Buckingham Transport Strategy

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Buckingham Transport Strategy

Quality information

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1. Introduction

1.1 Introduction

1.1.1 AECOM has been commissioned by Buckinghamshire County Council (BCC) to develop a transport strategy for Buckingham that supports future planned growth in the town up to 2033. The focus of this strategy is the town of Buckingham, but also recognises that the town will be affected in coming years by proposed growth in a wider area around the town.

1.1.2 The remainder of this chapter considers the context of the Buckingham Transport Strategy (BTS), and makes reference to existing relevant work i.e. the *Buckingham Area Transport Study*[1] and the *Buckingham Neighbourhood Development Plan*[2]. The study area and objectives of the BTS are presented in this section. This section also considers transport improvements previously considered for Buckingham, including those outlined in the Buckingham Outline Cycling Strategy.

1.1.3 Chapter 2 summarises the existing and future conditions in Buckingham relevant to the town's transport, including details of the future growth scenario (quantum and locations of dwelling and employment growth), and a review of the most recent Countywide modelling outputs.

1.1.4 Chapter 3 contains a SWOT (strength, weakness, opportunities, threats) analysis of the town in terms of its transport infrastructure and services. This analysis is presented by transport mode (i.e. highway, public transport and walking/cycling).

1.1.5 In the same categories, Chapter 4 presents potential transport improvement options for the town based on the analysis presented in the previous chapter.

1.2 Context of the Transport Strategy

Purpose of the Transport Strategy

1.2.1 The growth aspirations in the Vale of Aylesbury Local Plan (VALP) are likely to have an impact on transport requirements in Buckingham; any may therefore necessitate a number of improvements in/around the town. The aim of the BTS is to consider these growth aspirations holistically and propose measures that address their impacts as a whole, rather than the impact of each individual development.

1.2.2 In addition to accommodating these future growth aspirations, the BTS should also address existing known transport issues in the town.

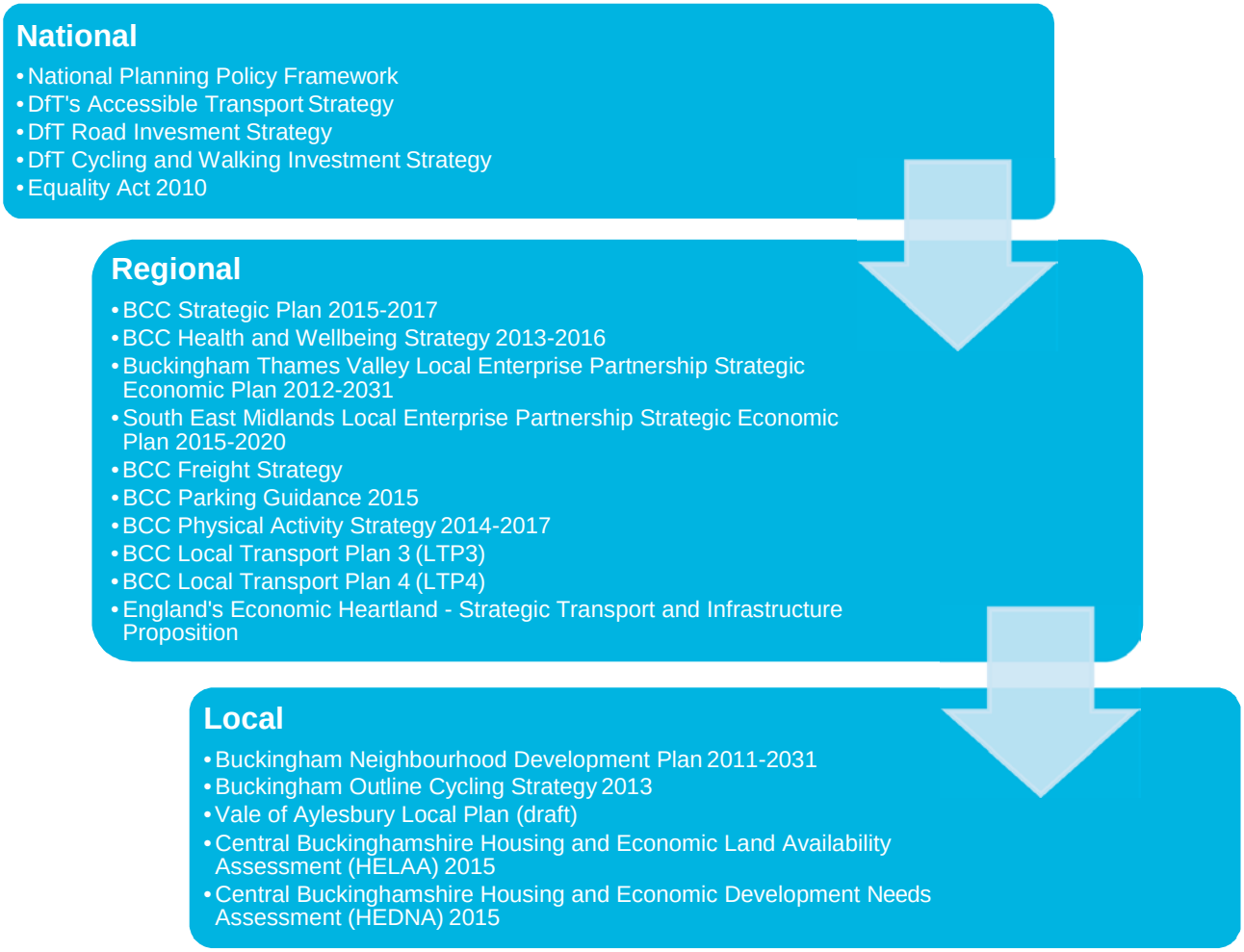
1.2.3 The BTS is expected to provide a guiding transport policy for Buckingham, to prioritise transport schemes for the area, and to promote a coordinated approach towards transport investment. Consequently, stakeholder consultation is an important element of its development.

Policy Context

1.2.4 The following section outlines the guiding policies and plans that have an impact on transport in Buckingham, and should therefore be considered as part of the BTS. Figure 1.1 presents the relevant policies at national, regional and local level.

[1] Jacobs, September 2015
[2] Made Version – Buckingham Town Council, October 2015

Figure 1.1: Policies relevant to the BTS



Buckingham Neighbourhood Development Plan 2011-2031

1.2.5 The *Buckingham Neighbourhood Development Plan*[3] is prepared by Buckingham Town Council and sets out the vision of the town to 2031. The overarching aim of the plan is to "make Buckingham a better place to live, work, study and play", which must be achieved in the context of sustainable growth. The plan is presented in six themes:

- Housing and phasing
- Design, heritage and environment
- Culture, leisure and health
- Economy and education
- Infrastructure
- Financial uplift (re-named Developer Contributions for clarity)

[3] Made Version – Buckingham Town Council, October 2015

1.2.6 Linked to these themes, the plan has 12 stated objectives, many of which are relevant to the town's transport infrastructure and are considered in the BTS:

- Conserve and enhance the town's historic environment and its setting.
- Provide minimum design requirements to ensure appropriate development in the town, building on the work of the 2001 Vision & Design Statement.
- Encourage development that strengthens culture, leisure, sport and play facilities in the town.
- Promote measures to improve the health of people living and working in Buckingham including the provision and retention of facilities locally.
- Maintain the quality of Buckingham's parkland and green space, in particular its 'green heart'.
- Foster the economic development of the town and its hinterland by providing employment led growth, increasing the town's appeal to tourists and invigorating the town centre.
- Help enable effective education across all tiers in Buckingham and ensure that links to and from the local economy are established.
- Provide a diverse housing stock to meet the needs of existing and future local people.
- Secure Developer Contribution from (previously stated as: "the financial uplift of") new development for the benefit of the local community through developer contributions, New Homes Bonus and/or Community Infrastructure Levy.
- Improve movement into and around the town in a healthy and safe manner; specifically cycling, walking and ease of access for the disabled.
- Encourage a reduction in the carbon footprint of Buckingham by promoting energy efficiency and renewable energy generation.
- Mitigate, and improve the capability of the town to deal with flooding.

Buckingham Outline Cycling Strategy 2013

1.2.7 An outline cycling strategy was developed in 2013 by BCC in liaison with Buckingham Town Council. In summary, the strategy proposes a number of new cycle routes and cycle parking facilities in the town.

1.2.8 Further detail on the Buckingham Outline Cycling Strategy is provided in section 4.2.

Vale of Aylesbury Local Plan

1.2.9 The Vale of Aylesbury Local Plan (VALP) is currently being developed by Aylesbury Vale District Council, and is due for submission in March 2017.

1.2.10 The VALP is informed by two key Central Buckinghamshire documents created to guide growth in its local authorities; the *Housing and Economic Development Needs Assessment* (HEDNA, 2015) defines what level of housing should be considered in the Aylesbury Vale district; and the draft *Housing Economic Land Availability Assessment* (HELAA) defines the areas that are potentially suitable for this development.

1.2.11 The VALP draws upon the conclusions from these two key documents to set out a number of options for how and where the growth identified for the district can occur. A number of factors will inform the final selection of a growth option for the VALP, including the amount of housing required, land availability, policy aspirations, environment and landscape considerations, infrastructure and the potential impact on the communities affected.

BCC Local Transport Plan (LTP4)

1.2.12 BCC has recently adopted its 4th Local Transport Plan (LTP4) as of April 2016, which sets out how transport can play its part in realising BCC's vision to 'make Buckinghamshire a great place to live and work'. Its aim is: "*To make Buckinghamshire a great place to live and work, maintaining and enhancing its special environment, helping its people and businesses thrive and grow to give us one of the strongest and most productive economies in the country."*

1.2.13 A number of policies are identified in the LTP4 to support this aim (which have been considered in the objectives of this strategy). BCC expects to develop a number of specific strategies based on the policies of the LTP4, including specific town transport strategies, such as the BTS.

Buckinghamshire & Thames Valley Local Enterprise Partnership Strategic Economic Plan 2012-2031

1.2.14 The Buckinghamshire Thames Valley Local Enterprise Partnership (BTVLEP) Strategic Economic Plan (SEP) sets out the BTVLEP's vision for sustainable economic growth, the interventions required to support this and an action plan for delivering these up to 2031.

1.2.15 Based on a detailed evidence base outlined in the SEP, a vision for its growth priorities up to 2031 was identified: 'to create a vibrant balanced competitive Buckinghamshire economy' and a mission 'to create the conditions that support our business to compete more effectively in the Global Race'.

1.2.16 In terms of transport, road congestion, unreliable journey times and poor connections to global markets were identified as creating a barrier to economic growth within Buckinghamshire. Specifically, a number of transport issues/existing conditions were identified for the BCC transport network that have informed the SEP's transport priorities and will also inform the BTS.

1.2.17 Based on the transport evidence identified in the SEP, an overarching transport objective was identified for the SEP: 'to create a smart, integrated, transport network, which provides excellent multi-modal connectivity between key areas of housing and economic growth across the wider sub-region'.

1.2.18 The LEP has secured £44.2 m from the Government's Local Growth Fund with £8.9m of new funding confirmed for 2015/16 and £27m for 2016/17 to 2021. This includes £8.3 m of funding which the Government has previously committed as part of Local Growth Deal funding to the area.

South East Midlands Local Enterprise Partnership Strategic Economic Plan (SEMLEP SEP)

1.2.19 The South East Midlands Local Enterprise Partnership (SEMLEP) Strategic Economic Plan **(**SEP) covers the period 2015 – 2020 across 11 local authorities, including Aylesbury Vale. As for the BTVLEP SEP, the purpose of the SEMLEP SEP is to identify essential infrastructure required to support and encourage sustainable growth. In terms of Aylesbury Vale, the BTVLEP is considered the key guiding LEP, however consideration should also be given to the aspirations and priorities of the SEMLEP. Both LEPs work together to support one another's bids.

1.2.20 In terms of transport, the SEMLEP SEP identifies east-west links in the region as a key priority.

Buckinghamshire Parking Guidance 2015

1.2.21 The Buckinghamshire Parking Guidance was published in September 2015 to give guidance on car parking provision and design for new developments across Buckinghamshire. It should be used in conjunction with Travel Plans to achieve appropriate levels and management of parking.

1.2.22 The guide states that parking provision must reflect real world demand and encourage sustainable transport modes, such as providing cycling facilities. Furthermore, it specifies that sustainable modes are not to be pursued by using parking supply constraint, which in the past was found to have little impact.

Buckinghamshire Freight Strategy

1.2.23 The BCC Freight Strategy was developed at the same time as BCC's LTP3. It considers freight and transport in Buckinghamshire in the context of the UK and outlines the Council's strategic approach to freight management. It identifies key freight management tools and develops distinct freight policies.

1.2.24 There are 15 policies outlined in the strategy which facilitate localised freight issues to be resolved at a local level. Relevant policies include:

- Continue considering environmental weight restrictions where there is significant use by non-local HGVs and there is a more appropriate route;
- Continue use of width and weight restrictions as freight management tool;
- BCC to continue tackling congestion as a priority; and
- Develop consistent DfT approved signage to direct HGVs onto strategic inter-urban corridors and onto the most appropriate routes.

1.2.25 The strategy states that housing developments (such as those committed and planned in Buckingham) would be expected to generate additional freight movement from, into and around Buckinghamshire during the construction period and due to business growth.

1.2.26 The BTS should consider these freight policies in identifying its potential mitigation strategy for the road network.

Buckinghamshire Health and Wellbeing Strategy 2013-2016

1.2.27 The Buckinghamshire Health and Wellbeing Strategy 2013 – 2016 was published by the Buckinghamshire Health and Wellbeing Board, which is a partnership of Councillors, GPs and other partners who work together to achieve their shared vision of improving health and wellbeing.

1.2.28 In addition to providing direct health advice to Councils and GPs, it also considers other factors that can influence health and wellbeing, such as access to transport, housing and environment.

1.2.29 As such, a number of priorities come from the strategy which are relevant to transport and should be considered in the objectives of the BTS. These are described below.

- **Work hard to protect our most vulnerable children and young people from harm**: consideration could be given to ways to improve the safety at rail and bus stations, safety using public transport, and road safety around schools;
- **Support early years providers, schools and youth centres to work with children and young people to ensure that they have the best opportunities to improve their health and wellbeing:** potential ways in which transport could support this would be through programmes to educate children, young people and parents on road safety and training provided to children and young people to provide them with the skills to cycle and walk safely and encourage them to use these modes more often;
- **Increase the number of people who are physically active**: transport improvements can have a big influence on this, through improved infrastructure and programmes and incentives to encourage more active travel as an alternative to the car; and
- **Work with communities to reduce the number of people experiencing loneliness and social isolation:** Transport can support this indirectly through focusing on any barriers to transport for people in these situations, such as providing better transport links to isolated communities, providing a wider range of transport options and ensuring that transport options are comfortable and affordable for everyone.

BCC Physical Activity Strategy 2014-2017

1.2.30 The BCC Physical Activity Strategy aims to encourage people across all groups in Buckinghamshire to become more active and gain the health benefits from this. Its key message is to get people active from a young age, to support and encourage this into adulthood and then to maintain this in old age.

1.2.31 The main challenges are to encourage behaviour change, to enable people to be more active and to identify where the provision / promotion of services are not meeting the needs of people.

1.2.32 Transport can play a key role in this and the Physical Activity Strategy states that active travel needs to be an easier choice, which includes ensuring the natural and built environment supports rather than creates barriers to active choices. This is reflected in the objectives of the BTS.

Central Buckinghamshire Housing and Economic Development Needs Assessment (HEDNA)

1.2.33 The purpose of the Housing and Economic Development Needs Assessment (HEDNA) was to establish the full Objectively Assessed Need (OAN) for housing across Central Buckinghamshire Housing Market Area (HMA) and the Full Objectively Assessed Economic Needs across the Central Buckinghamshire Functional Economic Market Area (FEMA). The housing projections from this assessment have been used in developing the spatial scenarios being considered for the draft VALP, summarised earlier in this document.

Aylesbury Vale Housing and Economic Land Availability Assessment (HELAA)

1.2.34 The Housing and Economic Land Availability Assessment (HELAA) forms a key component of evidence base used to inform the preparation of the Vale of Aylesbury Local Plan (VALP), which is summarised earlier in this document. The HELAA presents a strategic picture of the availability and suitability of land for development across the Vale and attempts to establish realistic assumptions on the delivery rate of new houses and economic floor space over the next 1-15 years.

Committed Transport Schemes

1.2.35 It is understood that there are currently two committed transport schemes of relevant to Buckingham. These are set out below.

A413 Sustainable Travel Scheme

1.2.36 The A413 Sustainable Travel Scheme[4] includes:

- a 9km shared cycle and footway link adjacent to the A413 between the towns of Winslow and Buckingham
- upgrades to three existing bus stops in Buckingham with real-time passenger information and Wi-Fi access

1.2.37 The scheme aims to encourage walking, cycling and bus travel between the two towns and local destinations along the corridor.

1.2.38 The scheme is primarily funded through the Buckinghamshire Thames Valley Local Enterprise Partnership (BTVLEP) and is expected to be completed by January 2017. At this point, the shared path will terminate at the southern edge of Buckingham (A421). In the following years, the shared cycle and footway will be extended into Buckingham town centre, funding for which has been secured from developer contributions (see Figure 2.32).

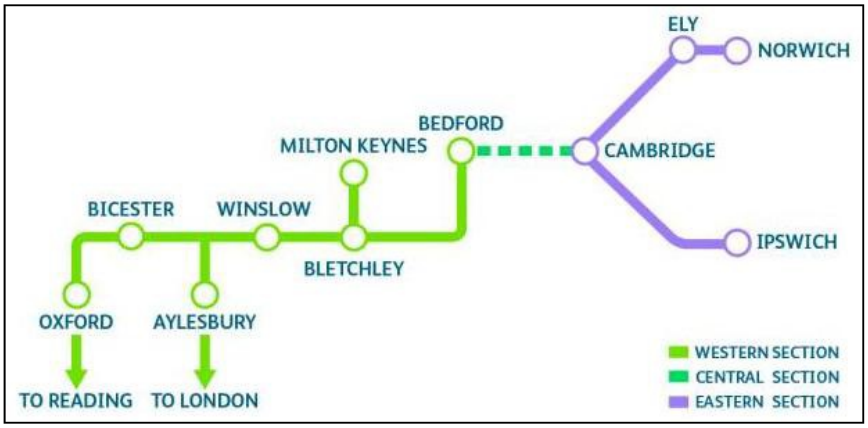
East-West Rail

1.2.39 Whilst slightly further afield, the opening of an East-West rail station in Winslow (due in 2019) is also of relevance to Buckingham given its use as an access point to this new rail corridor.

1.2.40 The LTP4 identifies that east to west rail travel in Buckinghamshire is difficult as there is no direct rail route and rail journey across the county often requires interchanging in London. This makes east west rail travel in the county (particularly the northern half) long, inconvenient and expensive, therefore encouraging car usage.

1.2.41 The proposed East-West Rail route will go some way to address this, particularly through the Western Section which is currently proceeding and due to start operating by 2019. The western section of the line will be the first to open and will improve connectivity between the urban centres shown in Figure 1.2 and the wider National Rail network.

Figure 1.2: East-West Rail Route Map



Oxford-Cambridge Expressway

1.2.42 The Oxford-Cambridge Expressway is a project of regional and sub-regional significance being driven by Highways England and the Department for Transport[5]. The strategic study report (Stage 1) for the expressway was published in August 2016 and "outlines the high level case for a strategic link to connect the cities of 'the brain belt' together".

1.2.43 BCC's preferred alignment of the expressway[6] is along the A329/A418, linking the urban centres of Oxford, Thame, Aylesbury, and Milton Keynes. The August 2016 strategic study report, however, indicates an alternative potential route via the A421 and Milton Keynes which would have significant implications for Buckingham.

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[4] http://www.buckscc.gov.uk/transport/scheme-and-projects/strategic-economic-plan/a413-sustainable-travel-scheme/

[5] https://www.gov.uk/government/publications/oxford-to-cambridge-expressway-strategic-study-interim-report

[6] National Infrastructure Commission: Call for Evidence Cambridge – Milton Keynes – Oxford 'growth corridor'

1.2.44 Regardless of the eventual expressway alignment, it is too early in the process of development to include detail within the BTS. Whilst there might be a positive benefit to Buckingham in terms of improvements to the A421, this is not guaranteed. Therefore, the BTS has been developed without taking this potential scheme into consideration.

