

# Himley Village Outline Application

## Transport Assessment

December 2014



**Himley Village Development  
NW Bicester Eco-Town  
Transport Assessment  
Prepared for  
P3Eco  
December 2014**



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# 1.0 Introduction

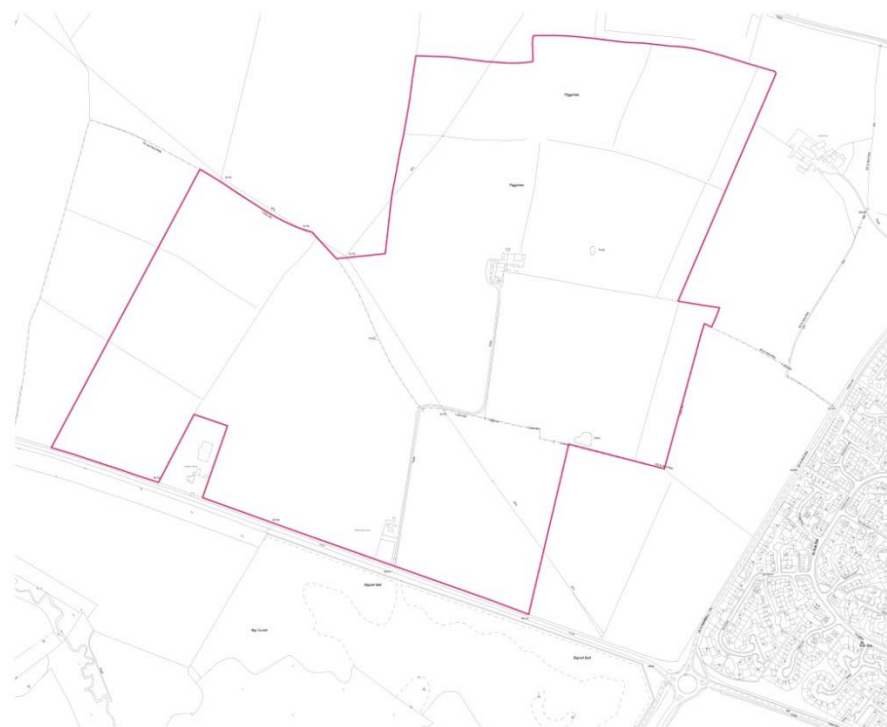
## 1.1 Overview

Alan Baxter and Associates were commissioned in September 2014 to prepare a Transport Assessment on behalf of P3Eco in support of the proposals for the Himley Village development, forming part of the NW Bicester masterplan. The Himley Village development comprises of 1,700 homes and extra care housing, commercial uses, community facilities and a primary school. The total Site area comprises approximately 90 hectares of land (Figure 1.1 shows the red line boundary for the Himley Village development).

The Himley Village development is part of the overall 6,000 home NW Bicester eco-town. This application has been formed based on the same principles and methodology that have been established for the eco-town (set out within the submitted NW Bicester masterplan), recognising that Himley Village development sits within the overall framework and should not be considered in isolation.

A separate detailed planning application has been submitted for a new A4095 NW Strategic Link Road (Ref: 14/01968/F also referred to as the 'boulevard' in the NW Bicester masterplan) which will provide an improved route around the north west of Bicester and link through the NW Bicester eco-town. Separate outline planning applications have also been submitted for land adjacent to Himley Village and to the north of the railway line.

Figure 1.1 Red Line Site Boundary



Source: Penoyre & Prasad, November 2014

## 1.2 The Site

The Site shown in Figure B.1 Appendix B in relation to the road network is located to the west of the A4095 Howes Lane and is bound to the south by Middleton Stoney Road. The Site is situated to the west of existing residential areas of Bicester, namely Highfield and west Bicester and is approximately 5km from the town centre (measured to the Himley Farm buildings enclosed within the red line boundary).

Bicester lies approximately 24km to the north east of Oxford and 28km to the south east of Banbury. The M40 is located 2km to the west, with access to the town from Junction 9 via the A41. The Site can also be accessed via Junction 10 of the M40 Motorway, which is located approximately 8km to the north-west. The Site comprises agricultural land and Himley Farm with Grade II listed farm buildings. The village of Bucknell is located to the north of the Site and Middleton Stoney to the west.

## 1.3 Development Proposal

The proposed land use mix for the Himley Village development for residential and non-residential uses is summarised in Table 1.1.

Table 1.1 Proposed Land Use Mix

Land use	GIA (m <sup>2</sup> )	Notes
Residential- privately owned * 70%	1,190 units	Based on NW Bicester Residential Strategy March 2014
Residential- Affordable housing *30%	510 units	Based on NW Bicester Residential Strategy March 2014
Residential- Total	1,700 units	Assumes residential dwelling mix of 1-5 bed based on NW Bicester Residential Strategy March 2014 (excl. extra care)
	156,395	
Hotel	2,600	Based on 40 room hotel/ 62m <sup>2</sup> per resident
Veterinary surgery	2,000	Based on discussion with possible occupant
Primary school	2,750	Based on typical 2FE primary school + nursery
Extra care/ retirement village	9,000	Based on 100 unit facility
Pub/ community	400	
Retail	700	
Health facility	1,500	Based on typical GP surgery + ancillary facilities
Office	1,000	
Nursery	100	
Energy centre	375	
Water treatment plant	450	

The proposals for walking, cycling, public transport and highway access are set out in Chapter 7 of this document. Sustainable travel measures to achieve modal share targets are also identified and set out in more detail in NW Bicester Framework Travel Plan for the Himley Village development.

## 1.4 Scope of study

The scope of this Transport Assessment has been discussed with the local Highway Authority, Oxfordshire County Council but essentially adopts the same approach as that used in the Transport Assessments for outline planning applications for other sites in the NW Bicester eco-town. The completed scoping note is included in Appendix A.

## 1.5 Report structure

This transport assessment follows the following structure;

**2. Policy-** provides an overview of relevant national and local planning policy documents in relation to the Site and proposal for development.

**3. Baseline-** a baseline review which describes the existing conditions of the Site and the surrounding area in terms of transport;

**4. Baseline mode share and containment** - describes the baseline mode share and containment of trips in Bicester;

**5. Planned transport and land use proposal-** summaries current transport and land use proposals in Bicester;

**6. Development proposal** - provides details of the development proposals for the Site;

**7. Movement strategy-** assesses the accessibility of the Site to local services by sustainable modes;

**8. Trip and traffic generation** - describes the trip and traffic generation methodology and sets out the forecast generation from the proposed development;

**9. Traffic modelling-** outlines the traffic modelling work undertaken to assess the impact of the proposed development on the existing transport infrastructure;

**10. Traffic impact-** outlines the traffic impacts;

**11. Network capacity assessment and mitigation-** sets out network capacity assessments and proposed mitigation;

**12. Phasing-** sets out indicative development and transport infrastructure phasing;

**13. Summary and conclusion-** provides an overall summary and conclusion.

# 2.0

## Policy context

### 2.1 Introduction

A review of the relevant national and local policy documents has been undertaken and is outlined in this chapter. The relevant national policy documents reviewed were;

- Government White Paper (2011)
- National Planning Policy Framework (2012)
- Planning Policy Statement 1- Eco-towns Annex (2009)
- The Strategic Road Network and the Delivery of Sustainable Development (2013)

At the local level the following documents were reviewed;

- Oxfordshire Local Transport Plan 2011-2013 (Revised April 2012 and Chapter 16 Bicester, May 2014)
- Cherwell Draft Local Plan (2014) and Proposed Modifications (2014)
- Eco-Bicester: One Shared Vision (2010)
- Bicester Masterplan (2012)
- Parking standards for new residential developments (2011)
- Cherwell Local Plan (2011)
- Code for Sustainable Homes (CfSH ENE 8) (2010)

### 2.2 National Policy

#### Government White Paper (2011)

A Government White Paper Creating Growth, Cutting Carbon (DfT) was released in 2011 which outlines a vision for a transport system which enables economic growth, is greener, safer and improves quality of life in communities. It sets out how Government objectives can be achieved through the following aspects;

- Choice of less carbon intensive modes of travel reducing adverse impacts on health, road safety, air quality and noise and wider environmental effects.
- Enabling local delivery and participation to enable long term, sustainable growth.
- Enabling sustainable transport choices such as the provision of frequent bus services in rural areas to the availability of low-emission cars.
- Promoting active travel such as walking and cycling.
- Making public transport more attractive i.e. smart and integrated ticketing for buses and rail.
- Managing traffic to reduce carbon and tackle congestion.
- Government commitments on local transport.

## National Planning Policy Framework (2012)

The National Planning Policy Framework (NPPF) sets out the Governments planning policies for England and how these are expected to be applied. At the heart of the National Planning Policy Framework is a presumption in favour of sustainable development. Under the overarching role of planning there are 12 core planning principles which underpin decision making. The most relevant policy for transport planning is the following; “Actively manage patterns of growth to make the fullest possible use of public transport, walking and cycling, and focus significant development in locations which are or can be made sustainable.”

**Chapter 4** ‘Promoting sustainable transport’ specifically relates to transport and movement stating that “transport system needs to be balanced in favour of sustainable transport modes, giving people a real choice about how they travel” (**Paragraph 29**).

**Paragraph 31** highlights that local authorities, neighbouring authorities and transport providers need to work collaboratively “to develop strategies for the provision of viable infrastructure necessary to support sustainable development”.

**Paragraph 32** states “decisions should take account of whether:

- The opportunities for sustainable transport modes have been taken up depending on the nature and location of the Site, to reduce the need for major transport infrastructure;
- Safe and suitable access to the Site can be achieved for all people; and
- Improvements can be undertaken within the transport network that costs effectively limit the significant impacts of the development. Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe.”

**Paragraph 34** states that “decisions should ensure developments that generate significant movement are located where the need to travel will be minimised and the use of sustainable transport modes can be maximised.”

**Paragraph 35** highlights that development proposals should maximise opportunities for alternative transport modes for the movement of goods or people. Therefore “developments should be located and designed where practical to

- Accommodate the efficient delivery of goods and supplies;
- Give priority to pedestrian and cycle movements, and have access to high
- Quality public transport facilities;
- Create safe and secure layouts which minimise conflicts between traffic and cyclists or pedestrians, avoiding street clutter and where appropriate establishing home zones;
- Incorporate facilities for charging plug-in and other ultra-low emission vehicles; and
- Consider the needs of people with disabilities by all modes of transport

**Paragraph 36** identifies that a key tool for achieving the above principles is through provision of a Travel Plan.

Furthermore, **Paragraph 38** highlights that for larger scale developments in particular “key facilities such as primary schools and local shops should be located within walking distance of most properties”.

## Planning Policy Statement 1- Eco-towns Annex (2009)

Planning Policy Statement 1 on Eco Towns sets out minimum standards to reduce carbon footprint of developments to a low level and to create a more sustainable way of living. Eco-towns should be exemplar projects that encourage residents to live within managed environmental limits and in communities that are resilient to climate change.

The Government has set a target to build 240,000 new homes per annum by 2016 and to reduce carbon emissions by 80 per cent below 1990 levels by 2050. In order to meet these targets and promote more sustainable development the minimum standards set for eco towns are more challenging and stretching than would normally be required for new development. The Government has identified four locations with the potential to be eco-towns, one of which is NW Bicester.

**Section E11-** Transport sets out the standards to be achieved for transport as follows:

“ET 11.1 Travel in eco-towns should support people’s desire for mobility whilst achieving the goal of low carbon living. The town should be designed so that access to it and through it gives priority to options such as walking, cycling, public transport and other sustainable options, thereby reducing residents’ reliance on private cars, including techniques such as filtered permeability. To achieve this, homes should be within ten minutes’ walk of;

- a.) Frequent public transport and
- b.) Neighbourhood services.

The provision of services within the eco-town may be co- located to reduce the need for individuals to travel by private car and encourage the efficient use of the sustainable transport options available.

**ET 11.2** Planning applications should include travel plans which demonstrate:

- a.) How the town’s design will enable at least 50 per cent of trips originating in eco-towns to be made by non-car means, with the potential for this to increase over time to at least 60 per cent
- b.) Good design principles, drawing from Manual for Streets, Building for Life, and community travel planning principles
- c.) How transport choice messages, infrastructure and services will be provided from ‘day one’ of residential occupation, and
- d.) How the carbon impact of transport in the eco-town will be monitored, as part of embedding a long term low-carbon approach to travel within plans for community governance.

**ET 11.3** Where an eco-town is close to an existing higher order settlement, planning applications should also demonstrate:

- (a) Options for ensuring that key connections around the eco-town do not become congested as a result of the development, for example by extending some aspects of the travel plan beyond the immediate boundaries of the town, and

(b) Significantly more ambitious targets for modal share than the 50 per cent (increasing to 60 per cent over time) mentioned above and for the use of sustainable transport.

**ET 11.4** Where eco-town plans intend to incorporate ultra-low carbon vehicle options, including electric car schemes to help achieve a sustainable transport system, planning applications should demonstrate that:

(a) There will be sufficient energy headroom to meet the higher demand for electricity, and

(b) The scheme will not add so many additional private vehicles to the local road network that these will cause congestion.

**ET 11.5** Eco-towns should be designed in a way that supports children walking or cycling to school safely and easily. There should be a maximum walking distance of 800m<sup>17</sup> from homes to the nearest school for children aged under 11, except where this is not a viable option due to natural water features or other physical landscape restrictions.”

## Circular 02/13 the Strategic Road Network and the Delivery of Sustainable Development (February 2013)

The DfT Circular explains how the Highways Agency engages with communities and development industries to deliver sustainable development whilst protecting the primary function of the strategic road network. The overall aim is to provide a safe and reliable strategic road network which allows efficient movement of people. It identifies that development that seeks achieve this through use sustainable modes of transport, minimise journey lengths and promoting accessibility to all to create robust travel plans is an effective means of managing the impact of development on the strategic road network. This document seeks to address matters arising from the planning process that have the potential to impact the road network. It states that development should only be refused on transport grounds where the residual cumulative impacts of development are severe.

## 2.3 Local Policy

### Oxfordshire Local Transport Plan 2011-2013. (Revised April 2012 and Chapter 16 Bicester, May 2014)

The Oxfordshire Local Transport Plan (LTP) sets out a series of policies and objectives to guide the future development of transport in Oxfordshire from 2011 to 2030. In May 2014 a revised Chapter 16 on Bicester was produced. A new Local Transport Plan (LTP4) is currently being undertaken which will go through consultation on a draft in early 2015.

The LTP strategy supports the Local Plan. This strategy recognises the importance of enhancing access to strategic transport networks and improving ease of travel between homes and jobs are vital in accommodating future growth in Bicester. Furthermore, it highlights that investment into transport is necessary to create an attractive town where people want to live and work and reduce the high levels of out-commuting.

#### **Transport Strategy Aims**

“The priority for Bicester is to provide the transport infrastructure which supports the aspirations set out in the Local Plan and the initiatives for their implementation in the forthcoming Bicester and NW Bicester masterplan. This includes tackling the challenges

identified in the Bicester Movement Study and those specific to Central Government standards for transport in Eco Towns. This will enable the town to thrive and realise its full growth potential, and its essential role in Oxfordshire's economy.

This strategy identifies a series of improvements to increase the overall capacity of transport networks and systems within the locality, enabling them to accommodate the additional trips generated by development; to adapt to their cumulative impact and to mitigate the local environmental impact of increased travel.

It is highlighted that where schemes are needed to mitigate one particular development, the developer will be expected to either construct or provide funding for the scheme; where a scheme is required due to the impact of more than one development, each developer will be expected to make a contribution proportional to the scale of their impact. Additional funding may also be sought via the Local Transport Board to the Local Growth Fund and other sources. It is noted Oxfordshire County Council are working towards a strategic transport contribution rate for developer funding, which will be adopted in a future update of this strategy.

It is essential to provide high quality access to the strategic highway and railway network to secure business investment and encourage people to make Bicester their home.

Oxfordshire County Council (OCC) aim to:

- Provide highway infrastructure which effectively reduces current and predicted transport congestion in Bicester;
- Increase highway capacity on perimeter routes to make these attractive to employment and longer distance traffic and thereby reducing the strain on the town centre and central corridor;
- Accommodate proposed strategic rail initiatives, including East West Rail and plans for electrification, and a possible future Rail Freight Interchange, in order to strengthen Bicester's position on the national rail network and maximise access to regional economic centres, such as Milton Keynes;
- Strengthen the town's walking, cycle and bus networks to reduce congestion, improve air quality and ensure good links to local employment opportunities and amenities within the town, as well as transport hubs."

Transport policies that are most relevant to NW Bicester are set out below:

**BIC1** – We will seek opportunities to improve access and connections between key employment and residential Sites and the strategic transport system by:

- Increasing capacity at Junction 9 of the M40 and supporting plans to improve Junction 10
- Delivering a strategic perimeter route around the town is the key component of this strategy.
- Working closely with partners to facilitate the delivery of proposed strategic rail initiatives, especially East West Rail.
- Working with the rail industry and developers to deliver solutions at the Charbridge Lane and London Road railway level crossing points



- Supporting the proposals to secure a potential freight interchange at Graven Hill and working with the district and developers to achieve this.
- Working with developers to improve the A41 Oxford Road, including enhancements to the Pingle Drive junction, new Site accesses, new bus stops and footpath and cycleway improvements.
- Creating a Park & Ride facility adjacent to the A41, close to the Vendee Drive junction
- Providing measures to reduce congestion through the central corridor (from Kings End (B4030) to the 3-arm Field Street, Buckingham Road and Banbury Road roundabout).
- Implementing focused enhancements to the A4421 (between the junctions with Bicester Road and Launton Road)
- Improvements to the Buckingham Road / A4221 junction
- Increasing capacity at the Howes Lane / Bucknell Road junction and approaches
- South East Link Road

In addition, it is noted that bus priority measures may be necessary at anticipated pinch points on the main approaches to the town centre as Bicester continues to grow in the long term. This is likely to include the Bucknell Road/ Field Street junction and the Buckingham Road approach to the three arm junction.

**BIC2** – We will work with strategic partners to develop the town’s walking, cycling and bus networks and links between key development Sites and the town centre and railway stations by:

- Enhancing pedestrian, cycle and public transport links to the two railway stations, in particular Bicester Town Station.
- Improving Bicester’s bus services along key routes
- Significantly improving public transport connectivity with other key areas of economic growth within Oxfordshire
- Providing improved public transport infrastructure
- Providing new sections of urban pedestrian and cycle routes to better connect residential developments with the town centre and key employment destinations.
- Public realm improvements in Bicester Market Square and The Causeway
- Securing green links between proposed development Sites on the outskirts of the town and existing Public Rights of Way, providing a series of leisure / health walks.

With regards to sustainable transport, the LTP3 highlights the importance of promoting a range of travel modes. The key objectives are highlighted below;

**BIC3** – we will work to get the most out of Bicester’s transport network by investigating ways to increase people’s awareness of the travel choices available in Bicester by:

- Undertaking travel promotions and marketing measures
- Developing a coordinated parking strategy in partnership with Cherwell District Council
- Discourage undesirable routeing of traffic by developing a signage strategy

## Cherwell Draft Local Plan (January 2014)

The proposed new Cherwell Local Plan was submitted to the Secretary of State for Communities and Local Government for formal Examination on 31 January 2014. It sets out the broad planning framework for the Cherwell district and will replace the Cherwell Local Plan 1996. During the Examination in Public on the emerging Local Plan, the Inspector requested that Cherwell District Council (CDC) assesses its housing needs against the Oxfordshire Strategic Housing Market Assessment, 2014. Accordingly, the Examination in Public was suspended whilst the Council explores options to increase housing delivery within the plan period. Subsequently, the emerging Local Plan (proposed modifications) was updated on 21 October 2014.

## Eco-Bicester: One Shared Vision (December 2010)

This document sets out the shared vision of the Eco Bicester Strategic Delivery Board (SDB) to highlight the aims and ambitions for the town of Bicester as a whole as it continues to grow in the long term. With regard to transport and movement the overall vision is to encourage walking and cycling as the first choice for travel within the town to improve health, reduce carbon emissions and the quality of the environment. The key aspects of the strategy include;

### **Reduce the need to travel by car**

- Promote walking, cycling and public transport within the town
- Work with employers and educational facilities to encourage sustainable travel
- Support designs for new development which support walkable neighbourhoods, public transport and provide good access to day to day services locally
- Improve non-vehicular access links to town centre facilities and other important destinations from across the town
- Give priority to walking, cycling and public transport where possible
- Provide high quality cycle parking and storage
- Provide improved bus service information
- Encourage car clubs and car share schemes where occasional journeys by car are necessary.

### **Travel Planning**

- Ensure schemes and initiatives to promote sustainable travel planning (as set out in the Department for Transport's Sustainable Travel Towns document) are developed in more detail for Bicester
- Provide innovative approaches to personal travel, including reduced energy consumption, low emission vehicles.

### **Improvements to the existing transport network**

- Ensure sustainable locations for development and highway improvement schemes as part of the 'Bicester Integrated Transport and Land Use Study' commissioned by Oxfordshire County Council in partnership with Cherwell District Council

- Provision of improvements to walking and cycling provision in the town
- Support Chiltern Railways' improvements to the Bicester to Oxford line and services to London
- Create a new perimeter road at 'South West Bicester' to relieve congestion in Bicester and reduce 'rat running' through surrounding villages
- Improvements to Junction 9 of the M40 to unlock the employment growth potential of the town (Phase 1 started in August 2010)
- Encourage electric vehicles and supporting infrastructure.

## Bicester Masterplan (2012)

Cherwell District Council produced a draft masterplan for Bicester (consultation draft in September 2012) to eventually form Supplementary Planning Guidance. It sets a vision for long-term growth of the town, identifies key physical and social infrastructure and provides a sustainable movement strategy, Figure 2.1. The Masterplan challenges are addressed in the OCC LTP3 chapter. The Bicester Masterplan is subject of ongoing review and consultation.

Figure 2.1 NW Bicester Masterplan Access and Movement Strategy



## Parking Guidance

Car and cycle parking standards have been reviewed and the key policies are summarised below;

### Parking Standards for New Residential Developments, Oxfordshire County Council (2011)

The guidance sets out the maximum car parking standards for allocated and unallocated spaces within new residential areas in the parishes of Banbury, Bicester, Kidlington, Bloxham, Bodicote, Adderbury, Yarnton and Gosford and Water Eaton.

The guidance provides parking standards for new residential developments for different areas of the County and the specific parking standards for the Cherwell Urban Areas including Bicester are detailed below in (Table 2.1)

Table 2.1 Car Parking Standards for Urban Areas in Cherwell (OCC, 2012)

Number of bedrooms per dwelling	Maximum number of allocated spaces	Maximum number of spaces when two allocated space per dwelling is provided		Maximum number of spaces when one allocated space per dwelling is provided		Max. number of spaces when no allocated is provided
		Allocated spaces	Unallocated spaces	Allocated spaces	Unallocated spaces	
1	1	N/A	N/A	1	0.4	1.2
2	2	2	0.3	1	0.6	1.4
2/3	2	2	0.3	1	0.7	1.5
3	2	2	0.3	1	0.8	1.7
3 /4	2	2	0.4	1	1.0	1.9
4+	2	2	0.5	1	1.3	2.2

**Note 1:** The rows in the table for 2/3 bedrooms and 3/4 bedrooms can be used when there are additional rooms in the dwelling which are not shown as bedrooms but where there is a high chance that they could be used as bedrooms.

**Note 2:** The Council will consider NW Bicester eco-town as a special case provided that certain minimum criteria are met. If there is a full range of every day services provided within easy walking or cycling distance of the dwelling and convenient access to an efficient public transport system accessing a wider range of services including employment, one allocated car parking space per dwelling will be required, regardless of dwelling size or tenure. This may be on plot or off plot. Off plot provision may be grouped in a parking court provided the courts are small, close by, secure and conveniently accessed. Additional unallocated off plot car parking may also be provided according to the principles of this document up to a maximum of one space per dwelling. A lower standard of parking may be acceptable dependent upon the layout and accessibility to services and to other modes of transport in agreement with the Highway Authority.

## Non-Statutory Cherwell Local Plan, Cherwell District Council, (2011)

The Non-Statutory Cherwell Local Plan sets out car parking standards for Bicester<sup>1</sup>. Maximum levels for car parking for non-residential uses are indicated in Appendix B.

The Cherwell District Council standards do not include a standard for cycle parking at schools and it is suggested that an allowance of 1 space per 10 pupils is accommodated plus 1 space per 10 staff. This has been confirmed with OCC for the Exemplar Site. Additionally the Oxford Local Plan (2007) sets a requirement for cycle parking at primary schools of 1 space per 15 pupils plus 1 space per 5 staff (or other people).

## Code for Sustainable Homes (CfSH ENE 8) (2010)

The Code for Sustainable Homes, 2010, Policy ENE8 aims to promote the wider use of bicycles as transport by providing adequate and secure cycle storage facilities, thus reducing the need for short car journeys and the associated CO<sup>2</sup> emissions. Table 2.2 sets out the criteria for achieving COSH credits;

Table 2.2 Provision of cycle parking for residential dwellings based on Code for Sustainable Homes ENE8 achieving 2 credits (maximum possible).

Criteria	Credits
Where individual or communal cycle storage is provided, that is <i>adequately sized, secure and convenient</i> , for the following number of cycles: Studios or 1 bedroom dwellings – storage for 1 cycle for every two dwellings 2 and 3 bedroom dwellings – storage for 1 cycle per dwelling 4 bedrooms and above – storage for 2 cycles per dwelling	1
<b>OR</b> Studios or 1 bedroom dwellings – storage for 1 cycle per dwelling 2 and 3 bedroom dwellings – storage for 2 cycles per dwelling 4 bedrooms and above – storage for 4 cycles per dwelling	2
Note: The requirements for secure cycle storage are met where compliance with clause 35 of Secured by Design (SBD) New Homes 2010 is achieved.	

CfSH rates the cycle parking provision using COSH credits system. To achieve the maximum number of credits (2); storage for 2 cycles should be provided for 2 or 3 bed dwellings and 4 cycles per dwelling for 4+ bed dwellings. These standards are above the OCC requirements which require a maximum of 2 spaces per dwelling for 2+ beds.

<sup>1</sup> <http://npa.cherwell.gov.uk/LocalPlan/written/cpt14.htm>

## 2.4 Other Guidance Documents

In addition to the national and local policy documents previously outlined, various guidance documents were reviewed to inform the TA. These documents give precedents of good practice and provide valuable guidance on eco developments, these include;

- Manual for Streets (1 and 2);
- DfT Guidance on Transport Assessment;
- Building Sustainable Transport into new developments: a menu of options for growth points and Eco-towns, DfT 2008;
- Design to Delivery: eco-towns transport worksheet, Town and Country Planning Association, March 2008.

## 2.5 Summary

The objectives for the Site have taken account of prevailing national and local policies. The development proposal will seek to fulfil the objectives of the policy documents noted in this chapter by providing an accessible and sustainable environment for pedestrians, cyclists, public transport users and vehicles and mitigating the impacts of development on the highway network.

# 3.0 Baseline

## 3.1 Introduction

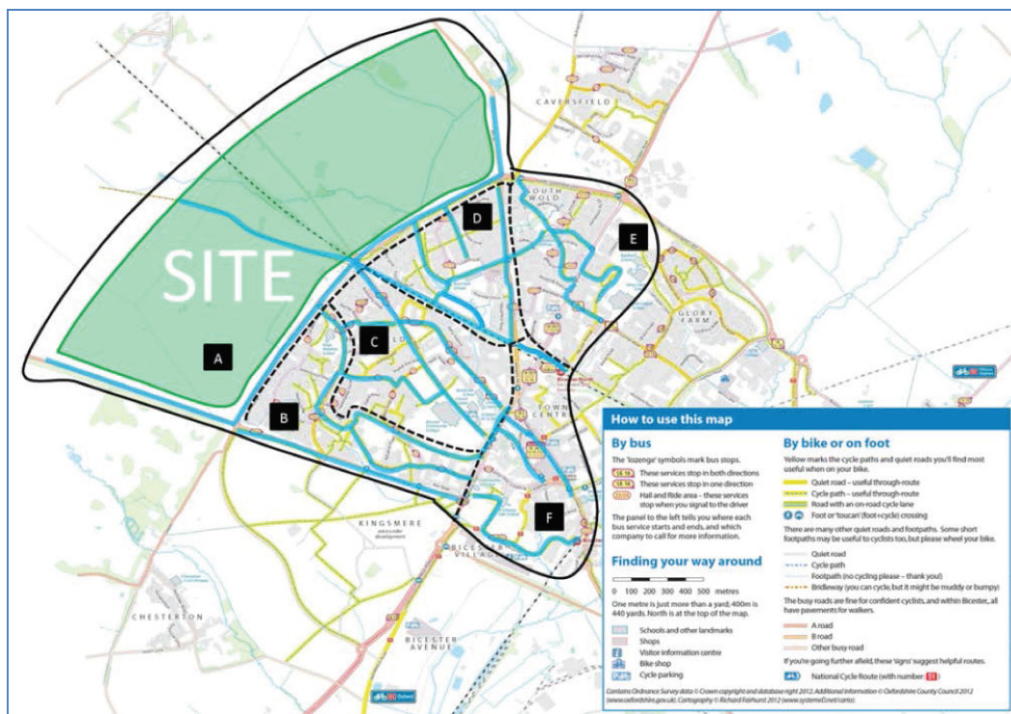
This chapter outlines the baseline review of existing transport conditions surrounding the Himley Village development including assessment of local provision for walking, cycling, bus services, train services and cars within the NW Bicester masterplan and wider town of Bicester. The information reviewed in the Application 1 Transport Assessment by Hyder (July 2014) has been reviewed and incorporated where appropriate for this application alongside analysis undertaken during a site visit in September 2014.

## 3.2 Walking and Public Rights of Way

### Walking Network

A comprehensive review of walking infrastructure locally has been undertaken and provided in Appendix 1 of the NW Bicester Masterplan Access and Travel Strategy. A summary of walking provision in Bicester is shown in Figure 3.1. Each of these routes has been audited and is included in Appendix 1 of the Access and Travel Strategy.

Figure 3.1 Walking Audit Zones and Routes



These routes connect the Site to Bicester town centre and other attractions, as shown in Figure 3.2 which outlines key education, transport and existing crossing infrastructure in Bicester. It highlights there are a number of pedestrian and 'toucan' (foot and cycle) crossings in Bicester.



