

Warwickshire County Council
**Strategic Transport Assessment
Phase 4**

Addendum 02 Southern Sites
Detailed Analysis

232815-60.R001

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This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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1 Introduction

1.1 Scope

Arup have been commissioned by Warwickshire County Council (WCC) and Warwick District Council (WDC) to undertake additional, more detailed analysis of the WDC Strategic Transport Assessment (STA) scenarios relating to the Draft Local Plan. This report serves as an addendum to the previous Phase 4 Strategic Transport Assessment (STA) and builds upon the evidence presented within that and previous STA Assessment reports.

This addendum is intended to outline the impacts of the southern Warwick sites that have been identified through the Draft Local Plan to ascertain the level of mitigation that is envisaged as being necessary to deliver only those sites and to establish costs of the cumulative mitigation measures identified through this study.

1.2 Study Objectives

The objectives of this phase of work are as follows:

- Understand the level of mitigation that is envisaged as being necessary to deliver only those sites in the south of the study area and to establish costs of the cumulative mitigation measures identified as a result of this process.
- To assess, once an appropriate mitigation strategy has been identified, the impacts of two potential additional scenarios on the overall level of network operation, specifically:
 - Inclusion of a link through the Europa Way consortium land which connects Europa Way to Myton Road
 - Inclusion of additional sites to the South of Warwick not previously included within the earlier assessment or the original Phase 4 STA work.

1.3 Background

The objectives set out in section 1.2 are intended to build upon transport work previously undertaken. It is intended that this report should be considered alongside these independent but, but complimentary, reports.

The nature of the strategic transport assessments completed to date mirrors the emergent nature of the development of the Core Strategy itself. As is mentioned throughout the remainder of this report, there are a number of assumptions pertaining to the Core Strategy that have yet to be fully determined, as such, this assessment is based on the most up to date and current assumptions but should by no means be considered conclusive. The outputs from this assessment are intended to advise on the potential implications of the relevant allocation strategies and accompanying mitigation schedules.

An overview of the process that has been followed prior to the commencement of this additional phase of testing has been summarised as follows:

WDC Strategic Transport Assessment – Phase 1

The first phase of the strategic transport assessment comprised three separate elements. Firstly, a strategic transport assessment was undertaken using Strategic modelling techniques. This formed a high level/low detail assessment which was intended to begin to inform WCC, WDC and the HA on the potential implications of a number of different allocation options. This work was then supplemented by an additional, more detailed, series of tests undertaken using the existing PARAMICS models of both Warwick & Leamington and Kenilworth and Stoneleigh. At this stage the assessments were based on four potential options and compared the differences between the Reference Case, Do Nothing (i.e. growth but no mitigation measures) and Do Something scenarios.

Finally, complementary technical assessments and key findings thereof were presented alongside a detailed review of additional mitigation measures that could be delivered alongside the proposed approach to the allocation of housing across the District. The principles regarding the implementation of sustainable modes set out within these assessments are still applicable today as they are valid irrespective of the allocation strategy adopted. However they cannot be determined further until a preferred option is identified as there is a need to tailor these measures specific to the sites proposed.

WDC Strategic Transport Phase 2

The second phase of the strategic transport assessment undertook a more detailed comparison of the potential impacts of two specific allocation strategies namely the Preferred Option and the Southern Focus. At this stage a more detailed review of the potential mitigation measures was undertaken and additional mitigation measures were included within the assessment dependent upon the option being tested. A number of additional Sensitivity tests were completed which focussed on a variety of issues such as the impact of the Coventry and Warwickshire Gateway development and the strategic significance of the Northern Relief Road.

WDC Strategic Transport Phase 3

The third phase of the strategic transport assessment undertook a more detailed comparison of the potential impacts of one specific approach to the allocation of development, namely the Revised Allocation. At this stage a more detailed review of the potential mitigation measures was undertaken and additional mitigation measures were included within the assessment dependent upon the option being tested. A number of additional Sensitivity tests were completed which focussed on a variety of issues such as the potential impacts of education provision, the impacts of revising certain mitigation measures and the potential feasibility of amending the mitigation strategy in order that it can better accommodate public transport movements and, specifically, those associated with a Park and Ride site located south of Warwick and Leamington.

WDC Strategic Transport Phase 4

The fourth phase of the strategic transport assessment undertook a more detailed assessment of the potential impacts of the RDA on the Warwick and Leamington area road network. This stage of the work also refined the proposed Local Plan transport scheme assumptions in light of the impacts of the RDA and identified, where appropriate, areas of change compared to the previously proposed phase 3 mitigation strategy. This study also involved an assessment of the potential

impacts of adopting alternative layouts for some of the originally proposed schemes within the area of Warwick Town Centre. As part of this fourth phase of the STA, the network interventions in some areas have been reviewed and, where possible, refined in response to the conditions that have been observed to occur as a result of the assignment of the RDA Demands within the model networks and the impacts thereof. In addition further amendments to the schemes have been made where concerns with regards feasibility or deliverability have arisen.

WDC Strategic Transport Phase 4 Addendum 1

This stand-alone assessment is intended to record the revised network conditions which are produced within both the existing Reference and 2028 WDC RDA Scenario networks as a result of the inclusion of the updated A46/A425 improvements. The study also intends to ascertain the implications on the strategic infrastructure of the allocation of additional employment land to the south east of Warwick, off Stratford Road.

1.4 Study Area

In line with previous stages of the STA the assessment has focussed on the impacts within and performance of the Warwick and Leamington transport network as informed by the Warwick and Leamington Wide Area PARAMICS model (WLWA). The coverage of the WLWA model has been illustrated within Figure 1 on the following page.

1.5 Report Structure

The remainder of this report is set out as follows:

- Section 2 – Outlines the development of the respective model scenarios
- Section 3 – Presents an overview of the mitigation assumptions and amendments.
- Section 4 – Describes the measures used to inform the assessment and analysis of impacts.
- Section 5 – Presents the outcome of the testing completed within the Southern Sites
- Section 6 – Documents the impacts of the Europa Way Consortium Land, Link Road Sensitivity Test
- Section 7 – Documents the impacts of the Appeal Sites Sensitivity Test
- Section 8 – Outlines the Summary and Conclusions

Figure 1 - Warwick and Leamington Model Coverage



2 Scenario Development

2.1 Overview

Prior to the commencement of the assessment it is important to ascertain that the Reference Case that has been adopted to inform the assessment is appropriate and fit for purpose.

The term Reference Case refers to the scenario against which all other scenarios are compared. In assessing the implications of any development allocation strategy it is important to ensure all variables are kept to a minimum, thus the Reference Case is used to identify the likely network conditions prior to the application of any of the core strategy assumptions. As part of the first addendum phase of testing against the Phase 4 Strategic Transport Assessment the 2028 Reference Case was updated to include the full proposals for the A46/A425 Birmingham Road Corridor works. Full details of this scheme are available through the business case submission for the Coventry and Warwickshire Strategic Economic Plan (SEP)¹. Details on how the scheme has been included within the 2028 Reference Case are provided within the Phase 4 Addendum 01 Report²

The following scenarios are examined within this report:

- M001 WLWA 2028 Reference Case
- M002 WLWA 2028 Southern Sites Do Nothing
- M003 WLWA 2028 Southern Sites Do Something
- M004 WLWA 2028 Southern Sites Do Something + Link+ Myton Link
- M005 WLWA 2028 Southern Sites Do Something + Appeals

As such the modelling has been assessed with the original 2028 Forecast demands included within the assessment. Should the plan period deviate by more than 3 or 4 years it may be necessary to update the forecasting processes but, until that time, it is reasonable to conclude that the incremental growth in demand between 2028 and 2029 is unlikely to affect the outcome of the assessment.

2.2 Proposed Developments

Each of the proposed and approved development sites across the study area have been included in the model for assessment. Each of the sites assessed are listed below and details for each are contained within Table 1 and Table 2:

- Site 1 – Land North of Gallows Hill
- Site 2 – Land at Myton
- Site 3 – Harbury Gardens
- Site 4 – Lower Heathcote Farm
- Site 5 – Land North of Harbury Lane
- Site 6 – Woodside Farm
- Site 7 – Land South of Gallows Hill
- Site 8 – The Asps

¹ http://www.cwlep.com/userFiles/sep_business_case_a425_stanks__appendices.pdf

² 232815-60.R001 WDC STA Phase 4 Addendum 01 – Stratford Road Analysis, Arup, November 2014

- Site 9 – Land West of Oakley Wood Road
- Site 10 – Land South of Mallory Road

Table 1 – Local Plan Sites: Southern Sites

Local Plan Site	Local Plan Housing Allocation	Planning Applications	Planning Application Housing Number
Land West of Europa Way: Europa Consortium WCC Myton School	1190 (+8ha employment)	W/14/0967 North of Gallows Hill (WCC) + Gallagher Triangle	425
		W/14/1076 West of Europa way (EWC)	735
		Land at Myton School	125
Land South of Harbury Lane	1720	W/14/0023 Harbury Gardens (AC Lloyd)	200
		W/14/0407 Lower Heathcote Farm (Gallaghers)	785
		TBC – likely Split across AC Lloyd and Severn Trent	735
Land north of Harbury Lane (Warwick Gates)	220	W/14/0407	220
Woodside Farm	280	W/13/1207 (outline)	280
		W/14/1054 (Reserved matters)	
Land north of Oakley Wood Road (South of School)	150	W/14/0689	150

The above table illustrates that there have been 3655 dwellings identified as necessary for inclusion within the first phase of testing.

Table 2 – Other sites: Appeals/Refused

Planning Applications	Planning Application Housing Number	Status of application
W/14/0681 South of Gallows Hill (part) (Gallaghers)	450	Refused
W/14/0300 The Asps (Barwoods)	900	Refused (appeal lodged,)
Land south of Mallory Road	125	125

The previous table reveals that the appeals sensitivity test includes provision for 1475 additional dwellings which currently have no formal status in the plan.

2.3 Development Status

A number of the developments tested within this assessment will be allocated through the local plan whilst others are coming forward outside of the local plan. The planning applications associated with some of these sites are likely to be progressed through the appeals process, the ‘appeals’ sites have therefore been tested separately from the local plan sites as there is less certainty surrounding the delivery of these sites. The location of the various development sites is shown in Figure 2 on the following page.

2.4 Site Access Strategy

2.4.1 Overview

The site access strategy for each of the proposed development sites was reviewed, and included within the model. These assumptions are detailed along with the internal road layout, within the following section of this report. The location of each of the development zones is depicted in Figure 3.

Figure 2 – Development Site Locations

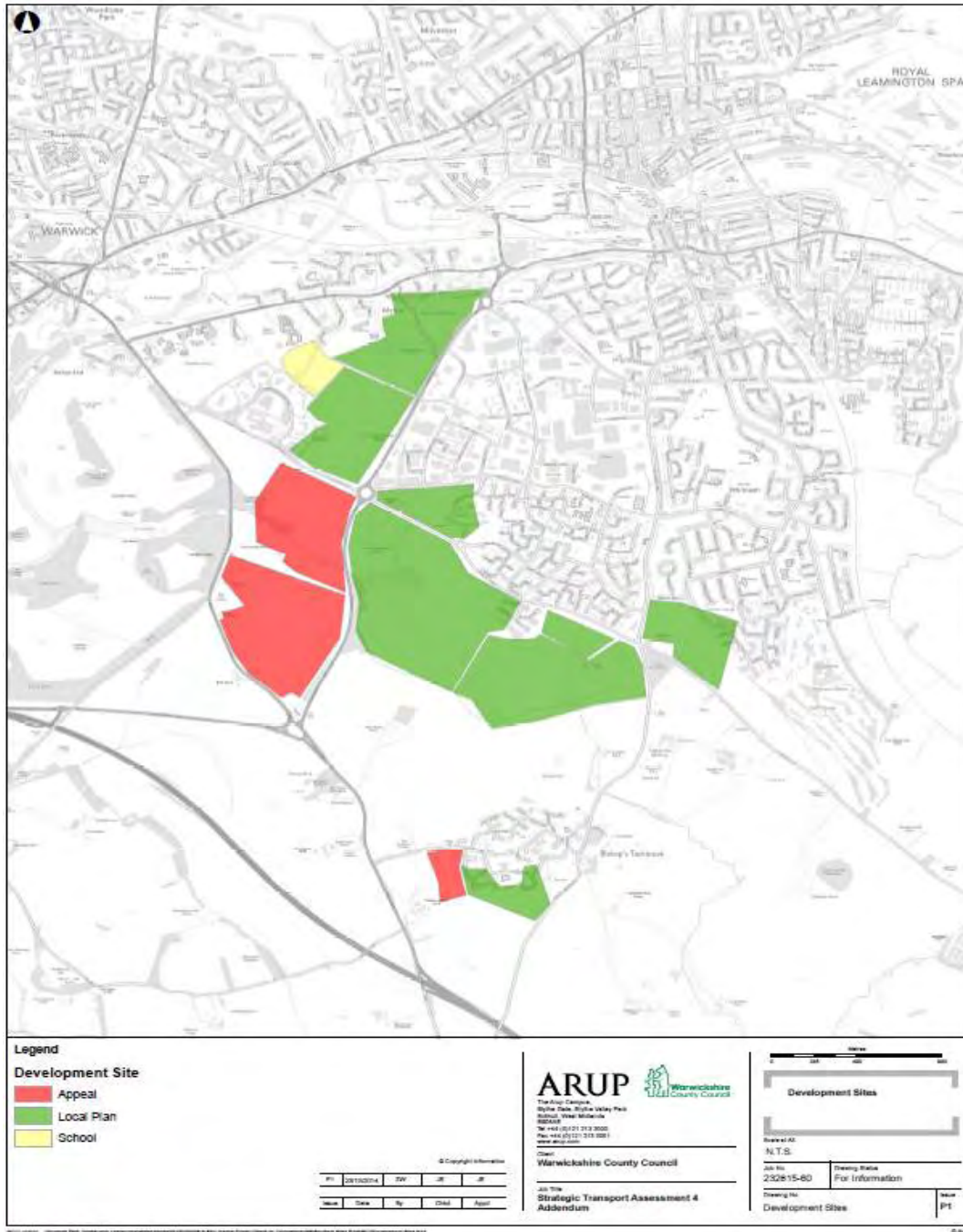
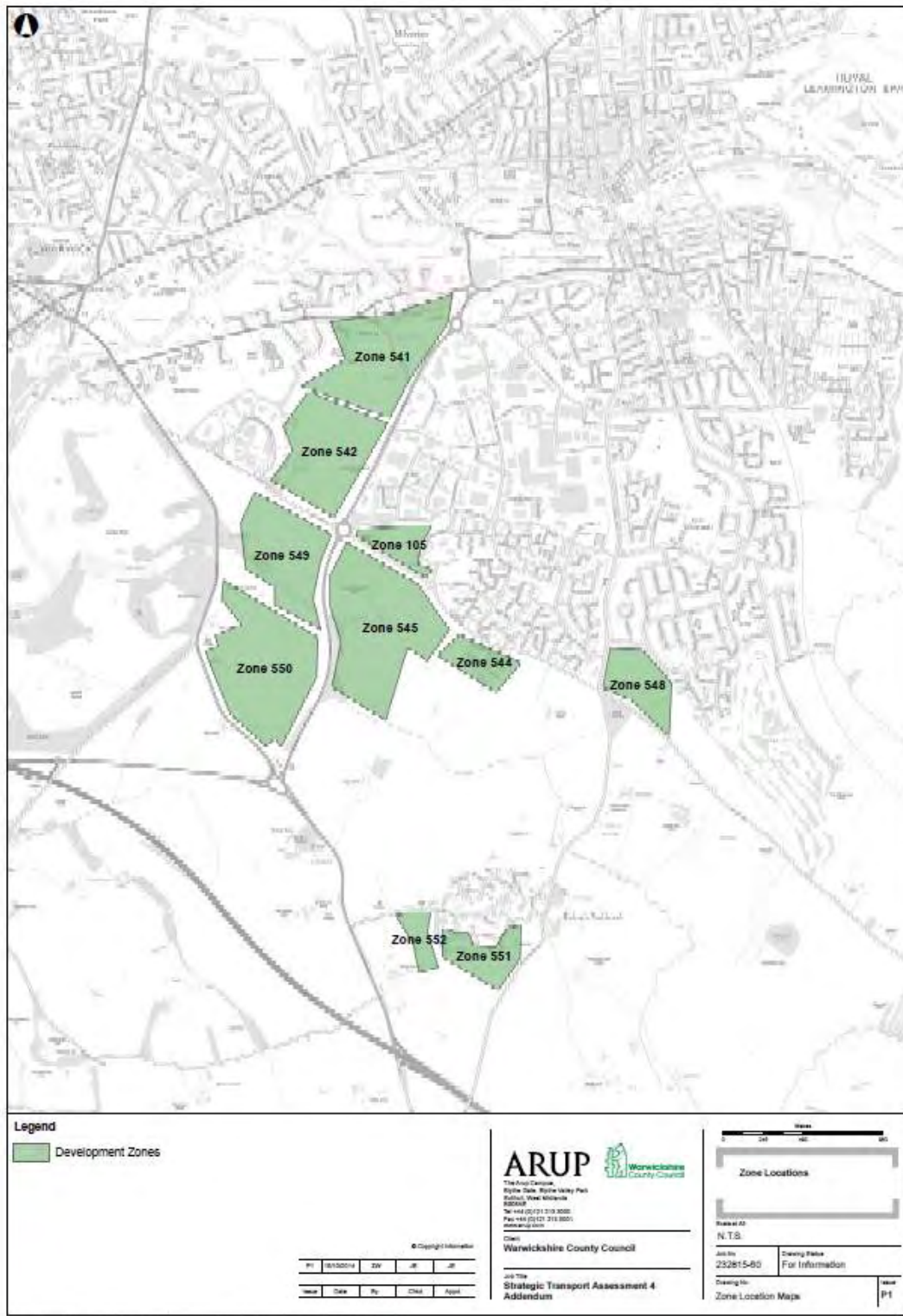


