Technical note

Project:	Cherwell Local Plan Modifications	**To:**	Oxfordshire County Council
Subject:	Cherwell District Technical Note	**From:**	Graham Bown
Date:	20 October 2014	**cc:**	

1. Introduction

Cherwell District Council is consulting on modifications to the Submission Cherwell Local Plan including modified Policies Maps and an update to a Sustainability Appraisal. The documents are published for consultation from Friday 22 August 2014 to Friday 3 October 2014 prior to submission to the Secretary of State for Communities and Local Government.

The public Examination hearings into the Submission Local Plan were suspended on 4 June 2014 for six months. This was to enable the Council to put forward proposed modifications to the Plan involving increased new housing delivery over the plan period to meet the full, up to date, objectively assessed needs of the district, as required by the National Planning Policy Framework (NPPF) and based on the Oxfordshire Strategic Housing Market Assessment 2014 (SHMA).

These Main Modifications are now available for public comment for a period of six weeks before they are formally submitted to the Secretary of State and the public Examination of the Local Plan re-commences. A number of minor modifications are also being made available for viewing at the same time. Comments made must relate to proposed modifications only. Cherwell district council is not consulting on other aspects of the Plan.

Atkins have already provided transport modelling advice for OCC on this subject, but now the final figures for the modifications have been released and some scenarios need to be re-run and also some additional outputs are required. This brief commissions Atkins to undertake the transport modelling work required towards this task. The work will use the Oxfordshire Strategic Model in combination with understanding the trip distribution into and out of the Cherwell district/modelled area.

1.1. Model System

The work is based on the new Oxfordshire Strategic Model (OSM). The base model has recently been completed and early forecasts for 2031 have been finalised. The OSM covers the strategic links in Oxfordshire and has a detailed modelled area and fully modelled area shown in Figure 1-1.

The detailed modelled area reflects the extent to which transport demand data has been collected and includes a representation of all movements to, from and within the county. Within the detailed modelled area all strategic highway links will be included although not all junctions will be simulated. The fully modelled area reflects the extent of calibration and validation data used in model development and therefore reflects the area in which the model's performance is known.

Cherwell straddles the detailed modelled area, with Bicester and Upper Heyford being within the detailed modelled area but Banbury outside it. This means that Banbury does not have the same level of model development as Bicester and as a result does not have the same level of certainty regarding traffic forecasts in the area. The impact of changes in transport demand in Banbury should only be considered as indicative. However, a stand-alone highway model for Banbury has been developed, and the impacts of changes in transport demand in Banbury are therefore reported in a separate Technical Report for Banbury.

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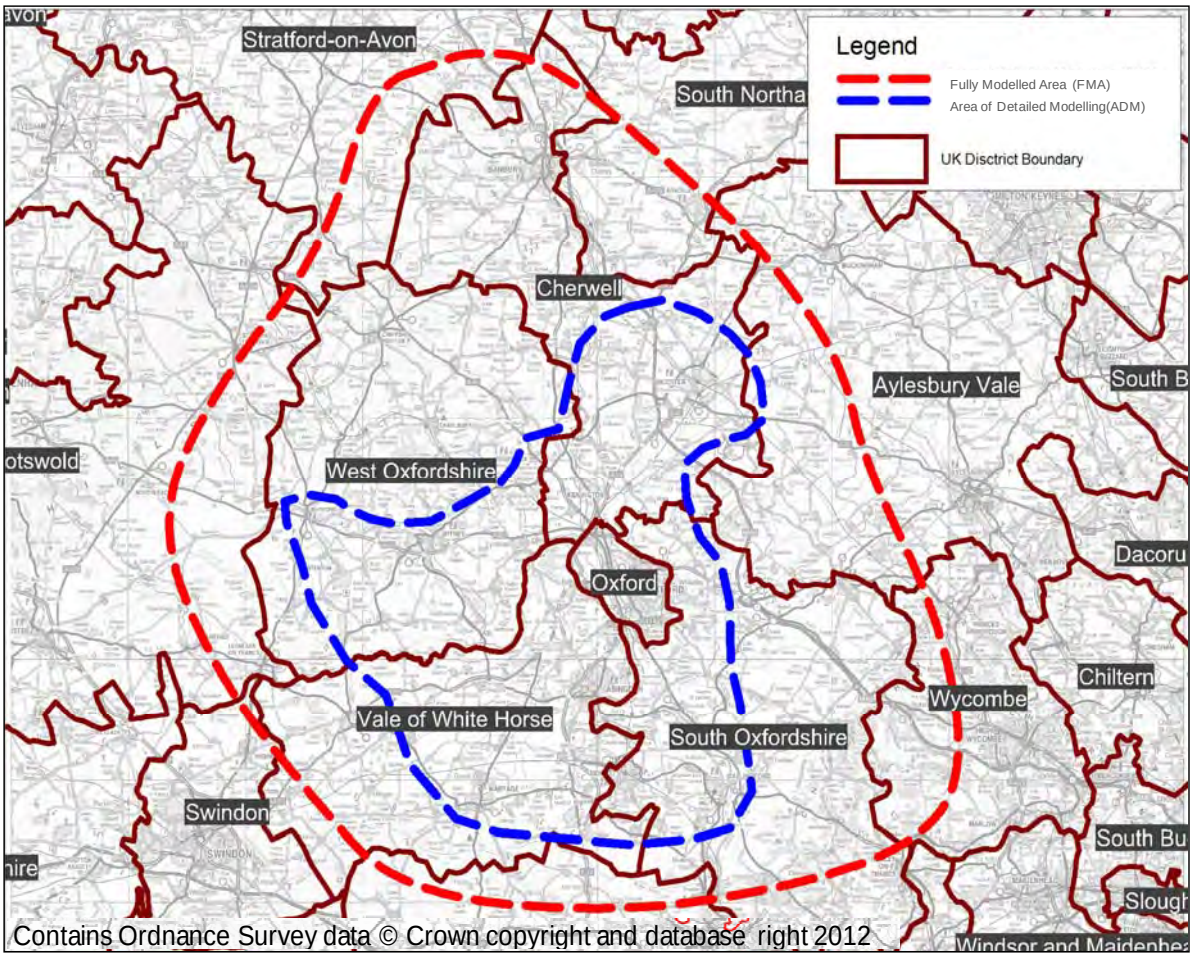
Testing of the highway mitigation options for Banbury are more progressed in the Banbury Highway Model [BHM], compared to OSM (which is an unvalidated model for the Banbury area). Therefore the Technical Report for the BHM should be considered more up-to-date when considering the highway network impacts in Banbury.

Figure 1-1 Detailed Modelled Area



The modelling work has been undertaken using a validated 2013 base year demand model and 2031 forecast year scenarios as follows and are described in more detail in following sections:

- Base Year 2013;
- 2031 Local Plan Modifications demand with no new mitigation measures (Scenario 2); and
- 2031 Local Plan Modifications demand with emerging mitigation measures (Scenario 5).

The two forecast scenarios described in this Technical Note are part of a series of scenarios run in the OSM looking at the impact of the Local Plan Modifications. Scenario 2 includes the Local Plan mitigation measures whilst Scenario 5 includes additional measure to mitigate the impact of the Local Plan Modifications. These are initial measures identified for testing in the scenario and are not the final set of measures.

A forecast year scenario has two elements: transport demand (trips by mode and time) and transport supply (the networks). Transport demand is formed from a reference case, known as a **Reference Forecast**. Transport supply reflects the existing networks and all certain changes up to the forecast year of 2031. A **Reference Forecast** is a term specific to setting up a forecast with a variable demand model and is an intermediate step to producing the Forecast Scenario. It uses the growth in trip ends over the forecasting period, but does not take into account changes in travel cost.

The **Forecast Scenario** reflects changes to the Reference Forecast brought about by the changes in network costs and is an iterative process within the demand model which can change trip frequency, time,

mode and destination. The iterations stop once a satisfactory level of convergence is reached (reflecting stability in the process) and the Forecast Scenario demand is created and its final assignment forms the model outputs.

An understanding of this process enables the results to be interpreted with more clarity. Any difference between the **Reference Forecast** and the **Forecast Scenario** will be a result of travel costs suppressing travel demand in cases where Reference Forecast > Forecast Scenario (or facilitating travel in the reverse). This is best viewed over a 12 hour period rather than specific modelled hours to account for changes in the time, mode and destination of the trip. Any final differences between the **Reference Forecast** and the **Forecast Scenario when time of day and mode are taken into account** are therefore due to trip frequency. Note that model output is vehicles for cars and people for public transport passengers.

To aid model convergence and reflect a general trend towards peak spreading (the process whereby the broadening of traffic flow profiles in peak periods in congested urban networks as traffic demand increases) the demand model assumes a flat peak period (7am to 10am and 4pm to 7pm), creating a rush-three hour rather than single rush-hour. The impact would be to slightly reduce demand between 8am and 9am and between 5pm and 6pm as more traffic would travel after the peak hour (analysis shows that flows before the 'peak hour' are similar in magnitude to the 'peak hour'). The benefit of this is improved model convergence.

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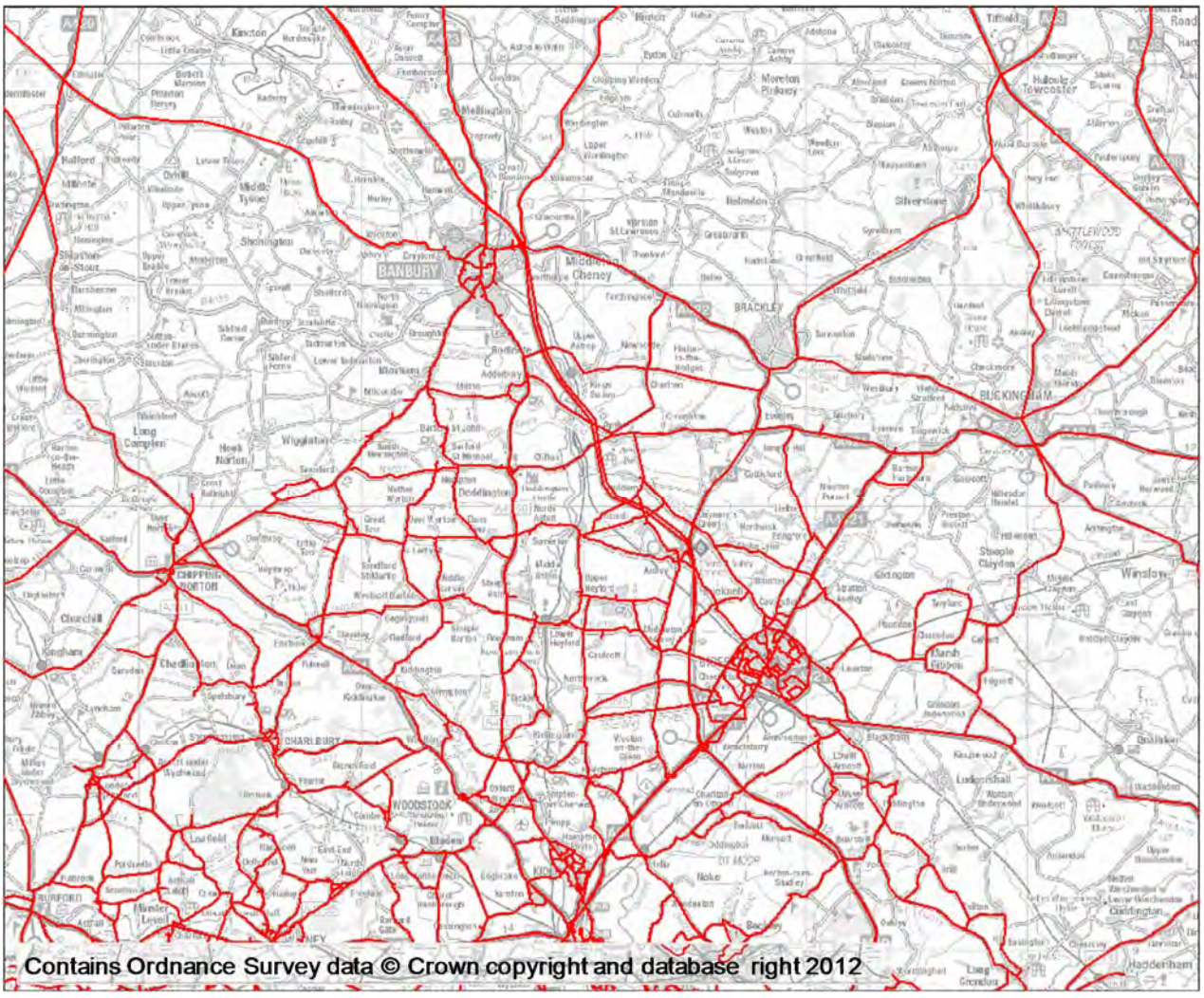
2. Base Year 2013

Cherwell district's strategic transport network includes Bicester and Upper Heyford being within the detailed modelled area but Banbury located outside of it. As stated previously, the impact of changes in transport demand in Banbury, as assessed using the Banbury Local Highway Model, are reported in a separate Technical Report.

The strategic highway network coded in Cherwell area is presented in Figure 2-1 below.

Figure 2-1 Cherwell Highway Network



2.1. Base Year Demand

Table 2-1 to Table 2-4 summarise the aggregated demand for the Base Year for Cherwell District and for the full OSM model. In Cherwell approximately 223,000 person movements are made during the 12 hour period from 7am to 7pm, with approximately 5% of motorised journeys (excluding walking and cycling) taking place by public transport.

Table 2-1 Base Year demand for Cherwell (AM period)

Base Year AM	Cherwell District		Entire model
	Origin	Destination	Origin/Destination
Car (vehicles)	41382	40358	236631
Bus (people)	3565	1733	30406
Rail (people)	1884	763	9302
TOTAL (people)	57177	52944	335497
Public Transport Mode Share	9.5%	4.7%	11.8%

Table 2-2 Base Year demand for Cherwell (IP period)

Base Year IP	Cherwell District		Entire model
	Origin	Destination	Origin/Destination
Car (vehicles)	70922	71421	413268
Bus (people)	3503	3731	49298
Rail (people)	1461	1546	9824
TOTAL (people)	93617	94553	575707
Public Transport Mode Share	5.3%	5.6%	10.3%

Table 2-3 Base Year demand for Cherwell (PM period)

Base Year PM	Cherwell District		Entire model
	Origin	Destination	Origin/Destination
Car (vehicles)	55719	56382	316028
Bus (people)	1389	2868	30314
Rail (people)	1125	1917	11112
TOTAL (people)	72163	75263	436461
Public Transport Mode Share	3.5%	6.4%	9.5%

Table 2-4 Base Year demand for Cherwell (12 hour)

Base Year 12 hour	Cherwell District		Entire model
	Origin	Destination	Origin/Destination
Car (vehicles)	168023	168161	965928
Bus (people)	8456	8332	110019
Rail (people)	4471	4226	30238
TOTAL (people)	222956	222760	1347667
Public Transport Mode Share	5.8%	5.6%	10.4%

2.2. Highway Network

This section describes the highway network performance in the Cherwell District. The overall Cherwell District network statistics for the model simulation area are shown below in Table 2-5.

Table 2-5 Base Year Network Statistics – Cherwell District

Time	Metric	Results	Unit
Morning Peak Hour	Total Time	9555.5	Pcu Hr
	Delay	921	Pcu Hr

Time	Metric	Results	Unit
	Total distance	689783.0	Pcu KM
	Speed	72.2	KM/h
Inter Peak Hour	Total Time	6826.4	Pcu Hr
	Delay	421.7	Pcu Hr
	Total distance	539370.6	Pcu KM
	Speed	79.0	KM/h
Evening Peak Hour	Total Time	11057.2	Pcu Hr
	Delay	1631	Pcu Hr
	Total distance	745919.4	Pcu KM
	Speed	67.5	KM/h

Overall, the speed in Cherwell District is in the same range as of OSM model which is of 76 km/h, 83 km/h and 74 km/h in Morning Peak, Inter Peak and Evening Peak respectively.

At a more detailed level the performance on individual links and junctions (for the area as shown in Figure 2-2) is provided in Table 2-6 for the morning and evening peaks. The assessment is organised in to routes and focuses primarily on the link performance in to key junctions along the route and also provides further detail relating specifically to junction performance where that differs to the link performance.

In the table junctions are highlighted in red if in the AM or PM peak the junction is over capacity and is highlighted in amber if in the AM or PM peak the junction is operating at capacity.

Figure 2-3 and Figure 2-4 show the network link and junction performance are measured by the volume to capacity (v/c) ratio and highlights those links on the highway network that are operating below operational capacity (v/c <85%), at operational capacity (v/c between 85% and 95%) and those that are exceeding operational capacity (v/c >95%).

The junction performance described below refers to results from a forecast of the strategic highway model and it is possible that detailed junction modelling software would not only be able to optimise signalised junction performance, but also produce marginally different junction performance results.