Figure 3.2 Crossing Infrastructure, Key Trip Attractors and Generators

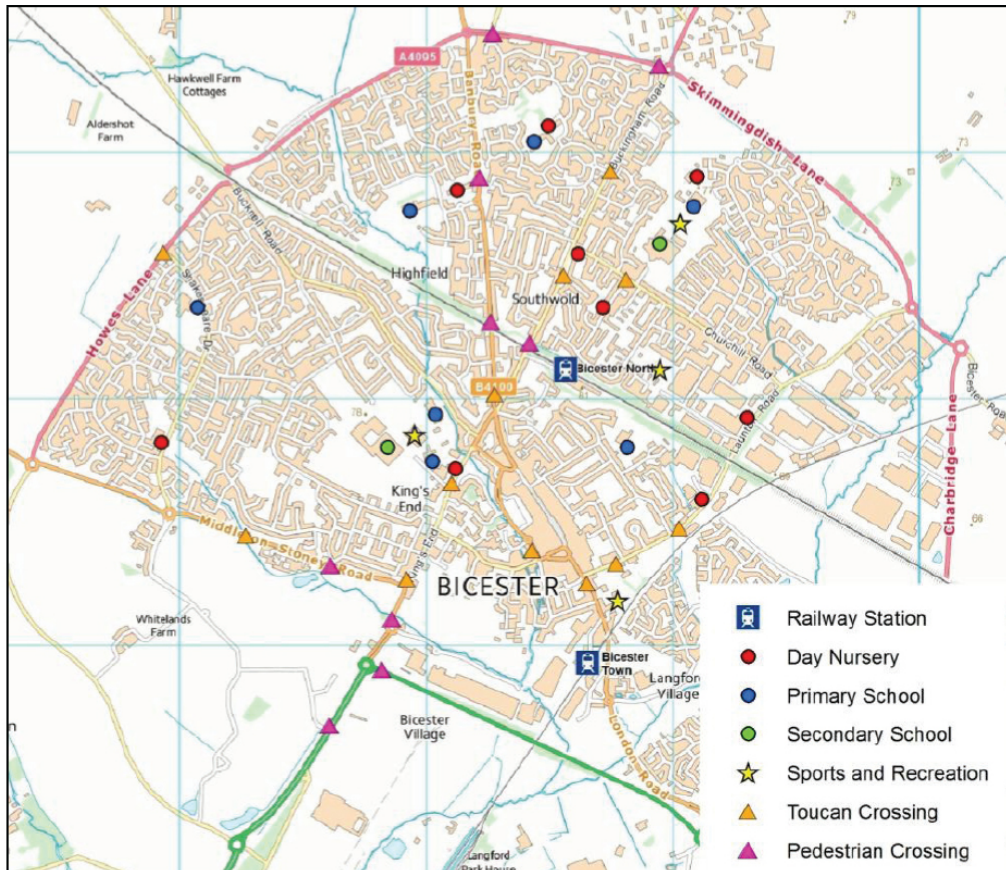


Figure 3.2 shows that the majority of the town is located within a radius of approximately 5km from the centre of the Site. From the Site the town centre is approximately a 40 minute walk and the amenities in the Highfield neighbourhood are around a 10 minute walk.

The nearest footway to the Site is located along Middleton Stoney Road to the east of the Middleton Stoney Road/ Howes Lane/ Vendee Drive roundabout. Middleton Stoney Road provides the most direct walking route from the Site to the town centre and Bicester Town station. It is recognised however that it is narrow, not well lit and lacks crossing infrastructure (Figure 3.3). To the west of Middleton Stoney Road/ Howes Lane/ Vendee Drive junction along the southern boundary of the Site there are currently no footways or pedestrian crossings due to a lack of demand (Figure 3.4).

Figure 3.3 and Figure 3.4 Pedestrian Facilities on Middleton Stoney Road





The Middleton Stoney Road/ Howes Lane/ Vendee Drive junction to the south east of the Site has recently undergone improvement works to create a new roundabout. It provides high quality pedestrian facilities with generous footways of approximately 2.5-3m in width combined with informal pedestrian crossings on all arms of the junction with refuge islands, tactile paving strips and signage. There is a segregated pedestrian and cycle route set back behind a line of mature trees, which occupies the old road of Vendee Drive to Chesterton.

Figure 3.5 and Figure 3.6 Pedestrian Facilities Middleton Stoney Road/ Howes Lane/ Vendee Drive Roundabout



To the east of the Site off Howes Lane (A4095) two existing pedestrian links provide a linkage between Howes Lane and the residential areas of Highfield, Shakespeare Drive, a variety of local amenities including Tesco Express, a pub, Coral and community centre and the town centre beyond. Currently the southern of the two links is an uninviting pedestrian link which is narrow, unlit and lacks natural surveillance (Figure 3.7). The northern link is of higher quality and formed in two sections the first from Howes Lane to Greenford Drive and the second linking to Shakespeare Drive. The northern link from Howes Lane is well lit and provides a meandering footpath (Figure 3.8).

Figure 3.7 and Figure 3.8 Pedestrian Routes through the Highfield Neighbourhood



Howes Lane (A4095) currently has no footways or pedestrian crossing facilities and subsequently has a rural character (Figure 3.9 and Figure 3.10). The lack of pedestrian facilities causes severance issues for pedestrians arriving from the traffic-free routes from the Highfield neighbourhood described above.

Figure 3.9 and Figure 3.10

Lack of Pedestrian Facilities along Howes Lane (A4095)



Further along the ring road, from Lords Lane (A4095) onwards a segregated pedestrian route runs parallel to the carriageway benefitting from street lighting, tactile paving and pedestrian refuges at junctions (shown in Figure 3.11). In addition, the footways forming the route are considered to be of an appropriate width and are well maintained in terms of surface condition. There are a small number of pedestrian crossings across the A4095 ring road, one of which is a toucan crossing situated on A4095 Southwold Lane approximately 100m west of the A4095/ B4100 roundabout (Figure 3.12). This facilitates both pedestrian and cycle crossing, although the excessive guard railing creates a barrier to ease of pedestrian movement.

Figure 3.11 and Figure 3.12

Pedestrian Facilities along the A4095 Carriageway



In general, the main radial roads off the ring road such as Buckingham Road and Bucknell Road, have very limited or poor quality provision for walking with narrow footways, uneven surfaces and street clutter such as excessive guard railings. The highest quality example is Banbury Road (B4100) which has a shared cycle and pedestrian path behind a line of mature trees providing a safe link from the north-west section of the ring road (A4095) to the town centre. Bucknell Road also facilitates pedestrian movement benefitting from footways on both sides of the carriageway and although these are of substandard condition and varying widths between 1.2m and 2m it provides a link to the town centre from the north east of the Site.

### 3.3 Public Rights of Way

There are no Public Rights of Way through the Site (Figure B.2 in Appendix B). There is a public footpath located to the north of the Himley Village development adjacent to the railway line connecting Bucknell to the A4095 and Buckingham Road.

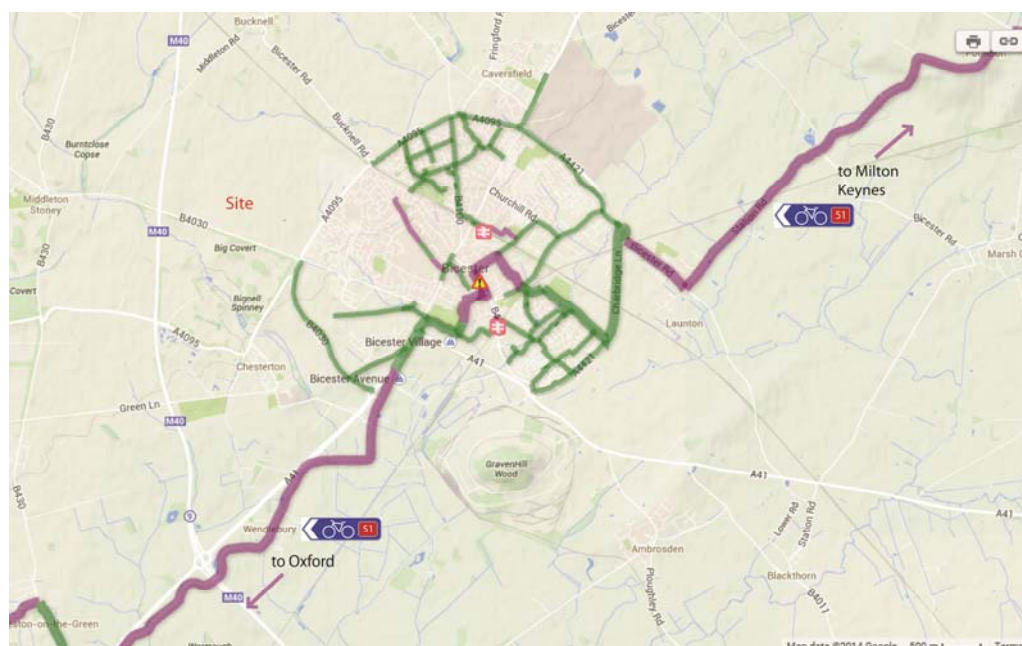
A public bridleway that runs between Bicester in the east and Ardley, Middleton Stoney and Upper Heyford in the west, is located north of the Site passing through the land south of the railway.

### 3.4 Cycling

National Cycle Network (NCN), Route 51, passes through Bicester in a south west to north east alignment, linking Launton village, Gavray Drive, Tubbs Crossing, Sheep Street, Bicester Village and Wendlebury (Figure 3.13). A combination of on-road routes (purple) and off-road traffic free routes (green) sections form the route passing through Bicester via the town centre and both stations (Bicester North and Bicester Town). Along the route cyclists are required to dismount their bike along a pedestrianised section of Sheep Street in the town centre.

Route 51 uses the best available facilities, but is not a very direct route through the town and is longer than the most obvious routes by car. This route does not benefit cyclists travelling east to west through Bicester i.e. from the Site to the town centre or train stations and could be more effective as a tourist route. A number of other routes exist to the south and east of the Site, providing connectivity to Bicester and Caversfield respectively.

Figure 3.13 National Cycle Network (NCN)



Source: Sustrans, 2014

#### Local Cycle Routes

The nearest formal cycle facilities to the Site are located to the south east on Vendee Drive on the old road to Chesterton with a combined cycle/pedestrian path segregated from the carriageway and set back behind a line of mature trees (Figure 3.14). There is provision of informal cyclist crossings on all arms of the Middleton Stoney Road/ Howes Lane/ Vendee Drive roundabout to the south east of the Site. Despite the provision of cycling facilities at the junction and Vendee Drive the other roads off the roundabout lack any cycle facilities. Cyclists travelling along Middleton Stoney Road both east and west of the roundabout and along Howes Lane (A4095) are expected to cycle on the carriageway. Considering the



national and 50mph speed limits along Howes Lane and Middleton Stoney Road east of the roundabout this creates an uncomfortable cycling environment (Figure 3.14 and Figure 3.15).

Figure 3.14 and Figure 3.15      Cycling facilities off the Middleton Stoney Road/  
Howes Lane/ Vendee Drive roundabout



## Cycle Parking

Cycle parking facilities in Bicester are well used but generally there is a lack of provision particularly in the town centre. Bicester North station has ample cycle parking with a total of 74 spaces.

## 3.5 Bus services

There is generally good provision of bus services within Bicester town itself and further afield, Figure B.3 in Appendix B shows the network map for Bicester.

A total of 17 bus services serve Bicester town centre including the Taxibus (a commuter service operating AM and PM peak hours) and Bicester Village shuttle bus. These routes serve the residential areas of town, the two railway stations, Bicester Village as well as further destinations such as;

- Cambridge: X5 (3 hours, up to 2 buses per hour)
- Oxford: X5 (30-35 minutes), S5 (40 minutes -1 hour) providing up to 7 buses per hour
- Banbury: 81 (2 buses on Thursdays, Fridays and Saturdays).

The majority of buses in Bicester serve the residential areas. The closest residential area to the Site is Highfield, immediately east of Howes Lane which is approximately 10 minutes' walk from the Site. This area is served by the S5 service (every 15 minutes), the Taxibus (commuter service operating am and pm peak), and services 21 (every 30 minutes) and 25 (hourly). The number 21 runs from the town centre, through Highfield and on to Chesterton, south of Bicester. The number 25 takes a similar route but continues beyond Chesterton to Kidlington and Oxford. In total there are up to 10 buses per hour serving this neighbourhood. The new Kingsmere development in SW Bicester off Middleton Stoney Road is served by the number 25. This is an hourly service which uses Middleton Stoney Road east of the Howes Lane/ Vendee Drive roundabout.

In the vicinity of the Site, bus service 25A, which connects Bicester, Kirtlington, Kidlington and Oxford via Middleton Stoney and Heyford, uses Middleton Stoney Road. This service

runs half hourly during the morning and evening peak and hourly for the rest of the day. However, currently there are no bus stops along Middleton Stoney Road as there is no demand for the service.

Table 3.1 Bus Routes from Bicester Town Centre

Service	Route	First	Last	Approximate Daytime Frequency
8	Cambridge-Bedford-Oxford	0635	2145	Every two hours
8	Oxford-Bedford-Cambridge	0740	2305	
18	Buckingham-Steeple Claydon-Bicester	0830	1745	Every two hours
18	Bicester-Steeple Claydon-Buckingham	0835	1800	
21	Bicester-Chesterton-Bicester (Circular)	0755	1755	Every 30 minutes
21	Bicester-Chesterton-Bicester (Circular) arrivals	0750	1820	
22	Bicester-Caversfield-Bicester (Circular)	0735	1825	Hourly
22	Bicester-Caversfield-Bicester (Circular) arrivals	0755	1900	
23	Bicester-Caversfield-Bicester (Circular)	0845	1745	Hourly
23	Bicester-Caversfield-Bicester (Circular) arrivals	0930	1830	
24	Bicester-Churchill Road-Bicester (Circular)	0800	1830	Every 30 minutes
24	Bicester-Churchill Road-Bicester (Circular) arrivals	0812	1842	
25	Kidlington/Oxford-Bicester arrivals	0725	1907	Hourly
25	Bicester-Oxford/Kidlington	0625	1910	
S5	Oxford-Gosford-Bicester-Glory Farm/Launton/Arcott/Langsford	0645	0011	Every 15 minutes
S5	Glory Farm/Arcott/Launton/Langton-Bicester-Gosford-Oxford	0555	2311	
X5	Cambridge-Bedford-Oxford	0635	2145	Every 30 minutes
X5	Oxford-Bedford-Cambridge	0740	2305	

## Bus Occupancy

Bus occupancy surveys were undertaken by Hyder Consulting on 14th June 2013 in Bicester town centre to establish occupancy levels of buses arriving and departing. Surveys were conducted during the AM peak (07:30-09:00), inter peak (09:30-12:30) and the PM peak (15:00-18:00) to provide an overview of bus use across the day. The surveys were conducted on a Market Day (Friday), the busiest day of the week, to account for highest patronage numbers.

It can be seen from Table 3.2 that the average occupancy levels for buses arriving at Market Square were relatively low throughout the day, with averages not exceeding 50%. The X5 service is the most utilised service, with maximum utilisation percentages of 92% during the inter peak and peak periods.

Table 3.2 Occupancy Levels of Bus Services Arriving at Market Square, Bicester

Service	Operator	Occupancy levels arriving at Market Square (%)					
		AM peak (07:30-9:00)		Inter peak (9:30-12:30)		PM peak (15:00-18:00)	
		Average	Maximum	Average	Maximum	Average	Maximum
8	Stagecoach in Northants	No Service	No Service	11	13	No Service	No Service
18	Langston & Tasker	25	25	25	40	3	6
21	Grayline Coaches	26	32	31	48	5	16
22	Thames Travel	10	10	14	31	4	7
23	Thames Travel	2	3	5	24	0	0
24	Thames Travel	0	0	23	52	6	14
25/ 25A	Thames Travel	No Service	No Service	46	72	10	21
S5	Stagecoach in Oxfordshire	10	25	13	36	15	35
5	Stagecoach in Bedford	29	41	35	92	46	92

Table 3.3 outlines the percentage occupation for buses departing from Market Square. Similarly to buses arriving at Market Square, no average occupation percentage exceeds 50%. Again, the X5 service displays the highest maximum occupation percentage at the inter peak (88%) and PM peak (90%). During the inter peak period, the 21, 25/25A and the X5 were the most popular services.

Table 3.3 Occupancy Levels of Bus Services Departing from Market Square, Bicester

Service	Operator	Occupancy levels arriving at Market Square (%)					
		AM peak (07:30-9:00)		Inter peak (9:30-12:30)		PM peak (15:00-18:00)	
		Average	Maximum	Average	Maximum	Average	Maximum
8	Stagecoach in Northants	No Service	No Service	11	13	No Service	No Service
18	Langston & Tasker	0	0	8	16	5	6
21	Grayline Coaches	2	6	42	81	22	68
22	Thames Travel	17	17	15	24	4	7
23	Thames Travel	4	7	16	79	12	24
24	Thames Travel	21	21	6	17	6	14
25/ 25A	Thames Travel	No Service	No Service	34	62	18	45
S5	Stagecoach in Oxfordshire	11	28	13	32	14	35
5	Stagecoach in Bedford	28	39	35	88	45	90

### 3.6 Rail Stations and Services

Bicester is well connected to the wider UK rail network (see Figure 3.16), with two railway stations, Bicester Town (on the original Bletchley – Oxford line) and Bicester North (on the original Great Western Mainline). The application Site is situated approximately 3.2km west of Bicester Town and approximately 4km north -west from Bicester North.

Bicester Town station is currently closed due to the construction of the Chiltern Railways Evergreen3 railway improvement scheme. This will provide a passenger train service between Oxford and London Marylebone via Bicester. In the long term the line will link Bicester to Milton Keynes, Bedford and eventually Cambridge. The station is due to re-open in summer 2015, and will provide two new platforms with step free access, improvements to the station building, improved transport interchange facilities with additional bus stops and cycle parking and an improved station approach road. It is anticipated that the line as far as Oxford (Water Eaton) Parkway should open in summer 2015 and the full line to Oxford in spring 2016.

Bicester North station lies on the Chiltern Rail line between London Marylebone and Birmingham, providing direct links to places such as High Wycombe, Banbury and Royal Leamington Spa. The station provides a range of facilities including a coffee and snack shop, Sheffield cycle stands and car parking facilities (operating pay and display).

Figure 3.16 East West Rail links (Source East West Rail, Sept 2013)





A summary of the rail services provided from both stations in Bicester is shown in Table 3.4.

Table 3.4 Summary of rail services

Station	Destination	Duration	Frequency
<b>Bicester North</b>	London Marylebone	60 mins	15 mins
	High Wycombe	30 mins	15-30 mins
	Banbury	20 mins	15-30 mins
	Birmingham Moor Street	1 hour	15 mins- 1 hour
	Birmingham New Street (change at Banbury)	1 hour 20 mins	n/a
<b>Bicester Town</b> (predicted)	Oxford	15 mins	30 mins
	London Marylebone	45 mins	30 mins

Table 3.4 above highlights there is a service approximately every 15 minutes to Banbury, Birmingham and London from Bicester North Station. Once Evergreen3 works are complete it is expected that two trains per hour will operate between Oxford and London Marylebone, providing rail passengers a 15 minute rail link between Bicester and Oxford. During the construction works a rail replacement bus service, which has been operating since February 2014, will continue to provide service from Bicester Town station to Islip (15-20 minutes) and Oxford (38-50 minutes).

In terms of access to the stations, Bicester Town is situated 1km by road from the town centre (approximately a 10 minute walk) and once re-opened will be served by numerous local bus services including service 25A from Bicester, Kirtlington, Kidlington and Oxford via Middleton Stoney Road. Bicester North is served by a number of bus routes and services including the shuttle bus to Bicester Village and the Bicester Taxibus (a commuter service), and many other local bus services which stop on Buckingham Road a few minutes' walk from the station.

## 3.7 Highway Network

The Site is strategically located within the local road network (Figure B.5 in Appendix B) as well as to strategic routes (Figure B.4 in Appendix B) including the M40, A41, A4095, A4421 and A34. To the south of Bicester the A41 connects to the M40 at junction 9, to Banbury and Birmingham in the north as well as High Wycombe, the M25 and London.

### Strategic Highway Network

#### **M40**

The M40 bypasses Bicester to the west in a north south alignment towards Banbury and Birmingham to the north and Aylesbury, the M25 and London to the south. Two junctions of the M40 serve the Site, namely Junction 10 situated 8.2km to the north of the Site and Junction 9 situated 5.4km to the south of the Site.

#### **A41/ A41 Oxford Road**

The A41 Oxford Road connects the south west of Bicester to the M40 at junction 9 and provides access to Middleton Stoney Road and central Bicester via a mini roundabout. It is a

dual carriageway subject to national speed limit which is bounded mainly by open fields with the exception of Bicester Village, Bicester Garden centre and the Kingsmere development. The road changes direction abruptly at Bicester Village in an easterly direction towards Aylesbury and London beyond.

### **A34**

The A34 is accessed from A41 at junction 9 of the M40 leading in a south easterly direction to Oxford and beyond (the M4 and Southampton). It is dual carriageway and is subject to speed limits that range between 50mph to 70mph.

## Local Highway Network

### **A4095/ A4421**

At the local level Bicester is bounded to the west, north and east by the A4095 and the A4421 forming a ring road and by the A41 and Middleton Stoney Road to the south. The A4095 and the A4421 roads are generally single carriageway (widening at junctions and slip roads) and are subject to a speed limit of 40mph. The northern sections of these roads incorporate a segregated cycle and pedestrian route along the southern edge nearest the town. Junctions off the ring road with radial roads such as Banbury Road and Buckingham Road are formed with roundabouts, thus the ring road is free of traffic signals with the exception of a toucan crossing on the A4095 Southwold Lane stretch between Banbury Road and Buckingham Road roundabouts.

### **A4095 Howes Lane**

To the east of the Site the A4095 Howes Lane extends north south from Bucknell Road to the junction with the B4030 Middleton Stoney Road. It is a single carriageway road rural in character and subject to varying speed limits of 40mph and 50mph. The road is bounded by fields to the west and the backs of houses in the Highfield area to the east. The western edge is formed by a grass verge and line of mature trees set approximately 3m back from the carriageway. There are currently no footways or street lighting.

### **A4095 Lord's Lane**

The A4095 Lords Lane is a single lane carriageway (in each direction) that extends between its roundabout junctions with the B4100 Banbury Road and Bucknell Road. The road is subject to a 50mph speed limit and street lighting is provided.

### **B4030 Middleton Stoney Road**

Middleton Stoney Road runs parallel to the southern boundary of the Site in a south-east to north-west direction. It is subject to national speed limit west of the Howes Lane/ Vendee Drive roundabout, and 30mph starts to the east of the roundabout. Its rural character is consistent along its length with mature vegetation and drainage ditches set back 2m back from the single carriageway which is approximately 7m in width.

### **B4030 Vendee Drive**

Vendee Drive (B4030) connects the Middleton Stoney Road east / Howes Lane roundabout with the east. It connects to the A41 to the south. It is a new single carriageway road subject to 50mph speed limit with a segregated pedestrian and cycle route.

### **Shakespeare Drive**

Shakespeare Drive is a local distributor road connecting Middleton Stoney Road to the A4095 Howes Lane (east of Vendee Drive) and provides access to a number of residential roads in the Highfield neighbourhood. Due to the residential surrounds it is subject to 30mph speed limit and benefits from continuous footways and street lighting. HGVs are restricted from using this route except for access.

### **Bucknell Road**

Bucknell Road connects the B4100 Queens Avenue in the south to the roundabout between the A4095 Howes Lane and Lords Lane in a south east to north-west alignment. It is a lit, single carriageway street with footways on both sides of the road and provides access to a number of residential side streets. North of the A4095 it becomes a rural lane providing access to Bucknell village.

### **B4100 Banbury Road**

The B4100 Banbury Road carriageway has a south to north alignment, from its convergence with Buckingham Road and Field Street via a roundabout (southern extent) to its roundabout convergence with the A4095 Lords Lane and Southwold Lane. To the north of the roundabout it passes the eastern extent of the NW Bicester eco-town and is predominately rural in character and subject to the national speed limit. The B4100 connects to the A43 at Baynards Green and is a route used to access the M40 Junction 10.

### **Bainton Road**

Bainton Road follows a general east to west alignment between the B4100 Banbury Road and the village of Bucknell (approximately 2km north-west of the Site). The carriageway is approximately 5.5m in width although there are places where passing bays are provided and there are sharp bends. It is subject to a 60mph speed limit until the fringes of Bucknell village, where the speed limit reduces to 30mph. The carriageway is not illuminated and there is an absence of formal footways.

### **Middleton Road**

Middleton Road extends Bainton Road connecting the villages of Bucknell and Middleton Stoney. The carriageway is 5.5m in width and is rural in character crossing the M40 over a bridge.

### **A4095 East of Banbury Road**

The A4095 is single carriageway link between Banbury Road and Buckingham Road. The carriageway is lit and the speed limit is 50mph. Right turn central bays are provided for side roads leading to the residential area to the south of the link. Land use to the north of the link consists of fields and DLO Caversfield land. A shared use footway is provided along the southern side of the carriageway and controlled pedestrian crossings are provided to the

east of the junction with Fringford Road and to the west of the roundabout on Buckingham Road. The majority of the northern side of the carriageway has a large grassed verge and is tree lined with no footway provision.

#### **Queens Avenue, South of Bucknell Road**

Queens Avenue is a single carriageway road between the signalised junction with Bucknell Road and the junction with Kings End. It is a 30mph speed limit, is street lit and parking/loading is restricted. Bus stops are provided on both sides of the carriageway, to north of Queens Court. Footways are provided on both sides of the carriageway with a grassed buffer zone. The western footway is shared by pedestrians and cyclists. A toucan crossing facility is provided south of St John's Street, linking to the shared footpath connecting to Hunt Close. A pedestrian crossing is provided to the north of Kings End at the end of the shared use footway. Land use along Queens Avenue is mixed with residential properties accessed via side roads/private drives, Bicester Community College and the Magistrate's Court.

#### **A4421 Neunkirchen Way**

The A4421 Neunkirchen Way link between the A41 and Peregrine Way is dual carriageway with two lanes in each direction. The speed limit is 50mph and street lighting is provided. A shared use footway is provided along the northern side of the carriageway. There is a residential estate to the north of the link, but there are no residential frontages. To the south of the link there are fields.

#### **A4421, East of Skimmingdish Lane**

The A4421 between Bicester Road and the A4095 is single carriageway with a speed limit of 50mph. The majority of the link is unlit. Off-carriageway facilities for both pedestrians and cyclists are only provided along the southern side of the carriageway between Bicester Road and Launton Road and at the northern section of the link where it connects to the A4095. To the north of the link there is a gliding club and airfield. To the south of the link, there is a residential estate but with no frontages or access from the A4421.

#### **A4421, North of Skimmingdish Lane**

The A4421 link to the north of Skimmingdish Lane is single carriageway, with a speed limit of 50mph and has no street lighting. Off-carriageway facilities for both pedestrians and cyclists are provided along the western side of the carriageway and bus stops are located north of the A4095 roundabout. To the east of the link there is a gliding club and airfield and to the west there are residential estates but with no frontages or direct access from the A4421.

#### **Ardley Road, East of B430**

Ardley Road is a single carriageway road between Station Road and Middleton Road which crosses over the M40. It is mainly rural in character with a speed limit of 60mph, changing to 30mph at the traffic calmed entry gate to Bucknell Village. A weight restriction on vehicles over 7.5 Tonnes is in place except for access. There are no footways or adjacent paths along the route and a 'pedestrians ahead' warning sign is located within the village. Street lighting has only been provided where there is a road hump north, just north of Bainton Road. Along the link there are farm houses set back from the carriageway and in Bucknell Village there are properties with frontage access.

### **A4095 North of Chesterton**

The A4095 is a single carriageway road with a speed limit of 60mph, changing to 30mph at the entry to Chesterton Village. There are no footways or footpaths provided and there is no street lighting. The road is mainly rural in character between the M40 and Chesterton Village with fields to the north and a golf course to the south. Within Chesterton Village there are residential frontages, a parish hall and a school. Footways are provided on both sides of the carriageway but there is no street lighting.

### **The Approach, West of Bucknell Road**

The Approach is a single carriageway road connecting Hudson Street and Bucknell Road. It is a residential area with a 30mph speed limit. Footways are provided on both sides of the carriageway which is street lit. Bus stops are located on both sides of the carriageway with a shelter on the southern side. Double yellow line waiting and loading restrictions are located on the corners of the junction with Bucknell Road.

### **Bicester Road, East of A4421 junction**

Bicester Road is a single carriageway road between the A4421 and Station Road. The speed limit is 50mph, changing to 30mph at the entry to Launton Village. National Cycle Network Route 51 is located along Bicester Road and an off-road segregated cycle/footway is provided on the southern side of the carriageway between the A4421 roundabout and the bridge over the railway line. Land use is mixed along the link with fields to the north and residential frontages, a parish hall and a school along the southern section. Footways are provided on both sides of the carriageway but there is no street lighting. Bus stops are provided in both directions, east of The Glades.

### **Fringford Road, North of Caversfield**

Fringford Road is a single carriageway road with a speed limit of 60mph, changing to 40mph at the entry to Caversfield Village. It is rural in character with fields located either side of the carriageway. Footways/footpaths have not been provided and there is no street lighting.

### **Ardley Road, North of Bucknell**

Ardley Road is a single carriageway road between Station Road and Water Lane. It is a 30mph road with footways provided on both sides of the carriageway for the majority of the link. There is no street lighting provided and the carriageway is fronted by residential properties and a community hall, just north of the Station Road junction. Bus stops are located south of Water Lane and a shelter provided on the western side of the carriageway.

### **Green Lane, West of Chesterton**

Green Lane is a single carriageway road between Northampton Road and Alchester Road, which crosses over the M40. It is rural in character and has a speed limit of 60mph, changing to 30mph at the traffic calmed entry to Chesterton Village. Within Chesterton Village there are residential frontages with section of on-street parking bays. Street lighting and footways are only provided on the link within the village.

## **Wendlebury Road, East of M40**

Wendlebury Road is a single carriageway road connecting between Oxford Road and the A41. It is mainly rural in character with a speed limit of 60mph road, changing to 30mph at the traffic calmed entry to Wendlebury Village. National Cycle Network Route 51 is located along Wendlebury Road and to the north of the link there is cycle facility along the westbound carriageway. Land use is predominately rural, with a garden centre just south of the A41 junction. Within Wendlebury Village there are residential frontages and a public house. There are no footways or footpaths along the link and there is no street lighting.

## **3.8 Baseline traffic**

### Bicester Saturn Model Base Year 2012

The Bicester SATURN model was built using 2007 traffic data, and hence the model has a 2007 base year. In order to validate the use of the model with a 2012 Base Year, a series of vehicle counts were carried out by Oxfordshire County Council (OCC) in 2012/2013 and supplied to Halcrow who undertook a validation exercise. In total 35 automatic traffic counts were undertaken. The validation report is included as part of the evidence base for the emerging Cherwell Local Plan.

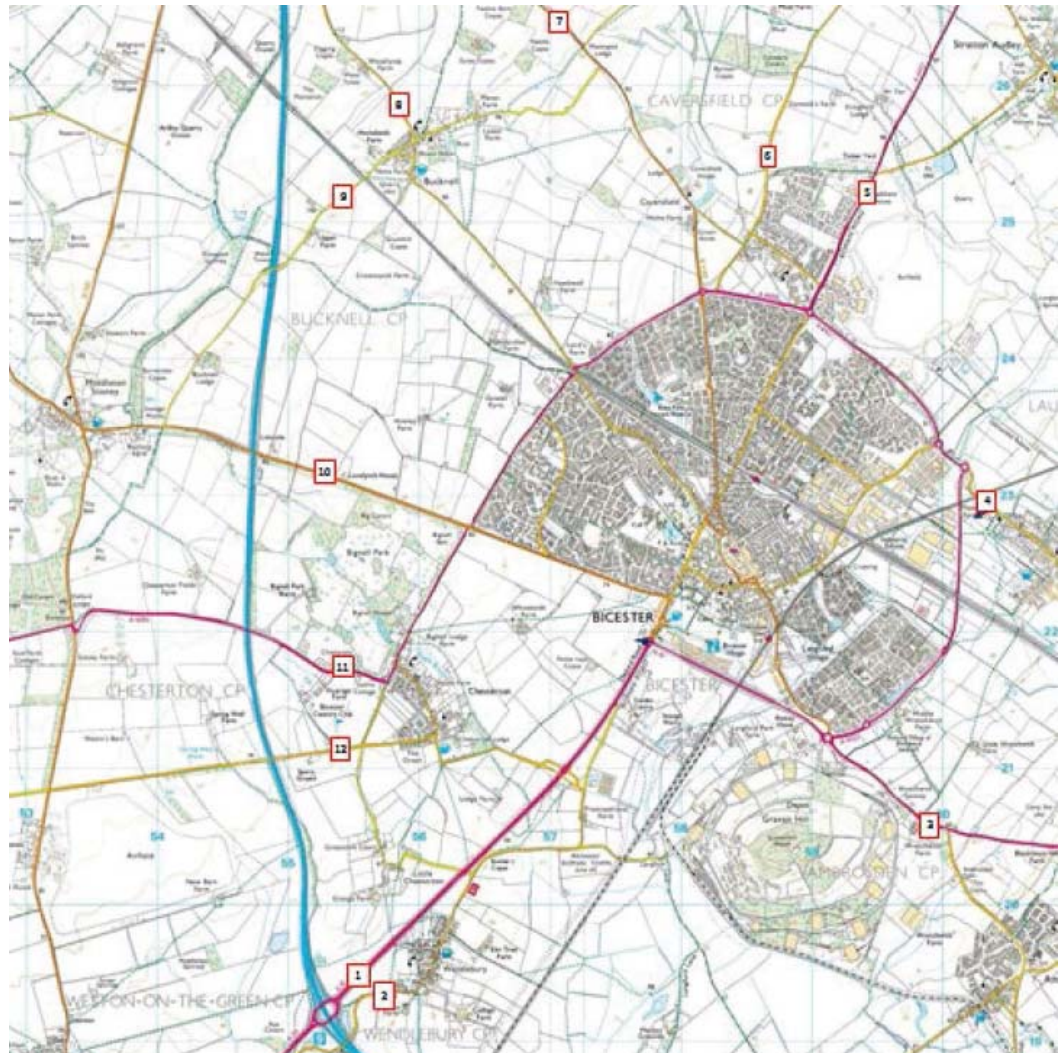
The 2012/2013 observed count data was compared to modelled traffic flow data from the 2007 base year Bicester AM and PM peak scenarios. The validation checks showed that the model nearly validates to the criteria set out in DMRB. The most significant issue is the overestimation of modelled flows on the B430. When considering the validation of the model within the town itself, the DMRB criteria were met.

