to be in place by 2026. These are largely the same as the base network, with the exception of the following schemes that are all either currently in the LTP programme or associated with committed development:

- Faraday Plaza/A339 Junction
- Pinchington Lane Dualling
- Wharf Road Closure
- Harts Hill / A4 Junction Improvements
- A4 Turnpike Road Improvements
- Robin Hood Roundabout Improvements

3.2.5 Both the AM and PM peaks have been used for the assessment. The modelled area is shown in Figure 3.1.

3.2.6 The Forecasting Methodology is available in Appendix A of this report.

3.2.7 TEMPRO has been used to calculate the level of expected traffic growth between 2006 and 2026. Traffic growth figures from TEMPRO include an allowance for the housing allocations derived from planning data which is based on a number of factors including the household targets set for each authority in the South East Plan. As the LDF Phase 2 Assessment is considering locations for this new housing it is important to first abstract some of these housing allocations from TEMPRO.

3.2.8 Planning data from TEMPRO shows that traffic growth figures between 2006 and 2026 for West Berkshire are based on an increase of 13,140 in the number of households in the district. TEMPRO spreads these across the district. The housing allocation for West Berkshire over this period, as set in the South East Plan, is 10,500. It was agreed with West Berkshire Council that 2,640 households should be removed from TEMPRO to more accurately reflect the likely scale of development to be delivered in West Berkshire.

3.2.9 As described above the LDF Phase 2 Assessment is considering the location for new housing. This includes the following:

- Housing within the Existing Newbury/Thatcham Built-Up Area
- Newbury Racecourse – 1,500 Households
- Additional LDF Sites – ranging from 1,000 to 2,000 Households

3.2.10 It was agreed with West Berkshire to remove 3,600 households from TEMPRO. This includes outstanding planning permissions (1100 households), sites identified in the SHLAA (1000 households) and an allowance of 1500 households at Newbury Racecourse.

3.2.11 The total number of households removed from TEMPRO across the whole district is 6,240. The sites are then added back in individually when they are tested separately with the traffic model.

3.3 DEVELOPMENT TRIP GENERATION AND DISTRIBUTION ASSUMPTIONS

3.3.1 This section outlines the key assumptions on traffic behaviour for each site used for the modelling analysis. Giving close scrutiny to ensuring the robustness of these assumptions ensures that the further analysis provides an accurate reflection of the impact of development on the network.

3.3.2 The assumptions have been derived for:

- Overall vehicle trip rates
- How those trip rates would change as a result of mitigation measures including:
  - Parking standards,
  - Smarter choices (the application of targeted Travel Plan and demand management measures to reduce the level of individual private vehicle trips that are generated by a new development);
  - Walking and cycling
- Reductions in the trip rate as a result of public transport improvements are not made, since the public transport model will be used to assess the impact of public transport measures described in Chapter 4.
- Trip distribution – a series of wards considered to be representative of the development sites has been selected for the basis of this assessment

3.3.3 The outline concepts for highway access have been reviewed and appraised. Further details are included within the individual site mitigation chapters later in the report.

TRIP RATES USED FOR TRAFFIC MODEL

3.3.4 For each LDF site, different levels of trip rate might be achieved according to the different characteristics of the site. A range of different start and ultimate trip rates may be applied to the different sites within the LDF Core Strategy depending on their location and the effectiveness of the mitigation measures. The set of trip rates were agreed with the project steering group prior to testing within the model.

3.3.5 The traffic model will use a vehicle trip rate which assumes management of demand, smarter choices and improvements to sustainable modes are in place. The trip rate used for the traffic model will assume no direct development related public transport improvements as the positive impact of these improvements will be modelled separately with the public transport model.

Trip Rate Derivation

3.3.6 The Phase 1 LDF Transport Assessment made some assumptions on trip rates and these have been taken as the ultimate trip rate within this study, for outlying development sites. The Phase 1 LDF study assumed a Departure Trip Rate of 0.41

vehicles per hour. This figure was based on TRICS data for Private Households in the South East and South West.

3.3.7 The trip rate applied to the trip distribution in the model was based on an average of departure trip rates for all sites included within TRICS, excluding Badger Farm, Winchester. The trip rate for the latter was too low relative to other larger sites (with developments over 100 dwellings), and hence not considered a realistic representation of trip rates.

3.3.8 Table 3.1 below shows the range of trip rates given by TRICS for sites in the South East and South West.

3.3.9 The trip rates have been developed in accordance with the policies set out within the South East Plan, particularly the policies relating to Reduce, Manage and Invest in the network.

Table 3.1 Trip Rates from TRICS Database 2008

Vehicle Departures (8.00 – 9.00)	Vehicle Arrivals (8.00 – 9.00)	Site	Number of Households
0.231	0.385	Alverton Rd, Penzance	13
0.260	0.123	Kingsholm Rd, Gloucester	73
0.259	0.070	Ridgeway/Meadow Way – Badger Farm, Winchester	1040
0.302	0.113	Longcroft Lane, Welwyn GC, Hertfordshire	53
0.333	0.071	Maple Drive, Wiltshire	99
0.389	0.148	A3050 Hurst Rd, East Molesey, Surrey	54
0.391	0.111	A24, Epsom, Surrey	514
0.409	0.151	Old Malling Way, Lewes, East Sussex	491
0.416	0.071	Knightwood Rd, Badgers Copse, Eastleigh	700
0.42	0.145	New Bedford Rd, Luton, Bedfordshire	131
0.427	0.127	Knightwood Rd, Chandlers Ford, Eastleigh	300
0.443	0.121	A266 Mid Lavant, Near Chichester, West Sussex	90
0.52	0.317	Riddy Lane, Luton, Bedfordshire	82

3.3.10 A TRICS run has been undertaken with the latest version of TRICS (2009). This gives a departure rate of 0.38 vehicles per hour, a small reduction of 0.03. This level of trip rate will ensure provision of effective and sustainable communities, although in town centre locations, this could be reduced further.

3.3.11 Therefore, the 0.41 vehicles per hour/dwelling trip generation figure used in the Phase 1 LDF Assessment is not a 'blank canvas'. It assumes that the site is accessible by public transport.

3.3.12 The base trip rate quoted in a Transport Assessment will tend to be closer to 0.55 or 0.6 vehicles per hour/dwelling, and then be reduced by a combination of policy measures, public transport improvements and travel planning measures. For the majority of proposed LDF sites, no Transport Assessments have been produced. As a result the base trip rate figures have not yet been established, but this guidance provides an indication of how base trip rates might be reduced as a result of mitigation.

3.3.13 The base trip rate has been assumed to be based on a Car Driver mode share of 75%. This is the average mode share for Car Driver in South East (Transport Statistics Great Britain, 2008). The trip rate after mitigation is in place is based on a Car Driver mode share close to 55%.

3.3.14 The following diagram demonstrates how mitigation measures can be applied to give a step-by-step reduction in trip rate from a high 'base'. This diagram also shows how the different LDF sites will have a different starting trip rate, which arises due to their relative location to transport facilities and the car parking standards.

Table 3.2 Impact of Mitigation Measures on Trip Rate

			Newbury Existing Built Up Area		Newbury Racecourse (West) - 435 HH		Newbury Racecourse (East & Central) - 1065 HH		North Newbury Sandleford Park Siege Cross Farm
TARGET OF MEASURE	**MEASURE**	% Reduction in Car Mode Share	**VEHICLE TRIP RATE - Departures AM PEAK HR**	% Reduction in Car Mode Share	**VEHICLE TRIP RATE - Departures AM PEAK HR**	% Reduction in Car Mode Share	**VEHICLE TRIP RATE - Departures AM PEAK HR**	% Reduction in Car Mode Share	**VEHICLE TRIP RATE - Departures AM PEAK HR**
			0.38		**0.27**		**0.55**		**0.55**
Management of Demand through Parking Standards and other policies	Reduced Demand	**5% Reduction**	↓	**5% Reduction**	↓	**5% Reduction**	↓	**5% Reduction**	↓
		-5%	**0.36**	**-5%**	**0.25**	**-5%**	**0.52**	**-5%**	**0.52**
Removing car trips from network in AM peak hour	Personal Travel Planning Car sharing Flexible working	**10% Reduction**	↓	**10% Reduction**	↓	**10% Reduction**	↓	**10% Reduction**	↓
		-10%	**0.33**	**-10%**	**0.23**	**-10%**	**0.48**	**-10%**	**0.48**
Achieving high mode shares Sustainable Modes	Improved walking and cycling links from site to key destinations	**7.5% Reduction**	↓	**7.5% Reduction**	↓	**7.5% Reduction**	↓	**7.5% Reduction**	↓
TRIP RATES FOR MODEL		**-7.5%**	**0.31**	**-7.5%**	**0.21**	**-7.5%**	**0.44**	**-7.5%**	**0.44**
Achieving high mode shares Public Transport	Improved public transport links from site to key destinations	**7.5% Reduction**	↓	**7.5% Reduction**	↓	**7.5% Reduction**	↓	**7.5% Reduction**	↓
		-7.5%	**0.29**	**-7.5%**	**0.20**	**-7.5%**	**0.41**	**-7.5%**	**0.41**

3.3.15 The table above provides trip rates for the model which include the impact of all mitigation measures except improvements to public transport.

3.3.16 The effect of improving public transport is expected to be a further 7.5% reduction in car mode share. This reduction is based on experience elsewhere where similar levels of mode share reduction are achieved through public transport improvements as with parking standards (5%), smarter choices (10%) and walking and cycling measures (7.5%).

3.3.17 The trip rates shown above are used by the traffic model to assess the impact of development without public transport improvements. The public transport model will then be used to confirm the positive impact of the proposed public transport improvements.

3.3.18 The table above includes trip rates for the existing built up area. The trip rates used are base trip rates for both houses and flats. Trip rates for flats have been taken from TRICS data for privately owned flats. The trip rate for the existing built up area is based on the proportion of houses and flats observed in 2005/06 (the most recent data available). The proportion of houses to flats used is 41:59.

3.3.19 Two trip rates have been provided for Newbury Racecourse, one for the 'West' area and one for the 'East and Central' area. The reason for providing two trip rates is that it is currently proposed that these two areas are comprised of different development mixes. The West area is assumed to mainly contain flats (as it is closer to Newbury Town Centre). The East and Central area is assumed to mainly contain houses. The actual proportion of flats and houses at Newbury Racecourse cannot be determined at this stage, however the assumptions made lead to around 70% of households using the higher (Houses) trip rate which is considered to be a robust assumption.

Calculating Captive Public Transport Mode Share

3.3.20 As described in Section 3.1 the Public Transport model shows the mode shift from car to public transport following the introduction of new routes. It does not, however, show the mode share for public transport for those that are captive to public transport (e.g. people without a car). For consistency the TRICS database was used to derive this modal share.

3.3.21 The section above describes how the vehicle departure trip rate in the AM peak hour, taken from the latest version of TRICS(2009), for privately owned housing in the South East and South West was 0.38. This has been abstracted from the TRICS database of vehicle surveys. The latest version of TRICS (2009) also provides multi-modal survey results.

3.3.22 Using multi-modal surveys, vehicle departure trip rates in the AM peak hour for privately owned housing in the South East and South West is 0.36. There are a smaller number of multi-modal surveys than vehicles surveys; however the fact that the departure trip rate from multi-modal surveys (0.36) closely matches that from vehicle surveys (0.38) suggests that multi-modal surveys can be used as a proxy for the mode share for public transport for all sites surveyed in TRICS.

3.3.23 The all modes departure trip rate from multi-modal surveys is 0.815 and the public transport departure trip rate is 0.049. Using these figures gives a public transport mode share of 6%. The TRICS database cannot be used to determine the proportion of those using public transport that are captive to public transport. For the purposes of this assessment it has been assumed that half of the 6% figure is captive to public transport. This results in a mode share for those captive to public transport of 3%. A review has been undertaken of available data on the proportion captive to public transport. A bus

operator named Trent Barton, based in Derby, states on their website that 30% of their existing customers could have used a car for every journey they chose to make by bus (i.e. they are not captive to bus). For the purposes of this assessment, we have assumed that the proportion not captive to public transport is 50%, as car availability is higher in West Berkshire than Derby. Only 13% of households in West Berkshire do not have a car, compared to 30% in Derby.

3.3.24 This mode share has been used with the results from the public transport model (which determine the mode shift from car to public transport) to calculate the overall mode share for public transport for each scenario. This is then used to assess the viability of proposed public transport improvements (Chapter 6).

3.3.25 The remainder of this chapter describes the measures that are required to achieve the reduction in vehicle trip rate. The chapter concludes with an explanation of source of data used to estimate trip distribution.

PARKING STANDARDS

3.3.26 A key factor in affecting the number of trips a development site generates is the level of parking provided. WSP assisted in researching and drafting a Parking Strategy for West Berkshire in 2006. In that draft strategy, WSP proposed the following parking standards based on levels of accessibility:

Table 3.3: Parking Standards Proposed in West Berkshire Parking Strategy

	Low Accessibility	Medium Accessibility	High Accessibility
1 Bed	1.5 spaces	1 space	0.75 spaces
2-3 Bed	2 spaces	1.5 spaces	1.25 spaces
4+ Bed	On Merit	On Merit	On Merit

3.3.27 The Phase 1 LDF Transport Assessment scored each potential development location in terms of accessibility. Three development sites (Newbury Racecourse, North Newbury and Siege Cross Farm) offered what could be classed as 'Medium Accessibility' as they were 15-30 minutes away from Newbury Town Centre by bus. Sandleford Park was slightly less accessible. However, this was due to the size of the site causing the centre of the development area to be further away from the town centre than the centrepoints of other sites. This location could be more accessible than originally assessed if any development was focussed on the northern part of the site or if improvements were made to the provision of public transport.

3.3.28 Reference to *21st Century London Living* and *Residential Car Parking Research 2007 (Department of Communities and Local Government)* provides some guidance on how parking standards may affect residential development. However, no clear link has been established between provision of parking spaces and reduction in trip rates.

3.3.29 Therefore, it might be estimated that application of policy measures may allow a 5% reduction in car mode share, comparable with reductions for public transport (7.5%) and smarter choices (10%). The allowance for smarter choices measures is

slightly higher owing to the specific evidence available for the level of success of these measures.

SMARTER CHOICE MEASURES

3.3.30 "Smarter Choices" is the application of targeted Travel Plan and demand management measures to reduce the level of individual private vehicle trips that are generated by a new development.

3.3.31 For a residential development these include the following:

- Personal travel planning, travel awareness campaigns and public transport information and marketing;
- Car clubs and car sharing schemes;
- Teleworking and home shopping

3.3.32 Previous experience would suggest Smarter Choice measures could achieve a mode shift away from private car of around 10%. This is based on a review of DfT's 'Smarter Choices - Changing the Way we Travel' (2004) and also evidence gathered by WSP.

3.3.33 It is usually the case that the larger the development site, smarter choice measures become more cost effective. Examples include car clubs and personal travel planning. Car clubs are more financially viable the greater the number of households they serve. Economies of scale mean that personal travel planning also becomes more cost effective for larger developments.

3.3.34 The individual elements of smarter choices initiatives expected to be implemented through LDF delivery are outlined below:

Personal Travel Planning, Travel Awareness Campaigns and Public Transport Information and Marketing

3.3.35 Personal Travel Planning involves the marketing of sustainable transport options tailored to individuals. When used alongside improvements to sustainable transport options it can increase mode shift away from car of between 5-10%.

Car Clubs and Car Sharing Schemes

3.3.36 It is difficult to judge the overall effect of car sharing, but there have been successful commuter car sharing schemes in both urban and rural areas. The DfT's 'Smarter Choices - Changing the Way we Travel' (2004) estimates that commuter car sharing could cut car commuting vehicle trips by as much as 7% by 2014.

Teleworking and Home Shopping

3.3.37 The DfT's 'Smarter Choices - Changing the Way we Travel' (2004) identifies that at present, at least 7% of the workforce telework some of the time, and if growth continues at current rates, around 30% of the workforce might be teleworking in a decade. The general impact that growing commuter teleworking is likely to have on a percentage reduction in car commuter trips is estimated within the report at 3-12%.

3.3.38 Based on a typical demographic and socio-economic makeup of the future residents within the proposed development sites, it would be reasonable to assume that the bottom end of this range would be appropriate here.

Summary

3.3.39 These measures have different levels of effect, depending on how actively they are promoted. Experience from guidance and from studies elsewhere would indicate that it would be possible to achieve a reduction in car mode share of at least 10% from travel plan and smarter choices measures.

SUSTAINABLE MODES (WALKING AND CYCLING)

3.3.40 Improvements to Sustainable Modes could include the following:

- Provision of new Footpaths and Cycleways
- Improved Cycle Parking at key destinations
- Improved crossing facilities for pedestrians and cyclists
- Better lighting of footways and cycleways

3.3.41 It is estimated that improvements to sustainable modes may allow a 7.5% reduction in car mode share, comparable with reductions for public transport (7.5%) and smarter choices (10%). More details are provided in Chapter 5.

PUBLIC TRANSPORT

3.3.42 The public transport improvements would include service enhancements and improvements to supporting infrastructure. These are detailed in Chapter 5 and have been modelled separately with the VISUM Public Transport Model (reviewed in Chapter 6).

TRIP DISTRIBUTION

3.3.43 The above section has described the expected trip rate for new development sites in West Berkshire. This section considers the expected distribution of these trips to/from each new development site.

3.3.44 Trip distributions for each development site have been based on 2001 Census Journey to Work Data and agreed with West Berkshire Council as an accurate representation of future trip making characteristics. This data is provided by ward, from which the following wards were selected to represent each development site:

- Newbury Town Centre: Victoria Ward
- Newbury Racecourse: Victoria Ward + Greenham Ward
- Sandleford Park: Falkland Ward + Greenham Ward
- Siege Cross: North Thatcham Ward
- North Newbury: Speen Ward + Clay Hill Ward

3.3.45 Trip Distributions for Newbury Racecourse, Sandleford Park and North Newbury are based on the combinations of two wards. These wards were selected as the characteristic of each ward on its own was not considered sufficient to represent the development site. For these development sites an average of trip distributions observed in two selected neighbouring wards was taken.

HIGHWAY ACCESS ASSUMPTIONS

3.3.46 The potential highway access points for each of the LDF development sites have been identified through consultation with the Council. This is summarised in Table 3.4 below.

Table 3.4 – LDF Development Site Loading Points

Site	Loading Point
North Newbury	Shaw Hill/Vodafone Access
South Newbury – Sandleford Park	New access road on A339/Monks Lane
Newbury Racecourse	B3421 Hambridge Rd/Racecourse Road
Thatcham – Siege Cross Farm	A4 Bath Road (2 points of access)

3.3.47 The locations of these loading points are shown in Figure 3.4. The access points have been provided by the Council as indicative locations. Our assessment has used these access points and identified any issues which may mean that their location has to be modified to ensure that access is delivered.

3.3.48 Other highway assumptions are stated within the Assessment Approach described in the remainder of this chapter. Further description of the highway access points is included in Chapters 8 to 11 under each development site.

3.4 FRAMEWORK FOR ASSESSING IMPACT ON TRANSPORT NETWORK

ASSESSMENT CRITERIA FOR NETWORK PERFORMANCE

3.4.1 The modelling has been undertaken against a number of indicators to reflect the impact of development on the network. In addition key congestion points on the network are identified. These indicators and the assessment of junctions are discussed below.

3.4.2 The traffic impact of each LDF Development Site has been assessed under the following attributes, which are common with the earlier Phase 1 Study:

- Network-Wide Performance
- Congestion on Key Links
- Journey Times on Principal Routes
- Local Re-assignment on Sensitive Local Roads

3.4.3 Each element is assigned a score between 0 and -2, where 0 represents a neutral traffic impact and -2 represents a significant negative impact. No attributes are assigned a positive score, since any apparent improvement, such as a reduction in traffic flow, will only occur as a result of increased congestion leading to reassignment elsewhere on the network. To award positive scores in such circumstances would imply a positive impact and would mask the detrimental effect of the development.

Network-Wide Performance

3.4.4 As part of the assignment process, SATURN produces a set of summary statistics covering the whole of the modelled area, which can be compared under different scenarios to judge the overall impact of a scheme or development. A subset of these statistics has been used to assess the impact of each development site using the following indicators:

- Over-Capacity Queues
- Travel Time
- Average Speed

3.4.5 Over-capacity queues are queues that are formed when traffic is unable to pass through a junction within a single cycle. The first three elements are all reported by SATURN as totals for the network as a whole. However, these will increase in proportion to the volume of traffic produced by the development, so it is difficult to make meaningful comparisons about the relative impact of each site. Consequently, the assessment has used average values per vehicle to enable a direct comparison between sites.

3.4.6 Since the statistics are an average of all trips over the entire modelled area, a significant impact in one area will only have a small average impact over the entire modelled area. The thresholds used to determine the scoring for each attribute are shown in Table 3.5.

Table 3.5 – Network-Wide Performance Scoring Thresholds

Score	Over-Capacity Queue	Travel Time	Average Speed
+ 2			
+1			
0	< 15 seconds	< 15 seconds	< 1 kph
– 1	15 – 30 seconds	15 – 30 seconds	1 – 2 kph
– 2	> 30 seconds	> 30 seconds	>2 kph

3.4.7 The average score across all elements is calculated to produce the overall site score for Network-Wide Performance.

Congestion On Key Links

3.4.8 A series of links have been identified that are representative of key locations within the study area. All links are considered in both directions. These links are:

Strategic Roads

- M4 East of A34
- M4 West of A34
- A4 Speen
- A4 Shaw
- A4 Turnpike

- A4 Bath Road
- A34 North of Donnington
- A34 South of Donnington
- A34 North of Tothill Services
- A339 North of A4 Donnington
- A339 South of A4 Newbury
- A339 South of Newtown
- A343 Andover Road
- B4640 Newtown Road

Local Roads

- Oxford Road
- Grove Road
- Love Lane
- Kiln Road
- Floral Way
- Hambridge Road
- Crookham Hill
- Greenham Road
- Pinchington Lane
- Monks Lane

3.4.9 For each link, the change in the volume-capacity (V/C) ratio is considered. A V/C ratio of 0.85 is considered to be congested and a value of 1 indicates the link is operating at capacity. Congested urban areas such as Newbury town centre are generally governed by junction capacity rather than link capacity, so link V/C ratios were not expected to change significantly. The V/C ratio thresholds are shown in Table 3.6.

Table 3.6 – Congestion on Key Links Scoring Thresholds

Score	Change in Link V/C Ratio
+ 2	
+1	
0	< 1%
– 1	1.1 - 5%
– 2	> 5%

3.4.10 Scores are assigned for each link under consideration and the average is then calculated to produce the score for the Congestion on Key Links attribute.

Journey Times on Key Routes

3.4.11 To demonstrate the impact of increased congestion at junctions in a manner that is straightforward and easy to compare between development sites, journey times on key routes have been calculated. These calculations include any delay experienced by vehicles while queuing at junctions. To better capture the impact of development sites, the routes have been split into local and strategic routes. The local routes chosen for assessment are:

- A339
- A4

3.4.12 Strategic routes considered are:

- A34
- M4

3.4.13 Due to the variety of roads that could be subject to re-routing, dependent on development site location, it is difficult to specify a robust numerical test that can be applied equally to all sites.

Table 3.7 – Journey Times on Key Routes Scoring Thresholds

Score	Change in Journey Time
+ 2	
+1	
0	< 15 seconds
– 1	15 - 30 seconds
– 2	> 30 seconds

3.4.14 As with the other attributes, the average score across all routes has been calculated to produce the overall score for the Journey Times on Key Routes element of the study.

Local Re-Assignment

3.4.15 Further assessment was undertaken to establish the level, if any, of traffic assigning onto locally sensitive roads, as a result of proposed development at each site.

3.4.16 In order to score this indicator, SATURN plots showing the difference in traffic flows on the surrounding local road network between the Base scenario and after development at each site, were reviewed.

3.4.17 LDF Development Sites were scored as indicated in Table 3.8 below. Explanatory text on the scores assigned to each development site is given in Chapter 4, together with details of the roads identified as being locally sensitive for each potential residential development location.

Table 3.8 – Local Re-assignment Scoring Thresholds

Score	Local Re- Assignment
+ 2	
+1	
0	Little or no re-routing onto sensitive local roads
– 1	Some re-routing onto sensitive local roads
– 2	High level of re-routing onto sensitive local roads

IMPACT ON JUNCTIONS

3.4.18 The section above describes the assessment that will be taking place against a number of strategic indicators. In addition to these impact on key junctions will also be assessed.

3.4.19 Each development site will be assessed as to how many junctions are expected to have an increase in flow of above 5%. Of these junctions the actual quantum of increase in flow will be measured to understand if these increases would lead to a junction's capacity being exceeded.

3.4.20 Plots from the model will also be produced which visually demonstrate where increases in flow on the network are expected to occur.

PUBLIC TRANSPORT MODEL ANALYSIS APPROACH

3.4.21 The public transport model will be used to determine the level of modal shift associated with changes in public transport provision. The traffic model will be run firstly without public transport improvements and secondly with public transport improvements to understand the mode shift from private to public transport associated with these improvements.

3.4.22 The full set of proposed public transport improvements that has been coded into the VISUM model can be found in Section 5 of this document. The following scenarios will be modelled with public transport improvements:

- Scenario 1 – Newbury Racecourse (1,500 households), With through traffic and with link to A339
- Scenario 2 – Newbury Racecourse (1,500 households), Without through traffic
- Scenario 3 – Sandleford Park (1,000 households)
- Scenario 4 – Sandleford Park (2,000 households)
- Scenario 5 – Siege Cross Farm (1,000 households)
- Scenario 6 – North Newbury (1,000 households)

3.4.23 The results for each scenario will be provided as follows:

- Overall network modal shift
- Incremental modal shift achieved for each development site concerned

3.4.24 Each highway modelling scenario will then be reassessed to include change in the highway demand as a result of modal shift associated with change in the public transport provision.

3.5 SUMMARY

3.5.1 This chapter outlines the assessment approach, the traffic forecast for 2026, and the assumptions which have been made around the trip characteristics of each development site. This includes assumptions on the derivation of TRICS trip rates which have been reduced as a result of parking demand management measures, travel planning measures and walking and cycling measures. Assumptions have been made relating to the public transport mode share, which will be validated through the public transport modelling assessment. Assumptions have been set out within this chapter on the wards used to derive trip distribution patterns for the new development sites

3.5.2 The chapter finished with outlining the method for assessing the impact of the development sites on the transport network. This includes examining network wide performance, congestion on key links, journey times on principal routes, and local re-assignment on sensitive local roads. These categories will provide consistency with the Phase 1 assessment, but for this Phase 2 study, we will also look at the impact on junctions and the impact of the sites on the public transport network. This framework will be applied to analyse the results in Chapter 4.