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Figure 2-2 Cherwell Area of Assessment

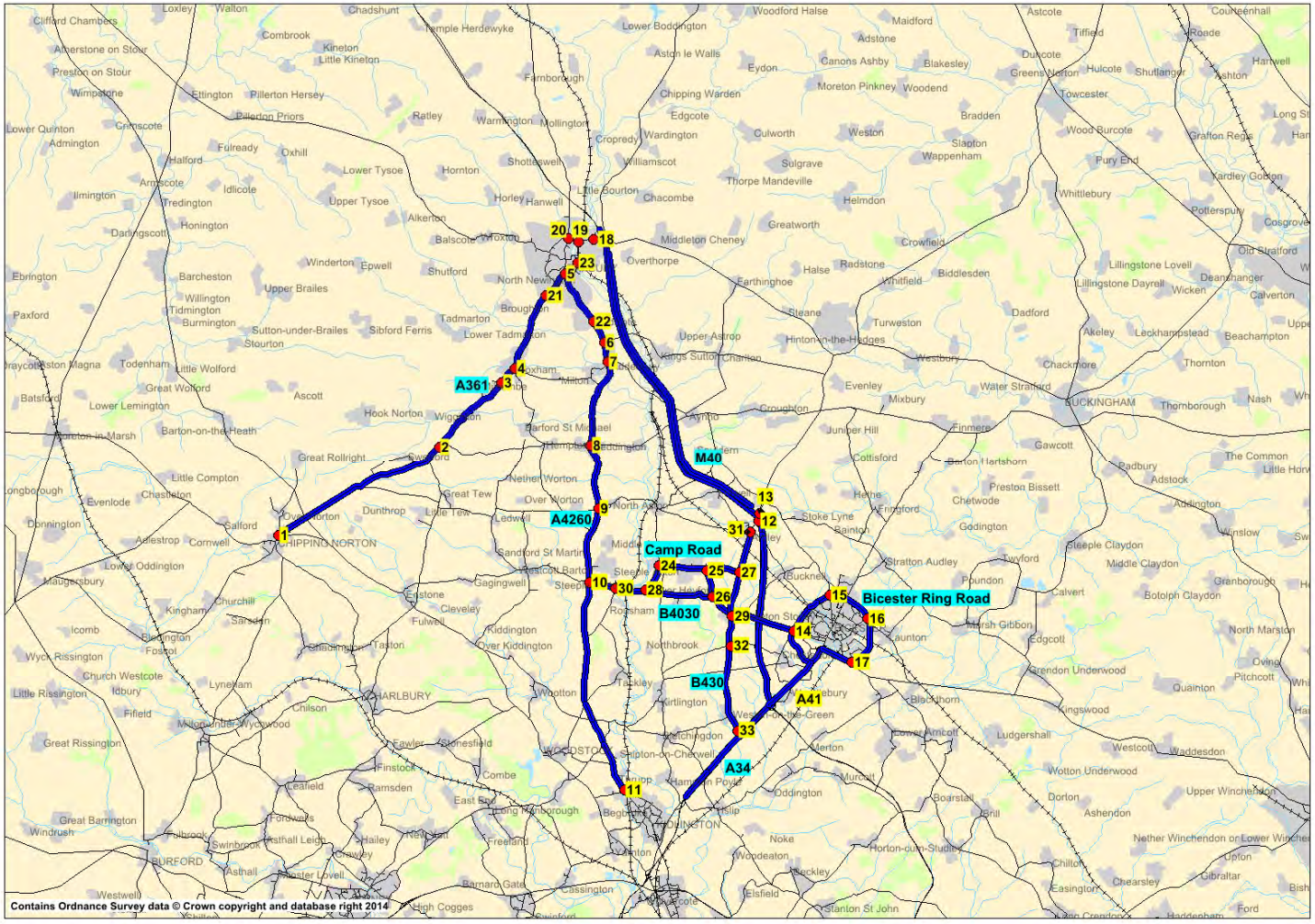


Table 2-6 Base Year (2013) network performance assessment

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
A361	London Road and Banbury Road Junction	1	Overall the performance of this junction is below capacity. However 3 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity.	Overall the performance of this junction is below capacity. However 3 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity.
	A361 and B4031 Junction	2	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	A361 and Bloxham Road Junction	3	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	S Newington Road and Barford Road Junction	4	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	A361 and B4100 Junction	5	Overall the performance of this junction is below capacity. However 2 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity.	Overall the performance of this junction is below capacity. However 1 turn perform over capacity. With reference to the links entering this junction, the northbound link performs at capacity.
A4260	A4260 and Twyford Road Junction	6	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
	A4260 and Aynho Road Junction Adderbury	7	Overall the performance of this junction is below capacity. However 1 turn perform at capacity and 2 turns perform over capacity. With reference to the links entering this junction, the westbound link performs over capacity.	Overall the performance of this junction is below capacity. However 1 turn perform at capacity. With reference to the links entering this junction, all links perform below capacity.
	A4260 and Hempton Road Junction Deddington	8	Overall the performance of this junction is at capacity. However 2 turns perform at capacity and 9 turns perform over capacity. With reference to the links entering this junction, the eastbound link performs over capacity; the southbound link performs over capacity; the westbound link performs over capacity.	Overall the performance of this junction is over capacity. However 12 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the eastbound link performs over capacity; the southbound link performs over capacity; the westbound link performs over capacity.
	A4260 and Somerton Road Junction North Aston	9	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	A4260 and B4030 Junction Hopcrofts Holt	10	Overall the performance of this junction is below capacity. However 3 turns perform over capacity. With reference to the links entering this junction, the southbound link performs over capacity.	Overall the performance of this junction is below capacity. However 1 turn perform at capacity and 2 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity.
	A4260 and Langford Lane Junction	11	Overall the performance of this junction is below capacity. However 1 turn perform over capacity. With reference to the links entering this junction, all	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
			links perform below capacity.	
M40 J11	Slips		The M40 northbound and southbound off-slips perform below operational capacity.	The M40 northbound and southbound off-slips perform below operational capacity.
	Circulation		The circulatory carriageway is over capacity.	The circulatory carriageway is over capacity.
M40 J10	Slips		The M40 northbound and southbound off-slips perform below operational capacity.	The M40 northbound and southbound off-slips perform below operational capacity.
	B430 Roundabout	12	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	A43 Roundabout	13	Overall the performance of this junction is below capacity. With reference to the links entering this junction, the southbound link performs at capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
Bicester Ring Road	Middleton Stoney Road Junction	14	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	Banbury Road Junction	15	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	Launton Road Junction	16	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
	A41 Junction	17	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
A34	A34 and M40 Junction 9		The M40 and A34 northbound and southbound off-slips perform below operational capacity.	The M40 and A34 northbound and southbound off-slips perform below operational capacity.
	A34 Circulation at M40 Junction 9		The circulatory carriageway is over capacity.	The circulatory carriageway is over capacity.
	A34 Slips Kidlington		The A34 southbound on-slip performs at capacity.	The A34 northbound and southbound off-slips perform below operational capacity.
	A34 Circulation at M40		The circulatory carriageway below operational capacity.	The circulatory carriageway below operational capacity.
Hennef Way	Hennef Way and Ermont Way Junction	18	Overall the performance of this junction is below capacity. However 3 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the westbound link performs at capacity.	Overall the performance of this junction is over capacity. However 2 turns perform at capacity and 4 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the eastbound link performs at capacity; the southbound link performs over capacity; the westbound link performs at capacity.
	Hennef Way and Concord Avenue	19	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. However 1 turn perform at capacity. With reference to the links entering this junction, the eastbound link performs at capacity.
	Hennef Way and Southam Road	20	Overall the performance of this junction is below capacity.	Overall the performance of this junction is below capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
			With reference to the links entering this junction, all links perform below capacity.	With reference to the links entering this junction, the southbound link performs at capacity.
Cherwell Street	Cherwell street and Bridge Street junction	23	Overall the performance of this junction is below capacity. However 1 turn perform over capacity. With reference to the links entering this junction, the westbound link performs over capacity.	Overall the performance of this junction is below capacity. However 2 turns perform over capacity. With reference to the links entering this junction, the westbound link performs over capacity.
Camp Road Station Rd to B4030	Camp Road and Station Road Junction	24	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	Camp Road and Unnamed Road Junction	25	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	Camp Road and B4030 Junction	26	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
Unnamed Road between Camp Road and B430	Unnamed Road and B430 Junction	27	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	Camp Road and Unnamed Road Junction	25	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
Station Road Camp Road to B4030	Station Road and B4030 Junction	28	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	Camp Road and Station Road Junction	24	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
B4030 Bicester to A4260	B4030 and A4095 Howes Lane Junction	14	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	Middleton Stoney Junction	29	Overall the performance of this junction is below capacity. However 5 turns perform over capacity. With reference to the links entering this junction, the eastbound link performs over capacity; the westbound link performs over capacity.	Overall the performance of this junction is below capacity. However 1 turn perform at capacity and 2 turns perform over capacity. With reference to the links entering this junction, the eastbound link performs at capacity; the westbound link performs over capacity.
	Camp Road and B4030 Junction	26	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	Station Road and B4030 Junction	28	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	Rousham	30	Overall the performance of this junction is below capacity.	Overall the performance of this junction is below capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
			With reference to the links entering this junction, all links perform below capacity.	With reference to the links entering this junction, all links perform below capacity.
	Holt Junction (B4030 and A4260)	10	Overall the performance of this junction is below capacity. However 3 turns perform over capacity. With reference to the links entering this junction, the southbound link performs over capacity.	Overall the performance of this junction is below capacity. However 1 turn perform at capacity and 2 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity.
B430 Ardley to A34	B430 and Ardley Road Junction	32	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	Unnamed Road and B430 Junction	27	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	Middleton Stoney Junction	29	Overall the performance of this junction is below capacity. However 5 turns perform over capacity. With reference to the links entering this junction, the eastbound link performs over capacity; the westbound link performs over capacity.	Overall the performance of this junction is below capacity. However 1 turn perform at capacity and 2 turns perform over capacity. With reference to the links entering this junction, the eastbound link performs at capacity; the westbound link performs over capacity.
	B430 and A4095 Junction	32	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
	A34 Junction	33	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.

Figure 2-3 Base Year (2013) network performance (Morning Peak Hour)

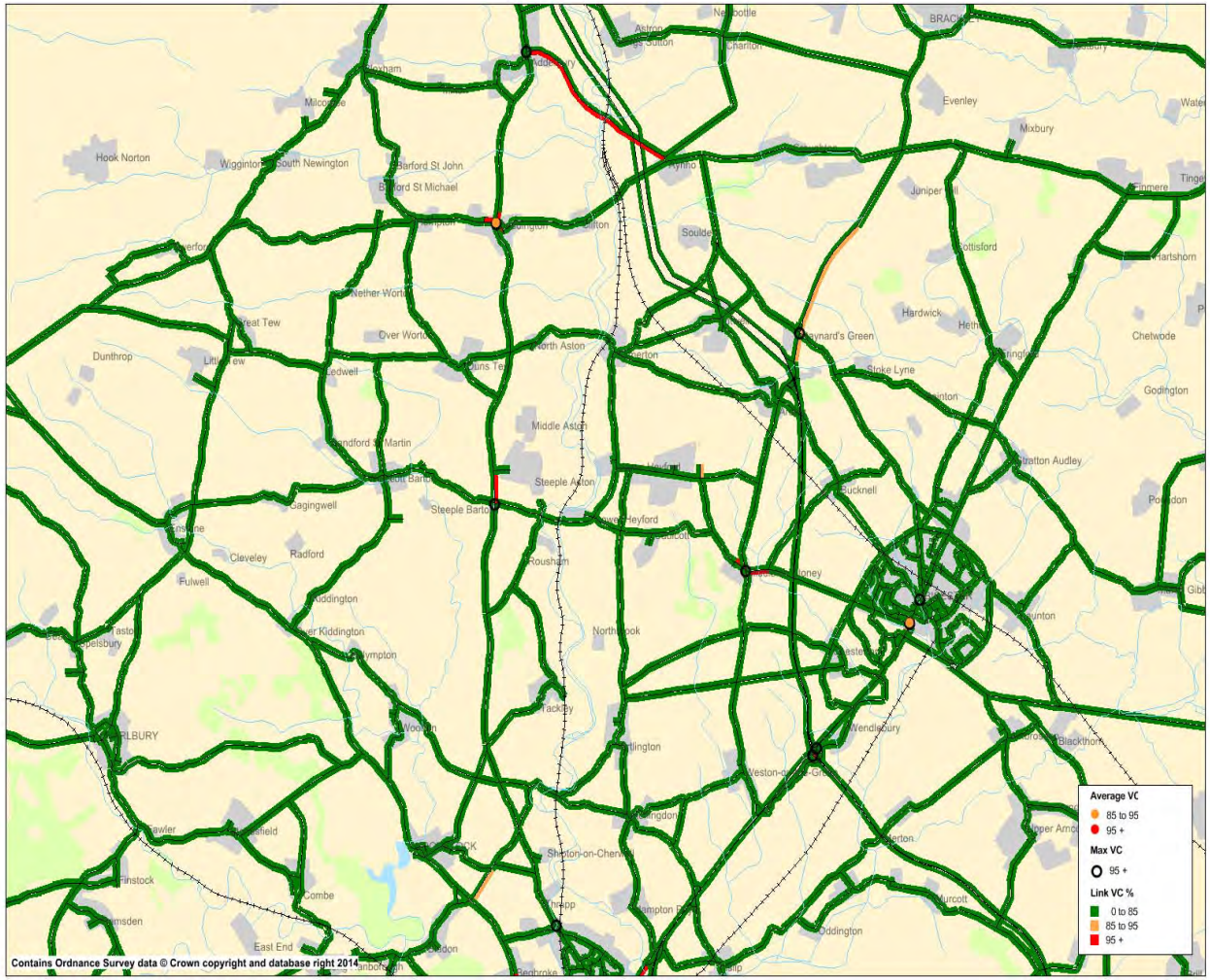
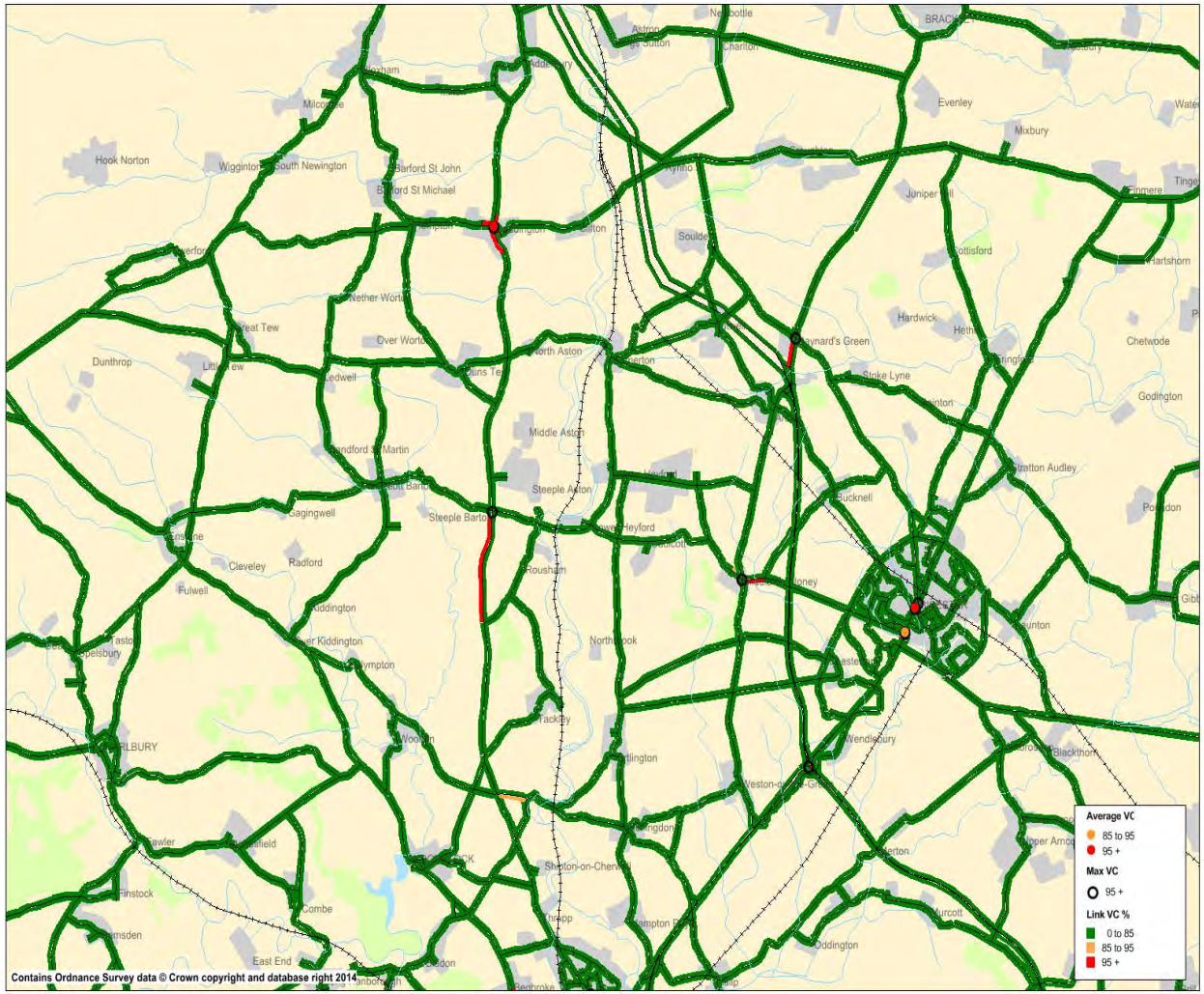


Figure 2-4 Base Year (2013) network performance (Evening Peak Hour)



2.3. Public Transport Network

The following tables show the base year (2013) public transport loads on the main corridors in Cherwell District. These are:

- Oxford to Bicester
- Oxford to Upper Heyford
- Oxford to Banbury.