The baseline traffic analysis uses the Saturn Model Flows to provide the evidence of current traffic levels. Baseline AM and PM peak hour flows for links and junctions across the study area have been obtained from the Bicester Saturn Model 2012 Base Year.

## Cordon Flows

An analysis has been undertaken of total traffic entering and leaving Bicester in the AM and PM peak hours in the Base Year 2012. Twelve cordon locations have been selected as providing all of the routes in and out of the town, with Bucknell village, Caversfield and Chesterton included within the cordon. The cordon locations are shown on Figure 3.17. The analysis also examines which routes are most used in the peak hours.

Figure 3.17 Bicester Cordon Locations



Base Year 2012 traffic movements inbound and outbound through each cordon are shown in Table 3.5 below. These are Base Year movements from the Bicester Saturn Model validated to observed movements. It can be seen that the A41 from the M40 J9 is the most used route, representing 27% of trips in the PM peak, but the A41 east of the A4421 is similarly used with 25% of PM peak trips. The B4100 Banbury Road and A4421 Buckingham Road (both 12% in PM peak) are also significant routes.

In total there were 9,536 trips in and out of Bicester in the AM peak hour and 9,660 in the PM peak hour. There is not a strong outbound movement in the AM peak and inbound in the PM peak – in fact there are more inbound than outbound trips in both the peak hours.

Table 3.5 Base Year 2012 Cordon Traffic Movements

Link Ref	Link Description	AM		PM		AM %	PM %
		Inbound	Outbound	Inbound	Outbound		
1	A41 E of M40	1210	1205	1493	1109	25.33	26.94
2	Wendlebury Road, E of M40	238	93	46	161	3.47	2.14
3	A41 E of A4421 junction	1085	1056	1185	1193	22.45	24.62
4	Bicester Road, E of A4421	319	344	330	287	6.95	6.39
5	A4421 Buckingham Road, N of Skimmingdish Lane junction	673	638	671	461	13.75	11.72
6	Fringford Road, N of Caversfield	16	58	46	66	0.78	1.16
7	B4100 Banbury Road, N of Bainton Road junction	632	485	525	661	11.71	12.28
8	Ardley Road, N of Bucknell Road	105	102	107	88	2.17	2.02
9	Middleton Road, W of Bucknell	25	2	2	10	0.28	0.12
10	B4030 Middleton Stoney Road, NW of NWB access	288	268	291	364	5.83	6.78
11	A4095, W of Chesterton	70	217	25	179	3.01	2.11
12	Green Lane, W of Chesterton	301	106	254	106	4.27	3.73
	<b>TOTAL</b>	<b>4962</b>	<b>4574</b>	<b>4975</b>	<b>4685</b>	<b>100</b>	<b>100</b>
	<b>In and Outbound Total</b>	<b>9536</b>		<b>9660</b>			



## Link Flows

The AM and PM peak hour flows on links have been factored to give 12 hour and 18 hour flows, using a factor of 4.330 and 5.212 respectively on the total of AM plus PM peak hour flow. The factors have been derived from ATC data collected locally to NW Bicester for the Exemplar development Transport Assessment. The hierarchy of flows for NW Bicester are mapped out in relation to the Site, illustrated in Figure B.6 Appendix B and the full set of data is shown in Table 3.6. The location of links analysed are referenced in Figure B.7 in Appendix B.

Table 3.6 Base Year 2012 Traffic Flows

Link Ref	Link Description	Base Year 2012			
		AM Peak Hour	PM Peak Hour	12 Hour Flows	18 Hour Flows
1	A41 northbound, N of M40 J9	1210	1493	11705	14088
2	A41 southbound, N of M40 J9	1205	1109	10021	12060
3	A41 Oxford Rd, S of A41 junction	2562	2490	21878	26331
4	Vendee Drive, W of A41 junction	353	249	2607	3138
5	A41, N of Pringle Drive	1496	1678	13745	16543
6	Middleton Stoney Rd, W of Kings End	970	846	7864	9465
7	Middleton Stoney Rd, W of Howes Lane	556	655	5244	6312
8	Howes Lane, N of Middleton Stoney Road	618	697	5695	6854
9	Howes Lane, E of Shakespeare Drive	750	848	6920	8329
10	Lords Lane, E of Bucknell Road	1003	1118	9185	11055
11	Lords Lane, W of Banbury Road	1108	1215	10060	12107
12	Bucknell Road, N of Lords Lane	247	192	1901	2288
13	Bucknell Road, S of Howes Lane	540	833	5946	7156
14	Banbury Road, N of Lords Lane	1117	1186	9973	12003
15	A4095 E of Banbury Road	1885	1886	16330	19654
16	Banbury Road, S of A4095	457	634	4725	5686
17	Buckingham Road, S of Skimmingdish Lane	717	842	6751	8125
18	Queens Avenue, S of	1035	1454	10779	12973

Link Ref	Link Description	Base Year 2012			
		AM Peak Hour	PM Peak Hour	12 Hour Flows	18 Hour Flows
	Bucknell Road				
19	A41 E of A41 Oxford Road	2129	2265	19028	22901
20	A4421 Neunkirchen Way	1370	1661	13126	15797
21	A41, E of London Road roundabout	2293	2396	10306	24439
22	A4421, E of Skimmingdish Lane	1471	1688	13680	16465
23	Shakespeare Drive, S of Howes Lane	142	152	1273	1532
24	M40 J10 northbound off slip road	482	599	4681	5634
25	Ardley Road (E of B430)	207	195	1741	2095
26	M40 southbound on slip road (from A43)	658	354	4382	5274
27	B430 M40 over bridge	2184	2170	18855	22693
28	A4095 N of Chesterton	602	553	5002	6020
29	Shakespeare Drive, E of Middleton Stoney Road	611	455	4616	5556
30	The Approach, W of Bucknell Road	320	243	2438	2934
31	A41 East of Pioneer Road	2141	2378	19570	23553
32	Bicester Road, E of A4421 junction	663	617	5543	6671
33	A4421 N of Skimmingdish Lane	1311	1132	10579	12733
34	Fringford Road, N of Caverfield	74	112	805	969
35	B4100 Banbury Road, N of Bainton Road	1117	1186	9973	12003
36	Ardley Road, N of Bucknell	207	195	1741	2095
37	Middleton Road, W of Bucknell	27	12	169	203
38	B4030 Middleton Stoney Road, NW of NWB	556	655	5244	6312
39	Green Lane, W of Chesterton	407	360	3321	3998
40	Wendlebury Road, E of M40	331	207	2330	2804
41	M40 northbound (mainline only), S of J9	3876	4332	43454	57812
42	M40 southbound	4424	4012	50828	59418

Link Ref	Link Description	Base Year 2012			
		AM Peak Hour	PM Peak Hour	12 Hour Flows	18 Hour Flows
	(mainline only), S of J9				
43	M40 northbound (mainline only), S of J10/N of J9	5513	4271	71000	83000
44	M40 southbound (mainline only), S of J10/N of J9	5500	5101	63872	74667
45	M40 northbound (mainline only), N of J10	5259	5849	66927	78238
46	M40 southbound (mainline only), N of J10	4842	5102	59914	70040

The Site is bounded to the south by Middleton Stoney Road (6,312 vehicles per day increasing to 9,465 vehicles to the east by the junction with King's End). The A4095 Howes Lane lies to the east of the Site with vehicle flows of 6,854 north of Middleton Stoney Road increasing to 8,329 north of Shakespeare Drive. This stretch of road forms the first section of the ring road continuing into A4095 Lords Lane. The 18 hour flows on the ring road around NW Bicester are (at their busiest points):

- A4095 Howes Lane (N Middleton Stoney Road/ E Shakespeare Drive)- 6,854 to 8,329 vehicles per day
- A4095 Lords Lane (E Bucknell Road/ W Banbury Road)- 11,055 to 12,107 vehicles per day
- A4095 (to the north west of junction with Banbury Road) - 19,654 vehicles per day
- A4421 Skimmingdish Lane – 12,733 vehicles per day

The ring road is connected to the centre by radial roads. The 18 hour flows on the radial roads (at the busiest points) are;

- Bucknell Road 7,156 vehicles per day
- Banbury Road 5,686 vehicles per day
- Buckingham Road 11,900 vehicles per day
- Queen's Avenue 15,200 vehicles per day
- Middleton Stoney Road (by junction with King's End) – 9,465 vehicles per day.

Shakespeare Drive is a local distributor road which connects Howes Lane and Middleton Stoney Road. AADT flows are 1,532 vehicles per day south of Howes Lane and 5,556 vehicles east of Middleton Stoney Road. There are a number of community facilities and small shops towards the southern end of Shakespeare Drive increasing movement flows east of Middleton Stoney Road.

The main north-south route through the town is formed by Buckingham Road, Queens Avenue, Field Street, Kings End and the Oxford Road. Flows vary from approximately 8,000 – 16,000 vehicles.

Middleton Road (west of Bucknell and approximately 2km north-west of the Site) has the lowest flows of 302 vehicles per day. Other smaller local roads include Green Lane, west of Chesterton (2804 vehicles) and A4095 north of Chesterton (6020 vehicles).

## Junction Turning Movements

The traffic turning movements at each existing junction across the town network have been provided from the Bicester Saturn Model for the 2012 Base Year and are shown in Table 3.7. The locations of the junctions and the reference numbers are shown in Figure B.8 in Appendix B.

Table 3.7 Base Year 2012 Total Turning Movements at Junctions

Junction	Description	AM Peak Hour	PM Peak Hour
J1-10005	M40 Junction 9	1228	1518
J1-10010	M40 Junction 9	3913	4069
J1-10185	M40 Junction 9	2559	2509
J1-10190	M40 Junction 9	3869	3664
	<b>Total M40 Junction 9</b>	<b>11569</b>	<b>11760</b>
J2	A41/Vendee Drive	2804	2675
J3	A41 Oxford Road/A41	3237	3133
J4	A41 Oxford Road/Pringle Drive	1899	2056
J5	Middleton Stoney Road/Kings End	1888	2021
J6	Field Street/Bucknell Road	1612	1709
J6B	Queens Avenue/St John Street	1188	1734
J7	Banbury Road/Field Street	2154	2042
J8	A41/A4421/B4100	3533	3817
J9	A4421/Peregrine Way	1536	1959
J10	Charbridge Lane/Gavray Drive	1108	1350
J11	A4421/Bicester Road	1668	1779
J12	A4421/Launton Road	1969	2161
J13	Skimmingdish Lane/Buckingham Road	2665	2748
J14	B4100 Banbury Road/A4095 Lords Lane	2284	2461
J16	B4100/Caversfield	1210	1247
J19	Lords Lane/Bucknell Road	1128	1247
J20	Howes Lane/Bucknell Road	1215	1215
J23	Howes Lane/Middleton Stoney Road/Vendee Drive	1481	1455
J26	M40 Junction 10, western rbt	2287	1650
J27	M40 Junction 10, south eastern rbt	2185	2247

Junction	Description	AM Peak Hour	PM Peak Hour
J28	M40 Junction 10, northern rbt	3185	2379
J29	Middleton Road, Bainton Road	265	252

## Junction Capacity

Base Year 2012 ARCADY and PICADY models have been produced for the key existing junctions in the vicinity of the Site (Figure B.8 in Appendix B).

The results of the base modelling show that all the junctions assessed are currently operating within capacity. Table 3.8 to Table 3.14 provide the results from the modelling of the existing junctions in the 2012 Base Year. The results show the RFC (Ratio of Flow to Capacity) and the maximum queue length in vehicles.

Table 3.8 Field Street/ Bucknell Road Base Year 2012 PICADY Model Results (J6)

	AM		PM	
	RFC	Queue	RFC	Queue
Field Street North	0.36	1.1	0.62	1.6
Bucknell Road	0.78	3.3	1.81	6
Field Street South	-	-	-	-

Table 3.9 A4421 Skimmingdish Lane/ Buckingham Road Base Year 2012 ARCADY (J13)

	AM		PM	
	RFC	Queue	RFC	Queue
A4421 Skimmingdish Lane	0.375	0.6	0.802	4
Buckingham Road	0.215	0.3	0.393	0.7
A4095 West	0.764	3.2	0.341	0.5
A4421 North	0.541	1.2	0.479	0.9

Table 3.10 A4095/ Banbury Road Base Year 2012 ARCADY Model Results (J14)

	AM		PM	
	RFC	Queue	RFC	Queue
A4095 East	0.571	1.3	0.479	0.9
Banbury Road South	0.195	0.2	0.197	0.2
A4095 West	0.65	1.8	0.519	1.1
B4030 North	0.492	1	0.556	1.2

Table 3.11 B4100 Banbury Road/ Side Road Base Year 2012 PICADY Model Results (J14)

	AM		PM	
	RFC	Queue	RFC	Queue
B4100 North	-	-	-	-
Side Road	0.042	0	0.092	0
B4100 South	0	0	0	0

Table 3.12 Lord's Lane/ Bucknell Road Base Year 2012 ARCADY Model Results (J19)

	AM		PM	
	RFC	Queue	RFC	Queue
Lords Lane	0.292	0.4	0.196	0.2
Bucknell Road South	0.453	0.8	0.64	1.8
Bucknell Road North	0.107	0.1	0.114	0.1

Table 3.13 Howes Lane/ Bucknell Road Base Year 2012 PICADY Model Results (J20)

	AM		PM	
	RFC	Queue	RFC	Queue
Bucknell Road South	-	-	-	-
Howes Lane	0.598	1.47	0.805	3.94
Bucknell Road North	0.675	2.27	0.711	2.56

Table 3.14 B4030/ A4095 Base Year 2012 ARCADY Model Results (J23)

	AM		PM	
	RFC	Queue	RFC	Queue
B4030 Northwest	0.251	0.3	0.241	0.3
A4095 Howes Lane	0.352	0.5	0.425	0.7
Middleton Stoney Road	0.381	0.6	0.401	0.7
B4030 Vendee Drive	0.566	1.3	0.487	0.9

The base year modelling shows all junctions assessed as operating within capacity. However, a number of junctions and approaches are predicted to operate close to 85% of their capacity. The junction between Field Street and Bucknell Road is operating close to capacity with the Bucknell Road arm of the junction operating with an RFC of 0.78 in the AM

peak and 0.81 in the PM peak indicating this junction would not be able to accommodate significant additional traffic without experiencing congestion. It should be noted however that the Base Year layout for this junction has now been superseded by the recent town centre improvements.

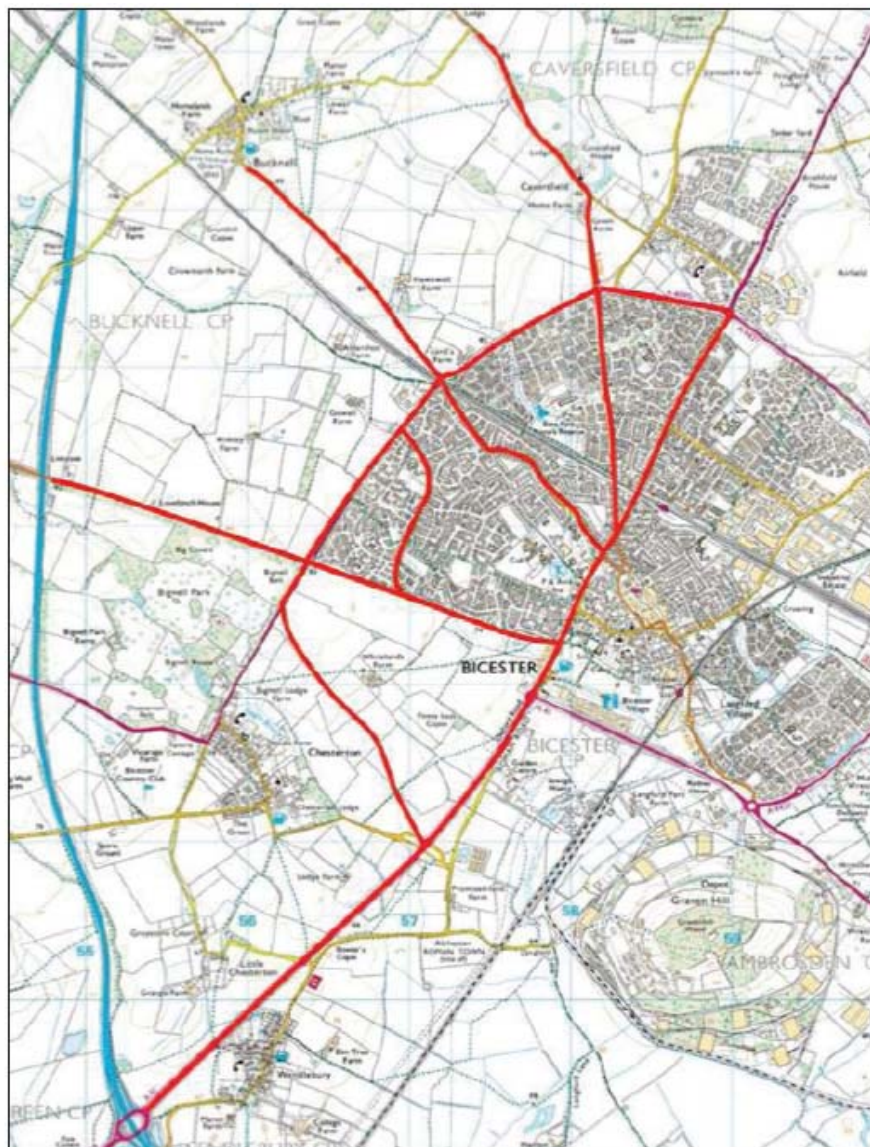
The A4421 Skimmingdish Lane/ A4095 junction and the Howes Lane/ Bucknell Road junction also operate close to capacity during the PM peak period. The A4421 Skimmingdish Lane junction operates with an RFC of 0.802 and the A4095 Howes Lane approach to Bucknell Road operates with an RFC of 0.805.

### 3.9 Personal Injury Accident Analysis

#### Data Analysis

This section analyses personal injury accidents (PIA) that were recorded on the road network in the vicinity of the site in the period between February 2009 and February 2014. The accident analysis area is shown below as Figure 3.18.

Figure 3.18 Accident Analysis Area Map



There have been a total of 114 incidents within the study are over the five year period; 98 slight, 14 serious and two fatal in severity. Table 3.15 and Table 3.16 provide an overview of casualties and their severity. Of the two fatal accidents; one occurred in 2012 along the B4030 Middleton Stoney road in which a HGV travelling southeast hit a pedestrian who had been jogging east on the footway, who for unknown reasons went into the carriageway. The second fatal accident occurred along Bucknell road when a vehicle travelling southeast lost control and exited the carriageway, hitting a tree and killing both driver and child passenger.

Table 3.15 All Accidents by Severity

	2009	2010	2011	2012	2013	2014	Total
Fatal	0	1	0	1	0	0	2
Serious	3	0	3	3	5	0	14
Slight	14	10	33	20	18	3	98
Total	17	11	36	24	23	3	114

Table 3.16 All Casualties by Severity

	2009	2010	2011	2012	2013	2014	Total
Fatal	0	2	0	1	0	0	3
Serious	3	0	6	3	5	0	17
Slight	17	15	43	31	26	4	136
Total	20	17	49	35	31	4	156

There have been a total of 14 pedestrian accidents over the five year study period. Table 3.17 provides an overview of pedestrian accidents and their severity. The fatal pedestrian accident within this study period is as stated above (Middleton Stoney Road). A total of four serious accidents occurred within the study period, of which two accidents occurred along Buckingham Road.

Table 3.17 Pedestrian Casualties by Severity

	2009	2010	2011	2012	2013	2014	Total
Fatal	0	0	0	1	0	0	1
Serious	2	0	1	1	0	0	4
Slight	1	0	5	0	3	0	9
Total	3	0	6	2	3	0	14

There have been a total of nine cycle accidents recorded over the five year study period. Table 3.18 provides an overview of cycle accidents and their severity. The majority of cycle accidents (8 out of 9) were slight with only one severe accident during the study period.



Table 3.18 Cycle Accidents by Severity

	2009	2010	2011	2012	2013	2014	Total
Fatal	0	0	0	0	0	0	0
Serious	0	0	0	0	1	0	1
Slight	0	1	3	2	2	0	8
Total	0	1	3	2	3	0	9

## Cluster Analysis

Further analysis has been undertaken at key locations within close proximity to the Site where clusters of accidents have been identified from the accident data. This includes the existing key junctions within the vicinity of the Site.

### **Bucknell Road near Hawkwell Farm**

Four accidents were recorded within a 350m section of the B4100 in the latest five year period. Two of the accidents were slight in severity, with one serious and one fatal. Three of the accidents were a result of drivers losing control of the vehicle. Causes included speeding and being under the influence of alcohol. The incident involving a fatality was due to excessive speeding, travelling too fast for conditions, aggressive driving and being impaired by alcohol. Three of the four accidents involved vehicles travelling southeast-bound along Bucknell Road.

### **B4100 (near Home Farm)**

Five accidents in total occurred in a 70m segment of the B4100 near Home Farm, all of which slight in severity. Two of the five accidents occurred as a result of the vehicle losing control rounding a corner along the B4100, travelling north/northwest bound. Two of the accidents occurred at the same junction adjoining Caversfield Road and the B4100. In both cases the vehicles pulling out of the junction failed to see the oncoming vehicle travelling southeast bound along the B4100, rounding a right hand bend. Another incident occurred due to a driver unfamiliar with driving on the left pulled out from a layby onto the wrong side of the road, colliding with an oncoming vehicle.

### **B4100 Banbury Road/A4095 Roundabout**

Two incidents have been recorded at the roundabout between the B4100 and A4095 in the last five years, one of which was serious in severity and the other slight. An incident involving a car and a motorcycle occurred due to the car travelling northbound attempting to make a U-turn north of the splitter island north of the roundabout. The car driver failed to give way to a motorcycle overtaking travelling northbound, resulting in a collision and serious injury to the motorcyclist.

### **A4095/Buckingham Road/Skimmingdish Lane**

Three accidents have been recorded at the roundabout between the A4095, Buckingham Road and Skimmingdish Lane, all of which were slight in severity. Two of the accidents were a result of vehicles colliding at the roundabout, one due to a driver failing to give way and the other due to an unknown distraction in the car. The remaining incident was a result of a driver being impaired by alcohol and losing control of the car.

### **B4030/Vendee Drive/Middleton Stoney Road/A4095**

Two accidents have been recorded at the roundabout between the B4030 and A4095 within the last five years, both of which were slight in severity. Both accidents were caused by drivers not stopping at junctions. The cause of one accident was due to a driver speeding and acting recklessly, failing to stop at the junction and exiting the carriageway. The other incident was due to a driver being impaired by drugs failing to stop at the junction and exiting the carriageway.

### **Howes Lane/Shakespeare Drive**

Three accidents have been recorded at the junction between Howes Lane and Shakespeare Drive, all of which were slight in severity and involving two cars. Two of the accidents were a result of a car jumping a red light, resulting in a collision. The remaining incident was due to a driver failing to give way at the junction.

## Accident Analysis Summary

In summary, the number of incidents on Bucknell Road near Hawkwell Farm, on the B4100 Banbury Road and the junction of Howes Lane/ Shakespeare Drive mean that safety issues need to be considered further in the impact assessment. The number of accidents at the roundabouts does not appear to be unusual given the volume of traffic movements.

# 4.0 Mode Share and Containment

## 4.1 Introduction

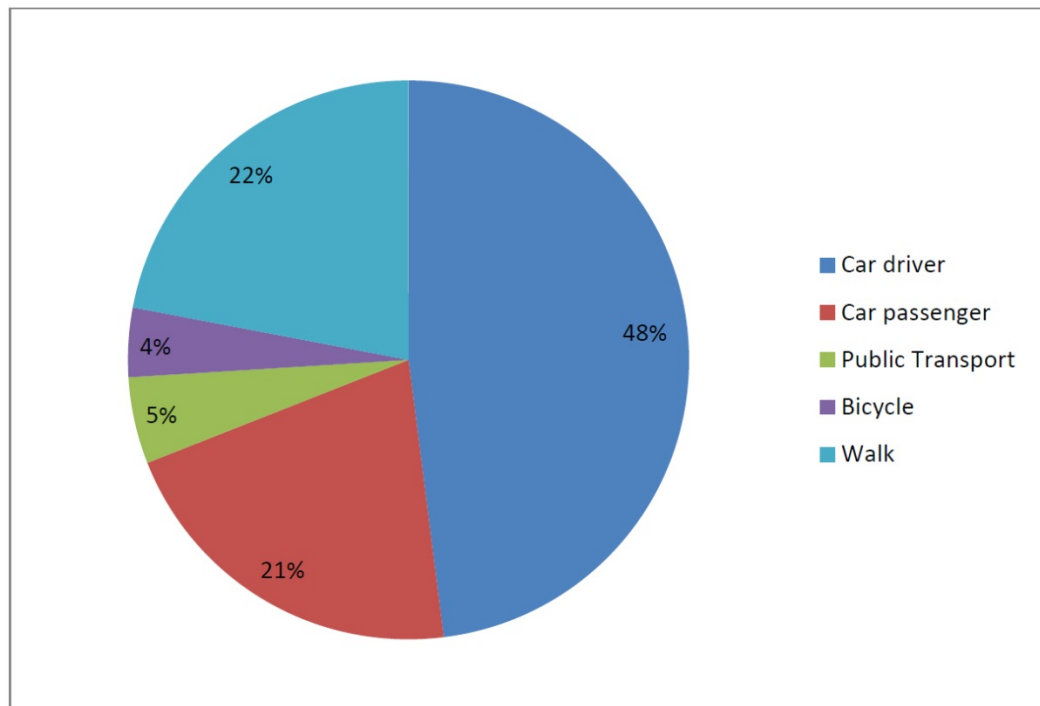
Appendix 5 of the NW Bicester Masterplan Access & Travel Strategy details the baseline mode share and containment of trips and this is summarised in this chapter to inform the Transport Assessment for Himley Village.

Baseline information on mode share of trips is available from the Bicester Household Travel Diary Data (2007 and 2010) and the 2011 Census on Method of Travel to Work. The 2010 Household Survey provides some data but is not as comprehensive as the survey undertaken in 2007. The 2010 Household Diary is used as it is most recent, but this has been supplemented by data from 2007 where it has not been available.

## 4.2 Mode Share

The share of trips by various modes for Bicester residents as a whole (2010 survey) is shown in Figure 4.1. This is of all trips made by residents across a seven day period.

Figure 4.1 Percentage of Total Travel by Mode, Bicester Residents, 2010



Source: Travel Behaviour Survey, Summary of Results, Autumn/Winter 2010/11, OCC 2011

The figures indicate that at present 69% of total trips are made by car modes and 31% by non-car modes. This is a slight increase in car trips compared to the 2007 survey which recorded 67.5% of all trips by households being made by car or goods vehicle.

The proportion of those currently using sustainable modes<sup>2</sup>, when car sharing is included as a sustainable mode, is currently 48%, showing the influence of car sharing on overall car use.

Of non-car modes, walking has the largest share at 22%. The public transport percentage includes both bus and rail trips (it is not broken down in the results into the separate modes).

Table 4.1 sets out modal share for trips within NW Bicester (under 1km), within Bicester (1-3km) and outside of Bicester (more than 3km). In this context trips of under 1km are assumed to be within the Himley Village site, trips of 1-3km are within Bicester and those of more than 3km are assumed to be outside of Bicester.

Table 4.1 Bicester Household Diary Surveys Mode Share by Distance (2010)

	2010 Bicester Household Survey		2010 Modal Share Internal Trips (under 1km)		2010 Modal Share External Trips Within Bicester (1-3km)		2010 Modal Share external Trip Outside Bicester (>3km)	
	% by mode	Total Car /Non car	% by mode	Total Car /Non car	% by mode	Total Car /Non car	% by mode	Total Car /Non car
<b>Car driver</b>	48%	69%	12%	22%	39%	60%	65%	86%
<b>Car passenger</b>	21%		10%		21%		21%	
<b>Bus passenger</b>	5%	31%	1%	78%	2%	40%	6%	14%
<b>Bicycle</b>	4%		5%		8%		3%	
<b>Walk</b>	22%		72%		30%		5%	
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

It can be seen from reference to Table 4.1 that in the baseline, 69% of all trips by households were made by vehicle but this varies from only 22% of internal trips, to 60% within Bicester and 86% of trips outside of Bicester. Furthermore, of non-vehicle modes, walking has the largest share at 22% of all trips but represents 72% of local trips of under 1km.

## Journey to Work Mode Shares: 2011 Census Data

The 2011 Census data provides a modal share of journeys to work in the Bicester North and Caversfield Wards compared to Cherwell District and England as a whole (daytime population). The table includes those who work from home (all the time) within the percentages. The data is shown in Table 4.2.

<sup>2</sup> Walking, cycling, electric car, rail, bus, taxi, car passenger or motorcycle as defined in Appendix 5 of the masterplan

The Census records approximately 76.9% of work journeys combining Caversfield and Bicester North as being made by car (71.2% drivers, 5.7% passengers). This is higher than the 68% for the Cherwell District and 62% for England as a whole. The percentage working from home is 6% on average in Cherwell District but higher at 8% in Caversfield. The percentage does not include those who work from home on a regular but not full time basis.