4 Traffic Impact 2006 and 2026 Without Mitigation

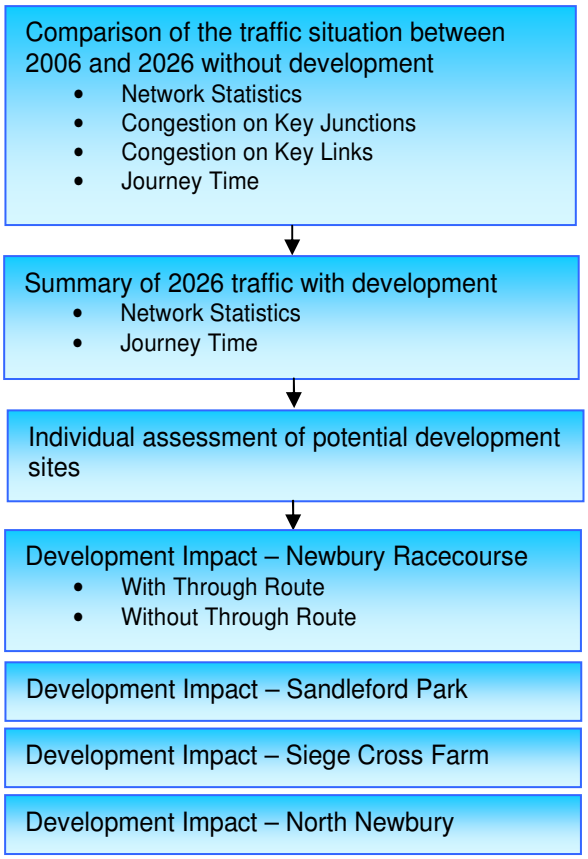
4.1 INTRODUCTION

4.1.1 This chapter sets out the results of analysis undertaken to ascertain the impact of LDF development sites without mitigation measures. Results are based on the scoring methodology as detailed in Chapter 3 and are given for each development assessed in isolation.

4.1.2 This step in the evaluation process is important as it provides a like for like comparison between 2006 and 2026. We can then more easily understand what may be required to achieve a level of network performance equal to that prior to the implementation of the development. Comparisons can then be made for 2026 (with development) for each scenario.

4.1.3 The results below show the score assigned to each development as well as a summary of the traffic impact of the development. The sections within this chapter are shown in the flowchart in Figure 4.1 below.

Figure 4.1 – Stages of 2006 and 2026 Traffic Impact Review



4.2 SUMMARY OF BASE TRAFFIC SITUATION IN 2006

INTRODUCTION

4.2.1 This section will outline the traffic situation in 2006 and the 2026 network without development. When the two are compared, it is easy to understand the proportion of traffic growth which is attributable to background traffic growth rather than the individual development sites. This section is reported using the following indicators:

- Network Statistics
- Congestion at key junctions
- Congestion on key links
- Journey time

4.2.2 Section 4.2 compares the performance of the model for the 2006 base with the forecast 2026 Do Minimum runs while section 4.3 will consider the impact of strategic development on the network in 2026.

NETWORK STATISTICS

4.2.3 Network statistics have been extracted from the 2006 Base and the 2026 Do Minimum scenario to indicate the impact of the Do Minimum across the entire modelled area. The results are shown in Table 4.1 below:

Table 4-1 Network Statistics for 2006 Base and 2026 Do Minimum Scenario – AM Peak

Network Statistics Parameter	2006 Base	2026 DM	Abs Diff	% Diff
Over-Capacity Queues (PCU.HRS)	97	1,469	1,372	1421.8%
Total Travel Time (PCU.HRS)	4,819	8,748	3,929	81.5%
Travel Distance (PCU.KM)	263,575	346,479	82,904	31.5%
Overall Average Speed (KPH)	55 (34mph)	40 (25mph)	-15 (9mph)	-27.6%
Trips loaded (PCUs)	35249.9	47376.3	12,126.4	34.4%
Ave O/C Queue (MIN / PCU)	0.16	1.86	1.70	1032.3%
Ave Travel Time (MIN / PCU)	8.20	11.08	2.88	35.1%
Ave Travel Distance (KM / PCU))	7.48	7.31	-0.16	-2.2%

(PCU = Passenger Car Units)

4.2.4 Over capacity queuing and total travel time have increased significantly due to the inclusion of the background growth as well as committed development traffic in the network. Average time spent in over capacity queues has increased by 1.7 minutes per PCU across the whole network, leading to an increase in average journey time of almost 3 minutes per PCU and a reduction in the average speed of 15 kph (9 mph).

Table 4-2 Network Statistics for 2006 Base and 2026 Do minimum Scenario – PM Peak

Network Statistics Parameter	2006 Base	2026 DM	Abs Diff	% Diff
Over-Capacity Queues (PCU.HRS)	108	1,241	1,133	1050.0%
Total Travel Time (PCU.HRS)	4,955	8,710	3,756	75.8%
Travel Distance (PCU.KM)	275,618	366,231	90,614	32.9%
Overall Average Speed (KPH)	56 (35mph)	42 (26mph)	-14 (8.6mph)	-24.5%
Trips loaded (PCUs)	35879	48404	12,525	34.9%
Ave O/C Queue (MIN / PCU)	0.18	1.54	1.36	752.4%
Ave Travel Time (MIN / PCU)	8.29	10.80	2.51	30.3%
Ave Travel Distance (KM / PCU))	8.29	7.57	-0.12	-1.5%

(PCU = Passenger Car Units)

4.2.5 Table 4.2 shows the changes in network statistics parameter in 2026 Do Minimum scenario compared to 2006 Base in PM peak. With the background growth and committed development traffic, the overall network operation deteriorates in 2026 Do Minimum scenario compared to 2006 Base model. Average time spent in over capacity queues increase by 1.36 minutes per PCU across the whole network, leading to an increase in average journey time of 2.5 minutes per PCU and a reduction in the average speed of 14 kph (8.6 mph).

CONGESTION AT KEY JUNCTIONS

4.2.6 Table 4-3 shows the congestion pattern for key junctions in both 2006 and 2026 in AM and PM peak periods.

4.2.7 Junctions which are nearing capacity (flow to capacity ratio 0.85 to 0.95) are shown in yellow, those which are at capacity (flow to capacity ratio 0.95 to 1) are shown in orange and those over capacity (flow to capacity ratio greater than 1) are shown in red.

4.2.8 Figure 4.2 shows the above information for 2006 (no development) displayed on a map base with Figure 4.3 displaying the same information for the 2026 Do Minimum scenario.

Table 4-3 Comparison of 2006 and 2026 Key Junctions

Junction	AM Peak		PM Peak	
	2006	2026	2006	2026
A339				
M4 J13				
Vodafone Rbt				
Robin Hood				
Faraday Plaza				
Bear Lane				
St Johns				
Pinchington				
Sandleford				
Swan Inn Rbt				
Greenham Park W				
Greenham Park E				
Thornford Rd Rbt				
Newbury Bypass				
Tothill Rbt W				
Tothill Rbt E				
A343 North				
A343 South				
A4W				
A4E				
A4				
Oxford Road				
Faraday Road				
Business Park				
Hambridge Road				
Lower Way				
Turnpike				
Henwick Lane				
Northfield Rd				
Park Lane				
Broadway				
The Moors				
Harts Hill				
Floral Way				
Pipers Way				
Gables Way				

	Junctions with spare capacity (under 0.85)
	Junctions nearing capacity (flow to capacity ratio 0.85 to 0.95)
	Junctions at capacity (flow to capacity ratio 0.95 to 1)
	Junctions over capacity (flow to capacity ratio >1)

4.2.9 The morning peak period in 2006 has one junctions nearing capacity, five junctions at capacity and two over-capacity, all on the A339 and A4 corridors. By 2026, the A339 corridor is predicted to have four junctions which are at or over capacity and the A4 corridor six with two nearing capacity.

4.2.10 The southern access junction to the A34 from the A343 is predicted to be over capacity by 2026 as the right turn to the northbound slip road is no longer able to cater for the demand.

4.2.11 The evening peak has fewer problem junctions in 2006 but again there is an increase predicted by 2026. The A339 corridor will have five junctions at or over capacity. The A4 corridor will have five at or over capacity and one nearing. The A34 junctions are predicted to remain within capacity in the evening peak in 2026.

4.2.12 Table 4.3 has shown that there are junctions which are predicted to be highly congested in both peak periods in 2026 due to background growth and committed development, with a general increase in congestion on junctions which were operating at or near capacity in 2006.

CONGESTION ON KEY LINKS

4.2.13 Table 4.4 and Table 4.5 show the comparison of total flow on the key links between 2006 and 2026 in AM and PM periods respectively. To estimate the change in overall congestion, the tables also include the sum of the ratio of flow volume (V) to capacity (C) (i.e. V/C) for each link.

Table 4-4 Key Links between 2006 and 2026 – AM Peak

ROAD	2006 - BASE		DM - 2026		Comparison			
	Flow	V/C	Flow	V/C	Abs Flow Diff	% Flow Diff	Abs V/C Diff	% V/C Diff
Strategic	41442	11.47	53977	15.49	12535	30.2%	4.02	35.0%
Local	10690	7.83	13644	10.47	2955	27.6%	2.64	33.7%

Table 4-5 Key Links between 2006 and 2026 – PM Peak

ROAD	2006 - BASE		DM - 2026		Comparison			
	Flow	V/C	Flow	V/C	Abs Flow Diff	% Flow Diff	Abs V/C Diff	% V/C Diff
Strategic	42087	11.55	55782	15.25	13695	32.5%	3.70	32.0%
Local	12082	8.83	15938	12.34	3856	31.9%	3.51	39.8%

4.2.14 Flows are expected to rise by at least 28% between 2006 and 2026 and congestion by between 32% and 40%.

JOURNEY TIME

4.2.15 Four routes have been examined to determine the impact of increased traffic flows in 2026 on journey times. These are displayed on Figure 4.4. Table 4.6 shows the journey time comparison for these routes between 2006 and 2026 in the morning peak and Table 4.7 shows the journey time comparison in the evening peak.

Table 4-6 Journey Time Comparison between 2006 and 2026 – AM Peak

Journey Time Route	2006 Base (sec)	2026 DM (sec)	Abs diff	%diff
A4 EB	1617	2048	431	26.7%
A4 WB	1596	2148	552	34.6%
A34 NB	615	808	193	31.4%
A34 SB	545	617	72	13.2%
A339 NB	859	1293	434	50.5%
A339 SB	589	1024	435	73.9%
M4 EB	474	541	67	14.1%
M4 WB	434	910	476	109.7%

Table 4-7 Journey Time Comparison between 2006 and 2026 – PM Peak

Journey Time Route	2006 Base (sec)	2026 DM (sec)	Abs diff	%diff
A4 EB	2040	2526	486	23.8%
A4 WB	1561	2425	864	55.3%
A34 NB	545	648	103	18.9%
A34 SB	542	649	107	19.7%
A339 NB	625	1023	398	63.7%
A339 SB	618	1036	418	67.6%
M4 EB	461	506	45	9.8%
M4 WB	463	540	77	16.6%

4.2.16 The morning peak results show an increase in all of the journey time routes due to increased traffic in 2026, with five routes predicted to have an increase in excess of 7 minutes. The worst of these is a 9 minute increase of time on A4 westbound route. The A34 and the M4 eastbound journey times have the least impact between 2006 and 2026.

4.2.17 In the evening peak, it is the A4 and A339 corridors which have the greatest increase in journey time between 2006 and 2026. The A4 increases by 8 minutes eastbound and 13 minutes westbound, whilst the A339 increases by 6 minutes in both directions.

SUMMARY

4.2.18 Between 2006 and 2026 there is predicted to be a significant increase in traffic within the modelled area due to overall background traffic growth even before any new LDF development is put in place. The increase in traffic is predicted to lead to significant increases in congestion and journey times within Newbury and Thatcham.

4.3 TRAFFIC IMPACT OF NEW DEVELOPMENT IN 2026

NETWORK STATISTICS

4.3.1 Network statistics have been extracted from the 'Do Minimum' (with committed development and sites likely to be developed within the existing built up area of Newbury, but without any LDF strategic housing sites) and all the 'Do Something' Scenarios modelled. The Do Something scenarios are each development with reduced trip rates as set out in table 3.2 before introducing improved public transport mitigation measures to indicate the impact of each development across the entire modelled area. The analysis undertaken assesses the data produced by the model for the full range of assessment criteria, then a review of the individual impacts associated with each of the potential development scenarios. The results are shown in Table 4.8 and Table 4.9 below.

Table 4-8 Network Statistics - AM PEAK

SCENARIOS	Over-Capacity Queues (sec/PCU)	Travel Time (sec/PCU)	Travel Distance (km/PCU)	Average Speed (kph)
Do Minimum – 2026	111.6	664.7	7.313	39.6
Newbury Racecourse (with through link)	101.8	651.7	7.233	40.0
Newbury Racecourse (no link)	140.7	704.0	7.212	36.9
Sandleford Park (1000)	126.4	691.4	7.262	37.8
Sandleford Park (2000)	134.2	709.4	7.242	36.8
Siege Cross Farm	128.9	697.5	7.258	37.5
North Newbury	126.2	683.5	7.257	38.2

Table 4-9 Difference of Network Statistics compared to Do- Minimum - AM PEAK

SCENARIOS	Over-Capacity Queues (sec/PCU)	Travel Time (sec/PCU)	Travel Distance (km/PCU)	Average Speed (kph)
Newbury Racecourse (with through link)	-9.831	-13.0	-0.081	0.4
Newbury Racecourse (no link)	29.149	39.3	-0.101	-2.7
Sandleford Park (1000)	14.769	26.7	-0.051	-1.8
Sandleford Park (2000)	22.572	44.7	-0.071	-2.8
Siege Cross Farm	17.292	32.8	-0.055	-2.1
North Newbury	14.589	18.7	-0.057	-1.4

Table 4-10 Network Wide Performance Score – AM Peak

SCENARIOS	Over-Capacity Queues	Travel Time	Travel Distance	Average Speed	Overall
Newbury Racecourse (with through link)	0	0	0	0	0.0
Newbury Racecourse (no link)	-1	-2	0	-2	-1.3
Sandleford Park (1000)	0	-1	0	-1	-0.5
Sandleford Park (2000)	-1	-2	0	-2	-1.3
Siege Cross Farm	-1	-2	0	-2	-1.3
North Newbury	0	-1	0	-1	-0.5

4.3.2 The results show an improvement in traffic conditions in the Newbury Racecourse (with through link) when compared to the Do Minimum Scenario. The most notable improvements are a 10 second reduction of time spent queuing and a 13 second decrease in the average journey time. Overall speed has been increased by 0.4 kph. This leads to a score of 0 overall for this scenario.

4.3.3 Table 4-10 also shows that the overall network performance deteriorates in the remaining scenarios compared to the Do Minimum for over-capacity queues, travel time and average speed. There is little change in travel distance for all scenarios.

4.3.4 In the morning peak, Newbury Racecourse without a link road, Sandleford Park (2000 dwellings) and Siege Cross Farm scenarios have large deterioration in network performance and score between -1 and -2. Sandleford Park (1000 dwellings) and North Newbury has less impact and score less than -1.

4.3.5 The evening peak network statistics for all scenarios are shown in Table 4.11 and Table 4-12 shows the difference in Network Statistics for all scenarios compared to Do Minimum. Table 4-13 shows the network wide performance score for each development in the evening peak.

Table 4-11 Network Statistics – PM Peak

SCENARIOS	Over-Capacity Queues (sec/PCU)	Travel Time (sec/PCU)	Travel Distance (km/PCU)	Average Speed (kph)
Do Minimum 2026	92.3	647.8	7.566	42.0
Newbury Racecourse (with through link)	95.9	642.2	7.494	42.0
Newbury Racecourse (no link)	109.4	668.7	7.525	40.5
Sandleford Park (1000)	104.1	662.2	7.503	40.8
Sandleford Park (2000)	117.9	677.2	7.408	39.4
Siege Cross Farm	111.4	663.3	7.482	40.6
North Newbury	105.8	658.5	7.500	41.0

Table 4-12 Difference of Network Statistics compared to Do Minimum – PM Peak

SCENARIOS	Over-Capacity Queues (sec/PCU)	Travel Time (sec/PCU)	Travel Distance (km/PCU)	Average Speed (kph)
Newbury Racecourse (with through link)	3.653	-5.646	-0.072	0.0
Newbury Racecourse (no link)	17.154	20.907	-0.041	-1.5
Sandleford Park (1000)	11.858	14.391	-0.063	-1.2
Sandleford Park (2000)	25.580	29.414	-0.158	-2.6
Siege Cross Farm	19.073	15.514	-0.084	-1.4
North Newbury	13.515	10.729	-0.066	-1.0

Table 4-13 Network Wide Performance Score – PM Peak

SCENARIOS	Over-Capacity Queues	Travel Time	Travel Distance	Average Speed	Overall
Newbury Racecourse (with through link)	0	0	0	0	0.0
Newbury Racecourse (no link)	-1	-1	0	-1	-0.8
Sandleford Park (1000)	0	0	0	-1	-0.3
Sandleford Park (2000)	-1	-1	0	-2	-1.0
Siege Cross Farm	-1	-1	0	-1	-0.8
North Newbury	0	0	0	-1	-0.3

4.3.6 As in the morning peak, Newbury Racecourse with the through link road has benefits over the Do Minimum and has an overall score of 0.

4.3.7 All other scenarios have better scores in the evening peak than in the morning with less negative impact experienced in this time period. Newbury Racecourse (no link), Sandleford Park (1000 dwellings), Siege Cross Farm and North Newbury see deterioration in network performance and have scores between 0 and -1. Sandleford Park (2000 dwellings) is slightly worse with a score of -1.0.

4.3.8 Differences in flows and delay between 2006 and 2026 are shown visually on SATURN Plots in Appendix C.

4.4 CONGESTION AT KEY JUNCTIONS

4.4.1 Table 4.14 and Table 4.15 shows the congestion pattern on key junctions for all scenarios compared against the 2006 and 2026 Do Minimum levels.

4.4.2 Junctions which are nearing capacity (flow to capacity ratio 0.85 to 0.95) are shown in yellow, those which are at capacity (flow to capacity ratio 0.95 to 1) are shown in orange and those over capacity (flow to capacity ratio greater than 1) are shown in red.

4.4.3 Figure 4.2 (in the appendix) shows the levels of congestion at key junctions in 2006. Figure 4.3 shows the levels of congestion at key junctions in 2026 before development. Figure 4.5 to figure 4.10 show the 2026 traffic impacts with the development sites but without mitigation.

Table 4-14 Key Junction Congestion for all Scenarios AM PEAK

Junction	2006	2026 DM	Newbury Racecourse (with through link)	Newbury Racecourse (no through link)	Sandleford Park (1000)	Sandleford Park (2000)	Siege Cross Farm	North Newbury
A339								
M4 J13								
Vodafone Rbt								
Robin Hood								
Faraday Plaza								
Bear Lane								
St Johns								
Pinchington								
Swan Inn Rbt								
Greenham Park W								
Greenham Park E								
Thornford Rd Rbt								
Tothill Rbt W								
Tothill Rbt E								
A343 North								
A343 South								
A4W								
A4E								
Oxford Road								
Faraday Road								
Business Park								
Hambridge Road								
Lower Way								
Turnpike								
Henwick Lane								
Northfield Rd								
Park Lane								
Broadway								
The Moors								
Harts Hill								
Floral Way								
Pipers Way								
Gables Way								

Table 4-15 Key Junction Congestion for all Scenarios PM PEAK

Junction	2006	2026 DM	Newbury Racecourse (with through link)	Newbury Racecourse (no through link)	Sandleford Park (1000)	Sandleford Park (2000)	Siege Cross Farm	North Newbury
A339								
M4 J13								
Vodafone Rbt								
Robin Hood								
Faraday Plaza								
Bear Lane								
St Johns								
Pinchington								
Swan Inn Rbt								
Greenham Park W								
Greenham Park E								
Thornford Rd Rbt								
Tothill Rbt W								
Tothill Rbt E								
A343 North								
A343 South								
A4W								
A4E								
A4								
Oxford Road								
Faraday Road								
Business Park								
Hambridge Road								
Lower Way								
Turnpike								
Henwick Lane								
Northfield Rd								
Park Lane								
Broadway								
The Moors								
Harts Hill								
Floral Way								
Pipers Way								
Gables Way								

4.4.4 Table 4-14 and Table 4.15 shows that the M4 junction 13 remains at the same level as the 2026 Do Minimum for all scenarios (either at or nearing capacity) and does not have its performance worsened by development traffic.

4.4.5 Robin Hood Gyratory, Faraday Plaza, Bear Lane, St Johns (AM only), Pinchington Lane (PM), A343 South (AM), Faraday Road (AM), Hambridge Road (PM), Lower Way (AM), Turnpike (AM), Henwick Lane and Pipers Way junctions are all over capacity in 2026 already and so do not show negative impact by additional development traffic. Although the modelling of the Newbury Racecourse scenario does show more junctions to be over capacity on the A339, the network performs better overall. The capacity at junctions on the A339 will be addressed through the subsequent development of mitigation measures.

4.4.6 St Johns (PM), Pinchington Lane (AM), Swan Inn (AM and PM), Tothill Rbt East (AM), Oxford Road (PM), Faraday Road (PM) and Hambridge Road (AM) junctions all have performance worsened with the development scenarios.

M4 Junction 12

4.4.7 The eastern extent of the SATURN Model does not include M4 Junction 12. However, the model has been used to calculate the number of additional trips through Junction 12 in the peak periods for each scenario by analysing the origins and destinations of trips from particular zones. The number of development trips through M4 Junction 12 for each scenario is shown in Table 4.16.

Table 4-16 Number of Development Trips through M4 Junction 12

SCENARIOS	AM Peak	PM Peak
Newbury Racecourse (with through link)	32	27
Newbury Racecourse (no link)	32	27
Sandleford Park (1000)	43	21
Sandleford Park (2000)	44	42
Siege Cross Farm	48	49
North Newbury	23	23

4.4.8 Data on the total number of trips through M4 Junction 12 in 2026 is not available. The number of trips made through M4 Junction 12 is known for 2008 (from Pincents Hill Mitigation Study, WSP, March 2009). The 2008 data can be used to understand the likely impact of each scenario on M4 Junction 12. In 2008, 6,945 trips were made through M4 Junction 12 in the AM Peak and 6,502 in the PM Peak. Using these figures, the ratio of development trips expected through M4 Junction 12 to the total trips through M4 Junction 12 does not exceed 1% for any of the scenarios.

4.5 JOURNEY TIME

4.5.1 Four routes in both directions (shown on Figure 4.4) have been analysed to determine the effect of each scenario on journey times. The actual modelled time in seconds is shown in Table 4.17 and Table 4.20 for the morning and evening peaks respectively. The difference of each scenario against the 2026 Do Minimum is shown in Table 4.18 and Table 4.21, with the scoring displayed in tables Table 4.19 and 4.22.

Table 4.23 shows an overall scoring based on both time periods derived by averaging the scores for the local and strategic routes.

Table 4-17 Journey Time – AM Peak

SCENARIO	LOCAL				STRATEGIC			
	A4 EB	A4 WB	A339 NB	A339 SB	A34 NB	A34 SB	M4 EB	M4 WB
Do Minimum - 2026	2048	2148	1293	1024	808	617	541	910
(1) Newbury Racecourse (with through link)	2115	2259	1078	1074	770	616	540	926
(2) Newbury Racecourse (no link)	2114	2361	1384	1056	835	619	542	928
(3) Sandleford Park (1000)	2154	2217	1460	1080	856	620	542	925
(4) Sandleford Park (2000)	2118	2237	1571	1115	908	625	544	932
(5) Siege Cross Farm	2166	2389	1341	1042	828	617	541	918
(6) North Newbury	2130	2216	1369	1136	831	629	539	924

Table 4-18 Journey Time Difference compared to Do Minimum – AM Peak

SCENARIO	LOCAL				STRATEGIC			
	A4 EB	A4 WB	A339 NB	A339 SB	A34 NB	A34 SB	M4 EB	M4 WB
(1) Newbury Racecourse (with through link)	67	111	-215	50	-38	-1	-1	16
(2) Newbury Racecourse (no link)	66	213	91	32	27	2	1	18
(3) Sandleford Park (1000)	106	69	167	56	48	3	1	15
(4) Sandleford Park (2000)	70	89	278	91	100	8	3	22
(5) Siege Cross Farm	118	241	48	18	20	0	0	8
(6) North Newbury	82	68	76	112	23	12	-2	14

Table 4-19 Development Score based on Journey Time – AM Peak

SCENARIO	LOCAL				STRATEGIC			
	A4 EB	A4 WB	A339 NB	A339 SB	A34 NB	A34 SB	M4 EB	M4 WB
(1) Newbury Racecourse (with through link)	-2	-2	0	-2	0	0	0	-1
(2) Newbury Racecourse (no link)	-2	-2	-2	-2	-1	0	0	-1
(3) Sandleford Park (1000)	-2	-2	-2	-2	-2	0	0	-1
(4) Sandleford Park (2000)	-2	-2	-2	-2	-2	0	0	-1
(5) Siege Cross Farm	-2	-2	-2	-1	-1	0	0	0
(6) North Newbury	-2	-2	-2	-2	-1	0	0	0

Table 4-20 Journey Time – PM Peak

SCENARIO	LOCAL				STRATEGIC			
	A4 EB	A4 WB	A339 NB	A339 SB	A34 NB	A34 SB	M4 EB	M4 WB
Base (Do Minimum)	2526	2425	1023	1036	648	649	506	540
(1) Newbury Racecourse (with through link)	2559	2355	1009	1015	644	672	506	540
(2) Newbury Racecourse (no link)	2634	2557	1043	1068	671	697	506	540
(3) Sandleford Park (1000)	2557	2472	1052	1071	662	664	506	539
(4) Sandleford Park (2000)	2584	2470	1072	1078	669	674	506	675
(5) Siege Cross Farm	2632	2585	1027	969	654	660	506	540
(6) North Newbury	2570	2483	1032	982	659	661	506	541

Table 4-21 Journey Time Difference compared to Do Minimum – PM Peak

SCENARIO	LOCAL				STRATEGIC			
	A4 EB	A4 WB	A339 NB	A339 SB	A34 NB	A34 SB	M4 EB	M4 WB
(1) Newbury Racecourse (with through link)	33	-70	-14	-21	-4	23	0	0
(2) Newbury Racecourse (no link)	108	132	20	32	23	48	0	0
(3) Sandleford Park (1000)	31	47	29	35	14	15	0	-1
(4) Sandleford Park (2000)	58	45	49	42	21	25	0	135
(5) Siege Cross Farm	106	160	4	-67	6	11	0	0
(6) North Newbury	44	58	9	-54	11	12	0	1

Table 4-22 Development Score based on Journey Time – PM Peak

SCENARIO	LOCAL				STRATEGIC			
	A4 EB	A4 WB	A339 NB	A339 SB	A34 NB	A34 SB	M4 EB	M4 WB
(1) Newbury Racecourse (with through link)	-2	0	0	0	0	-1	0	0
(2) Newbury Racecourse (no link)	-2	-2	-1	-2	-1	-2	0	0
(3) Sandleford Park (1000)	-2	-2	-1	-2	0	-1	0	0
(4) Sandleford Park (2000)	-2	-2	-2	-2	-1	-1	0	-2
(5) Siege Cross Farm	-2	-2	0	0	0	0	0	0
(6) North Newbury	-2	-2	0	0	0	0	0	0

Table 4-23 Overall Average Journey Time Scoring

SCENARIO	LOCAL			STRATEGIC		
	AM	PM	Overall	AM	PM	Overall
(1) Newbury Racecourse (with through link)	-1.5	-0.5	-1.0	-0.3	-0.3	-0.3
(2) Newbury Racecourse (no link)	-2.0	-1.8	-1.9	-0.5	-0.8	-0.6
(3) Sandleford Park (1000)	-2.0	-1.8	-1.9	-0.8	-0.3	-0.5
(4) Sandleford Park (2000)	-2.0	-2.0	-2.0	-0.8	-1.0	-0.9
(5) Siege Cross Farm	-1.8	-1.0	-1.4	-0.3	0	-0.1
(6) North Newbury	-2.0	-1.0	-1.5	-0.3	0	-0.1

4.5.2 The only scenario in which a significant positive benefit in journey times is experienced is with the addition of the through link from the A339 to the A4 in association with Newbury Racecourse in which journey times are reduced northbound on the A339 and A34. Without mitigation all remaining scenarios experience an increase of greater than 30 seconds in journey time on the A4 and A339 through Newbury in the morning peak. The evening peak is less uniform with the impact on local journey times with Sandleford Park (2000 dwellings) and Newbury Racecourse (no link) having the greatest impact.