Table 2-7 shows the public transport loads (per hour) for rail and bus in the Oxford to Bicester Corridor. It can be observed that the rail demand is very low between Oxford and Bicester, whilst the bus demand on the competing corridor is larger. This is due to the low frequency of the rail service (of less than one train per hour in each direction). More detail is provided in the plots shown in Figure 2-5.

Table 2-7 Public Transport Patronage: Oxford-Bicester Corridor

Mode	Time period	Oxford to Bicester	Bicester to Oxford
Rail	AM	17	40
	IP	11	12
	PM	42	11
Bus	AM	103	159
	IP	121	102
	PM	213	87

Table 2-8 (and Figure 2-6) shows the loadings per hour on the bus service 25A which operates on the Oxford to Upper Heyford Corridor. This shows modest loadings on the bus services in all of the modelled hours.

Table 2-8 Public Transport Patronage: Oxford-Upper Heyford

Mode	Time period	Oxford to Upper Heyford	Upper Heyford to Oxford
Bus	AM	1	10
	IP	5	5
	PM	18	7

Table 2-9 shows the public transport loadings per hour in the Oxford to Banbury Corridor. Rail patronage is greater than on bus due to the greater frequency of the rail services (approximately three trains per hour in each direction) and the shorter journey times. Further detail can be seen in Figure 2-7.

Table 2-9 Public Transport Patronage: Oxford-Banbury Corridor

Mode	Time period	Oxford to Banbury	Banbury to Oxford
Rail	AM	159	352
	IP	113	86
	PM	550	146
Bus	AM	11	40
	IP	15	22
	PM	37	17

The locations for the flows shown in the tables above can be seen in the following figures. They represent a mid-point on each route and do not show total public transport boardings and alightings.

Figure 2-5 Public Transport Patronage: Oxford-Bicester Corridor

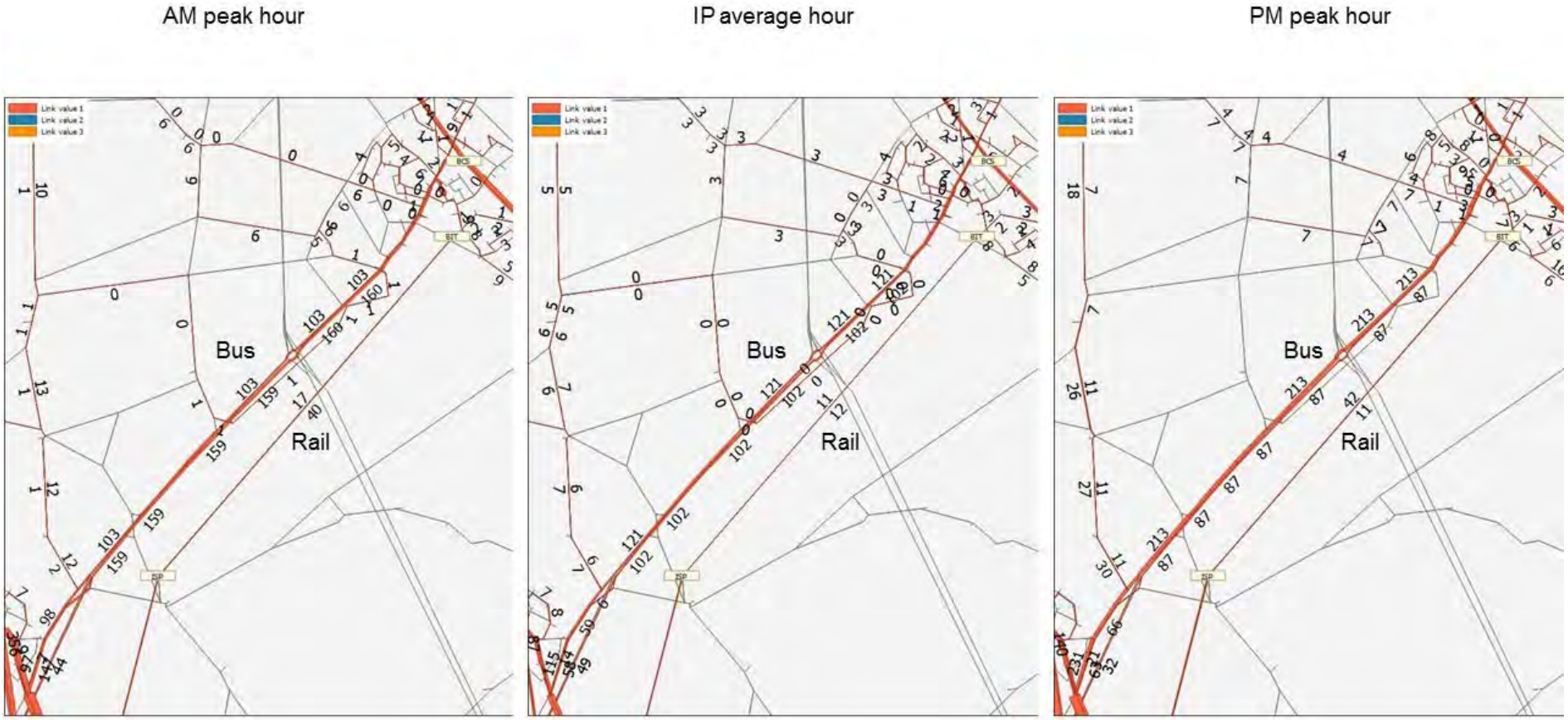
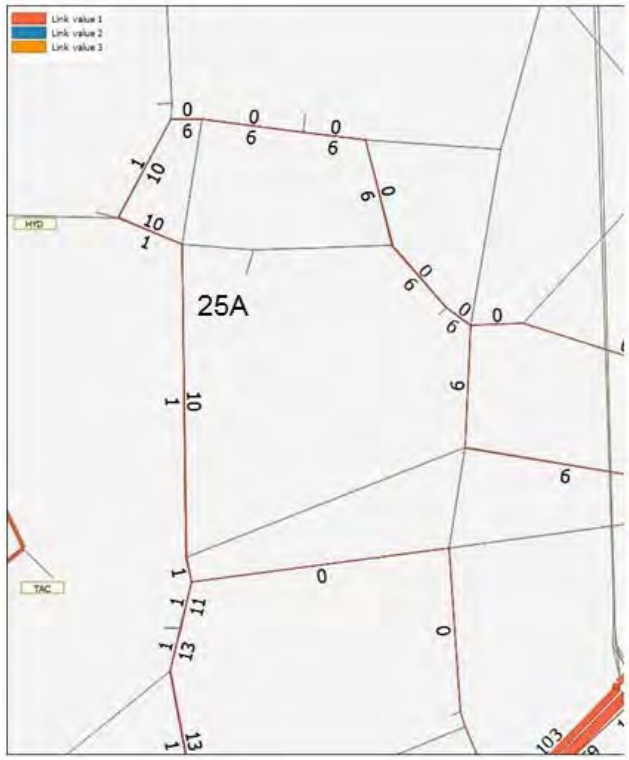


Figure 2-6 Public Transport Patronage: Oxford-Upper Heyford Corridor

AM peak hour



IP average hour

PM peak hour

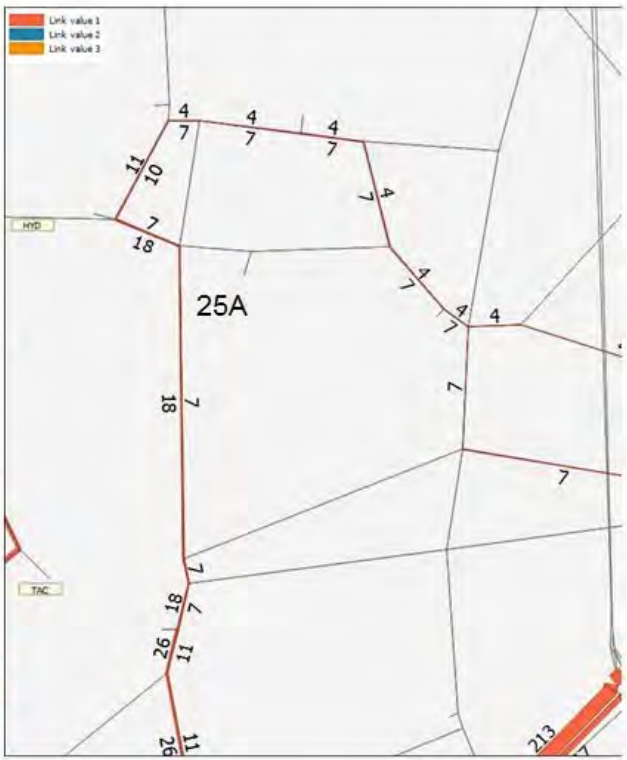
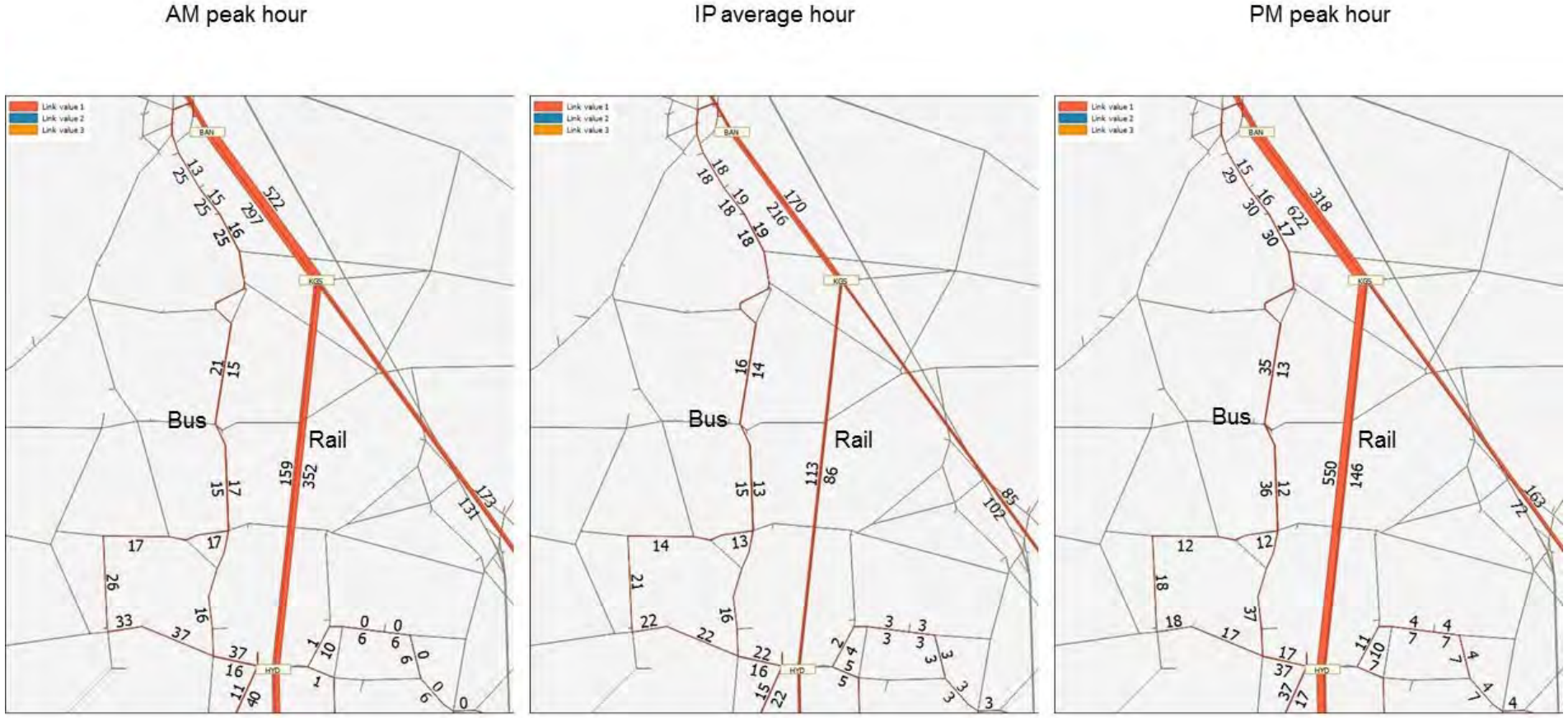


Figure 2-7 Public Transport Patronage: Oxford-Banbury Corridor



Technical note

3. Scenario 2

3.1. Scenario 2 - Assumptions

The first modelled scenario includes the 2031 Local Plan Modifications demand with the transport mitigation measures identified for the Local Plan. It does not include any additional mitigation measures for the Local Plan Modification demand. Table 3-1 shows the Local Plan land use inputs whilst Table 3-2 shows the additional land use inputs that form the Local Plan Modifications.

Table 3-1 Land Use Inputs – Local Plan 2031

Type	District and site	House	Jobs
Residential	Bankside Phase 1 and 2	1492	
Residential	Canalside	950	
Residential	Graven Hill	1900	
Residential	N of Hanwell Fields	500	
Residential	NW Bicester Phase 1 and 2	1793	
Residential	South East Bicester	400	
Residential	Southam Road	600	
Residential	SW Bicester Phase 1 and 2	2241	
Residential	Upper Heyford	761	
Residential	W of Bretch Hill	400	
Commercial	Bicester Business Park		3850
Commercial	Bicester Gateway		900
Commercial	Graven Hill		2070
Commercial	Land W of M40		1951
Commercial	NE Bicester business park		1092
Commercial	NW Bicester Phase 1 and 2		1800
Commercial	SE Bicester business park		2000
Commercial	Upper Heyford		1500
TOTAL		**11037**	**15163**

Table 3-2 Additional Land Use Inputs – Local Plan Modifications 2031

Type	District and site	House	Jobs
Residential	Bankside Phase 2	200	
Residential	Bolton Road	200	
Residential	Canalside	-250	
Residential	Drayton Lodge Farm	250	
Residential	Gavray Drive	300	
Residential	Graven Hill	200	
Residential	Higham Way	150	
Residential	N of Hanwell Fields	44	
Residential	NW Bicester Eco Town	1500	
Residential	South East Bicester	1100	
Residential	South of Salt Way area – Crouch Farm to Bodicote	1495	
Residential	SW Bicester	76	
Residential	*Upper Heyford*	*1600*	
Commercial	Bicester Business Park		2150
Commercial	Bicester Gateway		2600
Commercial	Graven Hill		-70

Type	District and site	House	Jobs
Commercial	Land North East of Junction 11 – Banbury 15		3500
Commercial	Land W of M40		550
Commercial	NE Bicester business park		-92
Commercial	NW Bicester Eco Town		400
Commercial	NW Bicester Eco Town		400
Commercial	NW Bicester Eco Town		400
Commercial	South East Bicester		333
Commercial	South East Bicester		333
Commercial	South East Bicester		333
Commercial	*Upper Heyford*		*0*
TOTAL		**6865**	**10837**

In total the Local Plan and the Local Plan Modifications comprise 17,902 dwellings and 26,000 jobs distributed across several locations in Cherwell District.

The trip rates used for these additional dwellings in Upper Heyford are presented Table 3-3 in below.

Table 3-3 Trip rates for Upper Heyford additional dwellings

Time Period	Car		Public Transport	
	Arrival	Departure	Arrival	Departure
AM Period	0.587	1.383	0.015	0.045
IP Period	1.718	1.577	0.036	0.033
PM Period	1.475	0.963	0.033	0.006

The highway and public transport schemes coded in as per the Local Plan are presented in Table 3-4 and Table 3-5 below respectively.