Figure 3- Development Zone locations



2.4.2 Site 1 –Land North of Gallows Hill

Site 1 relates to the Land North of Gallows Hill development. The site consists of the development of 425 residential dwellings, along with a number of smaller

ancillary land uses. For the purposes of this assessment the development is located at Zone 542 in the Paramics model.

The primary access for the site is proposed in the form of a new signal control junction with Gallows Hill. A secondary access point is also proposed, in the form of a left in/left out junction onto the A452 (Europa Way). The proposed internal road layout of the site comprises of a central spine road, which links the primary access at Gallows Hill to the adjacent 'Land at Myton' development to the north and also to the left in/left out junction with Europa Way. There are a number of smaller roads leading off the main spine road. The spine road will be designed to a 30mph speed limit. The source of site access information for this development has been derived from the Transport Assessment developed for this site, produced by Amec in April 2014. Figure 4 depicts the site access strategy incorporated into the model.

Figure 4 - Land North of Gallows Hill - Modelled Site Access Strategy



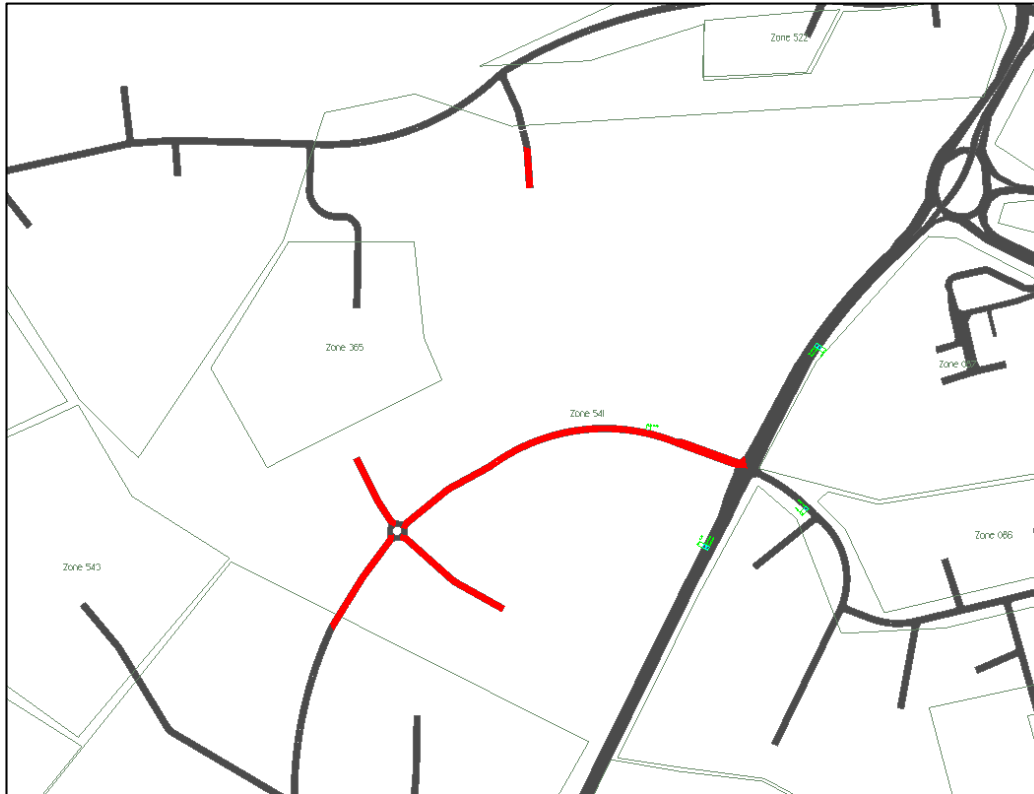
2.4.3 Site 2 – Land at Myton

Site 2 relates to the Land at Myton development. The site consists of the development of 735 residential dwellings, along with a number of smaller ancillary land uses. For the purposes of this assessment the development is located at Zone 541 in the Paramics model

The primary access into the site is proposed on the A425 (Europa Way), via a new signal controlled cross-roads junction, formed with the existing Olympus Avenue.

A secondary access is also proposed, providing access into the north of the site, off Myton Road, via Saumur Way. A central spine road is proposed through the site, which will be of 30mph speed limit. The proposed design of the spine road is such that it would accommodate buses, and link with the Gallows Hill development to the south of this site. Smaller secondary roads are also proposed within the site, which will lead off this central spine road. The source of the site access strategy information has been derived from Transport Assessment created for the site, produced by Amec in July 2014. Figure 5 below depicts the site access strategy incorporated into the model.

Figure 5 - Land at Myton - Modelled Site Access Strategy

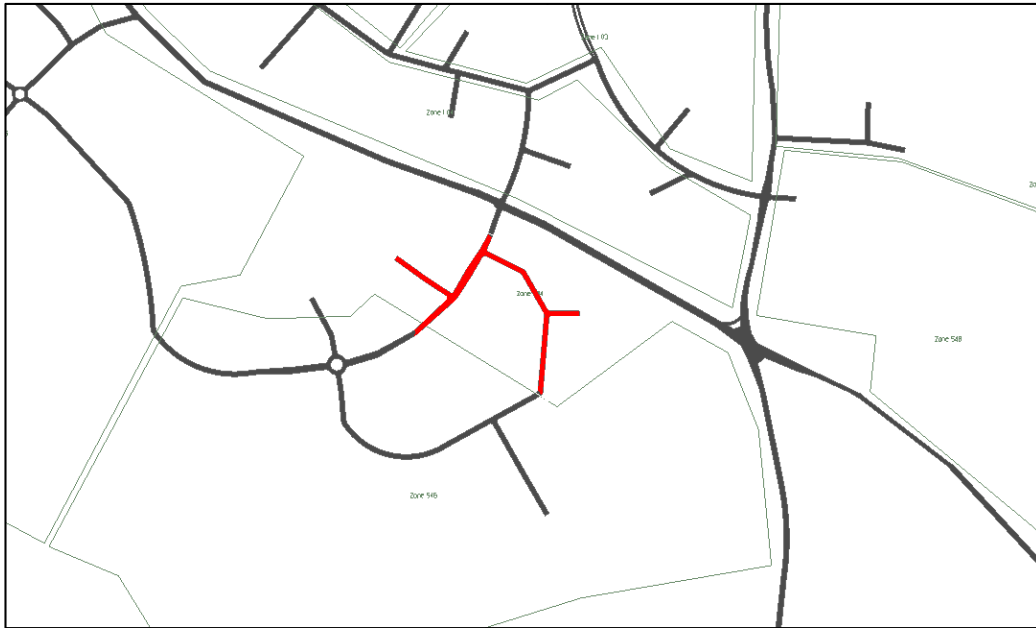


the model. x00/AXZ

2.4.4 Site 3 – Harbury Gardens

Site 3 relates to the Land South of Harbury Lane, “Harbury Gardens” development. The proposed site consists of the development of 200 residential dwellings, along with a number of smaller ancillary land uses. For the purposes of this assessment the development is located at Zone 544 in the Paramics model. The proposed primary site access is formed from a new junction with Harbury Lane, incorporating Cicero Approach. The access junction will be a signalised crossroads. The internal site layout has been designed to encourage low vehicle speeds and incorporate shared surface areas. The layout comprises of a network of streets with frontage access to properties. The source of the site access strategy information has been derived from the Transport Assessment produced by I-Transport in January 2013. Figure 6 depicts the site access strategy incorporated into the model.

Figure 6 - Harbury Gardens - Site Access Strategy

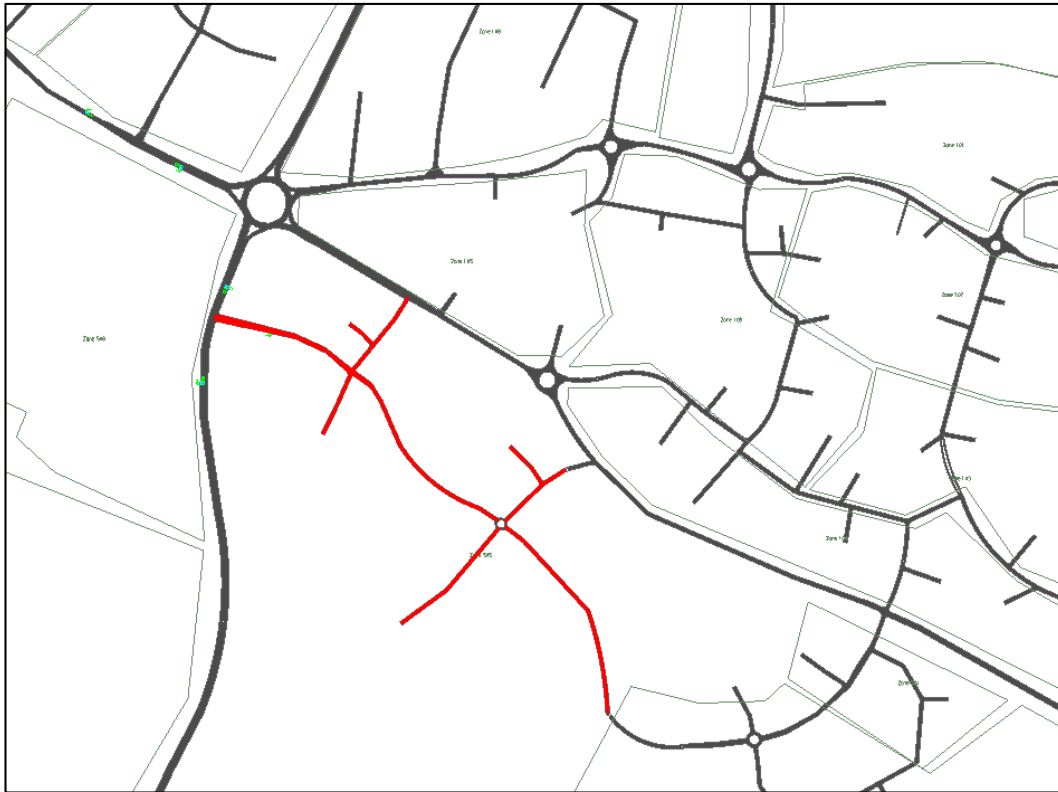


2.4.5 Site 4 - Lower Heathcote Farm

Site 4 relates to the Lower Heathcote Farm development. The proposed site consists of the development of 785 residential dwellings, along with a number of smaller ancillary land uses. For the purposes of this assessment the development is located at Zone 545 in the Paramics model

The proposed primary site access will be in the form of a signal controlled junction onto Europa Way. Two further site accesses are proposed, in the form of priority controlled access junctions on Harbury Road. One of these proposed junctions is located between the A452 roundabout and the Harbury Lane/Earls River Avenue roundabout, and the second located east of the Harbury Lane/Earls River Avenue roundabout. The proposed site access points are designed to be linked within the site boundary by a spine road, which will facilitate the movement of vehicles through the site, potentially providing an alternative route for existing traffic between Europa Way and Harbury Lane. The spine road will be designed for 30mph speed limits. The source of the site access strategy information has been derived from the Transport Assessment produced by WSP in April 2014. Figure 7 depicts the site access strategy incorporated into the model.

Figure 7 - Lower Heathcote Farm - Site Access Strategy



2.4.6 Site 5 – Land North of Harbury Lane

Site 5 relates to the Land North of Harbury Lane development. The proposed site consists of the development of 220 residential dwellings with associated public open space and landscaping. For the purposes of this assessment, the development has been included at Zone 105 in the Paramics model.

The proposed access strategy consists of two access junctions. The first access point will be in the form of a priority junction with Harbury Lane, and the second in the form of a priority junction with Heathcote Lane. The release of vehicles onto the network has been controlled by the use of car parks. There is no information available for the internal road layout of the site. The site access information has been derived from Design and Access Statement produced by Barratt Homes in March 2014. Figure 8 depicts the site access strategy incorporated into the model.

2.4.7 Site 6 – Woodside Farm

Site 6 relates to the Woodside Farm development. The proposed site consists of the development of 280 residential dwellings with associated public open space, landscaping and associated ancillary development. For the purposes of this assessment, the development has been included at Zone 548 in the Paramics model.