4.5.3 Whilst all scenarios also experience an increase in the A34 and M4 route journey times, only Sandleford Park (1000 and 2000 dwellings) and Newbury Racecourse (no link) have increased greater than 30 seconds on these routes.

4.5.4 Appendix D contains graphs of each journey time route by direction with each scenario displayed against the Do Minimum 2026. The locations of significant individual increases in delay are shown and outlined in the following sections which examine each development location in turn.

4.6 OVERALL SCORING

4.6.1 Table 4.24 and Table 4.25 show the summary results of analysis undertaken to ascertain the impact of future residential development on the network in morning and evening peak respectively. Results are based on the scoring methodology as detailed in Section 3. Then overall scoring has been assigned to each development based on the sum of the morning and evening scoring results shown in Table 4.26.

Table 4-24 Comparison of Scoring AM Peak

SCENARIO	Network-Wide Performance	Congestion on Strategic Links	Congestion on Local Links	Journey Times on Local Routes	Journey Times on Strategic Routes	Strategic Re-assignment	Local Re-assignment	TOTAL
Newbury Racecourse	0.0	-2.0	-1.0	-1.5	-0.3	-1.8	-1.0	-7.6
Newbury Racecourse	-1.3	-1.5	-1.8	-2.0	-0.5	-1.5	-1.8	-10.4
Sandleford Park (1000)	-0.5	-1.6	-1.4	-2.0	-0.8	-1.4	-1.4	-9.1
Sandleford Park (2000)	-1.3	-2.4	-1.7	-2.0	-0.8	-2.4	-1.7	-12.3
Siege Cross Farm	-1.3	-1.3	-1.7	-1.8	-0.3	-1.3	-1.7	-9.3
North Newbury	-0.5	-1.6	-1.5	-2.0	-0.3	-1.6	-1.4	-8.9

Table 4-25 Comparison of Scoring PM Peak

SCENARIO	Network-Wide Performance	Congestion on Strategic Links	Congestion on Local Links	Journey Times on Local Routes	Journey Times on Strategic Routes	Strategic Re-assignment	Local Re-assignment	TOTAL
Newbury Racecourse	0.0	-2.4	-1.4	-0.5	-0.3	-2.4	-1.4	-8.4
Newbury Racecourse	-0.8	-2.6	-1.7	-1.8	-0.8	-2.6	-1.6	-11.8
Sandleford Park (1000)	-0.3	-1.9	-1	-1.8	-0.3	-1.9	-0.8	-7.9
Sandleford Park (2000)	-1.0	-2.3	-0.7	-2.0	-1.0	-2.1	-0.7	-9.8
Siege Cross Farm	-0.8	-1.7	-1.8	-1.0	0.0	-1.7	-1.6	-8.6
North Newbury	-0.3	-1.9	-1	-1.0	0.0	-1.9	-0.8	-6.9

Table 4-26 Comparison of Scoring Overall

SCENARIO	Network-Wide Performance	Congestion on Strategic Links	Congestion on Local Links	Journey Times on Local Routes	Journey Times on Strategic Routes	Strategic Re-assignment	Local Re-assignment	TOTAL
Newbury Racecourse	0.0	-4.4	-2.4	-2.0	-0.5	-4.2	-2.4	-15.9
Newbury Racecourse	-2.1	-4.1	-3.5	-3.8	-1.3	-4.1	-3.4	-22.2
Sandleford Park (1000)	-0.8	-3.5	-2.4	-3.8	-1.0	-3.3	-2.2	-16.9
Sandleford Park (2000)	-2.3	-4.7	-2.4	-4.0	-1.8	-4.5	-2.4	-22.1
Siege Cross Farm	-2.1	-3.0	-3.5	-2.8	-0.3	-3.0	-3.3	-17.9
North Newbury	-0.8	-3.5	-2.5	-3.0	-0.3	-3.5	-2.2	-15.7

4.6.2 The results for the morning peak reveal that Newbury Racecourse with the through link road is the most favourable scenario as it shows less overall impact. Sandleford Park with 1000 dwellings, North Newbury and Siege Cross Farm show a similar degree of performance in the morning peak with these developments having a comparatively less impact on the network than the rest. Newbury Racecourse without the link and Sandleford Park with 2000 dwellings are the two worse performing scenarios in the morning peak period.

4.6.3 In the evening peak however, North Newbury has the least impact with Newbury Racecourse (with link road), Sandleford Park with 1000 dwellings and Siege Cross Farm showing similar but slightly worse results. As with the morning peak period, Newbury Racecourse without a link road and Sandleford Park with 2000 dwellings are the worst performing scenarios in the evening peak.

4.6.4 When the results of the morning and evening peaks are combined, there are three scenarios with similar results, with North Newbury scoring best (scoring 15.7), then Newbury Racecourse (with the through link) (scoring 15.9) and Sandleford Park with 1000 dwellings (scoring 16.9). Siege Cross Farm is the next scenario in order (scoring 17.9), with Sandleford Park with 2000 dwellings and Newbury Racecourse (without a link road) the least favourable scenarios (scoring 22.1 and 22.2).

4.7 DEVELOPMENT IMPACT WITHOUT MITIGATION – NEWBURY RACECOURSE

4.7.1 Two scenarios have been run for Newbury Racecourse. The first includes a through route providing a link road between Hambridge Road and the A339. The second scenario examines the development impact without a link road.

4.7.2 The results are summarised in table 4.27 below:

Table 4-27 – Newbury Racecourse Quantitative Scoring

Indicator	With Link Road			Without Link Road		
	AM	PM	Overall	AM	PM	Overall
Network-Wide Performance	0.0	0.0	0.0	-1.3	-0.8	-2.1
Congestion on Strategic Links	-2.0	-2.4	-4.4	-1.5	-2.6	-4.1
Congestion on Local Links	-1.0	-1.4	-2.4	-1.8	-1.7	-3.5
Journey Times on Local Routes	-1.5	-0.5	-2.0	-2.0	-1.8	-3.8
Journey Times on Strategic Routes	-0.3	-0.3	-0.5	-0.5	-0.8	-1.3
Strategic Re-assignment	-1.8	-2.4	-4.2	-1.5	-2.6	-4.1
Local Re-assignment	-1.0	-1.4	-2.4	-1.8	-1.6	-3.4
TOTAL	**-7.6**	**-8.4**	**-15.9**	**-10.4**	**-11.8**	**-22.2**

SCENARIO 1 - NEWBURY RACECOURSE WITH LINK ROAD

4.7.3 This scenario enables the development traffic to choose between the Greenham Road access and the new bridge over the railway to Hambridge Road, by use of a link road which would link the A4 to the A339. The link road would also provide a route for through traffic.

4.7.4 The presence of a link road provides capacity for traffic to bypass Robin Hood Roundabout and Bear Lane junction, thereby allowing the development traffic and existing 2026 background traffic to remain within the A4 and A339 corridors. The model indicates a potential transfer of traffic from roads outside Newbury to the A339 corridor, specifically from the A34 and Crookham Hill. This effect is more pronounced in the morning peak but the evening peak does see a drop in the volume of traffic using Crookham Hill to travel around the congested Newbury area. The model tends to re-distribute traffic towards the periphery of the modelled area where congestion is experienced within the centre. The effect of this is that capacity may subsequently be created on the A339 corridor and traffic may be redistributed here which was previously using other routes.

4.7.5 During the development of the mitigation package, it is important to ensure that the opportunity is taken to develop a series of measures for the benefit of Newbury town and through a re-balancing of network capacity.

4.7.6 Junctions with severe additional congestion above the Do Minimum levels:

- A339 / Robin Hood Gyratory
- A339 / Bear Lane Roundabout

- A339 / Pinchington Roundabout
- A339 / Swan Inn Roundabout
- A4 / Oxford Road Roundabout
- A4 / Faraday Road Signals
- A4 / Hambridge Road Signals
- A4 / Lower Way Signals
- A4 / Turnpike Roundabout
- A343/Monks Lane

SCENARIO 2 NEWBURY RACECOURSE WITHOUT LINK

4.7.7 This scenario has over two-thirds of traffic accessing the network over the new bridge onto Hambridge Road and the remainder accessing via Greenham (Racecourse Road). This is a result of the development being split into two distinct areas (East and West), each assigned with its own access.

4.7.8 With the development traffic loaded onto the network without the provision of any additional capacity over and above the Do Minimum scenario, there are severe impacts on existing traffic patterns. The development traffic utilises the capacity at the key junctions within Newbury and the existing traffic is pushed to the periphery of the model, onto the A34 and Crookham Hill (which sees significant queuing at the level crossing).

4.7.9 Junctions which have severe additional congestion above the Do Minimum levels include;

- A339 / Robin Hood Gyratory
- A339 / St Johns Roundabout
- A339 / Pinchington Roundabout
- A34 / A343 south Junction
- A4 / Oxford Road Roundabout
- A4 / Faraday Road Signals
- A4 / Hambridge Road Signals

4.8 DEVELOPMENT IMPACT WITHOUT MITIGATION – SANDLEFORD PARK

4.8.1 Two scenarios have been run for this development location. The first has 1000 dwellings and the second has the larger development of 2000 dwellings. The site is located to the south of Newbury between the A343 and A339.

Table 4-28 – Sandleford Park Quantitative Scoring

Indicator	1000 Dwellings			2000 Dwellings		
	AM	PM	Overall	AM	PM	Overall
Network-Wide Performance	-0.5	-0.3	-0.8	-1.3	-1.0	-2.3
Congestion on Strategic Links	-1.6	-1.9	-3.5	-2.4	-2.3	-4.7
Congestion on Local Links	-1.4	-1.0	-2.4	-1.7	-0.7	-2.4
Journey Times on Local Routes	-2.0	-1.8	-3.8	-2.0	-2.0	-4.0
Journey Times on Strategic Routes	-0.8	-0.3	-1.0	-0.8	-1.0	-1.8
Strategic Re-assignment	-1.4	-1.9	-3.3	-2.4	-2.1	-4.5
Local Re-assignment	-1.4	-0.8	-2.2	-1.7	-0.7	-2.4
TOTAL	**-9.1**	**-7.9**	**-16.9**	**-12.3**	**-9.8**	**-22.1**

SCENARIO 3 - SANDLEFORD PARK (1000 DWELLINGS)

4.8.2 The impact on travel patterns for Sandleford Park development (1000 dwellings) compared to Newbury Racecourse development (without the link) is a lot less. The location of the development to the south of the urban area of Newbury results in traffic travelling through the town centre to access some destinations to the north and there is a localised impact on Greenham Road during the AM peak period. There is however, one noticeable impact of this. Both Pinchington Lane and Swan Inn roundabouts become more congested with the addition of the development traffic. The split of traffic heading north and south will depend on the specific destinations. The split can be influenced by the location of accesses to the site, signage and the traffic management within the development site.

4.8.3 Junctions which have severe additional congestion above the Do Minimum levels include

- A339 / Pinchington Roundabout
- A339 / Swan Hill Roundabout
- A339 / St Johns Roundabout
- A34 / A343 South Junction
- A343 / Monks Lane

4.8.4 Junctions affected which are remote from the development site are due to the re-distribution of traffic

SCENARIO 4 - SANDLEFORD PARK (2000 DWELLINGS)

4.8.5 This run has the development in the same location as Scenario 3 but with the number of dwellings doubled to 2000. The effects on traffic patterns are the same as with 1000 dwellings but the level of congestion is greater. Junctions to the north of the development are impacted by the increased level of congestion, such as Robin Hood and St John's roundabout.

4.8.6 Junctions which have severe additional congestion above the Do Minimum levels include;

- A339 / St John's Roundabout
- A339 / Pinchington Roundabout
- A339 / Swan Hill Roundabout
- A34 / Tothill Services Roundabouts
- A34 / A343 Junctions
- A4 / Pipers Way Roundabout
- A343 / Monks Lane

4.8.7 It is possible that the impact on junctions to the north of the development site can be minimised with improvements to junctions to the south, including the access junctions to the A34. This should enable less traffic to travel north from the development and ease pressure on junctions to the north of the site.

4.9 DEVELOPMENT IMPACT WITHOUT MITIGATION – SIEGE CROSS FARM

4.9.1 Scenario 5 examines 1000 houses located at Siege Cross Farm which is located to the east of Thatcham, accessed directly onto the A4.

Table 4-29 – Siege Cross Farm Quantitative Scoring

Indicator	AM	PM	Overall
Network-Wide Performance	-1.3	-0.8	-2.1
Congestion on Strategic Links	-1.3	-1.7	-3.0
Congestion on Local Links	-1.7	-1.8	-3.5
Journey Times on Local Routes	-1.8	-1.0	-2.8
Journey Times on Strategic Routes	-0.3	0.0	-0.3
Strategic Re-assignment	-1.3	-1.7	-3.0
Local Re-assignment	-1.7	-1.6	-3.3
TOTAL	**-9.3**	**-8.6**	**-17.9**

4.9.2 The location of the development enables some traffic to access the development from the east without travelling through the centre of Thatcham and Newbury. The majority of the impact is on the A4 through Thatcham and to the east of Thatcham. Traffic accessing the development from the A34 has to travel either on the A339 or A4 and travel through Bear Lane or Robin Hood junctions. The lack of capacity for traffic east –west on the A4 leads to an increase of traffic on local roads such as Kiln Road, Love Lane and Floral Way.

4.9.3 Junctions which have severe additional congestion above the Do Minimum levels include;

- A339 / Robin Hood gyratory
- A339 / St Johns Roundabout
- A4 / Lower Way Signals
- A4 / Turnpike Roundabout
- A4 / The Moors Signals
- A4 / Pipers Way Roundabout

4.10 DEVELOPMENT IMPACT WITHOUT MITIGATION – NORTH NEWBURY

4.10.1 Scenario 6 examines 1000 dwellings at North Newbury accessed from both the Vodafone Roundabout and Shaw Hill, with all development lying east of the A339.

Table 4-30 North Newbury Quantitative Scoring

Indicator	AM	PM	Overall
Network-Wide Performance	-0.5	-0.3	-0.8
Congestion on Strategic Links	-1.6	-1.9	-3.5
Congestion on Local Links	-1.5	-1	-2.5
Journey Times on Local Routes	-2.0	-1.0	-3.0
Journey Times on Strategic Routes	-0.3	0.0	-0.3
Strategic Re-assignment	-1.6	-1.9	-3.5
Local Re-assignment	-1.4	-0.8	-2.2
TOTAL	**-8.9**	**-6.9**	**-15.7**

4.10.2 For scenario 6 the development is located north of Newbury adjacent to easy access to the A34 and M4. However, not all development trips have locations reached by the strategic routes and trips to local destinations have to come south into Newbury through the already congested Robin Hood Gyratory. There is also a lack of a straight forward route for traffic between the development site and local destinations to the west, without either travelling through Robin Hood roundabout or doubling back on the A34 at the M4 or services roundabouts.

4.10.3 The modelling results predict a switch of traffic from Robin Hood roundabout to routes on the A34 and Oxford Road, specifically for origins to the north west of Newbury, such as Speen and Donnington. This impacts on Oxford Road which runs parallel to the A34 and forms an alternative route to access the A34 and M4.

4.10.4 Whilst flows are significantly increased through the Vodafone Roundabout on the A339 with this development, this junction is predicted to remain within capacity in 2026 with the additional development traffic.

4.10.5 Junctions which have severe additional congestion above the Do Minimum levels include

- A339 / Robin Hood Gyratory
- A339 / St Johns Roundabout
- A4 / Oxford Road Roundabout
- A4 / Faraday Road signals

5 Outline of Sustainable Transport Mitigation Measures

5.1 INTRODUCTION

5.1.1 The purpose of this chapter is to summarise the approach being progressed by West Berkshire Council (WBC) to comply with Government guidance to encourage sustainable travel choices. The role of the sustainable measures will be to fulfil the requirements of the following themes. These themes have been identified as themes which meet the sustainable development objectives as well as the Highways Agency objectives of minimising the traffic impact on the strategic road network:

- Congestion management
- Reducing reliance on single occupancy car journeys
- Developing opportunities for travel by public transport
- Opportunities for a greater choice of travel

5.1.2 The sustainable measures will largely focus on public transport measures and walk and cycle measures. These will be supported by appropriate smarter choices measures as discussed in chapters 8-11.

5.1.3 West Berkshire Council is developing its well established evidence base to support delivery of the District's Core Strategy under the Local Development Framework (LDF). The approach outlined in this chapter is relevant to both the delivery of the key development sites around Newbury and possible options of development sites for the eastern urban area, as well as to existing West Berkshire communities.

5.1.4 Delivering sustainable development will be an essential aspect of the Local Development Framework. Promoting walking, cycling and public transport use will directly support the Council's objectives of minimising the impact of new development on the District, reducing the demand for car-based journeys and promoting the use of more healthy and sustainable forms of transport, where travel is necessary.

5.1.5 It is intended that the approach being adopted for the LDF will directly support the following proposed Core Strategy policies (as listed in Option for the Future: West Berkshire Core Strategy, April 2009):

- CS1 – Sustainable Development
- CS9 – Strategic Development Sites (at Newbury Racecourse, Sandleford Park, Siege Cross Farm or North Newbury, and in the Eastern Urban Area)
- CS20 – Infrastructure Provision
- CS21 –Transport

5.1.6 This section provides an initial scoping of the public transport services (routing and frequency) and other sustainable measures which are likely to be required to support each LDF site and achieve the 7.5% car trip rate reduction for public transport and 7.5% car trip rate reduction for walk and cycle measures referred to in Chapter 3 (Table 3.2). Public transport proposals will be tested in the public transport model to confirm the impact of these routes on highway network performance.

5.1.7 This section is also designed to provide Development Control advice for West Berkshire Council prior to transport assessments for individual sites being completed.

5.2 PUBLIC TRANSPORT MEASURES

PUBLIC TRANSPORT ROUTE ASSESSMENT APPROACH

5.2.1 To allow effective testing of public transport routes within the VISUM model, an initial assessment has been undertaken of the likely required provision for each site. To confirm that the provision is realistic, consideration has been given to costs and revenues based on indicative mode shares by public transport. The routes are tested further in Chapter 6 to ascertain the number of vehicles removed from the Highway network and confirm the likely level of public transport mode share that can be achieved.

NEWBURY EXISTING BUILT UP AREA HOUSING ALLOCATION

5.2.2 Growth forecast for the existing built up area of Newbury and Thatcham through planning commitments, SHLAA, and background traffic growth from TEMPRO has been included in the assessment.

5.2.3 Given the proximity of these smaller development sites to the town centre, additional bus services are unlikely to be required to make these individual development sites viable. However, the sites will benefit from existing services which are at their most frequent within the town centre, and these will need to be complemented by walking and cycling measures. These measures should be focussed on upgrading the access routes into the town centre and can be planned through the Council's Cycling Strategy

NEWBURY RACECOURSE

Current Provision

5.2.4 This development site is located north of Newbury Racecourse and as such is situated next to Newbury Racecourse station. However, Newbury Racecourse station is not as well served as Newbury railway station and does not offer direct rail services to London, therefore it is expected that Newbury railway station (situated 2km to the west) will be a bigger draw to residents.

5.2.5 The site currently has no bus services running directly past the site, however there is a good frequency of bus services on London Road (A4), located 1km to the north of the site. The only exception to this is the current Vodafone shuttle which runs along Hambridge Road. However this service is currently only for use by Vodafone employees. The site is within reach of Newbury town centre, however given the current lack of direct public transport service provision Accession plots showing levels of accessibility indicate that it takes between 15 – 30 minutes to access a major or district centre from this site.

Potential Improvements

5.2.6 An independent assessment of the public transport needs of this site has been undertaken. The key trip destinations from this site are within Newbury and Reading. Provision of a service to Newbury and Thatcham would allow both major trip destinations to be served either directly or through onward connections to Reading via bus or rail.

5.2.7 Although there are regular services operating on the A4 London Road, such as the 1 and 1A service, these are not suitable to divert into the site due to their current routing and serving to the north of Newbury (which could become un-served if this service was diverted into the Racecourse). Therefore, a new dedicated shuttle service is required to service this site and provide public transport access.

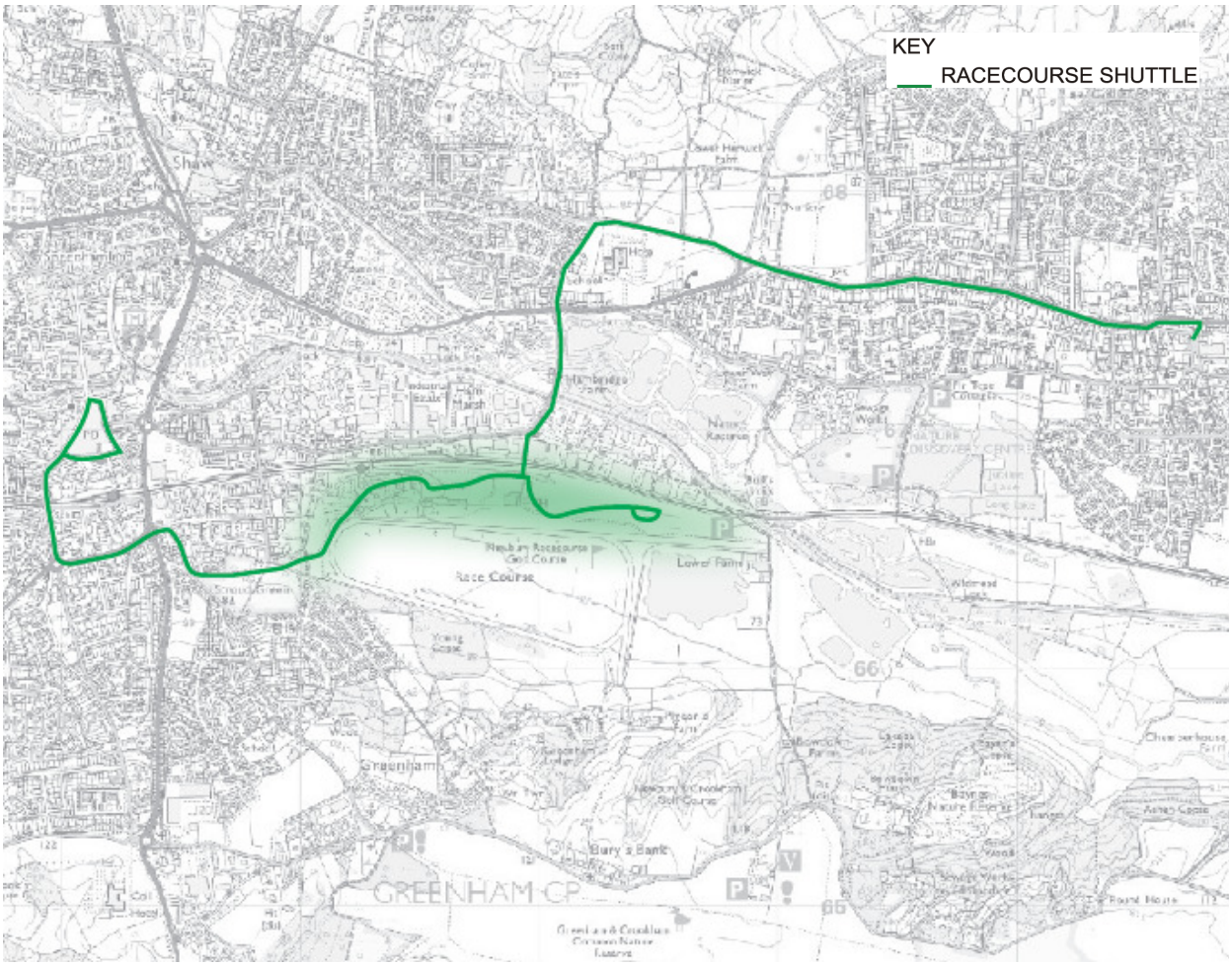
5.2.8 In developing a potential route outline for this shuttle service, consideration has been given to the Transport Assessment Report (TAR) developed by Stuart Michael Associates for this site which states that:

"Discussions have been taking place with local operator, Newbury Buses, in respect of providing a new bus service through the site, connecting the site with Newbury Town Centre, the hospital and Thatcham and utilising the bus only link between Western and Central areas of the site. The service would operate at a 20 minute frequency Monday to Saturday."

5.2.9 In addition, the developers propose that, "The new bus service would be accompanied by new bus infrastructure, such as a bus shelter, real time information systems and branded vehicles". The TAR states that a one month initial free bus travel would also be offered to residents and the proposed scheme is stated to link to the town centre via the Stroud Green area, thus benefiting residents adjacent to the west of the site.

5.2.10 No route plan has been included within the TAR. However, an expected routing has been identified through this LDF study and is shown in figure 5.1 below and figure 5.2 at the end of the report.