Table 3-4 Highway Schemes - Local Plan Modifications with Local Plan Mitigation 2031

Highway Scheme	Include in 2031 model?
A41 Oxford Road / Boundary Way roundabout	Yes
Bucknell Road/A4095 Howes Lane new priority junction	Yes
M40 J10	Yes
M40 J9 Phase 2	Yes
Park and Ride Southwest of Bicester	Included as Bus Service
South West Bicester Link Road	Yes
Bicester Town centre changes	Yes
Upper Heyford Improvement	Yes
A34 Milton Interchange Hamburger	Yes
A34 Chilton Northern Slip Roads	Yes
A34 Milton Interchange Hamburger	Yes
A41 / Neunkirchen Way roundabout (Rodney House)	Yes
A4130 new signalled T-junctions to development EZ	Yes
A415 Ducklington Lane/Station Lane junction improvement	Yes
Access to Harwell Section 1 (B4493 –A417)	Yes
Access to Harwell Section 2 (Hagbourne Hill)	Yes
Barton Transport Assessment, A40	Yes
Coding to reflect traffic management measures in villages (Harwell)	Yes
Didcot Northern Perimeter Road (NPR) 3 and associated junctions	Yes
Down's Road/A40 new junction	Yes

Highway Scheme	Include in 2031 model?
Featherbed/Steventon Lights junction and on-line improvements	Yes
Foxhall Bridge Widening	Yes
Frideswide Square including changes to Beckett Street	Yes
Great Western Park (GWP) and signalised access junctions	Yes
Grove Northern link Rd	Yes
Harwell Oxford all access points junction improvements	Yes
Headington roundabout/London Road bus lane improvements	Yes
Hinksey Hill	Yes
Jubilee roundabout scheme	Yes
Kennington Roundabout Improvements	Yes
Links through Valley Park to Science Bridge	Yes
Milton Park LDO mitigation schemes on Milton Park Road	Yes
Oxford Road / Pingle Drive junction	Yes
Relief to Manor Bridge (Science Bridge)	Yes
Rowstock Roundabout improvements	Yes
Transform Oxford Approach Roads, West Way Botley Road Junction	Yes
Valley Park spine road (A4130 – B4493)	Yes
Wantage Eastern Link Road	Yes
Bus priority on A41 corridor	No – scheme not defined
Widening of A41	No – scheme not defined

Table 3-5 Public Transport Schemes - Local Plan Modifications with Local Plan Mitigation 2031

Location	Scheme description	Include in 2031 model?
West Witney	To be served by extension of service S1 from Thorney Leys two times per hour, through the site and thus onwards to Carterton. This in addition to the existing 2 buses per hour via Curbridge.	Yes
Barton West	assume 3 buses per hour across the A40 to the John Radcliffe, as extension of service x13 Abingdon-City Centre JR.	Yes
Bankside	2 new buses per hour to Banbury via Bankside plus enhancement of service s4 between Deddington and Banbury via main road.	Yes
Crabhill	2 buses per hour Harwell-Crab Hill-Grove Airfield-Milton Park-Didcot (service 36) plus diversion of 2 buses per hour Wantage-Oxford through site (either x30 or 31).	Yes
NW Bicester	Services will increase in frequency as site builds out. Site will require separate services east and west of the railway. For 1793 dwellings (one third of build out) assume 4 new buses per hour to Bicester Town Centre and Bicester Town station.	Yes
Graven Hill/SW Bicester	"Graven Hill, assume 2 buses per hour to western side, plus enhanced service s5 two times per hour to eastern side, operating Arncott-Ambrosden-diversion into part of Graven Hill-Bicester Town Centre - possibly on to Oxford" "South West Bicester, 4 new buses per hour to Bicester Town Centre and station, plus s5 service to Oxford, 2 per hour through the site ideally or certainly via Middleton Stoney Road, then 4 per hour along the A41 (Accessed at Bicester Village stop, new Business Park stop and at Park and Ride)"	Yes

Location	Scheme description	Include in 2031 model?
NE Didcot	"North East Didcot, 4 buses per hour to Didcot Town Centre and Station and then 2 of these extended to Milton Park and on to Harwell"	Yes
Valley Park	"Valley Park, 2 buses per hour Didcot-Wantage Road-Valley Park-Milton Park plus 2 buses per hour Didcot - main road - Valley Park – Harwell"	Yes
Great Western Park	"Great Western Park, same pattern as at Valley Park, 4 per hour to Didcot Town Centre, 2 to Milton Park, 2 to Harwell"	Yes
East West Rail	East West Rail comprises four new services: • Reading – Bedford with a headway of 60 minutes all day; • Reading – Milton Keynes with a headway of 60 minutes all day; • Bletchley – Milton Keynes with a headway of 60 minutes all day; • Milton Keynes – Marylebone with a headway of 60 minutes all day.	Yes
Evergreen 3	Evergreen3 from Chiltern Railway consists in the creation of a new service between Oxford and London Marylebone, with a headway of 30 minutes all day.	Yes
Upper Heyford	Create a new service between Upper Heyford and Bicester with a frequency of 1 bph for all time periods.	Yes

3.2. Impact of Scenario 2 at Cherwell

This section describes the impact that the new demand and mitigation schemes have on the results from the models.

3.2.1. Demand Model

Table 3-6 to Table 3-9 summarise the **Reference Forecast** and the **Forecast Scenario** demand for **Cherwell District** in the Local Plan Modifications Demand with Local Plan Mitigation scenario. The demand model, which can change trip frequency, time and mode, shows a greater impact on the people having Cherwell as destinations, both at time period level and over the 12 hour period.

For the people who have Cherwell as **origin**, the demand model results in 1.5% reduction in car vehicle trips over the 12 hour period, with a significant increase in bus (8.5%) and rail (4.5%). The overall impact is a small reduction (1%) in total trips from the district (assuming an average vehicle occupancy of 1.25). For the people who have Cherwell as **destination**, the demand model results in 4.3% reduction in car vehicle trips over the 12 hour period, with a significant increase in bus (10.3%) and rail (15.2%). The overall impact is a small reduction (3.3%) in total trips from the district (assuming an average vehicle occupancy of 1.25).

Table 3-6 Forecast demand for Cherwell in Local Plan Modifications with Local Plan Mitigation (AM period)

	Forecast Scenario		Reference Scenario		Difference	
Mode	Origin	Destination	Origin	Destination	Origin	Destination
Car (vehicles)	71174	65531	72935	69994	-1762	-4462
Bus (people)	4647	4222	4449	3323	198	899
Rail (people)	3503	3500	3415	2820	89	680
TOTAL (people)	97118	89636	99033	93636	-1916	-3999
PT Mode Share	8.4%	8.6%	7.9%	6.6%		

Table 3-7 Forecast demand for Cherwell in Local Plan Modifications with Local Plan Mitigation (IP period)

Mode	Forecast Scenario		Reference Scenario		Difference	
	Origin	Destination	Origin	Destination	Origin	Destination
Car (vehicles)	122800	119097	119903	120707	2897	-1610
Bus (people)	5134	5181	4728	4954	406	227
Rail (people)	2788	3425	2959	3088	-172	337
TOTAL (people)	161422	157477	157566	158926	3855	-1449
PT Mode Share	4.9%	5.5%	4.9%	5.1%		

Table 3-8 Forecast demand for Cherwell in Local Plan Modifications with Local Plan Mitigation (PM period)

Mode	Forecast Scenario		Reference Scenario		Difference	
	Origin	Destination	Origin	Destination	Origin	Destination
Car (vehicles)	83544	83881	88908	89764	-5364	-5883
Bus (people)	3081	3845	2673	3736	408	109
Rail (people)	3401	3511	2888	3153	513	359
TOTAL (people)	110912	112207	116696	119094	-5784	-6886
PT Mode Share	5.8%	6.6%	4.8%	5.8%		

Table 3-9 Forecast demand for Cherwell in Local Plan Modifications with Local Plan Mitigation (12 hour)

Mode	Forecast Scenario		Reference Scenario		Difference	
	Origin	Destination	Origin	Destination	Origin	Destination
Car (vehicles)	277517	268509	281746	280464	-4229	-11955
Bus (people)	12862	13248	11850	12014	1012	1235
Rail (people)	9692	10436	9262	9061	430	1376
TOTAL (people)	369450	359321	373295	371655	-3845	-12333
PT Mode Share	6.1%	6.6%	5.7%	5.7%		

Table 3-10 to Table 3-13 summarise the **Reference Forecast** and the **Forecast Scenario** demand for the **entire model** in the Local Plan Modifications Demand with Local Plan Mitigation scenario.

Table 3-10 Forecast demand for the entire model in Local Plan Modifications with Local Plan Mitigation (AM period)

Mode	Forecast Scenario	Reference Scenario	Difference
	Origin/Destination	Origin/Destination	Origin/Destination
Car (vehicles)	323143	324036	-892
Bus (people)	34484	34359	124
Rail (people)	13346	14192	-845
TOTAL (people)	451759	453596	-1836
PT Mode Share	10.6%	10.7%	

Table 3-11 Forecast demand for the entire model in Local Plan Modifications with Local Plan Mitigation (IP period)

Mode	Forecast Scenario	Reference Scenario	Difference
	Origin/Destination	Origin/Destination	Origin/Destination
Car (vehicles)	570034	556818	13216
Bus (people)	60204	59910	294
Rail (people)	13833	15514	-1681
TOTAL (people)	786580	771447	15133

Mode	Forecast Scenario	Reference Scenario	Difference
	Origin/Destination	Origin/Destination	Origin/Destination
PT Mode Share	9.4%	9.8%	

Table 3-12 Forecast demand for the entire model in Local Plan Modifications with Local Plan Mitigation (PM period)

Mode	Forecast Scenario	Reference Scenario	Difference
	Origin/Destination	Origin/Destination	Origin/Destination
Car (vehicles)	400325	407794	-7469
Bus (people)	35909	36588	-679
Rail (people)	15215	15704	-489
TOTAL (people)	551530	562035	-10504
PT Mode Share	9.3%	9.3%	

Table 3-13 Forecast demand for the entire model in Local Plan Modifications with Local Plan Mitigation (12 hour)

Mode	Forecast Scenario	Reference Scenario	Difference
	Origin/Destination	Origin/Destination	Origin/Destination
Car (vehicles)	1293503	1288648	4855
Bus (people)	130597	130857	-260
Rail (people)	42394	45409	-3015
TOTAL (people)	1789869	1787076	2794
PT Mode Share	9.7%	9.9%	

The demand model, which can change trip frequency, time and mode, results in a 0.4% increase in car vehicle across the OSM model in the 12 hour period, whilst the bus passenger trips and rail trips decrease by around 0.2% and 6.6% respectively. The overall impact is a small increase of 0.2% in total trips (assuming an average vehicle occupancy of 1.25).

3.2.2. Highway Network

This section describes the highway network performance in the Cherwell District. The overall Cherwell District network statistics for the model simulation area are shown below in Table 3-14.

Table 3-14 Scenario 2 Network Statistics

Time	Metric	Results	Unit
Morning Peak Hour	Total Time	14894	Pcu Hr
	Delay	2662	Pcu Hr
	Total distance	921185	Pcu KM
	Speed	61.85	KM/h
Inter Peak Hour	Total Time	11700	Pcu Hr
	Delay	1112	Pcu Hr
	Total distance	838729	Pcu KM
	Speed	71.69	KM/h
Evening Peak Hour	Total Time	17760	Pcu Hr
	Delay	4250	Pcu Hr
	Total distance	1005627	Pcu KM
	Speed	56.62	KM/h

The network performance assessment for the key corridors in the district is described in Table 3-15 whilst Figure 3-1 and Figure 3-2 show this for the morning and evening peak hours respectively. The assessment

is organised in to routes and focuses primarily on the link performance in to key junctions along the route and also provides further detail relating specifically to junction performance where that differs to the link performance.

The network link and junction performance are measured by the volume to capacity (v/c) ratio and highlights those links on the highway network that are operating below operational capacity (v/c <85%), at operational capacity (v/c between 85% and 95%) and those that are exceeding operational capacity (v/c >95%).

The junction performance described below refers to results from a forecast of the strategic highway model and it is possible that detailed junction modelling software would not only be able to optimise signalised junction performance, but also produce marginally different junction performance results.

Table 3-15 Scenario 2 network performance assessment

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
A361	London Road and Banbury Road Junction	1	Overall the performance of this junction is below capacity. However 1 turn performs at capacity and 3 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the westbound link performs at capacity.	Overall the performance of this junction is below capacity. However 1 turn performs at capacity and 3 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the westbound link performs at capacity.
	A361 and B4031 Junction	2	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	A361 and Bloxham Road Junction	3	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	S Newington Road and Barford Road Junction	4	Overall the performance of this junction is at capacity. However 1 turn performs at capacity and 2 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the southbound link performs over capacity.	Overall the performance of this junction is at capacity. However 4 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the southbound link performs over capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
	A361 and B4100 Junction	5	Overall the performance of this junction is below capacity. However 2 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity.	Overall the performance of this junction is below capacity. However 2 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity.
A4260	A4260 and Twyford Road Junction	6	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is at capacity. However 2 turns perform at capacity. With reference to the links entering this junction, the southbound link performs over capacity.
	A4260 and Aynho Road Junction Adderbury	7	Overall the performance of this junction is below capacity. However 4 turns perform over capacity. With reference to the links entering this junction, the southbound link performs over capacity; the westbound link performs over capacity.	Overall the performance of this junction is at capacity. However 4 turns perform over capacity. With reference to the links entering this junction, the southbound link performs over capacity; the westbound link performs over capacity.
	A4260 and Hempton Road Junction Deddington	8	Overall the performance of this junction is over capacity. However 12 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the eastbound link performs over capacity; the southbound link performs over capacity; the westbound link performs over capacity.	Overall the performance of this junction is over capacity. However 12 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the eastbound link performs over capacity; the southbound link performs over capacity; the westbound link performs over capacity.
	A4260 and Somerton Road Junction North Aston	9	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
	A4260 and B4030 Junction Hopcrofts Holt	10	Overall the performance of this junction is below capacity. However 3 turns perform over capacity. With reference to the links entering this junction, the eastbound link performs at capacity; the southbound link performs over capacity.	Overall the performance of this junction is at capacity. However 8 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the eastbound link performs over capacity; the southbound link performs over capacity.
	A4260 and Langford Lane Junction	11	Overall the performance of this junction is below capacity. However 1 turn performs over capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. However 2 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity.
M40 J11	Slips		The M40 northbound and southbound off-slips perform below operational capacity. The M40 southbound on-slip and A361 southbound approach perform over capacity. The A422 eastbound approach performs at capacity.	The M40 northbound off-slip performs at capacity. The A361 southbound approach performs over capacity. The A422 eastbound approach performs over capacity.
	Circulation		The circulatory carriageway is over capacity.	The circulatory carriageway is over capacity.
M40 J10	Slips		The M40 northbound and southbound off-slips perform below operational capacity. The link between the roundabout in the north and the new signalised junction performs over capacity.	The M40 northbound off-slip performs over capacity. The link between the roundabout in the north and the new signalised junction performs over capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
	B430 Roundabout	12	Overall the performance of this junction is below capacity. However 2 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity.	Overall the performance of this junction is at capacity. However 2 turns perform at capacity and 2 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the westbound link performs over capacity.
	A43 Roundabout	13	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
Bicester Ring Road	Middleton Stoney Road Junction	14	Overall the performance of this junction is below capacity. However 3 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	Banbury Road Junction	15	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, the westbound link performs at capacity.
	Launton Road Junction	16	Overall the performance of this junction is below capacity. However 2 turns perform over capacity. With reference to the links entering this junction, the southbound link performs over capacity.	Overall the performance of this junction is at capacity. However 1 turn performs at capacity and 2 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the eastbound link performs at capacity; the southbound link performs at capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
	A41 Junction	17	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
A34	A34 and M40 Junction 9		The A34 southbound off-slip performs over capacity and M40 southbound offslip performs at capacity.	The A34 southbound off-slip performs over capacity.
	A34 Circulation at M40 Junction 9		The circulatory carriageway is over capacity.	The circulatory carriageway is over capacity.
	A34 Slips Kidlington		The A34 southbound on-slip performs at capacity.	The A34 northbound on-slip performs over capacity. The northbound approach of A44 also performs over capacity.
	A34 Circulation at M40		The circulatory carriageway below operational capacity.	The circulatory carriageway below operational capacity.
Hennef Way	Hennef Way and Ermont way Junction	18	Overall the performance of this junction is over capacity. However 9 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the eastbound link performs over capacity; the southbound link performs over capacity; the westbound link performs over capacity.	Overall the performance of this junction is over capacity. However 6 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the westbound link performs over capacity.
	Hennef Way and Concord Avenue	19	Overall the performance of this junction is below capacity. However 2 turns perform over capacity. With reference to the links entering this junction, the eastbound link performs over capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
	Hennef Way and Southam Road	20	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is at capacity. With reference to the links entering this junction, the southbound link performs at capacity; the westbound link performs at capacity.
Cherwell Street	Cherwell street and Bridge Street junction	23	Overall the performance of this junction is below capacity. However 3 turns perform over capacity. With reference to the links entering this junction, the westbound link performs over capacity.	Overall the performance of this junction is below capacity. However 3 turns perform over capacity. With reference to the links entering this junction, the westbound link performs over capacity.
Camp Road Station Rd to B4030	Camp Road and Station Road Junction	24	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	Camp Road and Unnamed Road Junction	25	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	Camp Road and B4030 Junction	26	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
Unnamed Road between Camp Road and B430	Unnamed Road and B430 Junction	27	Overall the performance of this junction is below capacity. However 2 turns perform over capacity. With reference to the links entering this junction, the eastbound link performs over capacity.	Overall the performance of this junction is below capacity. However 1 turn performs at capacity. With reference to the links entering this junction, the eastbound link performs at capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
	Camp Road and Unnamed Road Junction	25	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
Station Road Camp Road to B4030	Station Road and B4030 Junction	28	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	Camp Road and Station Road Junction	24	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
B4030 Bicester to A4260	B4030 and A4095 Howes Lane Junction	14	Overall the performance of this junction is below capacity. However 3 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	Middleton Stoney Junction	29	Overall the performance of this junction is below capacity. However 6 turns perform over capacity. With reference to the links entering this junction, the eastbound link performs over capacity; the westbound link performs over capacity.	Overall the performance of this junction is below capacity. However 9 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the eastbound link performs over capacity; the westbound link performs over capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
	Camp Road and B4030 Junction	26	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	Station Road and B4030 Junction	28	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	Rousham	30	Overall the performance of this junction is below capacity. However 3 turns perform over capacity. With reference to the links entering this junction, the westbound link performs over capacity.	Overall the performance of this junction is below capacity. However 3 turns perform over capacity. With reference to the links entering this junction, the westbound link performs over capacity.
	Holt Junction (B4030 and A4260)	10	Overall the performance of this junction is below capacity. However 3 turns perform over capacity. With reference to the links entering this junction, the eastbound link performs at capacity; the southbound link performs over capacity.	Overall the performance of this junction is at capacity. However 8 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the eastbound link performs over capacity; the southbound link performs over capacity.
B430 Ardley to A34	B430 and Ardley Road Junction	32	Overall the performance of this junction is below capacity. However 6 turns perform over capacity. With reference to the links entering this junction, the eastbound link performs over capacity; the westbound link performs over capacity.	Overall the performance of this junction is below capacity. However 1 turn performs at capacity and 3 turns perform over capacity. With reference to the links entering this junction, the southbound link performs at capacity; the westbound link performs over capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
	Unnamed Road and B430 Junction	27	Overall the performance of this junction is below capacity. However 2 turns perform over capacity. With reference to the links entering this junction, the eastbound link performs over capacity.	Overall the performance of this junction is below capacity. However 1 turn performs at capacity. With reference to the links entering this junction, the eastbound link performs at capacity.
	Middleton Stoney Junction	29	Overall the performance of this junction is below capacity. However 6 turns perform over capacity. With reference to the links entering this junction, the eastbound link performs over capacity; the westbound link performs over capacity.	Overall the performance of this junction is below capacity. However 9 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the eastbound link performs over capacity; the westbound link performs over capacity.
	B430 and A4095 Junction	32	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	A34 Junction	33	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.