The proposed access strategy consists of a new junction into the site off Tachbrook Road. The junction form proposed is that of a signal controlled

junction. A secondary emergency access onto Harbury Lane is also proposed. The site access information has been derived from the Transport Assessment produced by TPC in June 2013. Figure 9 depicts the site access strategy incorporated into the model.

Figure 8 - Land North of Harbury Lane - Site Access Strategy

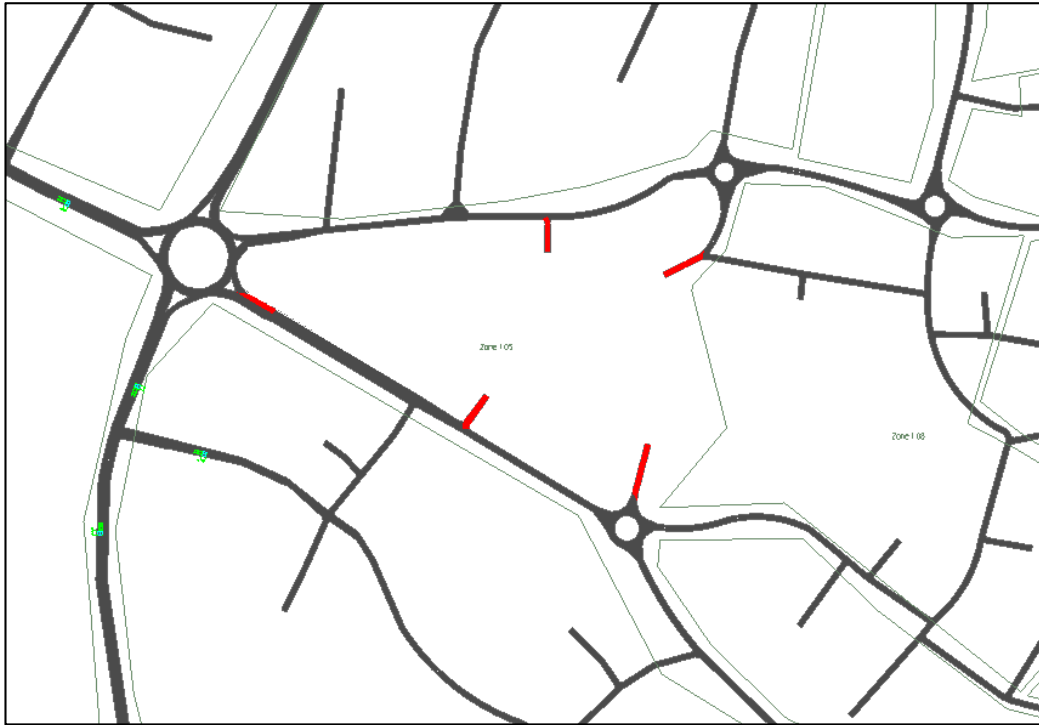


Figure 9 - Woodside Farm - Site Access Strategy



2.4.8 Site 7 – Land South of Gallows Hill

Site 7 relates to the Land South of Gallows Hill development. The proposed site consists of the development of 450 residential dwellings with associated public open space, landscaping and associated ancillary development. For the purposes of this assessment, the development has been included at Zone 549 in the Paramics model.

The proposed access strategy consists of two access points into the development. The first access is proposed in the form of a signalised T-Junction between the Warwick Technology Park and the A452 roundabout, on Gallows Hill. The second access is proposed on Europa Way which will take the form of a signalised cross roads between this site and site 4 at Lower Heathcote Farm. The site accesses will be linked via a spine road, from which individual development parcels will be accessed. The spine road will facilitate movement of vehicles through the site, potentially providing an alternative route for existing traffic between Europa Way and Gallows Hill. The road will be designed for a 30mph speed limit. The site access information has been derived from Transport Assessment produced by WSP in June 2014. Figure 10 below depicts the site access strategy incorporated into the model.

Figure 10 - Land South of Gallows Hill - Site Access Strategy



2.4.9 Site 8 – The Asps

Site 8 relates to The Asps development. The proposed site consists of the development of 900 residential dwellings with associated ancillary developments, including a park and ride facility with up to 500 spaces. For the purposes of this assessment, the development has been included at Zone 550 in the Paramics model.

The proposed access strategy consists of two access points into the development. The primary site access would be via a signalised junction onto the A452 Europa Way. A secondary access would be provided in the form of a priority junction onto Banbury Road. A route through the site will be provided from the Europa Way access to the Banbury Road access. The site access information has been derived from Transport Assessment produced by Peter Brett Associates in April 2014. Figure 11 depicts the site access strategy incorporated into the model.

Figure 11 - The Asps - Site Access Strategy

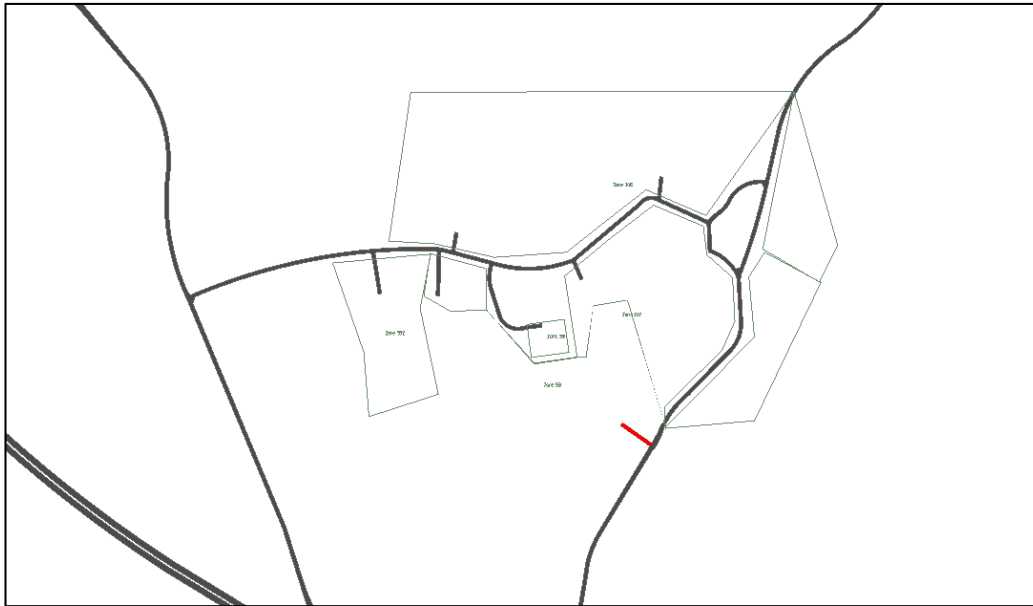


2.4.10 Site 9 – Land West of Oakley Wood Road

Site 9 relates to the Land West of Oakley Wood Road development. The proposed site consists of the development of 150 residential dwellings. For the purposes of this assessment, the development has been included at Zone 551 in the Paramics model.

The proposed access strategy consists of one access point into the development. This site access would be via a ghost island priority junction from Oakley Wood Road. The site layout will include a drop off and pick up point for buses and cars at the existing school. This will allow school traffic to remain on Oakley Wood Road, rather than travel to the school via Church Hill, which will reduce trips within Bishops Tachbrook. The site access information has been derived from Transport Assessment produced by Brookbanks in April 2014. Figure 12 depicts the site access strategy incorporated into the model.

Figure 12 - Land West of Oakley Wood Road - Site Access Strategy

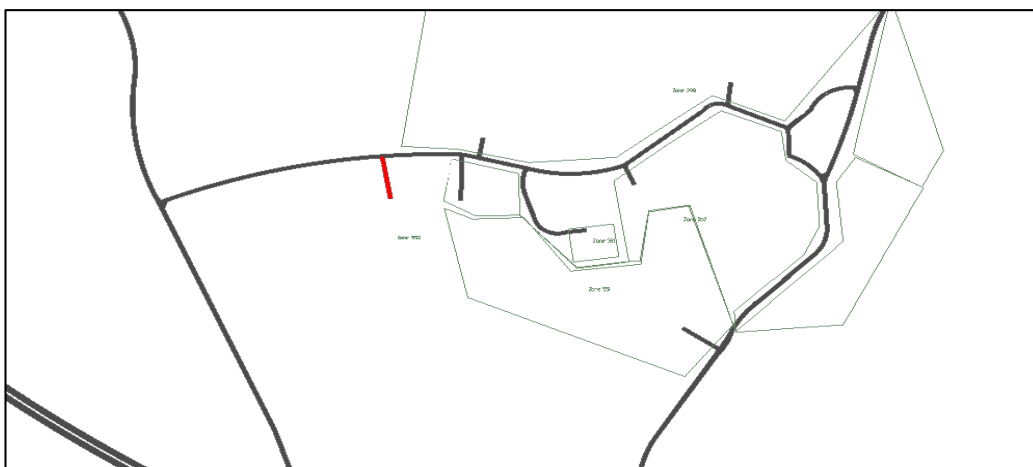


2.4.11 Site 10 – Zone 552 - Land South of Mallyory Road

Site 10 relates to the Land South of Mallyory Road development. The proposed site consists of the development of 125 residential dwellings. For the purposes of this assessment, the development has been included at Zone 552 in the Paramics model.

The proposed access strategy consists of one access point into the development. This site will be accessed off Mallyory Road via a priority junction. As part of the site access proposals it was agreed that speed limits would be reduced to 40mph on Mallyory Road. The site access information has been derived from the Transport Assessment produced by Peter Brett Associates in November 2013. Figure 13 depicts the site access strategy incorporated into the model.

Figure 13 - Land South of Mallyory Road - Site Access Strategy



2.5 WLWA 2028 Reference Case

WCC have already developed a forecast PARAMICS model for the Warwick and Leamington area which was considered to be reflective of likely 2028 conditions. This model was adopted during the previous Phase 4 STA work and it was not considered necessary to amend this model for the purposes of this assessment, despite the core strategy horizon year of 2029.

Since the assumption is that all additional growth that is likely to be delivered within the area between 2011 and the end of the plan period, which currently stands at 2029, is associated with the Core Strategy sites, then it was not considered necessary to make any further amendments to the Reference model demands at this stage. Full details on the assumptions contained within the 2028 Reference Case are available within the accompanying model forecast report³.

2.5.1 Core Strategy Plan Period – 2028 to 2029 Comparisons

WDC advised that the testing should consider the implications of the plan period extending beyond 2028 and into 2029. Currently, the majority of forecast models and redistribution calculations have been based on growth factors which have been derived from the TEMPRO database.

The National Trip End Model (NTEM) forecasts and the TEMPro (Trip End Model Presentation Program) software are used for transport planning purposes in projecting future transport growth. The forecasts include population, employment, households by car ownership, trip ends and simple traffic growth factors based on data from the National Transport Model (NTM).

The Warwick District TEMPRO factor for the 2011 to 2028 period is 10.2 % whilst the factor for the 2011 to 2029 period is 10.6%. This indicates that the TEMPRO predictions vary by less than 0.5% across the period. Therefore it was not considered necessary to reforecast the existing 2028 Reference Case to 2029 levels at this stage. Furthermore, by retaining the original 2028 forecast levels then, if necessary, comparisons between the results presented within the 2028 Phase 4 Strategic Transport Assessment and the subsequent addendum studies can be drawn. Re-forecasting the demands, at this stage, would invalidate such comparisons.

2.6 Local Plan Demand Forecasting

The following outlines the trip forecasting process associated with the Local Plan sites for inclusion within the modelling. The methodology described in the following sections relates to the development of demands to be assigned to the model in order that the sites identified through the Local Plan, to be located within southwest Warwick. The inclusion of the non-allocated sites and the associated demand and forecast levels has been documented within the next section of this Report.

The 2028 WLWA 2028 model inclusive of the demands associated with the southern sites as outlined within the following section is referred to as the:

- WLWA 2028 Southern Sites Do Nothing – Demands without mitigation

³ MID2535 LMVR Final 001 120710, JMP Consultants, July 2010

- WLWA 2028 Southern Sites Do Something – Demands and mitigation
- WLWA 2028 Southern Sites Do Something with Myton Link – As previous but with the link between Europa Way and Gallows Hill included within the model.

2.6.1 Residential Trip Generation

Trip generation for each of the sites have been derived for the peak hours based on strategic residential trip rates provided by Warwickshire County Council and factored to encompass shoulder hours as per the methodology applied during the first phase of the PARAMICS STA modelling. This is based on the application of WCC's standard residential trip rates. The WCC standard, peak hour residential trip rate, per dwelling, is summarised within the following Table 3:

Table 3 - WCC Standard Residential Trip Rate (per dwelling)

	In	Out	Total
0800 to 0900	0.12	0.48	0.6
1700 to 1800	0.48	0.12	0.6

These trip rates have then been factored to provide trip generation values for the shoulder hours of both AM and PM model periods. The methodology adopted is in line with that which was adopted previously. The following Table 4 provides the factors used to extrapolate peak hour trip rates to encompass the entire AM (07:00 to 10:00) and PM (16:00 to 19:00) time periods:

Table 4 - Residential Trip Profiling Factors

	0700 to 0800	0800 to 0900	0900 to 1000	1600 to 1700	1700 to 1800	1800 to 1900
In	65.10%	100.00%	101.90%	72.60%	100.00%	76.00%
Out	68.50%	100.00%	46.10%	96.40%	100.00%	97.90%
Average	66.80%	100.00%	74.00%	84.50%	100.00%	87.00%

The resultant, hourly trips rates, adopted to produce the development specific matrices are summarised within the following Table 5:

Table 5 - Residential Trip Rates

STA Trip Generation Rates	In	Out	Total
0700 to 0800	0.078	0.33	0.42
0800 to 0900	0.12	0.48	0.6
0900 to 1000	0.12	0.22	0.34
1600 to 1700	0.35	0.11	0.46
1700 to 1800	0.48	0.12	0.6
1800 to 1900	0.36	0.11	0.48

2.6.2 Employment Trip Generation

WDC/WCC have advised that employment is assumed to be delivered within one of the allocated sites as follows:

- 8Ha of Employment use (100% B1) has been assumed to be delivered within the land north of Gallows Hill (W/14/0967)

The above figures are gross floor area GFA which were converted into net coverage by the application of a 40% coverage factor. This is in line with previous stages of the STA. The historic STA employment trip rates, by classification, are presented within the following Table 6:

Table 6 - Employment Trip Rates

STA Trip Generation Rates	In	Out	Total
0700 to 0800	0.29	0.06	0.35
0800 to 0900	0.52	0.10	0.62
0900 to 1000	0.30	0.08	0.39
1600 to 1700	0.09	0.39	0.47
1700 to 1800	0.07	0.44	0.52
1800 to 1900	0.04	0.16	0.19

2.6.3 Trip Distribution

The distribution for both residential and employment elements was also updated during this phase of work to account for the latest 2011 census data. An overview of the assumptions behind the distribution is provided within **Appendix D**.

2.6.4 Trip Discounting

In line with the earlier assessments, adjustments have been made to trip generation to account for internalisation and mode shift.

A modal shift allowance was made for all sites of 15% whilst sites which contained an element of Residential and Employment were subject to a further 7.5% reduction to allow for internalisation.

The resultant trip generation levels, post application of the internalisation and modal shift factors were assigned to each of the developments as outlined within Table 7 on the following page.