Growth Scenario

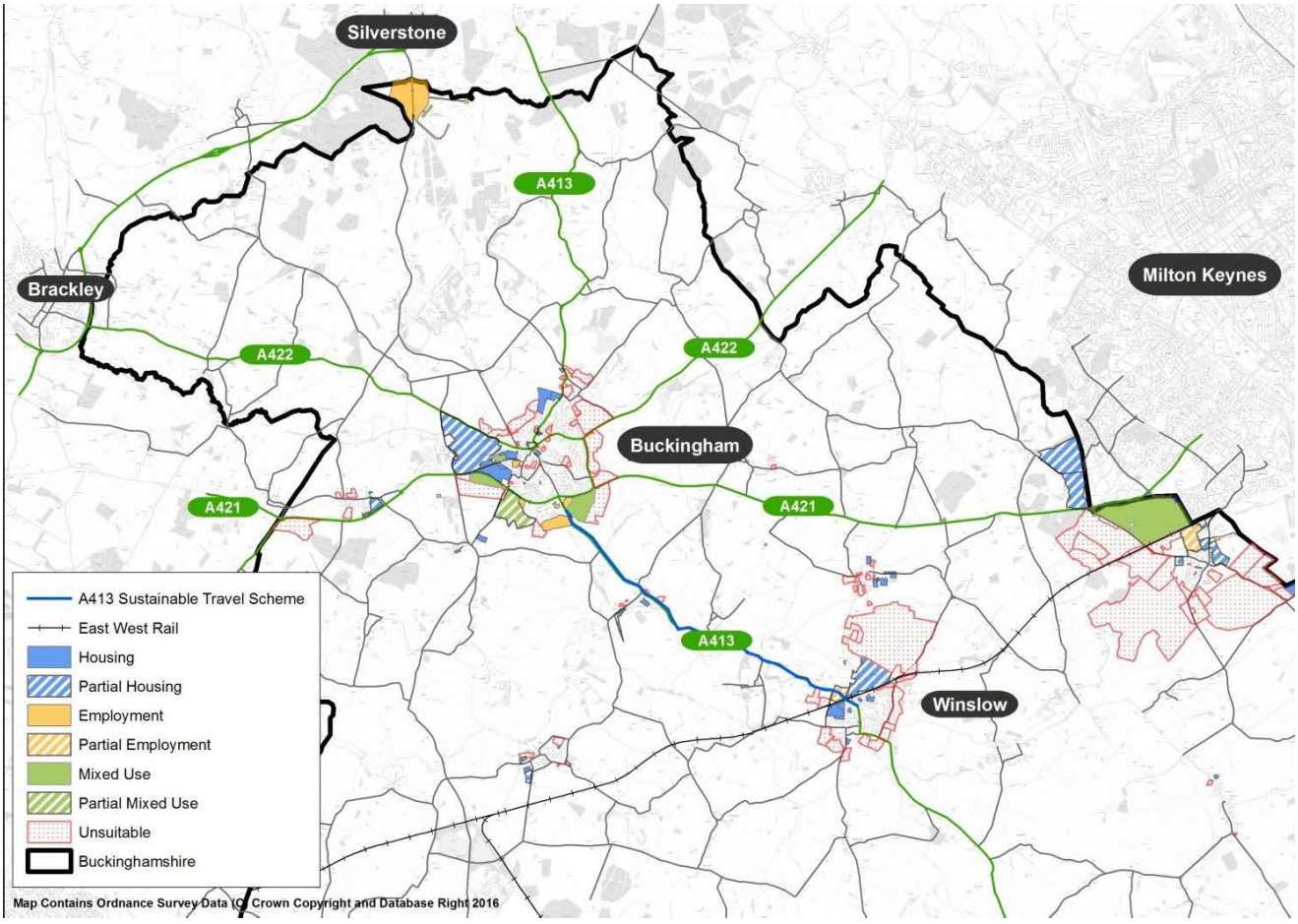
Housing and Economic Land Availability Assessment (HELAA)

1.2.45 The growth information presented in this sub-section relates to the land that is *available* for future development (as identified in the HELAA, AVDC October 2015), rather than the actual aspirations of the draft VALP. Once the final version of the Local Plan is published, therefore, the quantum of growth is likely to be more modest than that which is shown. Due to the strategic nature of this transport strategy, the precise quantum of development is not a critical consideration at this stage, although will have implications for funding availability.

1.2.46 Potential growth areas in and around Buckingham (based on HELAA, AVDC October 2015) as well as the two local committed transport schemes are shown in Figure 1.3. The majority of the potential growth around the town is on its western and southern fringes. Note that the large site to the north of Winslow is shown as "unsuitable" as this was its status when the HELAA was produced. Since this time, AVDC has indicated that this is no longer the case, and the site may be appropriate for development.

1.2.47 Further from the town, there is a significant amount of land available for development to the southwest of Bletchley (predominantly consisting of two large residential developments of 1,885 and 2,000 dwellings) that may come forward over the lifetime of the BTS[7].

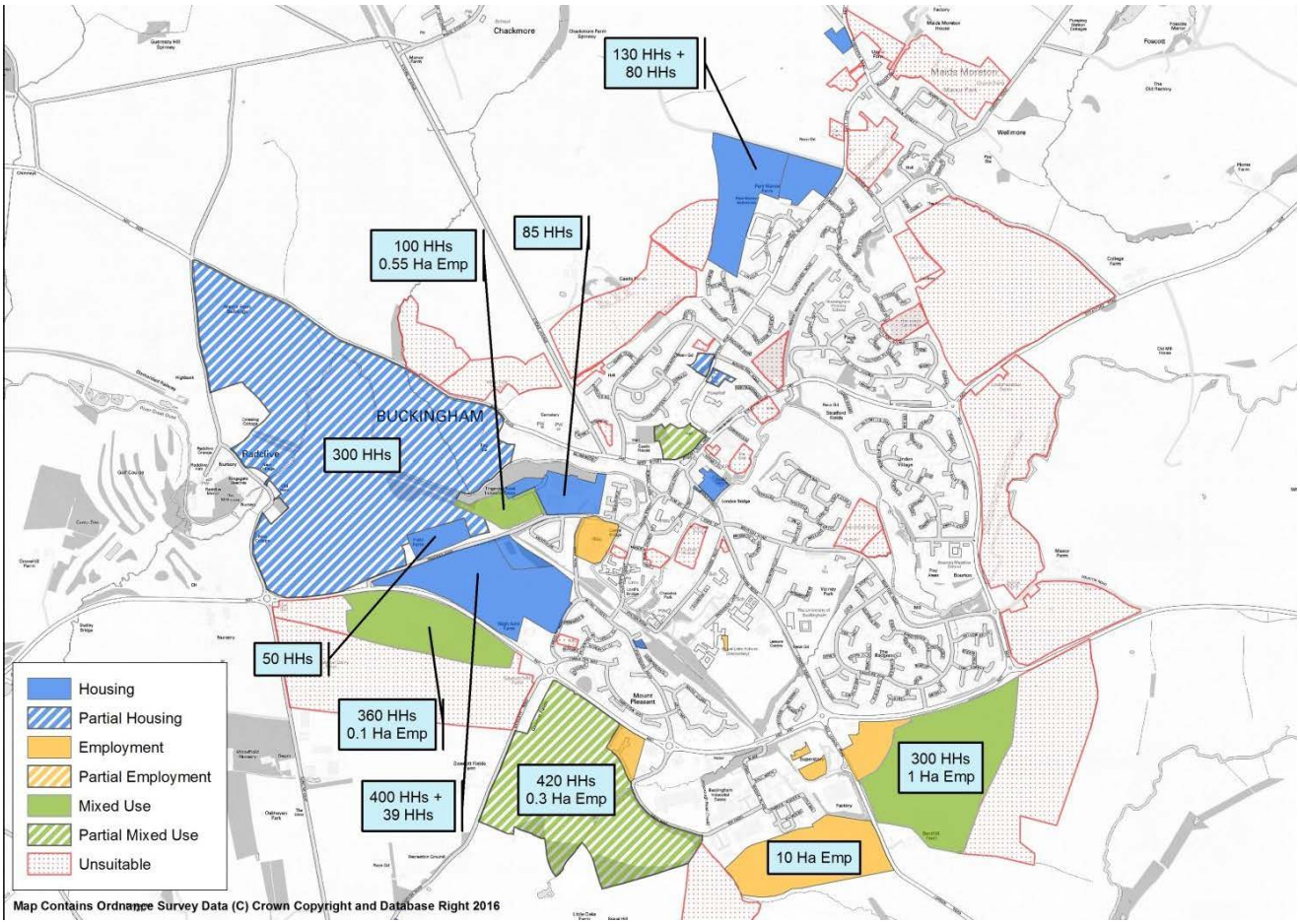
Figure 1.3: HELAA (October 2015) proposed growth and committed transport schemes



1.2.48 Figure 1.4 shows the spatial distribution and quantum of land available for development within the town of Buckingham (some of which is already committed – see following section). The quantum information is derived from information provided by BCC[7] and in the *Buckingham Neighbourhood Development Plan*[8].

[7] Source: Buckingham site information document received from BCC on 12th August 2016
[8] Made Version – Buckingham Town Council, October 2015

Figure 1.4: HELAA (October 2015) Growth Distribution and Quantum



Draft Vale of Aylesbury Local Plan (VALP)

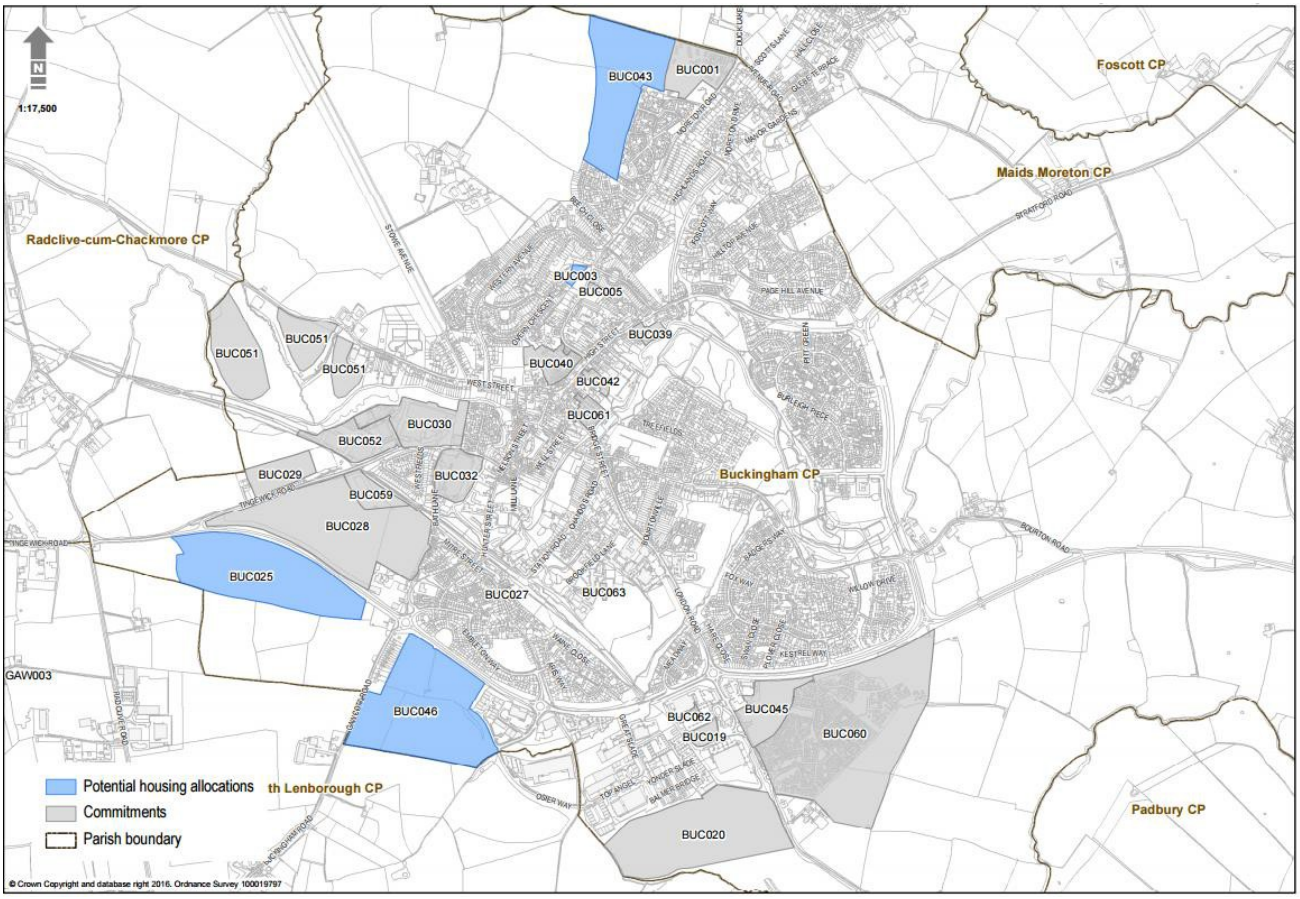
1.2.49 According to the draft VALP, Buckingham has a housing requirement of 2,571 dwellings[9]. The town already has 1,393 commitments as of 2015/2016 as shown in grey in Figure 1.5 (including 917 homes identified in the *Buckingham Neighbourhood Development Plan*[8]), as well as 621 completions between 2013 and 2016. This leaves a shortfall of 557 homes to be allocated in the draft VALP.

VALP Housing requirement	2,571
Commitments 2015/2016 (see Figure 1.5)	-1,393
Completions 2013-2016	-621
Residual housing requirement to be allocated in VALP	**557**

1.2.50 The HELAA identifies sites for 1,212 homes, therefore, only the most suitable/sustainable locations will be required to meet the residual requirement of 557. These developments are likely to be located in the land parcels indicated in blue in Figure 1.5.

[9] Vale of Aylesbury Local Plan: Draft Plan for Summer 2016 Consultation. Page 74.

Figure 1.5: Draft VALP – Potential Housing Allocations – Buckingham[10]

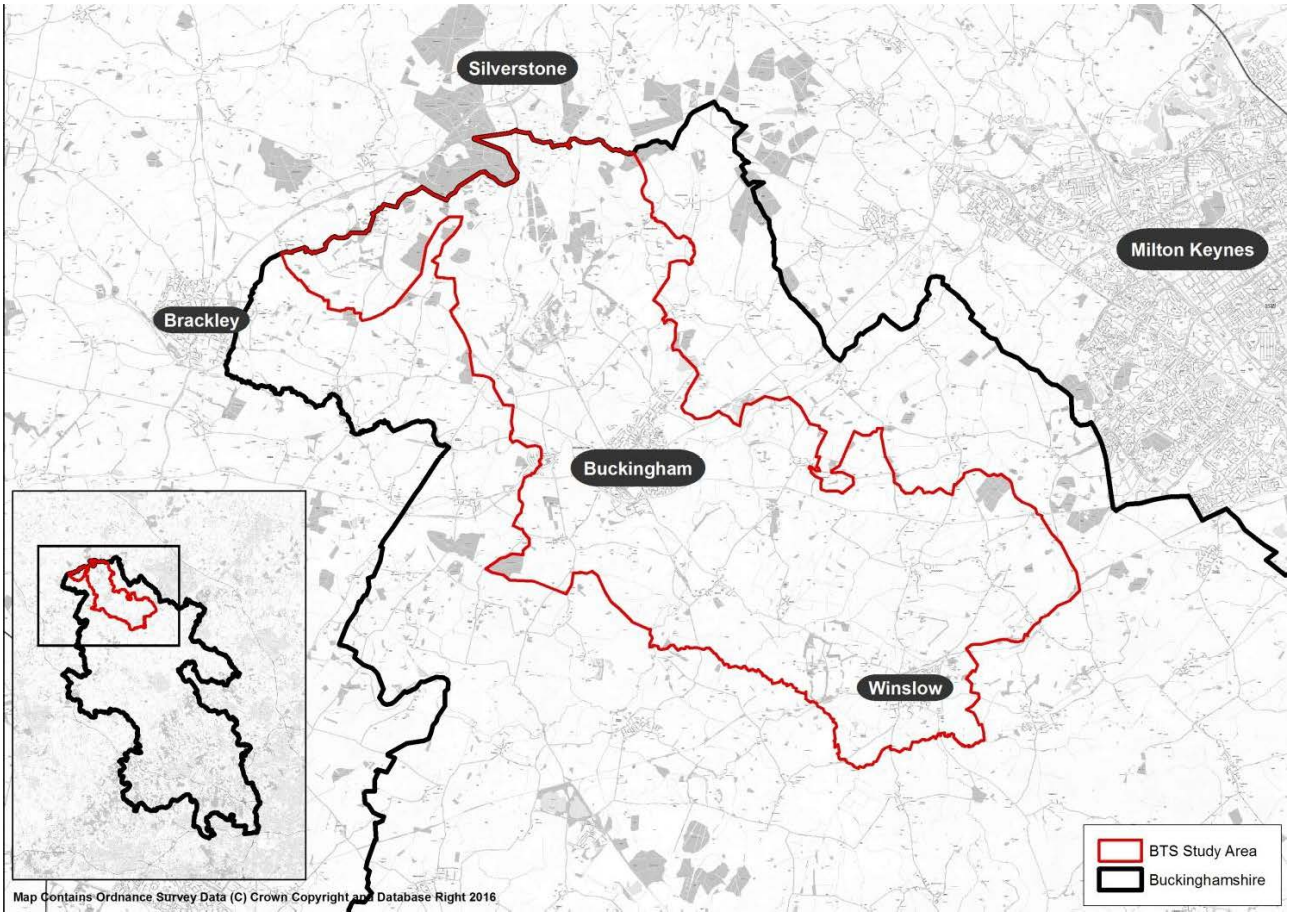


[10] Vale of Aylesbury Local Plan: Draft Plan for Summer 2016 Consultation.

Study Area

1.2.51 The urban area of Buckingham is the focus of the BTS, however, it is recognised that growth in terms of dwellings and employment is proposed in Silverstone Park to the north and in Winslow to the south. In addition, a new railway station in Winslow is proposed as part of East-West rail. On this basis, the defined study area has been extended beyond the immediate Buckingham urban area in order to capture these proposals, and is shown in Figure 1.6. The study area covers the proposed growth and committed transport schemes shown in Figure 1.3.

Figure 1.6: Buckingham Transport Strategy Study Area



Existing Transport Modelling

1.2.52 The study area is covered by the Countywide Strategic Transport Model. AECOM has undertaken an initial review of the modelling reports in relation to the above model, as listed below:

- Countywide Strategic Transport Model – Local Model Validation Report[11]
- Countywide Local Plan Modelling – Forecast Modelling Report[12]

1.2.53 This section briefly discusses the existing model scenarios, and how they are used to inform this study.

Countywide Strategic Transport Model

1.2.54 The Countywide Strategic Transport Model, which covers the Buckinghamshire County, is a multi-modal transport model including a highway model and a public transport (bus and rail) model. The model was developed and run using PTV VISUM 13.0. The base year of the model is 2013 and includes three time periods:

- Morning peak hour (0800 to 0900)
- Evening peak hour (1700 to 1800)
- Average inter peak hour (for an inter peak period of 1000 to 1600)

1.2.55 A forecast model was developed in June 2016 for the year 2033. This forecast includes 3 scenarios:

- Do Minimum (DM)
- Do Something 1 (DS1)
- Do Something 2 (DS2)

1.2.56 The assumed levels of growth within Buckinghamshire for the three scenarios is summarised in Table 3-A and Table 3-E of the *Forecast Modelling Report*[13] – shown below in Figure 1.7 and Figure 1.8.

1.2.57 The overall quantum of housing and employment growth in DS1 and DS2 are equal, however, the location of a 4,000 dwelling development varies between the two. In DS1, the development is placed in Haddenham, whilst in DS2, the development is in Winslow.

[11] 24/10/2014 – Jacobs
[12] 08/06/2016 – Jacobs
[13] Countywide Local Plan Modelling: Forecast Modelling Report. June 2016, Jacobs.

Figure 1.7: 2033 Forecast Growth Assumptions[13]

Future scenario (2033)	Summary details
Do Minimum (DM) 'No development'	• Growth capped to NTEM levels outside of Buckinghamshire • Includes planning completions since 2013 • Includes only outstanding housing and employment commitments within the districts
Do Something 1 (DS1)	• As Do Minimum plus; • All other Wycombe Local Plan sites • Allocated Retail employment sites from Wycombe HELAA • Chiltern, Aylesbury Vale and South Bucks residential HELAA sites not already committed • Aylesbury option 1 new settlement location (Haddenham) • VALP Issues and Options sites for smaller villages in Aylesbury Vale • Sites from Aylesbury Vale Level 1 green belt review • 50% of greenbelt sites in Chiltern and South Bucks • NTEM employment growth in Chiltern and South Bucks
Do Something 2 (DS2)	• As Do Something 1 but; • With Aylesbury option 2 new settlement location (Winslow) INSTEAD OF option 1 location.

Table 3-A Modelled scenarios

Figure 1.8: 2033 Forecast Growth Assumptions[13]

District	NTEM		DM		DS1		DS2	
	HH	Jobs	HH	Jobs	HH	Jobs	HH	Jobs
Aylesbury Vale	32,243	11,172	9,416	24,265	30,666	24,265	30,666	24,265
Chiltern	4,549	3,297	1,278	0	5,671	3,297	5,671	3,297
South Bucks	924	2,497	1,297	1,619	9,770	4,116	9,770	4,116
Wycombe	7,289	14,683	2,180	6,011	13,348	7,624	13,348	7,624
Total	**45,004**	**31,649**	**14,171**	**31,895**	**59,455**	**39,302**	**59,455**	**39,302**

Table 3-E 2033 modelled scenario growth and NTEM growth

1.2.58 In terms of highway network, the 2013 Base Year model has been supplemented with the schemes shown in Figure 1.9 to create the 2033 forecast scenario.

1.2.59 The Countywide model has been used to assess some of the highway improvements (described in section 4.3), and provides a high-level guide in the development of the strategy. It is noted that as the transport improvements are progressed, further model development will need to take place to be able to test schemes for feasibility and business cases.