Figure 3-1 Scenario 2 AM Peak Network Performance

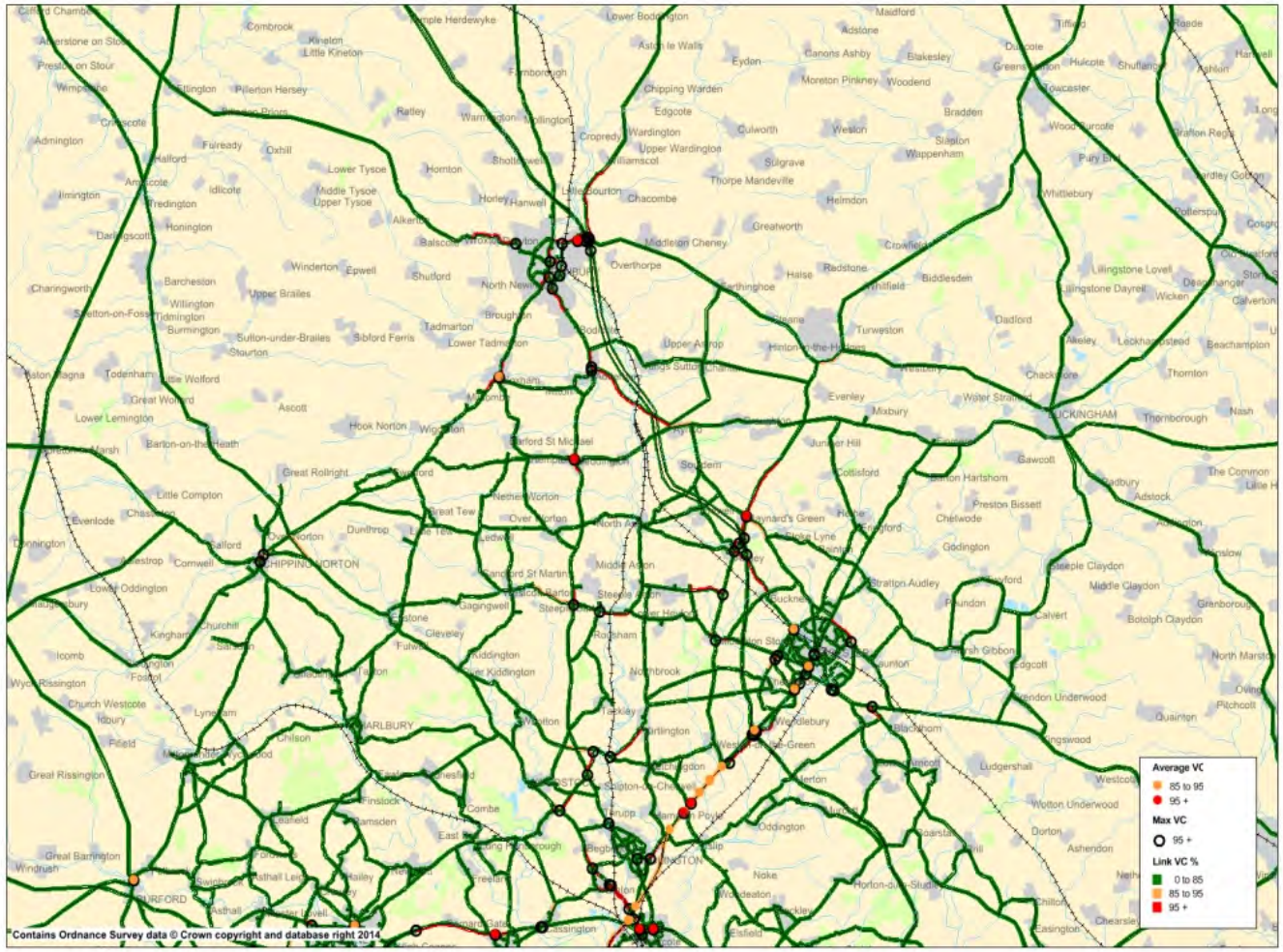
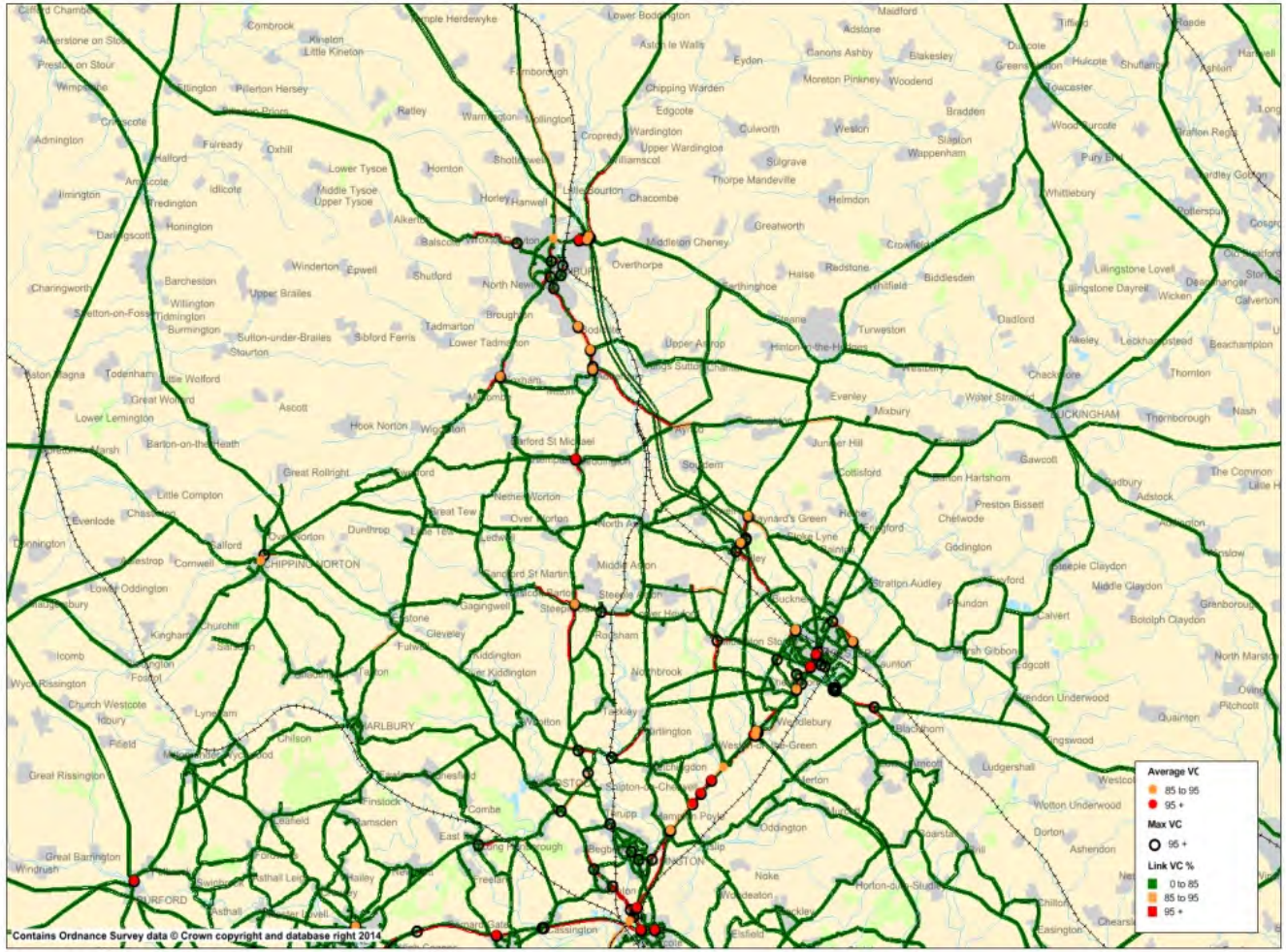


Figure 3-2 Scenario 2 PM Peak Network Performance



3.2.3. Public Transport Network

In the following tables and figures are presented the loads for bus and rail on the main corridors in Cherwell District in Scenario 2:

- Oxford to Bicester
- Oxford to Upper Heyford
- Oxford to Banbury.

Table 3-16 shows the public transport patronage (per hour) in the Oxford-Bicester Corridor. Due to the development sites in Oxford and Bicester, the travel demand increases significantly. The increase in supply both for rail (frequency of 4 trains per hour) and bus (frequency of 9 buses per hour) attracts a part of this demand. The train frequency is now competitive with the bus and hence loadings are broadly similar. More detail is shown in the plots Figure 3-3.

Table 3-16 Public Transport Patronage: Oxford-Bicester Corridor 2031 in Scenario 2

Mode	Time period	Oxford to Bicester	Bicester to Oxford
Rail	AM	715	451
	IP	246	155
	PM	596	554
Bus	AM	743	251
	IP	261	270
	PM	361	556

The public transport patronage between Oxford and Upper Heyford can be seen in Table 3-17 and this is shown in more detail Figure 3-4. Public transport is limited to the bus service 25A on this corridor. The development sites in Upper Heyford contain 1,500 jobs and 2,361 dwellings but this does not translate into more passengers for the bus due to the low frequency.

Table 3-17 Public Transport Patronage: Oxford-Upper Heyford Corridor 2031 in Scenario 2

Mode	Time period	Oxford to Upper Heyford	Upper Heyford to Oxford
Bus	AM	8	8
	IP	5	10
	PM	11	12

Public transport demand on the Oxford to Banbury Corridor is shown in Table 3-18 with further detail being shown in Figure 3-5. Due to the development sites in Oxford and Banbury, the travel demand increases significantly for the bus but has a neutral impact on rail.

Table 3-18 Public Transport Patronage: Oxford-Banbury Corridor 2031 in Scenario 2

Mode	Time period	Oxford to Banbury	Banbury to Oxford
Rail	AM	202	479
	IP	133	107
	PM	577	204
Bus	AM	211	101
	IP	43	65
	PM	83	117

The locations for the flows shown in the tables above can be seen in the following figures. They represent a mid-point on each route and do not show total public transport boardings and alightings.

Figure 3-3 Public Transport Patronage: Oxford-Bicester Corridor 2031 in Scenario 2

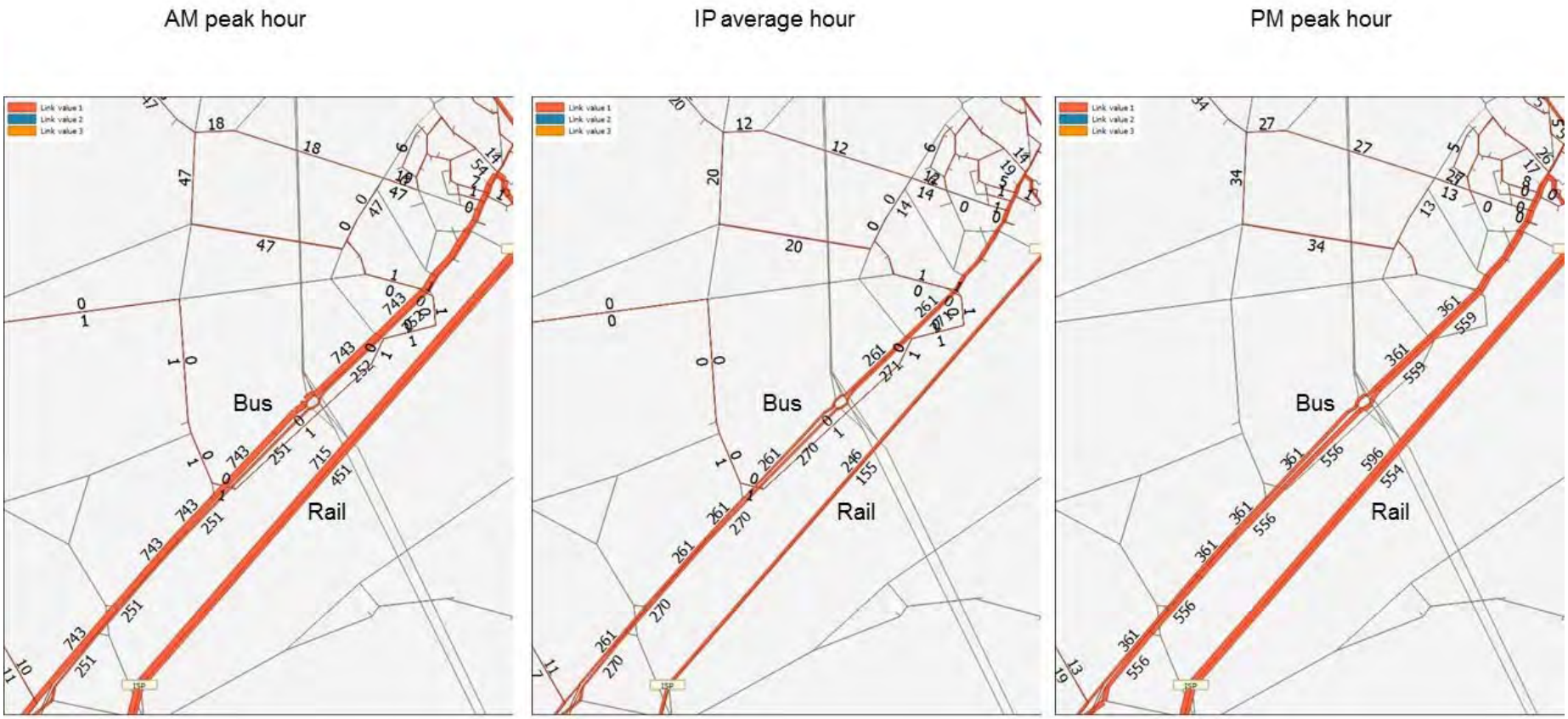
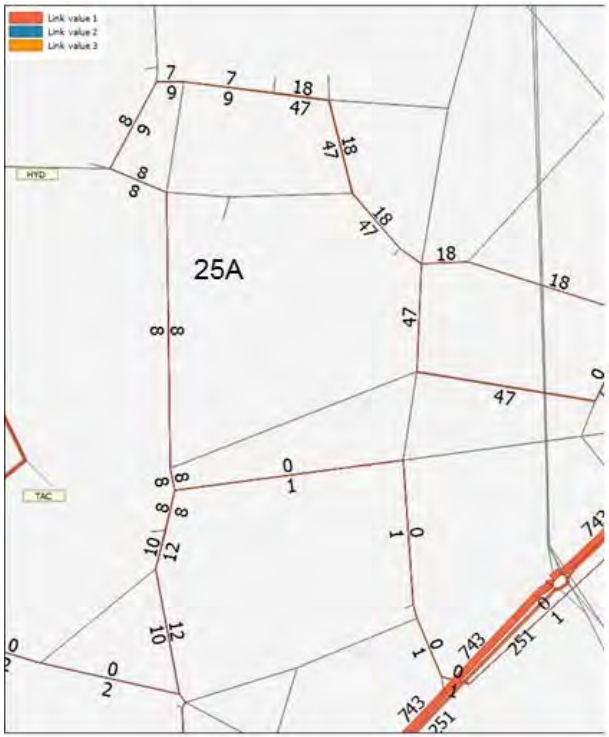
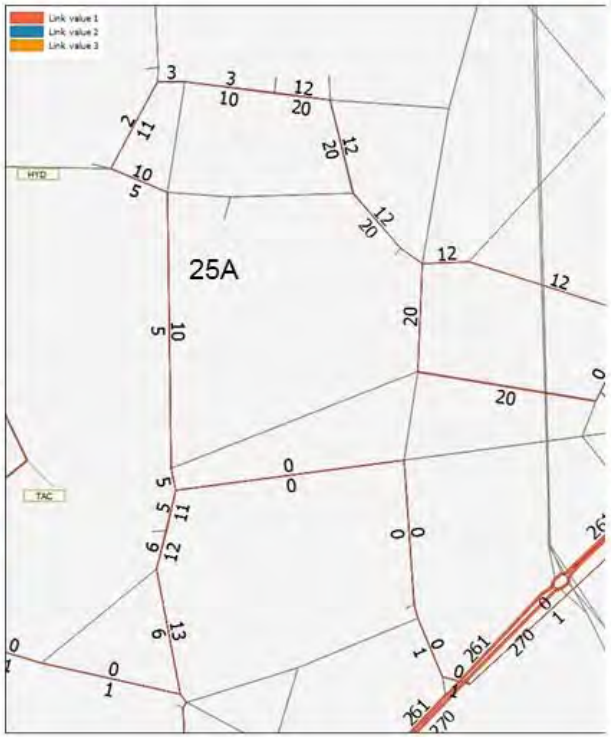