Table 7 - Net Trip Generation

Site Name	Adj.		AM		PM	
	Int.	MS	Arrs	Dep	Arrs	Dep
Land North of Gallows Hill	✓	✓	367	221	206	319
Land West of Europa Way	✗	✓	75	300	300	75
Land South of Harbury Lane, Harbury Gardens	✗	✓	20	82	82	20
Land South of Harbury Lane, Lower Heathcote Farm	✗	✓	80	320	320	80
Land north of Harbury Lane (Warwick Gates)	✗	✓	75	300	300	75
Woodside Farm	✗	✓	22	90	90	22
Woodside Farm	✗	✓	29	114	114	29
Bishops Tachbrook Land north of Oakley Road (south of school)	✗	✓	15	61	61	15

Initially this resulted in the following hourly, allocated demand levels, being identified for assignment within the WLWA model network:

Table 8 - Allocated Demand Levels

Model	0700 to 0800	0800 to 0900	0900 to 1000	1600 to 1700	1700 to 1800	1800 to 1900
WLWA	1406	2133	1240	1648	2072	1529

2.6.5 WLWA Core Strategy Demand Forecasting

Following the completion of the demand forecasting a further step was undertaken whereby all of the remaining general internal growth that had previously been assigned within the Reference Case network was removed, the purpose of this is to ensure that the internal growth assigned within the model network relates specifically to the CS sites which is consistent with the assumptions that underpin the WLWA forecasting process.

The growth between the 2028 Reference Case and 2028 WLWA Do Nothing scenario is summarised within the following Table 9:

Table 9 – Demand Growth

	0700 to 0800	0800 to 0900	0900 to 1000	1600 to 1700	1700 to 1800	1800 to 1900
2009 Base	34012	47723	32180	42024	46047	34083
Periodic	113915			122155		
2028 Ref Case	41050	49349	36850	46723	48878	41066
Periodic	127250			136667		
2028 Southern Sites No Peak Spread	42524	50282	37854	48751	49709	43276
Periodic	130660			141736		
Net Growth	14.70%			16.03%		

The sites that have been included within the initial assessment comprise over 3,500 houses which is significantly lower than the 12,500 proposed through the overarching Local Plan. As a result capping and redistribution assumptions were not considered appropriate as it would reduce the overall demand levels assigned within the model to a level which would not be proportionate to the 2028 horizon year. These principles are only considered appropriate when growth within the model is likely to exceed the predicted forecasts attributed to the delivery of 12,500 dwellings.

In order that the development impacts could be assessed in a manner consistent to the other stages of the Strategic Transport Assessment it was decided that the assumption pertaining to the application of peak spreading would be retained in order that the results extracted from this phase of testing could, if necessary, be compared back to the original Phase 4 STA model outputs.

2.6.6 Peak Spreading

Once the revised demand totals had been derived for the southern sites, peak spreading assumptions were applied. Since peak spreading assumptions had already been applied to the 2028 Reference Demands⁴ then the application of further peak spreading assumptions has been applied only to the growth that could be considered as occurring in addition to the original 2028 Reference Case.

A comprehensive overview of the assumptions pertaining to peak spreading is provided within previous STA reports. The peak spreading has been applied to 50% of the growth that has occurred between the Reference and Local plan scenarios. The peak spreading proportions have been derived directly from annual cordon count data and the forecast growth that has been subject to peak spreading has been assigned across the model hours using the following AM and PM proportions:

Table 10 – AM Peak Spreading Proportions

0700 to 0800	0800 to 0900	0900 to 1000
68%	6%	26%

Table 11 – Revised PM Peak Spreading Proportions

1600 to 1700	1700 to 1800	1800 to 1900
24%	43%	33%

An overview of changes resulting from the application of the peak spreading procedure to is illustrated within the following Table 12.

⁴ Warwick District Council Strategic Transport Assessment Modelling, - PARAMICS Testing and Results, JMP Consultants, 17 April 2012

Table 12- Peak Spreading Overview

	0700 to 0800	0800 to 0900	0900 to 1000	1600 to 1700	1700 to 1800	1800 to 1900
2028 Reference Demands	41050	49349	36850	46723	48878	41066
2028 Southern Sites Demands	41610	51482	37637	48330	50936	42512
Periodic Growth	3479			5112		
50% Peak Spread Total	1740			2556		
Peak Spreading Proportions	68%	6%	26%	24%	43%	33%
LDF Adjustments	592	52	226	307	549	422
Background Adjustments	629	-870	241	538	-1278	740
Assigned Hourly Demands	42524	50282	37854	48751	49709	43276
Difference	914	-1201	217	421	-1227	764

2.6.7 Education Trip Generation

In addition to the assignment of the demands associated with the new houses and the employment site, it was also identified that trips associated with the location of new education facilities should also be accounted for within the assessment.

WDC advised that the new education facilities will involve an extension to the existing Myton School site and, in total, the education facilities will comprise a two form entry primary school (420 pupils) and a 2400 pupil secondary school. The location of the school with reference to the other development sites is shown in Figure 2.

In order that the demand adjustments could be kept as simple as possible it was decided that the adjustments would be constrained to the AM peak hour as this is the period when education trips are most prevalent.

Trip generation values for the school were calculated based on analysis of the School Travel Survey (STS information collected by WCC Education services which details the number of pupils on roll at each school as well as the method of travel.

The STS data was assessed and Coton End Primary school was selected as a suitable proxy for the primary school pupils whilst existing figures for Myton School were considered sufficient for the secondary school element.

The pupil base car trip rates for primary and secondary school trips were identified as 22.72 and 21.38 respectively. This means that just over 20% of pupils will create a car based trip.

Application of these trip rates against the predicted pupil numbers results in a predicted 96 and 513 car based trips occurring as a result of the primary and secondary schools respectively.

An adjustment was required to account for the trips that already exist in the model and have been associated to the existing zone which represents Myton School (Zone 356).

In total the education facilities will generate 619 car based trips which, when adjusted to account for the existing education demand already assigned within the model network, means an additional 239 car based trips to be associated with the secondary school as well as the 96 trips to be associated with the new primary school.

Since these trips will not necessarily all be created within the peak hour the arrival and departures associated with the existing Myton School zone were assessed to apportion the new arrivals and departures across the 3 model hours with the trips associated with the 0800 to 0900 assigned to the model as a result.

The 3 hour arrival and departure profiles adopted within the modelling, based on TRICS, are outlined as follows:

Table 13 - Education Trip Profiling

	Trip Gen		Trip Profile	
	IN	OUT	IN	OUT
0700 to 0800	37	11	12%	4%
0800 to 0900	235	225	77%	82%
0900 to 1000	33	38	11%	14%
Total	305	274	100%	100%

The resultant AM peak hour trip generation figures were defined as follows:

Table 14 - Education Trip Generation

	Arr.	Dep.	Total
Total	258	235	493

The assignment of the education based trips within the model network was then undertaken on the following basis:

- All trips to the primary school were assumed to originate from the new housing sites. When leaving the schools the trips were then assigned a departure distribution based on the origin zone.
- Analysis of data from the Warwickshire observatory regarding number of households in Warwick District, compared to the numbers of pupils on roll, revealed that on average, there are 0.14 secondary school pupils created per household in Warwick district. Based on the 3380 houses within the immediate area this produced 114 new trips from the new developments.
- The remaining 125 trips required to be assigned to the school were created through an uplift of the trips associated with the existing Myton School Zone as both incoming and onward journeys in a manner consistent with the derivation of education based trips within the Base model.

2.6.8 WLWA RDA Demand Summary

The resultant Hourly demands assigned within the two key modelling scenarios are summarised within the following Table 15:

Table 15 - Scenario Demand Summary

	0700 to 0800	0800 to 0900	0900 to 1000	1600 to 1700	1700 to 1800	1800 to 1900
M001 WLWA 2028 Reference Case	41050	49349	36850	46723	48878	41066
M002 WLWA 2028 Plus Southern Sites	42525	50450	37864	48759	49714	43282

2.7 Appeal Sites Demand Forecasting

The following sections outline the trip forecasting process associated with the Local Plan sites for inclusion within the modelling. The current planning applications that are included as part of the appeals sites are:

- South of Gallows Hill (part) W/14/0681
- The Asps (Barwoods) W/14/0300
- Land South of Mallory Road

2.7.1 Trip generation

The trip generation rates for the appeals sites is consistent with the methodology set out in Sections 2.6.1 and 2.6.2 of this report.

2.7.2 Trip Discounting

In line with the earlier assessments, adjustments have been made to trip generation to account for internalisation and mode shift.

A modal shift allowance was made for both sites of 15%. Since neither contain employment there was no need for an internalisation adjustment.

The resultant trip generation levels are outlined within the following Table 16.

Table 16 - Net Trip Generation

Site Name	Site Ref	Adj.		AM		PM	
		Int.	MS	Arrs	Dep	Arrs	Dep
South of Gallows Hill (part)	W/14/0681	✘	✓	46	184	184	46
The Asps (Barwoods)	W/14/0300	✘	✓	92	367	367	92
Land South of Mallory Road				13	51	51	13

Initially this resulted in the following hourly, allocated demand levels, being identified for assignment within the WLWA + Appeals model network:

Table 17 - Allocated Demand Levels

Model	0700 to 0800	0800 to 0900	0900 to 1000	1600 to 1700	1700 to 1800	1800 to 1900
WLWA	1907	2871	1660	2219	2813	2125

2.7.3 Peak Spreading

As with the assignment of the southern sites in isolation, the cumulative (southern + appeal) demands have also been subject to peak spreading based on the principles outlined within previous STA reports and also the previous Section 2.6.6 of this Report.

A summary of the outcome following the application of the peak spreading principles is provided as follows:

Table 18- Peak Spreading Overview – Southern Sites & Appeals Sites

	0700 to 0800	0800 to 0900	0900 to 1000	1600 to 1700	1700 to 1800	1800 to 1900
2028 Reference Demands	41050	49349	36850	46723	48878	41066
2028 SF Demands	42110	52221	38057	48901	51677	43108
Growth from 2028 Ref	1060	2871	1207	2178	2799	2041
Periodic Growth	5139			7019		
50% Peak Spread Total	2569			3509		
Peak Spreading Proportions	68%	6%	26%	24%	43%	33%
LDF Adjustments	874	77	334	421	754	580
Background Adjustments	929	-1285	355	738	-1755	1016
Assigned Hourly Demands	43487	50444	38390	49497	49989	44155
Difference	1376	-1777	333	595	-1688	1047

2.8 M004 WLWA 2028 DS + Link Scheme – Europa Way Link Road

WDC have requested a sensitivity test be undertaken which assesses the effect on the network that may occur as a result of the connection of a link through the Europa Way Consortium land which links Europa Way and Myton Road. The principles of the new link are as follows:

The new link now effectively links Europa Way to Myton Road. The link is coded as 20 mph to reflect the residential nature of the road and proximity to the school.

It is intended that inclusions of the M004 scenario will also allow the investigation of the local implications of delivering the link including changes to localised vehicle flows which occur as a result of the new link.

Figure 14 – Link connecting Europa Way to Myton Road



3 Mitigation Overview

3.1 Introduction

During each of the preceding stages of the Strategic Transport Assessment, a series of network interventions have been derived and tested alongside the various housing and employment land allocation strategies.

The infrastructure requirements identified within the Phase 4 STA were reapplied onto the model network through an iterative process of identification of issues and constraints and implementation of mitigation whilst the model simulation was running. This approach enabled the identification of a number of core infrastructure requirements identified as necessary to accommodate the growth (specifically related to the development options as documented) on the network.

3.2 Outline Mitigation Schemes

The mitigation strategy was derived through the continuous assessment of the network performance post application of the scenario demands as identified within the previous section ref of this report.

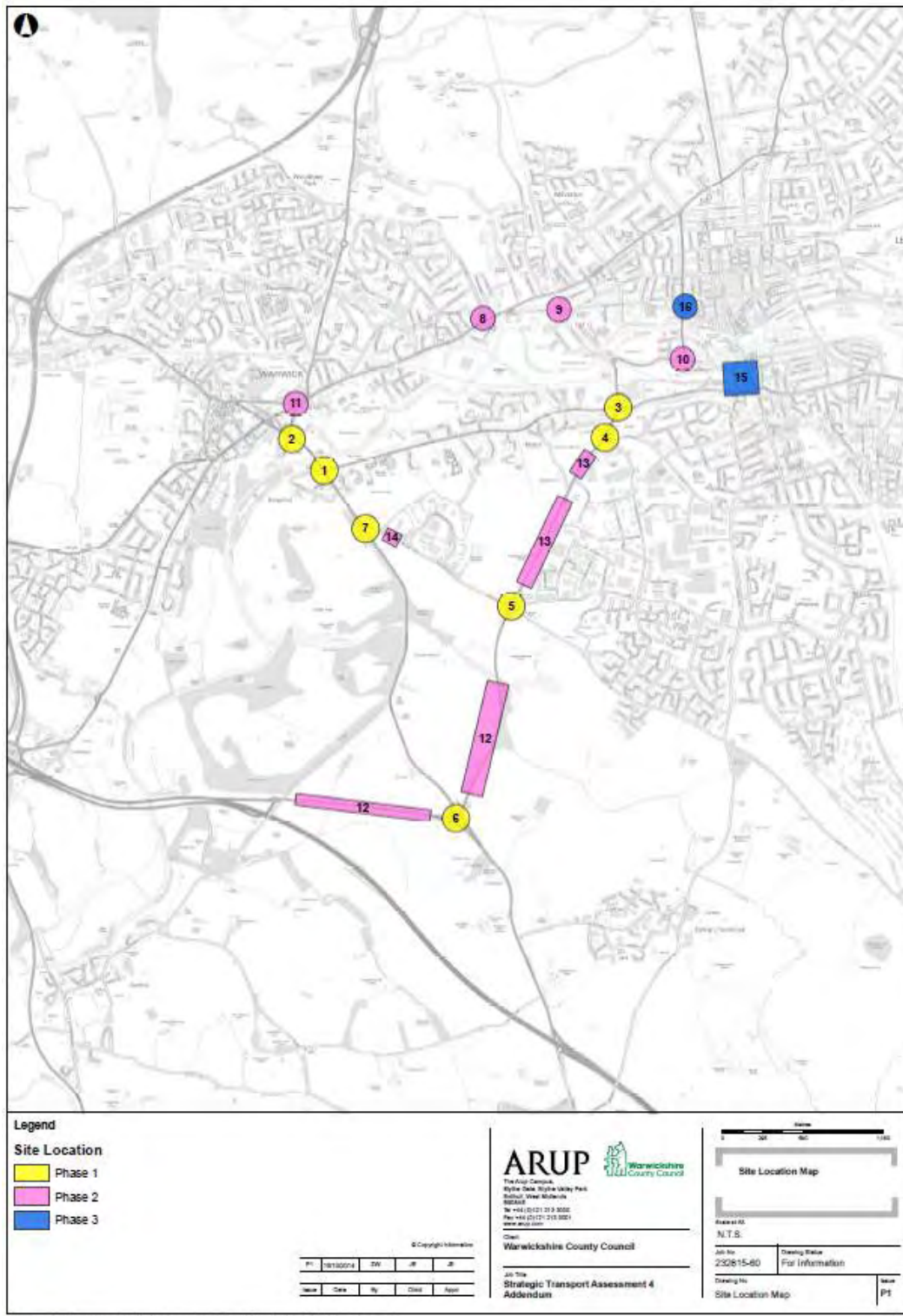
A phased approach to the application of mitigation schemes was undertaken in response to issues identified within the model network. The mitigation measures were essentially assigned within the model network in three tranches. Three key phases of mitigation were identified based on the following principles:

- The first phase of mitigation measures were identified as being critical to maintain any level of network operations. Even once these measures had been applied the network stability, within neither the AM or PM model periods, was unacceptable.
- Following the first phase, the implementation of the second phase of mitigation measures significantly improved the model stability within the AM period and also delivered some improved stability within the PM period. It should be noted, however, that the PM model performance was not considered to be acceptable.
- The final, third phase, of mitigation measures produced an acceptable level of stability across both AM and PM model periods, although it should be noted that, even after application of these schemes in full, residual impacts from the developments will still occur.