1.2.60 In December 2016, a further scenario (mitigation scenario) was produced including two highway schemes that are discussed further in section 4.3.

Figure 1.9: 2033 Forecast Network Schemes[13]

Scheme	District	Description	Scenario
HS2: Chalfont Lane Widening	Chiltern	Widening of Chalfont Lane to increase link capacity	DM & DS
HS2: Realignment of B485 Chesham Road and Kings Lane	Chiltern	Existing road realigned with upgraded junction	DM & DS
A355 Relief Road	South Bucks	New link between the Pyebush Roundabout and A355 north of Beaconsfield	DM & DS
M4 Smart Motorway	South Bucks	J3 to 8/9 upgraded to a smart motorway	DM & DS
Western Rail link to Heathrow	South Bucks	Closure of Hollow Hill Lane	DM & DS
Aylesbury SELR	Aylesbury	Link road through Hampden Fields development	DS
HS2: SM bypass	Aylesbury	New bypass off A4010	DM & DS
Stocklake Urban Link	Aylesbury	Upgrade to existing Stocklake Road	DM & DS
SLR and ELR (N)	Aylesbury	New link road connection Stocklake with A418	DM & DS
Realignment of A41 Bicester Road	Aylesbury	New junction and realignment of existing A41	DM & DS
Realignment of Station Road	Aylesbury	Station Road and surrounding roads realigned	DM & DS
Realignment of Perry Hill	Aylesbury	Realignment of existing road	DM & DS
Town Centre Masterplan	Wycombe	Capacity reduction on A40 with new link roads and capacity increases elsewhere	DM & DS
Southern Quadrant	Wycombe	Upgrade to Cressex Road / Cressex link junction and John Hall Way	DM & DS
Coates Lane	Wycombe	New from Morrison's to Coates Lane	DM & DS
Chapel Lane Junction	Wycombe	Junction improvements	DM & DS

Table 4-A Network changes included in DM and DS scenarios

Strategy Objectives

1.2.61 The objectives of the BTS (see Table 1.1) are defined in order to guide the strategy's development, and to ensure that potential transport schemes are appropriate for Buckingham's future requirements. These objectives have been presented to the Steering Group Meeting (10th August 2016) for discussion and confirmation.

1.2.62 Consideration will also be given to whether the potential schemes are deliverable (considering political, funding, timescale, or third party issues) and feasible (considering physical constraints, land availability and design standards).

Table 1.1: Buckingham Transport Strategy Objectives

Objective	Description	Supported Policies
1. Behaviour Change – 'make it easier and more attractive to travel by active travel and public transport in particular within Buckingham'	Supporting and working with the other objectives of the strategy, this is focussed on reducing car use and encouraging the uptake of active and public transport modes for more trips. This will include improvements to infrastructure to provide a well-connected, easy to use and safe public transport and walking/cycling network that is also equally accessible to those of limited mobility, improvements to public transport coverage and service levels, access to up to date online information through initiatives such as the One Transport project and programmes to encourage non-car use for short to medium distance trips.	– Local Transport Plan - Policies: 1, 2, 3, 4, 5, 10, 12, 13 and 16. – BCC Health and Wellbeing Strategy – BCC Physical Activity Strategy
2. Ease of movement in town centre – 'improve transport access and movement in town centre'	This is focused on making it easier to access and move around Buckingham, in order to make it more attractive to visit for work or leisure and spend time in. It supports the VALP in regenerating the town centre and accommodating future growth. Lack of permeability for active modes and high car use in the town centre have all been identified as barriers to movement and access within the town. Also ensuring new growth areas in Buckingham are well connected by all transport modes will be part of this objective.	– Local Transport Plan - Policies: 1, 2, 3, 7, 11, 12, 13 and 16. – BCC Physical Activity Strategy – BTV and SEM LEP Strategic Economic Plans
3. Improving Transport Options – 'improve accessibility into Buckingham and to other urban centres / new growth areas'	This is focused on improving existing transport links and providing more mode options to connect to surrounding urban centres and also ensuring this is provided to new areas of growth outside Buckingham. This would improve access to jobs for the local population both within Buckingham and to other urban centres and enable growth. This will support growth in Buckingham and access to a wider area of jobs.	– Local Transport Plan - Policies: 1, 2, 3, 6, 7, 13 and 16. – Vale of Aylesbury Local Plan – BTV and SEM LEP Strategic Economic Plans – BCC Health and Wellbeing Strategy – Buckinghamshire Freight Strategy
4. Improving Journey Times – 'improve journey time reliability'	In order to achieve generally consistent journey times and therefore reliability on the local road and transport network, the strategy should consider ways to manage demand and improve the network capacity to meet the demands of growth. Providing a reliable journey time on the network will attract more investment in the town and therefore support economic growth. All users should be considered in this objective and transport improvements should reflect a holistic strategy that considers priority for different users on the various road corridors.	– Local Transport Plan - Policies: 1, 2, 3, 7, 9, 12, 13 and 16. – BTV and SEM LEP Strategic Economic Plans – Buckinghamshire Freight Strategy
5. Managing congestion – 'minimise the impact of future growth on traffic levels, congestion and air quality'	Congestion levels on roads entering Buckingham and in peak periods in some parts of the town centre have been raised as an issue with current levels of demand. Through traffic has been identified as a significant source of congestion in the town centre. Therefore an important consideration of the BTS will be to ensure that the future growth of Buckingham does not make this issue noticeably worse and that transport infrastructure for new development is designed to encourage public transport and walking/cycling travel over private vehicle trips. Transport improvements may include initiatives that promote low carbon vehicles, improve efficiency of freight movements, and reduce the need to travel.	– Local Transport Plan - Policies: 1, 2, 3, 9, 10, 12, 13, 14, 15, 16 and 19. – Vale of Aylesbury Local Plan – BTV and SEM LEP Strategic Economic Plans – BCC Health and Wellbeing Strategy – Buckinghamshire Freight Strategy – BCC Physical Activity Strategy

Objective	Description	Supported Policies
6. Transport Safety – 'reduce the risk of death or injury on the transport network'	Address current safety issues on the road and transport network identified through evidence of speeding or collision history and ensure that any transport improvement considered for the strategy does not increase risk to safety. Also taking into account the aging demographic in the area and in new growth areas.	– Local Transport Plan - Policies 8 and 17. – BTV and SEM LEP Strategic Economic Plans – BCC Health and Wellbeing Strategy – BCC Physical Activity Strategy

Existing and Future Conditions of the Transport Network

2

2. Existing and Future Conditions of the Transport Network

2.1 Local Context

2.1.1 The following sections contextualise the Buckingham Transport Strategy study area relative to its surrounding areas in terms of demographic characteristics, land use and journey to work trip patterns.

Population Growth & Distribution

2.1.2 At the time of the last UK Census (2011), the BTS study area had a population of approximately 22,800 residents and has grown by approximately 2.2% since the previous Census in 2001.

2.1.3 Table 2.1 presents the population in 2001 and 2011, the change over this interval, and the population density.

Table 2.1: Population Growth and Densities[14]

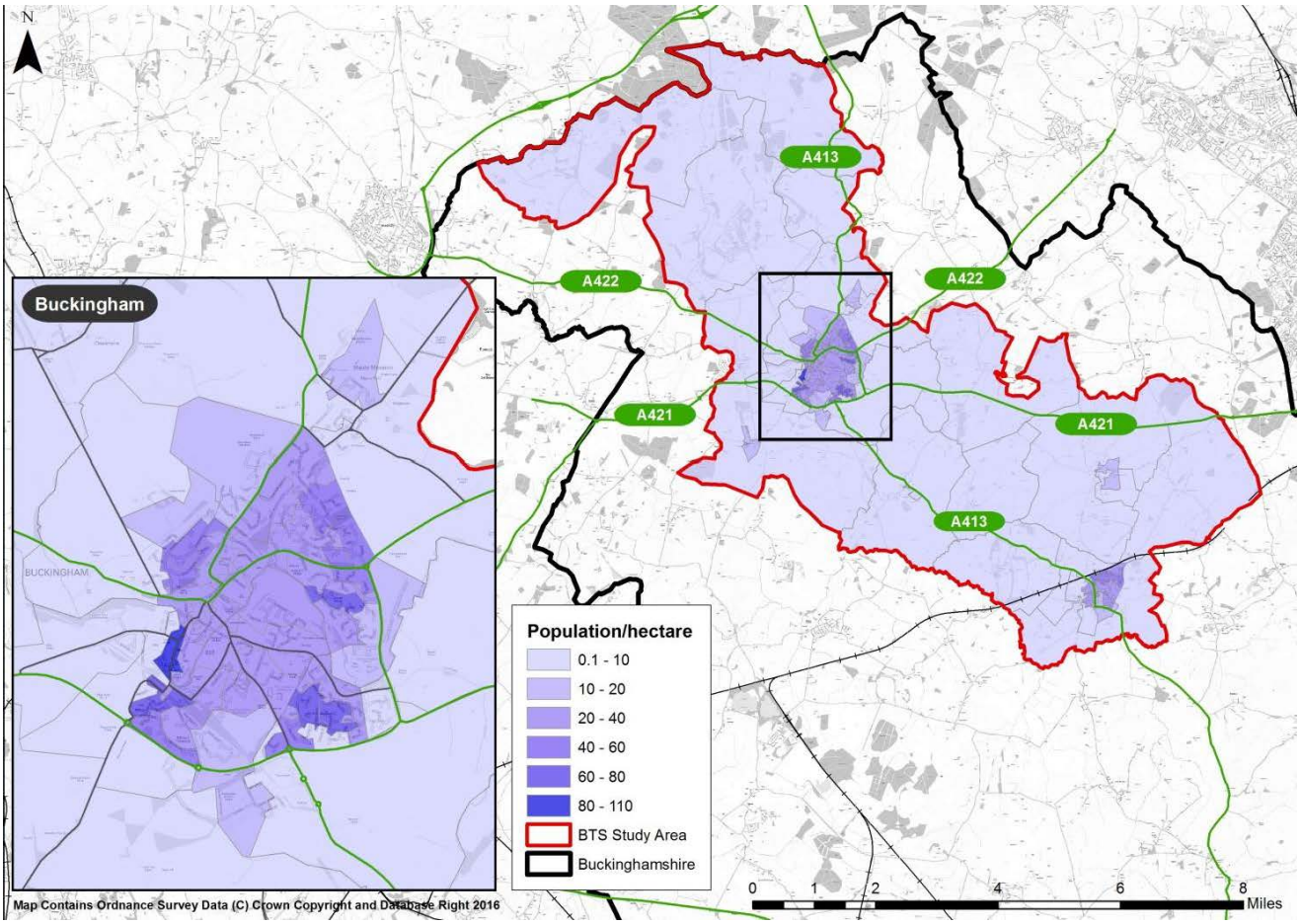
Area	Population 2001	Population 2011	Population Growth 2001/2011 (%)	Area (ha)	Population Density (inhab/ha)
Aylesbury Vale District	165,748	174,137	5.1%	90,275	1.9
Chiltern District	89,228	92,635	3.8%	19,635	4.7
South Bucks District	61,945	66,867	7.9%	14,128	4.7
Wycombe District	162,105	171,644	5.9%	32,457	5.3
Buckinghamshire County	479,026	505,283	5.5%	156,495	3.2
England	49,138,831	53,012,456	7.9%	13,027,872	4.1
BTS Study Area	22,341	22,835	2.21%	12,362	1.8

2.1.4 The population density of the study area is comparable with the Aylesbury Vale district as a whole, however, significantly lower than other districts within Buckinghamshire or the national value. This reflects the principally rural nature of the study area, and does not indicate the density of the town of Buckingham.

2.1.5 The population density by Census Output Area is shown in Figure 2.1, and demonstrates that the areas with the highest population density in the study area are Buckingham and Winslow. Within Buckingham, the population density is relatively consistent across its different Census Output Areas; however, a particularly dense residential area is the Hunter Street campus of the University of Buckingham towards the south-west of the town.

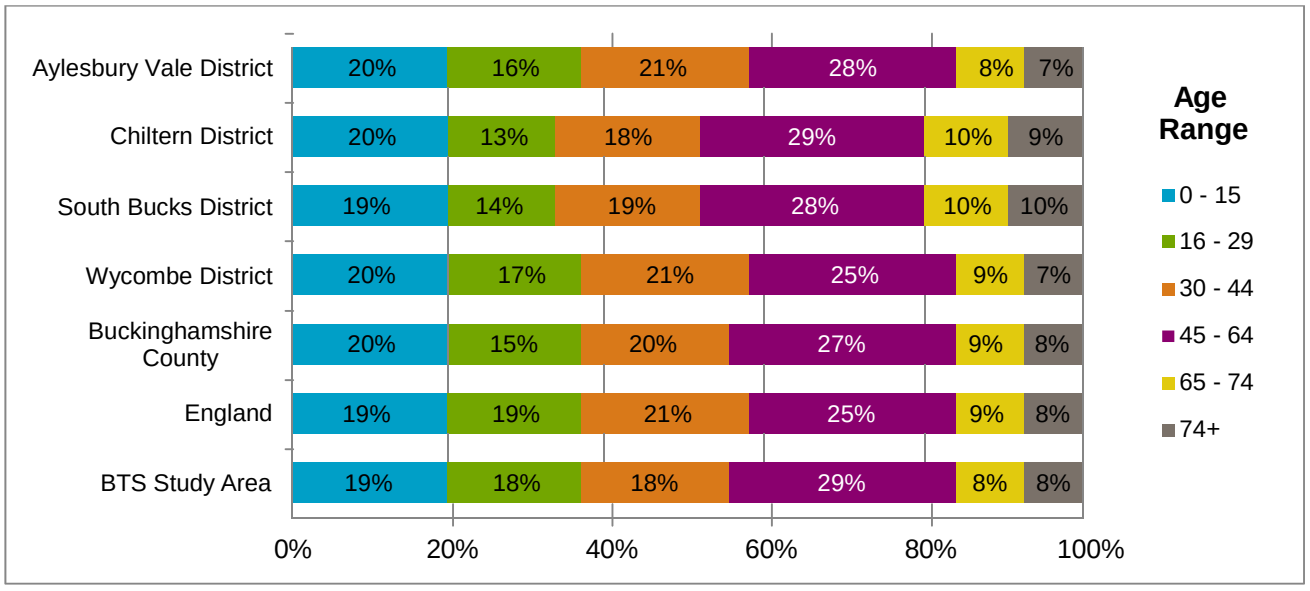
[14] Source: Census 2001 (Table UV020301) and Census 2011 (Table KS 101EW)

Figure 2.1: Population density in the BTS Study Area



2.1.6 Figure 2.2 shows the age distribution of the BTS study area relative to surrounding regions, and suggests that Buckingham is relatively similar to its surrounding regions in this regard. The largest population group is aged 45-64 (29%); 19% is under 16 years old, and 16% are 65+ years old.

Figure 2.2: Population Distribution by Age[15]



[15] Source: Census 2011 (Table KS 102EW)

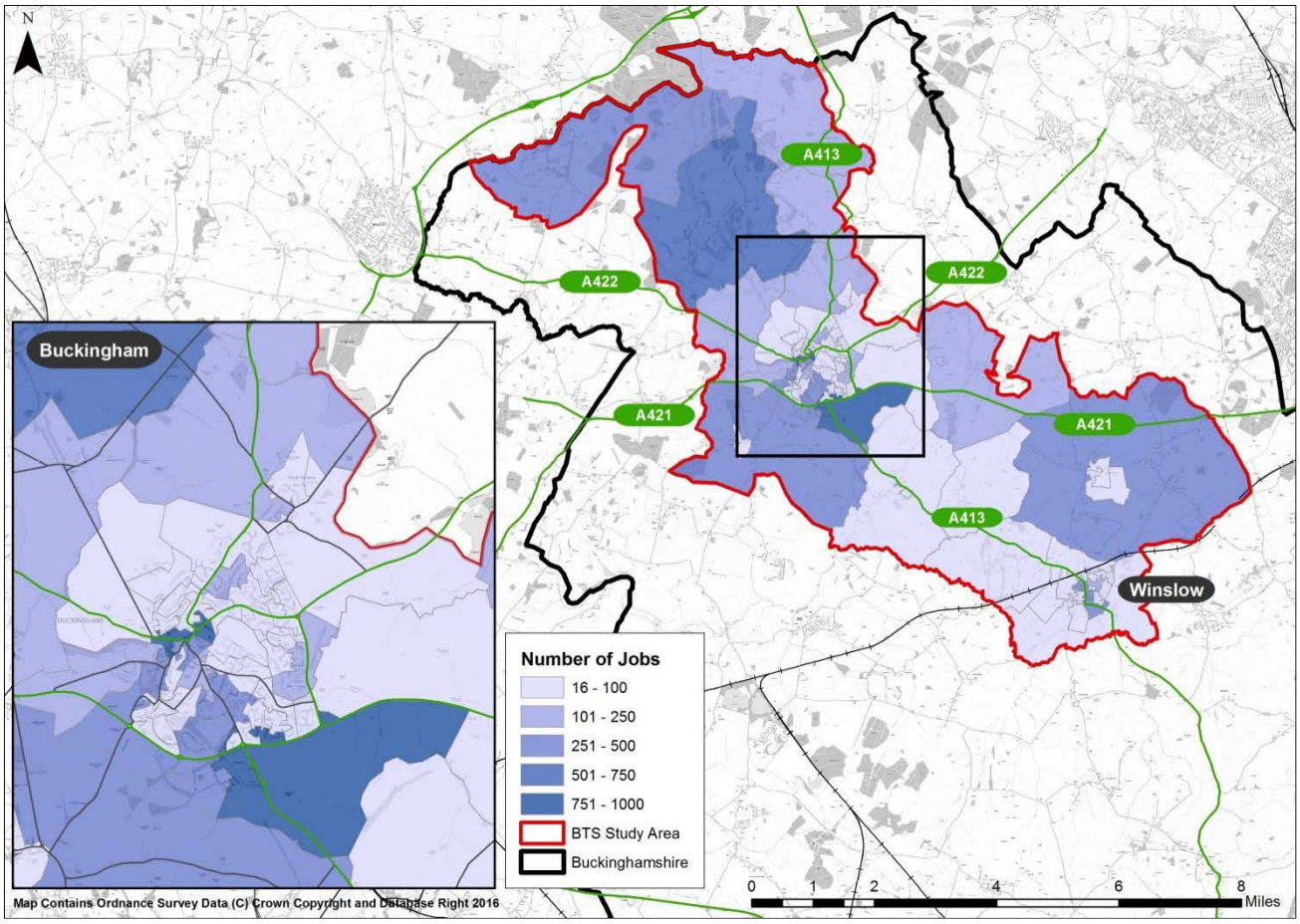
Employment

2.1.7 Figure 2.4 shows the spatial distribution of jobs in the study area according to Census data from 2011. Note that the diagram does not show job density, and therefore large zones with darker shading do not necessarily represent the most significant concentration of employment land use.

2.1.8 The most significant job sites represented in the plot are:

- Buckingham town centre
- South of the A421 near the A413 (i.e. Buckingham Industrial Estate, Tesco, Aldi etc.)
- Winslow town centre

Figure 2.3: Spatial Distribution of Jobs[16]



2.1.9 Table 2.2 presents the distribution of the study area's economically active population[17] in terms of employment type. The proportion of economically active residents is 52.95%, and therefore similar to the rest of Aylesbury Vale, other parts of Buckinghamshire and the nation as a whole. The value does not suggest that the BTS study area varies significantly in terms of employment levels.

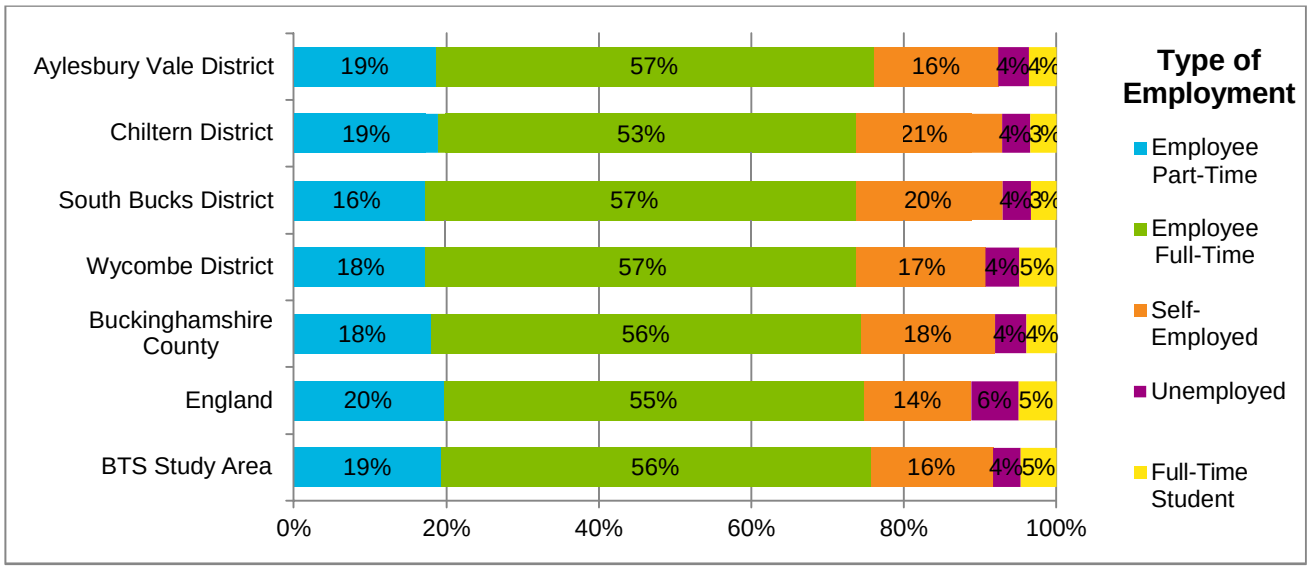
[16] Source: Census 2011 (Table WP 101 EW)
[17] Economically active people are those who are either employed or actively seeking employment.