Figure 3-4 Public Transport Patronage: Oxford-Upper Heyford Corridor 2031 in Scenario 2

AM peak hour



IP average hour



PM peak hour

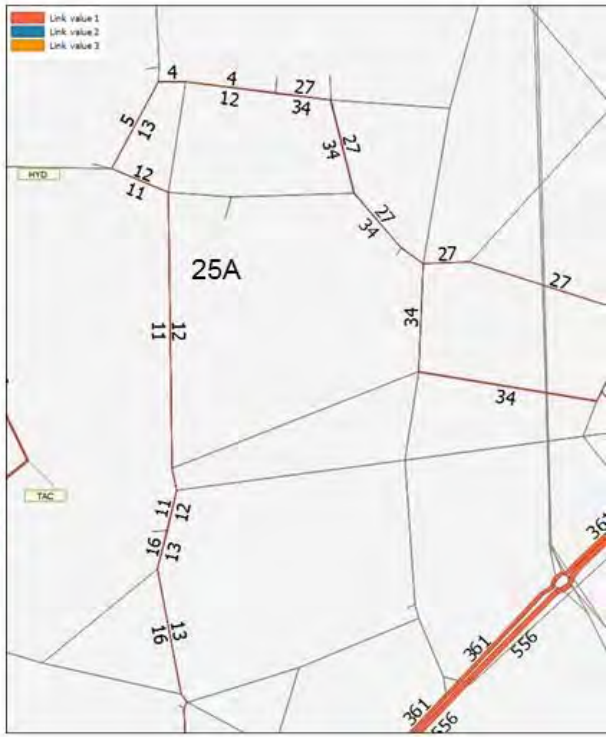
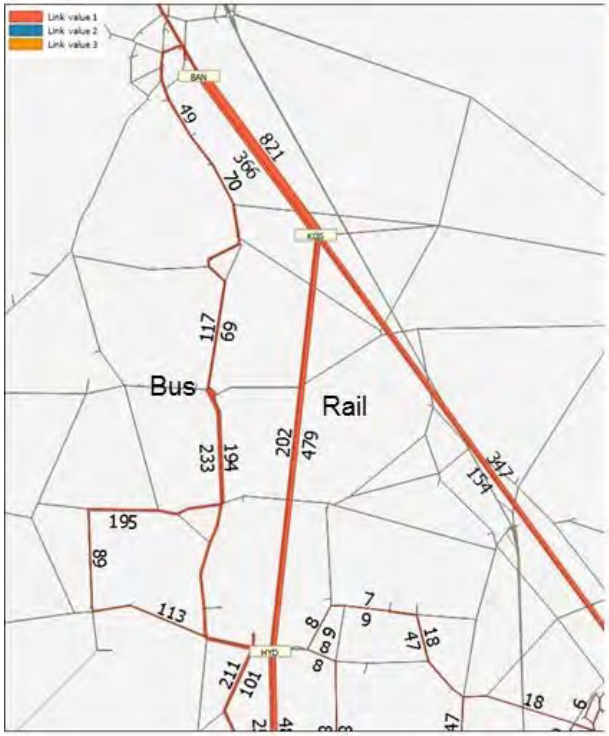
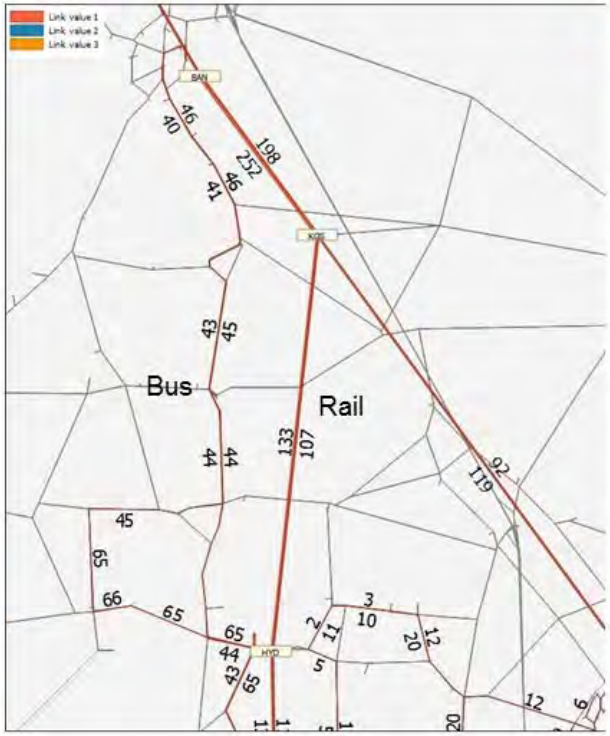


Figure 3-5 Public Transport Patronage: Oxford-Banbury Corridor 2031 in Scenario 2

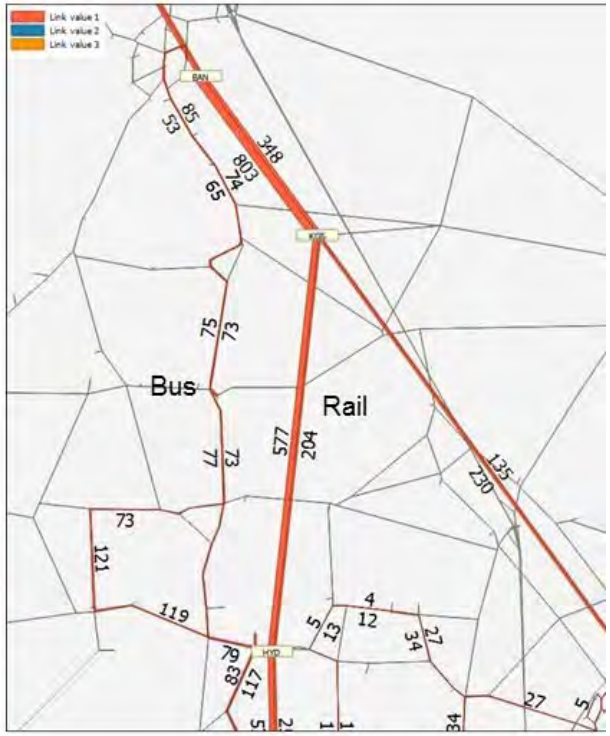
AM peak hour



IP average hour



PM peak hour



Technical note

4. Scenario 5

4.1. Scenario 5 - Assumptions

The second model scenario represents the 2031 Local Plan Modifications demand with the transport mitigation measures identified for both the Local Plan demand and for the Local Plan Modifications demand (including those for the Upper Heyford development). The demand assumptions are the same as in Scenario 2 reported above, and comprise 17,902 dwellings and 26,000 jobs.

The additional highway and public transport schemes included in the model are presented in Table 4-1 and Table 4-2.

Table 4-1 Highway Schemes - Local Plan Modifications with Local Plan Mitigation and Modifications Mitigation 2031

Highway Scheme
Signal optimisation at Junction 11
Signals at the junctions along Hennef Way (Including Ermont Way, Concord Avenue and Southam Road)
The new link road through the development south of Salt Way and a connection onto White Post Road / Oxford Road
Improvements to the Upper Cherwell Street corridor, including at Bridge Street junction
B430/Ardley Village Junction - 4-Arm Staggered traffic signal junction
B430/Camp Road Junction - 3-Arm traffic signal junction
B430 Middleton Stoney Junction – effectively a 3-Arm traffic signal junction with eastbound approach prioritised for public transport and 'local' access only
B4030 Station Road/Lower Heyford Road - Traffic Signals Optimised to 'manage' east-west movement north to Camp Road
B4030 Lower Heyford Road /B4030 Heyford Road - Traffic Signals Optimised to 'manage' east-west movement north to Camp Road and provide for bus movement
B4030/A4260 - Traffic Signals Optimised to 'manage' east-west movement

Table 4-2 Public Transport Schemes - Local Plan Modifications with Local Plan Mitigation and Modifications Mitigation 2031

Location	Scheme description
Upper Heyford	Increase of the frequency of bus service 25A, changing to 3 bph for all time periods.
Upper Heyford	New bus service between Bicester – Upper Heyford – Deddington – Aderbury – Banbury with a frequency of 1 bph

4.2. Impact of Scenario 5 at Cherwell

This section describes the impact that the new demand and mitigation schemes will have on the results from the models.

4.2.1. Demand Model

Table 4-3 to Table 4-6 summarise the **Reference Forecast** and the **Forecast Scenario** demand for **Cherwell District** in the Local Plan Modifications with full mitigation scenario. Similar to Scenario 2, the demand model, which can change trip frequency, time and mode, shows a greater impact on the people having Cherwell as destinations, both at time period level and over the 12 hour period.

For the people who have **Cherwell as origin**, the demand model results in 1.6% reduction in car vehicle trips over the 12 hour period, with a significant increase in bus (29.4%) and a decrease in rail (9.6%). The overall impact is a small reduction (0.8%) in total trips from the district (assuming an average vehicle occupancy of 1.25). For the people who have **Cherwell as destination**, the demand model results in 4.4% reduction in car vehicle trips over the 12 hour period, with a significant increase in bus (32.9%) and rail

(1.6%). The overall impact is a small reduction (3.1%) in total trips from the district (assuming an average vehicle occupancy of 1.25).

Table 4-3 Forecast demand for Cherwell in Local Plan Modifications with Local Plan Mitigation and Modifications Mitigation (AM period)

Mode	Forecast Scenario		Reference Scenario		Difference	
	Origin	Destination	Origin	Destination	Origin	Destination
Car (vehicles)	71206	65753	72935	69994	-1729	-4241
Bus (people)	5458	5434	4449	3323	1010	2111
Rail (people)	2994	3048	3415	2820	-421	228
TOTAL (people)	97460	90673	99033	93636	-1572	-2962
PT Mode Share	8.7%	9.4%	7.9%	6.6%		

Table 4-4 Forecast demand for Cherwell in Local Plan Modifications with Local Plan Mitigation and Modifications Mitigation (IP period)

Mode	Forecast Scenario		Reference Scenario		Difference	
	Origin	Destination	Origin	Destination	Origin	Destination
Car (vehicles)	122333	118788	119903	120707	2430	-1919
Bus (people)	6020	6018	4728	4954	1292	1064
Rail (people)	2399	3078	2959	3088	-561	-10
TOTAL (people)	161335	157581	157566	158926	3769	-1345
PT Mode Share	5.2%	5.8%	4.9%	5.1%		

Table 4-5 Forecast demand for Cherwell in Local Plan Modifications with Local Plan Mitigation and Modifications Mitigation (PM period)

Mode	Forecast Scenario		Reference Scenario		Difference	
	Origin	Destination	Origin	Destination	Origin	Destination
Car (vehicles)	83622	83576	88908	89764	-5286	-6188
Bus (people)	3850	4510	2673	3736	1177	774
Rail (people)	2980	3076	2888	3153	92	-77
TOTAL (people)	111358	112056	116696	119094	-5339	-7038
PT Mode Share	6.1%	6.8%	4.8%	5.8%		

Table 4-6 Forecast demand for Cherwell in Local Plan Modifications with Local Plan Mitigation and Modifications Mitigation (12 Hour)

Mode	Forecast Scenario		Reference Scenario		Difference	
	Origin	Destination	Origin	Destination	Origin	Destination
Car (vehicles)	277161	268116	281746	280464	-4586	-12348
Bus (people)	15328	15963	11850	12014	3479	3949
Rail (people)	8373	9202	9262	9061	-889	141
TOTAL (people)	370152	360310	373295	371655	-3143	-11345
PT Mode Share	6.4%	7.0%	5.7%	5.7%		

Table 4-7 to Table 4-10 summarise the **Reference Forecast** and the **Forecast Scenario** demand for the **entire model** in the Local Plan Modifications with full mitigation scenario. The demand model, which can change trip frequency, time and mode, results in a small (0.3%) increase in car vehicle trips in the OSM model area in the 12 hour period and a small increase in bus trips (1.6%) and a decrease in rail trips by 10.4%. The overall impact is a slight increase (0.2%) in total trips to/from the district (assuming an average vehicle occupancy of 1.25).

Table 4-7 Forecast demand in Local Plan Modifications with Local Plan Mitigation and Modifications Mitigations (All model) (AM period)

Mode	Forecast Scenario	Reference Scenario	Difference
	Origin/Destination	Origin/Destination	Origin/Destination
Car (vehicles)	323055	324036	-981
Bus (people)	35517	34359	1158
Rail (people)	12734	14192	-1457
TOTAL (people)	452070	453596	-1525
PT Mode Share	10.7%	10.7%	

Table 4-8 Forecast demand in Local Plan Modifications with Local Plan Mitigation and Modifications Mitigations (All model) (IP period)

Mode	Forecast Scenario	Reference Scenario	Difference
	Origin/Destination	Origin/Destination	Origin/Destination
Car (vehicles)	569610	556818	12791
Bus (people)	60861	59910	952
Rail (people)	13310	15514	-2204
TOTAL (people)	786184	771447	14737
PT Mode Share	9.4%	9.8%	

Table 4-9 Forecast demand in Local Plan Modifications with Local Plan Mitigation and Modifications Mitigations (All model) (PM period)

Mode	Forecast Scenario	Reference Scenario	Difference
	Origin/Destination	Origin/Destination	Origin/Destination
Car (vehicles)	400286	407794	-7508
Bus (people)	36580	36588	-9
Rail (people)	14637	15704	-1067
TOTAL (people)	551575	562035	-10461
PT Mode Share	9.3%	9.3%	

Table 4-10 Forecast demand in Local Plan Modifications with Local Plan Mitigation and Modifications Mitigations (All model) (12 hour period)

Mode	Forecast Scenario	Reference Scenario	Difference
	Origin/Destination	Origin/Destination	Origin/Destination
Car (vehicles)	1292950	1288648	4303
Bus (people)	132958	130857	2101
Rail (people)	40681	45409	-4728
TOTAL (people)	1789827	1787076	2752
PT Mode Share	9.7%	9.9%	

4.2.1. Highway Network

This section describes the highway network performance in the Cherwell District. The overall Cherwell District network statistics for the model simulation area are shown below in Table 4-11.

Table 4-11 Scenario 5 Network Statistics

Time	Metric	Results	Unit
Morning Peak Hour	Total Time	14615	Pcu Hr
	Delay	2523	Pcu Hr
	Total distance	914220	Pcu KM

Time	Metric	Results	Unit
	Speed	62.55	KM/h
Inter Peak Hour	Total Time	11635	Pcu Hr
	Delay	1140	Pcu Hr
	Total distance	834027	Pcu KM
	Speed	71.69	KM/h
Evening Peak Hour	Total Time	17253	Pcu Hr
	Delay	3877	Pcu Hr
	Total distance	1002420	Pcu KM
	Speed	58.10	KM/h

The network performance assessment for the key corridors in the district is described in Table 4-12 whilst Figure 4-1 and 4-2 show this for the morning and evening peak hours respectively. The assessment is organised in to routes and focuses primarily on the link performance in to key junctions along the route and also provides further detail relating specifically to junction performance where that differs to the link performance.