Whilst the addition of the schemes to the network was undertaken in a consequential manner, it was not possible to assess the benefit of including each scheme in isolation. This makes it difficult to determine the level of strategic importance attributed to each specific scheme identified through this process. It is reasonable to assume that all of the schemes identified in this phase of the assessment are critical since, without these schemes in place, the network is not observed to perform to an acceptable level. The order in which the schemes were identified also provides an indication of the likely phasing strategy that may be required.

In total, 16 schemes have been identified through this process and the location of the schemes identified thus far, alongside the phase of the assessment in which the schemes were identified, is summarised within the following Figure 15.

Figure 15 – Mitigation scheme locations



During the previous stages of the SEA also provided with the information identified

Table 19:

Table 19 – Mitigation Scheme Phasing Order

Scheme	Phase 1	Phase 2	Phase 3	Reference
Emscote Road/Greville Road		✓		8
Princes Drive/Warwick New Road		✓		9
Bath Street/High Street			✓	15
Adelaide Road/Avenue Road		✓		10
Dormer Place/Adelaide Road			✓	16
Myton Road Roundabout	✓			1
Priory Road/Smith Street/St Nicholas		✓		11
Castle Hill Gyratory Signals	✓			2
Europa Way/Myton Road Roundabout	✓			3
Shires Retail Park Roundabout	✓			4
Europa Way Roundabout	✓			5
Grey's Mallory Roundabout	✓			6
Europa Way Corridor – Part 1		✓		12
Europa Way Corridor – Part 2		✓		13
Tech Park Roundabout		✓		14
Banbury Road – 2 Lanes	✓			7

The proposed mitigation schemes have been documented extensively within previous phases of the STA work, therefore the following section of this report is intended only to summarise new assumptions or substantial refinements to those proposed schemes. Throughout the modelling exercise signals times have been refined and optimised, in some cases through the use of signal plans. It is expected that specific requirements to optimise signalised junctions will be identified during the detailed planning phase associated with one or more of the proposed site allocations. As such, the results observed when these mitigation measures are applied should be considered as a worst case, further improvements will undoubtedly be delivered during the detailed design stages.

Updated sketches for each of the schemes identified within the previous table have been provided, for each scheme, within **Appendix A** of this Report.

The grading system is specific to this round of detailed analysis and it should be acknowledged that if a scheme has been attributed Grade 2 status during this round of testing that does not preclude the need for the scheme to be delivered either to accommodate the current housing levels tested or the full local plan allocations it simply means that, when considering these developments in isolation, the schemes can be delivered at a later stage.

The initial scheme costs, associated with the above mitigation measures, are summarised within Table 20 on the following page. The costs identified within Table 20 equal £17.5 million. These costs relate only to the delivery of the hard infrastructure schemes identified through the assessment.

Table 20 - Outline Mitigation Schedule

Scheme	Cost
Emscote Road/Greville Road	£750,000
Princes Drive/Warwick New Road	£350,000
Bath Street/High Street	£500,000
Adelaide Road/Avenue Road	£350,000
Dormer Place/Adelaide Road	£300,000
Myton Road Roundabout	£450,000
Priory Road/Smith Street/St Nicholas	£300,000
Castle Hill Gyratory Signals	£650,000
Europa Way/Myton Road Roundabout	£1,600,000
Shires Retail Park Roundabout	£1,250,000
Europa Way Roundabout	£900,000
Grey's Mallory Roundabout	£500,000
Europa Way Corridor – Part 1	£5,550,000
Europa Way Corridor – Part 2	£2,950,000
Tech Park Roundabout	£600,000
Banbury Road – 2 Lanes	£500,000
Total	£17,500,000

3.3 Outstanding Mitigation Measures

The costs identified do not include any contributions towards either sustainable transport interventions nor do they include contributions towards the delivery of capacity enhancements along the M40.

Contributions towards the delivery of sustainable transport infrastructure and interventions could be secured on the basis of the fact that a £4 million cost was attributed to the delivery of the 12,800 houses, since up to 3000 dwellings will be delivered by developments of 10 or less houses, this means that the 3655 dwellings identified within the southern sites would likely require a contribution of 37.2% towards the £4 million identified which would equate to **£1.49 Million**.

Contributions towards capacity enhancements along the M40 may be required subject to the level of impact that is identified, on the HA network, however, the analysis of the impacts of the above sites does not indicate strategic level impacts to such an extent as the full reconfiguration of the M40 is required as has been included within some of the previous stages of the STA.

That does not preclude the strong likelihood that impacts will occur on the M40 since there are additional demand pressures being placed on the SRN by virtue of the magnitude and location of the 3655 dwellings to the south of Warwick.

Additional analysis is due to be undertaken by the Highways Agency to identify the level of contribution that may be considered appropriate to maintain an acceptable level of network operation along the M40 corridor and the form that such mitigation measures may take. Until such analysis is completed it is not

possible to make any further, more detailed estimates with regards the appropriate level of contribution to be secured for the delivery of capacity enhancements around the area of the M40.

However, at this stage, it is reasonable to assume that the developments and flows generated therefrom will undoubtedly increase the demand on the slip roads and merge points between M40 J15 and M40 J13 at least. These increase in flows may trigger the need for the type of merge/diverge that exists in those areas to be reconfigured in order that the risk of that area becoming over-capacity is minimised. Such measures may be required in advance of the delivery of larger scale M40 capacity enhancements and, furthermore, such measures may also be deliverable in a complementary manner to wider enhancements deliverable at a later stage of the plan period.

As such, and until further evidence is available from the work being undertaken by the Highways Agency, it is considered reasonable that a proportionate contribution towards the capacity enhancements should be secured for the purposes of ensuring that the merge/diverge sections of the M40 are not at risk of being over-capacity. Based on the same calculation as was applied to the application of the Sustainable Transport funding, this would result in a contribution of **£3.72 million** towards capacity enhancements on the M40 likely to take the form of upgrades to existing junctions and merge/diverge facilities.

3.4 Summary

Analysis of the interventions that have been identified reveals total scheme costs of £22.7 million which comprise:

- £17,500,000 capacity enhancements on local road network
- £1,480,000 Contribution towards sustainable transport provision
- £3,720,000 contribution to works on the M40

As it is not possible at present to identify the actual scale, cost and timing of capacity enhancements along the M40 corridor resulting from Local Plan proposals, Warwick District Council will continue to work with Warwickshire County Council, the Highways Agency and Stratford District Council to determine appropriate and timely capacity enhancements on the M40 and how such enhancements can be funded.

4 Results Analysis

4.1 Overview

The following sections of the report are intended to present the results obtained from the detailed testing undertaken with the WLWA models.

A tiered assessment has been adopted; results analysis is focussed on a strategic level assessment at this stage similar to that adopted during earlier stages of the assessment.

All of the measures used to inform the assessment are outlined as follows:

4.2 Model Stability

Due to the deterministic nature of assignment within PARAMICS it is possible for vehicles to continue to attempt to enter a network even when congestion has reached such an extent that the network is effectively 'grid-locked'. In some cases the grid-lock can occur due to problems that will require mitigation, in other cases it can be something as simple as vehicles entering a mini-roundabout from all three approaches at exactly the same time.

When a model becomes grid-locked vehicles still continue to be assigned to the network and so delay begins to increase exponentially. It should be acknowledged that these issues may be occurring due to a need for mitigation in one or more areas of the model but, if the models do not lock up every time it can be concluded that the problem is not severe enough to cause the network to cease to function. Furthermore, the fact that some model runs are completed without issue indicates that a mitigation strategy can only provide additional improvements and should be deliverable. If it is model error causing the issues then these results should also be discounted due to the fact that they cannot be considered realistic.

It should also be acknowledged that experience gained elsewhere in the application of PARAMICS micro simulation modelling, in projects of a similar size, has highlighted that the level of stability within the models frequently improves as development plans evolve and mitigation schemes are refined. This is also partly due to developments within the plan proceeding with applications prior to adoption, this allows the more localised impacts to be identified and mitigated through the developments detailed transport assessments. This level of detail cannot be achieved during a high level strategic assessment. All mitigation proposals will be subject to further detailed assessments, refinements and optimisation through the planning process and it is expected that improved network results and stability will be realised.

Twenty model runs were initially undertaken, where model stability has been particularly poor, the propensity for a model to lock up (and thus to be considered to have failed), is assessed to allow the reliability of the model network across the various scenarios to be better understood.

Additional runs were then collected to ensure that, where practicable, model outputs were based on a minimum of twelve runs per time period.

Based on an initial review of the model performance it was decided that an AM model run could be considered as having locked up whenever more than 8,500

vehicles are observed to remain on the model network at the end of the AM simulation period and 9,500 vehicles are observed to remain on the model network at the end of the PM simulation period. A greater level of latent demand is deemed acceptable during the PM than the AM due to the inherently higher level of variability contained within the PM scenario between each of the individual runs which is largely related to the higher demand levels within the WLWA model.

4.3 Number of Runs

Network statistics analysis has been based, consistently, on 10 runs per scenario due to the method of production, however, unless stated otherwise, all other statistics are based on a minimum of 10 runs and a maximum of 20 depending upon the number of successful runs collected.

4.4 Network Wide Statistics

A number of statistics used in the analysis have been obtained from analysing each individual trip that has occurred within the network. This information is collected within PARAMICS through the Trips-all file and contains information specific to each individual trip that has been completed within the model period. This information is then aggregated and processed to provide the following comparative statistics:

- **Average Distance (Km)** – The average distance travelled by a vehicle that completed their journey during the model simulation period.
- **Average Time (seconds)** – The average travel time of a completed trip during the model simulation period.
- **Average Speed (Km/h)** – The average speed travelled by all vehicles that completed a journey during the model simulation period.

These measurements are averages so can be used to compare between the various scenarios.

The use of these statistics is in line with the methodology adopted during the previous Strategic Transport Assessment work.

4.5 Queue Lengths

A second, more detailed, level of analysis has been undertaken in the form of queue length analysis. Queue length analysis is intended to accompany the mean speed analysis as it provides a more detailed picture of the impacts at specific junctions within the model network.

At this stage the analysis of queue lengths has been based on the average hourly maximum queue length. Results presented for each junction are based on the worst performing single approach. The hourly maximum for each individual model run has been calculated and then the average of all runs has been calculated for each hour. The maximum of these values, across all hours, is reported as the maximum periodic average maximum queue length. All queues are reported in numbers of vehicles.

The junctions for which average hourly maximum queue lengths have been calculated and compared are illustrated within Figure 14 on the following page. Junctions where queue differences have not been plotted on the maps simply represent junctions which did not trigger any of the assessment criteria across any one approach.

Queue difference plots have been produced for all model scenarios and have been presented within **Appendix B** of this report.

At this stage these results simply identify areas where further attention is required. A queue length increase of 50 vehicles does not necessarily mean that a scheme will not work, it may indicate that further optimisation of the layout or any signal times are required. Furthermore it may not account for improvements on other arms of the same junction which, when investigated further, may contain additional capacity which could be unlocked to reduce the queue length on the offending approach.

The classifications for the queue length analysis are outlined as follows:

- **Queue Reduction** (a reduction in queue lengths of greater than 5 vehicles)
- **Moderate Increase** (an increase in queue lengths of between 15 and 30 vehicles)
- **Severe Increase** (an increase in queue lengths of between 30 and 50 vehicles)
- **Very Severe Increase** (an increase in queue length of over 50 vehicles)

The locations of the junctions that have been included within the assessment are outlined within Figure 16 on the following page.

4.6 Journey Time Analysis

During the first phase of STA analysis some journey time routes were defined within the modelling and the time it takes vehicles to traverse these routes was collected and presented within the analysis. At that stage the purpose of analysis was simply to ascertain which routes experienced the lowest and greatest levels of delay across a number of different allocation options. Building upon that analysis, the purpose of the comparisons during this stage of work is to identify which areas of the network, when compared to the Reference Conditions, are likely to suffer the greatest changes in levels of delay when the allocated demand is assigned to the network.

In total 9 key routes were defined within the model network and these routes have been illustrated within Figure 17 on the following page.

In order that the impact on delay across various routes can be better understood the routes have been filtered by direction and have been split into sections. The purpose of this disaggregation is to ensure that a sufficient sample size is collected from the analysis as the number of vehicles travelling across the entire length of a number of the routes is likely to be substantially smaller than the number of vehicles travelling along each of the component parts of the route.