Table 2.2: Levels of Population Economically Active by Employment Type[18]

Area	Population Economically Active (aged 16 -74) by Type of Employment					Population Economically Active (aged 16 - 74)	
	Employee Part-Time	Employee Full-Time	Self-Employed	Unemployed	Full-Time Student	Total	% Population
Aylesbury Vale District	17,751	54,696	15,531	3,869	3,395	95,242	54.69%
Chiltern District	8,854	24,978	9,586	1,728	1,597	46,743	50.46%
South Bucks District	5,643	19,666	6,850	1,267	1,155	34,581	51.72%
Wycombe District	16,001	51,724	15,108	4,023	4,459	91,315	53.20%
Buckinghamshire County	48,249	151,064	47,075	10,887	10,606	267,881	53.02%
England	5,333,268	15,016,564	3,793,632	1,702,847	1,336,823	27,183,134	51.28%
BTS Study Area	2,339	6,811	1941	432	568	12,091	52.95%

2.1.10 Figure 2.4 presents the employment type data in Table 2.2 in proportional terms. The distribution of different employment types is broadly consistent with the district and surrounding regions, however the unemployment rate of 4% is lower than the national average of 6%.

Figure 2.4: Employment Type Distribution[19]



[18] Source: Census 2011 (Table KS 601EW)
[19] Source: Census 2011 (Table KS 601EW)

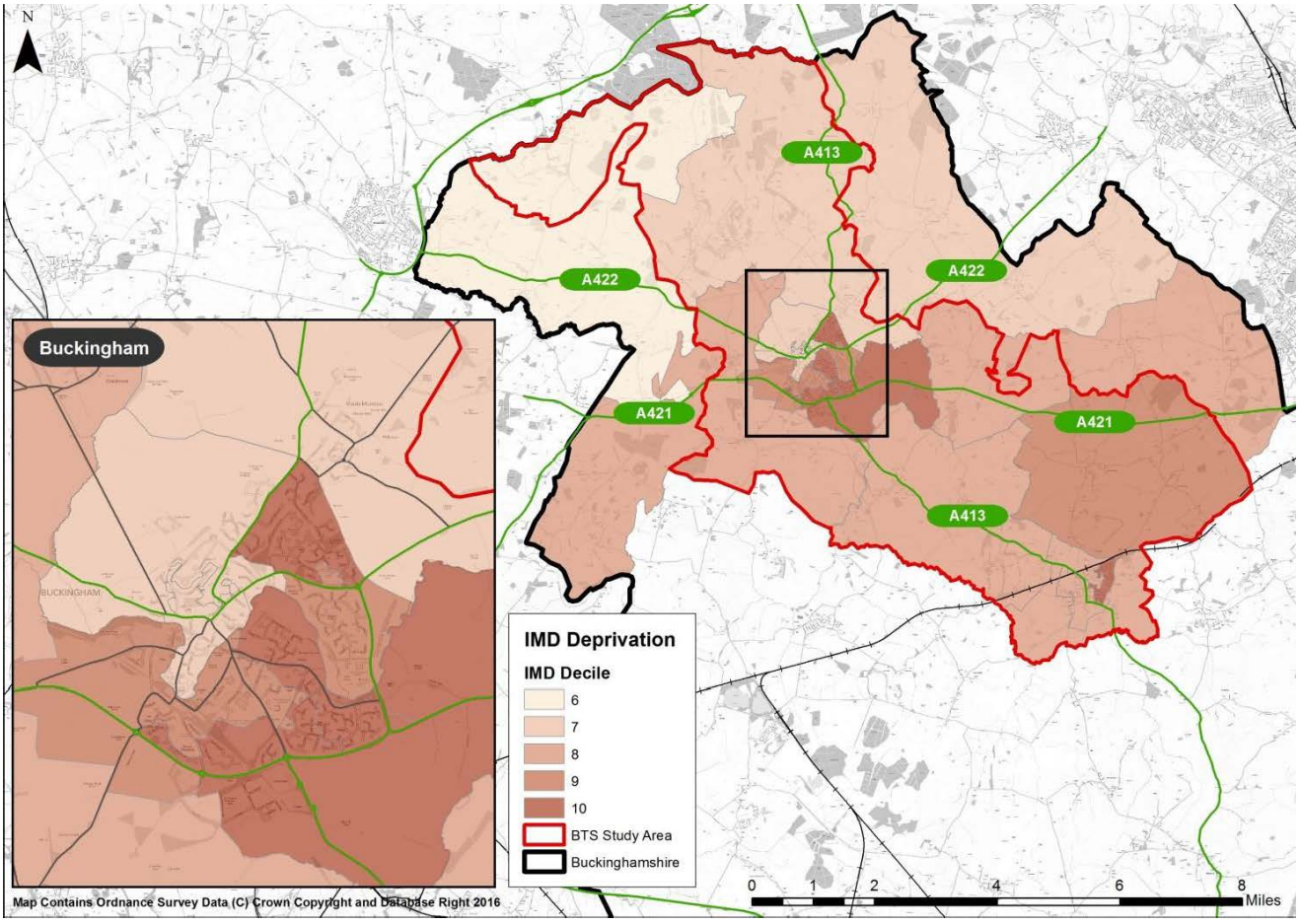
Index of Multiple Deprivation

2.1.11 Figure 2.5 shows the spatial distribution of the Index of Multiple Deprivation (IMD) for relevant LSOAs (Lower-layer Super Output Area) in the study area. The data is presented in terms of deciles, whereby decile 1 is most deprived in England and decile 10 is the least deprived in England. IMD is based on seven "domains of deprivation" with different relative weightings as shown in brackets below:

- Income Deprivation (22.5%)
- Employment Deprivation (22.5%)
- Education, Skills and Training Deprivation (13.5%)
- Health Deprivation and Disability (13.5%)
- Crime (9.3%)
- Barriers to Housing and Services (9.3%)
- Living Environment Deprivation (9.3%)

2.1.12 With the exception of one LSOA which lies partially within the BTS study area, all relevant LSOAs have a deprivation decile of 7 or higher (i.e. relatively low level of deprivation). The lowest levels of deprivation are located to the south and east of the town centre, whereas a slightly higher level of deprivation is shown in town's north-western flank.

Figure 2.5: Indices of Multiple Deprivation (Decile) Spatial Distribution[20]



[20] English Indices of Deprivation 2015

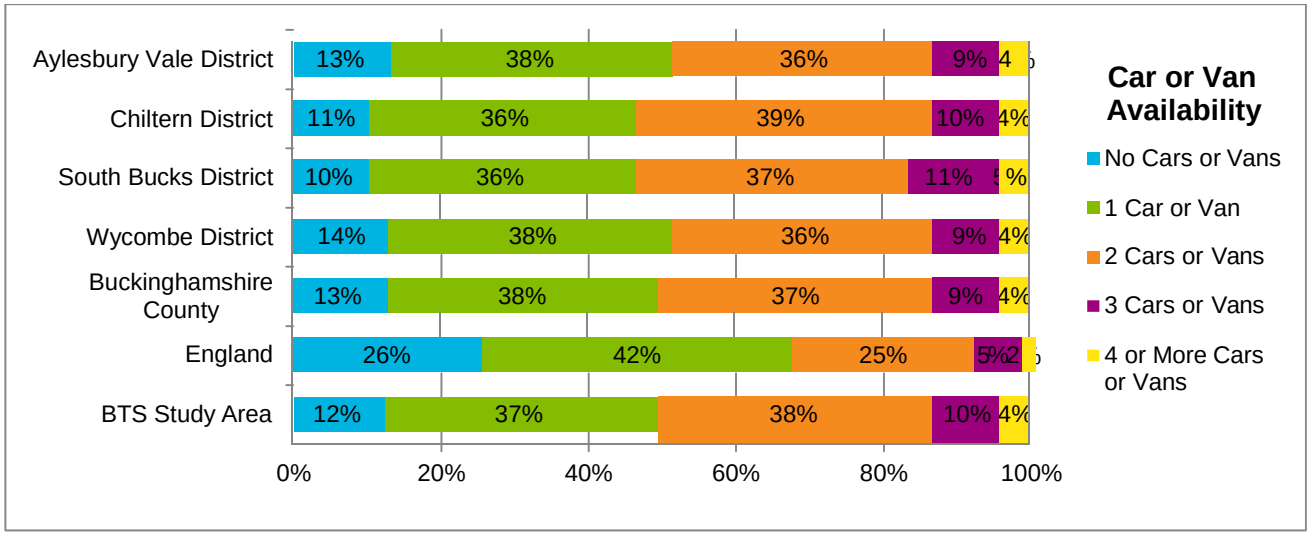
Car Availability

2.1.13 Table 2.3 and Figure 2.6 show the level of car availability in the study area and suggest a consistent pattern with that of Aylesbury Vale and the rest of Buckinghamshire. 88% of households own at least one car, compared to 83% in Aylesbury Vale district.

Table 2.3: Car or Van Availability[21]

Area	Households					Households All Cars or Vans in the Area	
	No Cars or Vans	1 Car or Van	2 Cars or Vans	3 Cars or Vans	4 or More Cars or Vans		
Aylesbury Vale District	9,244	26,465	25,100	6,139	2,458	69,406	106,185
Chiltern District	4,018	13,357	14,226	3,804	1,541	36,946	60,096
South Bucks District	2,711	9,591	9,845	2,966	1,401	26,514	44,527
Wycombe District	9,288	25,887	24,248	5,973	2,465	67,861	103,330
Buckinghamshire County	25,261	75,300	73,419	18,882	7,865	200,727	314,138
England	5,691,251	9,301,776	5,441,593	1,203,865	424,883	22,063,368	25,696,833
BTS Study Area	1,114	3,324	3,379	859	322	8,998	14,103

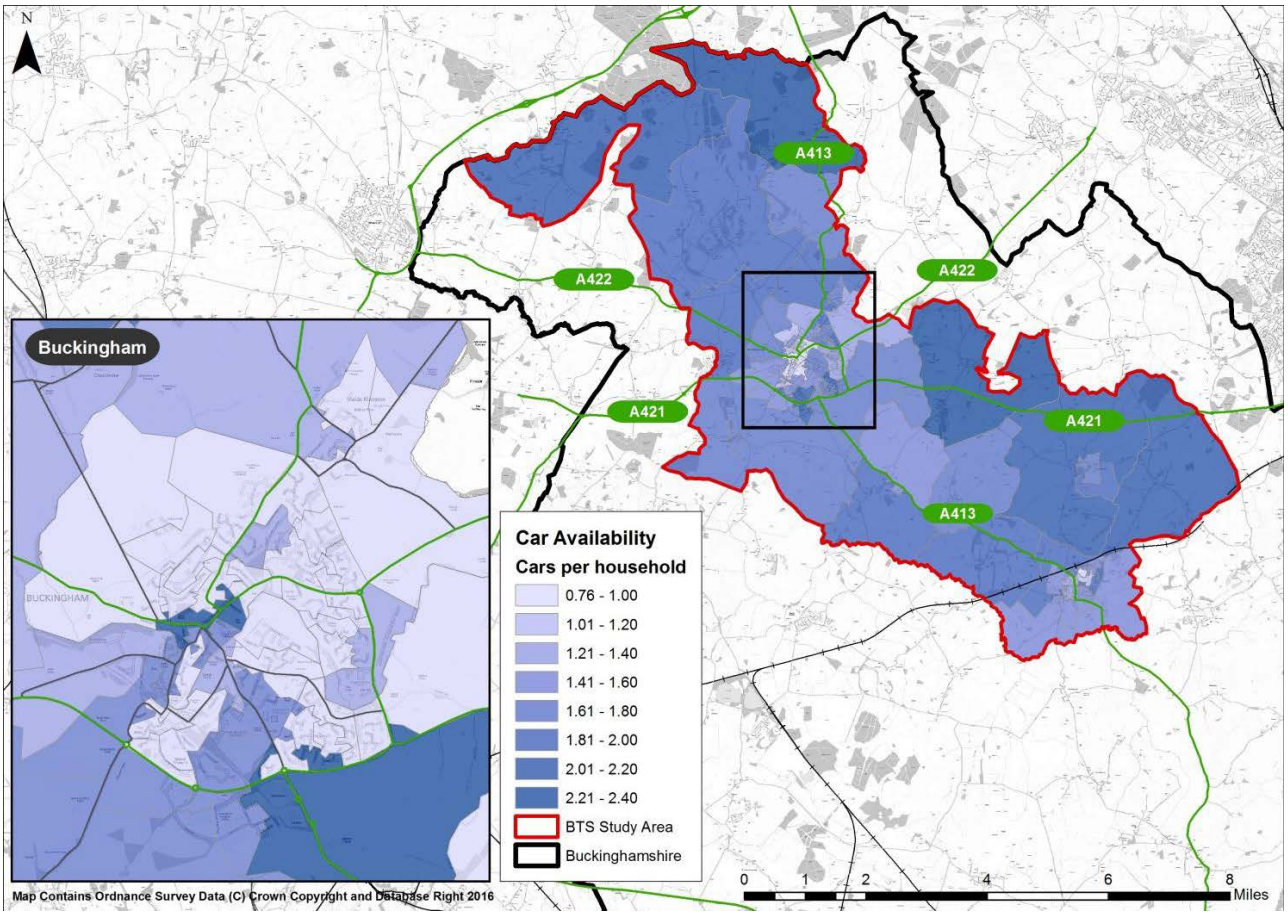
Figure 2.6: Car or Van Availability[22]



2.1.14 Figure 2.7 illustrates the spatial distribution of car/van availability in the study area. The areas with the lowest rates of car/van availability are in the urban centres of Buckingham and Winslow, reflecting the greater provision of public transport and/or higher rates of walking and cycling.

[21] Source: Census 2011 (Table KS 404 EW)
[22] Source: Census 2011 (Table KS 404 EW)

Figure 2.7: Map showing car availability across the study area



Journey to Work Trip Patterns

Modal Split

2.1.15 Figure 2.8 shows the modal share of journeys to work made by usual residents of the BTS study area aged 16-74. The data is based on 2011 Census data for the relevant Output Areas. As expected given its context and location, there is a strong reliance among study area residents on use of a car or van to drive to work (69%).

2.1.16 When compared against values for southeast England (excluding London) as a whole, the proportions are broadly similar (see Table 2.4). The most significant differences are in car/van usage (8% higher than SE England) and train usage (4% lower than SE England), most likely due to a lack of train station.

Figure 2.8: Modal share – Journeys to work by BTS Study Area Residents[23]

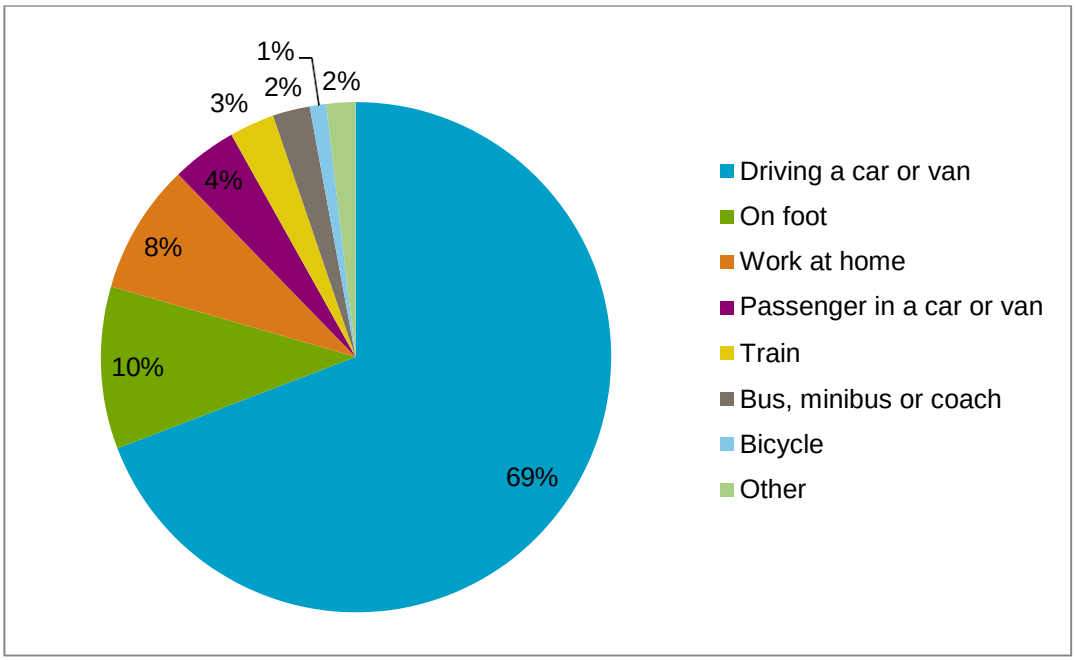


Table 2.4: Journey to Work Modal Split[24]

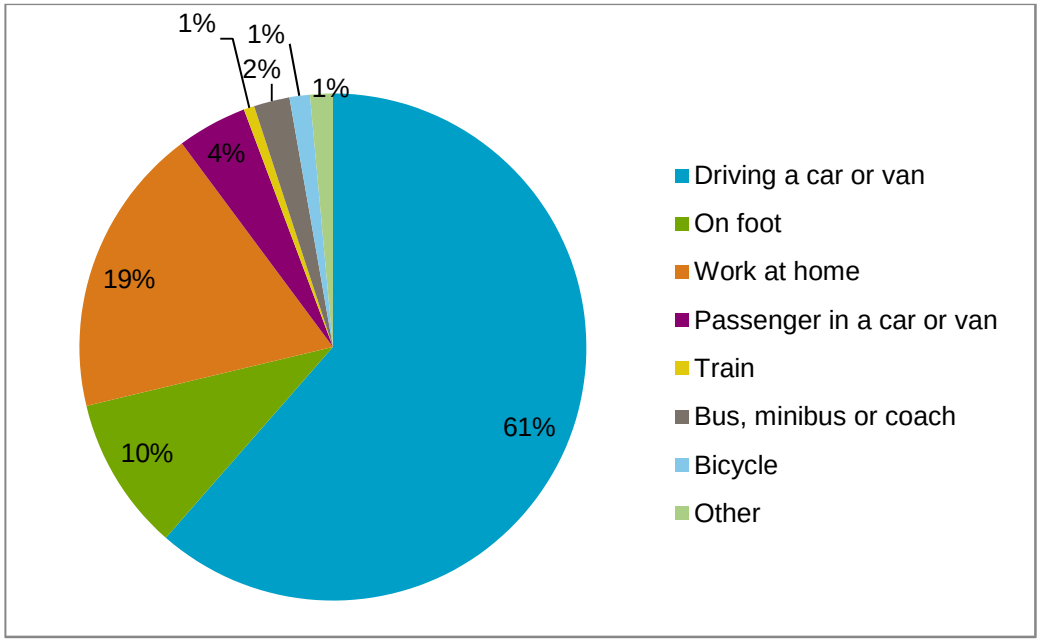
Mode	BTS Study area residents	Southeast England residents (ex. London)
Driving car/van	69%	61%
On foot	10%	11%
Work at home	8%	7%
Passenger in car/van	4%	5%
Train	3%	7%
Bus, minibus or coach	2%	4%
Bicycle	1%	3%
Other	1%	1%

2.1.17 Figure 2.9 shows the modal share of journeys made to work made by the workplace population[25] of the BTS study area. Note that this data is produced in terms of Census Workplace Zones (not Output Areas) and therefore it has been necessary to define a "proxy study area" as a close approximation. This is not expected to materially alter the conclusions drawn from this analysis.

2.1.18 As with journeys to work made by residents of the study area, those who work in the study area are heavily dependent on car or van usage to reach their workplace (61%). There is a significant proportion of the population that works from home (19%), most of which is concentrated in the more rural areas of the study area.

[23] Source: Census 2011 (Table QS 701 EW)
[24] Source: Census 2011 (Table QS 701 EW)
[25] Workplace population is an estimate of the population working in an area.

Figure 2.9: Modal share – Journeys to work made by BTS Study Area Workers[26]



Origin/Destination Patterns of Commuters

2.1.19 In addition to modal share, Census information also provides detail on the origin/destination patterns of commuters. Note that this data is produced in terms of Census Middle Super Output Areas, and as such it has been necessary to define a "proxy study area" as a close approximation.

2.1.20 Table 2.5 presents the workplaces of BTS study area residents, and shows that approximately half the population stays within the Aylesbury Vale district, and a further ~19% works in Milton Keynes. The data does not suggest a strong commuting tie with London or any other more distant destinations.