The network link and junction performance are measured by the volume to capacity (v/c) ratio and highlights those links on the highway network that are operating below operational capacity (v/c <85%), at operational capacity (v/c between 85% and 95%) and those that are exceeding operational capacity (v/c >95%).

The junction performance described below refers to results from a forecast of the strategic highway model and it is possible that detailed junction modelling software would not only be able to optimise signalised junction performance, but also produce marginally different junction performance results.

Table 4-12 Scenario 5 network performance assessment

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
A361	London Road and Banbury Road Junction	1	Overall the performance of this junction is below capacity. However 1 turn performs at capacity and 3 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the westbound link performs at capacity.	Overall the performance of this junction is below capacity. However 2 turns perform at capacity and 3 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the westbound links perform at capacity.
	A361 and B4031 Junction	2	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
	A361 and Bloxham Road Junction	3	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	S Newington Road and Barford road Junction	4	Overall the performance of this junction is at capacity. However 1 turn performs at capacity and 2 turns perform over capacity. With reference to the links entering this junction, the northbound link performs at capacity; the southbound link performs over capacity.	Overall the performance of this junction is at capacity. However 4 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the southbound link performs over capacity.
	A361 and B4100 Junction	5	Overall the performance of this junction is below capacity. However 2 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity.	Overall the performance of this junction is below capacity. However 1 turn performs at capacity. With reference to the links entering this junction, all links perform below capacity.
A4260	A4260 and Twyford Road Junction	6	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. However 1 turn performs at capacity. With reference to the links entering this junction, the southbound link performs at capacity.
	A4260 and Aynho Road Junction Adderbury	7	Overall the performance of this junction is below capacity. However 4 turns perform over capacity. With reference to the links entering this junction, the southbound link performs over capacity; the westbound link performs over capacity.	Overall the performance of this junction is at capacity. However 4 turns perform over capacity. With reference to the links entering this junction, the southbound link performs over capacity; the westbound link performs over capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
	A4260 and Hempton Road Junction Deddington	8	Overall the performance of this junction is over capacity. However 12 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the eastbound link performs over capacity; the southbound link performs over capacity; the westbound link performs over capacity.	Overall the performance of this junction is over capacity. However 12 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the eastbound link performs over capacity; the southbound link performs over capacity; the westbound link performs over capacity.
	A4260 and Somerton Road Junction North Aston	9	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	A4260 and B4030 Junction Hopcrofts Holt	10	Overall the performance of this junction is below capacity. However 3 turns perform over capacity. With reference to the links entering this junction, the southbound link performs over capacity;	Overall the performance of this junction is at capacity. However 8 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the eastbound link performs over capacity; the southbound link performs over capacity.
	A4260 and Langford Lane Junction	11	Overall the performance of this junction is below capacity. However 1 turn performs over capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. However 2 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
M40 J11	Slips		The M40 northbound off-slip and southbound on-slip perform at capacity. The A361 southbound approach performs over capacity. The A422 eastbound approach performs at capacity.	The M40 northbound off-slip performs at capacity. The M40 southbound, A361 southbound approach and the A422 eastbound approach performs over capacity.
	Circulation		The circulatory carriageway is at capacity.	The circulatory carriageway is over capacity.
M40 J10	Slips		The M40 northbound and southbound off-slips perform below operational capacity. The link between the roundabout in the north and the new signalised junction performs over capacity.	The M40 northbound off-slip performs over capacity. The link between the roundabout in the north and the new signalised junction performs over capacity.
	B430 Roundabout	12	Overall the performance of this junction is below capacity. However 2 turns perform at capacity. With reference to the links entering this junction, the northbound link performs at capacity.	Overall the performance of this junction is at capacity. However 2 turns perform over capacity. With reference to the links entering this junction, the northbound link performs at capacity; the westbound link performs over capacity.
	A43 Roundabout	13	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
Bicester Ring Road	Middleton Stoney Road Junction	14	Overall the performance of this junction is below capacity. However 2 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity.	Overall the performance of this junction is below capacity. However 2 turns perform at capacity. With reference to the links entering this junction, the northbound link performs over capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
	Banbury Road Junction	15	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, the westbound link performs at capacity.
	Launton Road Junction	16	Overall the performance of this junction is below capacity. However 2 turns perform over capacity. With reference to the links entering this junction, the southbound link performs over capacity.	Overall the performance of this junction is at capacity. However 1 turn performs at capacity and 2 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the southbound link performs at capacity.
	A41 Junction	17	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
A34	A34 and M40 Junction 9		The M40 southbound off-slip and A34 southbound off-slip perform at capacity.	The A34 southbound off-slip performs over capacity.
	A34 Circulation at M40		The circulatory carriageway is over capacity.	The circulatory carriageway is over capacity.
	A34 Slips Kidlington		The A34 southbound on-slip and the northbound approach from Woodstock Road perform at capacity.	The A34 northbound on-slip and the northbound approach from Woodstock Road perform over capacity.
	A34 Circulation at M40		The circulatory carriageway below operational capacity.	The circulatory carriageway below operational capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
Hennef Way	Hennef Way and Ermont Way Junction	18	Overall the performance of this junction is at capacity. However 1 turn performs at capacity and 7 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the westbound link performs at capacity.	Overall the performance of this junction is at capacity. However 9 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the eastbound link performs at capacity; the westbound link performs at capacity.
	Hennef Way and Concord Avenue	19	Overall the performance of this junction is at capacity. However 1 turn performs at capacity and 3 turns perform over capacity. With reference to the links entering this junction, the eastbound link performs over capacity; the westbound link performs at capacity.	Overall the performance of this junction is below capacity. However 1 turn performs at capacity and 3 turns perform over capacity. With reference to the links entering this junction, the westbound link performs over capacity.
	Hennef Way and Southam Road	20	Overall the performance of this junction is over capacity. However 11 turn performs over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the eastbound link performs over capacity; the southbound link performs over capacity; the westbound link performs over capacity.	Overall the performance of this junction is over capacity. However 9 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the eastbound link performs over capacity; the southbound link performs over capacity; the westbound link performs over capacity.
New link Road through Salt way development	Bloxham Road and New link Road Junction	21	Overall the performance of this junction is below capacity. However 1 turn performs over capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
	A4260 and New link road junction	22	Overall the performance of this junction is below capacity. However 1 turn performs at capacity. With reference to the links entering this junction, the southbound link performs at capacity.	Overall the performance of this junction is below capacity. However 1 turn performs at capacity and 7 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the southbound link performs over capacity; the access link performs over capacity.
Cherwell Street	Cherwell street and Bridge Street junction	23	Overall the performance of this junction is below capacity. However 2 turns perform over capacity. With reference to the links entering this junction, the westbound link performs over capacity.	Overall the performance of this junction is below capacity. However 2 turns perform over capacity. With reference to the links entering this junction, the westbound link performs over capacity.
Camp Road Station Rd to B4030	Camp Road and Station Road Junction	24	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	Camp Road and Unnamed Road Junction	25	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	Camp Road and B4030 Junction	26	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
Unnamed Road between Camp Road and B430	Unnamed Road and B430 Junction	27	Overall the performance of this junction is below capacity. However 1 turn performs over capacity. With reference to the links entering this junction, the eastbound link performs at capacity.	Overall the performance of this junction is below capacity. However 1 turn performs at capacity. With reference to the links entering this junction, all links perform below capacity.
	Camp Road and Unnamed Road Junction	25	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
Station Road Camp Road to B4030	Station Road and B4030 Junction	28	Overall the performance of this junction is below capacity. However 1 turn performs over capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. However 1 turn performs over capacity. With reference to the links entering this junction, all links perform below capacity.
	Camp Road and Station Road Junction	24	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
B4030 Bicester to A4260	B4030 and A4095 Howes Lane Junction	14	Overall the performance of this junction is below capacity. However 2 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity;	Overall the performance of this junction is below capacity. However 2 turns perform at capacity. With reference to the links entering this junction, the northbound link performs over capacity;

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
	Middleton Stoney Junction	29	Overall the performance of this junction is below capacity. However 1 turn performs at capacity and 6 turns perform over capacity. With reference to the links entering this junction, the eastbound link performs over capacity;	Overall the performance of this junction is below capacity. However 1 turn performs at capacity and 4 turns perform over capacity. With reference to the links entering this junction, the northbound link performs at capacity; the eastbound link performs over capacity;
	Camp Road and B4030 Junction	26	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	Station Road and B4030 Junction	28	Overall the performance of this junction is below capacity. However 1 turn performs over capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. However 1 turn performs over capacity. With reference to the links entering this junction, all links perform below capacity.
	Rousham	30	Overall the performance of this junction is below capacity. However 3 turns perform over capacity. With reference to the links entering this junction, the westbound link performs over capacity.	Overall the performance of this junction is below capacity. However 3 turns perform over capacity. With reference to the links entering this junction, the westbound link performs over capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
	Holt Junction (B4030 and A4260)	10	Overall the performance of this junction is below capacity. However 3 turns perform over capacity. With reference to the links entering this junction, the southbound link performs over capacity.	Overall the performance of this junction is at capacity. However 8 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the eastbound link performs over capacity; the southbound link performs over capacity.
B430 Ardley to A34	B430 and Ardley Road Junction	32	Overall the performance of this junction is at capacity. However 9 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the eastbound link performs over capacity; the westbound link performs over capacity.	Overall the performance of this junction is over capacity. However 1 turn performs at capacity and 8 turns perform over capacity. With reference to the links entering this junction, the northbound link performs over capacity; the southbound link performs over capacity; the westbound link performs over capacity.
	Unnamed Road and B430 Junction	27	Overall the performance of this junction is below capacity. However 1 turn performs over capacity. With reference to the links entering this junction, the eastbound link performs at capacity.	Overall the performance of this junction is below capacity. However 1 turn performs at capacity. With reference to the links entering this junction, all links perform below capacity.

Link	Junction	Junction Number	Morning peak hour	Evening peak hour
	Middleton Stoney Junction	29	Overall the performance of this junction is below capacity. However 1 turn performs at capacity and 6 turns perform over capacity. With reference to the links entering this junction, the eastbound link performs over capacity.	Overall the performance of this junction is below capacity. However 1 turn performs at capacity and 4 turns perform over capacity. With reference to the links entering this junction, the northbound link performs at capacity; the eastbound link performs over capacity.
	B430 and A4095 Junction	32	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.
	A34 Junction	33	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.	Overall the performance of this junction is below capacity. With reference to the links entering this junction, all links perform below capacity.

Figure 4-1 Scenario 5 AM Peak Network Performance

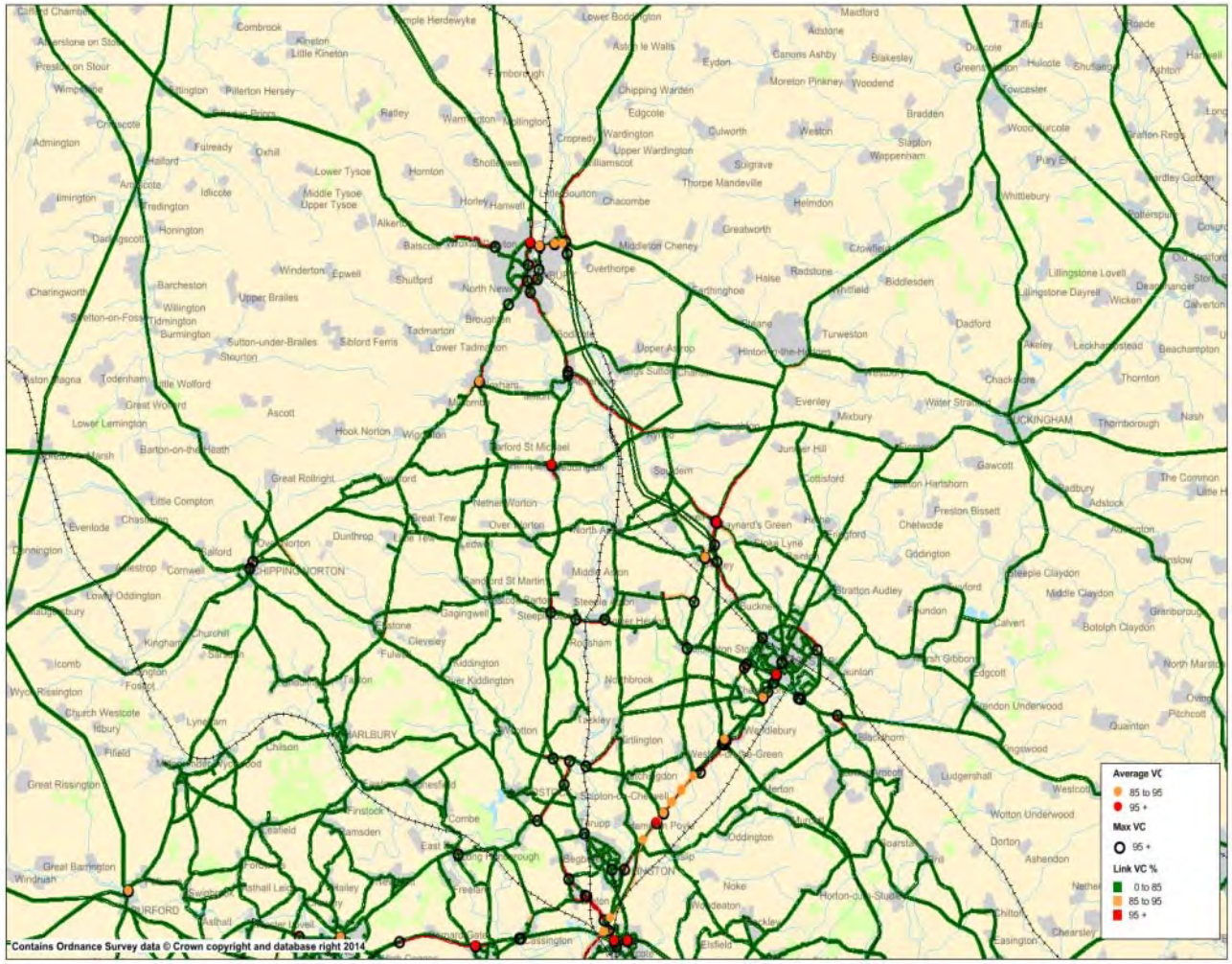
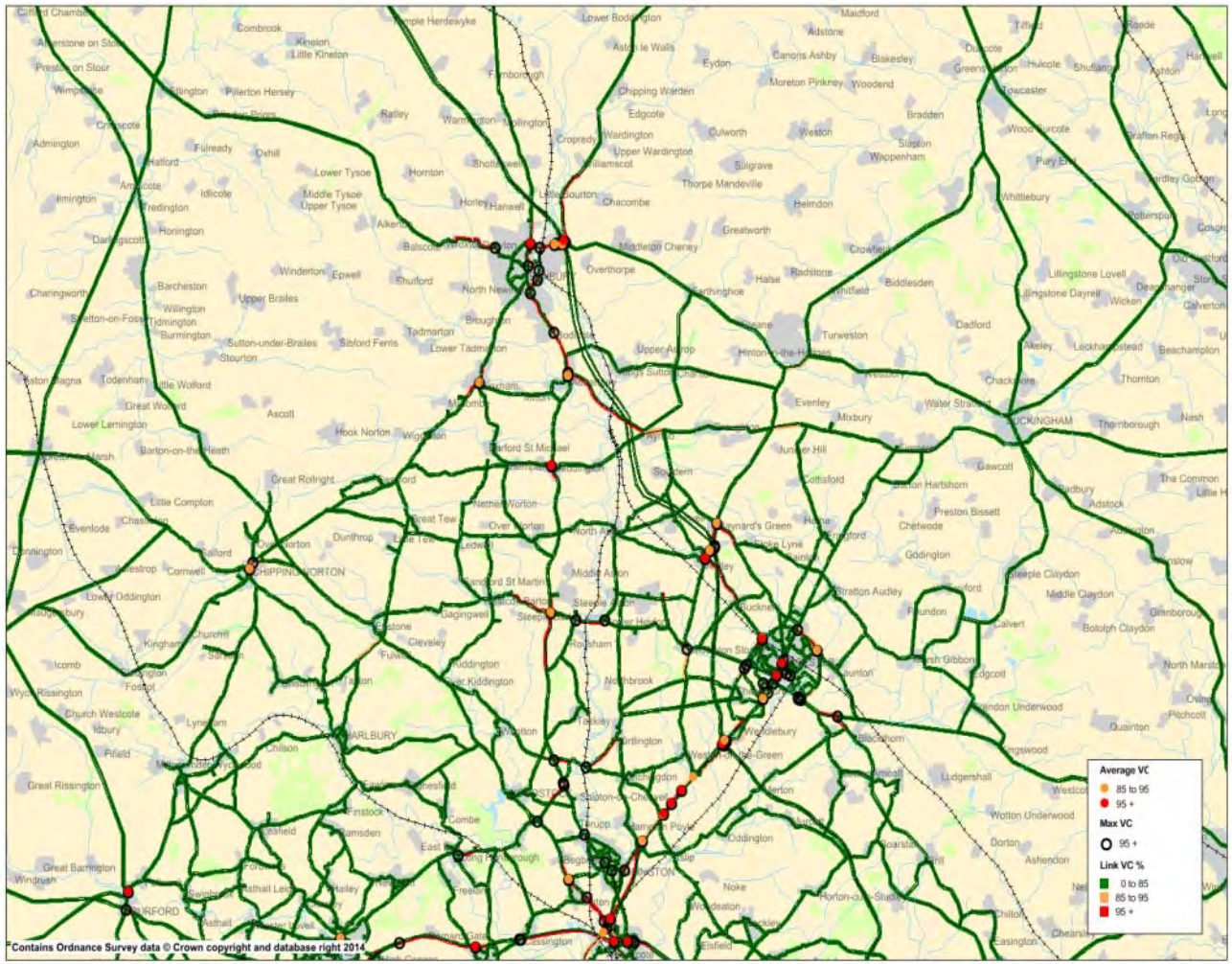


Figure 4-2 Scenario 5 PM Peak Network Performance



4.2.2. Public Transport Network

In the following tables and figures are presented the loads for bus and rail on the main corridors in Cherwell District in Scenario 2:

- Oxford to Bicester
- Oxford to Upper Heyford
- Oxford to Banbury.