The average time it takes for vehicles to travel across each section of the route has been collected and aggregated for each scenario and then the level of deviation

from the Reference Case conditions has been summarised using the following classification bands:

- **Delay Reduction** - A reduction in overall delay levels of -15% or more
- **No Significant Change** - A difference in journey times of between -15% and +15% falls within this category
- **Moderate Increase** - An increase in journey times of more than 15% but less than 25%
- **Severe Increase** – An increase in journey times of more than 25% but less than 50%
- **Very Severe Increase** – An increase in journey times, when compared to the Reference Case, of more than 50%

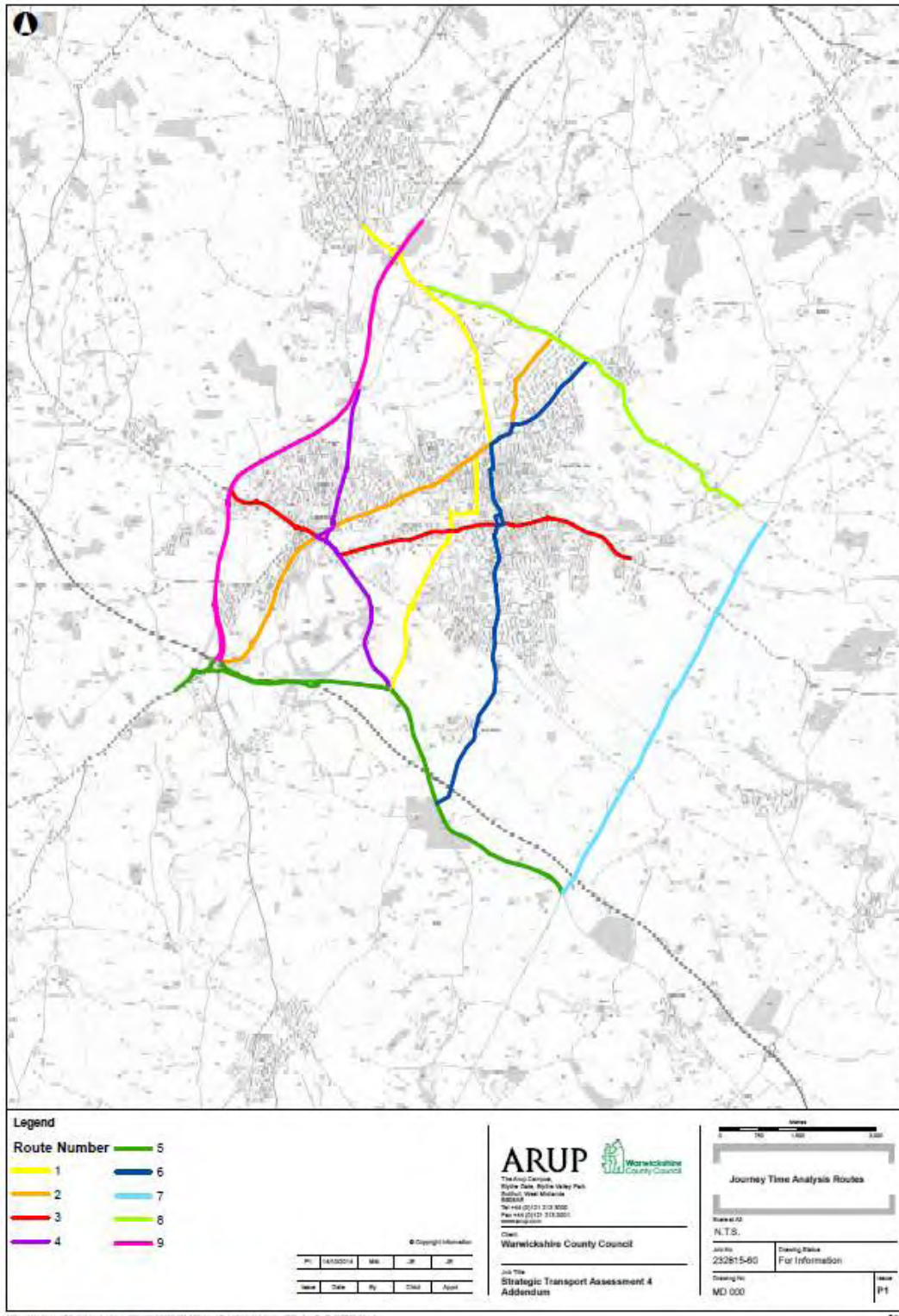
At this stage it was decided to classify journey time differences of between -15% and +15% as not significant. The intention is to highlight those areas which suffer the greatest impacts as these impacts are more pertinent to this stage of the assessment. The classifications adopted are in line with those that have been recommended by WCC and are such that they reflect the DMRB acceptability standards for comparisons between observed and modelled journey times. It should be noted that although the current methodology does not consider an increase in delay of less than 15%, on a single section of a route, as significant, during assessment of planning applications a lower threshold may be considered as it would be expected that the mitigation schemes are optimised

The benefit of undertaking delay analysis on key routes, compared to simply reviewing the network wide average journey time alongside the mean speed outputs, is that it begins to allow a more detailed picture of where the additional delays or journey time improvements are likely to occur.

Figure 16 – WLWA Queue Assessment, Junction Locations



Figure 17 – WLWA Journey Time Analysis Routes



5 Southern Sites Results Analysis

5.1 Overview

The following sections of the report are intended to present the results obtained from the detailed testing undertaken for the following three scenarios within the Warwick and Leamington Areas:

- M001 WLWA STA 4.5 2028 Reference Case
- M002 WLWA STA 4.5 2028 Southern Sites Do Nothing
- M003 WLWA STA 4.5 2028 Southern Sites Do Something

5.2 2028 STA Southern Sites - Results Analysis

The first stage of this assessment was to review the performance of the model network following the allocation of the revised demand levels and network optimisation.

5.3 Model Stability

An initial assessment of the level of model stability was undertaken by comparing the number of completed runs against the number of runs assumed to have failed, as outlined earlier within Section 4.2 of this report.

The apparent network stability exhibited within the AM and PM simulation runs across the three scenarios is illustrated within the following Table 21:

Table 21 - Model Stability Assessment 2028 Reference vs. 2028 SS Do Nothing vs. 2028 SS Do Something

	2028 Ref Case	2028 Do Nothing	2028 Do Something
AM	75%	80%	90%
PM	80%	70%	75%

From the previous table, it is evident that during the AM peak period, there is a notable improvement in the model stability when the mitigation measures are introduced (M003 Do Something) compared to both the Reference and Do Nothing scenarios. During the PM peak period, there is a 10% reduction in model stability for the Do nothing scenario compared to the Reference Case. Once the mitigation measures are introduced within the Do Something scenario however, the model stability improves slightly during this period.

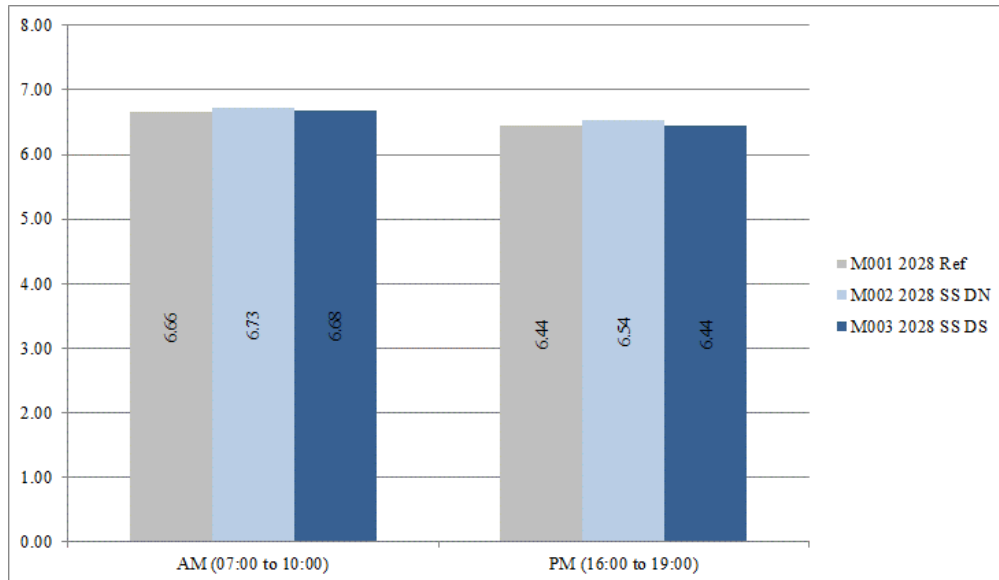
5.4 Network Wide Statistics

The following sets out the changes in network wide statistics between the 2028 Reference Case and the 2028 STA scenarios.

5.4.1 Average Journey Distance

Analysis of the average journey distance within each scenario, across the entire AM and PM model periods is presented within the following Figure 18.

Figure 18 - Average Journey Distance (2028 Reference vs. 2028 SS Do Nothing vs. 2028 SS Do Something), Km



Analysis of the previous figure indicates very little difference between the three scenarios. Since the demands between the Do Nothing and Do Something scenarios are consistent, the decrease in the distance travelled in the Do Something compared to the Do Nothing scenarios indicates a decreased propensity for vehicles to reassign along longer routes in response to congestion.

5.4.2 Average Journey Speed

Analysis of the average journey speed (km/h) within the three scenarios, across the entire AM and PM model periods, is presented within the Figure 19 on the following page.

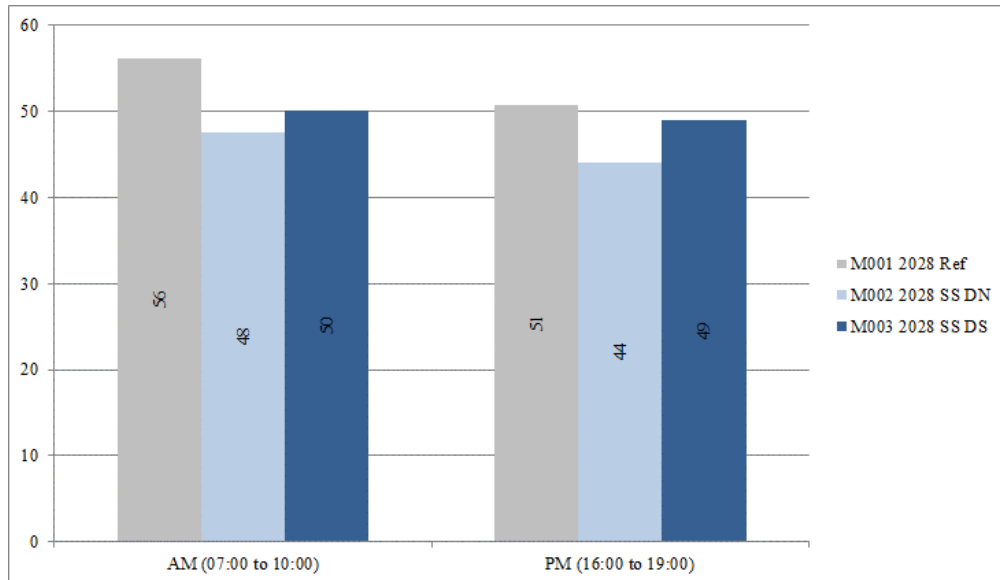
Figure 19 demonstrates that the allocation of the Southern Sites demands results in a drop in the average speed of vehicles, on the network, of approximately 15% and 14% in the AM and PM peak periods respectively when no mitigation measures are introduced (Do Nothing scenario). When the mitigation measures are introduced, compared to the reference scenario, the WLWA Do Something scenario results in a respective 10% and 4% drop in average speeds.

The drop in average speeds is likely to be indicative of the general effects of the assignment of the additional demand and the congestion effects thereof for the Do Nothing Scenario. The improvement in the average speeds for the Do Something scenario is a result of the mitigation measures being introduced. However, the average speeds for this scenario are still lower (particularly during the AM peak period) compared to the Reference Case.

It should be acknowledged that a small reduction in the average speeds is also likely to occur as a result of the concentration of development traffic in a specific area of the network that was previously unpopulated. The interaction between

development and background trips will naturally produce lower speeds in this area, as will the inclusion of new, signalised junctions in areas of the network that were previously free flowing, such as the Europa Way corridor between Gallows Hill and Shires Retail Park.

Figure 19 - Average Journey Speed (2028 Reference vs. 2028 SS Do Nothing vs. 2028 SS Do Something), Km/h



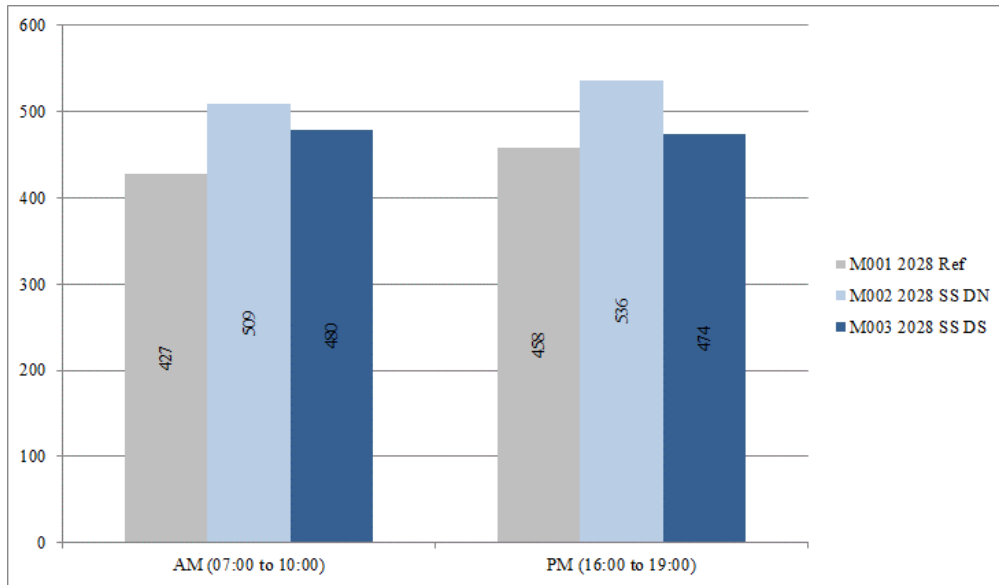
5.4.3 Average Journey Time (Seconds)

Analysis of the average journey time, in seconds, within each scenario, across the entire AM and PM model periods, is presented within Figure 20 on the following page.

Analysis of the difference in average journey times indicates an increase in the time it takes to complete a journey when compared to the 2028 Reference Case conditions of around 19% and 17% during the AM and PM periods respectively for the Do Nothing scenario.

When comparing the Reference Case to the WLWA Do Something scenario, the increase in 12% and 4% is expected during the AM and PM periods respectively. This indicates that the mitigation measures significantly mitigate the effects of the development and thus additional demands on the network. However the effects are not fully mitigated which can be seen by the increase in journey time compared to the Reference Case.

Figure 20 - Average Journey Time (2028 Reference vs. 2028 SS Do Nothing vs. 2028 SS Do Something), Seconds



5.5 Maximum Queue Length Analysis

The following sets out some initial observations based on the differences in queue lengths between the 2028 Reference Case and 2028 Southern Site scenarios.

The maps which are referred to within the following analysis are presented within **Appendix B** of this report.

5.5.1 AM Analysis (MQ001 and MQ003)

Analysis of the difference in queuing between the 2028 Reference and 2028 SS Do Nothing scenario, during the AM peak hour, reveals the following:

- There are two instances of severe increases in queue lengths. These impacts occur at the junction of A452/ Princes Drive and the junction of Westhill Road/ A445/ Kenilworth Road
- In the majority of instances the propensity for queues to increase beyond 30 vehicles is limited
- There are 6 instances where a queue length reduction is expected. Analysis of these locations indicates that the relative differences between the scenarios are not particularly high and, therefore, the reductions are unlikely to be significant.

Analysis of the difference in queuing between the 2028 Reference and 2028 SS Do Something scenario, during the AM peak hour, reveals the following:

- There is one instance of severe increases in queue lengths. These impacts occur at the junction of Westhill Road/ A445/ Kenilworth Road, most likely this is caused by the junctions being close to capacity and, therefore, the additional draw between the residential sites to the south and the Coventry and Warwickshire Gateway employment site to the north. The delivery of mitigation measures funded through the wider Local Plan commitments will likely mitigate these effects

- In the majority of instances the propensity for queues to increase beyond 30 vehicles is limited
- There are 12 instances where a queue length reduction is expected some of which represent significant reductions.

5.5.2 PM Analysis (MQ002 and MQ004)

Analysis of the difference in queuing between the 2028 Reference and 2028 SS Do Nothing scenario, during the PM peak hour, reveals the following:

- There are no severe increases experienced within the PM network which is an improvement in comparison to the AM
- The majority of junctions assessed that trigger the criteria experience a queue length increase of 15 to 30 vehicles
- There is one instance of a reduction in queuing which is triggered by a relatively small variation in queuing levels between the two scenarios.
- There are 6 instances where a queue length reduction is expected to occur.