Table 2.5: Workplaces of BTS Study Area Residents (Top Ten Places of Work) [27]

Place of Work	Workers Count	Workers Percentage
Aylesbury Vale	2950	49.40%
Milton Keynes	1120	18.80%
Cherwell	369	6.20%
South Northamptonshire	334	5.60%
Oxford	121	2.00%
Central Bedfordshire	86	1.40%
Westminster, City of London	86	1.40%
Wycombe	77	1.30%
Northampton	73	1.20%
South Oxfordshire	45	0.80%
Other	710	11.90%
Total	5971	100%

2.1.21 Table 2.6 summarises the residences of BTS study area workers, and shows that the study area primarily attracts workers who live within the Aylesbury Vale district. To a lesser extent, the study area also attracts workers from Milton Keynes and South Northamptonshire districts.

[26] Source: Census 2011 (Table WP 703 EW)
[27] Source: Census 2011 (Table WU 03 EW)

Table 2.6: Residences of BTS Study Area Workers (Top Ten Usual Residences) [28]

Usual Residence	Workers Count	Workers Percentage
Aylesbury Vale	3106	57.90%
Milton Keynes	730	13.60%
South Northamptonshire	666	12.40%
Cherwell	225	4.20%
Central Bedfordshire	82	1.50%
Northampton	81	1.50%
Daventry	31	0.60%
South Oxfordshire	25	0.50%
Oxford	24	0.40%
Chiltern	22	0.40%
Other	372	6.90%
Total	5364	100%

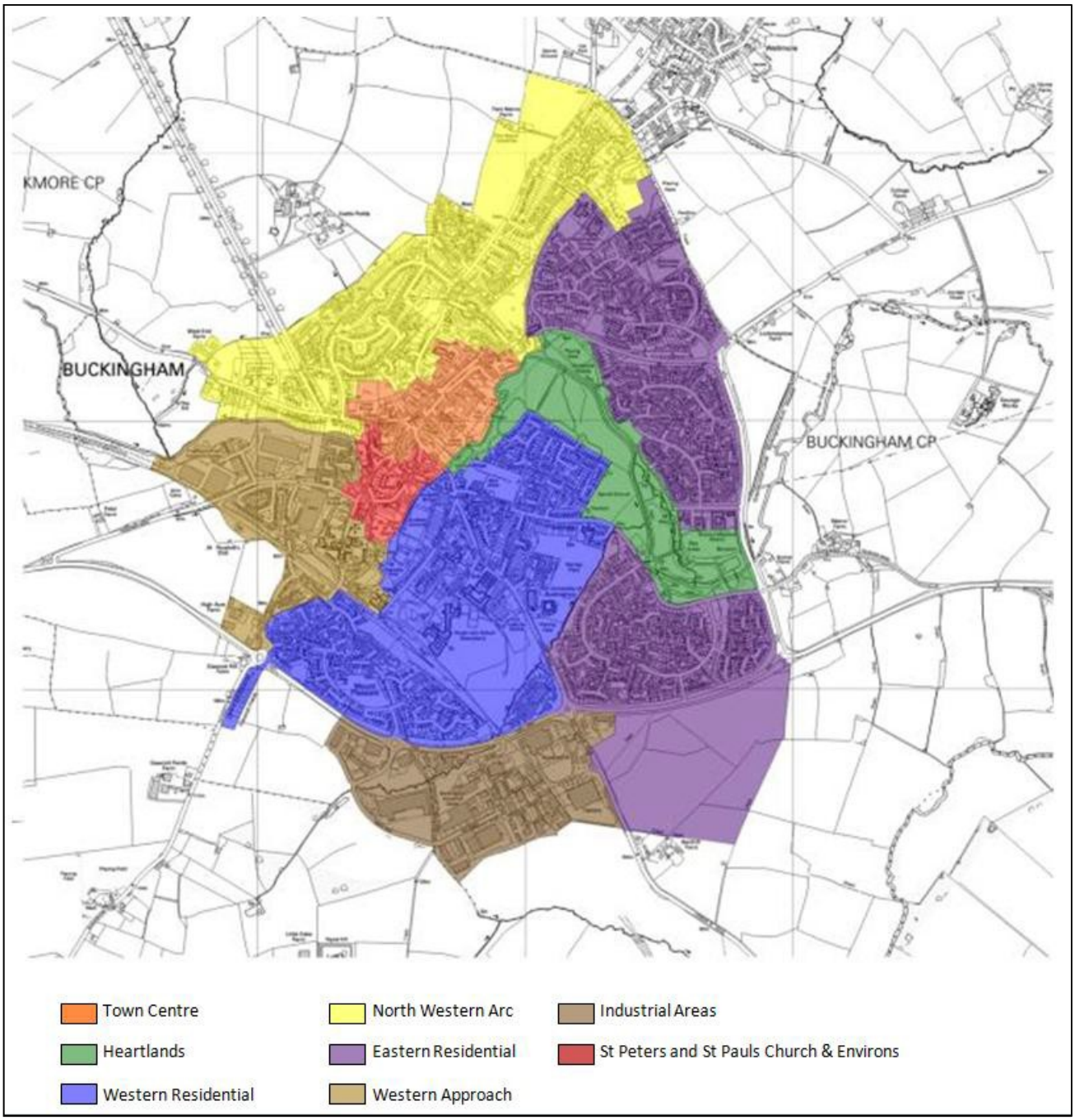
2.1.22 Analysis of Census Data[29] also shows that of the 4,222 workers in Buckingham town, 1843 (~44%) of these are residents within the BTS study area.

[28] Source: Census 2011 (Table WU 03 EW)
[29] Source: Census 2011 (Table WF 02 EW)

Existing Land Use

2.1.23 Figure 2.10 shows the existing land use characteristics in the town of Buckingham[30]. The town centre is focussed around its High St, and there are two industrial areas on the town's southern and western fringes. The remaining land use is predominantly residential/recreational.

Figure 2.10: Existing Land Use Categories



[30] Made Version – Buckingham Town Council, October 2015

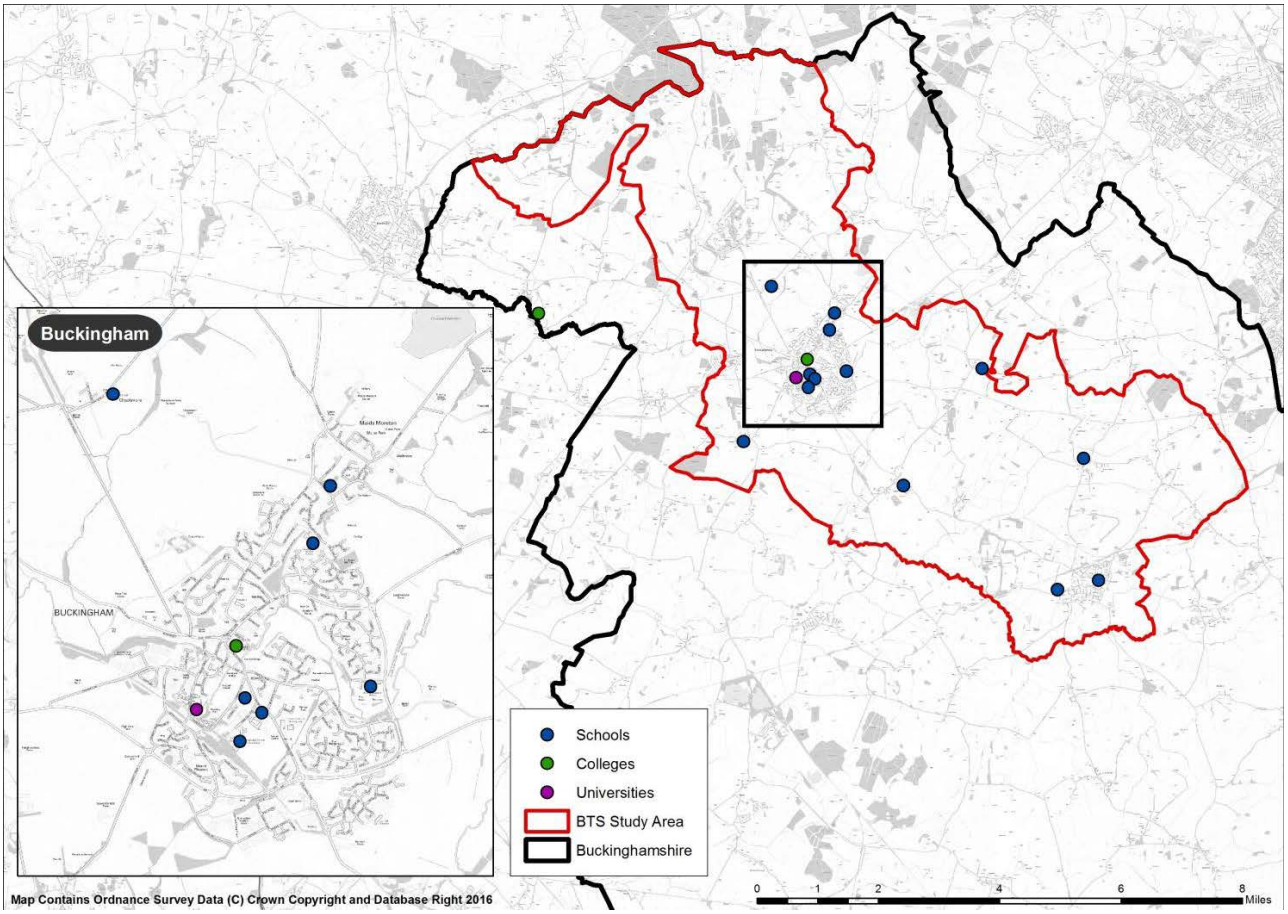
Education

2.1.24 Figure 2.11 shows the locations of education institutions (schools, colleges and universities) within the BTS study area. The town (including Maids Moreton) has four primary schools, two secondary schools, one adult learning centre (college) and one university.

2.1.25 The University of Buckingham is represented by its main Hunter St site, however, it is recognised that the university has premises elsewhere in the town.

2.1.26 Issues in relation to parking and transport arrangements in the vicinity of Buckingham's schools have been raised during the development of the BTS. It is, however, beyond the scope of this transport strategy to consider individual access arrangements on a site-by-site basis.

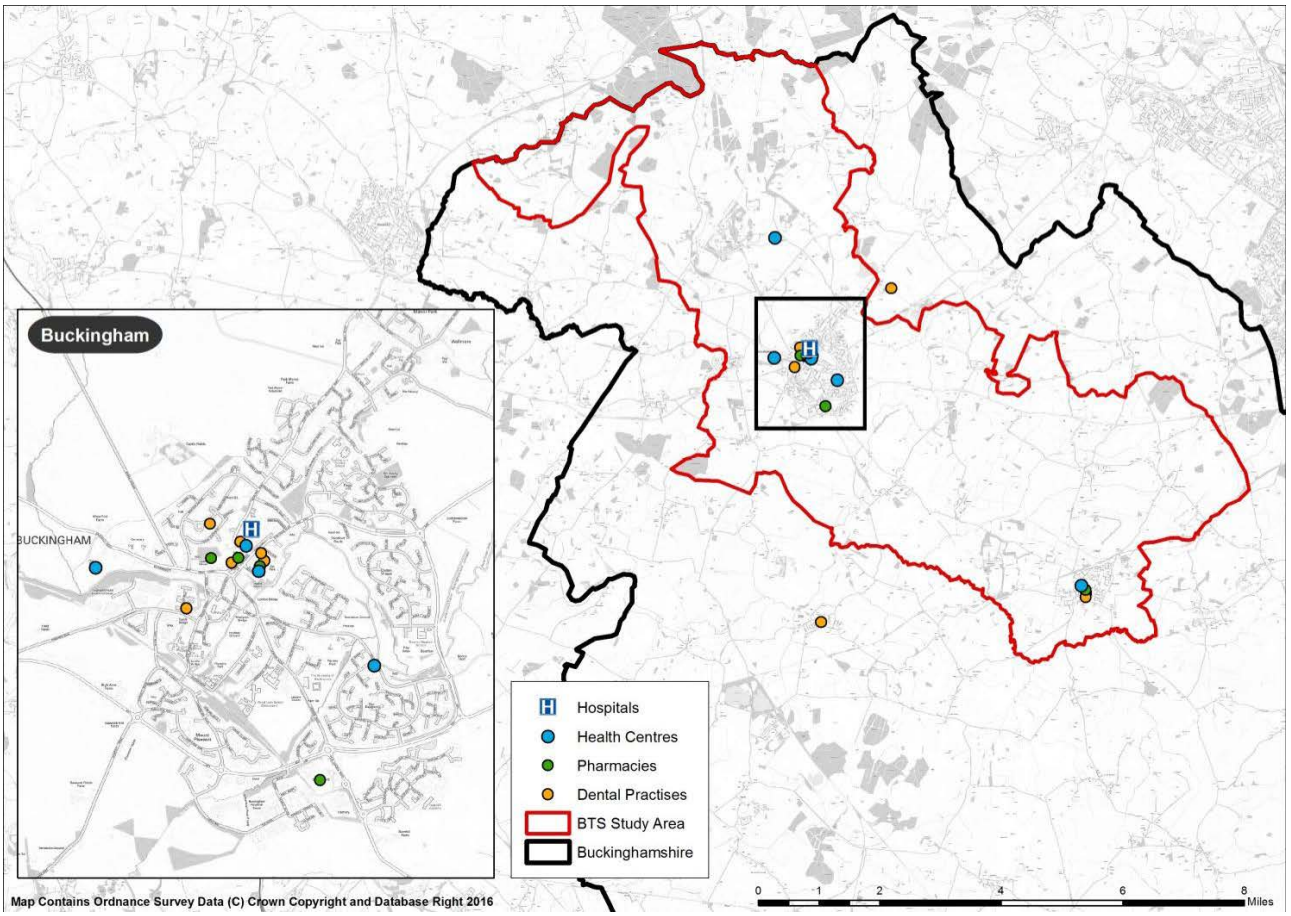
Figure 2.11: Education Institutions in the BTS Study Area



Health

2.1.27 Figure 2.12 shows the locations of healthcare facilities in the BTS study area and illustrates that the main concentration is in Buckingham town centre. The most significant facility is the Buckingham Community Hospital.

Figure 2.12: Healthcare Facilities in the BTS Study Area



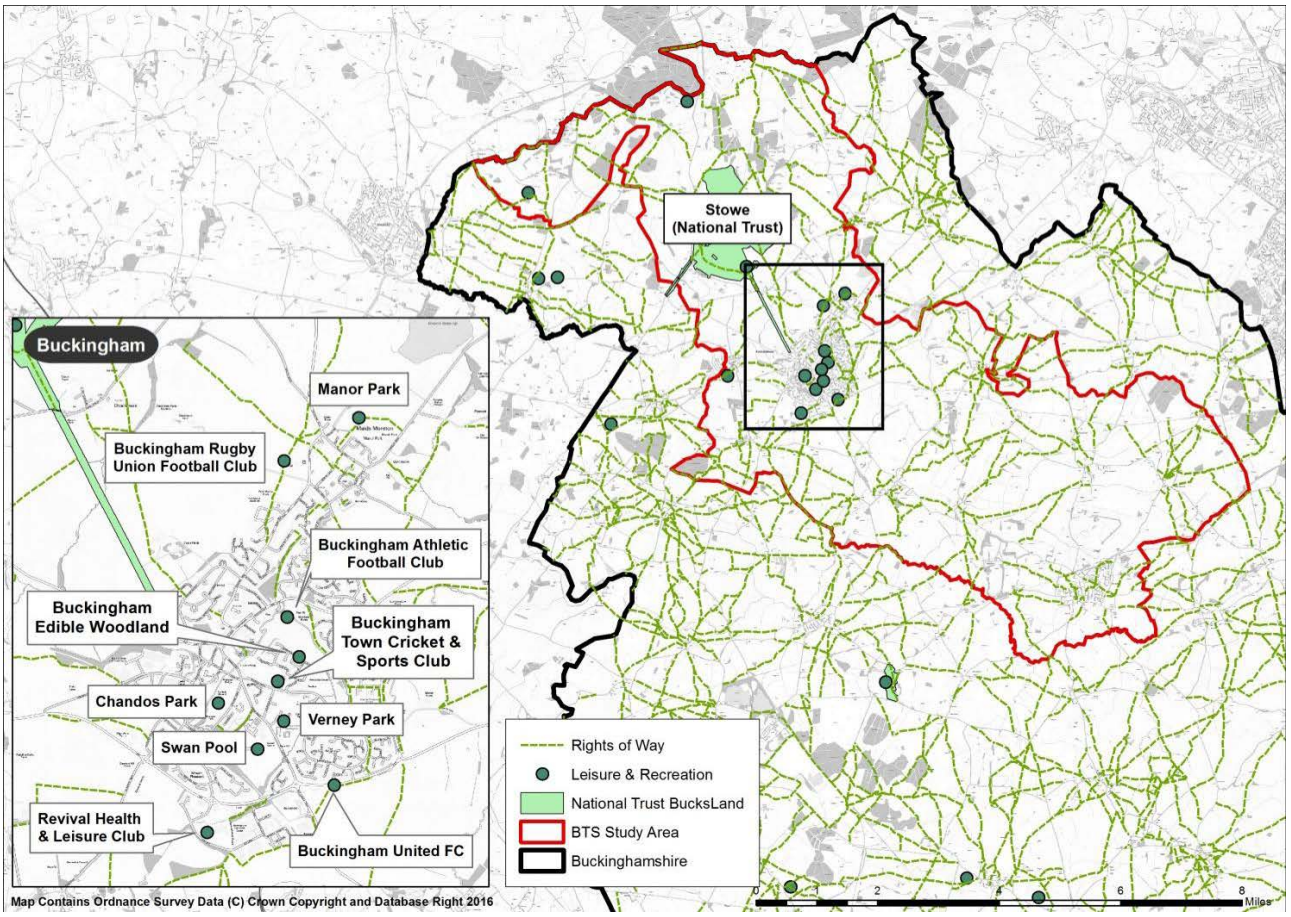
Community and Recreation

2.1.28 Figure 2.13 shows the locations of public rights of way, leisure/recreation facilities, and the Stowe National Trust property in in the BTS study area.

2.1.29 The leisure/recreation facilities are primarily in the town of Buckingham itself, and include various sports clubs, parks, a leisure centre and a public swimming pool.

2.1.30 The Stowe National Trust property is approximately 2 miles north of the town centre, and is considered a significant local tourist attraction. At the BTS Workshop (September 2016), it was highlighted that Buckingham should be further promoted as a tourist destination that (given its proximity) is visited in combination with Stowe.

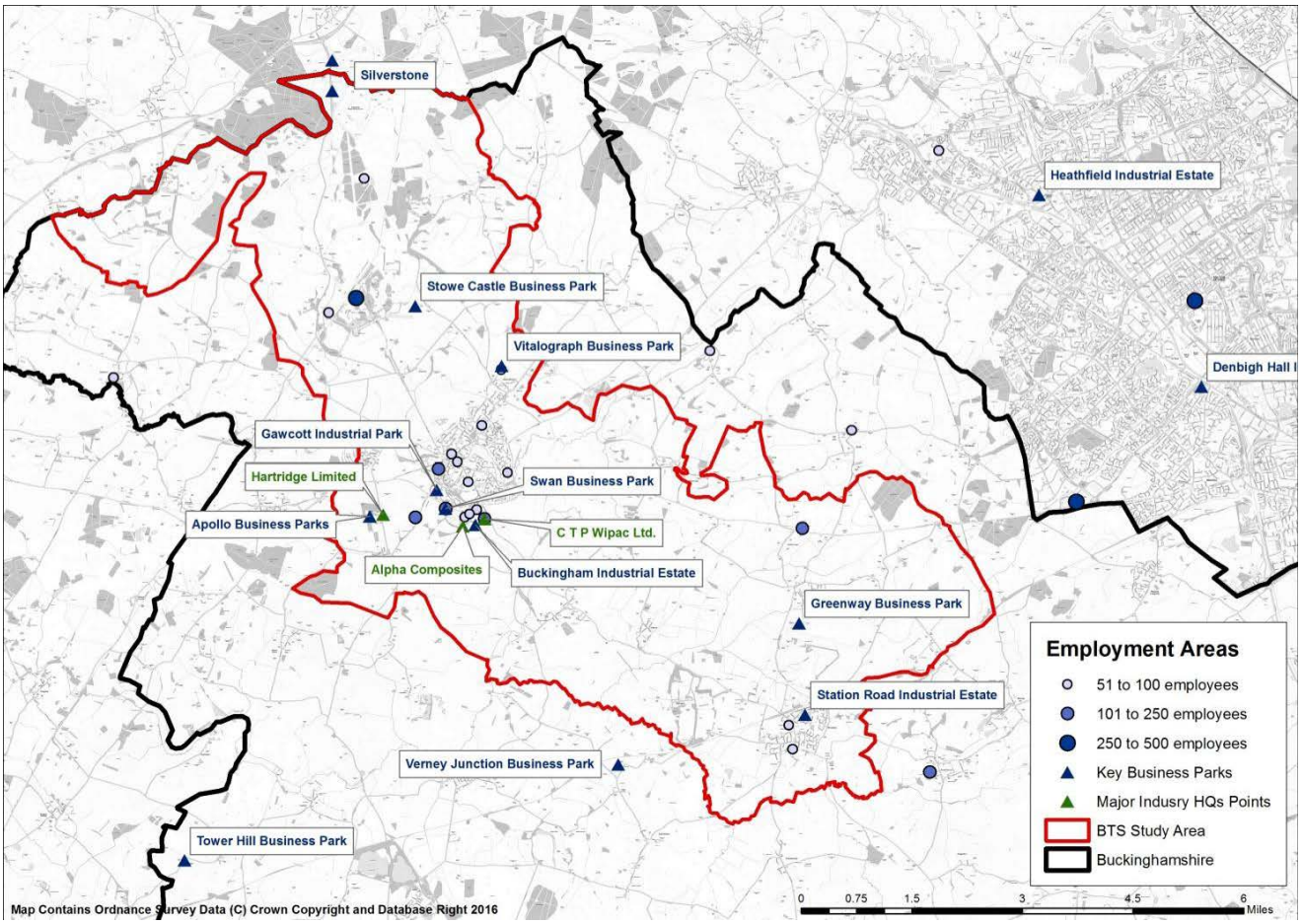
Figure 2.13: Community and Recreation spaces in the BTS Study Area



Employment Areas

2.1.31 The main employment areas, key business parks and major industry HQs are illustrated in Figure 2.14. The largest employment areas are Buckingham town centre and the industrial estate to the south of the A421.