Figure 5.1 –Potential routing of Newbury Racecourse shuttle service



5.2.11 The length of the proposed route has been identified as being in the region of 8 km each way, resulting in a 16km round trip. Initially based on an estimated average speed of 25kph, and then adjusted in comparison to current bus route timetables within the area, it has been calculated that the round trip will take 38 minutes resulting in a requirement for two buses to provide the 20 minute frequency of service stated within the TAR. However, such a provision leaves a very small layover time between runs of only two minutes, and it is suggested that a 20 minute frequency would be insufficient for a development of this size. At the preferred frequency of 15 minutes, 3 buses would be required, increasing costs by £150,000 annually.

5.2.12 Table 5.1 below indicates the cost/revenue analysis undertaken for this shuttle service based on the TAR suggested routing and frequency. Revenue analysis has been undertaken for 5% and 10% bus mode share scenarios.

Table 5.1 – Newbury Racecourse Shuttle Cost/Revenue Analysis

Costs	Newbury Racecourse	
	2 Buses	3 Buses
Return Trip Distance (Km)	**16**	**16**
Time Taken for 1 Round Trip (Mins)	38	38
Frequency (min)	**20**	**15**
Number of Vehicles Required	2	3
Cost per bus	150,000	150,000
TOTAL Annual Operational Cost	**300,000**	**450,000**

Revenue (5% Bus Mode Share)	Newbury Racecourse	
	2 Buses	3 Buses
Number of Homes	1500	1500
AM Peak to All Day Factor	8	8
Average Travel days in a year (6 days a week)	312	312
Bus Mode Share	5%	5%
TOTAL potential trips per year	187,200	187,200
Fare per trip	1.50	1.50
Trip Annual Revenue	**280,800**	**280,800**
Profit/Loss	**-19,200**	**-169,200**

Revenue (10% Bus Mode Share)	Newbury Racecourse	
	2 Buses	3 Buses
Number of Homes	1500	1500
AM Peak to All Day Factor	8	8
Average Travel days in a year (6 days a week)	312	312
Bus Mode Share	10%	10%
TOTAL potential trips per year	374,400	374,400
Fare per trip	1.50	1.50
Trip Annual Revenue	**561,600**	**561,600**
Profit/Loss	**261,600**	**111,600**

5.2.13 The expected costs and revenues in 5% and 10% mode share scenarios have been calculated based on an assumption that 1 person trip is generated by each household. Data from the National Travel Survey (2006) show that 11% of daily trips take place during the AM Peak Hour. This implies that the total number of all day trips is 9 times the number that occur in the AM Peak Hour. This would include a small number of late night trips which are less likely to be by bus. For this reason the factor used to estimate all day trips is 8.

5.2.14 The total number of annual trips has been calculated by multiplying the daily trip figure by 312 (i.e. 6 days a week). This is based on the assumption that the frequency of trips made reduces by half during the weekend (Saturday and Sunday). This is considered to be a reasonable assumption.

5.2.15 Two options were considered here to provide a higher and a lower frequency, with two different vehicle requirements to assess the impact on viability. Operation of the service along its full route on a 20 minute frequency would require 2 vehicles. This would reduce the funding requirement required for the service but allows for relatively limited layover, and the frequency of service is less attractive for residents than a 15 minute service.

5.2.16 The results of the analysis for a 2 vehicle operation indicates that in the 5% mode share scenario, the proposed shuttle service would require a funding requirement of around £19k. However, this does not include additional patronage that maybe picked up en-route from either Thatcham or the hospital. In the 10% mode share scenario the service is estimated to make an annual profit in the region of £262k

5.2.17 To provide the service at a 15 minute frequency along the whole route, would require 3 buses and allow for only limited layover. An alternative option would therefore be to retain a 15 minute frequency between the development site and Newbury Town Centre, with alternate services extending along the whole route to Thatcham, providing a 30 minute frequency of service to this location. This would still require 3 vehicles, but offers:

- Better penetration of the site;
- A more direct journey from the site to Thatcham;
- But certain parts of the site are not directly served as frequently

5.2.18 Such a scenario will provide a better level of service however the cost of running 3 buses with a 5% mode share would require an annual funding requirement of £169k. The service is sustainable at a mode share nearer to 10% where an estimated annual profit of £111k is made.

Recommended Solution To Be Modelled

5.2.19 Given the journey length to Reading, bus service provision to Newbury and Thatcham provides the most viable option for serving this site. The train provides an alternative faster option for those needing to access Reading. Provided that a 10% bus mode share can be achieved with the development site, we recommend:

- A 15 minute frequency service to Newbury, which also provides full local accessibility within the site
- A 30 minute service between Newbury and Thatcham via the site

5.2.20 The public transport model will be used to ascertain the likely mode share that could be achieved by these improvements. The results from the model are provided in Chapter 6.

SANDLEFORD PARK

Current Provision

5.2.21 Sandleford Park is located 2 to 3km south of Newbury Town Centre between the A343 and A339. This development site is in close proximity to two main bus routes; 'The Link' service runs every hour between Basingstoke and Newbury along the A339, while services 3A/3B/3C run alternately to provide a 45 minute frequency of service between New Greenham Park and Newbury Town Centre. This provides a current

average level of provision of three services past the site every two hours. New Greenham Park's location, on the outskirts of Newbury, also means that services currently take more than 30 minutes to access the town centre.

Potential Improvements

5.2.22 A package of options for public transport access in relation to Sandleford Park has been identified. These measures incorporate a package of current and new bus services.

5.2.23 As identified above, currently the site has two key bus services that already run past its boundary.

- 'The Link' service runs along the A339 between Newbury and Basingstoke providing an hourly service.
- The New Greenham Park shuttle service (Service 3 A/B/C) runs along the A339 to the east of the site and provides a 45 minute service throughout the day between New Greenham Park and Newbury Town Centre.

5.2.24 Analysis determined that key draws from this site are likely to be to Basingstoke and Newbury Town Centre. Other draws include the New Greenham Business Park.

5.2.25 The 'Link' is an inter urban bus service between Newbury and Basingstoke and is currently being marketed as such. To attract passengers to this service it is important that it is not diverted substantially from the most direct route between Newbury and Basingstoke. For this reason it is not proposed that the route of the 'Link' is altered.

5.2.26 It is proposed that the New Greenham Park shuttle services are redirected through the Sandleford Park site to provide mutual benefit to both residents, who benefit from additional public transport, and the operators who will gain additional patronage.

5.2.27 A diversion of the New Greenham Park service would benefit both the development site and the business park, this is because it would provide reverse patronage for this service for journeys that may currently run empty, for example AM peak return trips between New Greenham Park and Newbury Town Centre. The diversion will not significantly extend the route journey time and as such we estimate it could be accommodated within the current shuttle timetable. This means that it is anticipated that no additional funding is required for this diversion

5.2.28 Currently the service runs on a 45 minute frequency but we would expect this to potentially increase as New Greenham Park is built up.

5.2.29 The suggested service changes identified above will not be enough to support the proposed development of 2000 homes due to insufficient frequency. Therefore the current services would need to be supplemented by either an additional local service diversion or shuttle service. The role of Park and Ride has been considered within the context of this site, and although a site at New Greenham Park has been considered, such a site would not benefit the development site directly. Therefore, it is not proposed that a Park and Ride site be tested directly as part of the LDF modelling for this site, but this option may be tested as part of the Transport Vision.

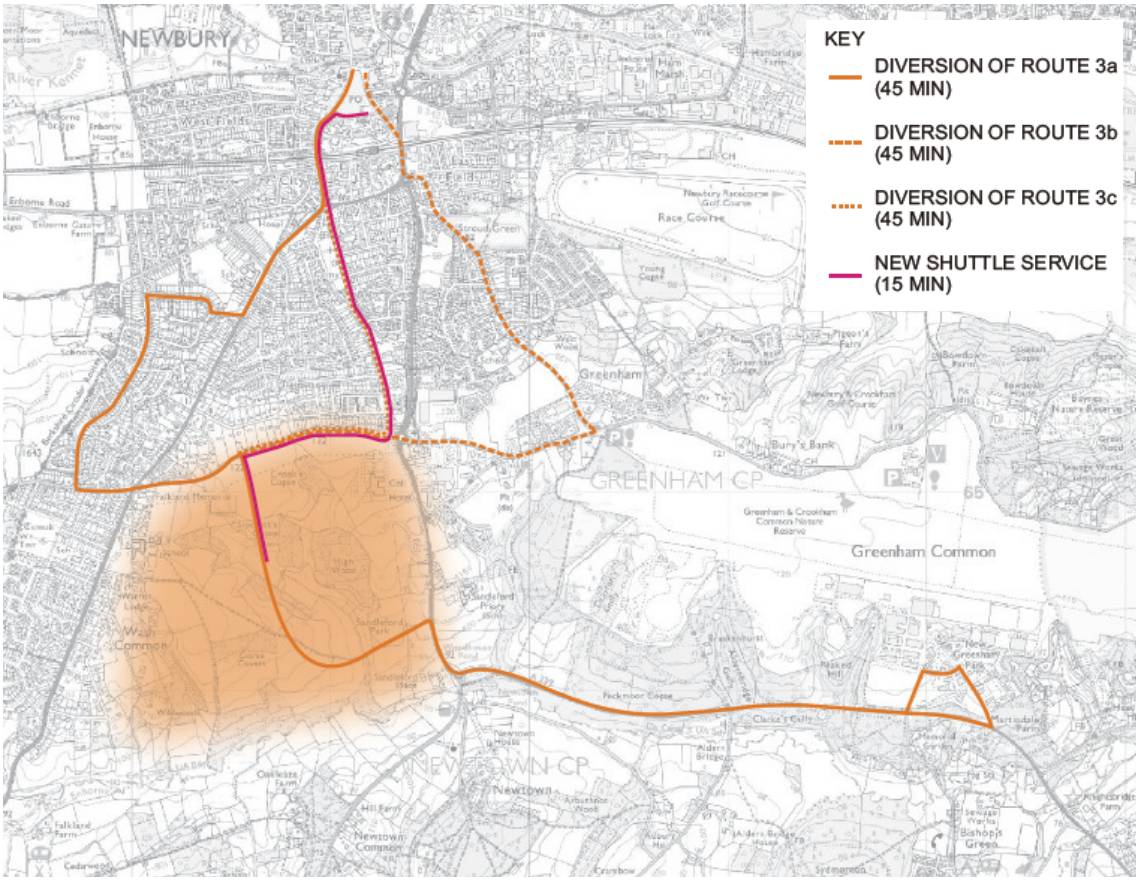
5.2.30 It is recommended that a new shuttle service will be required to provide public transport access between Sandleford Park and Newbury Town Centre. We propose that

this route accesses the site via the site's secondary northern access (with new junction) from Monks Lane.

5.2.31 There is a possibility that the new shuttle service would call additionally at Tesco's off Pinchington Lane. In addition the 'Link' service could also be diverted to Tesco with a stop at the store providing interchange opportunities between the two services. However, this would mean that the route between Sandleford Park and Newbury Town Centre would not be direct, and might be less attractive as an alternative to using the car.

5.2.32 The proposed routing for this shuttle and diversion of current services can be seen in Figure 5.3 below and Figure 5.4 at the end of the report. This is indicative and other assessments relating to constraints on the site that need to be taken into account (such as landscape value) may affect the suitability of the routes indicated. More detailed planning of routes can take place for this site if it is included in the proposed Core Strategy.

Figure 5.3 – Potential Public Transport Options for Sandleford Park



5.2.33 Having identified likely routings for each of these options, we have undertaken an initial cost/revenue analysis in relation to the new shuttle service. A cost/revenue analysis has only been undertaken for the new shuttle as the proposed diversions for the current services can be accommodated within the current timetable of these services and as such will not require additional funding.

5.2.34 The length of the proposed shuttle route has been identified as being in the region of 3.5 km each way, resulting in a 7km round trip. Based on an estimated average speed of 25kph it has been calculated that the round trip will take 20 minutes, resulting in a requirement of two buses to provide the 15 minute frequency of service. Table 5.2 below indicates the cost/revenue analysis undertaken for this shuttle service based on a 5% and 10% bus mode share.

5.2.35 Journey times could be further improved by installing a bus gate on the route of the shuttle service between Sandleford Park and Newbury Town Centre (between the site and the A339). A potential location would be on Newtown Road between Priory Road and Friars Road. This mitigation measure would result in diversions to car trips in the area. The impact of such a measure has not been modelled at this stage of assessment, but could be assessed as part of Phase 3.

Table 5.2 – Sandleford Park Shuttle Cost/Revenue Analysis

Costs	Sandleford Park
Return Trip Distance (Km)	**7**
Time Taken for 1 Round Trip Mins	20
Frequency (min)	**15**
Number of Vehicles Required	2
Cost per bus	150,000
TOTAL Annual Operational Cost	**300,000**

Revenue (5% Bus Mode Share)	Sandleford Park (2000 homes)	Sandleford Park (1000 homes)
Number of Homes	2000	1000
AM Peak to All Day Factor	8	8
Average Travel days in a year (6 days a week)	312	312
Bus Mode Share	5%	5%
TOTAL potential trips per year	249,600	124,800
Fare per trip	1.50	1.50
Trip Annual Revenue	**374,400**	**187,200**
Profit/Loss	**74,400**	**-112,800**

Revenue (10% Bus Mode Share)	Sandleford Park (2000 homes)	Sandleford Park (1000 homes)
Number of Homes	2000	1000
AM Peak to All Day Factor	8	8
Average Travel days in a year (6 days a week)	312	312
Bus Mode Share	10%	10%
TOTAL potential trips per year	499,200	249,600
Fare per trip	1.50	1.50
Trip Annual Revenue	**748,800**	**374,400**
Profit/Loss	**448,800**	**74,400**

5.2.36 The results of the analysis above indicates that with 2000 homes, at 5% mode share the proposed shuttle service will be self funding and make a relatively small profit

of £74.4k. At 10% mode share the service is estimated to make annual profit in the region of £448.8k. With 1000 homes, the service would require a 10% mode share to ensure a profit is made; with only a 5% mode share, the service would require additional funding support.

5.2.37 The service has the potential to support a 10 minute frequency of service for the same number of buses (2). However, this would leave a very short layover period between runs which may need to be extended to maintain reliability.

Recommended Solution To Be Modelled

5.2.38 Given the size of the Sandleford Park development, bus services to the site would be self supporting and make a profit. Two services are recommended –

- A diversion of the current New Greenham Park shuttle 3A/B/C, assuming additional costs are not incurred for the diversions
- A new shuttle service between the site and Newbury town operating a 15 minute service

5.2.39 These services will also improve public transport provision to Newbury College, which is adjacent to the Sandleford Park site.

5.2.40 The public transport model will be used to ascertain the likely mode share that could be achieved by these improvements. The results from the model are provided in Chapter 6.

SIEGE CROSS FARM

Current Provision

5.2.41 Siege Cross Farm is located on the eastern edge of Thatcham and lies 5km east of Newbury Town centre, and 24km to the west of Reading. In terms of public transport accessibility, the site is within 1km of Thatcham rail station, which lies on the Newbury – Reading line, providing connections to Reading, London and the South West. The site is also in close proximity to bus service 1 which runs the length of the A4 and provides a 20 minute frequency of service between Newbury Town Centre and Reading (offering a travel time of 25 minutes to Newbury and 50 minutes to Reading).

Potential Improvements

5.2.42 The key trip destinations from Siege Cross Farm will be Newbury, Thatcham and Reading. These destinations are all on the A4 Corridor.

5.2.43 The A4 study (previously undertaken by the Council with elements now at implementation stage) has recommended that bus priority should be placed along the A4 Corridor between Thatcham and Newbury. This will benefit service 1 and improve travel times along this part of the route. Key draws from this development are likely to be Thatcham, Newbury and Reading and the current service 1 already serves these areas. The development is proposed to contain 1000 homes.

5.2.44 Based on the above, two options for public transport provision have been scoped in relation to this potential development site.

- Diversion of current bus service 1 (between Newbury and Reading), and extension of the related 1A service (currently running between Newbury and Thatcham) to provide combined 15 minute service frequency;

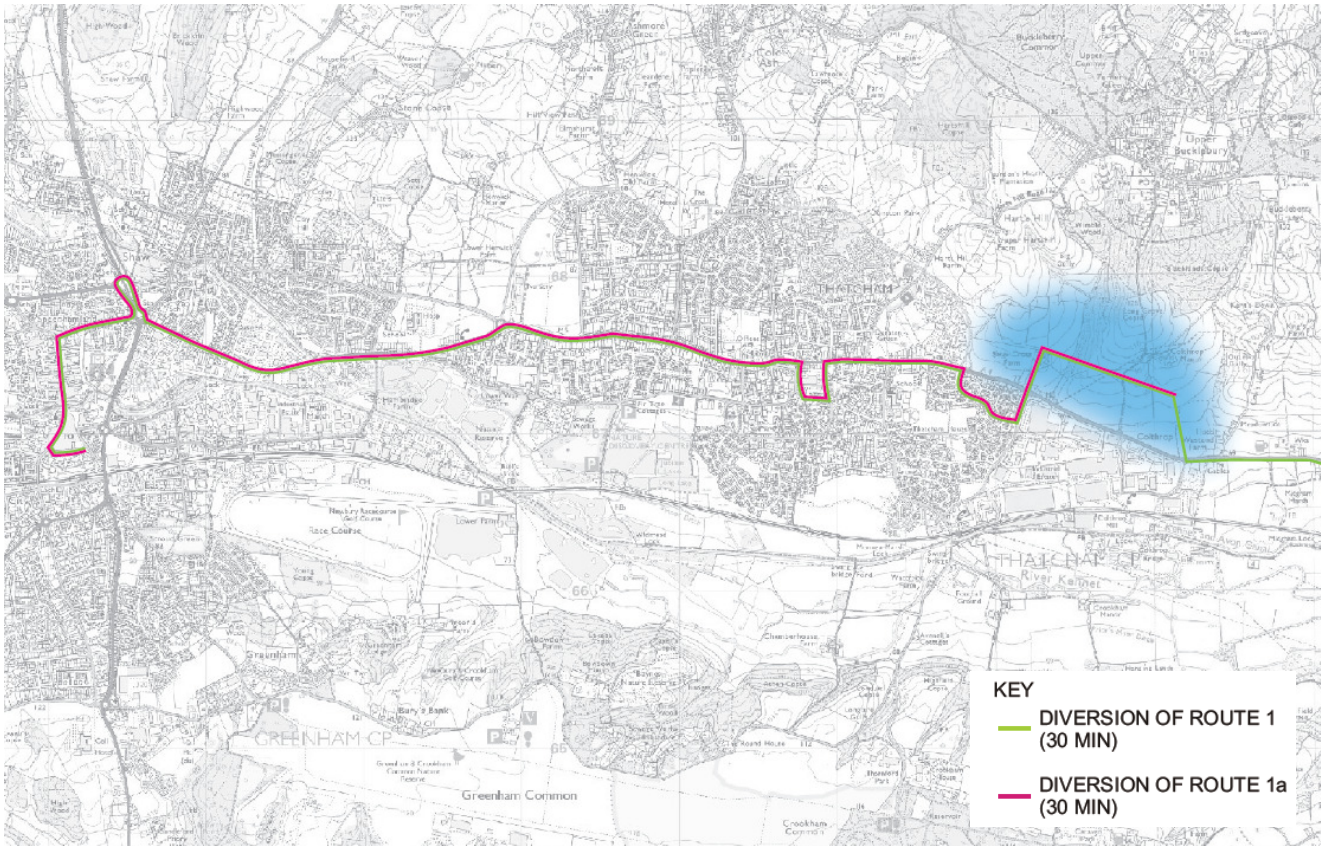
- New shuttle service between the site and Newbury.

5.2.45 Option 1 is to provide public transport access to Siege Cross Farm through the diversion of the current 1 service (which runs along the southern boundary of the site on the A4 between Newbury and Reading) and the extension of the off-peak 1A service which currently runs between Newbury and Thatcham. Both services currently run at 30 minute frequency. Extending both these services to Siege Cross farm will provide residents with a 15 minute frequency of service to Newbury Town Centre and a 30 minute service to Reading. We believe that each service would require an additional vehicle to enable the accommodation of the proposed extension/diversion, and maintain the current frequency of service, resulting in an annual operational cost for this option of £300,000 (£150,000 per bus).

5.2.46 Discussions with the operator may result in a solution requiring only 1 vehicle (and therefore a reduced cost), however at this stage 2 vehicles are assumed to ensure the analysis is robust.

5.2.47 Option 2 is to provide the development with its own shuttle service between Siege Cross Farm and Newbury Town Centre (via Thatcham). This service is proposed to follow the same routing as the 1 and 1A services along the A4 (in order to make full use of any bus priority measures implemented in the future) and will operate at a 30 minute frequency. The proposed routing for this shuttle and diversion of current services can be seen in Figure 5.5 below and Figure 5.6 at the end of the report:

Figure 5.5 – Potential Public Transport Options for Siege Cross Farm



5.2.48 The length of the proposed shuttle route has been identified as being in the region of 10 km each way, resulting in a 20km round trip. Based on an estimated average speed of 25kph it has been calculated that the round trip will take 48 minutes, resulting in a requirement of two buses to provide the 30 minute frequency of service. Table 5.3 below indicates the cost/revenue analysis undertaken for this shuttle service based on a 5% and 10% bus mode share.

Table 5.3 – Siege Cross Farm Shuttle Cost/Revenue Analysis

Costs	Siege Cross Farm
Return Trip Distance (Km)	**20**
Time Taken for 1 Round Trip Mins (based on 25kph)	48
Frequency (min)	**30**
Number of Vehicles Required	2
Cost per bus	150,000
TOTAL Annual Operational Cost	**300,000**

Revenue (5% Bus Mode Share)	Siege Cross Farm
Number of Homes	1000
AM Peak to All Day Factor	8
Average Travel days in a year (6 days a week)	312
Bus Mode Share	5%
TOTAL potential trips per year	124,800
Fare per trip	1.50
Trip Annual Revenue	**187,200**
Profit/Loss	**-112,800**

Revenue (10% Bus Mode Share)	Siege Cross Farm
Number of Homes	1000
AM Peak to All Day Factor	8
Average Travel days in a year (6 days a week)	312
Bus Mode Share	10%
TOTAL potential trips per year	249,600
Fare per trip	1.50
Trip Annual Revenue	**374,400**
Profit/Loss	**74,400**

5.2.49 The results of the analysis above indicate that at 5% mode share the proposed new shuttle service will make an annual loss of -£113k. However, at 10% mode share the service is estimate to be self funding with a small annual profit in the region of £74.4k.

5.2.50 Although potentially profitable at 10% mode share, the shuttle service frequency of 30 minutes is not ideal for a development of this size. However, given the

distance of the site from Newbury Town Centre, we do not believe it would be possible to run a self funding service at a higher frequency due to the increase in buses required. Therefore, of the two options identified, we recommend that the redirection of the current 1 and 1A service will be more sustainable in the long term, providing a higher combined frequency of service and direct public transport access from the site to Newbury, Thatcham and Reading.

Recommended Solution To Be Modelled

5.2.51 The assessment above concludes that a shuttle more frequent than every 30 minutes between Newbury and Siege Cross Farm would require supplementary funding support. A frequency of every 15 minutes rather than every 30 minutes would be more likely to attract a 10% mode share, but the costs of operation would increase since more vehicles would be required to provide the service.

5.2.52 Therefore, it is recommended that Service 1 is diverted to provide a frequent (every 15 minute) service between Newbury, Thatcham Town Centre and Siege Cross Farm.

5.2.53 The public transport model will be used to ascertain the likely mode share that could be achieved by these improvements. The results from the model are provided in Chapter 6.

NORTH NEWBURY

Current Provision

5.2.54 The North Newbury site encompasses an area to the East of the A339, This site lies just north of the Vodafone head quarters and is within 2km of Newbury Town Centre.

5.2.55 Current bus services running past or through the site include the 6/9 service to and from Newbury Town Centre to Chieveley and East Ilsley (running on a 120 minute frequency) and the irregular 107 service from Newbury Town Centre to Leckhampstead and Brightwalton. (4 services in the morning and 3 services in the evening). Service 15 also runs past the site but only operates 2 journeys daily.

5.2.56 The exception to these irregular services is the Vodafone shuttle bus network that operates to a maximum of 10 minute frequencies and services the Vodafone HQ site. However, these services are currently only available to Vodafone employees.

Potential Improvements

5.2.57 The main trip destination for this site will be Newbury. From Newbury connections will be possible to other key destinations such as Reading and Basingstoke.

5.2.58 A package of options for public transport provision have been independently developed for this site. The package incorporates a new shuttle service for the site, supplemented by additional services through diversion of a current bus service.

5.2.59 The new shuttle will provide a clockwise and anticlockwise loop service between Newbury Town Centre, the proposed development site and back to Newbury Town Centre. It is proposed that the clockwise shuttle follows a routing path along the B4494, through the development site and back to the Town Centre via the B4009, with

the anticlockwise shuttle following the reverse of this route. Each loop service is proposed to operate at a 30 minute frequency, giving a combined frequency of service between the town centre and the development site of 15 minutes.