Analysis of the difference in queuing between the 2028 Reference and 2028 SS Do Something scenario, during the PM peak hour, reveals the following:

- There are no severe increases experienced within the PM network which is an improvement in comparison to the AM.
- The majority of junctions assessed that trigger the criteria experience a level between a reduction in queuing levels and a maximum increase of 30 vehicles
- There is 1 instances where a queue increase greater than 30 is expected.

5.5.3 Queue Analysis Summary

A summary of the findings obtained through comparing the changes in queuing between the 2028 Reference Case and 2028 STA Scenarios is provided as follows:

- The 2028 WLWA Do Nothing junction performance is comparable to the 2028 Reference Case network but there are a number of severe and very severe increases in queue lengths that are recorded within the Do Nothing network when compared to the Reference Case
- The 2028 WLWA Do Something network impacts are similar in magnitude during both AM and PM periods and there are a number of instances where a queue length decrease is achieved
- When reviewing the performance of the 2028 WLWA Do Nothing and Do Something network performances it is apparent that the PM network performs better than the AM network for both scenarios
- The most severe impacts within the 2028 WLWA STA scenarios occur on routes outside of Warwick town, within the AM Do Nothing scenario the impacts appear concentrated to the north of the new sites which may indicate an increase in the number of vehicle movements travelling north/south across the network, within the PM these impacts are largely concentrated in the areas around the proposed sites
- The Do Something network performs better than the Do Nothing network in both periods when compared to the Reference Case network

- When the mitigation measures are introduced, there is a noticeable increase in number of junctions where a reduction in queue length is expected (6 to 12 during the AM peak period and 1 to 16 during the PM peak period)

The introduction of mitigation measures results in an overall improvement in queue conditions across the model extent. It is notable, however, that there are residual problems identified to the north of the model that are not mitigated within the two development scenarios. Further attention may be required in these areas in order that the impacts can be fully mitigated. It should also be noted that the areas to the north that experience severe and very severe increases in queue lengths are areas where additional mitigation measures have been proposed either through the earlier Phase 4 STA work or, in the case of Thickthorn and the junctions along the A452, funding may be delivered through long term regional Strategic Economic Plan infrastructure. Therefore it is likely that most of these impacts will be mitigated when the full Local Plan Infrastructure package is delivered alongside the full development allocation.

5.6 Journey Time Analysis

The following sets out some initial observations of journey time analysis plots for the three key scenarios; 2028 Reference Case and 2028 SS Do Nothing and 2028 SS Do Something. The comments in the remainder of this section are based on observations of the predicted journey times across pre-defined routes within the model area during both AM (08:00 to 09:00) and PM (17:00 to 18:00) peak hours.

The maps which are referred to within the following analysis are presented within **Appendix C** of this report whilst the specific drawing number pertaining to each element of the analysis has been provided within the accompanying title brackets.

5.6.1 AM Analysis (MD001 and MD003)

Analysis of the difference in queuing between the 2028 Reference and 2028 SS Do Nothing scenario, during the AM peak hour, reveals the following:

- The routes localised around the Town experience limited changes in journey times compared to the Reference Case, notably the Saltisford, Friars Street and The Butts all experience no significant change.
- An increase in journey times is experienced on all approaches to Warwick town, the most severe increase in journey times appears to occur along the Banbury Road approach into Warwick
- Increases in journey times are evident on three of the four approaches to Grey's Mallory which is likely to be indicative of increased pressure on the transport network in this area which occurs as a result of the additional development demands
- In addition to the severe increase in delays along Banbury Road, very severe increases in journey times are experienced along the Myton Road approach to the roundabout with Europa Way as well as along the route between Grey's Mallory roundabout and the M40. The latter is potentially increased congestion as a result of an increase in vehicle movements travelling from the Europa Way corridor area towards the M40. The issues at Myton Road are likely to be indicative of the Myton Road/Europa Way roundabout failing to accommodate the increase in demand which has occurred as a result of the new sites located within the area.

- Severe increases in journey times are also experienced along Tachbrook Park Road which is likely to be indicative of increased pressure on this corridor as a result of the new developments located to the south of Warwick
- Some increases in delay along routes to the north of Leamington are also evident which could occur either as a result of direction interaction with new development trips, displacement of background traffic onto these routes as a result of the new development trips or, most likely, a combination of both

Analysis of the difference in queuing between the 2028 Reference and 2028 SS Do Something scenario, during the AM period, reveals the following:

- Most of the journey times to the south have improved when compared to the Do Minimum, journey times along Banbury Road and Myton Road have actually reduced when compared to the Reference Case which is likely to indicate an additional benefit that may be delivered by the mitigation proposals in this area
- A very severe increase in journey times is identified along the Emscote Road NB approach to the Greville Road junction, this increase is likely to be directly linked to the provision of signals in this area, the increase will occur in part because prior to the implementation of the scheme proposals vehicles do not give way when travelling northbound. Similarly a reduction in journey times is observed along Emscote Road SB, the mitigation measures in this area do not reflect the SCOOT strategy that could be implemented to control the signals and, therefore, these impacts should be considered a worst case
- Increases in delay are expected on two of the arms to Grey's Mallory with severe increases in delay experienced by vehicles approaching from the south east. Some increase will inevitably occur as a result of the inclusion of the new development trips within the area, however it is likely that further optimisation of the scheme proposals in this area could further reduce the level of increase in journey times identified thus far
- The other instance of a very severe increase in journey times occurs along Westhill Road/ Bericote Road in the westbound direction and is in line with the impacts identified during the analysis of the difference between the Reference Case and 2028 SS Do Nothing scenario networks

5.6.2 PM Analysis (MD002 and MD004)

Analysis of the difference in queuing between the 2028 Reference and 2028 SS Do Nothing scenario, during the PM peak hour, reveals the following:

- There are four instances where a severe increase in queues is expected of which two of these occur along both directions of Myton Road and the remaining two occur on sections of the Tachbrook Road corridor which runs parallel to Europa Way
- There are a large number of instances where journey times have increased around the Myton Road/Europa Way area which indicates that the impacts which occur as a result of the new development trips assigned on the network will result in increases in journey times on all key corridors which will likely serve the new developments in the area
- Severe increases in journey times also occurs along the NB and SB approaches of Emscote Road to the junction with Greville Road, as highlighted earlier, in reality the signal proposals in this area would be part of a wider SCOOT strategy which would control traffic movements along the

corridor in a manner which serves to reduce the overall level of delay experienced through the optimisation of the cycle times

- A severe increase in journey times is also experienced by vehicles travelling SB towards the M40 which corresponds to increases observed in the same area during the AM period

Analysis of the difference in queuing between the 2028 Reference and 2028 SS Do Something scenario, during the PM peak hour, reveals the following differences in the journey time impacts:

- From the outset, there is a notable amount of routes where journey times have improved compared to the Reference Case which is indicative of potential additional benefits that may be unlocked as a result of the delivery of the mitigation proposals identified
- There are two instances where a very severe increase in journey times is predicted, there are increases on the Emscote Road NB approach to the Greville road junction and along the B4087 approach to the newly proposed Bath street gyratory. Both increases occur as a result of the inclusion of new signals on approaches where previously vehicles were able to move largely unopposed
- There are two routes where an increase in delay is expected on the approach to Grey's Mallory which would likely benefit from further optimisation of the Grey's Mallory Scheme proposals
- There is a reduction in journey times achieved for vehicles travelling SB along Europa Way towards the M40, this reduction in journey times is achieved without any specific mitigation being delivered within this area which may be considered to be indicative of wider benefits occurring as a result of the delivery of the mitigation proposals

5.6.3 Delay Analysis Summary

Analysis of the difference in journey times between the two 2028 Southern Sites scenarios and the Reference Case reveals that there are notable improvements in journey time expected for the Do Something scenario. These improvements are particularly evident within the AM period around the Town centre and in the PM period around the area of the proposed developments as well as the Myton Road/Old Warwick Road corridor

For both scenarios in both periods there are still increases in delay on the approaches to Grey's Mallory which would likely benefit from further optimisation of the Grey's Mallory Scheme proposals.

When comparing the 2028 Do Nothing Journey times it is apparent that there are a number of areas where severe and very severe increases in journey times occur which are subsequently mitigated by the inclusion of the mitigation proposals identified through the assessment.

5.7 Conclusion

The initial comparisons between the 2028 Reference Case and the 2028 Southern Sites STA scenarios reveal the following conclusions:

- Inclusion of the Southern Sites strategy demands will likely result in an increase in the average network journey times and a reduction in average

speeds that vehicles are able to achieve in comparison to the 2028 Reference Case conditions

- These negative impacts are reduced by markedly with the introduction of the mitigation measures associated with the Do Something scenario during both peak periods
- The most severe impacts within the 2028 SS scenarios occur on routes around the area of the developments and to the north of the sites
- Some areas experience improvements in delay and queuing despite no mitigation measures being proposed within the immediate area, this is indicative of wider benefits that could potentially be unlocked by the inclusion of the mitigation measures.

6 Europa Way Consortium Land, Link Road Sensitivity Results Analysis

6.1 Overview

The following sections of the report are intended to present the results obtained from the detailed Sensitivity testing undertaken within the Warwick and Leamington Model for the following three scenarios:

- M001 WLWA 2028 Reference Case
- M003 WLWA 2028 SS Do Something
- M004 WLWA 2028 SS Do Something + Myton Link

The inclusion of this sensitivity scenario is intended to help understand the affect the inclusion of the link through some of the proposed sites, which connects Europa Way and Myton Road, initially from a strategic standpoint and then secondly more localised impacts.

6.2 Model Stability

An initial assessment of the level of model stability was undertaken by comparing the number of completed runs against the number of runs which failed.

The network stability exhibited within the AM and PM simulation runs across the two scenarios is illustrated within the following Table 22:

Table 22 - Model Stability Assessment (2028 Reference vs. 2028 SS Do Something vs. 2028 SS DS + Link)

	M001 2028 Reference	M003 2028 SS Do Something	M004 2028 SS DS + Link
AM	75%	90%	85%
PM	80%	75%	70%

The analysis of the model stability indicates variation by a single run between the Do Something and link road sensitivity test which are unlikely to be considered significant.

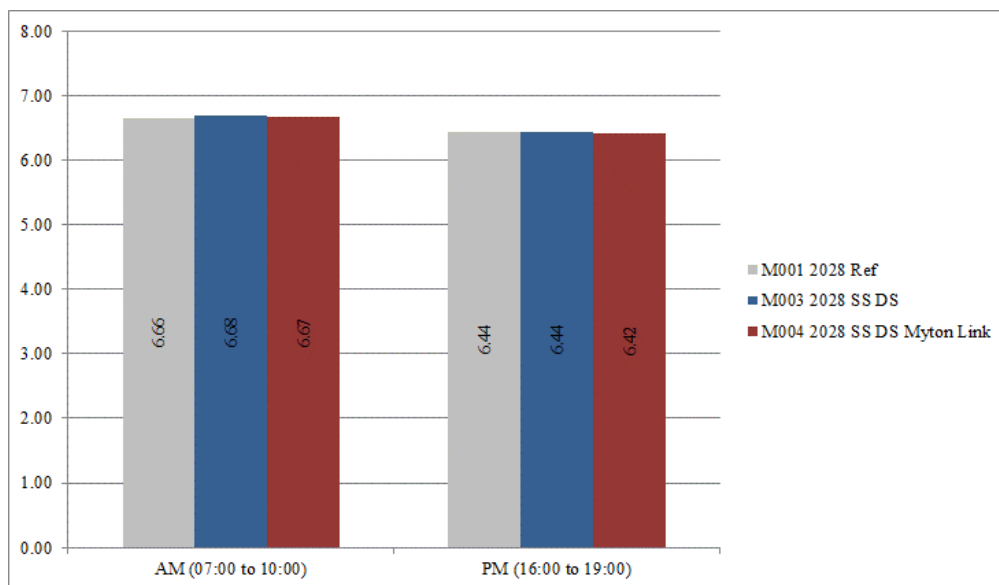
6.3 Network Wide Statistics

The following sets out the changes in network wide statistics between the 2028 Reference Case and the 2028 SS DS + Link scenario.

6.3.1 Average Journey Distance

Analysis of the average journey distance within each scenario, across the entire AM and PM model periods is presented within Figure 21 on the following page. Analysis of the figure indicates very little difference between the three scenarios.

Figure 21 - Average Journey Distance (2028 Reference vs. 2028 SS Do Something vs. 2028 SS DS + Link), Km

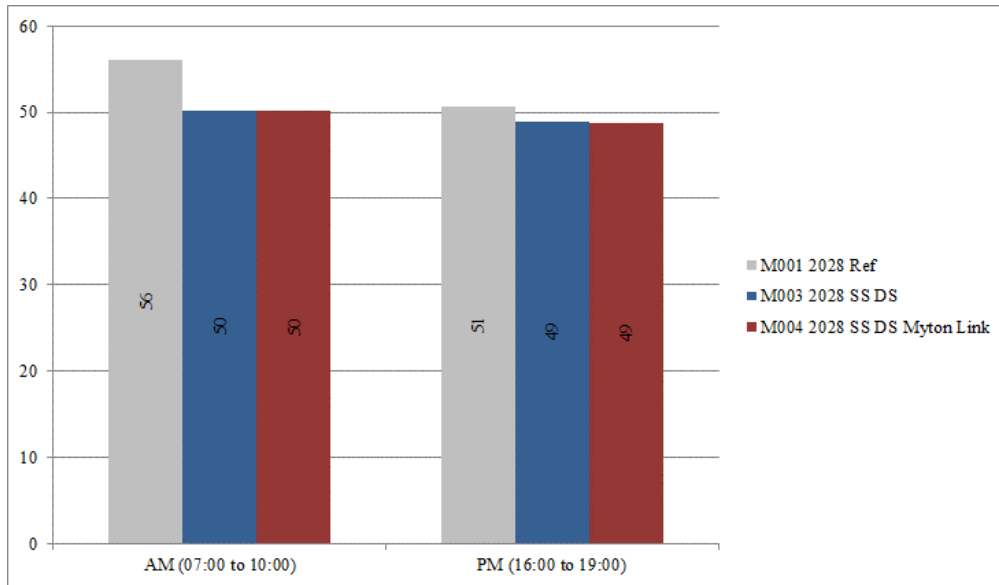


The differences in journey distance across the three scenarios are not considered to be significant in either period which could indicate, in part, that the developments, when delivered alongside the mitigation measures, do not induce reassignment of traffic onto longer routes within the model.

6.3.2 Average Journey Speed

Analysis of the average journey speed (km/h) within the three scenarios, across the entire AM and PM model periods, is presented within Figure 23 on the following page. This Figure demonstrates that the allocation of the SS demands is likely to result in an 11% and 4% reduction in journey speeds during the AM and PM peak period between the Reference Case network and the SS DS + Link scenario. This reduction is more prominent in the AM peak period and the results of the DS + Link scenario are very close to that of the Do Something scenario.