Table 4.2 Summary of Method of Travel to Work – Daytime/Working Population

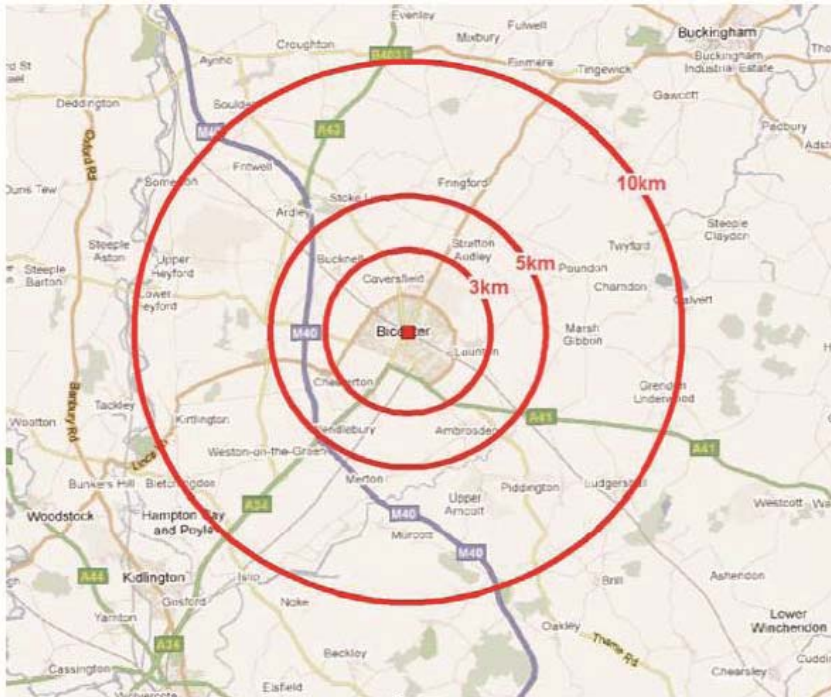
	<b>Caversfield</b>	<b>Bicester North</b>	<b>Cherwell</b>	<b>England</b>
<b>All Usual Residents Aged 16 to 74</b>	<b>1,573</b>	<b>4,223</b>	<b>74,829</b>	<b>25,162,721</b>
Work Mainly at or From Home	8%	5%	6%	5%
Underground, Metro, Light Rail, Tram	0%	0%	0%	4%
Train	2%	4%	3%	5%
Bus, Minibus or Coach	2%	4%	5%	5%
Taxi	0%	0%	0%	1%
Motorcycle, Scooter or Moped	1%	1%	1%	1%
Driving a Car or Van	77%	69%	63%	57%
Passenger in a Car or Van	5%	6%	5%	5%
Bicycle	1%	3%	3%	3%
On Foot	3%	8%	12%	11%
Other Method of Travel to Work	1%	0%	1%	1%

Source: 2011 Census

### 4.3 Containment of Trips

Figure 4.2 shows the extent of the various travel distances from the centre of Bicester. The whole of Bicester and the main development sites (including most of the NW Bicester eco-town area) is within the 3km distance. This distance therefore can be used to represent those trips 'contained' within Bicester.

Figure 4.2 Distance from Bicester Town Centre

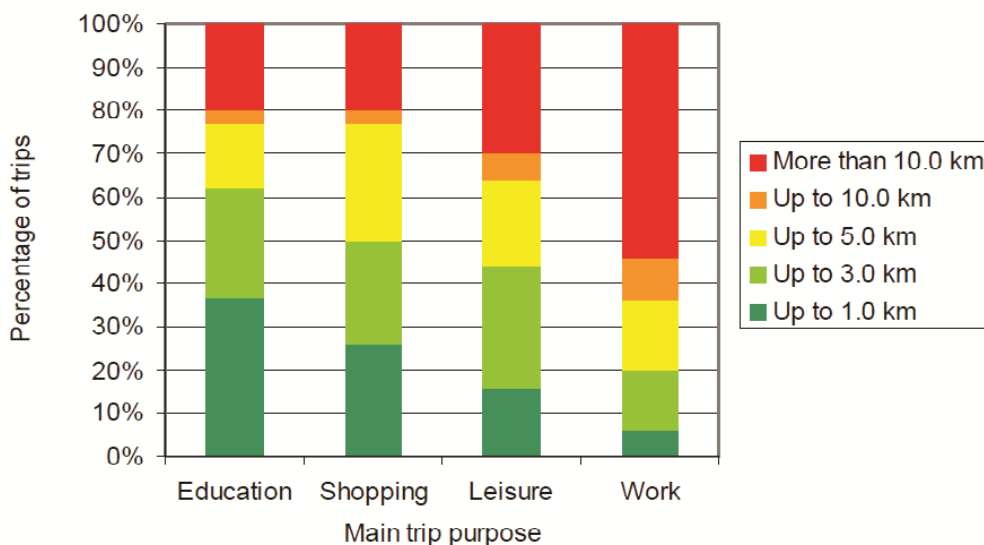


Source: Travel Behaviour Survey, Summary of Results, Autumn/Winter 2010/11, OCC 2011

### Containment by Trip Purpose

The 2010 survey provides information on the distance versus the trip purpose, as shown in Figure 4.3. The results show that the level of containment of trips within the 3km varies substantially by trip purpose, with 62% of educational trips, 50% of shopping trips and 44% of leisure trips contained compared to only 20% of work trips. The main challenge for achieving a high level of containment for the NW Bicester eco-town area will thus be ensuring a high level of containment of jobs within 3km of residents of the development, whereas other trip purposes tend to have relatively high containment at present in the town.

Figure 4.3 Trip Purpose vs Distance Travelled



Source: Travel Behaviour Survey, Summary of Results, Autumn/Winter 2010/11, OCC 2011

## Destinations

The 2007 Bicester Household Travel Diary survey data has been analysed to establish the destinations of Bicester residents by trip purpose.

Table 4.3 shows the main destinations for work based trips, highlighting that Oxford is a key destination, followed by Kidlington. Trips to the east of Bicester (to the industrial estates) and the town centre are also significant. Work based trips are however the most dispersed out of Bicester of the journey purposes, illustrating that the majority of Bicester residents currently commute out of the town for employment.

Table 4.3 Employment and Business Trips Main Destinations

Zone	District/Ward Name	% of Trips
35	Oxford District (B)	9.8
36	Kidlington Wards	9.5
41	Bicester East Ward	9.5
43	Bicester Town Ward	9.5
37	Wards South and West of Bicester	6.9
27	South Oxfordshire District	6.4
38	Wards North and West of Bicester	4.9
24	South Northamptonshire District	4.6
25	West Oxfordshire District	4.1
33	Aylesbury Vale District	3.6
	<b>Total to Main Destinations</b>	<b>68.9</b>

The majority of education related trips made by Bicester households are within Bicester, as shown in Table 4.4, totalling 81%. These trips are generally within walking or cycling distance of homes and thus have a high propensity for sustainable travel.

Table 4.4 Education Trip Main Destinations

Zone	District/Ward Name	% of Trips
43	Bicester Town Ward	19.6
44	Bicester West Ward	19.0
45	Bicester North Ward	17.9
41	Bicester East Ward	14.7
42	Bicester South Ward	9.8
35	Oxford District (B)	5.4
29	Banbury	3.8
36	Kidlington Wards	2.7
	<b>Total to Main Destinations</b>	<b>92.9</b>

As shown in Table 4.5, shopping trips are concentrated (61%) in the Bicester Town Ward and Bicester South (the town centre, Tesco store and Bicester Village) or are likely to be local centre trips (13% to Bicester North, East and West). The town centre is likely to have increased as a proportion following the opening of the new Sainsbury's store.

Table 4.5 Shopping Trip Main Destinations

Zone	District/Ward Name	% of Trips
43	Bicester Town Ward	40.9
42	Bicester South Ward	19.7
36	Kidlington Wards	10.2
41	Bicester East Ward	5.1
35	Oxford District (B)	4.4
45	Bicester North Ward	4.4
29	Banbury	3.6
44	Bicester West Ward	3.6
37	Wards South and West of Bicester	2.9
	<b>Total to Main Destinations</b>	<b>94.9</b>

Table 4.6 shows the destinations of the majority of leisure trips, with the town centre and other parts of Bicester accounting for 54% of trips. Areas to the south and west of Bicester, and Oxford, are also popular destinations.

Table 4.6 Leisure Trip Main Destinations

Zone	District/Ward Name	% of Trips
43	Bicester Town Ward	33.3
44	Bicester West Ward	12.5
37	Wards South and West of Bicester	11.1
35	Oxford District (B)	8.3
36	Kidlington Wards	8.3
42	Bicester South Ward	5.6
26	Vale of White Horse District	4.2
39	Fringford Ward	4.2
45	Bicester North Ward	2.8
	<b>Total to Main Destinations</b>	<b>90.3</b>

The data on destinations for people visiting friends and family as shown in Table 4.7 shows strong social linkage to Oxford, with Oxford District accounting for 22% of trips. However, 43% of visits were to people also living in Bicester.

Table 4.7 Visiting Friends and Family Trip Main Destinations

Zone	District/Ward Name	% of Trips
35	Oxford District (B)	22.0
42	Bicester South Ward	13.4
43	Bicester Town Ward	12.2
38	Wards North and West Bicester	7.3
45	Bicester North Ward	7.3
36	Kidlington Wards	6.1
44	Bicester West Ward	6.1
41	Bicester East Ward	3.7
	<b>Total to Main Destinations</b>	<b>78.0</b>

## Total Trip Containment

Applying the containment levels for each land use to the proportion of trips made by each purpose (set out in the Appendix 4 to the NW Bicester Masterplan Access and Travel Strategy) gives an overall estimate of 56.4% of trips contained within Bicester.



The current containment of trips within a sector of the town (such as NW Bicester will be) is not known but is assumed to be in the order of 25% given that such areas include educational facilities as well as some jobs and a range of local shops and services and some leisure facilities. The assumption of 25% is half that of Bicester containment as a whole.

## Containment of Trips by Car

The 2010 survey leads to the estimation that of total car trips made by Bicester residents, 48% are made within Bicester and 52% are to destinations outside of Bicester.

# 5.0 Planned Transport and Land Use Proposals

## 5.1 Transport Proposals

### Introduction

The preceding sections of this Transport Assessment report have summarised the strategic and local transport baseline and context for the proposed development. To support growth in the Bicester area and in order to provide better transport services there are a number of schemes, developments and strategies being adopted which will affect all transport modes in the area.

These schemes are being promoted through a number of procedures and organisations including the County Council, District Council, the Highways Agency, rail operators and other private developers. It should be noted that there are no funding responsibility allocations for the schemes on this list and inclusion within this document does not indicate any commitment from the Himley Village development to the schemes.

### Bicester Proposals included in Saturn Model

Section 2.3 sets out the proposals of the Bicester chapter of the Local Transport Plan (produced in May 2014) and this provides a comprehensive list of policy commitments to transport infrastructure in the town by the County Council.

The Bicester Saturn Model has incorporated the following transport proposals in agreement with the County Council in both the Reference Case and with NW Bicester development in 2031.

- Town centre access improvements (these have already been implemented but were not in the base year model 2012);
- Changes implemented as part of the town centre redevelopment (as above);
- Traffic calming and 30mph speed limit on Middleton Stoney Road;
- Changes at the Pingle Drive junction, A41 / Oxford Road (ESSO) junction and along the A41 corridor as part of the mitigation measures from Tesco's move and Bicester Village phase 4;
- Park & ride entrance/exit at the junction of Vendee Drive and the A41;
- A4095/B4100 junction alterations as part of NW Bicester Exemplar site;
- Alterations to the A41/London Road (Rodney House) junction as part of Graven Hill mitigation;
- M40 Junction 9 Phase 2 improvements;
- M40 Junction 10 Pinch Point Scheme;
- London Road level crossing closed permanently to through traffic at points immediately north and south of the current rail level crossing; and

- Removal of the existing level crossing at Charbridge Lane.

## Rail Proposals

The Chiltern Railways' Evergreen<sup>3</sup> proposals will include significant improvements at Bicester Town to cater for the introduction of services to London from Oxford. This requires the construction of a new chord between the two lines as they cross in the town. The East West Rail proposals would also serve Bicester Town and so link Bicester with Oxford and Science Vale to the south and Milton Keynes to the east. The new route will provide a fast and frequent commuter service between Bicester and Oxford, giving a realistic alternative to the congested A34. Chiltern Railways envisages operating two London-Oxford trains each hour in each direction, throughout the day. All trains will call at Bicester Town and Oxford stations, and the new Parkway station in North Oxford.

The East West Rail scheme involves reinstating and upgrading the railway between Cambridge and Oxford, Milton Keynes and Aylesbury to provide a strategic rail route that will link Ipswich, Norwich, Cambridge, Bedford, Milton Keynes, Aylesbury, Bicester and Oxford, with connections to national mainline services. The concept of East West Rail is that it provides an orbital route around London which both passenger and freight services will use for short, medium and long distances.

## M40 / A34 Junction 9 Wendlebury Phase 2 <sup>3</sup>

The project is located at the A34/M40 Junction 9. The A34 and M40 are key routes for road users travelling in the Midlands. The junction connects both carriageways of the M40, which runs south to the M25 and north to the M42, to the dual carriageway A34 trunk road and dual carriageway A41 county road from Bicester.

The main construction work began in late April 2014 and is expected to take approximately six months to complete. The programme aims to:

- Help to reduce congestion on the A34 northbound carriageway and on the A41 southbound carriageway
- Reduce journey times for road users
- Boost the local economy and support the Bicester Masterplan
- Improve safety for road users using the interchange

## M40 Junction 10 Improvements

The M40 Junction 10 Improvements are designed to tackle congestion by changing the way traffic on the A43 enters the M40 southbound traffic. The current entry slip lane onto the M40 southbound carriageway from Padbury roundabout will be closed and replaced with a new slip lane directly from Cherwell roundabout.

The work is part of the national Pinch Point Programme. The programme forms part of the UK Government's growth initiative, outlined during the Chancellor's Autumn Statement in November 2011. It is estimated that this work will be completed by the end of January 2015.

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<sup>3</sup> <http://highways.gov.uk/roads-projects/a34-m40-junction-9-wendlebury-phase-2>

## 5.2 Committed and Planned Development

Table 5.1 sets out committed/planned development that has been considered as part of the 2031 Reference Case together with the level of certainty associated with the development (as at the end of 2013). It should be noted that this is a fully comprehensive list of planned developments as agreed for testing with the County Council to provide a full assessment of development planned for the town. As such the Reference Case is a worst case of 2031 traffic levels.

Table 5.1 Committed and Planned Development

Input	Uncertainty	Comments
393 house/2,900sqm Employment development at NW Bicester exemplar	Near certain	Site approved and S106 signed. Expecting to implement by the end of 2013
4,607 house/25.5Ha employment development at NW Bicester Masterplan	Near certain	Site accepted by central government for eco-development. Is in the emerging Local Plan as BICESTER 1. Masterplan to be submitted for SPD in Spring 2014
Additional 1,000 house on NW Bicester Masterplan	More than likely	This is additional housing numbers than Cherwell District Council have previously discussed but can be fitted within the red line boundary of the Masterplan site
1,900 house/104,000sqmemployment at Graven Hill	Near certain	BICESTER 2 I the proposed Local Plan. Approved subject to S106
1,631 house development at SW Bicester	Near certain	Under construction
720 house development at SW Bicester	More than likely	Site identified in emerging Local Plan as BICESTER 3. Application going to Planning Committee imminently
Additional 100 houses at SW Bicester	More than likely	Currently being considered
46,200 sqm employment development at Bicester Business Park, including relocation of Tesco store	More than likely	Outline permission granted in 2010. Identified in the proposed Local Plan as BICESTER 4
Town centre redevelopment phase 1	Certain	Has just opened, including superstore, cinema and smaller retail units
Town centre redevelopment phase 2	Reasonably foreseeable	Proposed in the emerging Local Plan as BICESTER 6. CDC considering now that phase 1 is open
RAF Bicester	Near certain	In the Local Plan as BICESTER 8. Plans being drawn up
19,800 sqm employment at Bicester Gateway	More than likely	Identified in the proposed Local Plan submission as BICESTER10
26,400 sqm employment development at NE Bicester Business Park	More than likely	Identified in the proposed Local Plan submission document as BICESTER 11
800 houses/64,812 sqm employment development at SE Bicester	More than likely	Identified in the emerging Local Plan as BICESTER 12
Bicester Village phase 4	Near certain	Approval subject to S106
Caversfield, Fringford Lane	Near certain	200 dwellings
RAF Bicester (new houses in Caversfield)	Certain	Under construction

Source: White Young Green February 2014

# 6.0 Development Proposals

## 6.1 Himley Village

This chapter outlines the development proposals for the Himley Village development including the mix of land uses and their location across the site. A summary of the proposed land uses for residential and non-residential uses are outlined in Table 6.1 and Table 6.2.

Table 6.1 Residential Uses

	% *	Number	GIA (m <sup>2</sup> )	Notes
1 bed	9.9	168	9,240	Assumed 55m <sup>2</sup> average
2 bed	40.0	680	54,400	Assumed 50% flats (70m <sup>2</sup> average), 50% houses (90m <sup>2</sup> average)
3 bed	33.4	568	56,800	Assumed 100m <sup>2</sup> average
4 bed	12.3	209	25,080	Assumed 100m <sup>2</sup> average
5 bed	4.4	75	10,875	Assumed 145m <sup>2</sup> average
<b>Total</b>		<b>1700</b>	<b>156,395</b>	

\*Based on percentage unit mix in NW Bicester Residential Strategy March 2014 (excluding extra care)

Table 6.2 Non-residential Uses

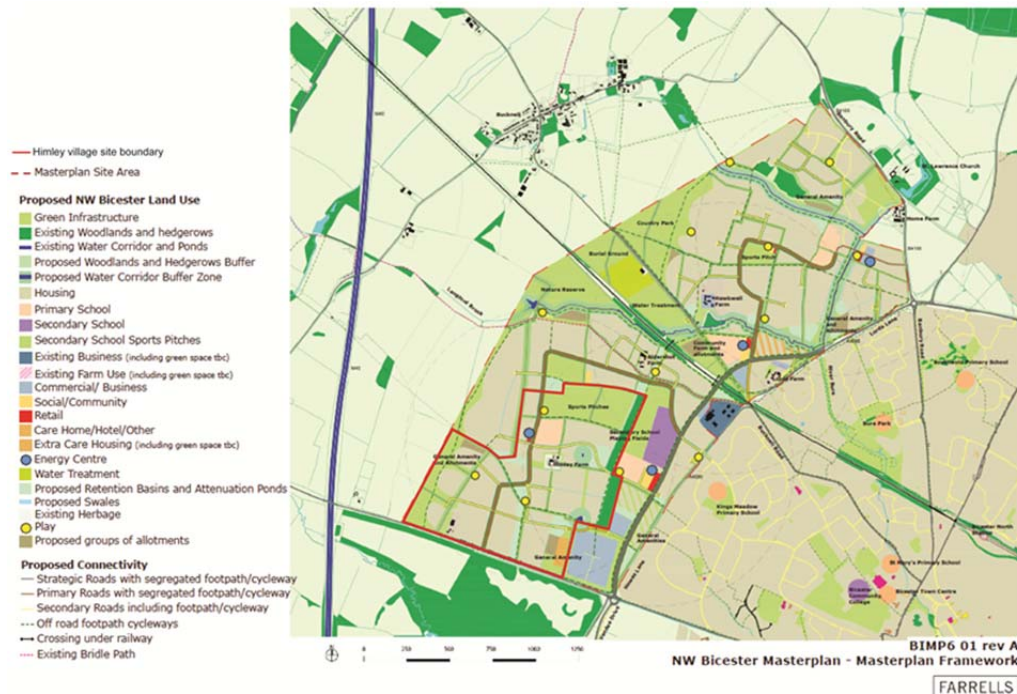
Land use	GIA (m <sup>2</sup> )	Notes
Hotel	2,600	Based on 40 room hotel/ 62m <sup>2</sup> per resident
Veterinary surgery	2,000	Based on discussion with possible occupant
Primary school	2,750	Based on typical 2FE primary school + nursery
Extra care/ retirement village	9,000	Based on 100 unit facility
Pub/ community	400	
Retail	700	
Health facility	1,500	Based on typical GP surgery + ancillary facilities
Office	1,000	
Nursery	100	
Energy Centre	375	
Water Treatment Plant	450	

For the purpose of the Transport Assessment it would be assumed that the development would be constructed in phases commencing in 2016 and expected build out completed in 2031 (subject to planning permission). It is recognised that build out may well take longer but this assumption provides a robust basis for assessment.

## 6.2 NW Bicester Eco-Town Masterplan

Figure 6.1 shows the overall masterplan for NW Bicester and highlights the location of the Himley Village development within the wider masterplan.

Figure 6.1 NW Bicester Eco-Town Masterplan



Source: NW Bicester Masterplan (Farrells/A2 Dominion)

The proposals for the Himley Village development have been made in close relationship to the land use mix and street layout of the wider NW Bicester masterplan. This involves connecting the development to the secondary school located to the north east of the Site on the Strategic Link Road, the business park proposed by Albion in the south east corner of the masterplan area off Middleton Stoney Road and to the amenities and employment located north of the railway line. Additionally, the provision of a range of non-residential and employment uses within the Himley Village development presents an opportunity to encourage a high level of containment of trips within the Site and ensures a high level of accessibility to uses within the NW Bicester eco-town and to wider Bicester, helping achieve the target of 50 per cent of trips by sustainable modes.

# 7.0 Movement Strategy

## 7.1 Introduction

This chapter outlines the proposed Movement Strategy for access to the Himley Village development for walking and cycling, bus services, vehicles and construction traffic. This includes assessment of both internal and external connections. For the purpose of this analysis internal connections are defined as links within the boundary of the NW Bicester masterplan and external connections are those outside this boundary.

## 7.2 Promoting Sustainable Travel and Vehicle Choices

A comprehensive range of measures to promote sustainable travel and vehicle choices are proposed for the Himley Village development which are contained in the accompanying Framework Travel Plan.

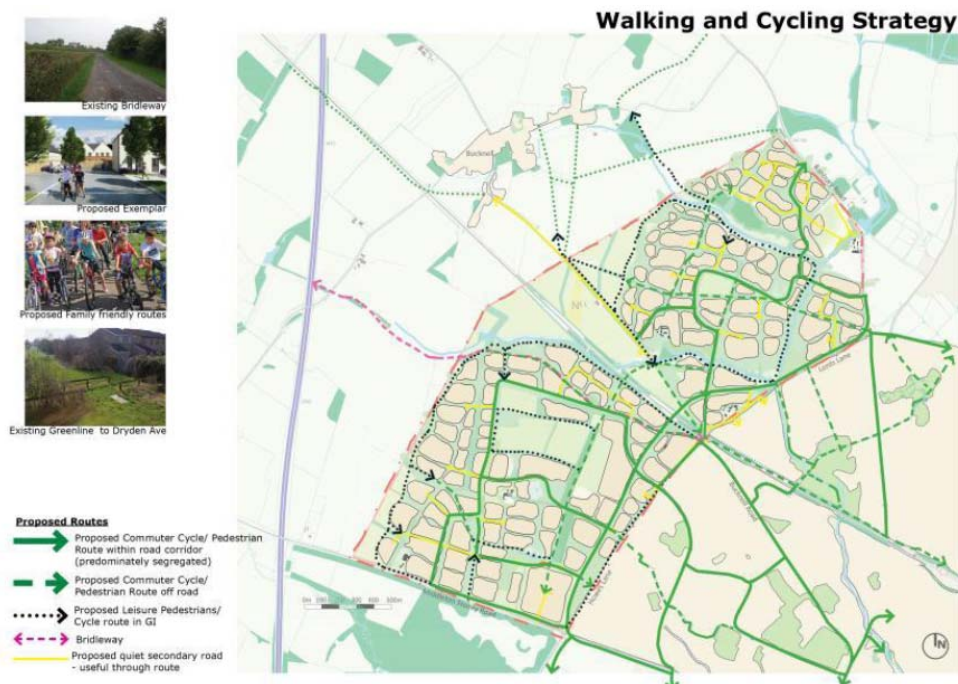
The development of the Masterplan Eco-Town will generate approximately 12,000 movement trips every day. Around 30% of these trips will be within the wider NW Bicester development with the vast majority of these being undertaken by sustainable modes including walking, cycling and by bus. Schools, employment, and local shops and services will be a maximum of 800m or a 10 minute walk from any dwelling within the Himley Village development. Walking will be the dominant mode for trips within the Site. 30% of trips will be within wider Bicester town with around half these being by sustainable modes. The remaining 40% of trips will to destinations outside of Bicester with three quarters of these being by private car.

## 7.3 Walking and Cycling

### External Connections

In order to achieve the amount of trips by walking and cycling set out in the targets a walking and cycling access strategy for the NW Bicester masterplan has been formulated and is set out in Appendix 1 to the Access and Travel Strategy. Figure 7.1 illustrates the proposed walking and cycling strategy for the masterplan and the connections to wider Bicester.

Figure 7.1 Walking and Cycling Strategy, NW Bicester Masterplan

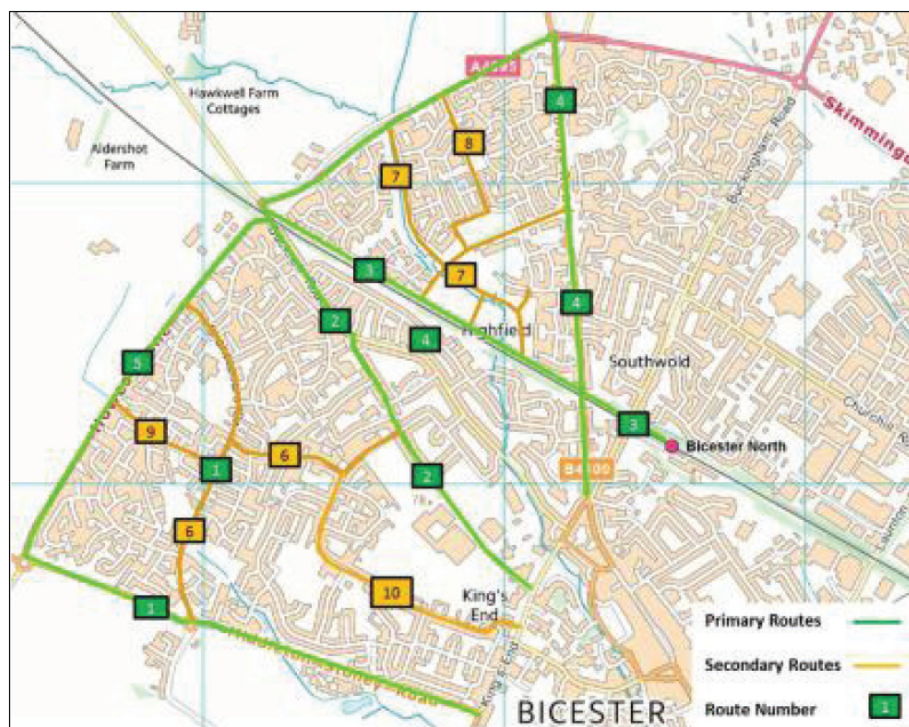


The NW Bicester masterplan layout proposes a fine grid of streets together with the routes through green corridors to ensure the entire development is accessible on foot and by bike.

A detailed audit and review was undertaken of walking and cycling routes between the development and the rest of Bicester. From this, a number of primary and secondary connections were identified which are likely to be the main routes for residents of NW Bicester masterplan (see Figure 7.2). It is recognised that these connections are not the only routes which will be used but these provide the best opportunity for direct routes which could be enhanced or upgraded to provide for both pedestrians and cyclists.



Figure 7.2 Primary and Secondary Connections from NW Bicester



Of the routes identified the following primary and secondary connections are considered important for the Himley Village development.

### Primary Connections

The primary connections for walking and cycling between the Himley Village development and Bicester are considered to be;

- Middleton Stoney Road east of the Middleton Stoney Road /Howes Lane/Vendee Drive/ roundabout (Route 1);
- Along Howes Lane (A4095) from Middleton Stoney Road to the Bucknell Road/Howes Lane junction and other sites of the NW Bicester Eco-Town (Route 5);
- Adjacent to Bucknell Road and George Street connecting Howes Lane (A4095) to the town centre (Route 2).

### Secondary Connections

The following connections are considered to be of additional significance in linking the Himley Village development to the rest of Bicester:

- Along Shakespeare Drive from Howes Lane (A4095) to Middleton Stoney Road east of the Middleton Stoney Road /Howes Lane/Vendee Drive/ roundabout (Route 6);
- Pedestrian routes from Howes Lane (A4095) through the Highfield residential neighbourhood area to Shakespeare Drive (Route 9).

In summary, the following areas for improvement are of particular relevance in providing good connectivity for pedestrians and cyclists to and from Himley Village development:

- Improvements along Howes Lane to provide a segregated cycleway and footway;

- Improvements to the off-road routes through Highfield residential area (detailed in Figure 3.7 and 3.8 earlier in the document) to provide high quality pedestrian and cycling routes from NW Bicester Eco-Town to the town centre ;
- Improvements along Shakespeare Drive to provide improved cycle and pedestrian links and new crossing facilities;
- New cycle and pedestrian links along the length of Middleton Stoney Road.

Improvements to routes will be further investigated in conjunction with Oxfordshire County Council and will form part of discussions regarding the S106 for the Himley Village development.

## Internal Walking and Cycling Connections

The internal NW Bicester eco-town walking and cycling network will comprise of a combination of routes segregated from traffic and unsegregated routes on the street network and traffic-free routes through green corridors (GI corridors) (Figure C.1 in Appendix C). The majority of pedestrian and cycle routes within the street network will provide the most direct access to key local employment areas, schools, local centres and hubs within NW Bicester. The GI corridors have a dual role of providing traffic free routes that connect out of the development to existing Bicester as well as leisure journeys.

### **Provision on Streets**

Along the north side of the existing Middleton Stoney Road a segregated two-way cycle path and a separate footway are proposed. This will be located between the existing hedgerow and new development.

Along the primary and secondary streets pedestrian and cycle paths will be segregated from vehicle movement on shared pedestrian and cycle paths adjacent to the carriageway. The primary street will incorporate a shared path on both sides of the carriageway and the secondary streets will have a shared path on one side. These paths will be 3m in width to accommodate two-way cycle and pedestrian movement. Cyclists will also be able to use the carriageway which will be traffic calmed.

The tertiary streets will be a single level surface with footways on both sides and will be designed to constrain vehicle speeds to 15mph to create an environment where cyclists can mix safely with vehicles on the carriageway. Home zones will be designed as shared surfaces creating a comfortable and safe environment for pedestrian, cyclists and slow moving vehicles (approximately 5mph) to mix.

To ensure pedestrian and cycle routes within the street network are well used and fit for purpose it is proposed they are well lit, use high quality surface materials and ensure natural surveillance. Safety of pedestrians and cyclists will be ensured by providing routes of adequate widths and with numerous crossing points. Additionally traffic calming measures will be implemented along the primary and secondary streets to reduce vehicle speeds and maximise pedestrian cycle safety across the Himley Village development.

This comprehensive network of pedestrian and cycle routes within the street network will maximise ease of movement across the site by foot and by bike and in particular it will help encourage cycling as an alternative to the car for internal trips. Figure C.2 in Appendix C

outlines the segregated and non-segregated cycling facilities within the Himley Village development.

### **Green Corridors**

A network of green corridors is proposed across the Himley Village development providing high quality green routes for pedestrians and cyclists. The main GI corridors are aligned in an east to west direction connecting the residential areas in the southern part of the Himley Village development towards the town centre. Additionally there are multiple GI corridors linking the north of the site to Middleton Stoney Road. The green corridors will be of high quality, traffic-free, green routes which will provide a more leisurely route around the Himley Village development with meandering shared pedestrian and cycle paths. These will be a minimum of 3m width to safely mix and accommodate both pedestrian and cyclist movement. It is proposed these routes are un-lit to retain the sensitive natural setting and therefore are likely to be primarily used by pedestrians and cyclists during daylight hours.

## Accessibility to Facilities and Amenities

### **External Destinations**

The development proposal seeks to provide good accessibility to jobs, education, shopping, community, and health facilities by being easily reached by public transport, cycle or on foot. This relates to the facilities provided within the NW Bicester eco-town and external accessibility within Bicester.

It is widely accepted (such as in former guidance PPG13 – Transport) that reasonable walking and cycling distances to facilities are 2km and 5km respectively (estimated 20-25 minute cycle). Figure C.3 in Appendix C, illustrates the walking and cycling time from the Himley Village development to the proposed and existing employment, retail, education and leisure opportunities in Bicester.

There are two secondary schools located within Bicester, Bicester Community College (3.5km from the Site) and the Cooper School (4.8km from the Site). Walking to both existing secondary schools is some distance, around 40 minutes to the closer of the two which is over the IHT guidelines<sup>4</sup> on acceptable walking distance of 2km or 25 minutes, and therefore walking is not likely to be considered. However, the cycle time of between 10- 15 minutes from the centre of the Himley Village Development is a viable alternative to the car.