Figure 2.14: Employers by size and relevant Employment Areas in the BTS Study Area



Air Quality

2.1.32 There are currently no Air Quality Management Areas (AQMAs) within the BTS study area. It is envisaged, however, that the transport schemes that address objectives 1 (encouraging active travel and public transport) and 5 (managing congestion) should also contribute to air quality improvements, particularly within Buckingham town centre.

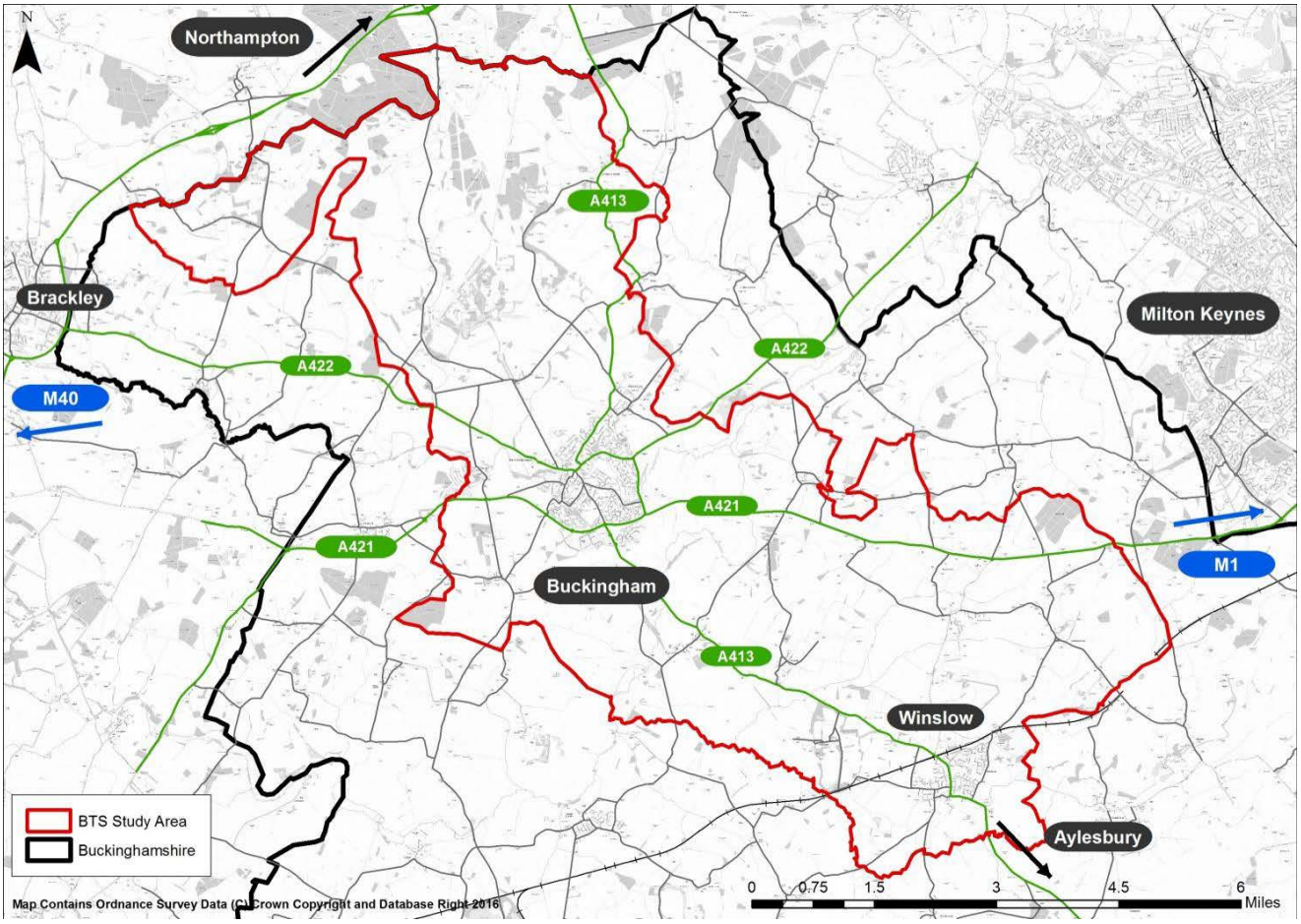
2.2 Highway Network

Existing Highway Network

2.2.1 Figure 2.15 shows the key A-roads in the BTS study area, including the A421, A422 and A413:

- A421: the primary east/west route through northern Buckinghamshire and provides strategic access between the M1, M40, and Milton Keynes
- A422: east/west route between M40 and northern Milton Keynes via Buckingham
- A413: north/south route between Aylesbury and A43 (near Silverstone) via Buckingham

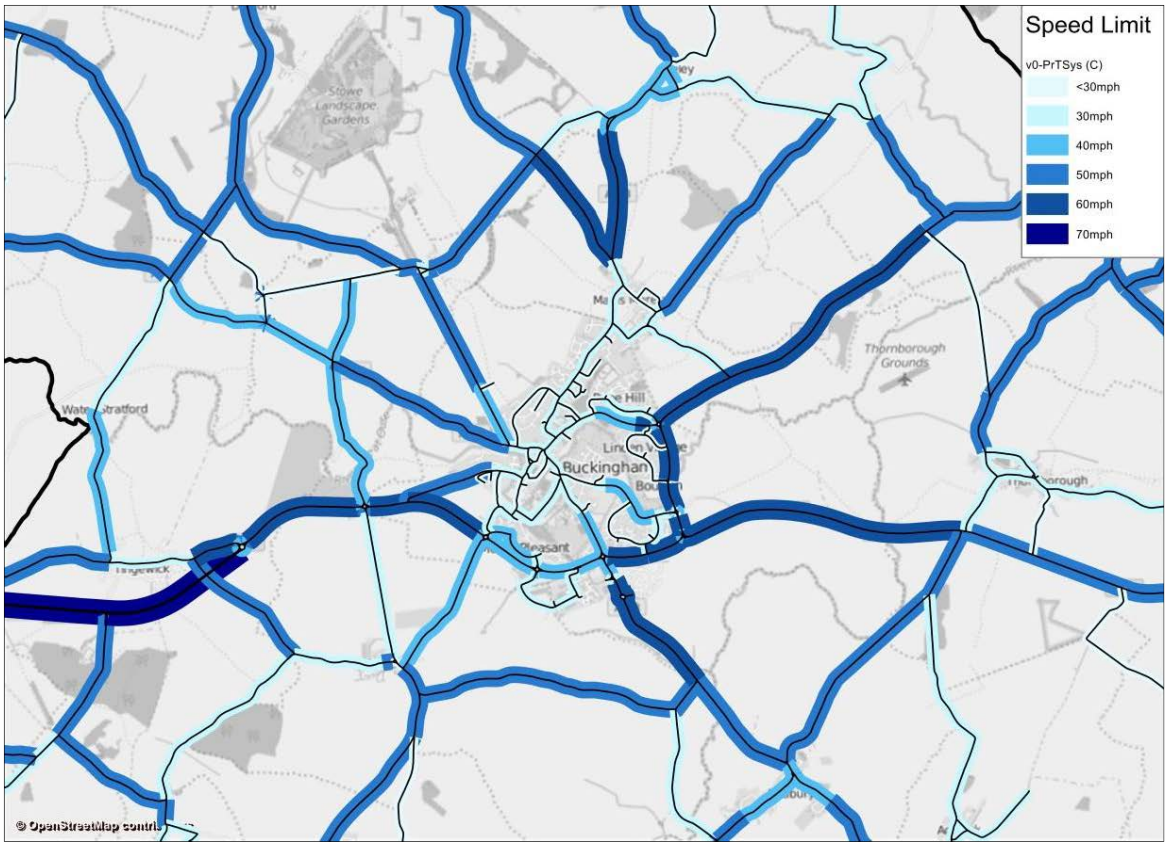
Figure 2.15: Key A roads in the BTS study area



2.2.2 Buckingham's surroundings are principally characterised by rural land uses and small villages. The nearest large urban centre is Milton Keynes (~22km), accessible via the A421 and A422. The routes into/out of the town are single carriageways controlled by priority junctions, and are predominantly free flowing (except in very close proximity to Buckingham where some congestion occurs – see Figure 2.21 and Figure 2.22).

2.2.3 Figure 2.16 shows the speed limits on the highway network around Buckingham as defined in the Countywide VISUM model. The town's radial routes mainly have speed limits of 50mph or higher, the main exceptions to which are the A421 directly to the south of the town (40mph) and Gawcott Rd (40mph). Within the town itself, speed limits are generally below 40mph.

Figure 2.16: Speed limits for roads in Buckingham[31]



2013 Traffic Volumes

2.2.4 Traffic volumes from the Buckinghamshire Countywide VISUM model (maintained by Jacobs) are shown in Figure 2.17 and Figure 2.18 for the 2013 base year. It should be noted that as a strategic model, flows on individual links within the town centre should be interpreted with a degree of caution.

2.2.5 The figures show that traffic volumes range from 250 to 1250 vehicles during the peak hours. The highest volumes are recorded on the key inbound/outbound routes i.e. the A421, A422 and A413. In the town itself, modelled flow volumes are highest on High St, Stratford Rd, West St, London Rd and the A413.

[31] Speed limits as defined in the Jacobs Buckinghamshire Countywide VISUM Model

Figure 2.17: AM Peak Link Flows in Buckingham, 2013[32]

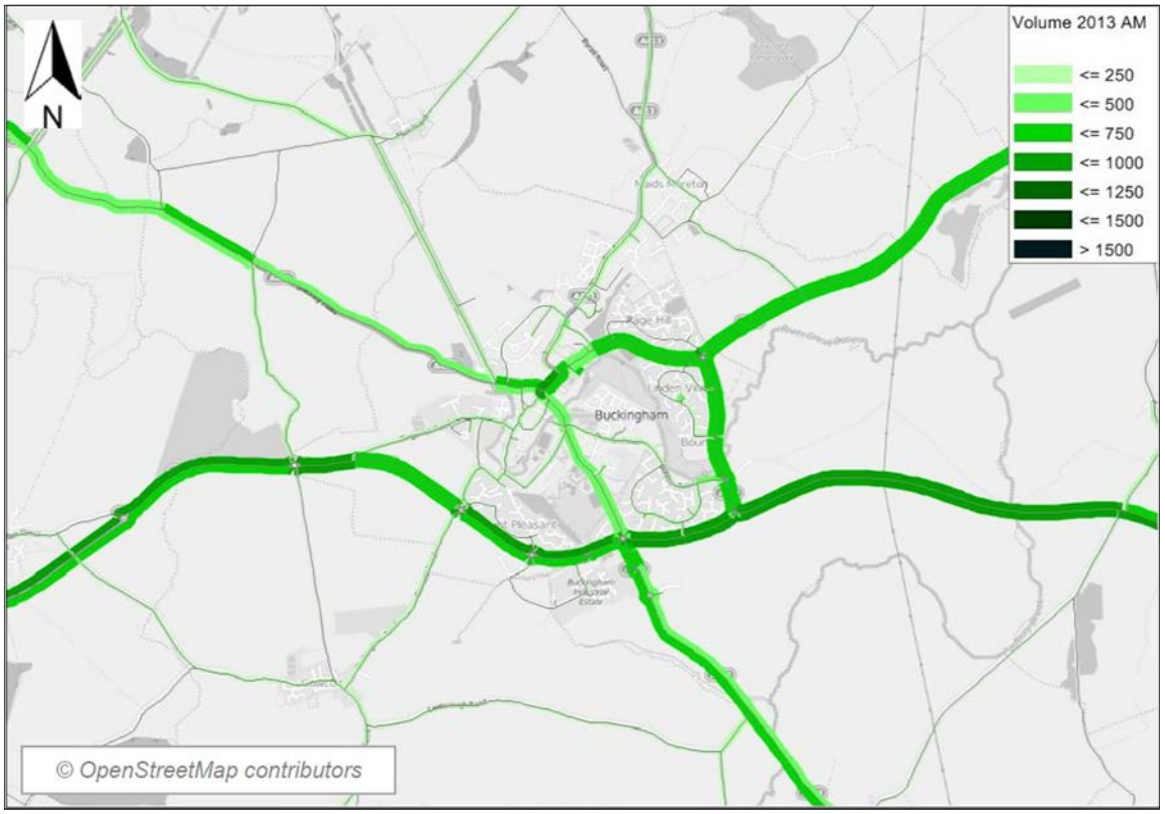
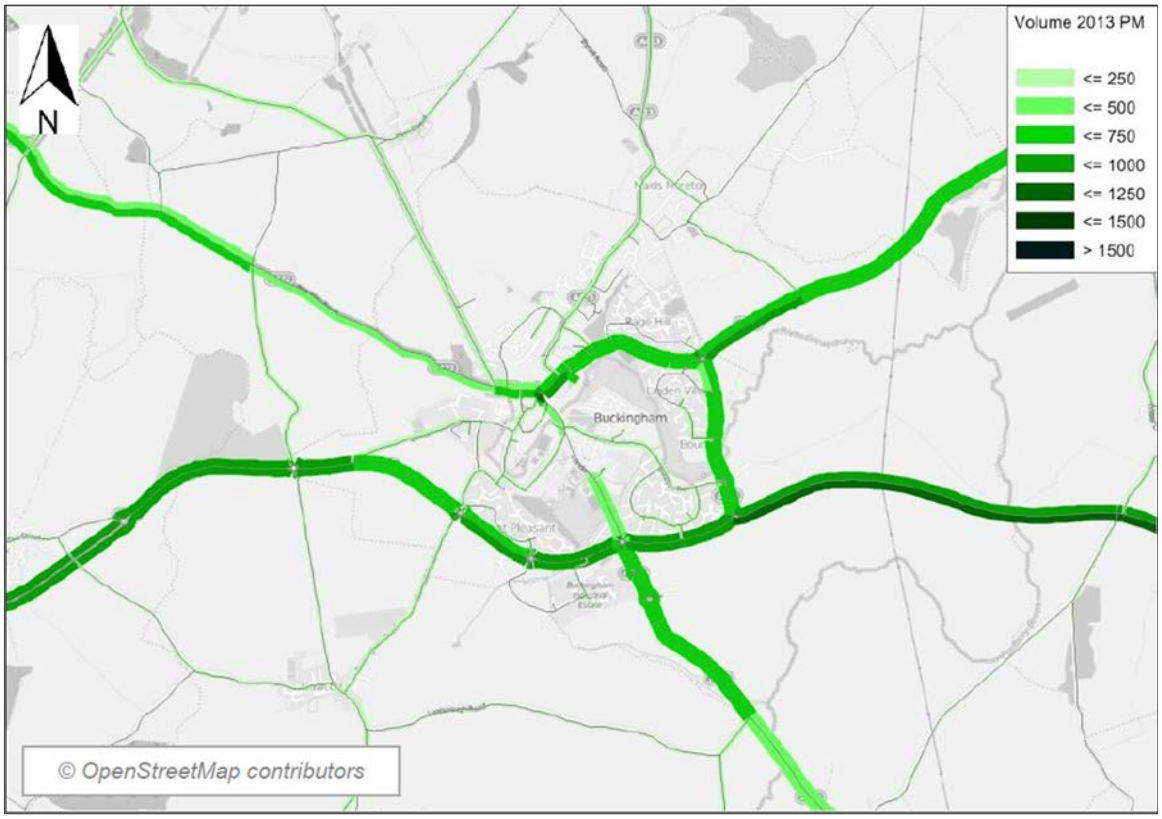


Figure 2.18: PM Peak Link Flows in Buckingham, 2013[33]

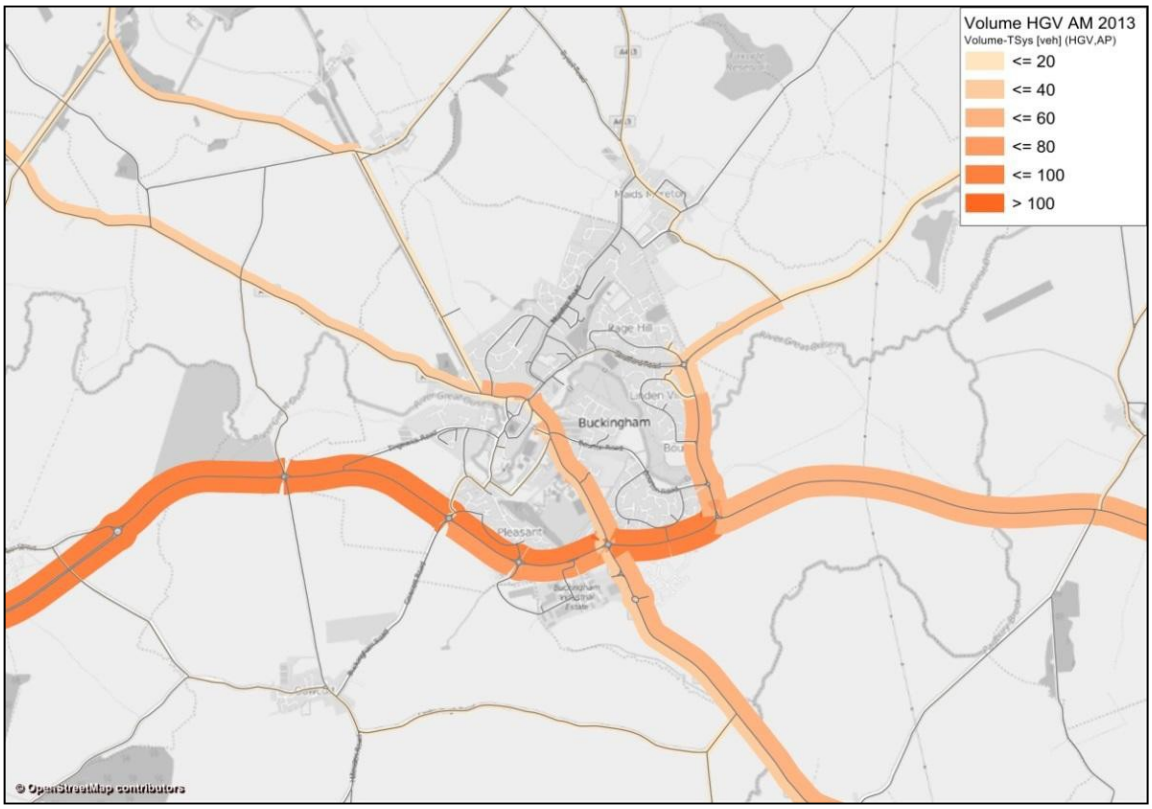


[32] Source: Buckingham Area Transport Study. September 2015, Jacobs
[33] Source: Buckingham Area Transport Study. September 2015, Jacobs

2013 HGV Volumes

2.2.6 Figure 2.19 shows HGV volumes around the Buckingham area in the morning peak (evening peak plot can be found in *Appendix I: 2013 Model HGV Volumes*). HGVs are mainly limited to the A421; however, there is some usage of London Rd, West St and the A413. The evening peak shows a similar pattern of HGV movements, however, lower volumes than the morning. A study[34] undertaken by Arup in 2011 suggests that there is concern about the volume of HGV trips through the town, particularly given the narrow and historic nature of its streets.