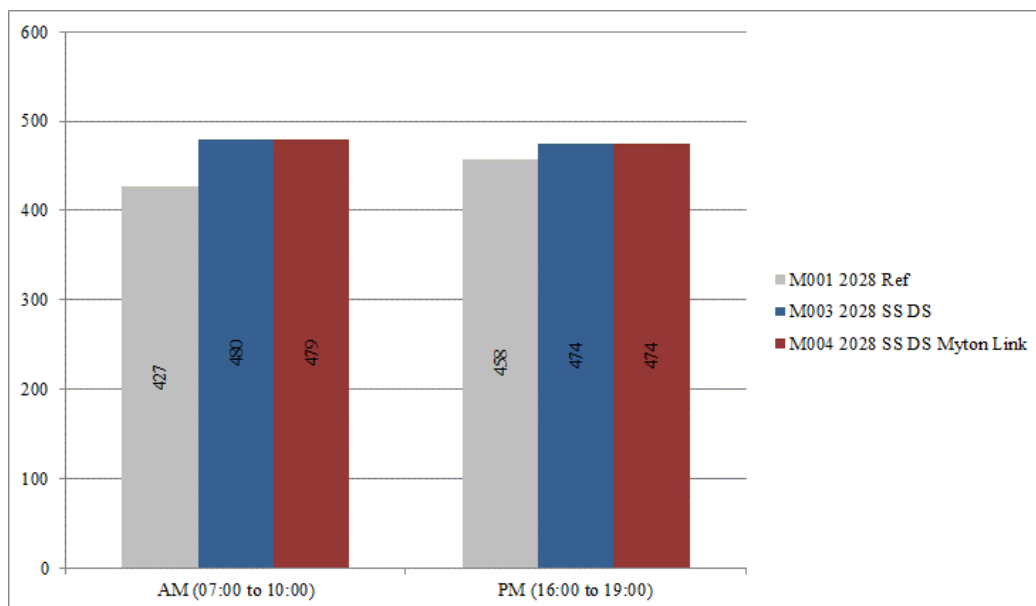
Figure 22 - Average Journey Speed (2028 Reference vs. 2028 SS Do Something vs. 2028 SS DS + Link), Km/h



6.3.3 Average Journey Time (Seconds)

Analysis of the average journey time, in seconds, within each scenario, across the entire AM and PM model periods, is presented within Figure 23. Analysis of Figure 23 reveals that journey times within the DS + Link scenario network are 12% and 4% higher within the AM and PM time periods respectively when compared to the Reference Case journey times. Again, the results of the Sensitivity scenario are very close to that of the Do something scenario.

Figure 23 - Average Journey Time (2028 Reference vs. 2028 SS Do Something vs. 2028 SS DS + Link), Seconds



6.4 Maximum Queue Length Analysis

The following sets out some initial observations based on the differences in queue lengths between the 2028 Reference Case and 2028 SS DS + Link scenario.

The maps which are referred to within the following analysis are presented within **Appendix B** of this report.

6.4.1 AM Analysis (MQ005)

Analysis of the difference in queuing between the 2028 Reference and 2028 SS DS + Link scenario, during the AM peak hour, reveals the following:

- The inclusion of the link results in no additional very severe increases in queuing levels other than, in line with the queue comparisons of the 2028 Do Something scenario, a very severe increase in the queue levels at the A445 Leicester Lane/ Westhill Road/ Kenilworth Road junction. This increase is also expected for the SS DS scenario
- The difference in queuing levels between the link road sensitivity test network and the 2028 Do Something reveals that queuing levels within the two networks are likely to be broadly comparable and, therefore, unaffected by the inclusion of the new link road.

6.4.2 PM Analysis (MQ006)

Analysis of the difference in queuing between the 2028 Reference and 2028 SS DS + Link scenario, during the PM peak hour, reveals the following:

- There are no instances of severe queue length increase as was expected for the DS scenario, in general the results extracted from the comparison between the link road sensitivity test network and the 2028 Ref case are broadly comparable to the results extracted from the same comparisons undertaken using the link road sensitivity test network versus the Reference Case.

6.4.3 Queue Analysis Summary

A summary of the findings obtained through comparing the changes in queuing between the 2028 Reference and 2028 SS DS + Link Scenario reveals very little difference in the queuing levels observed within the 2028 Link Road sensitivity test network and the 2028 Southern Sites Do Something network.

6.5 Journey Time Analysis

The following sets out some initial observations of the mean speed plots for the two key model scenarios; 2028 Reference and 2028 SS DS + Link scenario.

The maps which are referred to within the following analysis are presented within **Appendix C** of this report whilst the specific drawing number pertaining to each element of the analysis has been provided within the accompanying title brackets.

6.5.1 AM Analysis (MD005)

Analysis of the difference in delay between the 2028 Reference and 2028 DS + Link scenario, during the AM period, reveals that the differences in journey times between the 2028 Reference Case and the Link Road sensitivity network are broadly similar to the differences observed between the 2028 Reference Case and 2028 DS network.

Two very minor differences between the original 2028 Ref Case versus 2028 Do Something and the 2028 Link road sensitivity are that the delay along Emscote Road SB drops from an increase to a negligible change whilst the delay Along Leicester Lane SB in the North of Leamington increases from severe to very severe. Both are triggered by relatively small variations in delay between the two scenarios and neither change is likely to represent a significant impact which occurs as a result of the inclusion of the new link road, rather they represent changes which occur due to model variation.

6.5.2 PM Analysis (MD006)

As with the AM analysis, analysis of the difference in delay between the 2028 Reference and 2028 DS + Link scenario, during the PM period, reveals that the differences in journey times between the 2028 Reference Case and the Link Road sensitivity network are broadly similar to the differences observed between the 2028 Reference Case and 2028 DS network.

Again there are a number of instances where delays appear to change by a grade but investigation of the magnitude of these changes reveals that often it is caused by relatively small variations between scenarios, the delays are reasonably close to the boundary between the two categories and, between 2028 Do Something scenarios, the variation is such that a change in grade is identified.

As with the AM analysis these changes are not located within the immediate area of the proposed link road and, therefore, it is reasonable to conclude that the inclusion of the new link road will not have an impact on journey times at the strategic level.

6.5.3 Delay Analysis Summary

Analysis of the difference in journey times between the SS DS + Link scenario and the Reference Case reveals that the strategic level impacts identified when comparing the 2028 Link Road Sensitivity network to the 2028 Reference Case the variation in journey times is broadly consistent with that which was observed during the comparison of journey times within the 2028 SS Do Something network and the 2028 Reference Case. Thus it is reasonable to conclude that the inclusion of the link road will not have a significant impact on strategic level journey times across the model network.

6.6 Conclusion – Strategic Level Analysis

The initial comparisons between the 2028 Reference and 2028 SS DS + Link scenarios reveals that, strategically, inclusion of the link road will not have a material impact on the overall network performance, especially when compared to the 2028 SS Do Something scenario network.

6.7 Localised Flow Impact Analysis

In addition to the overview of the strategic impacts which arise as a result of the inclusion of the link between Europa Way and Myton Road. This analysis is intended to provide a better understanding of what, if any, localised impacts may occur as a result of the inclusion of the link road in particular

Analysis of the changes in vehicle flows at a number of locations within the vicinity of the link road has been undertaken. The analysis has centred upon a review of the changes in two-way vehicle flows, during the AM and PM peak hours at 6 locations, namely:

- Location 1 – New Link Road
- Location 2 – Myton Road East of Link Road Jct
- Location 3 – Myton Road West of Link Road Jct
- Location 4 – Gallows Hill West of New Europa Way site Access
- Location 5 – Europa Way North of Europa Way/Harbury Lane Junction
- Location 6 – Europa Way South of Shires Retail Park

An overview of these locations is provided within Figure 24 on the following page. Whilst the extracted flows, for both AM and PM peak hours, across the three key model scenarios, are presented within the following Table 23.

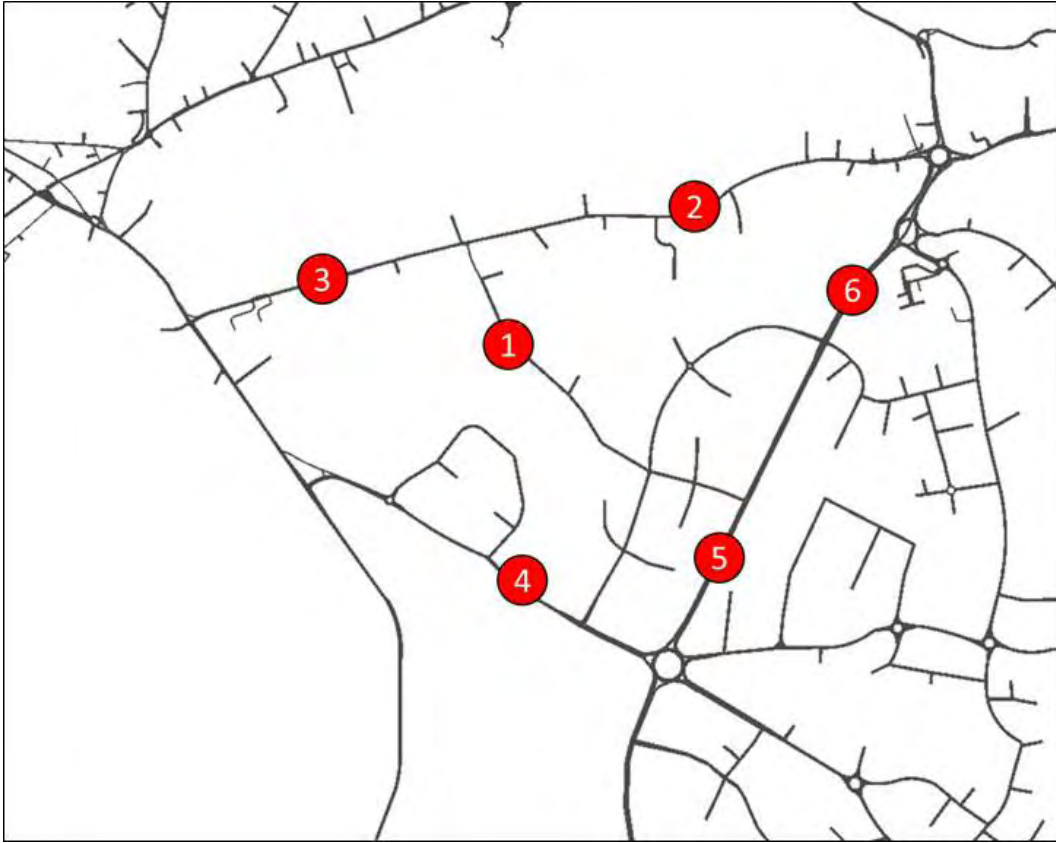
Table 23 Link Road Sensitivity Test - 2 Way Flow Analysis

Ref	Loc.	08:00 to 09:00			17:00 to 18:00		
		2028 Ref	2028 SS DS	2028 SS DS + Link	2028 Ref	2028 SS DS	2028 SS DS + Link
1	Link Road	0	0	252	0	0	230
2	Myton Road 1	1044	1104	1167	693	837	873
3	Myton Road 2	858	1149	1281	1043	1085	1175
4	Gallows Hill	1843	1430	1455	1573	1359	1277
5	Europa Way 1	2382	1918	1994	1913	1644	1618
6	Europa Way 2	2444	2402	2505	1937	2140	2127

Analysis of the information presented within the previous Table reveals that there are a number of areas where flows are predicted to increase as a result of the inclusion of the southern sites and the associated mitigation measures. This is to be expected given the increased quantum of development in this area.

Furthermore, additional trips may be created as a result of additional capacity being delivered on the network through the mitigation measures that have been proposed.

Figure 24 Link Road Sensitivity Test - Flow Analysis Locations



Analysis of the changes in flows reveals that the connection of the link results in 250 two way vehicle trips occurring within the peak hours, this number is not significant in strategic terms.

It is unlikely that high vehicle flows would be considered desirable in this area and therefore, considering that the modelling has already been refined to reflect a less desirable route between Europa Way and Myton Road then careful consideration will need to be given to the design of the link road, if it is to be delivered, in order that it does not present a viable and attractive route for strategic level trips to move between Europa Way and Myton Road.

It is interesting to note the reduction in flows along the southern section of Europa Way in both DS scenarios when compared to the 2028 Reference Case. Given that this does not manifest in a reduction in flows at the northern section of Europa Way it is reasonable to conclude that some trips are also opting to choose to route through the Europa Way land to the West rather than travel straight up Europa Way, most likely this will be in part as a result of some vehicles choosing to use the route through the site since it will inevitably be subject to less traffic and congestion than Europa Way. Again, this may need to be considered in detail when progressing the design of the route through the site in order that the reassignment of strategic levels trips is discouraged from deviating from the main Europa Way corridor.

Overall, however, analysis of the changes in vehicle flows in these areas reveals, that based on the coded assumptions, there is little in the way of strategic benefit offered by the link, however if it is considered desirable to include such a link then careful consideration should be given to the design to ensure that the link

does not become strategically desirable and, therefore, vehicular demand for the link increases in vehicle numbers and, in turn, unacceptable levels of congestion.

7 Appeals Sites - Sensitivity Results Analysis

7.1 Overview

The following sections of the report are intended to present the results obtained from the detailed Sensitivity testing undertaken within the Warwick and Leamington Model for the following three scenarios:

- M001 WLWA 2028 Reference Case
- M003 WLWA 2028 SS Do Something
- M005 WLWA 2028 SS Do Something + Appeals sites

The inclusion of the second sensitivity scenario SS DS + Appeals is intended to allow the examination of the impacts that inclusion of the additional ‘appeal’ sites has on the network relative to the Reference Case and the SS DS scenario which already includes mitigation strategies to accommodate the additional demands associated with the Southern Sites.

At this stage the purpose of the assessment is to identify whether or not the mitigation measures identified as being necessary to accommodate the allocated sites identified to the southwest of Warwick will also be able to accommodate the additional demands that may arise should the additional sites not allocated within the local plan also come forward.

7.2 Model Stability

An initial assessment of the level of model stability was undertaken by comparing the number of completed runs against the number of runs which failed.

The network stability exhibited within the AM and PM simulation runs across the two scenarios is illustrated within the following Table 24:

Table 24 - Model Stability Assessment (2028 Reference vs. 2028 SS Do Something vs. 2028 SS DS + Appeals)

	2028 Reference	2028 SS Do Something	2028 SS DS + Appeals
AM	75%	90%	85%
PM	80%	75%	40%

It is evident from the table above that the 2028 DS + Appeals scenario has a significantly reduced model stability during the PM period compared to the Reference Case.

The stability levels exhibited within the 2028 SS Do Something + Appeals during the PM should be considered as indicative that the current network arrangement is not able to accommodate the additional demand that have been allocated to the model network. As such, it should be recognised that the analysis which follows may be skewed on account of the fact that more runs have failed than been successful which, ultimately, may mean that in certain areas the network is at ‘tipping point’ in so far as once a problem occurs flow breakdown quickly ensues.

The analysis set out within the remainder of this report, specifically concerning the PM network performance, should be viewed as an indication of the network conditions based on a disproportionate set of model runs. When considering