The majority of homes in the Himley Village development are within a 20 minute cycle to all external destinations within the town, thus cycling does offer a viable alternative to the car. For example the small shops and community facilities in the neighbouring residential area of Highfield are within a 7 minute cycle (24 minute walk). Further across town, cycling time to Bicester Village, Bicester Town station, Bicester north station and Launton Road industrial estate is around 17-18 minutes from the most westerly homes in the Himley Village development.

Aside from travel time the cost is a major influence as to whether people choose to cycle or drive. Cycling is free which is a highly attractive when compared to cost of petrol and parking charges at both stations and the town centre (£7 before 10am, £4.50 after 10am and £1.70 for 3 hours respectively). Additionally, transport surveys relating to cycle parking

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<sup>4</sup> Guidelines for providing journeys on foot, Institution for Highways and Transport, 2000

show there is good provision in the town centre and stations including some sheltered, making cycling an attractive and viable alternative to the car.

### **Internal Destinations**

Within the Himley Village Development all houses would be within 800m, 10 minute walk or 3 minute cycle, of the primary school located in the application site (Figure C.4 Appendix C). Several houses also fall inside 800m walking radius to the secondary school located to the south of the railway line and north east of the Himley Village development. All of the houses are within 800m or a 10 minute walk of the community facilities and small shops located in the centre of the Site and along Middleton Stoney Road (Figure C.5 Appendix C).

Along the proposed bus loop on the southern side of the railway, there are 3 proposed bus stops situated along the primary street every 300-400m. The exact locations of the bus stops is to be confirmed but are likely to be located 300m north of Middleton Stoney Road, by the primary school and local centre, and by the sports fields to the north of the Site. Figure C.6 Appendix C shows 400m walking radius (5 minute walk) from bus stops and indicates the majority of houses are within 400m walking distance, with the exception of a few housing plots towards the SW and NE of the Site which are 500m away. Additionally all houses are also within a 3-5 minute cycle to the secondary school located to the south of the railway line and north east of the Himley Village development.

## **7.4 Public Transport**

### **Eco-Town Masterplan**

PPS1 seeks for a minimum of 50% of travel to and from the Site to be via non car means and the bus will have a significant role to play in providing a means of sustainable travel for journeys by residents of the Site and those employed or visiting NW Bicester. Moreover, the bus will provide accessibility to education, jobs, services and facilities for those who do not have a car, which in particular will benefit young people, elderly people and those on lower incomes. A service which does this effectively as part of the long term development of the Site will be a 'successful' bus service.

### **Proposed Bus Route**

In accordance with the overall strategy for the wider NW Bicester eco-town a one way bus loop will pass through the Himley Village development in a clockwise direction. The bus service will use the NW strategic link road (southbound) before turning westbound on the southern secondary street and entering the Site. The route will then head northbound on the primary street, continuing on this street until it connects with the NW strategic link road from where it will use Bucknell Road to access the town centre, see (Figure C.7 in Appendix C). Bus stops will be located on the primary street just north of the junction with the secondary street to the south, at the neighbourhood centre and primary school and adjacent to the sports pitches. The majority of dwellings will be within a 400m walking distance of a bus stop (Figure C.6 in Appendix C).

In the early phases of development it is proposed that the frequency of buses is proposed every 15 minutes from the occupation of an agreed number of units. Once the 15 minute service is commercially viable, frequencies may increase to every 10 minutes.

There is a need to afford greater priority to buses on Bucknell Road and in the town centre with respect to alleviating congestion at the town centre junctions. The use of Bucknell Road as the main bus route in the long term gives advantages to buses in that other routes are expected to be more heavily trafficked.

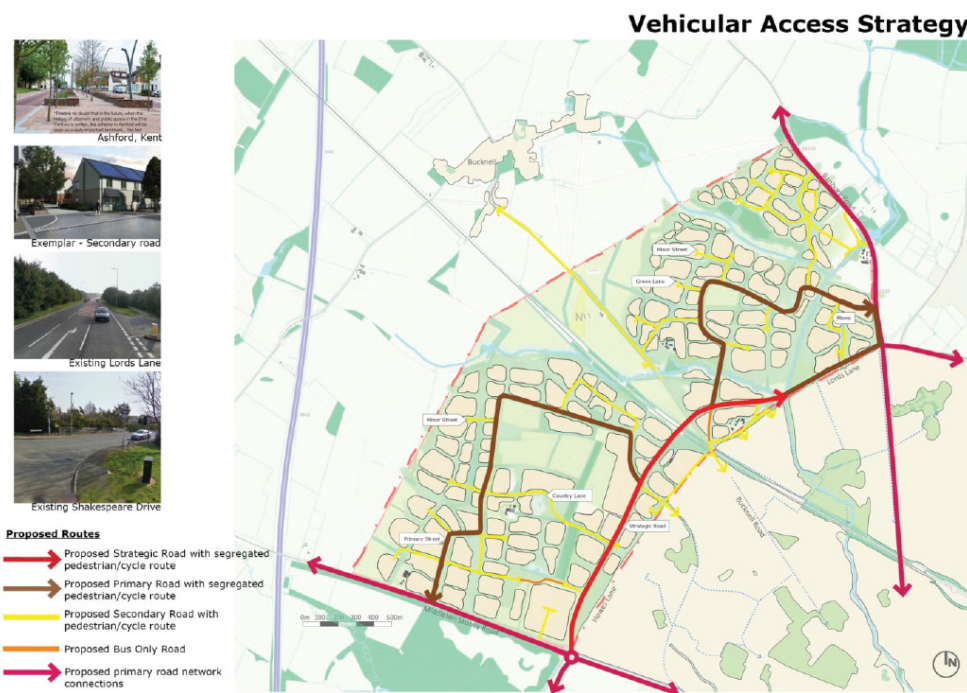
## 7.5 Vehicular Access

### Eco-Town Masterplan

An overall vehicular access strategy for the NW Bicester masterplan has been developed (Figure 7.3) with the following key considerations:

- Meet OCC policy aspirations to increase the capacity of the Howes Lane/ Lord's Lane junctions and links, recognising the strategic importance of the corridor for movements on the north-west of the town;
- The need to integrate NW Bicester eco-town into the town and thus to minimise the barrier presented by new road links to the development and ensure they can be easily crossed by pedestrians and cyclists;
- Addressing the constraints presented by the existing Howes Lane/ Lord's Lane corridor and in particular the rural lane character of Howes Lane and the skewed underpass of the railway with the junctions on either side;
- Minimise impacts of traffic in nearby existing residential areas and communities.

Figure 7.3 Vehicular Access strategy



A range of options were assessed to arrive at the best access strategy for the Howes Lane/ Lord's Lane corridor and access for the NW Bicester masterplan when considering the whole range of factors. Each option assumed a single carriageway of lower speed than the existing route but included the removal of the existing junction constraints near the railway. A route was selected and developed and is incorporated into the masterplan and will be provided in

detail as part of the separate planning application for the A4095 NW Strategic Link Road. The design includes the following:

- A new road to replace Howes Lane and Lord's Lane from the Middleton Stoney Road roundabout to join Lord's Lane east of Purslane Drive;
- A new underpass of the railway north of the existing Avonbury Business Park, passing to the north of Lord's Farm on the east side of the railway;
- Keeping part of the old Howes Lane and Lord's Lane to provide access to and from the existing residential areas and Bucknell Road to the south;
- A bus only section south of the new link on the east side of the railway;
- Traffic travelling from Bucknell Road in the town centre will be diverted to the east on the Old Lord's Lane, then north through the Masterplan, thus aiming to reduce the attractiveness of the route for through traffic;
- A one way out of the Shakespeare Drive area towards the new link to avoid as much through traffic as possible.

## Access and Street Hierarchy

Principal access to the Site is proposed from an access point on Middleton Stoney Road where the primary street connects with this radial route to Bicester. This junction is proposed as a priority junction with a protected right turning facility (ghost island arrangement) (Figures D.1 and D.2 in Appendix D). This arrangement minimises the footprint of the junction whilst providing a safe point of access into the Himley Village street network. A secondary access point is proposed on Middleton Stoney Road at the location of the existing Himley Farm track. This will also be in the form of a priority junction with a protected right turning facility (Figures D.1 and D.3 in Appendix D). It provides access mainly to the commercial uses proposed along Middleton Stoney Road but also to some housing. It connects into the street network within the Himley Village development via a tertiary street.

The existing speed limit on Middleton Stoney Road is 60mph. It is envisaged that in conjunction with construction of the two access junctions the speed limit would as a minimum be reduced to 50mph, if not 40mph. The change in speed limit would start/ end at the western extent of Himley Village, making the new urban edge of Bicester. The urban frontage on Middleton Stoney Road will to a certain extent assist in calming vehicle speeds to the speed limit but other features such as a defined gateway and radio activated speed warning signs would also be required.

A street hierarchy has been defined for the Site (Figure C.8 in Appendix C). This comprises a primary street, secondary streets, tertiary streets and home zone/mews streets which are all subject to a speed limit of 20mph. The primary street runs north south through the Site and onward into the adjacent site to the north from where it then connects to the NW strategic link road. Overall therefore the primary street will form a central spine throughout the entire development area south of the railway line. Secondary street connections are proposed in an east to west alignment. The secondary streets connect to the NW strategic link road in the east and into the residential areas of the Himley Village development to the west. The tertiary and home zone/mews streets will be designed to restrain vehicle speeds to less than 15mph to allow pedestrians and cyclists to safely mix with vehicles.



## Traffic Calming

The primary street and secondary streets will be designed with a range of vertical and horizontal traffic calming measures employed to restrain vehicle speeds to between 15mph and 20mph. The measures used will be:

**E1- Junction tables-** speed table that covers an entire junction with ramps on all approaches. The surface is flush with the footway to provide an accessible crossing for pedestrians.

**E2- Carriageway narrowing-** changes the visual appearance of the road i.e. reduces two way carriageway to a single lane of traffic.

**E3- Chicanes-** horizontal deflection created through carriageway alignment, landscape features or parking bays.

**E4- Raised courtesy pedestrian crossings-** The crossing is raised to the level of the footway and vehicles give way, giving priority to pedestrians and cyclists. These are situated at GI corridor cross over points, where pedestrian and cycle activity is likely to be higher.

**E5- Change of road surface material/ colour-** to alert drivers to a change of driving environment with potentially higher number of pedestrians and potential crossings.

It should be noted that if carriageway narrowing (E2) is used as a traffic calming measure along a bus route, priority should be given to buses. Traffic calming events would be provided at 60-70m intervals along primary and secondary streets. Figure B.9 in Appendix B sets out the indicative traffic calming strategy for the Himley Village development.

## 7.6 Parking Provision

### Residential Car Parking

Parking provision for the development has been developed through the application of Oxfordshire County Councils 'Parking Standards for New Residential Developments' (OCC, 2010). The guidance sets out the maximum parking standards for allocated and unallocated spaces within new residential areas throughout Oxfordshire, together with guidance on space dimensions and parking layouts.

The parking standards set out in the guidance have been informed by research undertaken in Oxfordshire, which found that the most important factors influencing car ownership are dwelling size and tenure, location and that the overall number of car parking spaces in a development can be reduced if some spaces are provided as unallocated to specific properties. The guidance provides parking standards for new residential developments for different areas of the County including specific parking standards for the Cherwell Urban Areas including Bicester, detailed previously in Table 2.1.

Table 7.1 indicates provision by unit type. It can be seen that all dwelling types are lower than the maximum standards for allocated parking and unallocated parking spaces are marginally lower. As a total, the provision of parking would be less than the standards. Garages are included as allocated spaces and the unallocated spaces includes visitor parking provision. Visitor spaces are to be provided within the unallocated parking provision in parking bays within the street design.

Table 7.1 Indicative Residential Parking Provision

Dwelling size	Number of Dwellings	Allocated	Allocated per dwelling	Unallocated	Unallocated per dwelling
1 bed	168	168	1	67	0.4
2 bed	680	680	1	340	0.5
3 bed	568	568	1	398	0.7
4 bed	209	293	1.4	209	1.0
5 bed	75	143	1.9	75	1.0
<b>Total</b>	<b>1,700</b>	<b>1,851</b>		<b>1,092</b>	

## Non-residential Car Parking

Parking provision for other uses recognises the level of trips that will be on foot, cycle or by bus. It will be part of a parking strategy which links to the Travel Plan with the aim of discouraging car use to the non-residential uses of the Himley Village development. The standards for non-residential uses will be in accordance with that agreed for the Exemplar development, Cherwell District Council Local Plan and using professional judgement. Table 7.2 indicates the average parking provision for each of the non-residential uses on the Himley Village Site.

Table 7.2 Non-residential Car Parking Provision

Land use	GIA (m <sup>2</sup> )	Parking provision	Notes
Hotel	2,600	40	1 per room
Veterinary surgery	2,000	67	1 per 30m <sup>2</sup>
Primary school	2,750	40	Typical
Retirement village	9,000	75	Based on 100 unit facility
Pub/ community	400	27	1 per 15m <sup>2</sup>
Retail	700	35	1 per 20m <sup>2</sup>
Health facility	1,500	68	1 per 22m <sup>2</sup>
Office	1,000	33	1 per 30m <sup>2</sup>
Nursery	100	10	Assumed
<b>Total</b>		<b>395</b>	

Source: Penoyre & Prasad, November 2014

## Cycle Parking

The residential units will have cycle storage provided in accordance with the Code for Sustainable Homes, 2010, Policy ENE8. It assumes the second option of storage for 1 cycle for 1 bed homes, 2 for 2 and 3 bed and 4 for 4 or more bed homes, achieving 2 out of 2 credits. The criteria for achieving COSH credits are shown in Figure 7.4.



Figure 7.4 Cycle parking Standards, CfSH, 2010

Criteria	Credits
Where individual or communal cycle storage is provided, that is <i>adequately sized, secure and convenient</i> , for the following number of cycles: Studios or 1 bedroom dwellings – storage for 1 cycle for every two dwellings 2 and 3 bedroom dwellings – storage for 1 cycle per dwelling 4 bedrooms and above – storage for 2 cycles per dwelling	1
<b>OR</b> Studios or 1 bedroom dwellings – storage for 1 cycle per dwelling 2 and 3 bedroom dwellings – storage for 2 cycles per dwelling 4 bedrooms and above – storage for 4 cycles per dwelling	2
Note: The requirements for secure cycle storage are met where compliance with clause 35 of Secured by Design (SBD) New Homes 2010 is achieved.	

The proposed cycle parking for residential units in the Himley Village Development is based on The Code for Sustainable Homes ENE8 achieving 2 credits (maximum possible), see Table 7.3.

Table 7.3 Proposed Residential Cycle Parking Standards.

Dwelling size	%*	Dwellings	Cycles	Notes
1 bed	9.9	168	<b>168</b>	1 per dwelling
2 bed	40.0	680	<b>1,360</b>	2 per dwelling
3 bed	33.4	568	<b>1,136</b>	2 per dwelling
4 bed	12.3	209	<b>836</b>	4 per dwelling
5 bed	4.4	75	<b>300</b>	4 per dwelling
<b>Total</b>		<b>1,700</b>	<b>3,800</b>	

\*based on percentage unit max in NW Bicester Residential Strategy March 2014 (excluding extra care).

Source: Penoyre & Prasad, November 2014

The proposed cycle parking for residential units in the Himley Village Development is set out in Table 7.4.

Table 7.4 Proposed Non-residential Cycle Parking Standards

Use	GIA (m <sup>2</sup> )	Cycles	Notes
Hotel	2,600	<b>4</b>	1 per 5 staff. Assumed 20 staff
Veterinary Surgery	2,000	<b>10</b>	1 per 5 staff. Assumed 50 staff
Primary school	2,750	<b>50</b>	Assumed
Retirement village	9,000	<b>4</b>	1 per 5 staff. Assumed 20 staff
Pub/ community	400	<b>20</b>	1 per 20m <sup>2</sup>
Reatil	700	<b>7</b>	1 per 113m <sup>2</sup>
Health facility	1,500	<b>10</b>	1 per 5 staff. Assumed 50 staff
Office	1,000	<b>29</b>	1 per 35m <sup>2</sup>
Nursery	100	<b>2</b>	1 per 5 staff. Assumed 10 staff
<b>Total</b>		<b>136</b>	

Source: Penoyre & Prasad, November 2014

It can be seen that the non-residential uses will have cycle parking for staff and visitors provided over and above the Cherwell DC standards (outlined in Table 7.5).

With regard to the primary school, the CDC standards do not include a standard for cycle parking at schools and it is suggested that an allowance of 1 space per 10 pupils is accommodated. A space allowance should also be made for children’s scooter parking.

Stands will be of ‘Sheffield’ type and will be located in well lit, accessible locations. Storage for staff will be provided in covered secure shelters close to building entrances. Cycle stands will also be provided adjacent to each of the bus stops to encourage people to cycle and then transfer to bus.

Table 7.5 Cycle Parking Standards for Non-residential Uses, Cherwell DC

	<b>Residential</b>	<b>Food retail</b>	<b>Non-food retail</b>	<b>B1- Offices</b>	<b>D2- Assembly and Leisure</b>	<b>A3- Restaurant/ pubs</b>
Long stay/ employee resident	1 bed- 1 space 2+ bed- 2 spaces	1 stand per 12 staff	1 stand per 6 staff	1 stand per 150sqm	1 stand per 12 staff	1 stand per 12 staff
Visitor	1 stand per 2 units where more than 4 units	1 stand per 200sqm	1 stand per 200sqm	1 stand per 500sqm	1 stand per 20sqm	1 stand per 20sqm of public space

## 7.7 Construction Traffic

The construction phase of development for the purposes of this assessment is anticipated to commence in 2016 and build out over approximately a 15 year period to 2031.

As a large proportion of the construction traffic is anticipated to be heavy goods vehicles it is essential that residential areas are avoided during the course of construction by heavy goods vehicle drivers associated with the proposals. It is therefore considered appropriate to have a lorry routeing agreement to ensure drivers use the peripheral road/A4095 and will be prohibited from passing through the centre of Bicester unless they are transporting locally sourced materials/goods. It is anticipated that, over the life of the construction period, virtually all construction traffic for the development will use the A41/Vendee Drive from the M40 Junction 9 and Middleton Stoney Road to access the development.

## 7.8 Summary

The proposed development comprises a mix of land uses and will provide the physical and service infrastructure to enable a high proportion of trips to be made by sustainable modes including walking, cycling and public transport. This chapter demonstrated that walking cycling and buses provide a viable alternative to driving in the majority of instances. It highlighted that a wide range of facilities including a primary school, small shops and community facilities within the development can be accessed within acceptable walking times and existing facilities located within Bicester can be accessed within acceptable journey distances and times by cycling and by bus, in comparison to the car.

# 8.0

## Trip and Traffic Generation

### 8.1 Introduction

This chapter details the trip generation methodology that has been applied in order to forecast the volume of trips by all modes as well as vehicular traffic to be generated by the proposed Himley Village development.

The methodology used for the 6,000 homes for NW Bicester has been applied to the quantum of development for the Himley Village development. The NW Bicester Masterplan Access & Travel Strategy, together with its Appendices 5 and 6 on trip rates and traffic generation, provide more detail on the approach.

It should be noted that the development proposals include a small energy centre and water treatment plant. It has been assumed that these uses will not produce significant trip generations on a daily basis and thus the effect is considered negligible. Therefore these have been excluded from this trip generation exercise.

### 8.2 Trip Rates

The TRICS database (v6.11.2) has been used as the basis for all trip rates except for those for the proposed hotel use, whereby v7.1.2 was used. The database allows the user to customise a number of parameters to only include surveys which correspond as far as possible with conditions at the proposed development. It should be noted that:

- Multi-modal surveys have been used;
- The trip rates refer to total person trip rates (i.e. the total trips that would be generated by each land use including those generated by car, public transport, walking, cycling etc.); and
- The trip rates derived are for the AM peak (08:00-09:00), PM peak (17:00-18:00) and 12 hour (07:00-19:00) assessment periods which will be considered in the assessment.

It should be noted that TRICS has its limitations in that no sites are available of similar size and complexity to NW Bicester.

It was agreed with OCC that 'mean' average total person trips from the development would be used for non-residential land uses with two trip rates for residential for comparison as follows:

- An 85th%ile total person trip rate for residential as this was requested by OCC (although the set of data gives a significantly higher total person rate than other consented developments in Bicester have used and higher than the trips made by Bicester households known from the 2010 household travel survey) and
- An average total person trip rate which is more in line with local consented developments and the surveyed trips of Bicester residents from the Bicester Household Survey 2007/2010.

The higher, 85th%ile trip rates for residential have been used in the traffic impact assessment to provide a worst case, whilst the comparative traffic generation using the average 'mean' trip rates are also provided.

## Mean Average Trip Rates

Table 8.1 to Table 8.3 show the 'Mean' Average multi modal total person trips rates for all land uses in the Himley Village development. This includes a full list of trip rates relevant to the whole NW Bicester masterplan although not all uses are included in the Himley Village development.

Table 8.1 Summary of AM Peak Hour 'Mean' Average Multi Modal People Trip Rates

Land Use	Unit	Mean Arrivals	Mean Departures	Total
Residential - Privately Owned	Per Unit	0.237	0.821	1.058
Residential – Affordable Housing*	Per Unit	0.190	0.657	0.846
Residential – Care Home	Per resident	0.125	0.119	0.244
Children's Nursery	Per pupil	0.416	0.227	0.643
Primary School	Per pupil	1.311	0.330	1.641
Secondary School	Per pupil	0.965	0.049	1.014
B1 Office Business Park/ Eco Business Centre	Per 100 sqm GFA	2.084	0.308	2.392
B2 Industrial Units	Per 100 sqm GFA	0.617	0.322	0.939
B8 Storage and Distribution	Per 100 sqm GFA	0.038	0.019	0.057
Local Shops	Per 100 sqm GFA	11.432	10.587	22.019
Community Hall/ Multi Faith Centre	Per 100 sqm GFA	1.068	0.519	1,587
Library/ Visitor Centre	Per 100 sqm GFA	2.273	0.593	2.866
Doctors Surgery	Per 100 sqm GFA	7.286	3.700	10.986
Dental Surgery	Per 100 sqm GFA	4.019	0.609	4.628
Sports Centre	Per 100 sqm GFA	0.885	0.557	1.442
Fitness Centre	Per 100 sqm GFA	0.884	1.207	2.091
Hotel	Per 100 sqm GFA	0.213	0.409	0.622

\*Note that results from the National Travel Survey suggest that 20% fewer trips are made by residents of affordable housing. It is thus proposed that a factor of 0.80 is applied to the privately owned housing rates.

Table 8.2 Summary of PM Peak Hour 'Mean' Average Multi Modal People Trip Rates

<b>Land Use</b>	<b>Unit</b>	<b>Mean Arrivals</b>	<b>Mean Departures</b>	<b>Total</b>
Residential - Privately Owned	Per Unit	0.605	0.369	0.974
Residential – Affordable Housing	Per Unit	0.484	0.295	0.779
Residential – Care Home	Per resident	0.074	0.119	0.193
Children's Nursery	Per pupil	0.180	0.314	0.494
Primary School	Per pupil	0.021	0.045	0.066
Secondary School	Per pupil	0.029	0.072	0.101
B1 Office Business Park/Eco Business Centre	Per 100 sqm GFA	0.292	2.094	2.386
B2 Industrial Units	Per 100 sqm GFA	0.145	0.482	0.627
B8 Storage and Distribution	Per 100 sqm GFA	0.019	0.046	0.065
Local Shops	Per 100 sqm GFA	9.863	10.042	19.905
Community Hall./Multi Faith Centre	Per 100 sqm GFA	1.802	0.950	2.752
Library/Visitor Centre	Per 100 sqm GFA	3.953	8.103	12,056
Doctors Surgery	Per 100 sqm GFA	3.516	5.353	8.869
Dental Surgery	Per 100 sqm GFA	0.244	5.481	5.725
Sports Centre	Per 100 sqm GFA	2.839	2.341	5.180
Fitness Centre	Per 100 sqm GFA	3.836	2.256	6.092
Hotel	Per 100 sqm GFA	0.314	0.183	0.497

Table 8.3 Summary of 12-hour 'Mean' Average Multi Modal People Trip Rates

<b>Land Use</b>	<b>Unit</b>	<b>Mean Arrivals</b>	<b>Mean Departures</b>	<b>Total</b>
Residential - Privately Owned	Per Unit	4.107	4.369	8.476
Residential – Affordable Housing	Per Unit	3.286	3.495	6.781
Residential – Care Home	Per resident	1.767	1.823	3.590
Children’s Nursery	Per pupil	1.801	1.796	3.597
Primary School	Per pupil	2.449	2.409	4.858
Secondary School	Per pupil	1.623	1.606	3.229
B1 Office Business Park/Eco Business Centre	Per 100 sqm GFA	8.818	8.729	17.547
B2 Industrial Units	Per 100 sqm GFA	4.655	4.783	9.438
B8 Storage and Distribution	Per 100 sqm GFA	0.514	0.536	1.050
Local Shops	Per 100 sqm GFA	113.601	112.206	225.807
Community Hall./Multi Faith Centre	Per 100 sqm GFA	19.932	16.325	36.257
Library/Visitor Centre	Per 100 sqm GFA	65.218	65.218	130.436
Doctors Surgery	Per 100 sqm GFA	66.616	66.728	133.344
Dental Surgery	Per 100 sqm GFA	35.688	34.712	70.400
Sports Centre	Per 100 sqm GFA	18.471	15.245	33.716
Fitness Centre	Per 100 sqm GFA	21.322	18.297	39.619
Hotel	Per 100 sqm GFA	2.424	2.564	4.988

## Residential 85<sup>th</sup> %ile Trip Rates

The 85th%ile total person trip rates for residential are included in Table 8.4 below.

Table 8.4 Residential Trip Rates 85%ile

<b>Residential Person Trips</b>	<b>Unit</b>	<b>Mean Arrivals</b>	<b>Mean Departures</b>	<b>Total</b>
AM Peak- Privately Owned	Per Unit	0.384	1.058	1.442
AM Peak – Affordable Housing*	Per Unit	0.307	0.846	1.154
PM Peak – Privately Owned	Per Unit	0.778	0.517	1.295
PM Peak - Affordable Housing*	Per Unit	0.622	0.414	1.036
12 Hour - Privately Owned	Per Unit	4.843	5.939	10,782
12 Hour - Affordable Housing*	Per Unit	3.874	4.751	8.626

### 8.3 Trip Generation Methodology

Appendix 6 of the NW Bicester Masterplan Access and Travel Strategy sets out the proposed methodology for calculating the number of trips generated by each land use for the full NW Bicester development. The trip rates as set out above and the mode share and containment principles as set out in Chapter 4 of this TA have been used to calculate the number of internal and external trips by each mode for each land use proposed in the Himley Village development.

In summary, the following methodology has been applied:

#### Residential

- Person trip rates have been obtained from the TRICS database (as in Table 8.1 to Table 8.4);
- Residential trip generations by journey purpose have been identified from the National Travel Survey (2008/12, Table NTS0502) and applied to the number of person trips;
- Assumptions have been made in relation to the internalisation of trips within NW Bicester, external within Bicester and external outside Bicester (see Table 8.5 in the containment and linked trips section);
- The number of internal, external within Bicester and external to Bicester person trips by purpose has been calculated using the National Travel Survey proportions and the internalisation assumptions. The number of person trips by mode has been established using the total number trips by distance and purpose and the 2031 target mode split (Table 8.7);
- The traffic generation to and from the site in the AM and PM peak period is based on the number of car driver trips.

## Employment

The site will include B1 employment uses. The following methodology has been used to calculate the number of trips:

- Person trip rates were used as in Table 8.1 to Table 8.3;
- The number of internal and external trips has been estimated from assumptions regarding containment of trips (Table 8.6);
- Internal trips have been excluded from total trips as they are double counted with trips made by residents;
- The 2031 target mode split for external trips within and outside Bicester has been applied to the respective number of person trips by each mode.

## Education

The following methodology has been applied to calculate the number of trips to and from the proposed nursery and primary school:

- Person trip rates have been obtained from the TRICS database (as in Table 8.1 to Table 8.3);
- The number of internal and external trips has been estimated from assumptions regarding containment of trips (Table 8.6);
- Internal trips have been excluded from total trips as they are double counted with trips made by residents;
- The 2031 target mode split for external trips within and outside Bicester has been applied to the respective number of person trips by each mode.

## Community, Health and Care, Retail and Leisure

The following methodology has been used to calculate the number of trips generated by community, health and care uses:

- Person trip rates have been obtained from the TRICS database (as in Table 8.1 to Table 8.3). Note that the trip rate for 'Doctors Surgery' has been applied to the proposed 'Veterinary Surgery' use, and the 'Community Hall/Multi Faith' trip rate applied to the proposed 'Community/Pub' use.
- The number of internal and external trips has been estimated from assumptions regarding containment of trips (Table 8.6);
- An estimate of the proportion of trips which are linked to other land uses has been made and the trip generation has been reduced accordingly (Table 8.6);
- Internal trips have been excluded from total trips as they are double counted with trips made by residents;
- The 2031 target mode split for external trips within and outside Bicester has been applied to the respective number of person trips by each mode.



## Hotel

The following methodology has been applied to calculate the number of trips to and from the proposed hotel:

- Person trip rates have been obtained from the TRICS database (as in Table 8.1 to Table 8.3);
- The number of internal and external trips has been estimated from assumptions regarding containment of trips, which for the hotel use are assumed to be the same as those for Employment as set out in Table 8.6;
- Internal trips have been excluded from total trips as they are double counted with trips made by residents;
- The 2031 target mode split for external trips within and outside Bicester has been applied to the respective number of person trips by each mode.

## Containment and Linked Trips

As set out in the Access & Travel Strategy, the target level of containment is for at least 35% of trips to be within NW Bicester and 60% to be within Bicester as a whole (i.e. 40% or less travelling outside of Bicester). The individual assumptions in relation to containment for resident trips are set out in Table 8.5 and for other land uses in Table 8.6.

Table 8.5 Containment of Resident Trips by Journey Purpose

Journey Purpose	Internal Trips in NWB (%)	External Trips in Bicester (%)	External Trips outside Bicester
Commuting	10	30	60
Business	10	30	60
Education	65	15	20
Shopping	30	30	40
Other services	50	20	30
Visiting friends and relatives (VFR)	15	30	55

Table 8.6 Containment and Linked Trip Assumptions for Non-Residential Trips

Land use	Internal Trips in NWB (%)	Total Trips within Bicester (including internal to NWB) (%)	Percentage Linked Trips (%)
Primary School	85	95	-
Secondary School	75	95	-
Employment	10	30	-
Retail & Leisure	60	70	30
Community, Health & Care	60	70	30

## 8.4 Target Mode Share

The target mode share which has been applied is discussed in the Access & Travel Strategy. Table 8.7 sets out the target modal share for 2031 which has been applied to the trips by all modes to derive vehicle trips.

Table 8.7 Target Mode Share

	2031 PPS Target All Trips		2031 Internal Trips		2031 External Trips Within Bicester		2013 External Trips Outside Bicester	
	% by mode	Total Car /Non car	% by mode	Total Car /Non car	% by mode	Total Car /Non car	% by mode	Total Car /Non car
<b>Car driver</b>	40%	50%	7%	14%	35%	52%	57%	77%
<b>Car passenger</b>	10%		7%		17%		20%	
<b>Bus passenger</b>	10%	50%	1%	86%	5%	48%	11%	23%
<b>Bicycle</b>	10%		10%		10%		7%	
<b>Walk</b>	30%		75%		33%		5%	
<b>Total</b>	<b>100%</b>		<b>100%</b>		<b>100%</b>		<b>100%</b>	

## 8.5 Trip Generation

The methodology set out above has been used to calculate the multi-modal trips for the Himley Village development. The following sections provide the calculated trip generation from the Himley Village development using the 85th%ile trip rate for residential as a worst case for the purposes of assessment.

### Internal Trips within NW Bicester

Table 8.8 sets out the trips by mode that are anticipated to remain within the NW Bicester development.