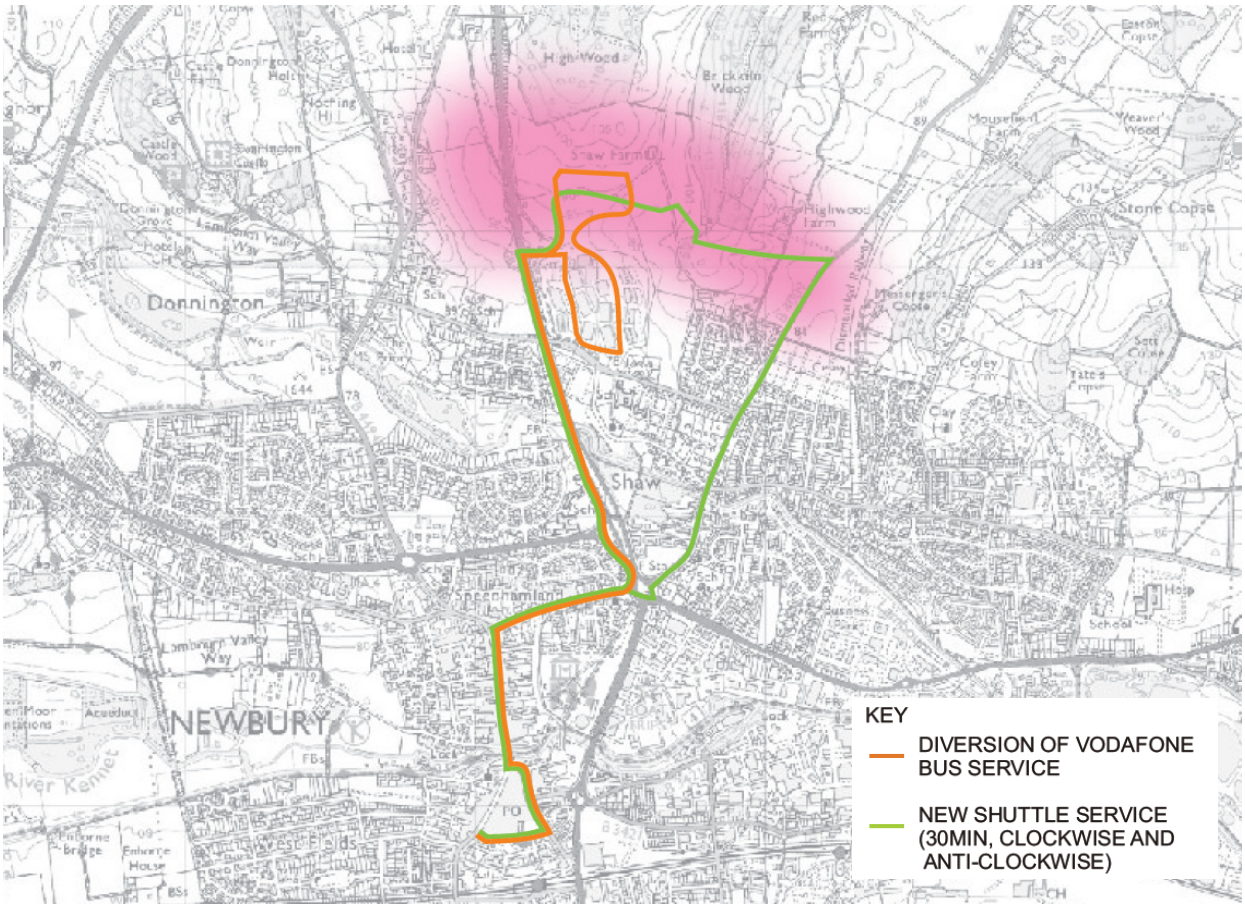
5.2.60 In addition, the proposed North Newbury development site is located directly north of the Vodafone headquarters, which operates its own frequent staff bus service to multiple locations around Newbury, including to Newbury Town Centre/ Newbury Train Station. Given the site's close proximity to these current services we propose a minor extension of the current Vodafone Newbury Train Station service (V1 – 'HQ Express Rail Link') into the development site following its drop off at Vodafone HQ. We believe this extension will have minimal impact on the Vodafone service and will be complimentary in its operation due to providing reverse patronage to commuter trips in the peak.

5.2.61 It is understood that regulations do not currently allow Vodafone's services to be used by the public. However, a solution would be to register the Vodafone services for public use in one direction only (i.e. North Newbury to Newbury in the morning peak and Newbury to North Newbury in the evening peak).

5.2.62 Discussions with West Berkshire Council have indicated that Vodafone would be willing to allow a sharing of their service in principle, however, the terms of this agreement have yet to be fully discussed with Vodafone directly and it is likely that a funding contribution will be required to the provider of the operation (which we have not included within our cost/ revenue analysis).

5.2.63 It is proposed that the Vodafone bus service extension will provide supplementary public transport access in addition to the development's own shuttle service. The proposed routing for this shuttle and redirection of Vodafone service can be seen in Figure 5.7 below and Figure 5.8 at the end of the report:

Figure 5.7 – Potential Public Transport Options for North Newbury



5.2.64 The length of the proposed new shuttle route has been identified as being in the region of 8km for a complete loop. Based on an estimated average speed of 25khp it has been calculated that the round trip will take 19 minutes, resulting in a requirement of two buses to provide the 15 minute frequency of service.

5.2.65 Table 5.4 below indicates the cost/revenue analysis undertaken for this shuttle service based on a 5% and 10% bus mode share

Table 5.4 – North Newbury Shuttle Cost/Revenue Analysis

Costs	North Newbury
Return Trip Distance (Km)	**8**
Time Taken for 1 Round Trip Mins (based on 25kph)	19
Frequency (min)	**15**
Number of Vehicles Required	2
Cost per bus	150,000
TOTAL Annual Operational Cost	**300,000**

Revenue (5% Bus Mode Share)	North Newbury
Number of Homes	1000
AM Peak to All Day Factor	8
Average Travel days in a year (6 days a week)	312
Bus Mode Share	5%
TOTAL potential trips per year	124,800
Fare per trip	1.50
Trip Annual Revenue	**187,200**
Profit/Loss	**-112,800**

Revenue (10% Bus Mode Share)	North Newbury
Number of Homes	1000
AM Peak to All Day Factor	8
Average Travel days in a year (6 days a week)	312
Bus Mode Share	10%
TOTAL potential trips per year	249,600
Fare per trip	1.50
Trip Annual Revenue	**374,400**
Profit/Loss	**74,400**

5.2.66 The results of the analysis above indicates that at 5% mode share the proposed new shuttle service will make a small annual loss of -£113k. However, at 10% mode share the service is estimate to be self funding with an annual profit in the region of £74k.

Recommended Solution to be modelled

5.2.67 The recommended solution is to provide a loop service through the site as this ensures that each end of the site is connected to Newbury.

5.2.68 To supplement this loop service it is recommended that the Vodafone services are extended into the central area of the site, subject to agreement with Vodafone.

5.2.69 The public transport model will be used to ascertain the likely mode share that could be achieved by these improvements. The results from the model are provided in Chapter 6.

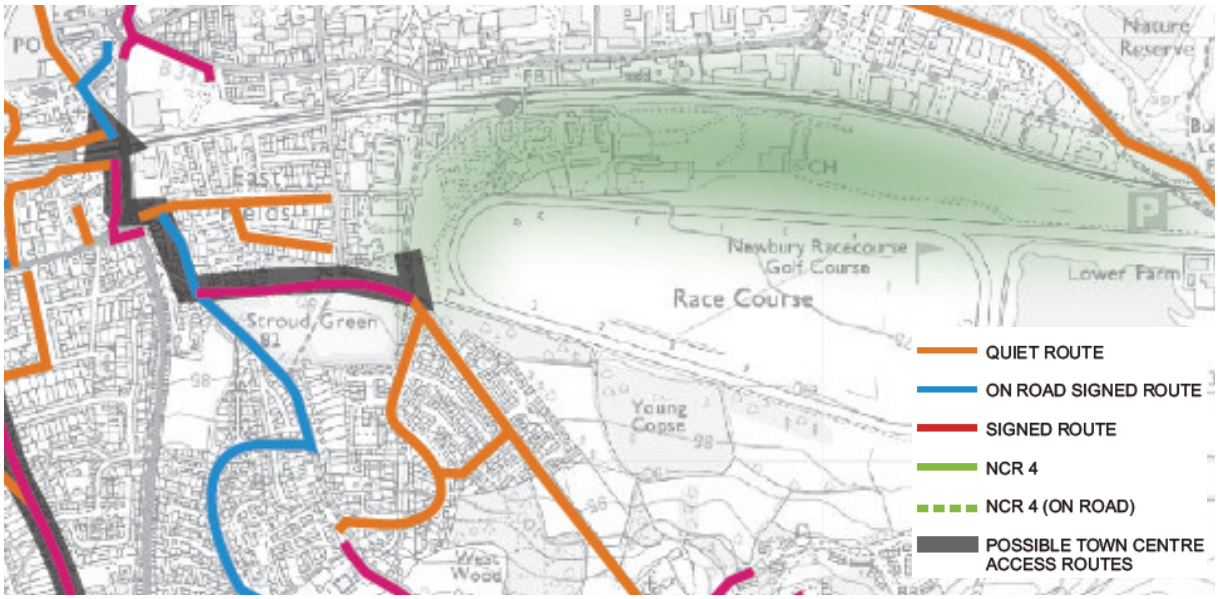
5.3 SUSTAINABLE MEASURES – WALKING AND CYCLING

NEWBURY RACECOURSE

5.3.1 The Newbury Racecourse development site is between 1 and 2 km from Newbury Railway Station and Newbury Town Centre. This distance is sufficient to ensure that walking and cycling are encouraged for journeys between Newbury Racecourse and Newbury Town Centre.

5.3.2 Figure 5.9 (see appendix) shows each development site, including Newbury Racecourse, in relation to the existing Newbury and Thatcham cycle network. Figure 5.10 below highlights which of these current cycle and walking links are particularly relevant to the Newbury Racecourse development.

Figure 5.10 – Current cycle and walking links relative to Newbury Racecourse development



5.3.3 A cycle route currently exists between Newbury Racecourse and Newbury Town Centre (via Racecourse Road and Greenham Road). Sections of this route, including along Racecourse Road, are provided off carriageway. A route also exists between Newbury Racecourse and New Greenham Park, a key employment destination (via Greenham Road). Consideration was given to the need for additional cycle route provision and appropriate connections to the site. It was concluded that existing cycle links may sufficiently serve the development site in some areas, but to provide sustainable development, more than one access point would be required to ensure that adequate choice of route from the site onto the network is provided and therefore all of the site is served. Locations for improved crossing facilities will also need to be identified.

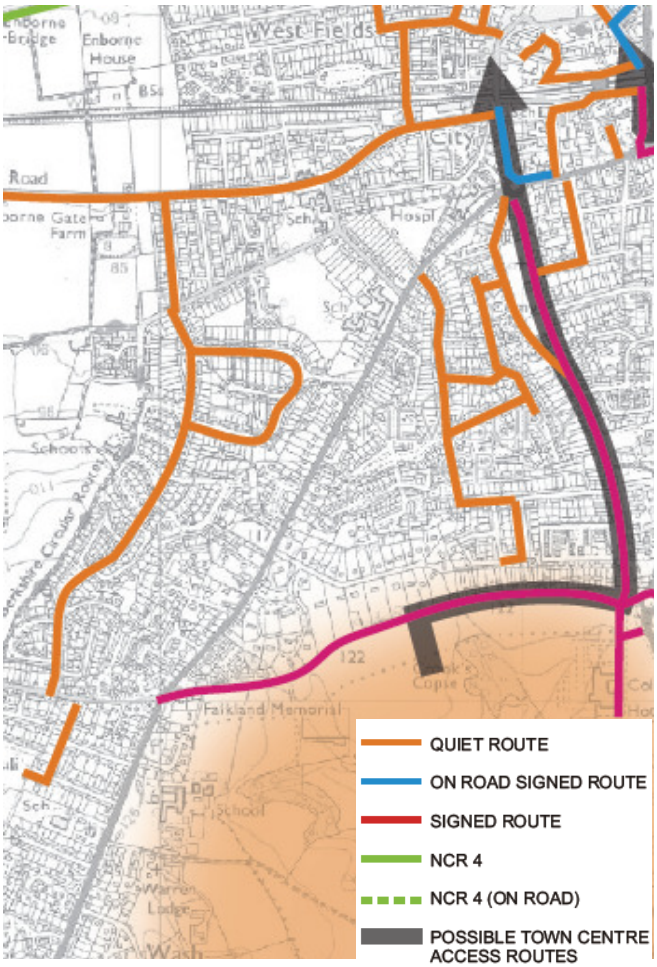
5.3.4 The Newbury Racecourse development would include provision for cyclists within the development and also on the new rail bridge proposed to link the development site to Hambridge Road. These will need to take account of the topography of this area where there are some steep gradients.

SANDLEFORD PARK

5.3.5 The Sandleford Park development site is between 1.5 and 2.5 km from Newbury Railway Station and Newbury Town Centre. This distance is slightly further than those measured for Newbury Racecourse and whilst walking may be less attractive as an option over these distances, provision of a dedicated pedestrian route to the town centre with good signage will be an important part of the strategy. However, cycling will still be an attractive option for journeys to Newbury Town Centre.

5.3.6 Figure 5.9 (see appendix) shows each development site, including Sandleford Park, in relation to the existing Newbury and Thatcham cycle network. Figure 5.11 below highlights which of these current cycle and walking links are particularly relevant for Sandleford Park development.

Figure 5.11 – Current cycle and walking links relative to Sandleford Park



5.3.7 An off carriageway cycle route currently exists between Newbury Town Centre and Sandleford Park (via Newtown Road). Consideration was given as to the need for additional cycle route provision and appropriate connections to the site and it was concluded that improvements to cycle links between the site and the town (particularly along Newtown Road for example) would ensure more sustainable development at the site. Locations for improved crossing facilities, however, will also be required.

5.3.8 The Sandleford Park development would also need to include provision for cyclists within the development, and between the site and the quiet lanes that would allow cyclists to access the town centre.

5.3.9 A cycle route is also currently available between Sandleford Park and New Greenham Park (NGP), a significant destination for employment (via Pinchington Lane).

5.3.10 Pedestrian and cycle links between the site and NGP would need to be considered in terms of severance to the link caused by the A339 with its heavy traffic flows. Additional pedestrian cycle paths and crossing facilities would need to be considered against capacity constraints on the A339.

SIEGE CROSS FARM

5.3.11 The Siege Cross Farm development site is between 1 and 2 km from Thatcham Town Centre and between 5 and 6 km from Newbury Town Centre. This distance is sufficiently low to encourage walking and cycling to Thatcham Town Centre, but too far to encourage walking to Newbury Town Centre. However, cycling will still be an attractive option for journeys to Newbury Town Centre.

5.3.12 Figure 5.9 shows each development site, including Siege Cross Farm, in relation to the existing Newbury and Thatcham cycle network. Figure 5.12 below highlights which of these current cycle and walking links are particularly relevant to the Siege Cross Farm development.

Figure 5.12 – Current cycle and walking links relative to Siege Cross Farm development

5.3.13 A cycle route currently exists between Newbury, Thatcham and Siege Cross Farm (via the Kennet and Avon Canal and Lower Way). This route is on the National Cycle Network (NCN Route 4). Consideration was given to the need for additional cycle route provision and appropriate connections to the site and it was concluded that enhancements to provide better route choice for cyclists between Siege Cross Farm and Newbury is an important part of the strategy for this site. Provision for cycle routes through Thatcham town centre itself is limited and there is potential for these to also be improved. Also developers should be asked to contribute to the upkeep of the cycle path along the Kennet and Avon towpath.

5.3.14 A cycle route also exists between Siege Cross Farm and New Greenham Park. However, this is via quiet country lanes which during winter evenings may be too dark to attract regular cycle commuting.

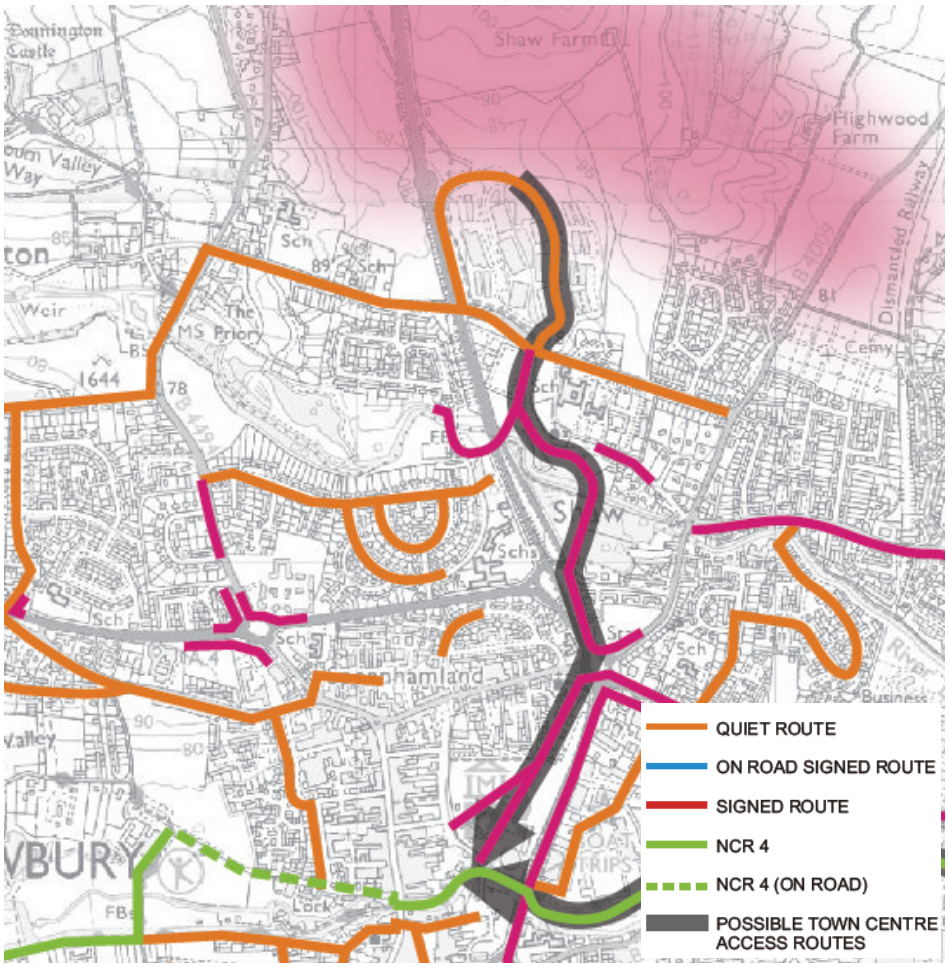
5.3.15 As well as the provision of cycle routes to/from Siege Cross Farm, there would also need to be provision for cyclists within the development.

NORTH NEWBURY

5.3.16 The North Newbury development site is between 2 and 2.5 km from Newbury Railway Station and Newbury Town Centre. This distance is slightly further than those measured for Newbury Racecourse and walking will not be as an attractive option over these distances. Walking will still be encouraged alongside cycling, which will be an attractive option for journeys to Newbury Town Centre.

5.3.17 Figure 5.9 shows each development site, including North Newbury, in relation to the existing Newbury and Thatcham cycle network. Figure 5.13 below highlights which of these current cycle and walking links are particularly relevant to the North Newbury development.

Figure 5.13 – Current cycle and walking links relative to North Newbury development



5.3.18 An off carriageway cycle route currently exists between Newbury town centre and North Newbury. This route is already designed to provide access between Newbury Town Centre and the Vodafone HQ. This route should be extended to serve the North Newbury site (to the north of the Vodafone HQ). Other routes will also be considered to ensure that more than one option for cycle access is provided.

5.3.19 Consideration was given as to need for additional cycle route provision and it was concluded that existing cycle links could be improved to provide better cycle accessibility to the site, and to provide more access points from the site, possibly via Shaw Hill. The North Newbury development would also need to include provision for cyclists within the development.

5.4 SUMMARY

5.4.1 This chapter has identified potential public transport and sustainable mitigation measures for each of the LDF development sites.

5.4.2 The public transport model will be used to ascertain the likely mode share that could be achieved by the public transport improvements. The results from the model are provided in Chapter 6.

6 Development Impact with Sustainable Transport Mitigation Measures

6.1 INTRODUCTION

6.1.1 The effect of introducing the package of public transport measures has been assessed in three stages which are reported within this chapter –

- Analysis of the trips transferring from the highway network as a result of the new public transport services being introduced.
- An assessment of viability of the services through analysis of the demand and revenues for these services
- The re-running of the traffic model to assess the impact of introducing public transport service.

6.2 ANALYSIS OF TRIPS TRANSFERRING FROM HIGHWAY NETWORK

6.2.1 This section outlines the number of trips transferring from the highway network to public transport as a result of the proposed new public transport measures being introduced. This analysis has been undertaken for the am peak to illustrate the level of transfer during the more congested peak hour.

NEWBURY RACECOURSE

6.2.2 Table 6.1 illustrates the impact of the proposed public transport routes (outlined in paragraph 5.2.19 on the Newbury Racecourse development site in Scenario 1 and 2 in the AM Peak. The results for Scenario 1 show the additional shift to public transport is around 7% (or 38 car trips) for journeys originating at the site and approximately 5% (or 8 trips) for those travelling to the site during the AM peak hour.

6.2.3 Similar figures for Scenario 2 are 7.8% (or 44 trips) for origins and 5% (or 9 trips) for destinations. Scenario 2 shows slightly higher mode shift to public transport which is a result of the more congested network in this scenario compared to Scenario 1 which pushes more trips onto public transport.

Table 6.1 – Car mode share for Newbury Racecourse by Origin and Destination (AM)

	Origin				Destination			
	Pre mode shift	Post mode shift	Absolute Difference	% Difference	Pre mode shift	Post mode shift	Absolute Difference	% Difference
Scenario 1 – Newbury Racecourse (1,500 households), with inner eastern link to A339	562	523	-38	-6.8%	171	163	-8	-4.7%
Scenario 2 – Newbury Racecourse (1,500 households), Without inner eastern link	562	518	-44	-7.8%	171	163	-9	-5.0%

Discrepancies in totals due to rounding

6.2.4 A sensitivity test was undertaken for Newbury Racecourse (with inner eastern link road) to examine the effect of introducing reduced fares on the bus services. A reduction of 50% (i.e. half was tested). The test results show a small network wide increase in transfer of highway trips could be achieved. The public transport model, however, only calculates mode shift for those not captive to public transport. Demand

associated with those captive to public transport is also likely to increase as fares reduce.

SANDLEFORD PARK

6.2.5 Table 6.2 illustrates the impact of the proposed public transport routes (outlined in paragraph 5.2.38) on the Sandleford Park development site in Scenario 3 and 4. The results for Scenario 3 show the additional shift to public transport is around 5% (or 21 car trips) for journeys originating at the site and approximately 3% (or 3 trips) for those travelling to the site during the AM peak hour. The proportion of mode shift for Scenario 4 is similar, resulting in 42 less car trips from the site and 6 less car trips to the site.

Table 6.2 – Car mode share for Sandleford Park by Origin and Destination (AM)

	Origin				Destination			
	Pre mode shift	Post mode shift	Absolute Difference	% Difference	Pre mode shift	Post mode shift	Absolute Difference	% Difference
Scenario 3 – Sandleford Park (1,000 households)	441	420	-21	-4.8%	120	117	-3	-2.6%
Scenario 4 – Sandleford Park (2,000 households)	881	839	-42	-4.8%	240	234	-6	-2.7%

Discrepancies in totals due to rounding

6.2.6 The development site location provides good opportunity for attracting good levels of public transport use since the routes from this site into Newbury are less congested, and there is scope for providing bus priority measures were these to be required. The viability of the bus services is marginally enhanced with the 2,000 households development as costs of provision increase less rapidly than the revenue received.

6.2.7 These findings support the earlier cost/revenue analysis which indicates that the 2000 homes development will make good profits, whilst the 1000 home development will require additional bus service support.

SIEGE CROSS FARM

6.2.8 Table 6.3 illustrates the impact of the proposed public transport routes (outlined in paragraph 5.2.51) on the Siege Cross Farm development site in Scenario 5. The results for Scenario 5 show the additional shift to public transport is around 1% (or 4 trips) for journeys originating at the site and approximately 2% (or 2 trips) for those travelling to the site during the AM peak hour.

Table 6.3 – Car mode share for Siege Cross Farm by Origin and Destination (AM)

	Origin				Destination			
	Pre mode shift	Post mode shift	Absolute Difference	% Difference	Pre mode shift	Post mode shift	Absolute Difference	% Difference
Scenario 5 – Siege Cross Farm (1,000 households)	440	436	-4	-0.9%	120	118	-2	-1.9%

Discrepancies in totals due to rounding

6.2.9 This site shows smaller shifts to public transport than for Newbury Racecourse and for Sandleford Park. This is due to the fact that this site is further from the built up area of Newbury and high take up levels for the service are harder to achieve.

NORTH NEWBURY

6.2.10 Table 6.4 illustrates the impact of the proposed public transport routes (outlined in paragraph 5.2.67) on the North Newbury development site in Scenario 6 for the AM peak hour. The results for Scenario 6 show the additional shift to public transport is around 11% (or 48 car trips) for journeys originating at the site and 6.5% (or 8 trips) for those travelling to the site during the AM peak hour.

Table 6.4 – Car mode share for North Newbury by Origin and Destination (AM)

	Origin				Destination			
	Pre mode shift	Post mode shift	Absolute Difference	% Difference	Pre mode shift	Post mode shift	Absolute Difference	% Difference
Scenario 6 – North Newbury (1,000 households)	441	393	-48	-10.8%	120	112	-8	-6.5%

Discrepancies in totals due to rounding

6.2.11 The public transport for this development site attracts a greater transfer of trips from the highway network than the other development sites which is a result of the site benefiting from a 10 minute frequency service to Newbury Town Centre at peak times. It is proposed that this level of service is provided by using spare capacity on the existing Vodafone shuttle service. This is reliant on regulatory issues discussed in Section 5 being overcome. It should be noted that the trip figures shown above are for the North Newbury development site only, and do not include trips to/from the Vodafone HQ site.

EXPECTED MODE SHIFT AGAINST TARGET MODE SHIFT

6.2.12 As described in Section 3, the target mode shift away from car for the proposed public transport improvements was 7.5%. Table 6.5 below compares the expected mode shift away from car for residents at each LDF development site in the AM Peak following the introduction of public transport improvements.

Table 6.5 Expected Mode Shift following Public Transport Improvements

	Target Mode Shift	Expected Mode Shift (AM Peak, Origin)
Scenario 1 – Newbury Racecourse (1,500 households), with through traffic and with link to A339	7.5%	**6.8%**
Scenario 2 – Newbury Racecourse (1,500 households), Without through traffic	7.5%	**7.8%**
Scenario 3 – Sandleford Park (1,000 households)	7.5%	**4.8%**
Scenario 4 – Sandleford Park (2,000 households)	7.5%	**4.8%**
Scenario 5 – Siege Cross Farm (1,000 households)	7.5%	**0.9%**
Scenario 6 – North Newbury (1,000 households)	7.5%	**10.8%**

6.2.13 The table above shows that the mode shift varies between scenarios, between a range of 0.9% (for the Siege Cross Farm) to 10.8% (for North Newbury). The reason that improvements to public transport at Siege Cross Farm result in a low mode shift is likely to be due to the longer distances between Siege Cross Farm and Newbury Town

Centre (leading to longer journey times) compared to other LDF development sites. The reason that North Newbury LDF development site has the highest mode share is likely to be because it benefits from a 10 minute frequency service between the site and Newbury Town Centre at peak times (which is proposed by using spare capacity on the existing Vodafone shuttle service). This is reliant on regulatory issues discussed in Section 5 being overcome.

6.2.14 Public transport improvements at Newbury Racecourse result in a mode shift away from car (6.8%/7.8%) which very nearly meets the proposed target mode shift (7.5%), although only just in the worse performing scenario for network wide performance. It is expected that this LDF development site will benefit from its location close to Newbury Town Centre, which will further encourage transfer from car (to walk and cycle).

6.2.15 Public transport improvements at Sandleford Park result in a mode shift away from car of 4.8%. This mode shift could be improved further with better public transport services to destinations other than Newbury Town Centre. As described in Chapter 5 the inter urban bus service between Newbury and Basingstoke (the 'Link') is not proposed to enter the development site as it could discourage existing users. However, Basingstoke would be a key destination for residents at Sandleford Park and therefore there is scope for further investigation into diverting the Link service to serve Sandleford Park. Additionally, proposals for a bus gate on Newtown Road would be expected to increase the mode shift away from car to public transport as services between Sandleford Park and Newbury Town Centre would become more attractive.