Figure 2.19: AM HGV Flows in Buckingham, 2013[35]

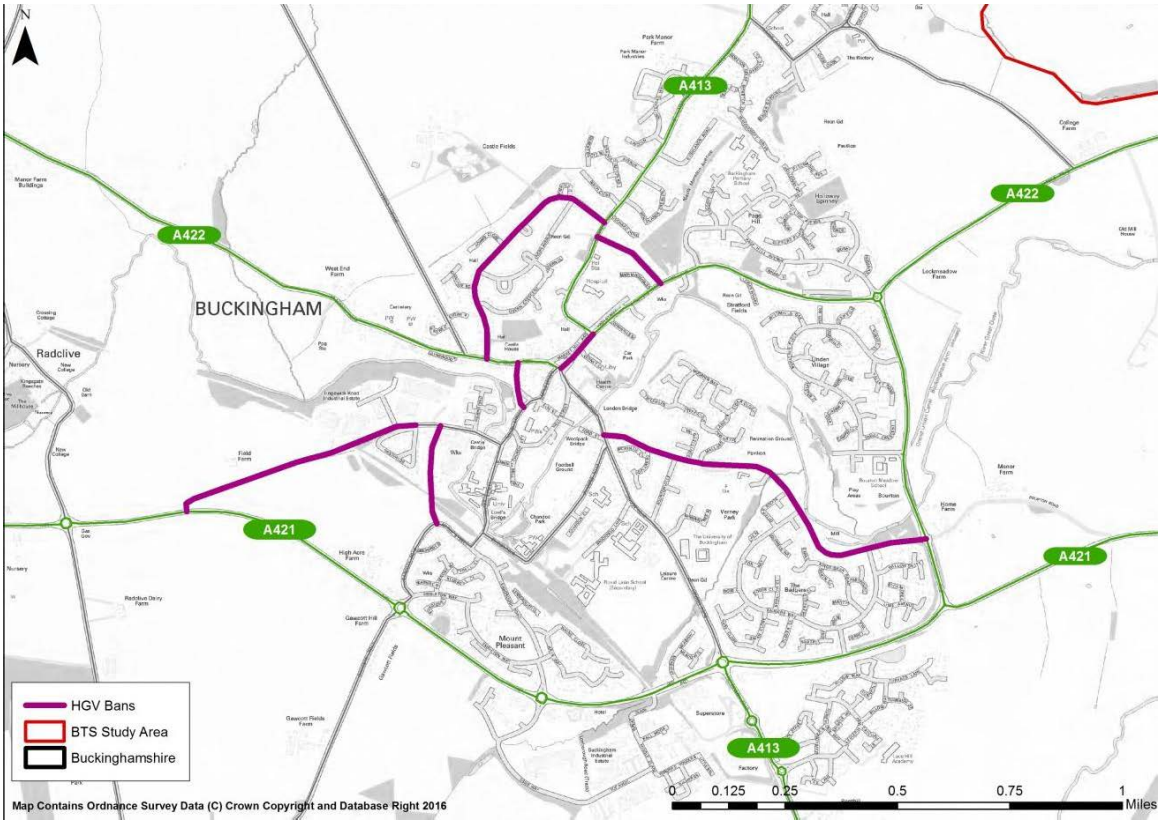


[34] Aylesbury Vale Advantage Ltd – Buckingham Town Centre: Parking and Sustainable Transport Study (Arup, February 2011)

[35] Source: Buckinghamshire Countywide VISUM Model

2.2.7 The roads in Buckingham on which HGVs are banned are shown in Figure 2.20.

Figure 2.20: HGV Bans in Buckingham[36]



2013 Network Performance

2.2.8 Congestion ratio results from the Buckinghamshire Countywide VISUM model (maintained by Jacobs) are shown in Figure 2.21 and Figure 2.22 for the AM and PM peaks. As a strategic tool, the VISUM is not intended to estimate vehicle interactions and delay at individual junctions; however, a high level understanding of congestion can be obtained.

2.2.9 Congestion ratio is defined as the ratio of the travel time in the model and the free flow travel time. Note that there is no standard methodology for describing what is and what is not an acceptable level of congestion.

2.2.10 Modelling suggests that much of the network operates within capacity, however, congestion is indicated on the approaches to two main junctions in the town centre:

- Market Square / Bridge St / West St roundabout – junction of two main routes into Buckingham town centre (traffic from A421 and A422)
- High St / Moreton Rd roundabout – junction of main road through town centre and northern radial route (A413)

[36] Source: Buckinghamshire Countywide VISUM Model

Figure 2.21: AM Peak Performance Plots in Buckingham, 2013[37]

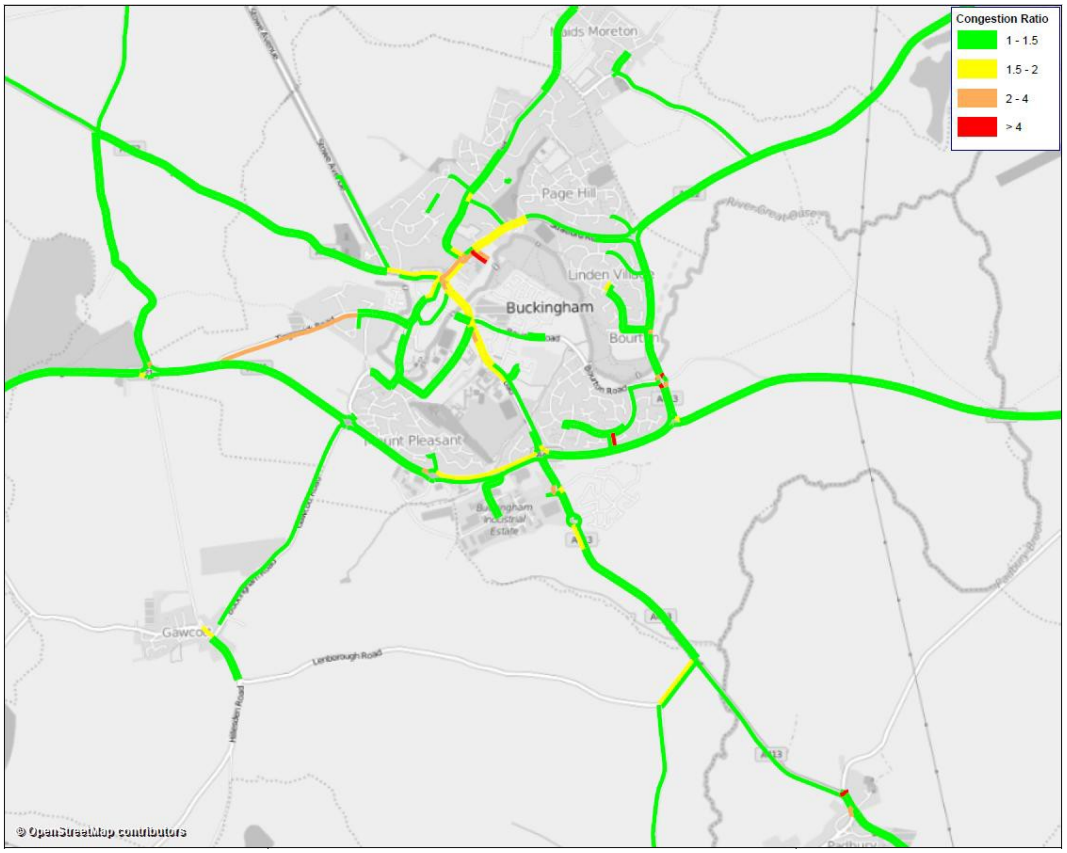
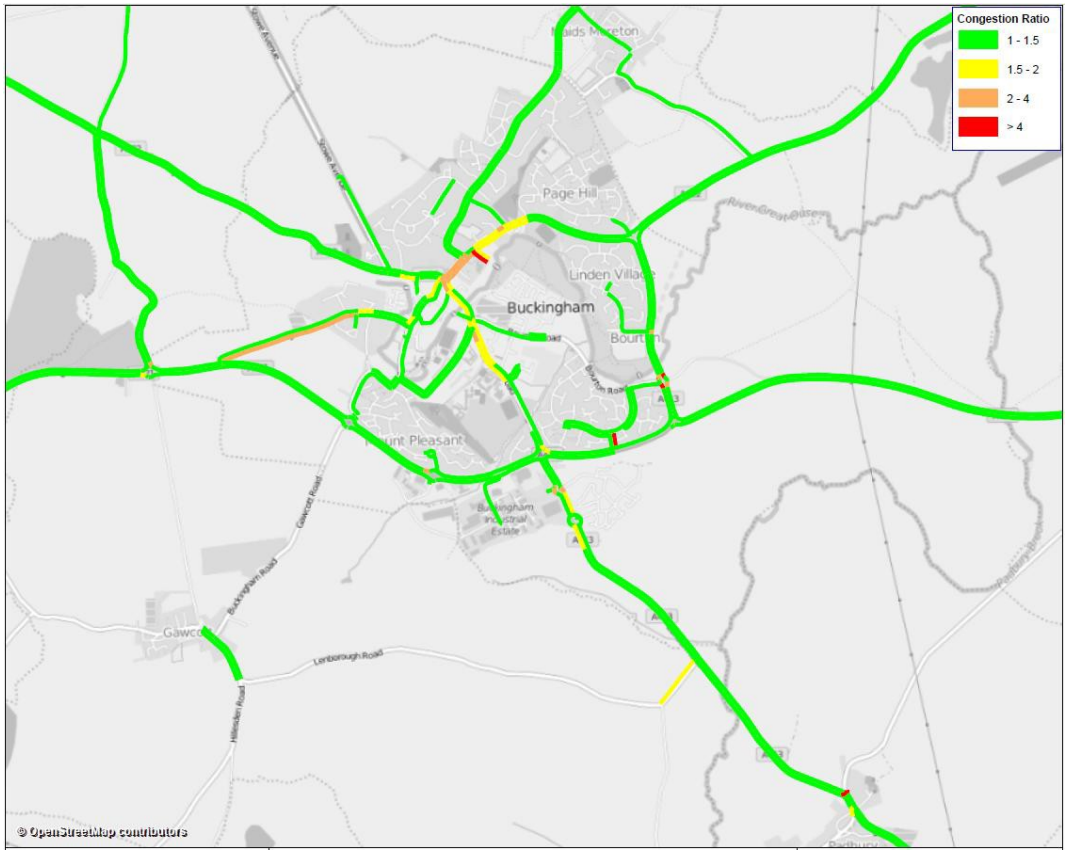


Figure 2.22: PM Peak Performance Plots in Buckingham, 2013[38]



[37] Source: Appendix A – Forecast Modelling Report – Countywide Local Plan Modelling – June 2016, Jacobs
[38] Source: Appendix A – Forecast Modelling Report – Countywide Local Plan Modelling – June 2016, Jacobs

Users of Key Routes

2.2.11 Select Link Analysis (SLA) was undertaken using the 2013 Buckinghamshire Countywide VISUM transport model for the key radial routes in and out of Buckingham. SLA isolates the users of a specified link (or links) and displays the origins, destinations and routing of these users. The figures in this section show the SLA for the AM Peak. The PM peak plots can be found in *Appendix II: PM Peak Select Link Analysis Plots.*

2.2.12 The figures show that there are significant volumes of A422 through-traffic using Buckingham High St in both directions in both peak periods. Modelling suggests that these trips are predominantly catering for movements from the M40 (north) to Milton Keynes in the AM peak, and the reverse in the PM peak.

2.2.13 The model also indicates significant volumes of north-south through-traffic. This through-traffic uses the A413 south of Buckingham and Stowe Ave/A413 north of Buckingham. These trips are predominantly catering for movements between the M1 (near Northampton) and Aylesbury/Winslow.

Table 2.7: Buckingham Through-traffic

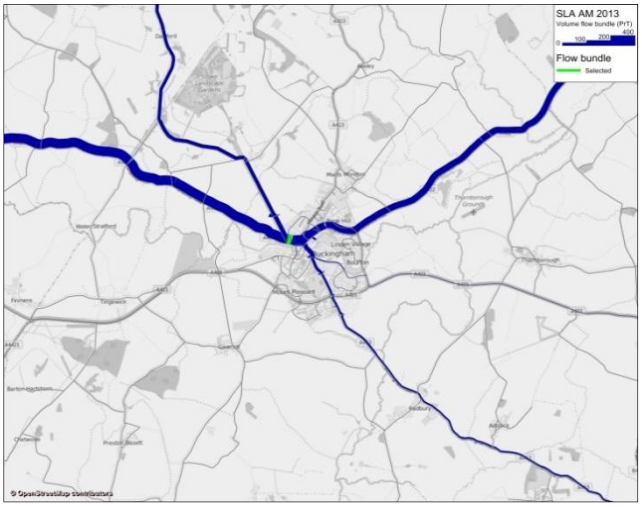
Movement and Time Period	Total volume on road used in town centre	Volume of Through-traffic	% Through-traffic
Eastbound A422	*High St*		
AM Peak	764	271	35%
PM Peak	709	145	20%
Westbound A422	*High St*		
AM Peak	544	98	18%
PM Peak	756	258	34%
Northbound A413/Stowe Ave	*Bridge St*		
AM Peak	465	152	33%
PM Peak	532	174	33%
Northbound A413/Stowe Ave	*Bridge St*		
AM Peak	394	119	30%
PM Peak	387	101	26%

2.2.14 Indications of through-traffic are also shown from select link analysis on other key radial routes, much of which uses Buckingham High St.

Figure 2.23: AM Peak Select Link Analysis (Inbound) [39]

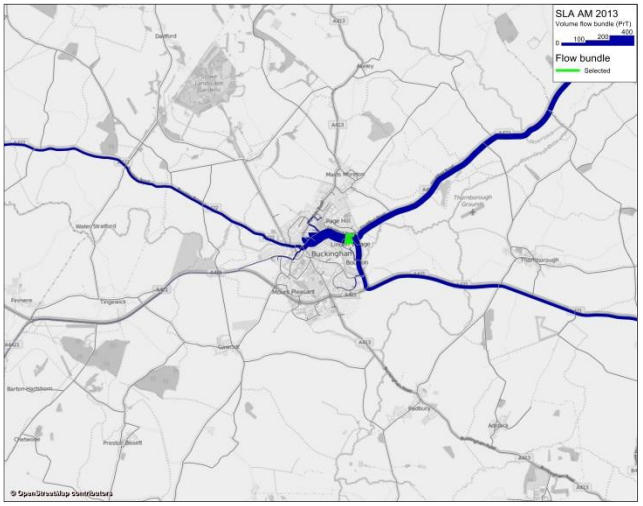
Nelson Street

West Street



Moreton Road

Stratford Road



Bourton Road

London Road

[39] Source: Buckinghamshire Countywide VISUM Model

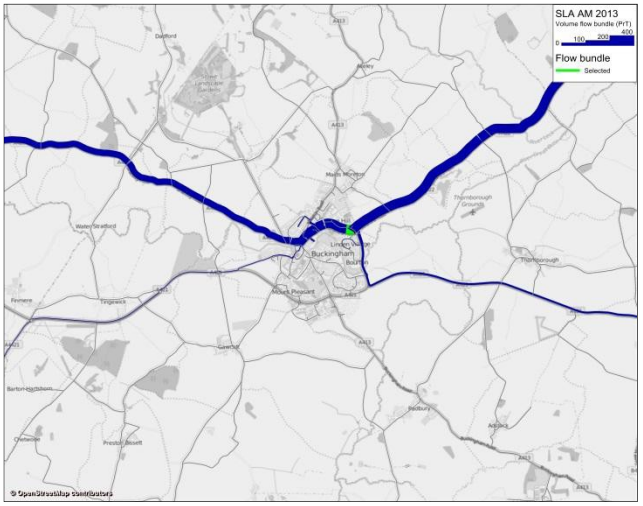
Figure 2.24: AM Peak Select Link Analysis (Outbound) [40]

Nelson Street

West Street

Moreton Road

Stratford Road



Bourton Road

London Road

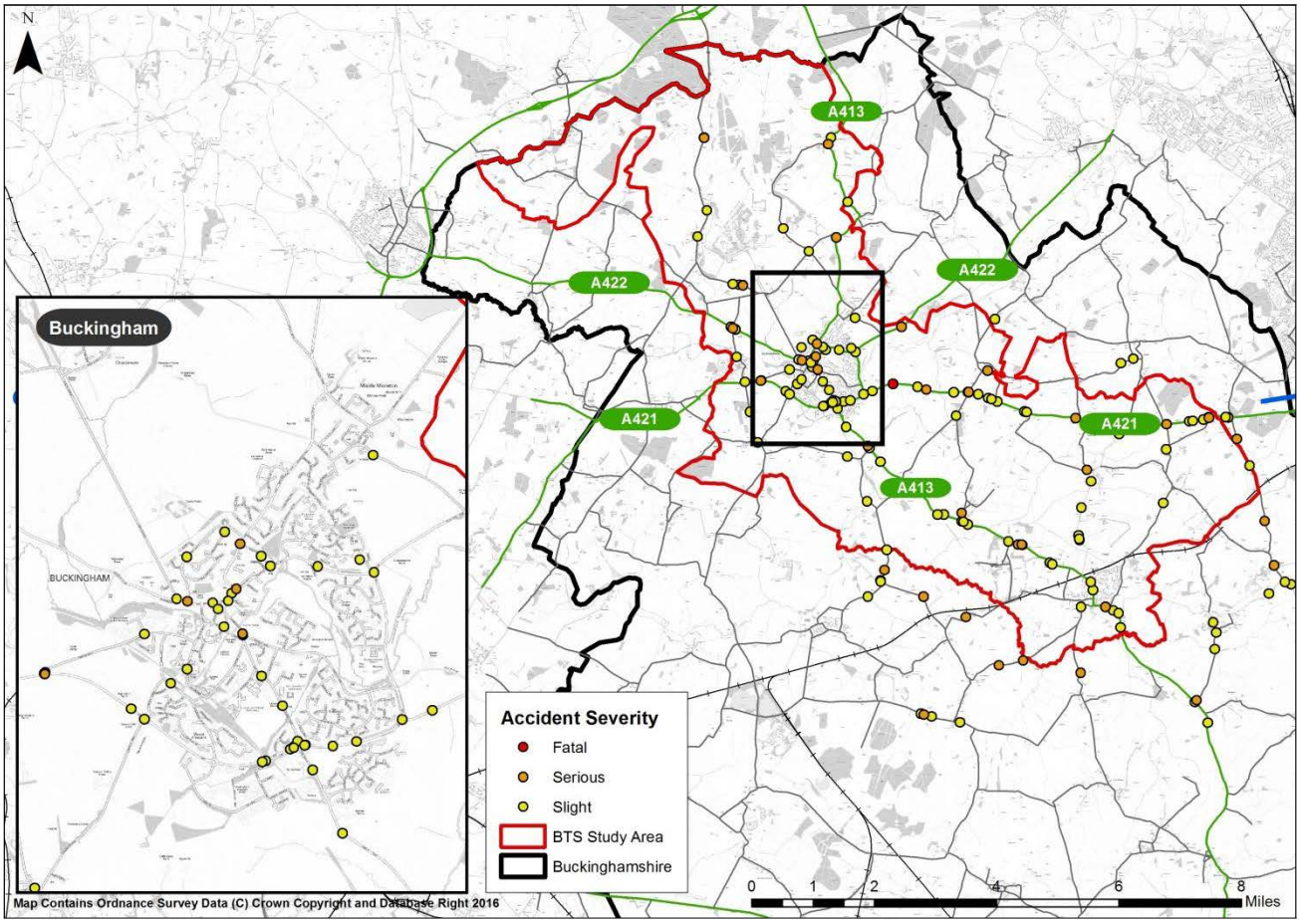
[40] Source: Buckinghamshire Countywide VISUM Model

Road Collision History

2.2.15 Road traffic collision data provided by BCC for May 2013 to May 2016 is shown in Figure 2.25. Initial observations suggest that collisions are particularly prevalent at the following two junctions in the vicinity of Buckingham:

- A421 / London Rd roundabout
- Market Square / Bridge St / West St roundabout

Figure 2.25: Map of Collision Events



2.3 Car Parking

Existing Infrastructure

2.3.1 Figure 2.26 shows the location of public off-street car parking locations in Buckingham town centre. Cornwalls Meadow is the most central and largest car park in Buckingham. The cost of parking in Buckingham town centre is relatively low (Table 2.9 shows the parking costs for Cornwalls Meadow – the other car parks are free of charge), and as such is likely to encourage residents to drive rather than walk or cycle.

2.3.2 In addition to these off-street parking facilities, many of the local residential streets offer unrestricted on-street parking within walking distance of the town centre.