Table 8.8 Internal Trips within NW Bicester

Mode	AM peak (08.00 to 09.00)			PM peak (17.00 to 18.00)			12 Hour (07.00 to 19.00)		
	In	Out	Total	In	Out	Total	In	Out	Total
Car driver	19	53	73	23	15	38	181	222	404
Car passenger	19	53	73	23	15	38	181	222	404
Bus passenger	3	8	10	3	2	5	26	32	58
Bicycle	28	76	104	33	22	54	259	318	577
Walk	207	572	779	245	163	408	1943	2383	4326
Total	277	762	1039	327	217	544	2591	3177	5768
Car mode share			14%			14%			14%

## External Trips within Bicester

Table 8.9 sets out the number trips by mode that are anticipated to be external to the NW Bicester development but remain within Bicester.

Table 8.9 External Trips within Bicester

Mode	AM peak (08.00 to 09.00)			PM peak (17.00 to 18.00)			12 Hour (07.00 to 19.00)		
	In	Out	Total	In	Out	Total	In	Out	Total
Car driver	74	134	208	122	86	208	801	954	1756
Car passenger	36	65	101	59	42	101	389	464	853
Bus passenger	11	19	30	17	12	30	114	136	251
Bicycle	21	38	59	35	25	59	229	273	502
Walk	70	127	196	115	81	196	756	900	1656
Total	211	384	595	349	245	594	2290	2727	5017
Car mode share			52%			52%			52%

## External Trips outside of Bicester

Table 8.10 sets out the number trips by mode that are anticipated to involve origins or destinations outside of Bicester.

Table 8.10 External Trips outside of Bicester

Mode	AM peak (08.00 to 09.00)			PM peak (17.00 to 18.00)			12 Hour (07.00 to 19.00)		
	In	Out	Total	In	Out	Total	In	Out	Total
Car driver	184	362	546	360	262	622	2295	2709	5004
Car passenger	65	127	192	126	92	218	805	951	1756
Bus passenger	36	70	105	70	51	120	443	523	966
Bicycle	23	44	67	44	32	76	282	333	615
Walk	16	32	48	32	23	55	201	238	439
Total	323	635	958	632	460	1091	4026	4753	8779
Car mode share			77%			77%			77%

## Trip Containment

Table 8.11 summarises the number of trips from the development anticipated to be within the NW Bicester development or external to the site but within Bicester. It can be seen that the level of containment varies in the peak hours, with more trips being contained in the morning peak due to the influence of education trips, and less in the evening peak due to employment trips. Overall for the 12 hour period, 55% of trips are anticipated to be contained in Bicester. This is slightly lower than the target of 60%, but leads to a robust estimate of external trips for the impact analysis.

In addition the proportion of trips within the site is also slightly lower than target at 29%, also giving a robust assumption on trips on the external highway network.

Table 8.11 Containment of Trips for Himley Village

Containment	AM peak (08.00 to 09.00)			PM peak (17.00 to 18.00)			12 Hour (07.00 to 19.00)		
	In	Out	Total	In	Out	Total	In	Out	Total
Within NWB	277	762	1039	327	217	544	2591	3177	5768
Within Bicester	211	384	595	349	245	594	2290	2727	5017
Outside Bicester	323	635	958	632	460	1091	4026	4753	8779
<b>Total</b>	811	1780	2592	1308	922	2230	8907	10657	19564
Within NWB			40%			24%			29%
Within Bicester			23%			27%			26%
Total Containment			63%			51%			55%

Table 8.12 summarises the containment of trips by each mode. It can be seen that car trips are forecast to be predominately outside of Bicester, with 70% of trips. This is a robust assumption given that the Bicester Household Survey 2010 found that only 52% of trips were to destinations outside of Bicester – although this is of resident trips only. Moreover the percentage of bus passenger trips outside of Bicester is 76% reflecting the usage of services such as the X5 to travel to longer distance destinations. In contrast, 67% of walking trips are internal to the development and 34% of cycling trips.

Table 8.12 Containment of Trips by Mode (12 Hour Trips)

Mode	Within NWB		Within Bicester		Outside Bicester		Total Trips
	No.	%	No.	%	No.	%	
<b>Car driver</b>	404	5.6%	1756	24.5%	5004	69.9%	7164
<b>Car passenger</b>	404	13.4%	853	28.3%	1756	58.3%	3012
<b>Bus passenger</b>	58	4.5%	251	19.7%	966	75.8%	1274
<b>Bicycle</b>	577	34.1%	502	29.6%	615	36.3%	1693
<b>Walk</b>	4326	67.4%	1656	25.8%	439	6.8%	6420
<b>Total</b>	<b>5768</b>	<b>29.5%</b>	<b>5017</b>	<b>25.6%</b>	<b>8779</b>	<b>44.9%</b>	<b>19564</b>

## Total Trips by All Modes

The total trips by all modes generated by the Himley Village development are set out in Table 8.13. It can be seen that the overall mode share forecast for car trips using this methodology is 52% in the 12 hour period, i.e. just above the target to be aimed at of 50%.

Table 8.13 Himley Village Development Total Trips by All Modes

Mode	AM peak (08.00 to 09.00)			PM peak (17.00 to 18.00)			12 Hour (07.00 to 19.00)		
	In	Out	Total	In	Out	Total	In	Out	Total
Car driver	278	549	827	505	363	868	3278	3886	7164
Car passenger	120	245	365	209	149	357	1376	1637	3012
Bus passenger	49	97	146	90	65	155	583	691	1274
Bicycle	71	159	230	112	78	190	770	923	1693
Walk	293	730	1023	392	267	659	2900	3520	6420
Total	811	1780	2592	1308	922	2230	8907	10657	19564
Car mode share			46%			55%			52%

## Total Vehicle Trips

Table 8.14 outlines the total vehicle trips generated by the Himley Village development of NW Bicester.

Table 8.14 Total Vehicle Trips

Containment	AM peak (08.00 to 09.00)			PM peak (17.00 to 18.00)			12 Hour (07.00 to 19.00)		
	In	Out	Total	In	Out	Total	In	Out	Total
Internal	19	53	73	23	15	38	181	222	404
External in Bicester	74	134	208	122	86	208	801	954	1756
External outside Bicester	184	362	546	360	262	622	2295	2709	5004
<b>Total</b>	278	549	827	505	363	868	3278	3886	7164

## 8.6 Trips with Average Trip Rate

For comparison, the number of residential trips that would be generated using the lower, average total person trip rates is shown in Table 8.15 for all modes. The overall number of trips is 81% of the 85th%ile rate over the 12 hour period.

Table 8.15 Total Trip Generation with Average Trip Rate

Mode	AM peak (08.00 to 09.00)			PM peak (17.00 to 18.00)			12 Hour (07.00 to 19.00)		
	In	Out	Total	In	Out	Total	In	Out	Total
Car driver	207	436	644	400	273	673	2869	3014	5883
Car passenger	88	194	283	165	111	276	1201	1263	2464
Bus passenger	37	77	113	72	49	121	511	537	1048
Bicycle	50	125	175	88	58	146	667	703	1370
Walk	194	570	763	307	194	500	2483	2631	5114
Total	576	1402	1979	1031	686	1717	7731	8148	15879
Car mode share			47%			55%			53%

## 8.7 Summary

The trip rates used for the traffic generation of the Himley Village development are based on 85th%ile rates which represent similar vehicle generations to other proposed developments in the town without the mix of land uses and range of sustainable travel provision. Moreover the assumptions for containment and mode share which have led to the vehicle traffic generations for the Himley Village development are more conservative than the targets. Taken together the trip rates, mode share and containment assumptions provide a worst case/ robust basis for the assessment of impact.

# 9.0 Traffic Modelling

## 9.1 Introduction

The number of traffic movements forecast to be generated by the development (as set out in Chapter 8) has been modelled by White Young Green using the County's Bicester Saturn Model. This assigns the traffic generation to the road network. The model is also being used to test various scenarios for the whole town's development on behalf of Oxfordshire County Council as part of the Local Plan evidence base and as discussed in Chapter 3, is considered to provide the best available tool for assessing the impact of NW Bicester.

The modelling has been undertaken for the full 6,000 homes less the Exemplar development. It has been agreed with OCC that the difference in traffic generation between the Himley Village development and the full NW Bicester can then be used to quantify the traffic impact of the application level of development on links and junctions, as a full assessment has taken place on the full development.

## 9.2 Model Scenarios

The modelling has used 2031 as the opening year for the full development of NW Bicester, whilst it is recognised that build-out of the master plan development will take longer. The upper trajectory of housing delivery within a 25 year timescale is for 4,062 homes by 2031 and 6,000 by the end of 2039. The use of 2031 for the Opening Year is the approach taken as this fits with the end date of the Local Plan and is the best available basis for assessment and represents a worst case.

The following scenarios have been assessed:

- Base Year 2012
- Reference Case 2031 -- this includes full development of the town including developments beyond 2031 but not NW Bicester (with the exception of the permitted Exemplar development). This gives visibility on predicted traffic patterns in the town without NW Bicester, for comparison.
- Full Development 2031 – 85th%ile Trip Rates with level crossing removed – this scenario includes NW Bicester as well as all other developments as per the Local Plan in the town.
- Full Development 2031 – 85th%ile Trip Rates with level crossings removed and a SE Link Road – this scenario assesses whether a link road in the SE of Bicester influences the level and distribution of impacts of the NW Bicester compared to not having a SE Link Road.
- Full Development 2031 – Average Trip Rates with level crossing removed – this scenario uses the lower total person trip rates for residential land use as the basis for the traffic generation for NW Bicester.

The Technical Note by WYG detailing the modelling assumptions is appended to the Access & Travel Strategy.

## 9.3 Scenario for Traffic Assessment

It was agreed in discussion with Oxfordshire County Council (OCC) that the 2031 Full NW Bicester development (85th%ile) with no SE Link Road represented the most appropriate scenario for the assessment of the full development and the design of the road link and junctions. This enables an understanding of the impacts without strategic road improvements elsewhere in the town. The issues regarding the SE link road are however discussed later in this chapter.

The 85th%ile NW Bicester vehicle trip rate is higher than that used in the submission for both the SW Bicester development or Graven Hill development in the AM peak hour as well as higher than used for Graven Hill in the PM peak hour. It is considered that these trip rates represent a development which has similar traffic generation to other developments in the town. Use of this modelling scenario for assessing the development therefore provides a view of what would happen to the road network if the development is similar to other developments in the town. It avoids the need to consider how traffic would be accommodated if the modal shift targets are not met.

It has also been agreed that the 2031 Full NW Bicester development (average trip rates) with no SE Link Road scenario provides an appropriate basis for comparison, giving the level of traffic that could be anticipated to result if the sustainable travel targets are achieved for NW Bicester. The Highways Agency have identified that this target scenario is considered to be the most appropriate traffic generation level for assessing the impact on the motorway junctions and monitoring would thereafter be put in place to ascertain whether the targets are being met.

## 9.4 Initial Modelling March 2014 & Iterative Modelling April/May 2014

The results of the modelling of the main scenarios identified two notable features of the Full Development (85<sup>th</sup>%ile) scenario:

- The usage of the A4095 NW Strategic Link Road appeared not to be maximised with traffic increasing significantly on the radial routes (Middleton Stoney Road, Banbury Road and Buckingham Road);
- A large amount of traffic using Banbury Road and the junction with the A4095; and
- Increases in traffic were observed through adjacent residential areas.

The results were discussed with Cherwell DC (CDC) and OCC and it was agreed that further model runs would be undertaken including two potential mitigation measures (each tested separately):

1. Changing the speed limit on the proposed new Howes Lane/ Lord's Lane link from 30mph to 40mph; and
2. Introducing traffic calming measures to the Shakespeare Drive area. This tested a one way north to south from the old Howes Lane into Shakespeare Drive and 20mph on Shakespeare Drive, Blenheim Drive and West Street, to see in principle what benefits traffic calming would bring, although details of what might be implemented would be for further discussion.



At the same time as undertaking the model runs above, minor changes were made to the modelling details of the Banbury Road/ A4095 junction as the Saturn outputs seemed to be suggesting there was more than expected capacity.

It was concluded from the modelling undertaken that there were benefits in introducing minor modifications to the proposals for NW Bicester compared to the original modelling results. The results showed slightly higher impact of the traffic calming on the use of the new route than the speed limit change. The traffic calming introduction with a one way section would increase traffic on Middleton Stoney Road but significantly reduce traffic on Shakespeare Drive at the northern end. The change of the new link to a 40mph route was considered to represent a detrimental impact on the principles of the NW Bicester masterplan and the ability to integrate the development with the existing residential areas of the town.

At a meeting between Hyder Consulting, OCC and CDC on 8th May 2014, it was agreed that the scenario for testing of the traffic impact would incorporate the traffic calming principles but not change the design speed of the Howes Lane/ Lord's Lane Link Road. The revised scenario with the traffic calming is therefore the basis of further assessment, with 85th%ile trip rates and average trip rates.

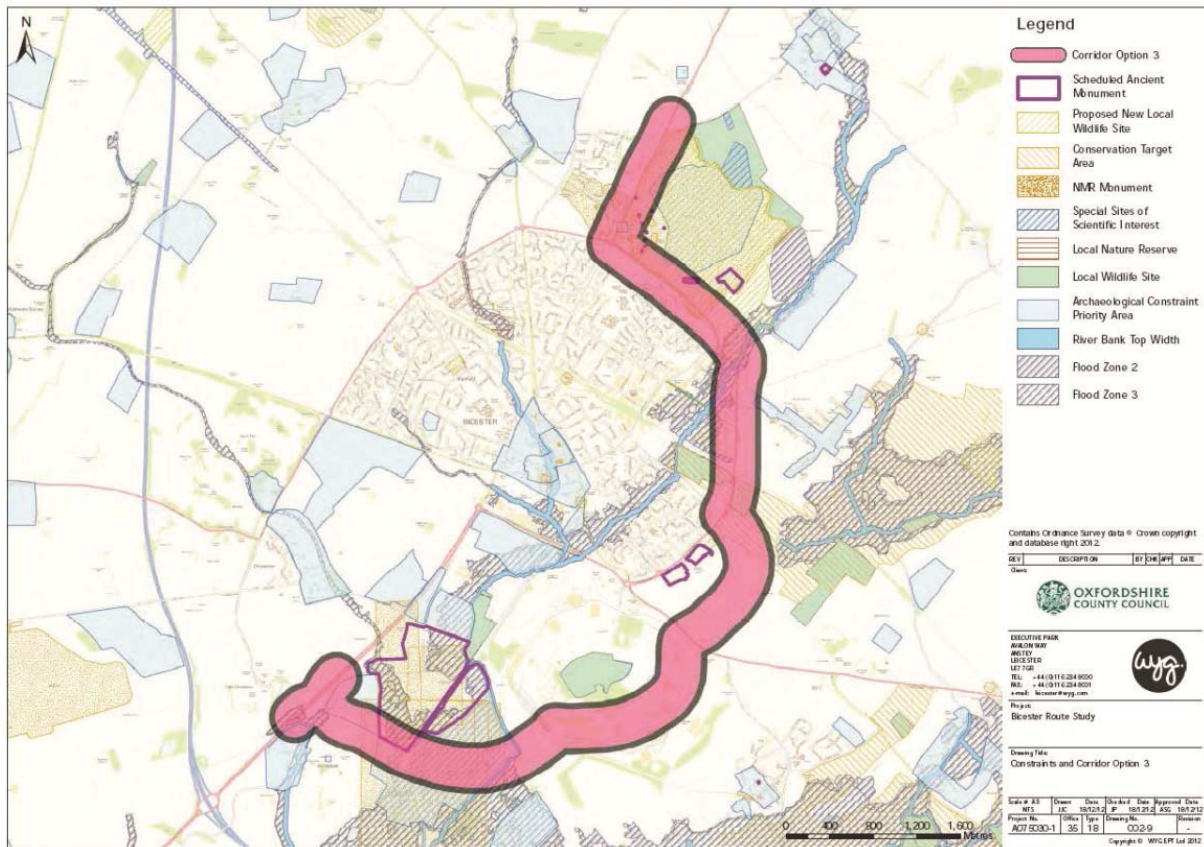
## 9.5 SE Link Road

A traffic modelling scenario has also been provided which assesses the full NW Bicester (85th%ile) traffic with the introduction of a SE Link Road (as set out in the OCC Bicester Peripheral Routes Study).

Figure 9.1 below shows the indicative route for improvement included in the modelling (the highest performing option in the Peripheral Route Study report was selected whilst recognising that there is not a preferred route). This indicates an improved eastern peripheral road from the A4421 Buckingham Road/ Skimmingdish Lane junction to the Gavray Drive junction and an offline improvement around the Graven Hill development and connecting to the A41 Oxford Road.

The implications of the SE Link Road are discussed further in the following traffic impact and mitigation chapters.

Figure 9.1 SE Link Road Option for Traffic Modelling



## 9.6 Model Outputs

The results of the Saturn modelling are discussed in Chapter 10 Traffic Impact. The outputs for the NW Bicester development relate to the full Masterplan development and use the 85th%ile trip rate traffic generation.

The Saturn Model outputs included plots of link flow demand for each of the scenarios as follows:

1. Base Year 2012 AM Peak
2. Base Year 2012 PM Peak
3. Reference Case 2031 AM Peak
3. Reference Case 2031 PM Peak
4. NW Bicester full development 2031 AM Peak
5. NW Bicester full development 2031 PM Peak

The outputs also included plots showing the difference between the scenarios as follows:

- NW Bicester full development scenario minus the Reference Case AM Peak
- NW Bicester full development scenario minus the Reference Case PM Peak.

# 10.0 Traffic Impact

## 10.1 Introduction

This chapter considers the traffic impact on the road network following the completion of the proposed development. For the purposes of this assessment an Opening Year of 2031 has been assessed, as this is the available year of the Bicester Saturn Model and the end year of the Cherwell Local Plan, thus meeting the criteria of Circular 02/13.

As discussed in the previous chapter, the modelling work has been undertaken on the full 6,000 homes development less the 392 homes of the exemplar development. The proportion of traffic generated by the Himley Village development has been calculated as 26.43% in the AM peak hour, 28.46% in the PM peak hour and 28.53% in the 12 hour period.

These percentages have been applied to cordon, link and junction flows to identify and assess the impact of the Application development on Reference Case 2031 traffic levels as agreed with OCC and CDC in a meeting between Hyder Consulting, OCC and CDC on 8th May 2014.

## 10.2 Cordon Flows

The twelve cordon locations around Bicester were identified in Chapter 3. The Bicester Saturn Model has provided forecast flows for each scenario and these have been factored by the proportion of traffic generation anticipated from the Himley Village development.

In the 2031 Reference Case (no NW Bicester), a 29% growth in traffic entering and leaving Bicester in the AM peak hour and 31% in the PM peak hour is anticipated by the model, giving 12,282 trips in the AM peak hour and 12,657 in the PM peak hour. Notably in the Reference Case the movements become more 'tidal' with a higher movement inbound in the AM peak and outbound in the PM peak.

In the 2031 with development scenario with the Himley Village development using the 85<sup>th</sup> percentile trip rates, a further 2.4% growth in the AM peak hour and 1.9% growth in the PM peak hour in traffic entering and leaving Bicester are anticipated by the model, in addition to other traffic growth. In total 298 trips in the AM and 242 trips in the PM entering or leaving Bicester appear to be related to Himley Village, as this is the level of increase above the Reference Case in 2031.

The traffic generation of the Himley Village development is estimated as 827 vehicles in the AM Peak and 868 in the PM peak. The proportion of the Himley Village traffic generation which makes trips external to Bicester can therefore be estimated as 34% in the AM peak and 29% in the PM peak. While the model is forecasting a containment level in 2031 following build out of the Himley Village development higher than the containment target of "less than 40% of trips to be outside of Bicester" (see Access & Travel Strategy), the predicted vehicular containment is low compared to the 52% by car estimated to be outside of Bicester from the Bicester Household Survey 2010. It should be noted that the percentages crossing the cordons are for the peak hours however rather than all day as with the household survey thus it only provides an indication of containment of traffic.

It can be seen from Table 10.1 that minor increases are anticipated at the majority of cordon locations, with the exception of:

- Wendlebury Road, east of the M40;
- Ardley Road, north of Bucknell;
- Middleton Road, west of Bucknell; and
- B4030 Middleton Stoney Road.

Table 10.1 Change in Cordon Traffic Flows

Ref	Name	2012 Base Year		2031 No NWB		2031 + Himley Village		Change in flow	
		AM Peak hr	PM Peak hr	AM Peak hr	PM Peak hr	AM Peak hr	PM Peak hr	AM Peak hr	PM Peak hr
1	A41 E of M40	2415	2602	2764	3043	2772	2985	0.3%	-1.9%
2	Wendlebury Road, E of M40	331	207	450	254	472	248	4.9%	-2.2%
3	A41, E of A4421 junction	2141	2378	3096	3018	3093	3033	-0.1%	0.5%
4	Bicester Road, E of A4421 junction	663	617	421	580	411	588	-2.3%	1.4%
5	A4421 Buckingham Road, N of Skimmingdish Lane Junction	1311	1132	1780	1641	1827	1652	2.6%	0.7%
6	Fringford Road, N of Caversfield	74	112	99	188	100	190	1.1%	0.9%
7	B4100 Banbury Road, N of Bainton Road junction	1117	1186	1353	1599	1389	1609	2.6%	0.6%
8	Ardley Road, N of Bucknell	207	195	349	533	387	539	10.8%	1.1%
9	Middleton Road, W of Bucknell	27	12	32	30	107	155	235.4 %	415.4 %
10	B4030 Middleton Stoney Road, NW of NWB access	556	655	522	642	583	752	11.6%	17.2%
11	A4095, W of Chesterton	287	204	805	568	820	579	1.9%	1.9%
12	Green Lane, W of Chesterton	407	360	611	561	619	570	1.3%	1.6%
	<b>Total</b>	<b>9536</b>	<b>9660</b>	<b>12282</b>	<b>12657</b>	<b>12580</b>	<b>12899</b>	<b>2.4%</b>	<b>1.9%</b>

## 10.3 Link Impact Analysis

The change in flows on the assessed links (as identified in Chapter 3) based on the anticipated generation of the traffic from the Development has been calculated.

Table 10.2 shows the predicted link flows with and without the Development in 2031. The percentage change on each link in the different time periods is then identified.

It can be seen that for many of the links, the increase as a result of the Himley Village development over the scenario without the development is minor. There are a number of links however which show an increase in traffic flow of more than 10% in line with the assessment in the ES traffic and transport chapter which are:

- Middleton Stoney Road, west of Howes Lane
- Bucknell Road, south of Howes Lane
- Banbury Road, north and south of Lord's Lane
- Buckingham Road, south of Skimmingdish Lane
- Shakespeare Drive, south of Howes Lane and east of Middleton Stoney Road
- M40 J10 northbound slip road
- Ardley Road, east of B430
- The Approach, west of Bucknell Road
- Ardley Road, north of Bucknell
- Middleton Road, west of Bucknell
- Middleton Stoney Road, north west of NW Bicester

Mitigation will be considered for the links in Chapter 11.

Table 10.2 Himley Village Development Flows

Ref	Link description	2031 Flows without Himley Village		Himley Village Flows		2031 flows with Himley Village		Percentage Change	
		AM Peak hr	PM Peak hr	AM Peak hr	PM Peak hr	AM Peak hr	PM Peak hr	AM Peak hr	PM Peak hr
1	A41 northbound, N of M40 J9	1510	1575	15	-16	1525	1559	1.0%	-1.0%
2	A41 southbound, N of M40 J9	1242	1269	-4	15	1238	1284	-0.3%	1.2%
3	A41 Oxford Rd, S of A41 junction	4324	4016	84	91	4408	4107	1.9%	2.3%
4	Vendee Drive, W of A41 junction	757	989	17	60	774	1049	2.3%	6.1%
5	A41, N of Pingle Drive	2229	2235	63	64	2292	2299	2.8%	2.9%
6	Middleton Stoney Rd, W of Kings End	966	1158	15	53	981	1211	1.5%	4.6%

Ref	Link description	2031 Flows without Himley Village		Himley Village Flows		2031 flows with Himley Village		Percentage Change	
		AM Peak hr	PM Peak hr	AM Peak hr	PM Peak hr	AM Peak hr	PM Peak hr	AM Peak hr	PM Peak hr
7	Middleton Stoney Rd, W of Howes Lane	519	642	240	280	759	922	46.3 %	43.6 %
8	Howes Lane, N of Middleton Stoney Rd	1075	1198	-37	-86	1038	1112	-3.4%	-7.2%
9	Howes Lane, E of Shakespeare Drive	1077	1173	35	12	1112	1185	3.2%	1.0%
10	Lords Lane, E of Bucknell Road	1391	1409	-62	-58	1329	1351	-4.5%	-4.1%
11	Lords Lane, W of Banbury Road	1384	1448	-61	-96	1323	1352	-4.4%	-6.6%
12	Bucknell Road, N of Lords Lane	257	432	-31	-77	226	355	-12.2 %	-17.8 %
13	Bucknell Road, S of Lords Lane	516	932	53	22	569	954	10.3 %	2.4%
14	Banbury Road, N of Lords Lane	1522	1755	35	138	1557	1893	2.3%	7.8%
15	A4095 E of Banbury Road	2106	2163	6	36	2112	2199	0.3%	1.7%
16	Banbury Road, S of A4095	764	929	87	75	851	1004	11.4 %	8.0%
17	Buckingham Road, S of Skimmingdish Lane	1258	1252	102	79	1360	1331	8.1%	6.3%
18	Queens Avenue, S of Bucknell Road	1998	2109	33	78	2031	2187	1.6%	3.7%
19	A41 E of A41 Oxford Road	3505	3447	68	77	3573	3524	1.9%	2.2%
20	A4421 Neunkirchen Way	1849	1938	41	60	1890	1998	2.2%	3.1%
21	A41, E of London Road roundabout	1969	1632	16	19	1985	1651	0.8%	1.2%
22	A4421, E of Skimmingdish Lane	2154	2453	40	92	2194	2545	1.9%	3.7%
23	Shakespeare Drive, S of Howes Lane	138	85	38	36	176	121	27.2 %	42.5 %
24	M40 J10 northbound off slip road	759	523	79	50	838	573	10.4 %	9.5%
25	Ardley Road (E of B430)	364	532	34	6	398	538	9.2%	1.2%

Ref	Link description	2031 Flows without Himley Village		Himley Village Flows		2031 flows with Himley Village		Percentage Change	
		AM Peak hr	PM Peak hr	AM Peak hr	PM Peak hr	AM Peak hr	PM Peak hr	AM Peak hr	PM Peak hr
26	M40 J10 southbound on slip road (from A43)	565	240	9	-2	574	238	1.6%	-0.9%
27	B430 M40 over bridge	2376	2579	7	54	2383	2633	0.3%	2.1%
28	A4095 N of Chesterton	1076	976	29	22	1105	998	2.7%	2.3%
29	Shakespeare Drive, E of Middleton Stoney Road	950	873	49	99	999	972	5.1%	11.4 %
30	The Approach, W of Bucknell Road	401	507	106	59	507	566	26.4 %	11.7 %
31	A41 East of Pioneer Road	3075	3009	3	17	3078	3026	0.1%	0.6%
32	Bicester Road, E of A4421 junction	421	580	-10	8	411	588	-2.3%	1.4%
33	A4421 N of Skimmingdish Lane	1780	1641	47	11	1827	1652	2.6%	0.7%
34	Fringford Road, N of Caversfield	99	188	1	2	100	190	1.1%	0.9%
35	B4100 Banbury Road, N of Bainton Road	1353	1599	36	10	1389	1609	2.6%	0.6%
36	Ardley Road, N of Bucknell	349	533	38	6	387	539	10.8 %	1.1%
37	Middleton Road, W of Bucknell	32	30	75	125	107	155	235.4 %	415.4 %
38	B4030 Middleton Stoney Road, NW of NWB	522	642	61	110	583	752	11.6 %	17.2 %
39	Green Lane, W of Chesterton	611	561	8	9	619	570	1.3%	1.6%
40	Wendlebury Road, E of M40	450	254	22	-6	472	248	4.9%	-2.2%
41	M40 northbound (mainline only), S of J9	4001	4310	8	1	4009	4311	0.2%	0.0%
42	M40 southbound (mainline only), S of J9	4387	4077	1	1	4388	4078	0.0%	0.0%
43	M40 northbound (mainline only), S of J10 / N of J9	5786	6269	82	44	5868	6313	1.4%	0.7%
44	M40 southbound (mainline only), S of J10 / N of J9	5398	4693	11	-1	5409	4692	0.2%	0.0%

Ref	Link description	2031 Flows without Himley Village		Himley Village Flows		2031 flows with Himley Village		Percentage Change	
		AM Peak hr	PM Peak hr	AM Peak hr	PM Peak hr	AM Peak hr	PM Peak hr	AM Peak hr	PM Peak hr
45	M40 northbound (mainline only), N of J10	5243	6053	8	0	5251	6053	0.1%	0.0%
46	M40 southbound (mainline only), N of J10	5877	5133	4	3	5881	5136	0.1%	0.1%

## 10.4 Junction Impact Analysis

Turning movements on junctions across the Bicester town network have been extracted from the Bicester Saturn Model for each scenario. In total this comprises 32 junctions of which 10 are new or replacement junctions proposed as part of the NW Bicester Masterplan and to be delivered by the various developments with Himley Village delivering two new junctions.

Discussions between Hyder Consulting, Oxfordshire County Council and the Highways Agency on 8th May 2014 led to agreement that the change in turning movements should be analysed for all of the junctions.

The percentage impact of the Himley Village development on existing junction turning movements has been calculated by apportioning the traffic generation of traffic from Himley Village over that forecast for the full Masterplan through the Saturn modelling.

As shown in Table 10.3, the following junctions show an increase of close to or more than 5% on the Reference Case 2031 in the AM peak:

- B4100/ Caversfield unnamed road;
- Howes Lane/ Middleton Stoney Road;
- Middleton Road/ Bainton Road.

The following junctions show an increase of close to or more than 5% (a figure typically used for junctions as potentially being significant) on the Reference Case 2031 in the PM peak:

- A41 Oxford Road/ London Road;
- A41/A4421/B4100;
- B4100/ Caversfield unnamed road;
- Howes Lane/ Middleton Stoney Road;
- Middleton Road/ Bainton Road.