The total reference case demand for Scenarios 2 and 5 is identical and so changes in public transport demand are a results of improvements related to the additional mitigation measures.

Table 4-13 shows the public transport loads between Oxford and Bicester and these are shown in further detail in Figure 4-3. For this corridor, results are similar to Scenario 4, with a significant increase in bus and rail patronage.

Table 4-13 Public Transport Patronage: Oxford-Bicester Corridor 2031 in Scenario 5

Mode	Time period	Oxford to Bicester	Bicester to Oxford
Rail	AM	702	435
	IP	238	148
	PM	570	540
Bus	AM	751	205
	IP	254	239
	PM	346	537

The public transport loads between Oxford and Upper Heyford are shown in Table 4-14 (and in more detail in Figure 4-4). The demand is using bus service 25A which operates on this corridor. The results for this Scenario are significantly higher than in Scenario 4 due to the improvements in frequency for service 25A.

Further analysis is being undertaken to understand the drivers behind the bus demand from Oxford to Upper Heyford being greater than to Oxford from Upper Heyford.

Table 4-14 Public Transport Patronage: Oxford-Upper Heyford Corridor 2031 in Scenario 5

Mode	Time period	Oxford to Upper Heyford	Upper Heyford to Oxford
Bus	AM	218	47
	IP	43	65
	PM	83	117

Public transport demand on the Oxford to Banbury Corridor is shown in Table 4-15 with further detail shown in Figure 4-5. For this corridor, results are similar to Scenario 4, with the travel demand increasing significantly for the bus but having a neutral impact on rail.

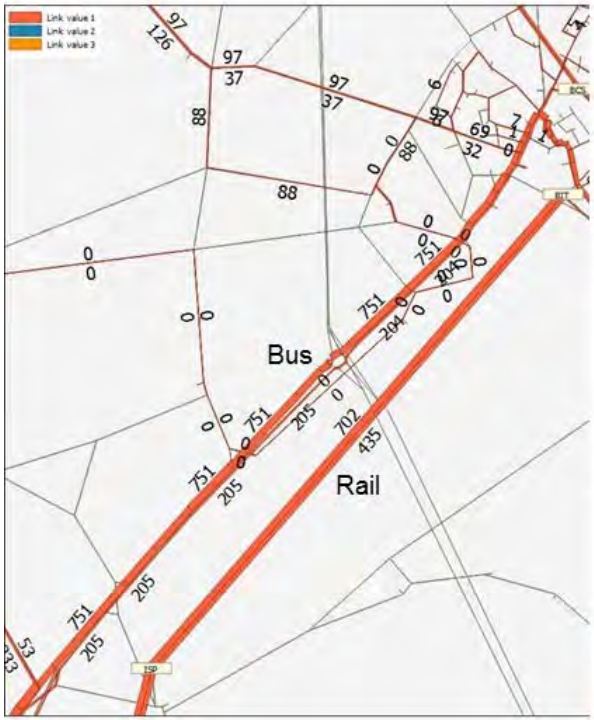
Table 4-15 Public Transport Patronage: Oxford-Banbury Corridor 2031 Scenario in 5

Mode	Time period	Oxford to Banbury	Banbury to Oxford
Rail	AM	177	406
	IP	113	94
	PM	512	179
Bus	AM	172	140
	IP	26	48
	PM	48	83

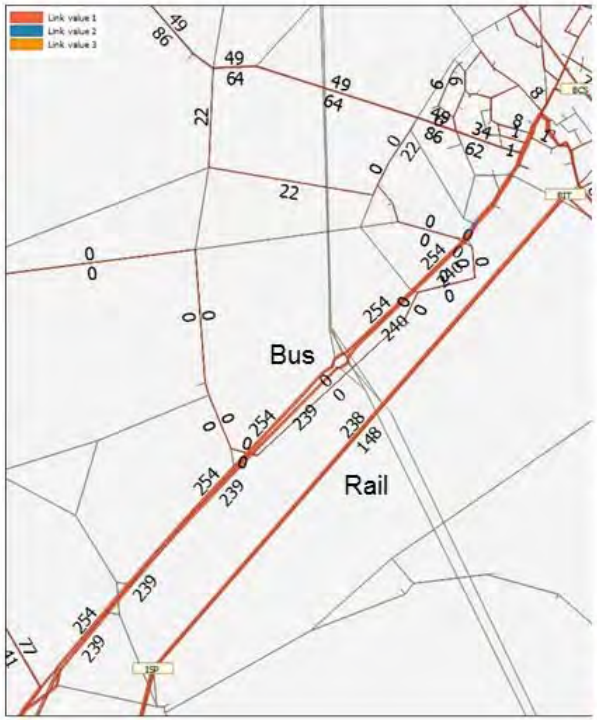
The locations for the flows shown in the tables above can be seen in the following figures. They represent a mid-point on each route and do not show total public transport boardings and alightings.

Figure 4-3 Public Transport Patronage: Oxford-Bicester Corridor 2031 in Scenario 5

AM peak hour



IP average hour



PM peak hour

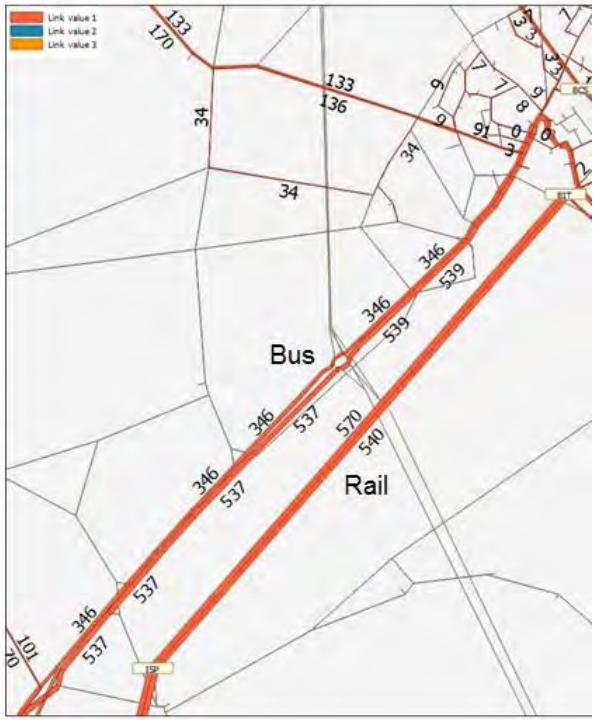


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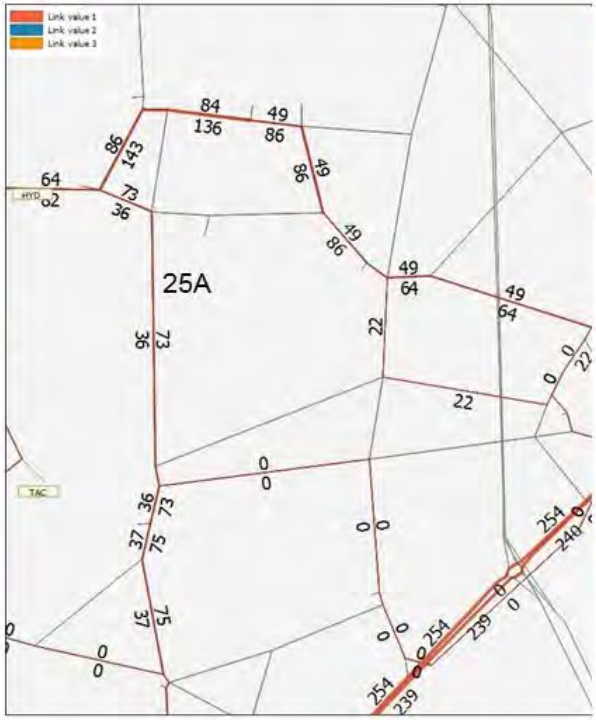
Figure 4-4 Public Transport Patronage: Oxford-Upper Heyford Corridor 2031 in Scenario 5

AM peak hour

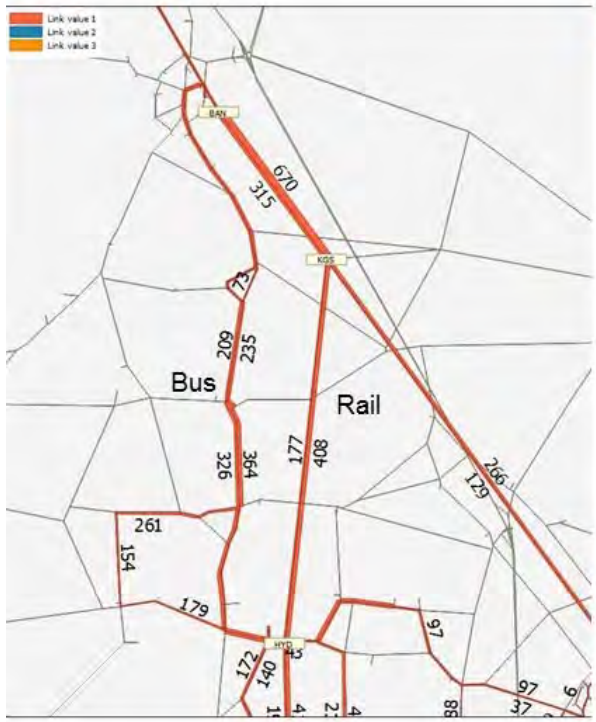
IP average hour



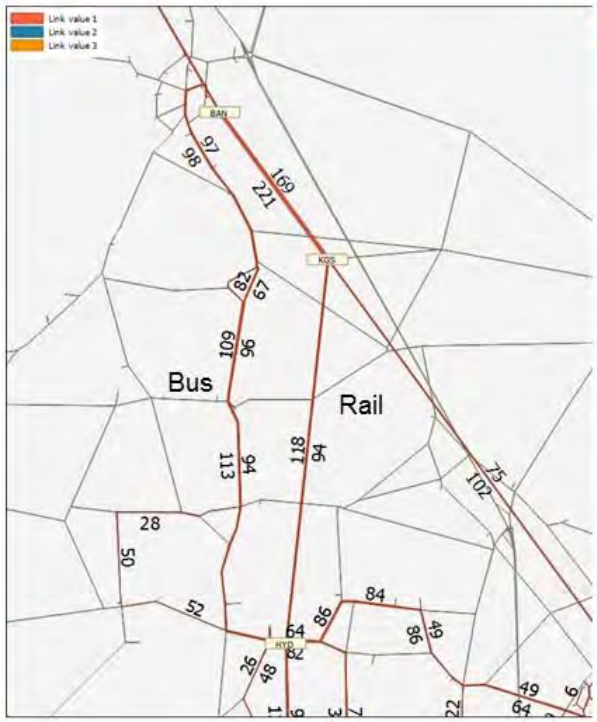
PM peak hour

Figure 4-5 Public Transport Patronage: Oxford-Banbury Corridor 2031 in Scenario 5

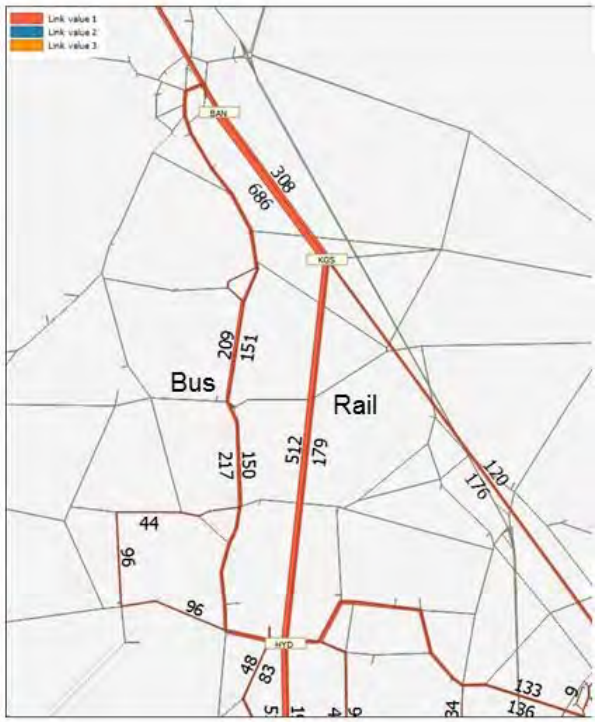
AM peak hour



IP average hour



PM peak hour



Technical note

5. Summary

Two 2031 forecast model scenarios were run testing the Local Plan and the Local Plan Modifications with and without transport mitigation measures for the Local Plan Modifications. The following scenarios were run:

- Base Year 2013
- 2031 Local Plan Modifications demand with the transport mitigation measures identified for the Local Plan demand (Scenario 2)
- 2031 Local Plan Modifications demand with the transport mitigation measures identified for both the Local Plan demand and for the Local Plan Modifications demand (including those for the Upper Heyford development) (Scenario 5)

Section 2 of this technical note describes the transport conditions (from runs of the OSM) in the 2013 base year, whilst Section 3 and Section 4 describe the results of the 2031 OSM model runs for Scenarios 2 and 5 respectively (as detailed above). The key difference between the two scenarios is the introduction of transport mitigation measures to address the impacts of the Local Plan modifications.

Table 5-1 compares the 2031 12 hour forecast demand for the Cherwell District for the Reference Scenario and the two forecast scenarios (Scenarios 2 and 5). It can be seen that the introduction of the mitigation measures results in a decrease in both car and rail travel and increase in bus travel. As the mitigation measures are a combination of highway improvements, increased bus provision and measures to manage traffic on the highway network these results are intuitive.

Table 5-1 2031 Forecast demand for Cherwell District – Scenarios 2 and 5 (12 Hour)

Mode	Reference Scenario		Forecast Scenario 2		Forecast Scenario 5	
	Origin	Destination	Origin	Destination	Origin	Destination
Car (vehicles)	281746	280464	277517	268509	277161	268116
Bus (people)	11850	12014	12862	13248	15328	15963
Rail (people)	9262	9061	9692	10436	8373	9202
TOTAL (people)	373295	371655	369450	359321	370152	360309

Table 5-2 shows equivalent results for the full OSM model area and the results are similar to those observed above for Cherwell District with an increase in bus demand and reduction in car and rail demand.

Table 5-2 2031 Forecast demand for the entire model – Scenarios 2 and 5 (12 hour)

Mode	Reference Scenario	Forecast Scenario 2	Forecast Scenario 5
	Origin/Destination	Origin/Destination	Origin/Destination
Car (vehicles)	1288648	1293503	1292950
Bus (people)	130857	130597	132958
Rail (people)	45409	42394	40681
TOTAL (people)	1787076	1789869	1789827

The difference of trips between the forecast scenario and reference scenario are presented in Table 5-3 below.

Table 5-3 Change in the number of movements in the scenarios considered

Mode	Scenario 2_Difference		Scenario 5_Difference	
	Origin	Destination	Origin	Destination
Car (vehicles)	-4229	-11955	-4586	-12348
Bus (people)	1012	1235	3479	3949
Rail (people)	430	1376	-889	141
TOTAL (people)	-3845	-12333	-3143	-11345

The change in the percentage of public transport trips is presented in Table 5-4 below.

Table 5-4 Change in percentage of Public Transport for the two scenarios

Scenario	Forecast	Reference	Difference
Scenario 2	6.10%	5.66%	0.45%
Scenario 5	6.40%	5.66%	0.75%

Speed and delay statistics for the four scenarios considered is presented in Table 5-5.

Table 5-5 Speed and Delay Statistics for the two scenarios

Scenario Number	Morning Peak Hour		Evening Peak Hour	
	Speed (Kmph)	Delay (PCU-Hr)	Speed (Kmph)	Delay (PCU-Hr)
Scenario 2	61.85	2662	56.62	4250
Scenario 5	62.55	2523	58.10	3877

It can be seen that the Local Plan Modification Mitigation measures are leading to an increase in bus patronage with a decrease in car and rail demand. The reduction in rail demand is greater than that for car which appears reasonable as the mitigation measures do include some highway improvement schemes.