6.2.16 The next section discusses whether the expected number of trips transferred to public transport, as shown in the public transport model, is sufficient for the proposed transport improvements to cover their costs without the need for additional funding support.

6.3 VIABILITY OF PROPOSED PUBLIC TRANSPORT ROUTES

6.3.1 The expected mode shifts from car to public transport following public transport improvements, taken from the public transport model, have been used to assess the financial viability of the proposed public transport improvements.

6.3.2 The reduction in car trips following the introduction of public transport improvements has been converted to person trips by using a vehicle occupancy figure of 1.46. This is taken from DfT WebTag guidance and refers to average vehicle occupancies in the AM Peak period.

6.3.3 As explained in Section 3.2 the public transport model is used to determine the shift from car to public transport following the introduction of public transport improvements. These figures do not include those who are captive to public transport. Section 3.3 describes how the mode share for those captive to public transport is estimated to be 3% (half the total bus mode share).

6.3.4 The expected mode share for public transport, not including those who are captive to public transport, has been estimated for each public transport improvement. Mode shares have been calculated using the reduction in car trips from the public transport model. Data from the National Travel Survey (2006) show that 11% of daily trips take place during the AM Peak Hour. This implies that the total number of all day trips is 9 times the number that occur in the AM Peak Hour. This would include a small

number of late night trips which are less likely to be by bus. For this reason the factor used to estimate all day trips is 8.

6.3.5 The total number of annual trips has been calculated by multiplying the daily trip figure by 312 (i.e. 6 days a week). This is based on the assumption that the frequency of trips made reduces by half during the weekend (Saturday and Sunday). This is considered to be a reasonable assumption.

6.3.6 The expected revenue for each proposed public transport improvement has been calculated by multiplying expected total number of trips by a proxy fare figure (£1.50). These revenues have then been compared against operating costs, calculated in Section 5, to assess the financial viability of each proposed public transport improvement. The results from this assessment are presented in Table 6.6 to 6.9 below:

Table 6.6 – Viability of Public Transport Improvements – Newbury Racecourse

Cost v Revenue (based on data from Model)	Newbury Racecourse (with Through Route)	Newbury Racecourse (without Through Route)
Trips in the AM Peak (Transfer from Car, Vehicles, taken from Model)	47	51
Trips in the AM Peak (Transfer from Car, Persons, assuming 1.46 persons per car)	69	74
AM Peak to All Day Factor	8	8
Average Travel days in a year (6 days a week)	312	312
Total Trips (Bus, Transfer from Car)	171276	185852
Total Trips (Bus, Captive)	112320	112320
Total Trips (All Modes, based on 8 trips per house per day)	3744000	3744000
Estimated Bus Mode Share (Transfer from Car)	5%	5%
Estimated Bus Mode Share (Captive)	3%	3%
Fare per trip	1.50	1.50
Trip Annual Revenue (Transfer from Highway)	**256,913**	**278,778**
Trip Annual Revenue (Captive)	**168,480**	**168,480**
Trip Annual Revenue Total	**425,393**	**447,258**
Annual Running Cost	**450,000**	**450,000**
Annual Profit/Loss	**-24,607**	**-2,742**

Table 6.7 – Viability of Public Transport Improvements – Sandleford Park

Cost v Revenue (based on data from Model)	Sandleford Park (1000 Households)	Sandleford Park (2000 Households)
Trips in the AM Peak (Transfer from Car, Vehicles, taken from Model)	24	48
Trips in the AM Peak (Transfer from Car, Persons, assuming 1.46 persons per car)	35	70
AM Peak to All Day Factor	8	8
Average Travel days in a year (6 days a week)	312	312
Total Trips (Bus, Transfer from Highway)	87460	174920
Total Trips (Bus, Captive)	74880	149760
Total Trips (All Modes, based on 8 trips per house per day)	2496000	4992000
Estimated Bus Mode Share (Transfer from Car)	4%	4%
Estimated Bus Mode Share (Captive)	3%	3%
Fare per trip	1.50	1.50
Trip Annual Revenue (Transfer from Car)	**131,190**	**262,380**
Trip Annual Revenue (Captive)	**112,320**	**224,640**
Trip Annual Revenue Total	**243,510**	**487,020**
Annual Running Cost	**300,000**	**300,000**
Annual Profit/Loss	**-56,490**	**187,020**

Table 6.8 – Viability of Public Transport Improvements – Siege Cross Farm

Cost v Revenue (based on data from Model)	Siege Cross Farm
Trips in the AM Peak (Transfer from Car, Vehicles, taken from Model)	7
Trips in the AM Peak (Transfer from Car, Persons, assuming 1.46 persons per car)	10
AM Peak to All Day Factor	8
Average Travel days in a year (6 days a week)	312
Total Trips (Bus, Transfer from Highway)	25509
Total Trips (Bus, Captive)	74880
Total Trips (All Modes, based on 8 trips per house per day)	2496000
Estimated Bus Mode Share (Transfer from Car)	1%
Estimated Bus Mode Share (Captive)	3%
Fare per trip	1.50
Trip Annual Revenue (Transfer from Car)	**38,264**
Trip Annual Revenue (Captive)	**112,320**
Trip Annual Revenue Total	**150,584**
Annual Running Cost	**300,000**
Annual Profit/Loss	**-149,416**

Table 6.9 – Viability of Public Transport Improvements – North Newbury

Cost v Revenue (based on data from Model)	North Newbury
Trips in the AM Peak (Transfer from Car, Vehicles, taken from Model)	55
Trips in the AM Peak (Transfer from Car, Persons, assuming 1.46 persons per car)	80
AM Peak to All Day Factor	8
Average Travel days in a year (6 days a week)	312
Total Trips (Bus, Transfer from Highway)	200429
Total Trips (Bus, Captive)	74880
Total Trips (All Modes, based on 8 trips per house per day)	2496000
Estimated Bus Mode Share (Transfer from Car)	8%
Estimated Bus Mode Share (Captive)	3%
Fare per trip	1.50
Trip Annual Revenue (Transfer from Car)	**300,643**
Trip Annual Revenue (Captive)	**112,320**
Trip Annual Revenue Total	**412,963**
Annual Running Cost	**300,000**
Annual Profit/Loss	**112,963**

6.3.7 The assessments above show that proposed public transport improvements do not require funding support in the 2000 household scenario at Sandleford Park and the 1000 household scenario at North Newbury. The estimated mode share for public transport, not including those captive to public transport, is estimated to be 4% for Sandleford Park. This mode share is not sufficient to ensure that the proposed public transport improvement does not require funding support in the 1000 household scenario at Sandleford Park. As discussed in the previous section a potential way to make public transport services between Sandleford Park and Newbury Town Centre more attractive would be to install a bus gate on Newtown Road.

6.3.8 The assessment shows that proposed public transport improvements for Newbury Racecourse with the through route would require a small amount of additional funding support. The proposed public transport improvement at Newbury Racecourse requires 3 vehicles, rather than the 2 each other development site requires. This results in an operating cost 50% higher than other development sites. A solution may be to reduce service frequency so that only 2 vehicles are required. However, this could result in the mode share, for those not captive to public transport, reducing from the anticipated level of 5% as a reduction in service frequency could make the service less attractive.

6.3.9 A sensitivity test has been undertaken for Newbury Racecourse to examine the effect of introducing reduced fares. Reducing fares by 50% results in a small network wide additional transfer of highway trips. However, a reduction in fares is likely to have a negative impact on levels of revenue generation. The balance between the reduction in highway trips and reduction in fare revenue would need to be considered before this measure is introduced.

6.3.10 The assessment also shows that the proposed public transport improvements for Siege Cross Farm would require additional funding support. This is due to a low mode share for public transport, not including those captive to public transport, of 1%. The site is some distance from the urban centres, and is not close to a public transport route which contributes to this low share.

6.4 ANALYSIS OF NETWORK PERFORMANCE WITH PUBLIC TRANSPORT IMPROVEMENTS

6.4.1 Following the modelling assessment of the public transport measures, the final stage of the assessment process is to report the network statistics, journey time data and congestion results reported in Chapter 4 with the public transport improvements included.

6.4.2 The public transport modelling assessment has tested the impact of the changes in the public transport provision for each development in 2026. This test has been carried out against each scenario without Public Transport Improvements, thus demonstrating the incremental impact of public transport improvement.

6.4.3 The assessment of the LDF public transport test has been carried out through:

- Review of network wide performance statistics produced by the traffic model
- Comparison of travel time data extracted from the traffic model on both local and strategic routes
- Congestion at key junctions

6.4.4 Analysis in this section has been carried out for the morning peak to illustrate how the results differ to the model results without the public transport routes.

6.4.5 The difference in flow and delay following the introduction of public transport improvements is shown in Appendix C.

6.4.6 Appendix C also includes flow diagrams which show where trips are made to from each development site. This information has been used to identify potential highway mitigation measures.

NETWORK STATISTICS

Newbury Racecourse (With Through Link)

6.4.7 Network statistics have been extracted for Newbury Racecourse (with through link) without and with public transport to indicate the impact of improvements to public transport. The results are shown in Table 6-10 below:

Table 6-10 Network Statistics for Newbury Racecourse (with through link) with Public Transport Improvement compared to Newbury Racecourse (with through link) AM Peak

	Newbury Racecourse (with through Link)	Newbury Racecourse (With through Link)with PT	Abs Diff	% Diff
Over-Capacity Queues (PCU.hrs)	1,372	1,366	-6	-0.5%
Total Travel Time (PCU.hrs)	8,786	8,738	-48	-0.5%
Travel Distance (PCU.km)	351,015	350,385	-630	-0.2%
Overall Average Speed (kph)	40	40.1	0.1	0.3%
Trips loaded (PCUs)	48533	48409	-124	-0.3%
Ave O/C Queue (min/PCU)	1.696	1.692	0.004	-0.2%
Ave Travel Time (min/PCU)	10.86	10.83	-0.03	-0.3%
Ave Travel Distance (km/PCU)	7.23	7.24	0.01	0.1%

6.4.8 The results show an improvement in traffic conditions across the model area as a result of the public transport improvement in this scenario. The improvements over the no PT scenario are small, all being less than 1%. The overall decrease of 124 trips in total trips loaded to the network which have shifted to improved public transport services, the majority of which are on key local routes, has had very little effect on the network performance as a whole.

6.4.9 Due to this assessment being undertaken at a network wide level, the benefits of local improvements to public transport, and subsequent reductions in car mode share, are not experienced network wide.

6.4.10 Network statistics extracted from Newbury Racecourse (no through link) without and with public transport improvements are shown in Table 6-11 below:

Table 6-11 Network Statistics for Newbury Racecourse (no through link) with Public Transport Improvement compared to Newbury Racecourse (no through link) AM Peak

	Newbury Racecourse (no through Link)	Newbury Racecourse (no through Link)with PT	Abs Diff	% Diff
Over-Capacity Queues (PCU.hrs)	1,897	1,704	-194	-10.2%
Total Travel Time (PCU.hrs)	9,491	9,280	-211	-2.2%
Travel Distance (PCU.km)	350,011	350,937	927	0.3%
Overall Average Speed (kph)	37	38	0.9	2.4%
Trips loaded (PCUs)	48532	48401	-131	-0.3%
Ave O/C Queue (min/PCU)	2.346	2.112	-0.234	-10.0%
Ave Travel Time (min/PCU)	11.73	11.50	-0.23	-2.0%
Ave Travel Distance (km/PCU)	7.21	7.25	0.04	0.5%

6.4.11 Table 6-11 shows that without the through link, the network is more congested, therefore the improvement on the traffic conditions due to public transport provision is higher than in Newbury Racecourse (with through link). The improvements are a 10% reduction of time spent queuing and a 2.4% increase in overall average speed. The

overall improvement across the network is attributable to the reduced trips on the network due partially to a greater shift from car to public transport (131 trips) than with the through link, and partially to the highly congested network being more sensitive to changes.

Table 6-12 Network Statistics for Sandleford Park (1000) with Public Transport Improvement compared to Sandleford Park (1000) AM Peak

	Sandleford Park (1000)	Sandleford Park (1000) with PT	Abs Diff	% Diff
Over-Capacity Queues (PCU.hrs)	1,698	1,680	-18	-1.0%
Total Travel Time (PCU.hrs)	9,289	9,258	-31	-0.3%
Travel Distance (PCU.km)	351,216	350,961	-255	-0.1%
Overall Average Speed (kph)	37.80	37.90	0.1	0.3%
Trips loaded (PCUs)	48363	48299	-64	-0.1%
Ave O/C Queue (min/PCU)	2.106	2.087	-0.019	-0.9%
Ave Travel Time (min/PCU)	11.52	11.50	-0.02	-0.2%
Ave Travel Distance (km/PCU)	7.26	7.27	0.01	0.1%

6.4.12 Table 6-12 shows an improvement in traffic conditions in Sandleford Park (1000) across the model area as a result of the public transport improvements. Time spent queuing has been reduced by 0.9%. There is very little change in the remaining parameters due to a total of only 64 trips shifted to improved public transport services.

Table 6-13 Network Statistics for Sandleford Park (2000) with Public Transport Improvement compared to Sandleford Park (2000) AM Peak

	Sandleford Park (2000)	Sandleford Park (2000) with PT	Abs Diff	% Diff
Over-Capacity Queues (PCU.hrs)	1,823	1,802	-21	-1.2%
Total Travel Time (PCU.hrs)	9,641	9,572	-70	-0.7%
Travel Distance (PCU.km)	354,325	354,166	-159	0.0%
Overall Average Speed (kph)	36.8	37.0	0.2	0.5%
Trips loaded (PCUs)	48923	48840	-83	-0.2%
Ave O/C Queue (min/PCU)	2.236	2.214	-0.022	-1.0%
Ave Travel Time (min/PCU)	11.82	11.76	-0.07	-0.6%
Ave Travel Distance (km/PCU)	7.24	7.25	0.01	0.1%

6.4.13 Table 6-13 results show similar patterns as Sandleford Park (1000 dwellings). However, with 1000 extra dwellings, there is greater congestion in the network and therefore a greater shift to public transport (83 trips). The improvements are a 1.0% reduction of time spent queuing and a 0.5% increase in average speed.

Table 6-14 Network Statistics for Siege Cross farm with Public Transport Improvement compared to Siege Cross Farm AM Peak

	Siege Cross Farm	Siege Cross Farm with PT	Abs Diff	% Diff
Over-Capacity Queues (PCU.hrs)	1,731	1,739	7	0.4%
Total Travel Time (PCU.hrs)	9,371	9,387	16	0.2%
Travel Distance (PCU.km)	351,030	351,084	54	0.0%
Overall Average Speed (kph)	37.5	37.4	-0.1	-0.3%
Trips loaded (PCUs)	48363	48369	6	0.0%
Ave O/C Queue (min/PCU)	2.148	2.157	0.009	0.4%
Ave Travel Time (min/PCU)	11.63	11.64	0.02	0.2%
Ave Travel Distance (km/PCU)	7.26	7.26	0.00	0.0%

6.4.14 Table 6-14 shows the network performance comparison for Siege Cross Farm without and with public transport improvements. The results show very little change in network performance due to a low modal shift in this scenario (6 trips).

Table 6-15 Network Statistics for North Newbury with Public Transport Improvement compared to North Newbury AM Peak

	North Newbury	North Newbury with PT	Abs Diff	% Diff
Over-Capacity Queues (PCU.hrs)	1,695	1,666	-29	-1.7%
Total Travel Time (PCU.hrs)	9,180	9,154	-26	-0.3%
Travel Distance (PCU.km)	350,893	350,561	-332	-0.1%
Overall Average Speed (kph)	38.20	38.30	0.1	0.3%
Trips loaded (PCUs)	48355	48229	-126	-0.3%
Ave O/C Queue (min/PCU)	2.103	2.072	-0.031	-1.5%
Ave Travel Time (min/PCU)	11.39	11.39	0.00	0.0%
Ave Travel Distance (km/PCU)	7.26	7.27	0.01	0.2%

6.4.15 Table 6-15 shows the network performance comparison across the network for North Newbury without and with Public Transport Improvement. The results show an improvement in traffic conditions across the model area as a result of the public transport improvements in this scenario. The most notable improvements are a 1.5% reduction of time spent queuing and a 0.5% reduction in overall travel time. This is due to an overall decrease of 126 trips in total trips loaded onto the network which have shifted to improved public transport services.

JOURNEY TIME COMPARISON

6.4.16 Four routes in both directions have been analysed to determine the effect of each scenario on journey times with Public Transport Improvement. Journey times for each scenario are compared to Do Minimum. Appendix D show graphs of journey times on the four routes following the introduction of public transport improvements.

6.4.17 Table 6-16 shows the journey time comparison for the AM time period for Newbury Racecourse with the through link road.

Table 6-16 Journey Time Results for Newbury Racecourse (with through link) with Public Transport Improvement compared to Newbury Racecourse (with through link) AM Peak

SCENARIO	LOCAL				STRATEGIC			
	A4 EB	A4 WB	A339 NB	A339 SB	A34 NB	A34 SB	M4 EB	M4 WB
Newbury Racecourse (with through link)	2115	2259	1078	1074	770	616	540	926
Newbury Racecourse (with through link) with PT	2055	2268	1046	1064	764	616	540	927
Difference (seconds)	-60	9	-32	-10	-6	0	0	1
Difference (%)	-2.8%	0.4%	-3.0%	-0.9%	-0.8%	0.0%	0.0%	0.1%

6.4.18 The implementation of Public Transport improvements has reduced flows such that there are improved journey times on four of the eight routes, three of which are local Newbury routes. The A4 eastbound experiences a 2.8% decrease in journey time, occurring at Pipers Way roundabout. The majority of the journey time reduction on the A339 is experienced at Robin Hood Roundabout in both directions, with a 3% reduction northbound and a 1% reduction southbound. Strategic routes are unaffected.

6.4.19 Table 6-17 shows the journey time comparison for Newbury Racecourse without a through link road, with and without Public Transport Improvements.

Table 6-17 Journey Time Results for Newbury Racecourse (no through link) with Public Transport Improvement compared to Newbury Racecourse (no through link) AM Peak

SCENARIO	LOCAL				STRATEGIC			
	A4 EB	A4 WB	A339 NB	A339 SB	A34 NB	A34 SB	M4 EB	M4 WB
Newbury Racecourse (no link)	2114	2361	1384	1056	835	619	542	928
Newbury Racecourse (no link) with PT	2102	2311	1375	1061	832	619	542	928
Difference (seconds)	-12	-50	-9	5	-3	0	0	0
Difference (%)	-0.6%	-2.1%	-0.7%	0.5%	-0.4%	0.0%	0.0%	0.0%

6.4.20 Table 6-17 shows a reduction in journey times on local routes after the implementation of public transport improvements for Newbury Racecourse without a link, with reductions in delay at Faraday Road, Robin Hood and Bear Lane. Strategic routes are unaffected.

6.4.21 Table 6-18 shows the journey time comparison for Sandleford Park (1000 dwellings), with and without Public Transport improvements.

Table 6-18 Journey Time Results for Sandleford Park (1000) with Public Transport Improvement compared to Sandleford Park (1000) AM Peak

SCENARIO	LOCAL				STRATEGIC			
	A4 EB	A4 WB	A339 NB	A339 SB	A34 NB	A34 SB	M4 EB	M4 WB
Sandleford Park (1000 dwellings)	2154	2217	1460	1080	856	620	542	925
Sandleford Park (1000 dwellings) with PT	2091	2222	1450	1083	851	620	542	924
Difference (seconds)	-63	5	-10	3	-5	0	0	-1
Difference (%)	-2.9%	0.2%	-0.7%	0.3%	-0.6%	0.0%	0.0%	-0.1%

6.4.22 Table 6.18 shows a 2.9% reduction in journey time on the A4 eastbound route. This is due to a large reduction in delay at Pipers Way roundabout. Reduction in delays at Bear Lane has reduced journey times on the A339 northbound whilst the remaining routes see very little change.

6.4.23 Table 6-19 shows the journey time comparison for Sandleford Park (2000 dwellings), with and without public transport improvements.

Table 6-19 Journey Time Results for Sandleford Park (2000) with Public Transport Improvement compared to Sandleford Park (2000) AM Peak

SCENARIO	LOCAL				STRATEGIC			
	A4 EB	A4 WB	A339 NB	A339 SB	A34 NB	A34 SB	M4 EB	M4 WB
Sandleford Park (2000 dwellings)	2118	2237	1571	1115	908	625	544	932
Sandleford Park (2000 dwellings) with PT	2141	2215	1562	1116	903	625	543	932
Difference (seconds)	23	-22	-9	1	-5	0	-1	0
Difference (%)	1.1%	-1.0%	-0.6%	0.1%	-0.6%	0.0%	-0.2%	0.0%

6.4.24 Table 6.19 shows that as with the Sandleford Park (1000) scenario with public transport mitigation, journey time scores are reduced for local routes but are unaffected for strategic routes. Whereas there are more noticeable reductions at St Johns Roundabout and at Turnpike Roundabout, reductions across the rest of the network are more evenly spread.

6.4.25 Table 6-20 shows the journey time comparison for Siege Cross Farm, with and without public transport improvements.

Table 6-20 Journey Time Results for Siege Cross Farm with Public Transport Improvement compared to Siege Cross Farm AM Peak

SCENARIO	LOCAL				STRATEGIC			
	A4 EB	A4 WB	A339 NB	A339 SB	A34 NB	A34 SB	M4 EB	M4 WB
Siege Cross Farm	2166	2389	1341	1042	828	617	541	918
Siege Cross Farm with PT	2179	2392	1346	1041	829	618	541	918
Difference (seconds)	13	3	5	-1	1	1	0	0
Difference (%)	0.6%	0.1%	0.4%	-0.1%	0.1%	0.2%	0.0%	0.0%

6.4.26 Table 6.20 shows only very small increases in journey times. Given that the modal shift achieved for this development was the smallest of the six scenarios it is not surprising that there is little impact on the journey times, with all routes experiencing a less than 1% change.

6.4.27 Table 6-21 shows the journey time comparison for North Newbury, with and without public transport improvements.

Table 6-21 Journey Time Results for North Newbury with Public Transport Improvement compared to North Newbury AM Peak

SCENARIO	LOCAL				STRATEGIC			
	A4 EB	A4 WB	A339 NB	A339 SB	A34 NB	A34 SB	M4 EB	M4 WB
North Newbury	2130	2216	1369	1136	831	629	539	924
North Newbury with PT	2120	2223	1348	1120	830	626	539	926
Difference (seconds)	-10	7	-21	-16	-1	-3	0	2
Difference (%)	-0.5%	0.3%	-1.5%	-1.4%	-0.1%	-0.5%	0.0%	0.2%

6.4.28 Table 6.21 shows very little change on the majority of routes, whilst the A339 experiences a 1.5% reduction northbound and a 1.4% reduction southbound. This is due to reductions in delay at Robin Hood and Bear Lane Roundabouts. The majority of routes demonstrate a reduction in journey time. However, a re-distribution of traffic within the model has contributed to small increases in journey times on the A4 and M4 westbound.

CONGESTION AT KEY JUNCTIONS

6.4.29 Table 6-22 shows the congestion pattern on key junctions for all scenarios with public transport improvements in AM peak.

6.4.30 Junctions which are nearing capacity (flow to capacity ratio 0.85 to 0.95) are shown in yellow, those which are at capacity (flow to capacity ratio 0.95 to 1) are shown in orange and those over capacity (flow to capacity ratio greater than 1) in red.

6.4.31 Table 6-22 shows very similar results to the without public transport scenarios results shown in Table 4.14. There is however, an improvement in results for the Newbury Racecourse without a link scenario for which Pinchington Lane is predicted to no longer be nearing capacity.

6.4.32 Figures 6.1 to 6.6 (in the appendix) show the traffic impacts of the new development at key junctions after the implementation of public transport improvements.

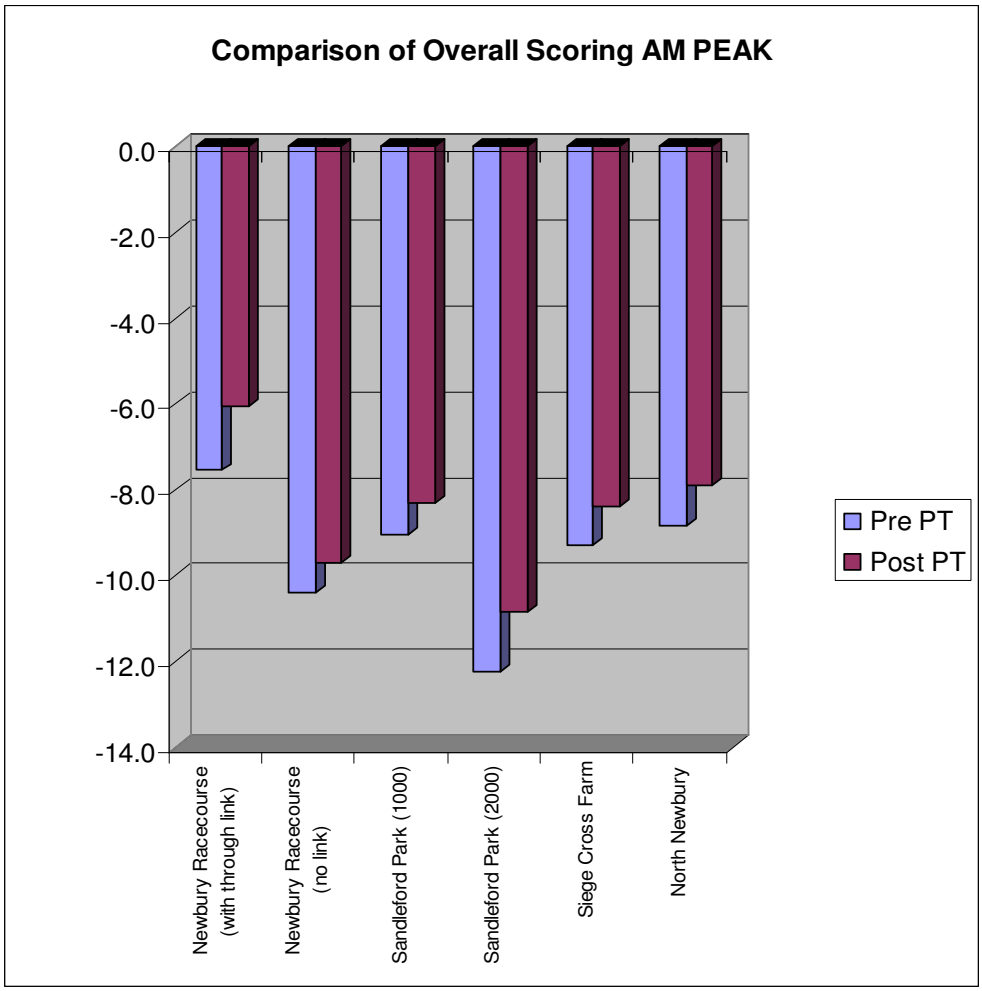
Table 6-22 Congestion on Key Junctions AM PEAK with PT

Junction	2006	2026 DM	Newbury Racecourse (with through link)	Newbury Racecourse (no through link)	Sandleford Park (1000)	Sandleford Park (2000)	Siege Cross Farm	North Newbury
A339								
M4 J13 Rbt								
Vodafone Rbt								
Robin Hood Gyratory								
Faraday Plaza Signals								
Bear Lane Rbt								
St Johns Rbt								
Pinchington Lane Rbt								
Swan Inn Rbt								
Greenham Park W Rbt								
Greenham Park E Rbt								
Thornford Rd Rbt								
Tothill Rbt W Rbt								
Tothill Rbt E Rbt								
A343 North Rbt								
A343 South Priority								
A4W Rbt								
A4E Rbt								
Oxford Road Rbt								
Faraday Road Signals								
Business Park Rbt								
Hambridge Road Signals								
Lower Way Signals								
Turnpike Rbt								
Henwick Lane Signals								
Northfield Rd Signals								
Park Lane Signals								
Broadway Signals								
The Moors Signals								
Harts Hill Signals								
Floral Way Rbt								
Pipers Way Rbt								
Gables Way Rbt								

OVERALL SCORING

6.4.33 Figure 6.7 shows the comparison of the scoring for the morning peak for pre and post public transport improvements. It can be seen that the improvements in public transport provision has improved the score for all scenarios, with reduced flows reducing congestion in the network. This flow reduction is due to a shift from car driver to public transport partially from development scenario traffic and partially from trips within the study area that benefit from the introduction of improved public transport provision.