Table 10.3 Change in Junction Turning Movements

Junction	Description	2012 Base Year		2031 Reference Case No NWB		2031 with Himley Village		% Change	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
J1-10005	M40 Junction 9	1228	1518	1530	1570	1545	1555	1.0%	-0.9%
J1-10010	M40 Junction 9	3913	4069	3728	3370	3750	3364	0.6%	-0.2%
J1-10185	M40 Junction 9	2559	2509	2650	2177	2663	2192	0.5%	0.7%
J1-10190	M40 Junction 9	3869	3664	3460	3063	3463	3088	0.1%	0.8%
	<b>Total M40 Junction 9</b>	<b>11569</b>	<b>11760</b>	<b>11368</b>	<b>10180</b>	<b>11422</b>	<b>10199</b>		
J2	A41/Vendee Drive	2804	2675	3761	4142	3825	4102	1.7%	-1.0%
J3	A41 Oxford Road/A41	3237	3133						
J3 - 22205				3817	3339	3897	3561	2.1%	6.7%
J3 - 22206				2427	2230	2466	2328	1.6%	4.4%
J3 - 22207				2491	2416	2513	2461	0.9%	1.9%
	<b>Total A41 Oxford Road/London Road</b>			<b>8735</b>	<b>7985</b>	<b>8876</b>	<b>8351</b>		
J4	A41 Oxford Road/Pringle Drive	1899	2056	2581	2624	2644	2680	2.4%	2.1%
J5	Middleton Stoney Road/Kings End	1888	2021	2728	2839	2782	2925	2.0%	3.0%
J6	Field Street/Bucknell Road	1612	1709	2749	2977	2837	3050	3.2%	2.5%
J6B	Queens Avenue/St John Street	1188	1734	2478	2853	2531	2913	2.1%	2.1%
J7	Banbury Road/Field Street	2154	2042	2377	2635	2481	2673	4.4%	1.4%
J8	A41/A4421/B4100	3533	3817						
J8 - 22270				2508	2025	2554	2212	1.8%	9.2%
J8 - 22271				2467	2081	2513	2241	1.9%	7.7%
J8 - 22272				1454	2400	1464	2142	0.7%	-10.8%
J8 - 22273				1967	2255	1985	2192	0.9%	-2.8%
J8 - 22274				2203	2008	2232	2095	1.3%	4.3%
	<b>Total A41/A4421/B4100 Junction</b>			<b>10599</b>	<b>10769</b>	<b>10748</b>	<b>10881</b>		

Junction	Description	2012 Base Year		2031 Reference Case No NWB		2031 with Himley Village		% Change	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
J9	A4421/Peregrine Way	1536	1959	2151	2435	2200	2407	2.3%	-1.2%
J10	Charbridge Lane/Gavray Drive	1108	1350	3278	3718	3361	3682	2.5%	-1.0%
J11	A4421/Bicester Road	1668	1779	3551	4068	3623	3999	2.0%	-1.7%
J12	A4421/Launton Road	1969	2161	3680	4447	3751	4306	1.9%	-3.2%
J13	Skimmingdish Lane/Buckingham Road	2665	2748	3620	3669	3684	3829	1.8%	4.4%
J14	B4100 Banbury Road/A4095 Lords Lane	2284	2461	2888	3145	2921	3222	1.2%	2.5%
J16	B4100/Caversfield	1210	1247	1773	1904	1865	2091	5.2%	9.8%
J19	Lords Lane/Bucknell Road	1128	1247	1585	1806	1291	1458	-18.6%	-19.3%
J20	Howes Lane/Bucknell Road	1215	1215	1704	1704	1507	1492	-11.6%	-12.4%
J23	Howes Lane/Middleton Stoney Road/Vendee Drive	1481	1455	1973	2032	2191	2266	11.1%	11.5%
J26	M40 Junction 10, western rbt	2287	1650	2477	2817	2492	2864	0.6%	1.7%
J27	M40 Junction 10, south eastern rbt	2185	2247	3752	2857	3755	2941	0.1%	2.9%
J28	M40 Junction 10, northern rbt	3185	2379	3487	3095	3495	3153	0.2%	1.9%
J29	Middleton Road, Bainton Road	265	252	451	606	515	659	14.3%	8.7%

## 10.5 Summary

This chapter has provided an overview of the percentage impacts of the Himley Village development on cordon flows, link flows and junction turning movements.

Assessment of how the development is anticipated to impact on network capacity is set out in Chapter 11, together with proposals for mitigation.

# 11.0 Network Capacity Assessment and Mitigation

## 11.1 Overview

The traffic impact of the Himley Village development was set out in Chapter 10.

An assessment of the capacity of the network to accommodate the full NW Bicester 6,000 homes development (less the Exemplar development) has been undertaken and is the focus of this chapter. As such it provides context for the Himley Village development. This includes detailed assessments of a range of junctions. The impact of additional traffic on proximate communities has been considered, together with the strategic impacts on the east side of Bicester and the motorway junctions. Highway and other improvements required to mitigate the overall impacts are discussed. The analysis and mitigation discussion in this chapter addresses the areas in turn as below.

Proposed Highway Infrastructure and Junctions:

- A4095 Strategic NW Link Road;
- NW Bicester access junctions; Existing Network:
- Town network off-site junctions;
- Bucknell village;
- Shakespeare Drive area;
- Caversfield village;
- Eastern peripheral route; and
- M40 J9 and J10.

A summary of the potential mitigation and/or contributions to wider improvements is provided at the end of the chapter. It is recognised that there is a need for further work on improvements in conjunction with OCC, noting that the package of overall Bicester transport improvements is currently being confirmed by OCC for the Local Plan and this has not been available to fully inform mitigation for the NW Bicester development.

It is envisaged that the developer of the Himley Village development will be responsible for meeting a proportionate level of this package of mitigation.

It should be emphasised that the Reference Case 2031 traffic is included in each case which includes all committed and planned developments up to and beyond the Local Plan level. The need for mitigation if the other growth was not taking place needs to be taken into account when considering appropriate measures.

## 11.2 A4095 NW Strategic Link Road

It is proposed that the NW Bicester development will deliver a new A4095 NW Strategic Link Road for Bicester which will address traffic movement and highway constraint issues which have long been an issue for the town. The link road will provide a new, straight underpass of the railway line, removing the constraint of the skewed bridge and junctions on each side. It will connect to the B4030 Vendee Drive, providing a continuous good standard link from the A41 to the B4100 Banbury Road.

### Link Capacity

The proposed NW Strategic Link Road is designed as a 7.3m wide single carriageway route, with a speed limit of 30mph, no frontage access and limited access points. The capacity of the link has been assessed in relation to DMRB Vol 5.1 TD 79/99 road types. It is considered that it would be a UAP2 good standard single carriageway.<sup>5</sup>

This category of road has a capacity of 1470 vehicles in one direction, with the main direction assumed to represent 60% of two way traffic. The two-way capacity is therefore 2450. The link road is forecast to carry the level of traffic as set out in Table 11.1 in each scenario. This demonstrates that the new link provides adequate capacity for the forecast traffic flows with full traffic growth and all Bicester development traffic to meet existing deficiencies plus accommodated planned growth.

Table 11.1 NW Strategic Link Road Forecast Traffic 2031 Full Development

Ref.	Description	2031 Full Development	
		AM	PM
8	New Link, North of Middleton Stoney Road	935	896
9	New Link, East of Shakespeare Drive	1209	1216
10	New Link, East of Bucknell Road	1155	1206
11	Lords Lane, West of Banbury Road	1152	1112

### Junction Capacity

Junction assessments of all the proposed new junctions on the new NW Strategic Link Road have been undertaken using standard industry software (LinSig3, Arcady, Picady).

None of these junctions would be implemented/improved as part of Himley Village, but are included in this section to provide a complete analysis.

The results are reported in Table 11.2 to Table 11.3, below. This includes the Howes Lane/Middleton Stoney Road roundabout as it will be revised to accommodate the new link. The junctions are reported in consecutive order from the Howes Lane/ Middleton Stoney Road junction in the west to the junction of the new link with the old Lord's Lane in the east.

<sup>5</sup> <http://www.dft.gov.uk/ha/standards/dmrb/vol5/section1/ta7999.pdf>

Table 11.2 Revised Howes Lane/ Middleton Stoney Road Roundabout with Development 2031 ARCADY model results (J23)

	AM		PM	
	RFC	Queue	RFC	Queue
B4030 Northwest	0.76	3.1	0.712	2.4
Howes Lane	0.601	1.5	0.722	2.5
Middleton Stoney Road	0.585	1.4	0.678	2.1
B4030 Vendee Drive	0.716	2.5	0.565	1.3

RFC = Ratio of Flow to Capacity. 0.85 or less means it is operating within capacity.

Table 11.3 Proposed Site Access (Junction 22) with Development 2031 LinSig model results

	AM		PM	
	DoS	Queue	DoS	Queue
New Link Road (W)	42.0%	6.8	34.4%	5.3
Site Access	26.8%	1.1	42.2%	1.9
New Link Road (E)	65.0%	9.5	55.6%	9.2

DoS = Degree of Saturation (90% or less means it is operating within capacity)

Table 11.4 Proposed Site Access (Junction 30) with Development 2031 LinSig model results

	AM		PM	
	DoS	Queue	DoS	Queue
Site Access	16.8%	0.7	0%	0
New Link Road East	43.8%	6.5	43.8%	6.5
New Link Road West	47.2%	7.2	41.3%	6

Table 11.5 Proposed Site Access (Junction 21) with Development 2031 LinSig model results

	AM		PM	
	DoS	Queue	DoS	Queue
Site Access	69.2%	11.9	47.1%	5.6
New Link Road East	69.6%	11.4	72.9%	14
Access to Bicester	43.2%	6.3	72.5%	9.6
New Link Road West	61.4%	10.1	42.2%	6.8

Table 11.6 Proposed Site Access/ Busway (Junction 31) with Development 2031 LinSig model results

	AM		PM	
	DoS	Queue	DoS	Queue
Site Access	79.2%	10.3	69.3%	8.7
New Link East	42.5%	6.8	69.3%	12.8
Busway	1.1%	0.1	1.1%	0.1
New Link West	80.2%	20.4	69.1%	14.6

Table 11.7 Proposed New Link/ Lord's Lane (Junction 18) with Development 2031 LinSig model results

	AM		PM	
	DoS	Queue	DoS	Queue
Site Access	59.8%	4.6	72.4%	7.2
Lord's Lane East	51.6%	6.2	74.3%	12.8
New Link Road West	59.8%	10	43.4%	5.7

The modelling for the proposed junctions along the A4095 NW Strategic Link Road predicts that all junctions will operate well under capacity with all the proposed growth of the town as well as the full NW Bicester development flows.

### 11.3 NW Bicester Access Junctions

The NW Bicester masterplan proposed that five junctions would serve the development from existing roads: two from Middleton Stoney Road, one from Lord's Lane and two from Banbury Road. These have been modelled with the full NW Bicester development. As with the new link junctions, most of these junctions would not be provided as a result part of the Himley Village development but are included in this section to provide a complete analysis.

It should be noted that for the Himley Village development an additional access junction is proposed on Middleton Stoney Road taking the total to three – two serving Himley Village and one serving the Albion Land. For the purposes of the capacity assessment it is assumed that the western part of NW Bicester would be served by a new single junction on Middleton Stoney Road, at the location proposed in the Masterplan.

#### Exemplar Site Junctions

The junctions proposed for the Exemplar development will be subject to additional traffic from an increase in the Reference Case 2031 flows on the B4100 Banbury Road together with additional NW Bicester traffic from the eastern side of the Masterplan. The southern access junction (15) is shown to be over capacity as a priority junction with the full Masterplan development, largely due to the volume of traffic on Banbury Road leading to delays for traffic turning out of the development, with a queue of approximately 72 vehicles developing within the site.

Table 11.8 Exemplar Site Southern Access with Development 2031 PICADY model results (J15)

	AM		PM	
	RFC	Queue	RFC	Queue
B4100 South	-	-	-	-
Southern Access	0.698	2	2.683	71.84
B4100 North	0.016	0	0.639	1.65

Table 11.9 Exemplar Site Northern Access with Development 2031 PICADY model results (J32)

	AM		PM	
	RFC	Queue	RFC	Queue
B4100 South	-	-	-	-
Northern Access	0.578	1.34	0.865	5.07
B4100 North	0.016	0.02	0.067	0.07

Given the capacity of the priority junction to accommodate the full NW Bicester development traffic, alternative junction configurations have been examined. A signalised junction appears to provide the best performance, while also providing good pedestrian facilities across the junction. Table 11.10 and Table 11.11 show the results from the LINSIG modelling of a signalised junction at this location. This demonstrates that a signalised junction would provide sufficient capacity to accommodate the forecast traffic flows. Detailed testing of the priority junction layout has indicated it could accommodate 75% of the Full Development traffic before requiring an upgrade to a signalised junction layout. As such it will not be required until a point in time towards the end of the build out of the development.

Table 11.10 Exemplar Site Southern Access Signalised Junction, with full Development 2031 LinSig results AM Peak

	Full Development	
	DoS	Queue
A4100 North	54.6%	9.7
Side Road	58.1%	4.5
A4100 South	59%	7.0

Table 11.11 Exemplar Site Southern Access Signalised Junction, with full Development 2031 LinSig results PM Peak

	Full Development	
	DoS	Queue
A4100 North	45.5%	6.7
Side Road	64.9%	4.1
A4100 South	0.834	8.5

## Lord's Lane/ Site Access/ Germander Way

A proposed four arm traffic signalised junction as a replacement to the priority junction at Germander Way has been modelled and operates well within capacity. The results from LinSig are shown in Table 11.12.

Table 11.12 Lord's Lane/ Site Access/ Germander Way with Development 2031 LinSig model results (J17)

	AM		PM	
	DoS	Queue	DoS	Queue
A4095 West	72.8%	13.2	50.2%	7.8
A4095 East	33.5%	4.5	51.8%	8.2
Germander Way	73.0%	0.4	15.3%	0.4
New Site Access	70.6%	5.3	34.2%	1.5

## Middleton Stoney Road Site Access

Two junctions have been modelled as priority junctions with right turning facilities for the full Masterplan on Middleton Stoney Road, to the north-west of Howes Lane. Both operate well within capacity.

Table 11.13 Site Access South (to Albion Land) from Middleton Stoney Road with Development 2031 PICADY model results (J24)

	AM		PM	
	RFC	Queue	RFC	Queue
B4030 West	-	-	-	-
New Development Access	0.139	0.16	0.35	0.53
B4030 East	0.29	0.4	0.056	0.06

Table 11.14 Site Access North (to Himley Village Development) from Middleton Stoney Road with Development 2031 PICADY model results (J25)

	AM		PM	
	RFC	Queue	RFC	Queue
B4030 West	-	-	-	-
New Development Access	0.649	1.8	0.492	0.96
B4030 East	0.388	0.6	0.447	0.83

As previously stated two junctions are proposed to serve Himley Village Development so queuing at junction 25 would be slightly less than shown in Table 11.14.

## 11.4 Town Network Off-Site Junctions

### Overview

The methodology for off-site junctions has been to consider the impact of the full NW Bicester development on a number of key junctions and areas of the town, as agreed with OCC. It is expected that any mitigation required will then be agreed for the full NW Bicester masterplan and apportioned to the individual applications in relation to the scale of traffic generation, the level of impact of NW Bicester on the junctions and the in combination effects arising from planned growth.

On the basis of the discussion with OCC a number of other junctions in the town have been assessed (as listed in Table 11.15) in the future year 2031 with and without the NW Bicester development.



Table 11.15 Town Network Off-Site Junctions

Ref.	Description
J6	Field Street/ Bucknell Road/Banbury Road
J13	A4421 Skimmingdish Lane/ Buckingham Rd
J14	B4100 Banbury Road/ A4095 Lord's Lane
J16	B4100/ Caversfield unnamed road
J19	Lord's Lane/ Bucknell Road
J20	Howes Lane/ Bucknell Road

It is important to note that in each case the full growth of Bicester is included – all committed and planned development in the Reference Case 2031 and then the NW Bicester development is added to the Reference Case for the full NW Bicester scenario in 2031. As such this is the worst case of maximum development.

Each of the junctions is discussed in turn in the following sections. Where capacity issues are identified, potential mitigation is discussed.

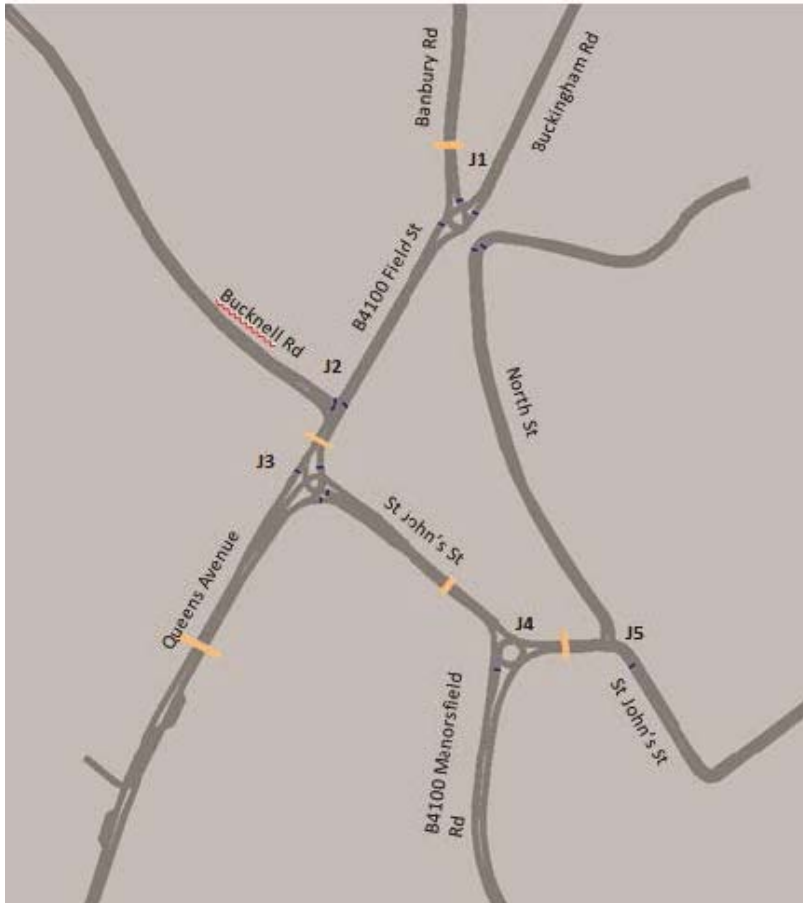
### Town Centre Junctions (including J6)

For assessment of the town centre junctions of Field Street, Banbury Road, Bucknell Road and Manorsfield Road, which are all in close proximity, access to the County's Vissim model has been used.

The Vissim model has been used to assess the impact of the full NW Bicester development on five junctions in the town centre and enable solutions to be investigated to accommodate traffic growth. Figure 11.1 shows the extent of the town centre model with the existing layout as recently implemented.

The Vissim model has been used to test the Reference Case 2031 and the full NW Bicester Development 2031.

Figure 11.1 Town Centre Vissim Model Network



To provide the context to the town centre modelling, substantial increases in traffic in the Reference Case 2031 are forecast by the Bicester Saturn Model. For example the Field Street/ Bucknell Road junction is expected to increase by 70.5% from the Base Year 2012 to the Reference Case 2031 in the AM peak and 74.2% in the PM peak. The full NW Bicester development leads to a further 12.1% on the Reference Case in the AM peak and 8.6% in the PM peak. The modelled traffic flows are therefore 91.2% higher in the AM peak and 89.2% in the PM peak at this particular junction but only a minor proportion are related to NW Bicester.

The results show that in the Reference Case 2031 there is an overall delay of vehicles across the network of 275 hours and 293 hours for the AM and PM peak hours respectively. In the full NW Bicester Development scenario, overall delays increase to 303 hours and 313 hours respectively. The delays per vehicle are set out in Table 11.16 and Table 11.17 on each link.

Table 11.16 and Table 11.17 show the queues and delays on links in the AM and PM peak hours, comparing the full NW Bicester development flows to the Reference Case in 2031. It can be seen that with the Reference Case there are substantial queues particularly in the AM peak hour on Buckingham Road (24 vehicles) and Bucknell Road (49) and in the PM peak hour on Banbury Road (106 vehicles), Buckingham Road (42), Bucknell Road (51) and Manorsfield Road (27). With the full NW Bicester development, queues increase particularly on Banbury Road (to 108 vehicles) and Manorsfield Road (to 41 vehicles) in the AM peak but show improvement on some links in the PM peak (e.g. a reduction on Banbury Road from 106 to 85 vehicles).

Table 11.16 Comparison of Reference Case 2031 and Full NW Bicester Development  
Vissim Model Results – Vehicle Queues and Delay per Vehicle – AM  
Peak Hour

Road Name	Movement	Reference case 2031		Full NW Bicester 2031	
		Queue (veh)	Delay (s)	Queue (veh)	Delay (s)
Banbury Road	Left	1	5	108	5
Banbury Road	Right	1	17	108	17
Buckingham Road	Right	24	4	38	4
Buckingham Road	Straight	24	12	38	12
B4100 Field Street	Left	0	1	0	1
B4100 Field Street	Straight	0	1	0	1
Bucknell Road	Left	49	17	52	17
Bucknell Road	Right	48	59	52	59
B4100 Field Street	Right	8	17	10	17
B4100 Field Street	Straight	9	10	10	10
Queens Avenue	Left	1	0	1	0
Queens Avenue	Straight	1	2	1	2
B4100 Field Street	Left	1	2	1	2
B4100 Field Street	Straight	1	2	1	2
St John's Street	Right	1	9	10	9
St John's Street	Left	0	3	0	3
Queens Avenue	Right	0	5	2	5
Queens Avenue	Straight	1	8	10	8
St John's Street EB	Straight	0	0	0	0
St John's Street EB	Right	0	1	0	1
St John's Street WB	Straight	0	3	4	3
St John's Street WB	Left	0	2	4	2
B4100 Manorsfield Road	Right	0	1	40	1
B4100 Manorsfield Road	Left	0	1	41	1
North Street	Left	0	0	17	0
North Street	Right	0	1	17	1
St John's Street EB	Right	0	0	18	0
St John's Street EB	Straight	0	1	0	1
St John's Street WB	Left	0	0	0	0
St John's Street WB	Straight	0	0	0	0

Table 11.17 Comparison of Reference Case 2031 and Full NW Bicester Development  
Vissim Model Results – Vehicle Queues and Delay per Vehicle – PM  
Peak Hour

Road Name	Movement	Reference case 2031		Full NW Bicester 2031	
		Queue (veh)	Delay (s)	Queue (veh)	Delay (s)
Banbury Road	Left	106	8	85	5
Banbury Road	Right	106	29	85	20
Buckingham Road	Right	42	13	42	5
Buckingham Road	Straight	42	28	42	17
B4100 Field Street	Left	0	1	0	1
B4100 Field Street	Straight	0	2	0	1
Bucknell Road	Left	51	20	51	14
Bucknell Road	Right	51	63	51	56
B4100 Field Street	Right	13	36	12	22
B4100 Field Street	Straight	13	13	12	10
Queens Avenue	Left	1	0	1	0
Queens Avenue	Straight	1	2	1	2
B4100 Field Street	Left	1	3	1	2
B4100 Field Street	Straight	1	2	1	1
St John's Street	Right	5	8	6	9
St John's Street	Left	0	2	0	3
Queens Avenue	Right	1	15	1	9
Queens Avenue	Straight	10	17	10	10
St John's Street EB	Straight	0	2	0	2
St John's Street EB	Right	0	2	0	2
St John's Street WB	Straight	2	9	2	8
St John's Street WB	Left	2	3	2	3
B4100 Manorsfield Road	Right	26	9	29	4
B4100 Manorsfield Road	Left	27	15	29	9
North Street	Left	2	0	3	0
North Street	Right	2	6	3	3
St John's Street EB	Right	3	0	3	0
St John's Street EB	Straight	0	3	0	1
St John's Street WB	Left	0	0	0	0
St John's Street WB	Straight	0	0	0	0

Given the forecast delays on the network in both the full NW Bicester development and the Reference Case in 2031, various signalised junction options have been looked at for the town centre.

The first option consisted of signalising Bucknell Road/ Field Street and St John's St/Field Street junctions including pedestrian crossings on all arms and a short reservoir to allow traffic turning from the centre of the junction. The alignment of both Bucknell Road and St John's St is staggered by about 20 metres.

The results of the LinSig model showed that the internal reservoir was full and the junction did not function effectively. The lack of space on Bucknell Road does not allow much flexibility with the junction layout particularly for the movement of buses and HGV's out of Bucknell Road. As a consequence of these movements the stop lines had to be located a long way away from the centre of the junction and the intergreens have increased greatly at this junction. A reduction of 60% of the traffic flows was needed to keep the degree of saturation flow under 100%.

A second signalised option was tested which included the removal of the internal reservoir and model the junction with one controller and with all round pedestrian crossings. This option did not perform as well as the first option with a longer and higher degree of saturation on each approach. The traffic would have to be more than 60% less in order for it to work.

These two options were tested in Vissim and it was observed that the model would get congested 15 minutes into the model running time instead of 45 minutes for the existing model. On this basis it was concluded that the existing arrangements perform better than signalised alternatives.

A sensitivity test has been undertaken to assess the level of traffic that can be accommodated before queuing becomes unacceptable with the existing layout. A reduction of 40% of the full NW Bicester scenario flows would be needed to maintain acceptable levels of traffic delays (or approximately 35% on the Reference Case flows). The overall delay per vehicles drops to 71 hours and 133 hours with this reduction in the AM and PM peak hours. Based on the Bucknell Road/ Field Street junction flows, this indicates that the existing arrangements could operate with an additional 14.8% traffic in the AM peak and 13.5% in the PM peak. As such the full NW Bicester development traffic could be accommodated in the town centre if the other traffic growth was not included.

The analysis shows that alternative layouts do not offer a better solution to accommodate all of the traffic growth in the town centre compared to the new layout that are forecast by 2031, and that the majority of the additional traffic is due to other developments rather than the full NW Bicester scheme. Moreover, the Himley Village development would have a relatively minor impact on the town centre by itself, representing only 28.5% of NW Bicester traffic in the 12 hour period.

The impact on bus movements of increased delays is an area for concern and solutions to be developed will need to focus on those improvements which will benefit bus movements.

The potential issues in the town centre highlight the need to achieve a high share of trips by sustainable modes for NW Bicester but also other developments in the town. There is a need to consider town centre movements in the context of studies for the eastern peripheral routes and wider development of the town.

## A4421 Skimmingdish Lane/ Buckingham Road (J13)

The A4421 Skimmingdish Lane junction is a four arm roundabout to the north of Bicester. Table 11.18 and Table 11.19 below show the ARCADY modelling results of this junction with Base Year, Reference Case and full NW Bicester development flows in the AM and PM peak hours. A scheme of minor modifications to increase the capacity of the junction has been agreed as part of the Exemplar development. The scheme involves widening to the eastern and northern arms to incorporate three lane entries, along with increasing the western arm approach to provide wider lanes. The modelling for 2031 incorporates these changes.

Table 11.18 A4421 Skimmingdish Lane/ Buckingham Road ARCADY model results AM Peak Hour (J13)

	Base Year 2012		Reference case 2031		With Full Development 2031	
	RFC	Queue	RFC	Queue	RFC	Queue
A4421 Skimmingdish Lane	0.375	0.6	0.353	0.5	0.438	0.8
Buckingham Road	0.215	0.3	0.557	1.3	0.707	2.4
A4095 West	0.764	3.2	0.867	6.3	1.007	37.9
A4421 North	0.541	1.2	0.881	7.0	0.933	11.4

Table 11.19 A4421 Skimmingdish Lane/ Buckingham Road ARCADY model results PM Peak Hour (J13)

	Base Year 2012		Reference case 2031		With Full Development 2031	
	RFC	Queue	RFC	Queue	RFC	Queue
A4421 Skimmingdish Lane	0.802	4	0.953	16.2	1.175	251.2
Buckingham Road	0.393	0.7	0.810	4.1	0.979	20.0
A4095 West	0.341	0.5	0.285	0.4	0.400	0.7
A4421 North	0.479	0.9	0.688	2.2	0.751	3.0

The ARCADY modelling results of the existing layout show the model predicted to operate over capacity in both the AM and the PM Reference Case in 2031 with the A4421 North operating over capacity in the AM peak with a queue length of 7 vehicle and the A4421 Skimmingdish Lane approach predicted to operate in the PM peak with a queue of 16 vehicles.

The modelling with the full NW Bicester development leads to an increase in delays with the A4095 West and A4421 North approaches operating over capacity in the AM peak with queue lengths of 38 and 11 vehicles respectively. In the PM peak model the A4421 Skimmingdish Lane approach and Buckingham Road are predicted to operate over capacity with a predicted queue length of 251 vehicles and 20 vehicles respectively.

Given the capacity issues consideration has been given to junction modifications which would be able to accommodate the traffic volumes indicated.

To improve capacity at the A4095/ A4421 Skimmingdish Lane junction an initial proposal has been modelled to demonstrate the type of junction arrangement that would be required to accommodate the level of flow generated in future years. Two junction designs were tested; a crossover type signal controlled junction and a signalised roundabout.

A signalised roundabout appears to provide adequate capacity at the location for forecast traffic demands. This would require an increase in the diameter of the roundabout from 49m to approximately 75m in order to include sufficient internal reservoirs. To achieve this is likely to require land outside of the highway boundary.

A signalised junction was tested, and would be similar in scale to that proposed for the B4100 Banbury Road/ A4095 junction (Junction 14 in Figure 3.10), however the junction failed to provide adequate capacity for forecast demand at this location.

The proposed minor modifications to the junction configuration gives a capability to support an increase over the base year flows before it is over-capacity and therefore further improvements may not be needed until the medium term. For context, the issues at this junction are exacerbated by the NW Bicester development flows but the increase in traffic as part of the Reference Case in 2031 is already substantial at 36% in the AM peak hour and 34% in the PM peak hour. This compares to a 6.7% increase from the full NW Bicester development in the AM peak hour and 15.3% in the PM peak hour. As such the NW Bicester development could be accommodated if the cumulative impacts of all other growth in the town were not being taken into account.

The junction forms part of the eastern peripheral route being considered for improvement by OCC. Any improvements required for the junction need to be brought forward in the wider context of the eastern peripheral route.

## A4095/ B4100 Banbury Road (J14)

The A4095/ B4100 Banbury Road junction is a four arm roundabout to the north of Bicester. Table 11.20 and Table 11.21 show the ARCADY modelling results of this junction with Base Year, Reference Case and full NW Bicester development flows.

Table 11.20 A4095/ B4100 Banbury Road ARCADY model results AM Peak Hour (J14)

	Base Year 2012		Reference case 2031		With Full Development 2031	
	RFC	Queue	RFC	Queue	RFC	Queue
B4100	0.478	0.9	0.704	2.3	0.709	2.4
A4095 (East)	0.441	0.8	0.605	1.5	0.634	1.7
Banbury Road	0.365	0.6	0.436	0.8	0.602	1.5
A4095 (West) Left	0.102	0.1	0.216	0.3	0.125	0.1
A4095 (West) Ahead Right	0.636	1.7	0.778	3.4	1.061	56.5

Table 11.21 A4095/ B4100 Banbury Road ARCADY model results PM Peak Hour (J14)

	Base Year 2012		Reference case 2031		With Full Development 2031	
	RFC	Queue	RFC	Queue	RFC	Queue
B4100	0.402	0.7	0.553	1.2	0.654	1.9
A4095 (East)	0.555	1.2	0.794	3.8	0.897	8.1
Banbury Road	0.351	0.5	1.038	31.4	1.543	229.0
A4095 (West) Left	0.144	0.2	0.314	0.5	0.184	0.2
A4095 (West) Ahead Right	0.791	3.7	0.849	5.2	0.871	6.1

The ARCADY modelling results of the existing layout show the junction operating over capacity in the PM peak hour Reference Case 2031 on the Banbury Road approach with queues of up to 31 vehicles. With the full NW Bicester development flows the A4095 (West) arm operates over capacity with predicted queues of up to 57 vehicles and in the PM peak Banbury Road operates significantly over capacity with queues predicted of 229 vehicles.

To improve capacity at the A4095/ B4100 Banbury Road junction a theoretical arrangement has been developed to demonstrate the type of junction arrangement that would be required to accommodate the level of flow generated in future years either with or without the NW Bicester development. This would involve a traffic signalised junction as a potential replacement to the existing roundabout.

A layout would need to incorporate two lanes on both the A4095 approaches with flares at junction to provide four lanes. The B4100 approach would be one lane widening to three lanes at the stop-line and the Banbury Road approach would be one lane widening to two at the stop-line. There would need to be widening to two lanes on exit from the roundabout on Banbury Road north of the junction. The feasibility of this in terms of accommodation within the highway boundary and providing footways will be the subject of more detailed consideration. Table 11.22 shows the LinSig modelling results of this junction with AM and PM peak full NW Bicester development flows.

Table 11.22 Banbury Road/ A4095 Junction Possible Layout Results with Full NW Bicester Development flows (results show highest values per lane for each approach)

	AM Peak		PM Peak	
	DoS	Queue	DoS	Queue
B4100	77.3%	8.7	74.3%	7.9
A4095 (East)	72.4%	4.9	88.0%	7.7
Banbury Road	58.9%	4.5	86.6%	10.8
A4095 (West)	75.3%	6.9	75.5%	5.4

The LinSig modelling results of the possible junction layout show the model operating under capacity in both the AM and PM peak hours with the full NW Bicester development flows. The B4100 has the highest degree of saturation (DoS) in the AM peak with a DoS of 77.3% with a corresponding queue length of 9 PCUs (passenger car units). The A4095 (East) has the highest degree of saturation in the PM peak with a DoS of 88.0% with a corresponding queue length of 8 PCUs.