Figure 6-7: Relative performance of individual sites with public transport



6.5 SUMMARY

6.5.1 This chapter has shown that the introduction of the public transport measures results in levels of transfer of trips from highway which contribute towards the target levels of 7.5% transfer outlined in Chapter 3. The remainder of the mode share will be made up of those that are “captive” to public transport, e.g. those who do not own a car.

6.5.2 A sensitivity test has been undertaken which shows that a small additional transfer can be achieved from highway to public transport through fare reductions, but that this also needs to be supported by other measures such as personalised marketing to maximise the shift to public transport. The assessment undertaken demonstrates that adoption of proposed public transport measures at each of the potential development sites will produce an overall positive, although limited, impact. However, as traffic patterns change as a result of the mode shift alternative patterns of congestion occur.

7 Outline Of Highway Mitigation Measures

7.1 INTRODUCTION

7.1.1 The review of the performance of the highway network as discussed in Chapter 4 indicates that most of the network is close to or at capacity with the developments in place. As indicated by the modelling assessment work, much of this capacity is taken up by through traffic using the A339. Therefore the highway mitigation package for the LDF sites has been developed around some common principles which have then been tailored to the specific requirements of each development site. Once the elements of the highway mitigation package are agreed, further model testing of the preferred elements will be tested as part of LDF Phase 3 to illustrate their impact.

7.2 COMMON MITIGATION REQUIREMENTS

7.2.1 A number of requirements for highway mitigation benefit all of the development sites as well as Newbury as a whole. These common requirements for highway mitigation include:

- Provision of additional highway capacity between A4 and A339;
- Consistency of junction type along A339 to enable more effective flow management;
- An appropriate common management system for the A339 junctions (such as MOVA or SCOOT);
- Appropriate provision of bus priority along the A339 to enable effective provision of improved bus services by balancing the speed of service with maintaining patronage – with good bus priority, bus routes could be adapted to run via this corridor (see para 7.2.16);
- Effective traffic management at gateways into the town and on routes accessing the A339 to deter rat running by through traffic

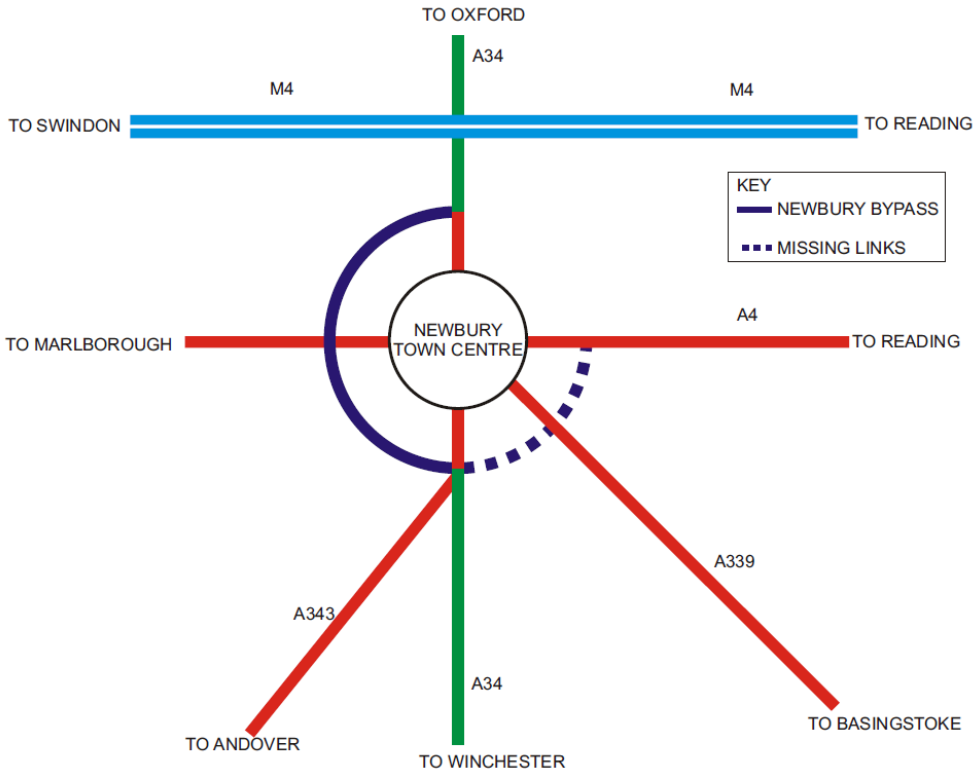
7.2.2 The nature of how the above mitigation measures might be provided is outlined below:

ADDITIONAL HIGHWAY CAPACITY

7.2.3 The modelling undertaken to date shows significant congestion issues around the network without future developments or associated transport mitigation measures. There are limits to the degree to which enhancing junctions and road alignments will increase capacity.

7.2.4 Additional public transport measures will contribute towards alleviating congestion, but additional road capacity is still likely to be required to accommodate movements along key desire lines. Key desire lines that have been identified which are not currently provided for include access between the A4 and the A339, and between the A339 and the A34 south of Newbury. Figure 7.1 below shows routes the main routes in the Newbury Area.

Figure 7.1 **Identification of Missing Links in the Newbury Area**



7.2.5 Figure 7.1 shows that the Newbury Bypass allows journeys between A34 (S), A343, A4 (W) and A34 (N) to be made without the need to travel through Newbury Town Centre. There is limited need for journeys to be made between A34 (N) Oxford and A4 (E) Reading as those on the A34 are likely to use the M4 to reach the Reading Area. However, direct links are not currently available between the A34 (S) and the A339 and the A339 and the A4 (E). Those wishing to make these journeys currently need to travel through Newbury Town Centre.

7.2.6 Between the A339 and the A34 there is a route from Newtown roundabout to the Tothill junction on the A34. This route is not signed as a recognised route between the A339 south of Newbury and the A34, but when used helps alleviate congestion on the A339 through Newbury Town Centre.

7.2.7 Providing additional capacity between the A339 and the A34 would be a longer term challenge owing to the potential environmental and planning constraints to the south of Newbury. Also providing such a link would only directly benefit one of the strategic development sites (Sandleford Park).

7.2.8 A link between the A4 and the A339 would potentially benefit all the new strategic development sites, and a number of routing options have already been identified for this link. Therefore the option for providing additional highway capacity between the A4 and the A339 is considered to be deliverable within the LDF period, and has been explored within this LDF study.

7.2.9 Provision to accommodate this demand between the A4 and the A339 could be provided by two potential alignments:

- Option 1 - An inner eastern link between A4 and A339 skirting the Racecourse site
- Option 2 - An outer eastern link east of Thatcham on the A4 around the edge of Greenham Common rejoining A339 via Thornford Road.

7.2.10 The role of both options would be to facilitate the movement of traffic between the A4 and A339, thus reducing the pressure on the Robin Hood and Bear Lane junctions. The advantages and disadvantages of these options are included in Tables 7.1 and 7.2 below

Table 7.1 Option 1 – Inner Eastern Link

Advantages	Disadvantages
Lower construction cost	Negotiation required with landowners to facilitate delivery
More direct routes to destinations on the edge of Newbury	Additional traffic close to current Racecourse site
Minimal environmental mitigation required	Potential negotiation required with Newbury Racecourse developer over management of through traffic
Negotiation required with fewer potential landowners	Need to provide priority for public transport within Racecourse site

Table 7.2 Option 2 – Outer Eastern Link

Advantages	Disadvantages
Construction distance not much less than inner relief road	Higher construction cost
Reduces overall traffic levels across whole Newbury town	Environmental mitigation required to cross flood plain
Provides quicker links between the A339 and A4	Routing would need to avoid environmentally sensitive areas (including Greenham Common)
Reduced pressure on road network within proximity of Sandleford Park	Negotiation potentially required with more landowners

7.2.11 To provide an early indication of the relative scale of costs associated with these options, an estimated cost for these two options has been derived using broad unit costs per kilometre taking a broad alignment of potential routes of each option. The broad alignment of the two options considered is included in Figure 7.1. The alignment for the outer eastern link assumes new build between the A4 (Bath Road) and Thornford

Road near Crookham. Additional upgrading of the existing route between Thornford Road and A339 may be required. This element has not been included in the costing.

7.2.12 The estimated costs are based on a 20% contingency and an additional 15% for preliminary costs. The costs do not include Land Costs or Environment and Flooding Mitigation Costs. The costs also do not include Traffic Management, Network Rail possession cost and statutory service diversion cost and therefore will need to be refined further prior to being used as a basis for scheme cost derivation.

7.2.13 The outline cost estimates developed are included in Table 7.3 below:

Table 7.3- Estimated Costs for Inner and Outer Eastern Link Options

Relief Road Options	Road Link Distance	Estimated Cost
Inner Eastern Link (Includes new roundabout on A339)	2.1 km	£4.5 million
Outer Eastern Link (Includes, two new roundabouts (on A4 Bath Road & Thornford Rd), 2 river bridges and 1 railway bridge)	3km	£20 million

7.2.14 Previous studies have examined the cost of the outer eastern link. The *Cross-Kennet Traffic Study (Jacobs Consultancy)* from 2004 identified the broad order of cost for this as being in excess of £20 million without improvements to Crookham Hill. The reason that the cost of the Outer Eastern Link option is higher than the Inner Eastern Link is due to the requirement for the Outer Eastern Link of the construction of a railway bridge and two river bridges.

Figure 7.2 – Eastern Link Road Options

CONSISTENCY OF JUNCTION TYPE

7.2.15 The junctions along the A339 are mostly roundabouts with a signalised roundabout at Bear Lane, and a signalised gyratory at Robin Hood. These types of junction mean that there is limited potential to manage the flow of through traffic using the A339. With signalised junctions, there is more scope to manage the traffic by giving greater priority to traffic exiting a development where this is required, and less priority to traffic using the A339 as a through route for example. The gateways to the town should be marked by junctions of a consistent type. The approach from the north is signalised at Robin Hood junction. A signalised junction at Newtown roundabout (A339 / B4640 junction) would provide a similar demarcation for the southern entry to Newbury. (The approach from the north of Newbury would change if the site at North Newbury were to be developed with the Vodafone roundabout possibly becoming the main “gateway” to the site.)

MANAGEMENT OF JUNCTIONS USING A COMMON SIGNAL MANAGEMENT SYSTEM

7.2.16 Once junctions are provided in a consistent form (signalised junctions for example), the economies of scale from a junction management system (such as SCOOT or MOVA) can be realised. This will provide the Council with more influence and control over how queues are managed so that traffic flows from developments and those making through journeys can be balanced. This control can be exercised differentially

during the peak and off peak periods, to provide for example, more priority to through traffic during the off peak than during the peak periods.

PRIORITY FOR BUS SERVICES AT JUNCTIONS

7.2.17 Provision of signalised junctions rather than roundabouts means that priority can more easily be given to buses. Selected vehicle detection can be used to detect buses on approach to junctions, and be given priority through the junction. This can be applied using SCOOT and MOVA, and typically gains around 5-7 seconds per junction. The junction between Newtown roundabout and Pinchington Lane requires less in the way of bus priority as congestion is less of an issue, but on approach to St Johns Road roundabout, bus priority could benefit the reliability of buses approaching from the south.

7.2.18 More buses would use the A339 link into Newbury if bus priority were provided, and sufficient patronage would exist from the new development sites, particularly Sandleford Park to support this routing, whilst certain existing routes could still operate along Newtown Road for example to collect existing passengers along that corridor.

TRAFFIC MANAGEMENT

7.2.19 To support the development of a consistent junction strategy, traffic management (traffic calming humps or chicanes) can usefully be deployed to ensure that through traffic is not encouraged to rat run through non appropriate roads, but that through traffic from the south for example is encouraged to use the Newtown Straight to join the A34 as the recognised route.

7.3 SPECIFIC MITIGATION BY SITE

7.3.1 This section assumes that the accesses to the sites will be provided as discussed in Chapters 8 – 11, and highway mitigation measures are specified for each site separately below. These mitigation measures will be developed by taking into account the common mitigation requirements above.

7.3.2 The provision of additional highway capacity within the Newbury area, and particularly between A4 and A339 would be of benefit to all development sites, and contributions should be sought from all development sites towards this.

NEWBURY RACECOURSE

7.3.3 In developing the package of highway mitigation measures for Newbury Racecourse, we have taken account of the proposals as set out in the Newbury Racecourse draft TAR, but have not been restricted by these proposals in developing the package for this site. However, the proposals as set out by the application do not take full account of the wider impact of additional traffic associated with the development site. Therefore, this assessment undertaken on behalf of the Council takes account of this wider impact and the potential need for additional highway capacity.

7.3.4 The Newbury Racecourse Transport Assessment (November 2008) includes the following off-site highway improvements:

- Robin Hood Gyratory
  - Additional entry lane at London Road
  - Modification of the gyratory's central reserve
  - Advanced lane guidance signs

- A339/Kings Road/Bear Lane Roundabout
  - Installation of MOVA traffic signal control at this junction (in progress)
  - Western Area Access – Racecourse Road
- Upgrade to the existing priority junction at the main entrance of the Racecourse on Racecourse Road

7.3.5 Improvements are already being installed at Robin Hood Gyratory as part of the Newbury Parkway Development, but these improvements tend to enhance performance rather than provide significant additional capacity.

7.3.6 A number of road and junction management options have also been proposed in the Transport Assessment. These include an extension of the one way system (Mill Lane – Boundary Road – Kings Road). The Transport Assessment explains that the benefit of extending the one way system would be to allow more efficient use of the existing road network. Our initial comments, however, are that of the options the TA considers, retaining two way traffic through the Bone Lane Industrial Estate is preferred as it would not lead to an increase in HGV traffic using Hambridge Road (which is a disadvantage of the first option).

7.3.7 The above off site highway mitigation measures will help facilitate this site, but the extension of the one way system at this stage has less direct benefit for this site. We would recommend other supporting highway management measures and provision of additional highway capacity as follows:

- Effective demand management of the existing highway is required to ensure that car trips are reduced and the use of alternatives is encouraged.
- Highway access is required from the west of the development through Racecourse Road (or similar alignment) to A339, and from the east of the development via Hambridge Road to the A4). There are two ways in which the highway could be altered to accommodate this development:
  - The development could be managed by retaining each part of the site as a separate entity and each part being accessed separately, with a through route only providing through access for buses and emergency vehicles via a bus gate
  - The wider transport planning objectives for Newbury will be better served by linking the A4 with the A339 and this study has identified two options for doing this (table 7.3). If the lower cost option for this desire line is preferred, part of the land required for the Racecourse development could be used to provide the inner relief road.
  - The Hambridge Road/A4 junction improvements are also required to accommodate this development

SANDLEFORD PARK

7.3.8 As part of the highway mitigation package for this site in addition to the eastern link, it is recommended that:

- The preferred main access to the site is on the A339, rather than via Monks Lane. This allows better access to destinations south of Newbury on the A339, such as Basingstoke. Alternative access could be provided from the site onto Monks Lane and accessing the A339 at Pinchington Lane roundabout. Actual site access will be determined following more detailed site assessment.
- The Pinchington Lane roundabout and the main site access between Pinchington Lane and Newtown roundabouts should be signalised to provide smoother flows of traffic through Newbury along the A339 close to Sandleford Park. Monks Lane junction with the A339 is served from the roundabout junction which also serves Pinchington Lane which has been recently dualled for its initial length to accommodate increased traffic flows from the Superstore and retail sites. There are also committed development sites which have increased traffic flows onto the A339 Pinchington Lane /Monks Lane junction. Capacity constraints at this roundabout would be mitigated by the signalisation of the roundabout and the consideration of increased dual carriageway for the initial length of Monks Lane.
- Signalisation of St Johns Road roundabout to manage the flow of traffic along the A339. This will allow greater flexibility in the priority which is given to traffic from the development site compared to through traffic using the A339. With signals, flows can be managed and the degree of priority can be influenced. Whereas at roundabout junctions, flows from the right will have priority and could affect ease of egress from this site in the AM Peak.
- The site will also benefit from the A339 – A4 inner relief road link, and so contributions towards this improvement should be built into the package for Sandleford Park should this be taken forward.

7.3.9 Although not directly attributable to the site, the signalisation of Newtown Roundabout should be considered. This would provide a consistency of junction type along the A339 and provide a clear demarcation of the gateway into the town.

7.3.10 A number of related developments close by will have an impact on the section of the A339 serving Sandleford Park, and the impacts of these have been considered in the modelling assessment for this study. New Greenham Park (Business Park) which is not yet fully occupied together with the GAMA site which has not commenced, have the potential to increase traffic flows significantly. Further assessment of the link and junction capacity will be undertaken as part of Phase 3 to confirm any need for carriageway widening and other traffic management measures.

SIEGE CROSS FARM

7.3.11 The A4 experiences congestion along points to the west of this site into Newbury, and this congestion will be added to by this development. The main destination for trips from Siege Cross Farm are Reading and Newbury. However, travel time increases occur across the network.

7.3.12 The Bath Road A4/Pipers Way/Siege Cross Farm roundabout junction is poorly configured and would require to be improved to current geometry requirements to enhance capacity. Signalisation of the roundabout is also a possible option.

7.3.13 The originally intended Thatcham northern "bypass route" to the A4 formed by Floral Way, Heath Lane, Bowling Green Lane and Tull Way has not become a reality due to incoming residents seeking traffic speed restraint measures. However, the Floral Way secondary access could provide for an extension to this route with the possibility that through traffic may be encouraged to use the route. Consideration of the traffic capacity benefits/disbenefits of this link would need to be investigated and considered against environmental issues.

7.3.14 Apart from the signalisation of the access junctions onto the A4 (including the A4 Pipers Way/Siege Cross Farm roundabout), further highway mitigation along the lines outlined within the A4 Route Study undertaken by WSP (2006) would help to mitigate the effects of this development site. This recommended a number of proposals in terms of highway, public transport and cycle/pedestrian schemes to improve traffic flow and road safety along the A4 for all modes of transport. In looking at the schemes proposed, the benefits of the highway and public transport measures along the Newbury – Thatcham stretch of the A4 can be attributed to Siege Cross Farm. As such, a proportion of these costs could be expected to be funded by the Siege Cross Farm development. The exact level of funding would need to be agreed through negotiations.

7.3.15 Tables 7.4 to 7.6 shows the A4 study recommended schemes identified as being beneficial to the Siege Cross Farm development, split into highway, public transport and cycle / pedestrian schemes. All schemes costs stated within the tables are full schemes costs (as set out within the A4 Study Report). It should be noted that some of these schemes are already being progressed following the A4 Study.

Table 7.4 - A4 Study Highway Schemes Beneficial to Siege Cross Farm

Location on A4	Scheme	Estimated Cost	Recommended Year of Delivery
Fleming Road/ A339 junction	New junction onto the A339 to connect to Faraday Road	£400,000	2010/11
Broadway Junction	Traffic signal and junction improvements	£40,000	2007/08
Chapel Street / Harts Hill; Road	Junction improvements and rationalisation of signals	£100,000	Funding dependant

Table 7.5 - A4 Study Public Transport Schemes Beneficial to Siege Cross Farm

Location on A4	Scheme	Estimated Cost	Recommended Year of Delivery
Faraday Road to Newbury Business Park	Westbound Bus Lane	£600,000	2012+
Newbury Business Park Junction	Signalisation and Bus Priority	£350,000	2011/12
Business Park to Hambridge Road	Westbound Bus Lane	£550,000	2111/12
Hambridge Road junction	Capacity and Bus Priority Improvements	£562,000	2008/09
Lower Way Junction	Bus Priority Improvements	£52,000	2008/09
Benham Hill	Westbound Bus Lane	£40,000	2010/11
Turnpike Road Junction	Safety Improvements and Bus	£90,000	2007/08

Table 7.6 - A4 Study Cycle/Pedestrian Schemes Beneficial to Siege Cross Farm

Location on A4	Scheme	Estimated Cost	Recommended Year of Delivery
Floral way to Gables Way	Westbound Cycle Lane (Cycle Improvements Phase 3)	£5,000	2009/10
	Off-Carriageway Cycle Lanes	£30,000	2009/10

7.3.16 In addition to the above schemes, contributions should also be sought towards the A339 – A4 eastern link if this is taken forward since this will provide greater route choice and improved reliability of car journeys to and from Siege Cross Farm.

NORTH NEWBURY

7.3.17 Assuming that most of the development is located to the east of the A339, it is proposed that the accesses from the site onto the A339 and Long Lane will provide the main highway improvements required for the site. Changes to Robin Hood Roundabout are difficult to implement in a way which benefit the development site, but at the same time do not encourage through traffic through Newbury.

7.3.18 In addition to the eastern link, the main supporting highway infrastructure which should be considered for this site includes:

- The site access via the Vodafone site is a key part of the mitigation for this site, providing access to the A339
- Constraint measures such as traffic calming on Oxford Road and Love Lane would help ensure that appropriate roads are used by appropriate traffic. It is important to prevent a new link between the A339 and the B4009 becoming a 'rat run' through the site, which might be caused by existing congestion at Robin Hood Roundabout and the current lack of linkage between the residential areas either side of the B4009. The recent traffic calming of an existing 'rat run' Kiln Road /Turnpike Road/Benham Hill /A4 link for traffic intending to proceed east toward Thatcham, assists in managing flows on A4, and complementary measures would assist in this.
- To the south of the site there is a possibility of a road link to Shaw Farm Road which has a junction with Love Lane. However this is not considered suitable as a significant vehicular access to the site due to its rural nature and the consequential environmental impact that would be caused in order to upgrade the road. It could form an emergency link or quiet route toward Newbury Town centre for cyclists and pedestrians.

7.4 SUMMARY

7.4.1 This chapter has identified that due to the proximity of the development sites to Newbury town centre, developing a discrete set of mitigation packages for each site is not the most effective way of delivering cost effective highway solutions for large new development sites.

7.4.2 There are a number of requirements for highway mitigation which benefit all of the development sites as well as Newbury as a whole. These common requirements are best taken forward as a package, since they then form the foundation for a robust contributions policy. The common requirements recommended for the highway mitigation include:

- The need for additional highway capacity since the current network is at full stretch. The provision of some of this capacity can be achieved through shifting car journeys to other modes and modifications to road alignments, lane widths and junction types. When capacity ceilings are reached with these interventions it is considered necessary to provide additional highway capacity linking the A4 and A339;
- Consistency of junction type along A339 to enable more effective flow management;
- Appropriate use of signalised junctions managed through a common management system (such as MOVA or SCOOT);

- Appropriate provision of bus priority along the A339 to enable effective provision of improved bus services;
- Effective traffic management at gateways into the town and on routes accessing the A339 to deter rat running by through traffic

SPECIFIC MITIGATION BY SITE

7.4.3 In addition to the above, specific packages of mitigation for each site should be developed. For Sandleford Park, this includes signalisation of key junctions on the A339 to achieve consistency of junction type. For Siege Cross Farm, this includes delivery of many of the highway improvements for the A4 recommended within the A4 study. For North Newbury, this includes traffic calming of key routes to ensure that appropriate routes are used by through traffic and local traffic.

8 Summary Of Mitigation Package - Newbury Racecourse

8.1 INTRODUCTION

8.1.1 This chapter summarises the Potential Package of Mitigation Measures for Newbury Racecourse.

8.2 MANAGEMENT OF PARKING DEMAND

8.2.1 As discussed in Chapter 3, a key factor in affecting the number of trips a development site generates is the level of parking provided. WSP assisted in researching and developing a Parking Strategy for West Berkshire in 2006. In that strategy, WSP proposed the following parking standards based on levels of accessibility:

Table 8.1 Parking Standards Proposed in West Berkshire Parking Strategy

	Low Accessibility	Medium Accessibility	High Accessibility
1 Bed	1.5 spaces	1 space	0.75 spaces
2-3 Bed	2 spaces	1.5 spaces	1.25 spaces
4+ Bed	On Merit	On Merit	On Merit

8.2.2 The Phase 1 LDF Transport Assessment scored each potential development location in terms of accessibility. Newbury Racecourse was classed as 'Medium Accessibility' as it is 15-30 minutes away from Newbury Town Centre by bus.

8.2.3 Therefore, it is proposed that the Newbury Racecourse has a Parking Standard of 1 space per 1 bedroom households and 1.5 units per 2-3 bedroom households.

8.2.4 To ensure that the management of parking demand at Newbury Racecourse does not result in more parking taking place in neighbouring residential areas it is proposed that residential parking restrictions are considered for these areas.

8.3 SMARTER CHOICES

8.3.1 As described in Section 3 "Smarter Choices" is the application of targeted Travel Plan and demand management measures to reduce the level of individual private vehicle trips that are generated by a new development.

8.3.2 For a residential development these include the following:

- Personal travel planning, travel awareness campaigns and public transport information and marketing;
- Car clubs and car sharing schemes;
- Teleworking and home shopping

8.4 SUSTAINABLE MODES

8.4.1 As described in Section 5, a cycle route currently exists between Newbury Racecourse and Newbury Town Centre (via Racecourse Road and Greenham Road). Consideration was given as to the need for additional cycle route provision and it was

concluded that enhancements to existing cycle links will be required to deliver this development site.