The modelling assessment has indicated that the existing junction would be capable of accommodating 33% of the increase in traffic, in the AM peak period. However, any more than 33% of the development traffic would cause the junction to become overcapacity. At that point the replacement of the existing roundabout with traffic signals potentially offers a solution to accommodate further growth.

## B4100 Banbury Road / Caversfield (J16)

The junction of the B4100 with the unnamed road to Caversfield has been assessed given the increase in traffic flows on the B4100 at this location together with the existing cluster of accidents in the vicinity of the junction. The results for the Reference Case and full NW Bicester development scenario models are shown in Table 11.23 and Table 11.24, below, for the AM and PM peak periods, respectively.

Table 11.23 B4100 Banbury Road/ Caversfield PICADY Model Results AM Peak (J16)

	Reference Model		Full Development	
	RFC	Queue	RFC	Queue
A4100 North	-	-	-	
Side Road	0.391	0.63	0.32	0.5
A4100 South	0.099	0.2	0.2	0.5

Table 11.24 B4100 Banbury Road/ Caversfield PICADY Model Results PM Peak (J16)

	Reference Model		Full Development	
	RFC	Queue	RFC	Queue
A4100 North	-	-	-	
Side Road	0.704	2.3	1.268	78.9
A4100 South	0	0	0.167	0.05

The junction operates satisfactorily in both scenarios in the AM peak period; however it becomes over-capacity in the PM peak period, with a queue of approximately 79 vehicles indicated on the side road. Given that the side road is a narrow, effectively single-track road and there is an existing accident issue at the junction, there is a need for mitigation. As part of the Exemplar development the speed limit is to be reduced to 40mph on this section of Banbury Road which should bring some benefit to the road safety issues. Physical improvements are likely to prove difficult given the presence of properties to the north of the junction and on the west side of Banbury Road. Signalisation might be an option but may not be appropriate without extensive traffic calming prior to the junction. There is a need for discussion with OCC on appropriate improvements which may include wider traffic management measures to minimise the amount of additional traffic using the side road and to improve safety at the junction. Traffic impacts on Caversfield are considered later in this chapter.

## Howes Lane/ Lord's Lane/ Bucknell Road (J19 and J20)

The existing junctions near to the railway of Howes Lane and Lord's Lane with Bucknell Road are in close proximity and are therefore discussed together. With the introduction of the new A4095 NW Strategic Link Road the existing junctions close to the railway will

provide for local access rather than the route for through traffic. The roundabout junction of Lord's Lane and Bucknell Road will be replaced with a priority junction.

The modelling results are presented below, firstly for the existing junctions in the Base Year and Reference Case 2031 (with no A4095 Strategic NW Link Road) and secondly for the revised junctions with the link road and full development.

## Existing Junctions in the Base Year and Reference Case 2031

The results demonstrate that the junctions perform acceptably in the Base Year but the Howes Lane/ Bucknell Road junction is close to capacity. There are consented developments which will have an impact on this junction. Allowing for the growth in traffic included in the Reference Case in 2031, the priority junction of Howes Lane and Bucknell Road becomes significantly over-capacity, causing queues of 176 vehicles along the A4095 Howes Lane. This situation demonstrates the need for an improvement in this area to accommodate future traffic without the NW Bicester development. Given the constraints of alignment of the railway in this location, various past studies have always led to the same conclusion: that a new under-pass of the railway is required.

Table 11.25 A4095 Lord's Lane/ Bucknell Road ARCADY Model Results: AM Peak

	Base Model		Reference Model	
	RFC	Queue	RFC	Queue
Lord's Lane	0.292	0.4	0.195	0.2
Bucknell Road South	0.453	0.8	0.64	1.8
Bucknell Road North	0.107	0.1	0.121	0.1

Table 11.26 A4095 Lord's Lane/ Bucknell Road ARCADY Model Results: PM Peak

	Base Model		Reference Model	
	RFC	Queue	RFC	Queue
Lord's Lane	0.196	0.2	0.419	0.7
Bucknell Road South	0.64	1.8	0.661	1.9
Bucknell Road North	0.114	0.1	0.134	0.2

Table 11.27 A4095 Howes Lane/ Bucknell Road PICADY Model Results: AM Peak

	Base Model		Reference Model	
	RFC	Queue	RFC	Queue
Bucknell Road South	-	-	-	-
Howes Lane	0.598	1.47	1.011	19.4
Bucknell Road North	0.675	2.27	1.061	54.96

Table 11.28 A4095 Howes Lane/ Bucknell Road PICADY Model Results: PM Peak

	Base Model		Reference Model	
	RFC	Queue	RFC	Queue
Bucknell Road South	-	-	-	-
Howes Lane	0.805	3.94	1.878	176.4
Bucknell Road North	0.711	2.56	1.137	101.05

## Existing Junctions with A4095 Strategic NW Link Road Constructed

Table 11.29 and Table 11.30 show the results of modelling the Howes Lane and Lord's Lane junctions with the full development traffic in 2031. As described above, in the full development scenario, this pair of junctions is bypassed to the north by the new link road, and both junctions become priority junctions, forming a staggered priority junction. The link road results in a significant volume of traffic being removed from these junctions and they are therefore well within capacity in this scenario.

Table 11.29 Howes Lane/ Bucknell Road/ Lord's Lane PICADY Model Results AM Peak

	Full Development	
	RFC	Queue
Bucknell Road South	0.401	0.67
Howes Lane	0.499	0.99
Bucknell Road North	-	-
Lord's Lane	0.272	0.37

Table 11.30 Howes Lane/ Bucknell Road/ Lord's Lane PICADY Model Results PM Peak

	Full Development	
	RFC	Queue
Bucknell Road South	0.515	1.05
Howes Lane	0.287	0.4
Bucknell Road North	-	-
Lord's Lane	0.32	0.47

In conclusion, the provision of the new link mitigates impacts of the Reference Case and the full NW Bicester development at this location, giving sufficient capacity to accommodate growth.

## 11.5 Bucknell Village

The link flow analysis demonstrates that whilst base year traffic flows are low, there is anticipated to be an increase in traffic on links to and from Bucknell in both the Reference Case and with the full NW Bicester development in 2031.

Table 11.31 summarises the link flows on the routes to and from the village in each scenario. It can be seen that in the Reference Case, an increase in PM peak hour traffic using Bucknell Road is forecast of 125%, as well as Bainton Road (118%) and Ardley Road (62%). With the full NW Bicester development in 2031, a reduction of traffic using Bucknell Road is shown as a result of the route becoming less direct, but further increases are forecast on other routes. It should be noted that the percentage increases are very large given the very low base flows, particularly on Middleton Road and the traffic increases should be seen in that context.

Table 11.31 Bucknell Village Link Flows

Link	Base Year		Reference Case 2031		% Increase of Ref Case over base Year		With NW Bicester 2031		% Increase of NW Bicester over Ref Case	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Bucknell Road, south of Bucknell	247	192	257	432	4	125	149	186	-40	-3
Bainton Road, west of B4100	110	157	240	254	118	62	422	351	76	38
Ardley Road, north of Bucknell	207	195	364	532	76	173	507	564	39	6
Middleton Road, west of Bucknell	27	12	35	30	30	150	317	468	806	1460

It is considered likely that the Bicester Saturn Model does not fully take account of the difficult alignment of Bainton Road as an access to the village and may be overpredicting traffic movements. Nonetheless it is recognised that the NW Bicester development is in close proximity to the village and the routes westwards towards J10 of the M40/ south to the A34 via the village may be used to an extent by Development traffic.

The diversion of Bucknell Road as part of the development proposal reduces traffic on the link and will also help to reduce accident issues south of the village. In order to further minimise impacts in the village it is proposed to introduce traffic calming measures, the nature and extent of which will be agreed with OCC and the Parish Council. It is recognised that the traffic forecast on these links would then use other routes, but the aim would be for traffic to use the more appropriate links to and from the development than the minor roads through Bucknell.

## 11.6 Shakespeare Drive Area

Traffic calming measures for Shakespeare Drive area have been identified and incorporated into the Bicester Saturn Model. This tested a one way north to south from the old Howes Lane into Shakespeare Drive and 20mph on Shakespeare Drive, Blenheim Drive and West

Street, to see in principle what benefits traffic calming would bring, although details of what might be implemented would be for further discussion.

The link flows at either end of Shakespeare Drive and on The Approach (as key links within the area) in each scenario are shown in Table 11.32. It can be seen that there are increases in traffic on the links forecast with the Reference Case in 2031. The full NW Bicester development adds to traffic on the links. This demonstrates that the traffic calming and one way access between Shakespeare Drive and the old Howes Lane is important to restrict traffic movements as far as possible.

Table 11.32 Shakespeare Drive Area Link Flows

Link	Base Year		Reference Case 2031		With NW Bicester 2031	
	AM	PM	AM	PM	AM	PM
Shakespeare Drive, of Howes Lane	142	152	138	85	280	212
Shakespeare Drive, E of Middleton Stoney Road	611	455	950	873	1135	1222
The Approach W of Bucknell Road	320	243	401	507	801	715

The increase in traffic in the area could impact on pedestrian severance and amenity. However, it is proposed that measures are introduced in the area to mitigate impacts on pedestrians and cyclists which may include speed reduction measures (build outs for example), widened footways/ cycle route and crossing points. These measures in combination should minimise the traffic routeing through the area and provide improved conditions for pedestrians and cyclists.

The Bicester Saturn Model tested a one way entrance into Shakespeare Drive from the old Howes Lane. Consultation ahead of the application submission indicated that a one way out of Shakespeare Drive might be favoured by local residents and Councillors, giving them access to the new link road. It was also identified that there are side roads to Shakespeare Drive where additional traffic calming measures might need to be considered, should traffic routeing through them increase and issues emerge.

## 11.7 Caversfield Village

The increase in traffic on the unnamed road to Caversfield has highlighted that there may be impacts that require further assessment on the links within the village. As such, the link flows for Skimmingdish lane, Fringford Road and the unnamed road have been extracted for the various scenarios and are included in Table 11.33 below. It can be seen that the percentage increases in traffic are large, given the relatively low base flows. The Reference Case 2031 gives rise to the larger percentage increases, with the full NW Bicester development adding a further 30% in the AM peak to Skimmingdish Lane and 55% to the unnamed road. The modelling forecasts these flows because of delays at the junctions on the A4095, B4100 and A4421 leading to traffic re-routeing through minor roads. As such, improvements to capacity of these junctions should reduce the impact on Caversfield.

In order to minimise increases in traffic through Caversfield however, it is proposed to introduce traffic calming measures, the nature and extent of which will be agreed with OCC and the Parish Council.

Table 11.33 Caversfield Link Flows

Link	Base Year		Reference Case 2031		% Increase Base Year		With NW Bicester 2031		% Increase on Ref Case	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Skimmingdish Lane	96	100	529	261	451	161	687	266	30	2
Fringford Road (S of Skimmingford Ln)	170	58	394	193	132	233	490	142	24	-26
Fringford Road (N of Skimmingdish Ln)	74	112	99	188	34	68	104	195	5	4
Unnamed Road	93	98	423	153	355	56	655	179	55	17

## 11.8 Eastern Peripheral Route

The Bicester Peripheral Routes Study was produced in January 2014 on behalf of OCC. The need for improvements to the peripheral routes around the town to facilitate growth was recognised and various options were examined, leading to the conclusion that an improvement to the eastern peripheral route from the A4421 Skimmingdish Lane/ Buckingham Road junction to the A41 including a SE Link Road would offer most benefits. The County Council is currently developing proposals as part of the Local Plan work.

In terms of the relationship to NW Bicester, it is acknowledged there will be an increase in traffic on the east side of the town. The traffic modelling for NW Bicester has been undertaken assuming no SE link road or improvements to the eastern side of Bicester (beyond that for the level crossings) in order to be able to separately identify the impact of NW Bicester. The full NW Bicester development is forecast to increase traffic levels above the Reference Case in 2031 by approximately 320 vehicles on Charbridge Lane (the largest increase) in the AM peak. In the PM peak a similar level of increase is experienced on Skimmingdish Lane.

To provide context to the changes, Table 11.34 shows the link flow on Charbridge Lane in each scenario. It can be seen that there is a very large growth in traffic in the Reference Case compared to the Base Year of 210% in the AM peak and 181% in the PM peak. The full NW Bicester development adds 9.7% in the AM peak and leads to a reduction in the PM peak of 5.2%. This demonstrates that the need for improvements to the eastern peripheral route is driven by other developments as part of the Reference Case, with NW Bicester slightly exacerbating the AM peak issues and alleviating the PM peak issues at this location.

Table 11.34 Traffic Flow on Charbridge Lane, by Scenario

Base Year 2012		Reference Case 2031				With Full NW Bicester 2031			
AM	PM	AM	% Increase on Base Year	PM	% Incr on Base Year	AM	% Incr on Ref Case	PM	% Incr on Ref Case
1023	1286	3176	210	3613	181	3485	9.7	3424	-5.2

A traffic modelling scenario has been provided which assesses the full NW Bicester (85th%ile) traffic with the introduction of a SE Link Road (as set out in the OCC Bicester Peripheral Routes Study).

In summary, the AM Peak the main changes with the introduction of a SE Link Road are traffic reductions on:

- A41 Oxford Road and London Road as an alternative route is provided to the SE (1581 vehicles);
- Middleton Stoney Road (approximately 200 vehicles);
- Charbridge Lane (221 vehicles);
- Launton Road (245 vehicles);
- Minor reductions on Bucknell Road, Banbury Road and Buckingham Road and (notably) the new Howes Lane/ Lord's Lane link.

Increases in traffic flow are forecast on Vendee Drive (228 vehicles) and Queens Avenue.

In summary, the PM Peak the main changes with the introduction of a SE Link Road are traffic reductions on:

- A41 Oxford Road and London Road as an alternative route is provided to the SE (1568 vehicles);
- Middleton Stoney Road (approximately 200 vehicles);
- Charbridge Lane (166 vehicles);
- Skimmingdish Lane (133 vehicles);
- Minor reductions on part of Buckingham Road, Launton Road and (notably) the new Howes Lane/ Lord's Lane link.

Increases in traffic flow are forecast on Vendee Drive (199 vehicles) and parts of Queens Avenue.

The flow changes give an indication of locations where there could be benefits. It is recognised that improvements are needed to the eastern peripheral route of Bicester to accommodate planned growth and that there is a relationship between the capacity of the network on the east side to traffic issues in other areas discussed in previous sections notably traffic movements in the town centre and on the NW side of the town in the vicinity of the NW Bicester development. However it is clear that the need for improvements is not brought about by the NW Bicester development.

## 11.9 M40 Junctions 9 and 10

The NW Bicester development will also impact on the strategic road network with respect to Junctions 9 and 10 of the M40. It is notable that the traffic using J9 appears to diminish in both the Reference Case and with NW Bicester compared to the Base Year, whereas traffic using J10 increases, particularly in the PM peak. These effects are likely to be due to the increase in delays anticipated as a result of traffic growth on the A41 and J9, leading to traffic choosing alternative routes (i.e. routing to J10). This highlights the fact that traffic modelling is responsive to capacity issues. If improvements are introduced in any particular location or measures introduced to deter traffic then traffic patterns are likely to alter. This could mean for example that an improvement at J9 could reduce the traffic travelling north-west to J10.

An over-arching discussion on the approach to the motorway junctions has been undertaken by the County Council as part of the consideration of the Cherwell Local Plan and the NW Bicester team have been party to these discussions. The modelling results have been provided to the Highways Agency and these are being used as part of information to examine the need for future investment in the network (post Phase 2 for J9 and the J10 pinch point scheme).

The analysis for the full NW Bicester development of percentage impact of NW Bicester traffic on Junctions 9 and 10 of the M40 is contained in Appendix 7 to the Masterplan Access and Travel Strategy. In summary, NW Bicester traffic gives an increase of 1.8% above the Reference Case at J9 in the AM peak and 0.7% in the PM peak. At J10, the increase in the AM peak at the western roundabout is 3.3%, south east roundabout 0.3% and northern roundabout 0.8%. In the PM peak the impacts at J10 are higher with 5.9% at the western roundabout, 10.3% at the south east roundabout and 6.6% at the northern roundabout. A capacity assessment has not been undertaken as the Highways Agency are considering the impact of growth as a whole at J9 and J10. P3 Eco Group will engage in dialogue with the Highways Agency together with OCC on future improvements and this may include a proportionate contribution if schemes are brought forward.

## 11.10 Summary of Full NW Bicester Mitigation

The network capacity and potential mitigation discussion in this chapter leads to a number of proposals for mitigation and/or contributions towards wider infrastructure for the full NW Bicester development. The following are measures to directly mitigate the impact of NW Bicester:

- Signalisation of the Exemplar southern access junction;
- Replacement of the B4100 Banbury Road / A4095 roundabout with traffic signals;
- Traffic management measures on the B4100 Banbury Road/ Caversfield unnamed road to reduce traffic levels and accident issues;
- Traffic calming measures in Bucknell and Caversfield to reduce through traffic;
- Measures to further reduce through traffic and assist walkers and cyclists in the
- Shakespeare Drive area.



The following strategic improvements have been identified to which NW Bicester would anticipate contributing towards in a manner proportionate to the impact. This package will be reviewed once the OCC work for the Local Plan is available but includes:

- The A4095 NW Strategic Link Road;
- Town centre access improvements;
- Modifications to the A4421 Skimmingdish Lane/ A4095 junction;
- Improvements to the eastern peripheral route;
- Improvements to the M40 J9 and J10.

All of the above are subject to discussion and agreement with the County Council.

In proposing these elements of mitigation, the NW Bicester development will be helping OCC to deliver a number of aspects of the LTP3, notably:

- Increasing capacity at the Howes Lane / Bucknell Road junction and approaches;
- Increasing capacity at Junction 9 of the M40 and supporting plans to improve Junction 10;
- Delivering a strategic perimeter route around the town is the key component of this strategy;
- Providing measures to reduce congestion through the central corridor (from Kings End (B4030) to the 3-arm Field Street, Buckingham Road and Banbury Road roundabout);
- Improvements to the Buckingham Road / A4221 junction; and
- South East Link Road.

## 11.11 Promoting Sustainable Travel

It is important to note that the analysis contained in this Chapter is based on the 85th%ile trip rates for residential, which effectively represent a level of traffic which might be expected if the development is similar to other developments in the town. However, the aim is that the traffic levels would be more aligned to the average trip rates, which are lower given the emphasis on sustainable travel to meet the modal shift targets of PPS1.

A crucial means of mitigating traffic impacts will be to achieve modal share and containment targets, through the access and travel strategy set out earlier in this report. The strategy for sustainable travel measures is fully detailed in the Framework Travel Plan. The Access and Travel Strategy and the Framework Travel Plan include a range of offsite measures for walking, cycling and public transport together with softer measures to promote sustainable travel and travel awareness.

The implementation of these measures would support the following policies of the LTP3:

- Enhancing pedestrian, cycle and public transport links to the two railway stations, in particular Bicester Town Station.
- Improving Bicester's bus services along key routes
- Providing improved public transport infrastructure
- Securing green links between proposed development sites on the outskirts of the town and existing Public Rights of Way, providing a series of leisure / health walks.

## 11.12 Himley Village Development Mitigation

The Himley Village Development represents 28.5% of the overall impact of the NW Bicester development over a 12 hour period. The issues and mitigation described in this chapter relates to the forecast situation with all other growth in Bicester as well as the full NW Bicester development. As such the mitigation required for Himley Village if considered by itself is lesser in scale. It is anticipated that a proportionate contribution towards these measures will be made as part of the Himley Village application.

# 12.0 Phasing

## 12.1 Overview

Development of Himley Village is expected to commence in 2016 and be undertaken in a number of discrete phases, with completion in around 2031.

The diagrams in Appendix E show an indicative eight phases for build out of the development. In broad terms the proposal is for construction starting from the area adjacent to Middleton Stoney Road and moving north eastwards into the site.

## 12.2 Construction Access

Two vehicle access points are proposed for Himley Village on Middleton Stoney Road both in the form of a ghost island junction with protected right turn facility. The primary access to Himley Village will be via a junction with the primary street, this being located in the western part of the site. This access is shown in the overall NW Bicester masterplan. A secondary access is also proposed at the location of the existing Himley Farm access track.

The proposal for construction phasing is to separate resident's vehicles from construction vehicles. At the start of construction both ghost island junctions will be constructed with the eastern access used for construction vehicles and the western access used for resident's vehicles. As the development is built out streets will be constructed and these will be used to allow residents access to their homes. A network of separate temporary routes will also be provided to allow construction vehicles to access the areas under construction.

Up to and including Phase 4, construction vehicles will access the site from Middleton Stoney Road only. In Phase 5 construction vehicles will access the site from both Middleton Stoney Road and the strategic link road to the east. In Phase 6, 7 and 8, construction vehicle access will be from the strategic link road only.

## 12.3 Highway Capacity

It is proposed that a total of 490 homes would be provided by the end of Phase 2.

An assessment has been undertaken as to the level of car trips that would be generated by this quantum of housing. Given that this housing would be set apart from the rest of the NW Bicester eco-town and there would be very few services and facilities on site at this stage, the level of trip containment and use of sustainable modes would also be low.

For the assessment a conservative approach has been taken assuming that all of the trips would be external to the site and that 80% would be by car. Taking the 85th %tile person trip rates used in the overall assessment as a basis, this would give the vehicle trip rates and vehicle trips as set out in Table 12.1 and Table 12.2.

Table 12.1 Phase 1 and 2 Vehicle Trip Rates

		Arrival	Departure
<b>AM Peak</b>	<b>Private</b>	0.30	0.85
	<b>Affordable</b>	0.25	0.68
<b>PM Peak</b>	<b>Private</b>	0.62	0.33
	<b>Affordable</b>	0.50	0.33

Table 12.2 Phase 1 and 2 Vehicle Trips

		Arrival	Departure
<b>AM Peak</b>	<b>Private (340 units)</b>	102	289
	<b>Affordable (150 units)</b>	38	102
	<b>Total</b>	<b>142</b>	<b>398</b>
<b>PM Peak</b>	<b>Private (340 units)</b>	211	112
	<b>Affordable (150 units)</b>	75	50
	<b>Total</b>	<b>286</b>	<b>162</b>

These predicted flows would be arriving and departing Himley Village via the junction with the primary street. The number of vehicles using this junction will be at similar levels or less than those that would be using this junction once the NW Bicester eco-town is fully occupied. Capacity analysis (See Chapter 11) has demonstrated that this junction has more than enough capacity to accommodate this level of traffic flow from the development. Therefore, this single junction is sufficient to accommodate traffic generated by Himley Village Phases 1 and 2.

To the south east of Himley Village is the Middleton Stoney Road / Howes Lane / Vendee Drive roundabout. This junction will change in the future with the Howes Lane arm removed and the strategic link road arm added. However, this will not change the form of the junction significantly and therefore the capacity will similarly not change significantly. Capacity analysis (See Chapter 11) has demonstrated that this roundabout has more than enough capacity to accommodate the level of traffic from the full NW Bicester eco-town. Therefore, this junction has sufficient capacity to accommodate traffic generated by Himley Village Phases 1 and 2.

The Howes Lane/Bucknell Road junction is located to the north east of Himley Village. Capacity analysis and site observations indicate that this junction is currently at or approaching capacity during peak periods. Improvements to this junction in form of widening the Howes Lane arm to increase the length over which two approach lanes are provided, is currently underway. In the short term traffic flows at this junction will increase as a result of the Exemplar development being occupied, increasing occupancy of the Kingsmere development and traffic attracted to the western peripheral route as a result Vendee Drive. It seems likely that this junction will in the short term continue to operate at or near capacity despite the improvements.

An element of traffic generated by Himley Village Phases 1 and 2 will have a destination/origin to the north of the town and will want to use the western peripheral route and therefore the Howes Lane/Bucknell Road junction. This junction will act as a constraint to the overall highway network in the town and traffic will therefore re-route onto other roads where there is capacity i.e. the central corridor through the centre of Bicester (Kings End/Queens Avenue/Buckingham Road) or the eastern peripheral route. Given the available capacity elsewhere on the network and the potential for traffic to re-route in order to minimise delays, it is not considered that the likely capacity constraint at

the Howes Lane/Bucknell Road junction should hinder the delivery of Phase 1 and 2 of Himley Village.

The capacity issues at the Howes Lane/Bucknell Road junction are a constraint on the delivery of the overall NW Bicester Eco-Town and the solution to this is the strategic link road. From Phase 3 of Himley Village it is assumed that the strategic link road will be constructed and that east west connections from Himley Village can be made to this. In Phase 3 the southern secondary street will be connected to the strategic link road. Longer term this connection is intended to be a bus link only but in the short term a decision will need to be made as to whether this open for all vehicles. In Phase 5 a connection will be made to the northern secondary street but this will be for construction vehicles and it is only at the end of Phase 8 that this becomes available for use by general vehicles. Depending on the phasing of other sites it is possible that the primary street will continue outside of Himley Village making a connection to the strategic link road further to the north.

## 12.4 Bus Services

As described in Chapter 7, the southern part of the NW Bicester eco-town will be served by a one way clockwise bus loop running through the development.

Interim bus service arrangements would have to be co-ordinated with other sites south of the railway. However, assuming that Himley Village were to be developed in isolation the proposal is that by the end of Phase 2, there would be a 15 minute frequency bus service serving the development. This would access the development from Middleton Stoney Road entering the site at the primary street junction. This service would either turnaround within the development or potentially could be run in a loop arrangement exiting at the proposed secondary junction. Beyond the development it is proposed that the service uses Middleton Stoney Road, Kings End and Queens Avenue as this would provide the most rapid connection to the town centre.

Consultation will also be undertaken with the bus company operating existing services along Middleton Stoney Road to investigate the feasibility of creating bus stops adjacent to Himley Village Development from early in the occupation of Phase 1.

From Phase 3 there is the potential for the final bus service for the southern part of the eco-town to be implemented, albeit in a truncated arrangement. The exact bus service proposals from Phase 3 onwards will have to respond to the construction of housing and infrastructure elsewhere across the NW Bicester eco-town.

# 13.0

## Summary and Conclusions

### 13.1 Overview

This Transport Assessment has been prepared to support the planning application submitted for the Himley Village development.

The assessment has considered the current situation with regards to sustainable travel modes, the highway network, traffic conditions and road safety in the vicinity of the application site.

### 13.2 The Proposed Development

The proposed development provides a mixed use development of 1,700 homes (including extra care housing), a primary school, employment, shopping, leisure, social and community facilities, and a hotel. As such, the development in itself provides the opportunity for a high level of locally based trips by walking or cycling and accessibility analysis demonstrates that sustainable modes provide realistic alternatives to the car for many journeys.

The proposed development layout includes good connections for walking and cycling within the site and from the site as well as a frequent bus service between the development and the town centre and rail stations (Bicester North and Bicester Town). The development will therefore benefit from a high level of connectivity to the wider NW Bicester development as well as the rest of the town. The mix of land uses and provision for sustainable modes, together with travel plan measures to encourage 'smarter choices' will enable the targets for mode share and travel set out in the PPS1 Supplement to be achieved.

### 13.3 Walking and Cycling Connections

The improvements to and/ or contributions to support off-site walking and cycling links of particular relevance in providing good connectivity to and from the Himley Village development are as follows:

- Improvements along Howes Lane to provide a segregated cycleway and footway;
- Improvements to the off-road routes through Highfield residential area to provide high quality pedestrian and cycling routes from NW Bicester eco-town to the town centre;
- Improvements along Shakespeare Drive to provide improved cycle and pedestrian links and new crossing facilities;
- New cycle and pedestrian links along the length of Middleton Stoney Road.

Improvements to routes will be further investigated in conjunction with Oxfordshire County Council and will form part of discussions regarding the s106 for Himley Village development.

## 13.4 Bus Connections

A frequent bus service is proposed between the Himley Village development and the town centre, aiming to provide six services per hour by full occupation of the development subject to viability at that point in time, with a minimum of four per hour. In the early phases of the Himley Village development the service would use Middleton Stoney Road to connect to the town centre. As the site builds out in parallel with overall growth of NW Bicester there will be a loop through the development returning via Bucknell Road to the town centre.

## 13.5 Sustainable Travel Initiatives

A crucial means of mitigating traffic impacts will be to achieve modal share and containment of trips targets, and this will also help the NW Bicester vision to be achieved. The strategy for sustainable travel measures is fully detailed in the Framework Travel Plan and the access and travel strategy, but includes support for a car club, promotion of electric vehicles and cycling promotion and support as well as a management and monitoring structure to give confidence that targets can be achieved.

## 13.6 Traffic Forecasts

Forecasts of traffic arising from the development have been made using trip rates which effectively assume the traffic generation will be the same as other developments in the town, with the entire NW Bicester masterplan (6,000 new homes) being completed by 2031. This traffic generation has been used at the request of OCC as the basis for assessing traffic impact, whilst the development may give rise to a lower level of traffic generation given the land use mix of the overall masterplan the provision for other modes. As such the worst case has been assessed.

The Development forms a part of the overall NW Bicester masterplan and the approach taken to traffic impact has been to assess the full NW Bicester development on the basis that any mitigation can be developed as a whole and then apportioned to the Himley Village development based on the scale of traffic impact.

The traffic modelling has been undertaken using the Bicester Saturn Model for 2031. This includes an agreed Reference Case for 2031 which includes all committed and planned developments in the town – as such it is the maximum growth scenario. In the scenario with the NW Bicester development, much of the traffic impact across the network arises from the other developments with NW Bicester representing only a proportion of traffic increase.

## 13.7 Network Capacity Impact and Mitigation

The scope of the traffic assessment was agreed with the County Council and the town centre network has been examined, but with a detailed focus on a number of key areas. A summary of the potential mitigation and/or contributions to wider improvements is provided below. It is recognised that there is a need for further work on improvements in conjunction with OCC, noting that the package of overall Bicester transport improvements is currently being confirmed by OCC for the Local Plan and this has not been available to fully inform mitigation for the NW Bicester development. Therefore, an addendum will be submitted once this information on the wider improvements has been issued by OCC.

The following are measures to directly mitigate the impact of NW Bicester:

- Signalisation of the Exemplar southern access junction;
- Replacement of the B4100 Banbury Road / A4095 roundabout with traffic signals;
- Traffic management measures on the B4100 Banbury Road/ Caversfield unnamed road to reduce traffic levels and accident issues;
- Traffic calming measures in Bucknell and Caversfield to reduce through traffic;
- Measures to further reduce through traffic and assist walkers and cyclists in the Shakespeare Drive area.

The following strategic improvements have been identified to which NW Bicester would anticipate contributing towards in a manner proportionate to the impact. This package will be reviewed once the OCC work for the Local Plan is available but includes:

- The A4095 NW Strategic Link Road;
- Town centre access improvements;
- Modifications to the A4421 Skimmingdish Lane/ A4095 junction;
- Improvements to the eastern peripheral route;
- Improvements to the M40 J9 and J10.

All of the above are subject to discussion and agreement with the County Council.

## 13.8 Conclusion

The provision of the mitigation measures and/ or a proportionate contribution to measures will address the impacts of the NW Bicester on the road network as well as support improvements to the town's infrastructure. The Himley Village development will support the measures in proportion to the scale and traffic impact of the development as part of the NW Bicester masterplan. The measures supported will assist the County Council in addressing a range of town wide transport issues which are identified in LTP3.

The provision of high quality sustainable travel infrastructure, together with the travel planning measures to promote sustainable travel will ensure that the PPS1 Supplement targets are met. This will help make the vision for NW Bicester a reality.

It is concluded that there are no transport reasons why the development should not be granted consent.