8.4.2 The Newbury Racecourse development would need to include provision for cyclists within the development and also on the new rail bridge proposed to link the development site to Hambridge Road.

8.5 PUBLIC TRANSPORT

8.5.1 As described in Chapter 5, bus service provision to Newbury and Thatcham provide the most viable options for serving this site. Provided that a 10% mode share can be achieved with the development site (and the modelling has indicated that this may only just be achieved once the "captive" bus users are included), the following services are recommended:

- A 15 minute frequency service to Newbury, which also provides full local accessibility within the site
- A 30 minute service between Newbury and Thatcham via the site

8.6 HIGHWAY ACCESS

8.6.1 The Newbury Racecourse Transport Assessment (November 2008) proposes that the Western development area is accessed via Racecourse Road only, whereas the Eastern and Central areas would be accessed via a new bridge over the railway line. The new bridge would connect to the existing highway network at the junction of Hambridge Road and Hambridge Lane.

8.7 HIGHWAY MITIGATION

8.7.1 We would recommend other supporting highway management measures and additional highway provision as follows:

- Hambridge Road/A4 junction improvements are required to accommodate this development.
- The Newbury Racecourse site itself is close to the town centre, and requires relatively limited highway mitigation to deliver the site. The real requirement is for effective demand management to ensure that car trips are reduced and the use of alternatives is encouraged.
- Highway access is required from the west of the development through Racecourse Road (or similar alignment) to A339, and from the east of the development via Hambridge Road to the A4). There are two ways in which the highway could be altered to accommodate this development:
  - The development could be managed by retaining each part of the site as a separate entity and each part being accessed separately, with a through route only providing through access for buses and emergency vehicles via a bus gate.
  - The wider transport planning objectives for Newbury will be better served by using part of the land required for the Racecourse development to provide the inner relief road to link the A4 with the A339, if the lower cost option for providing for this desire line is preferred.

9 Summary Of Mitigation Package - Sandleford Park

9.1 INTRODUCTION

9.1.1 This chapter summarises the potential package of mitigation measures for Sandleford Park.

9.2 MANAGEMENT OF PARKING DEMAND

9.2.1 As discussed in Chapter 3, a key factor in affecting the number of trips a development site generates is the level of parking provided. WSP assisted in researching and developing a Parking Strategy for West Berkshire in 2006. In that strategy, WSP proposed the following parking standards based on levels of accessibility:

Table 9.1 Parking Standards Proposed in West Berkshire Parking Strategy

	Low Accessibility	Medium Accessibility	High Accessibility
1 Bed	1.5 spaces	1 space	0.75 spaces
2-3 Bed	2 spaces	1.5 spaces	1.25 spaces
4+ Bed	On Merit	On Merit	On Merit

9.2.2 The Phase 1 LDF Transport Assessment scored each potential development location in terms of accessibility. As described in Section 4 Sandleford Park can be described as having Medium Accessibility.

9.2.3 Therefore, it is proposed that the Sandleford Park has a Parking Standard of 1 space per 1 bedroom households and 1.5 units per 2-3 bedroom households.

9.2.4 To ensure that the management of parking demand at Sandleford Park does not result in more parking taking place in neighbouring residential areas it is proposed that residential parking restrictions are considered for these areas.

9.3 SMARTER CHOICES

9.3.1 As described in Section 3, “Smarter Choices” is the application of targeted Travel Plan and demand management measures to reduce the level of individual private vehicle trips that are generated by a new development.

9.3.2 For a residential development these include the following:

- Personal travel planning, travel awareness campaigns and public transport information and marketing;
- Car clubs and car sharing schemes;
- Teleworking and home shopping

9.4 SUSTAINABLE MODES

9.4.1 As described in Chapter 5, a cycle route currently exists between Newbury Town Centre and Sandleford Park (via Newtown Road). Consideration was given as to the need for additional cycle route provision and it was concluded that improvements are

required to encourage greater take up of cycling and to fully integrate the site with the wider network.

9.4.2 The Sandleford Park development would also include provision for cyclists within the development.

9.4.3 A cycle route is also currently available between Sandleford Park and New Greenham Park (a significant destination for employment), but improved access is required from the Common to New Greenham Park. Improvements will be made to crossing opportunities on the A339.

9.5 PUBLIC TRANSPORT

9.5.1 As described in Chapter 5, it is expected that bus services to the Sandleford Park development, would be self supporting at the 2000 home scenario, and with a 10% mode share for the 1000 home scenario. Two services are recommended –

- A diversion of the current New Greenham Park shuttle 3A/B/C (currently running at a 45 minute frequency) between Monks Lane and Newtown Road, assuming additional costs are not incurred for the diversions
- A new shuttle service between the site and Newbury town operating a 15 minute service

9.6 HIGHWAY ACCESS

9.6.1 There are two potential road access points for this site:

- An eastern access formed with a new junction and access road leading from the A339; and
- A northern access with new junction from Monks Lane

9.7 HIGHWAY MITIGATION

9.7.1 As part of the highway mitigation package for this site, it is recommended that:

- The preferred main access to the site is between Newtown roundabout and Pinchington Lane roundabout.
- The Pinchington Lane roundabout and the main site access between Pinchington Lane and Newtown roundabouts should be signalised to provide smoother flows of traffic through Newbury along the A339 close to Sandleford Park. Monks Lane junction with the A339 is served from the roundabout junction which also serves Pinchington Lane which has been recently dualled for its initial length to accommodate increased traffic flows from the Superstore and retail sites. There are also committed development sites which have increased traffic flows onto the A339 Pinchington Lane /Monks Lane junction. Capacity constraints at this roundabout would be mitigated by the signalisation of the roundabout and the consideration of increased dual carriageway for the eastern section of Monks Lane between the site and the A339.
- Signalisation of St Johns Road roundabout to manage the flow of traffic along the A339. This will allow greater flexibility in the priority which is given to traffic from the development site compared to through traffic using the A339.

- The site will also benefit from the A339 – A4 inner relief road link, and so contributions towards this improvement should be built into the package for Sandleford Park should this be taken forward.

9.7.2 Although not directly attributable to the site, the signalisation of Newtown Roundabout should be considered. This would provide a consistency of junction type along the A339 and provide a clear demarcation of the gateway into the town.

10 Summary Of Mitigation Package - Siege Cross Farm

10.1 INTRODUCTION

10.1.1 This chapter summarises the potential package of mitigation measures for Siege Cross Farm.

10.2 MANAGEMENT OF PARKING DEMAND

10.2.1 As discussed in Chapter 3, a key factor in affecting the number of trips a development site generates is the level of parking provided. WSP assisted in researching and developing a Parking Strategy for West Berkshire in 2006. In that strategy, WSP proposed the following parking standards based on levels of accessibility:

Table 10.1 Parking Standards Proposed in West Berkshire Parking Strategy

	Low Accessibility	Medium Accessibility	High Accessibility
1 Bed	1.5 spaces	1 space	0.75 spaces
2-3 Bed	2 spaces	1.5 spaces	1.25 spaces
4+ Bed	On Merit	On Merit	On Merit

10.2.2 The Phase 1 LDF Transport Assessment scored each potential development location in terms of accessibility. Siege Cross Farm was classed as 'Medium Accessibility' as it is 15-30 minutes away from Newbury Town Centre by bus.

10.2.3 Therefore, it is proposed that the Siege Cross Farm has a Parking Standard of 1 space per 1 bedroom households and 1.5 units per 2-3 bedroom households.

10.2.4 To ensure that the management of parking demand at Siege Cross Farm does not result in more parking taking place in neighbouring residential areas it is proposed that residential parking restrictions are considered for these areas.

10.3 SMARTER CHOICES

10.3.1 As described in Section 3, Smarter Choices" is the application of targeted Travel Plan and demand management measures to reduce the level of individual private vehicle trips that are generated by a new development.

10.3.2 For a residential development these include the following:

- Personal travel planning, travel awareness campaigns and public transport information and marketing;
- Car clubs and car sharing schemes;
- Teleworking and home shopping

10.4 SUSTAINABLE MODES

10.4.1 As described in Chapter 5, a cycle route currently exists between Newbury, Thatcham and Siege Cross Farm (via the Kennet and Avon Canal and Lower Way). This route is on the National Cycle Network (NCN Route 4). Consideration was given as to the need for additional cycle route provision and it was concluded that existing cycle

routes would need to be enhanced to provide good quality cycle accessibility to the site. Contributions should be sought to improvements/maintenance of the Kennet and Avon towpath.

10.4.2 The Siege Cross Farm development would also include provision for cyclists within the development.

10.4.3 The cycle routes which are provided would need to be implemented in a way which prioritises provision for commuter/every day travel.

10.5 PUBLIC TRANSPORT

10.5.1 As described in Chapter 5, it is concluded that a shuttle more frequent than every 30 minutes between Newbury and Siege Cross Farm would not be self funding.

10.5.2 For this reason it is recommended that public transport access to the site would be through the diversion of the existing Service 1 between Newbury and Reading.

10.6 HIGHWAY ACCESS

10.6.1 It is proposed that highway access is at two points on the A4 east of Thatcham.

10.7 HIGHWAY MITIGATION

10.7.1 As described in Chapter 7, the signalisation of the access junctions onto the A4 (including the A4 Pipers Way/Siege Cross Farm roundabout) is required to deliver this site. The highway network close to this site becomes heavily congested once the development site is built out.

10.7.2 The necessary highway mitigation for this site is difficult to achieve at low cost. The junctions on this route have been examined as part of the A4 study. It is recommended that the highway improvements at these junctions be taken forward, together with the sections of bus priority between Thatcham and Newbury. The pedestrian and cycle improvements close to the site should also be taken forward (as set out in the A4 study) in order to help facilitate the delivery of this site.

10.7.3 However, these improvements are unlikely to be sufficient to provide the level of highway capacity improvement required for this site.

10.7.4 The results of the testing of the inner relief road which has been tested with the Racecourse development provides additional capacity to mitigate that development site.

10.7.5 An inner relief road may be sufficient to mitigate the effects of development at Siege Cross Farm. However, an outer relief road may mitigate this site more effectively. Further model testing will demonstrate whether or not this is the case.

10.7.6 The selection of Siege Cross Farm as a preferred site should be dependent on obtaining contributions towards an eastern relief road since this will provide greater route choice and improved reliability of car journeys to and from Siege Cross Farm.

11 Summary Of Mitigation Package - North Newbury

11.1 INTRODUCTION

11.1.1 This chapter summarises the potential package of mitigation measures for North Newbury.

11.2 MANAGEMENT OF PARKING DEMAND

11.2.1 As discussed in Chapter 3, a key factor in affecting the number of trips a development site generates is the level of parking provided. WSP assisted in researching and developing a Parking Strategy for West Berkshire in 2006. In that strategy, WSP proposed the following parking standards based on levels of accessibility:

Table 11.1 Parking Standards Proposed in West Berkshire Parking Strategy

	Low Accessibility	Medium Accessibility	High Accessibility
1 Bed	1.5 spaces	1 space	0.75 spaces
2-3 Bed	2 spaces	1.5 spaces	1.25 spaces
4+ Bed	On Merit	On Merit	On Merit

11.2.2 The Phase 1 LDF Transport Assessment scored each potential development location in terms of accessibility. North Newbury was classed as 'Medium Accessibility' as it is 15-30 minutes away from Newbury Town Centre by bus.

11.2.3 Therefore, it is proposed that the North Newbury has a Parking Standard of 1 space per 1 bedroom households and 1.5 units per 2-3 bedroom households.

11.2.4 To ensure that the management of parking demand at North Newbury does not result in more parking taking place in neighbouring residential areas it is proposed that residential parking restrictions are considered for these areas.

11.3 SMARTER CHOICES

11.3.1 As described in Section 3, "Smarter Choices" is the application of targeted Travel Plan and demand management measures to reduce the level of individual private vehicle trips that are generated by a new development.

11.3.2 For a residential development these include the following:

- Personal travel planning, travel awareness campaigns and public transport information and marketing;
- Car clubs and car sharing schemes;
- Teleworking and home shopping

11.4 SUSTAINABLE MODES

11.4.1 As described in Chapter 5, an off carriageway cycle route currently exists between Newbury Town Centre and North Newbury. This route already provides access between Newbury Town Centre and the Vodafone HQ. This route should be extended to serve the North Newbury site.

11.4.2 The North Newbury development would also include provision for cyclists within the development. The cycle strategy for this site would need to include signage and supporting measures to maximise take up.

11.5 PUBLIC TRANSPORT

11.5.1 As described in Section 5, the recommended public transport provision is to provide a clockwise and anticlockwise loop service through the site (30 minute frequency on each loop, providing a combined frequency to the site of 15 minutes) as this ensures that each end of the site is connected to Newbury Town Centre.

11.5.2 To supplement this loop service it is recommended that the appropriate Vodafone services, funded by the developer, are extended into the central area of the site, subject to agreement with Vodafone and regulatory issues described in Section 5 being overcome.

11.6 HIGHWAY ACCESS

11.6.1 Highway access is proposed from both Shaw Road and the existing Vodafone roundabout on the A339.

11.7 HIGHWAY MITIGATION

11.7.1 Assuming that most of the development is located to the east of the A339, it is proposed that the accesses from the site onto the A339 and Long Lane will provide the main highway improvements required for the site. Changes to Robin Hood Roundabout are difficult to implement in a way which benefit the development site, but at the same time do not encourage through traffic through Newbury.

11.7.2 In addition to the eastern link, the main supporting highway infrastructure which should be considered for this site includes:

- Site access via Vodafone to A339 to facilitate access to the site;
- Constraint measures such as traffic calming on Oxford Road and Love Lane would help ensure that appropriate roads are used by appropriate traffic. It is important to prevent a new link between the A339 and the B4009 becoming a ‘rat run’ through the site, which might be caused by existing congestion at Robin Hood Roundabout and the current lack of linkage between the residential areas either side of the B4009.

11.7.3 To the south of the site there is a possibility of a road link to Shaw Farm Road which has a junction with Love Lane. However this is not considered suitable as a significant vehicular access to the site due to its rural nature and the consequential environmental impact that would be caused in order to upgrade the road. It could form an emergency link or quiet route toward Newbury Town centre for cyclists and pedestrians

12 Summary And Conclusions

12.1 INTRODUCTION

12.1.1 This LDF Stage 2 study has provided the traffic modelling evidence to support the promotion of particular sites as part of the Core Strategy for West Berkshire. It has become clear through the course of the study that there is a significant increase in congestion expected across the whole network as a result of overall background traffic growth between 2006 and 2026. This will mean that the majority of the highway network is over capacity by 2026.

12.1.2 With the development sites in place, particular congestion hotspots on the highway network are evident. These include most of the key junctions on the sections of the A4 and A339 within Newbury and the A34 junctions into Newbury. A series of mitigation measures will be required to assist in facilitating the development of these sites.

12.2 COMMON MITIGATION REQUIREMENTS

12.2.1 A number of measures for highway mitigation would benefit all of the development sites as well as Newbury as a whole. These common requirements for the highway mitigation include:

- The need for additional highway capacity arises since the current network is at full stretch. The provision of some of this capacity can be achieved through shifting car journeys to other modes and modifications to road alignments, lane widths and junction types. When capacity ceilings are reached with these interventions it is considered necessary to provide additional highway capacity linking the A4 and A339;
- Consistency of junction type along A339 to enable more effective traffic flow management; with junctions managed through a common management system (such as MOVA or SCOOT);
- Appropriate provision of bus priority along the A339 to enable effective provision of improved bus services;
- Effective traffic management at gateways into the town and on routes accessing the A339 to deter rat running by through traffic

ADDITIONAL HIGHWAY CAPACITY

12.2.2 The modelling undertaken to date shows significant congestion issues around the network without future developments or associated transport mitigation measures. There are limits to the degree to which enhancing junctions and road alignments will increase capacity. Additional road capacity is likely to be required to accommodate movements along key desire lines. Key desire lines not currently provided for include access between the A4 and the A339, and between the A339 and the A34 south of Newbury.

12.2.3 Between the A339 and the A34 there is already a route from Newtown roundabout to the Tothill junction on the A34. This route is not signed as a recognised route between the A339 south of Newbury and the A34, but when used helps alleviate congestion on the A339 through Newbury Town Centre.

12.2.4 Providing additional capacity between the A339 and the A34 would be a longer term challenge owing to the potential environmental and planning constraints to the south of Newbury. Also providing such a link would only directly benefit one of the strategic development sites (Sandleford Park).

12.2.5 A link between the A4 and the A339 would potentially benefit all the new strategic development sites, and a number of routing options have already been identified for this link. Therefore the option for providing additional highway capacity between the A4 and the A339 is considered to be deliverable within the LDF period, and has been explored within this LDF study.

12.2.6 Provision to accommodate this demand between the A4 and the A339 could be provided by two potential alignments:

- Option 1 - An inner eastern link between A4 and A339 skirting the Racecourse site
- Option 2 - An outer eastern link east of Thatcham on the A4 to the A339 via Thornford Road.

12.2.7 An initial indication of the potential cost of this additional highway capacity would suggest that the funding of such an improvement would need to be shared between a number of development sites.

12.3 SUSTAINABLE TRANSPORT MITIGATION MEASURES

12.3.1 A package of bus services for each of the development sites has been developed to support the highway mitigation measures. Public transport services cover their costs for Sandleford Park (2000 household scenario) and North Newbury, but small amounts of funding support are required for Newbury Racecourse and Siege Cross Farm. With Sandleford Park, it is important that the public transport is provided from the development opening. It will take several years for the full build out of 2000 homes to be delivered at the site, therefore, a phasing plan will be required to stagger expenditure and ensure that financial contributions are secured sufficiently early in the process.

12.3.2 The bus services are supported by a series of pedestrian and cycle improvements for each site which can be delivered without significant cost and can be delivered within relatively short timescales

12.4 PREFERRED SITES ON BASIS OF HIGHWAY AND SUSTAINABLE TRANSPORT PERFORMANCE

12.4.1 On the basis of the congestion levels experienced at each of the LDF sites before highway mitigation measures are introduced, the following sites are favourable in highway terms, and on the basis of congestion levels alone, would be recommended to be taken forward in the following order –

- Newbury Racecourse is preferred principally due to its sustainable location. It is deliverable as a preferred site as long as a new link is provided integrally to the site. If a new link is not provided as part of the site, congestion levels at the site increase significantly. A small level of funding support is required due to the vehicle requirement to maintain the required level of service (a 15 minute frequency between the town centre and the site;
- North Newbury – good levels of revenue are generated by the proposed public transport provision for this site;

- Sandleford Park – Capacity exists on this part of the A339 to accommodate new development at this site. The overall flow of traffic on the A339 will be assisted with appropriate signing of through traffic. Assistance with mitigating the wider effects will be given by introduction of the A4/A339 link. In terms of bus provision, 2000 homes generates good levels of revenue, whereas at 1000 homes, a small level of funding support is required, or a larger amount if the 10% mode share is not achieved;
- Siege Cross Farm – the statistics show that this site creates a worse impact on the highway network than the other sites, and public transport is less viable due to the location of the site which is further away from the urban centres.

12.4.2 The levels of revenue or subsidy support for bus services are all subject to amendment as part of further negotiation by individual development sites, but provide an initial indication of the financial performance were the required levels of service to be met.

12.5 MITIGATION DELIVERY

12.5.1 On the basis of the highway mitigation outlined in Chapter 7, some schemes will be quicker and less costly to deliver, which will affect the overall deliverability of the development sites. It is recommended that the new eastern link road is provided for the benefit of all development sites and contributions are collected from all developers. This will have greater implications for the Newbury Racecourse site, since the alignment of this route will reduce the available land for development on this site. This can be addressed in subsequent discussions with developers of all sites to finalise the levels of contributions towards strategic infrastructure.

12.5.2 Much of the delivery of highway mitigation for North Newbury and Sandleford Park can be delivered through improvements to junctions on the A339 to provide consistency. With a signal management system, opportunity then exists to provide bus priority at these junctions through selected vehicle detection.

12.5.3 Siege Cross Farm presents more issues in terms of mitigation delivery. On the highway side, the improvements recommended within the A4 study will partially address the highway capacity issues, but the eastern link road will also be required.

12.6 OVERALL RECOMMENDED PREFERRED SITES

12.6.1 When highway mitigation and sustainable transport measures are considered together, the following locations and sizes of development sites are recommended:

- Racecourse (1,500 homes)
- Sandleford Park (1,000 homes)
- North Newbury (1,000 homes)

12.6.2 These recommendations have been derived using the traffic model and an assessment of the financial sustainability of public transport options.

12.6.3 The Racecourse (with the Link Road) performs the best in highway terms, slightly less so on public transport viability. Overall it is the preferred site due to the sustainable location of the site.

12.6.4 The 2,000 homes scenario for Sandleford Park has an additional traffic impact on the highway network when compared to the 1,000 homes scenario. However, the

benefit of the 2,000 homes scenario is that public transport services to the site would be financially sustainable.

12.6.5 The recommended preferred sites listed above include 1,000 homes at Sandleford Park. However, the difference in traffic impact between the two scenarios is not significant. With careful development of an appropriate mitigation package, the site would be capable of supporting more than 1,000 homes. This could be phased and decisions taken on the level of build out on the basis of future need for housing.

12.6.6 Increasing the number of homes at Sandleford Park would assist with the bus viability. .Financial support (£112,800) is required to provide public transport access to Sandleford Park in the 1,000 homes scenario, when bus mode share is assumed to be 5%. This would reduce if a higher mode share for bus could be achieved. Measures such as providing a bus gate on Newtown Road between Priory Road and Friars Road would encourage a higher bus mode share.

12.6.7 North Newbury provides the best balance in terms of the good performance on both highway and public transport grounds. Although it ranks second to Racecourse in highway terms, it has high public transport patronage.

12.7 NEXT STEPS

12.7.1 The development sites have been tested individually to understand the effect of mitigation without assuming that Newbury Racecourse would be delivered prior to all other development sites. Additional highway capacity is required to support all development sites. This has been tested with Newbury Racecourse, but additional highway mitigation will be tested as part of Stage 3 of the LDF study. These will be discussed in detail with West Berkshire Council, and can include the mitigation measures described in Chapters 8 to 11, but it is suggested that the following tests will help to understand the implications of how a relief road would help mitigate the development sites:

- Newbury Racecourse with outer relief road
- Siege Cross Farm with inner and outer relief road
- North Newbury with inner relief road
- Sandleford Park with outer relief road

12.7.2 The following will also be undertaken as part of Stage 3 of the LDF study:

- Confirmation of the recommended mitigation packages for each site;
- Test agreed combinations of specific highway mitigation packages (detailed in Chapters 7-11) within combined highway and public transport model;
- More detailed costings of the recommended measures;

12.7.3 The above tasks will provide the basis for completing the sound and robust evidence base as part of West Berkshire's Core Strategy. The modelling and assessment work undertaken for the LDF will also provide valuable input to the Transport Vision and inform the options which are tested as part of this study

Appendices and Figures

Glossary of Terms

Absolute Logit Models – A statistical model that determines the probability of discrete events. In this assessment a Logit Model has been used to determine mode split.

Accession – Accession is an accessibility planning software tool. Accession enables assessments to be made for different areas and population groups. It covers a wide range of transport modes and helps identify potential solutions such as changes in the location of services and the delivery of education, hospital and public transport. The application produces accessibility maps.

Bottleneck/Congestion Hot Spots – a location on the highway network where congestion regularly occurs

Car Clubs – Car Clubs are designed to provide 'pay-as-you-go' access to cars as an alternative owning a private car. Joining a car club can reduce carbon emissions as car club cars are more environmentally friendly and are used more efficiently.

DM – 'Do Minimum' – used as a scenario to compare the situation the effect of the 2026 committed developments with the strategic development sites

DPD – Development Plan Documents are the key statutory documents within the LDF and set out the vision, strategy and policies for West Berkshire.

LDF – Local Development Framework

Local Model Validation Report - The LMVR provides a summary of accuracy of the base from which forecasts have been prepared and demonstrates the accurate reproduction of the existing situation as independently observed.

Mitigation – Measures proposed to reduce the potential negative impact of new development on the transport network

MOVA - Microprocessor Optimised Vehicle Actuation – Isolated junction optimisation method used to minimise queues at traffic light junctions.

PCU - Passenger car units - A unit of measure whereby large vehicles (e.g. HGV) are converted to passenger cars using multiplication factors. This allows for dealing with mixed traffic streams more accurately than assuming that all vehicles are of equal length.

Phase 1,2,3 - Phase 1 of the Study undertook a review of the impact of potential strategic residential development locations across West Berkshire. This report covers Phase 2 of the Study, which includes a more detailed review of potential sites selected on the basis of transport and other key determining criteria. Phase 3 of the Study will assess the recommended mitigation packages for each site.

PPS – Planning Policy Statements are prepared by the government after public consultation to explain statutory provisions and provide guidance to local authorities and others on planning policy and the operation of the planning system

PT – Abbreviation for Public Transport (i.e. Bus, Rail)

PV – Abbreviation for Private Vehicle (i.e. Car)

SEA – Strategic Environmental Assessment is a process to ensure that significant environmental effects arising from policies, plans and programmes are identified, assessed, mitigated, communicated to decision-makers, monitored and that opportunities for public involvement are provided.

Smarter Choices – is the application of targeted Travel Plan and demand management measures to reduce the level of individual private vehicle trips that are generated by a new development.

SCOOT – Split Cycle Offset Optimisation Technique -Junction optimisation software which links multiple junctions together to create green light runs for platoons of traffic

SATURN – Simulation and Assignment of Traffic on the Urban Road Network - is an industry standard suite of software for traffic modelling

TEMPRO – Acronym for the Department for Transport's Trip End Model Presentation Program. TEMPRO is based on development information provided by local authorities and is used to analyse data about trip ends (destinations), journey mileage, car ownership and the population and workforce. TEMPRO is often used to estimate traffic growth.

Travel Plan - is a package of measures and initiatives that aim to reduce the number of car journeys made, by providing people with greater choice. Examples and descriptions of potential measures are defined within Para 3.3.27 – 3.3.36 of the report.

TRICS – Trip Rate Information Computer System (provides estimated trip rates for development sites) www.trics.org.uk

Trip Rate - The number of trips made to or from a location in a given time. This is usually presented by a given unit (e.g. per household) or by area (e.g. per 100m^2)

VISUM – An industry standard transport modelling package used for modelling four stage transport demand models (The four stages are: trip generation, mode choice, trip distribution and assignment).

WebTAG - The Department for Transport website designed to provide detailed guidance on the appraisal of transport projects and wider advice on scoping and carrying out transport studies.

Figures