Figure 2.26: Public Off-Street Car Parking Locations[41]

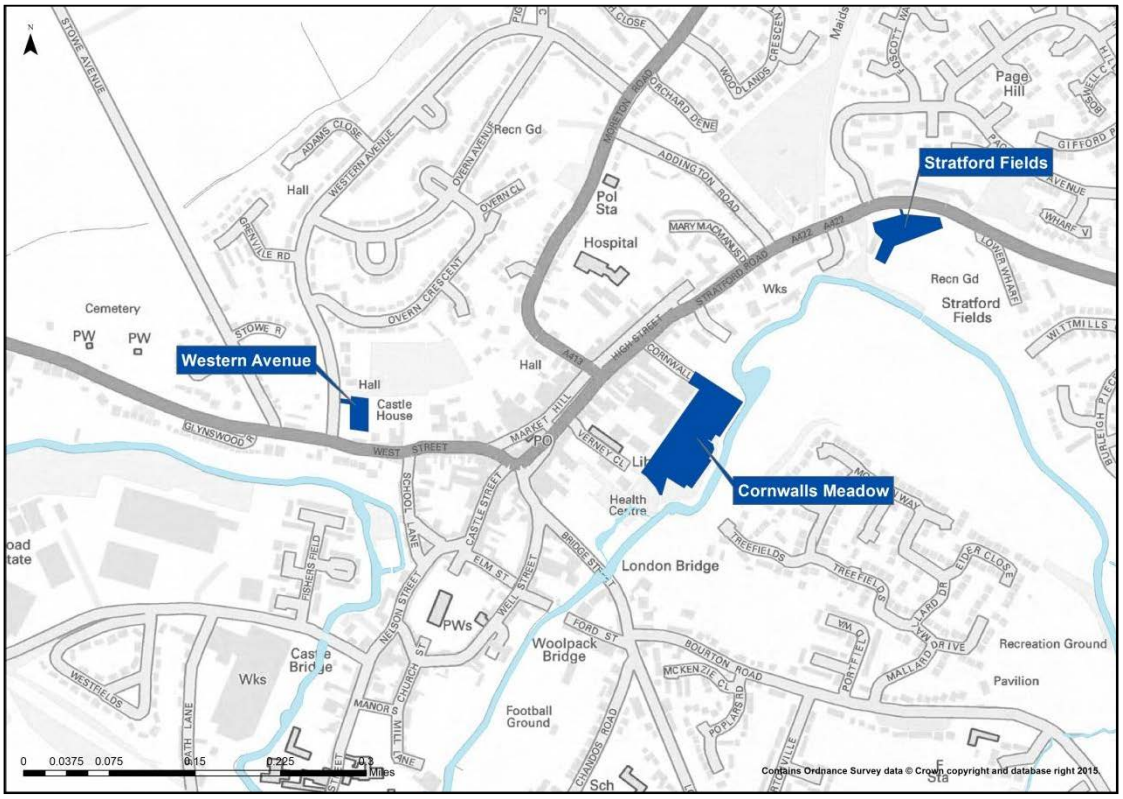


Table 2.8: Public Off-Street Car Parking Capacities[42]

	Location	Stay	Type	Public Spaces	Blue Badge Spaces	Payment Method	Season Tickets	Opening Times
1	Cornwalls Meadow	Long and Short Stay	Open Air	324	14	Pay & Display and Pay by phone	No	Mon-Sun All day
2	Western Avenue	Long Stay	Open Air	42	0	Free	No	Mon-Sun All day
3	Stratford [illegible]	Long Stay	Open [illegible]	40	2	Free	No	Mon-Fri 8.00am-6.00pm, Sat 8.00am-12.30pm

Table 2.9: Public Off-Street Car Park Pricing[43]

Cornwalls Meadow	Period of Time	Prices
Monday to Saturday (08:30-17:00)*	up to 3 hours	£0.50
	3 to 4 hours	£1.00
	4 to 5 hours	£1.50
	Over 5 hours	£2.50
Sundays & Bank Holidays	Free	

*Free outside these hours

[41] Source: aylesburyvaledc.gov.uk/map-car-parks-buckingham
[42] Source: Adapted from aylesburyvaledc.gov.uk/map-car-parks-buckingham
[43] Source: Adapted from aylesburyvaledc.gov.uk/map-car-parks-buckingham

Parking Guidance

2.3.3 In September 2015, BCC published the *Buckinghamshire Parking Guidance*, which sets out the county's approach to vehicle parking provision on new developments. The county is split into 3 zones for the purpose of this guidance (A,B and C); Buckingham is in Zone B. The zoning system is based on the assumption that urban areas offer more accessibility in terms of walking, cycling and public transport, and therefore that it is not necessary to provide as many car parking spaces for residential areas.

Table 2.10: Residential Zoning Guidance[44]

Zone	Zone Characteristics		Development Type	Residential Parking Standards (by number of bedrooms)				
				1	2	3	4	5
B	Mid-Range Population	Between 8,000 and 69,999 residents	Up to 10 dwellings	1	2	2	3	3
			Above 10 dwellings	1.5	2	2	2.5	3

2.3.4 The guidance also mentions the importance of considering electric vehicle charging infrastructure in new developments along with consideration for any emerging technology linked to this. The provision of spaces for bicycles, motorcycle/scooters and blue badge holders is also covered in the guidance.

2.3.5 Vehicle parking guidance is also given in the Draft VALP (section 7); however, an initial review suggests that there are a number of inconsistencies relative to the BCC guidance. These inconsistencies may warrant further work to ensure the policies are complementary and practical in terms of implementation.

2.4 Public Transport Network

Rail Network

2.4.1 Buckingham currently has no local railway station. The town's nearest rail stations are at Aylesbury, Milton Keynes and Bicester, which are approximately 20 – 30 minutes away by bus. Aylesbury and Bicester are served by Chiltern Railways and offer access to London Marylebone. Milton Keynes Central is served by Virgin Trains and London Midland providing services to London Euston; and by Southern providing services to East Croydon via Kensington Olympia.

2.4.2 Table 2.11 presents the station usage data by station according to the Office for Rail and Road (2014-2015), and shows that Milton Keynes Central, Bicester North and Aylesbury are the most heavily used stations in Buckingham's vicinity.

Station Usage

Table 2.11: Estimated station usage (by total entries)[45]

Station Name	London Station	Yearly Total Entry Estimate
Aylesbury	Marylebone	567,111
Aylesbury Vale Parkway	Marylebone	64,322
Bicester North	Marylebone	848,201
Bicester Town	Marylebone	44,220
Milton Keynes Central	Euston	3,324,733
Bletchley	Euston	494,459
Wolverton	Euston	205,268

[44] Source: Buckinghamshire Parking Guidance
[45] Source: Office for Rail and Road (2014-2015)

Rail Service Frequency

2.4.3 Frequencies and fares are listed below for the three most local stations: Aylesbury, Milton Keynes Central, and Bicester North (frequencies from other stations can be found in *Appendix III: Train frequencies from alternative stations*).

2.4.4 In summary, rail services to the capital are direct and relatively frequent, however, the time required to reach the station (either with public transport or car) may explain the relatively low rates of commuting to London in the BTS study area (see section 2.1).

Table 2.12: Aylesbury to London train frequencies and journey times

Aylesbury Station	***Via Stoke Mandeville***		***Via High Wycombe***	
Aylesbury to London Marylebone	***Frequency***	***Journey Times***	***Frequency***	***Journey Times***
AM peak (8 -10am)	3 per hour	58-60 mins	1 per hour	67 mins*
PM Peak (4 - 6 pm)	3 per hour	60 mins	1 per hour	70 mins
Interpeak (10am - 4pm)	3 per hour	60-66 mins	1 per hour	70 mins
Saturday	3 per hour	60-67 mins	1 per hour	64-67 mins
Sunday	2 per hour	65-70 mins	1 per hour	66 mins

* some journeys require a change at Princes Risborough

Table 2.13: London to Aylesbury train frequencies and journey times

Aylesbury Station	***Via Stoke Mandeville***		***Via High Wycombe***	
London Marylebone to Aylesbury	***Frequency***	***Journey Times***	***Frequency***	***Journey Times***
AM peak (8 -10am)	3 per hour	53-59 mins	1 per hour	67 mins
PM Peak (4 - 6 pm)	4 per hour	59-70 mins	1 per hour	61-67 mins
Interpeak (10am - 4pm)	3 per hour	54-59 mins	1 per hour	65 mins
Saturday	3 per hour	53-68 mins	1 per hour	67 mins
Sunday	3 per hour	53-66 mins	1 per h our	64-65 mins*

Table 2.14: Milton Keynes Central train frequencies and journey times

Milton Keynes Central	***Milton Keynes Central to London Euston***		***London Euston to Milton Keynes Central***	
	Frequency	***Journey Times***	***Frequency***	***Journey Times***
AM peak (8 -10am)	8 per hour	36-61 mins	8 per hour	30-59 mins
PM Peak (4 - 6 pm)	8 per hour	32-60 mins	8 per hour	30-62 mins
Interpeak (10am - 4pm)	8 per hour	34-58 mins	8 per hour	30-60 mins
Saturday	8 per hour	34-59 mins	8 per hour	30-60 mins
Sunday	5-6 per hour	36-66 mins	5-6 per hour	33-64 mins

Table 2.15: Bicester North Station train frequencies and journey times

Bicester North Station	***Bicester North to London Marylebone***		***London Marylebone to Bicester North***	
	Frequency	***Journey Times***	***Frequency***	***Journey Times***
AM peak (8 -10am)	2 per hour	62-68 mins	2 per hour	53-69 mins
PM Peak (4 - 6 pm)	2 per hour	55-69 mins	2 per hour	52-65 mins
Interpeak (10am - 4pm)	2 per hour	59-66 mins	2 per hour	53-64 mins
Saturday	2 per hour	66-70 mins	2 per hour	66-67 mins
Sunday	2 per hour	69 mins	2 per hour	67 mins

Train fares

2.4.5 Train fares for Buckingham's three most local stations are presented in Table 2.16. Note that the fares do not include "Advance" tickets which can be purchased at a significantly discounted price relative to Anytime or Off-Peak tickets.

Table 2.16: Return train fares for 1 adult in Standard Class

	Aylesbury to London Marylebone	Milton Keynes Central to London Euston	Bicester North to London Marylebone
Anytime	£31.50	£39.20	£58.20
Off-peak	£20.70	£15.50	£24.80

Bus Services

2.4.6 Buckingham is currently served by ten bus routes, with services operated by Langston & Tasker, Arriva, Redline Buses and Stagecoach. Buses run along the main routes between Buckingham and the neighbouring towns of Milton Keynes, Bicester, Aylesbury and Brackley.

2.4.7 Buckingham's bus services are relatively infrequent; with the exception of the X5 and 60/X60, headways are typically an hour or greater, with reduced services in the evening and weekends. Services to surrounding villages are also limited, operating on restricted timetables that do not allow for flexibility.

2.4.8 Figure 2.27 shows the bus routes relevant to Buckingham, the frequencies of which can be found in Table 2.17. Bus routing within Buckingham town can be found in Figure 2.28.

Figure 2.27: Bus Routes through Buckingham (wider view)

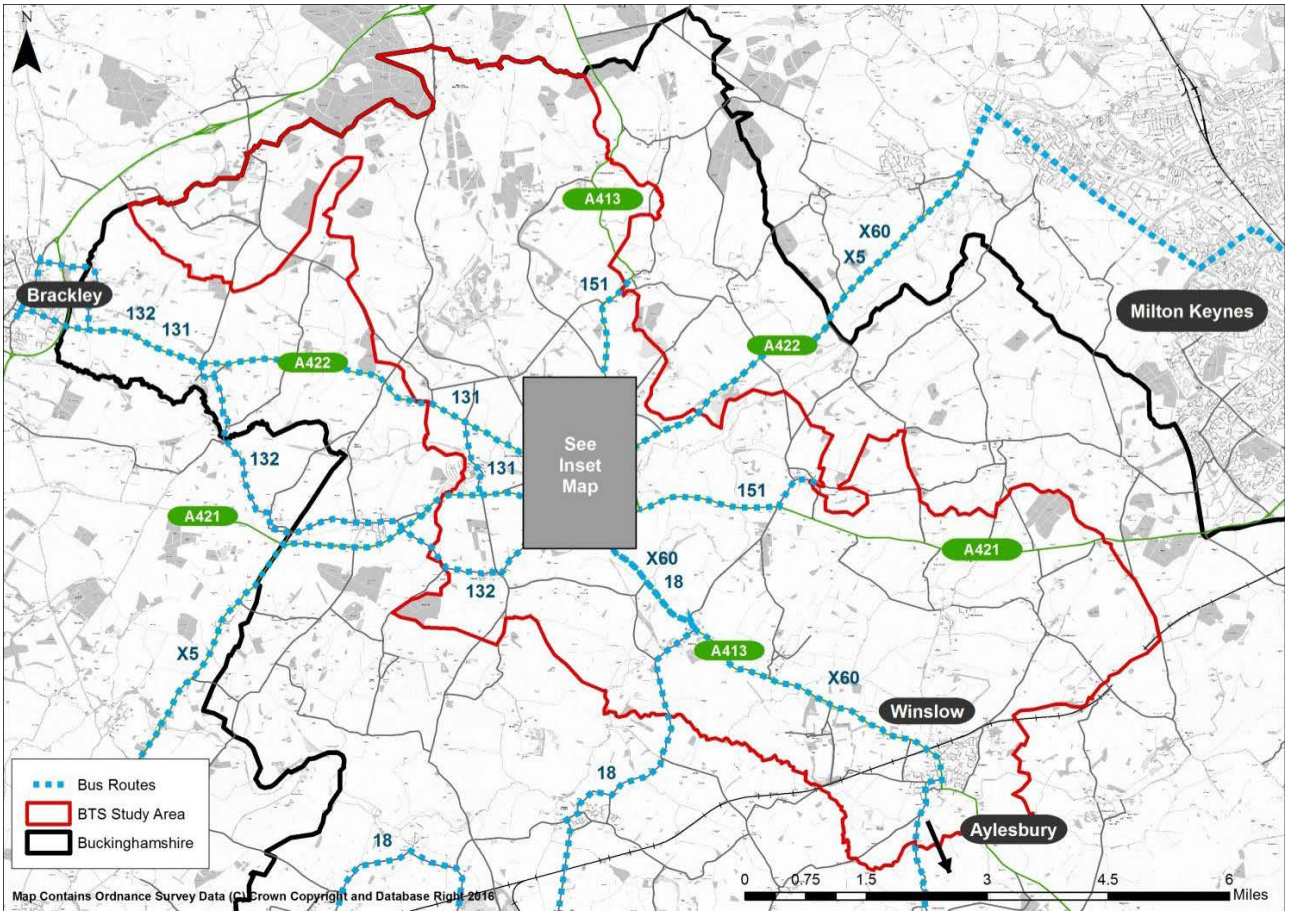


Figure 2.28: Bus Routes through Buckingham (town view)[46]

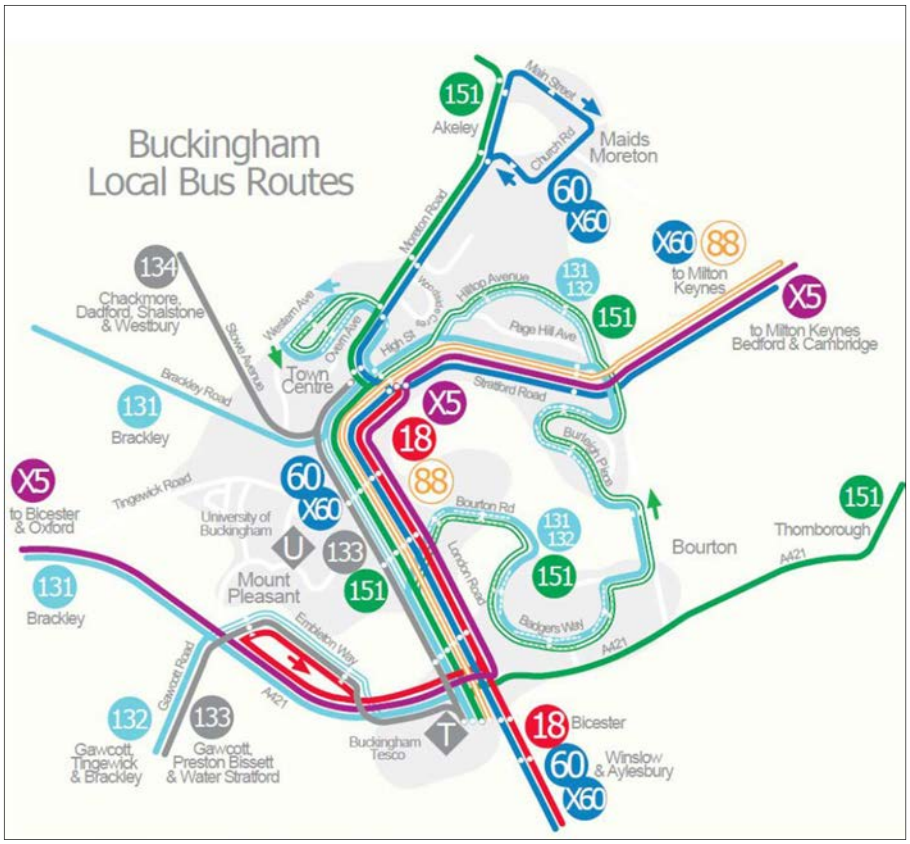


Table 2.17: Bus frequencies[47]

Buses Frequencies	X60 Direction 1	X60 Direction 2	60	X5	133	151	18	131/132	134
AM peak (8 -10am)	2 per hour	2 per hour	1 per hour	2 per hour	0	0	0.5 per hour	0.5 per hour	0
PM Peak (4 - 6 pm)	2 per hour	1 per hour	0.5 per hour	1 per hour	0	1 per day	0.5 per hour	0	0
Interpeak (10am - 4pm)	2 per hour	1 per hour	0.5 per hour	2 per hour	1 per day*	0	0.5 per hour	1 per hour	1 per day*
Saturday	1 per hour	1 per hour	0.5 per hour	2 per hour	0	0	0	0.33 per hour	0
Sunday	0	0	4 per day	0	0	0	0	0	0

*Only Tuesday

[46] Source: Transport for Bucks, Nov 2014
[47] Source: http://www.buckscc.gov.uk/transport/buses-and-trains/bus-timetables/

2.5 Walking and Cycling

Walking/Cycling Movements

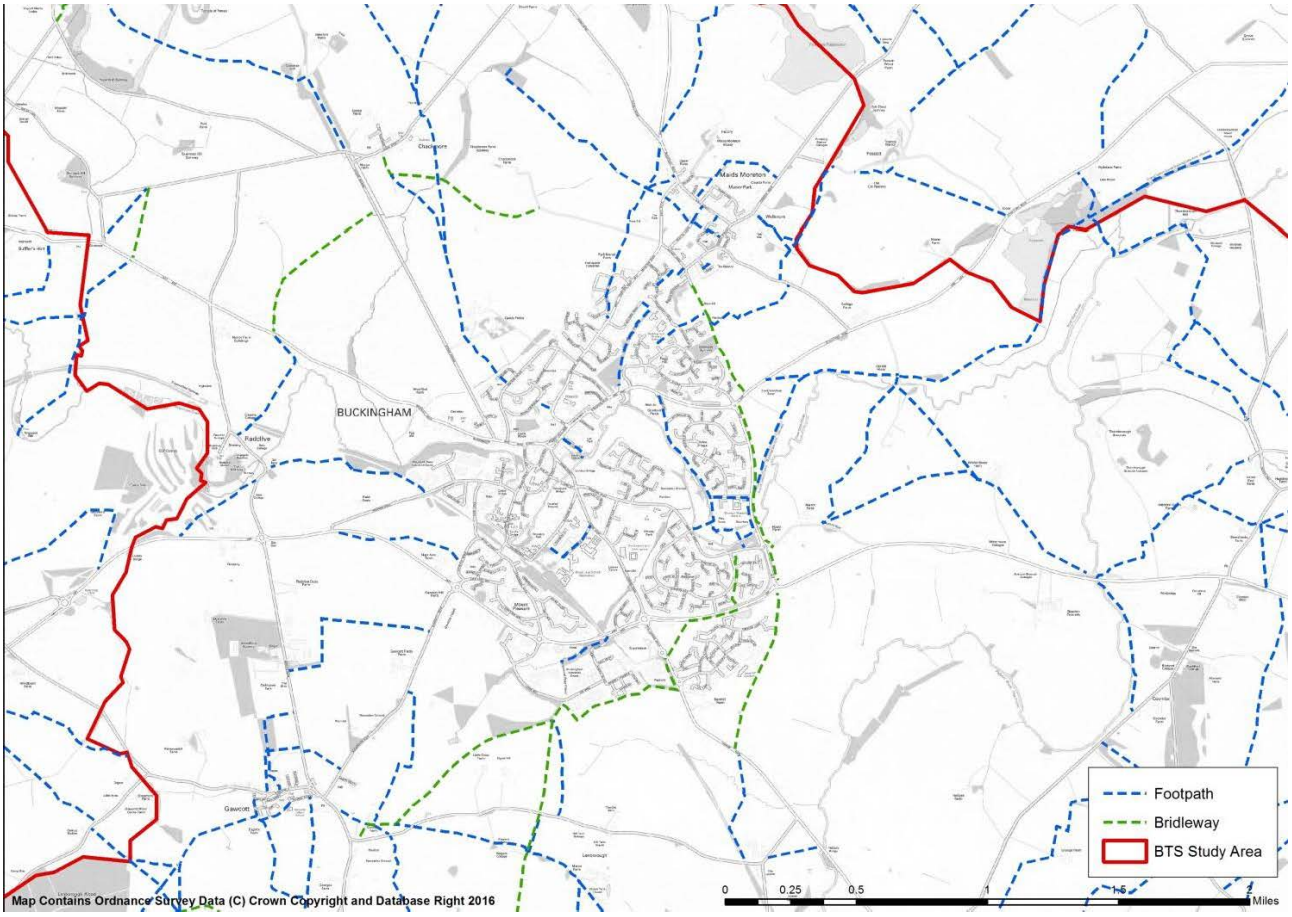
2.5.1 Journey to Work data from the 2011 Census suggests relatively low levels of commuting by bicycle or on foot. 1% of journeys to work by BTS study area residents are made by bicycle, and 10% are made on foot. The proportions are the same for those working in the BTS study area.

Rights of Way

2.5.2 Figure 2.29 shows the Rights of Way within the Buckingham area. Outside the town, there is a fairly comprehensive network of public rights of way that provide off-road links from Buckingham to outlying villages.

2.5.3 It should be noted, however, that the condition and accessibility of this pedestrian network has not been assessed in detail by AECOM and may not be appropriate for all users.

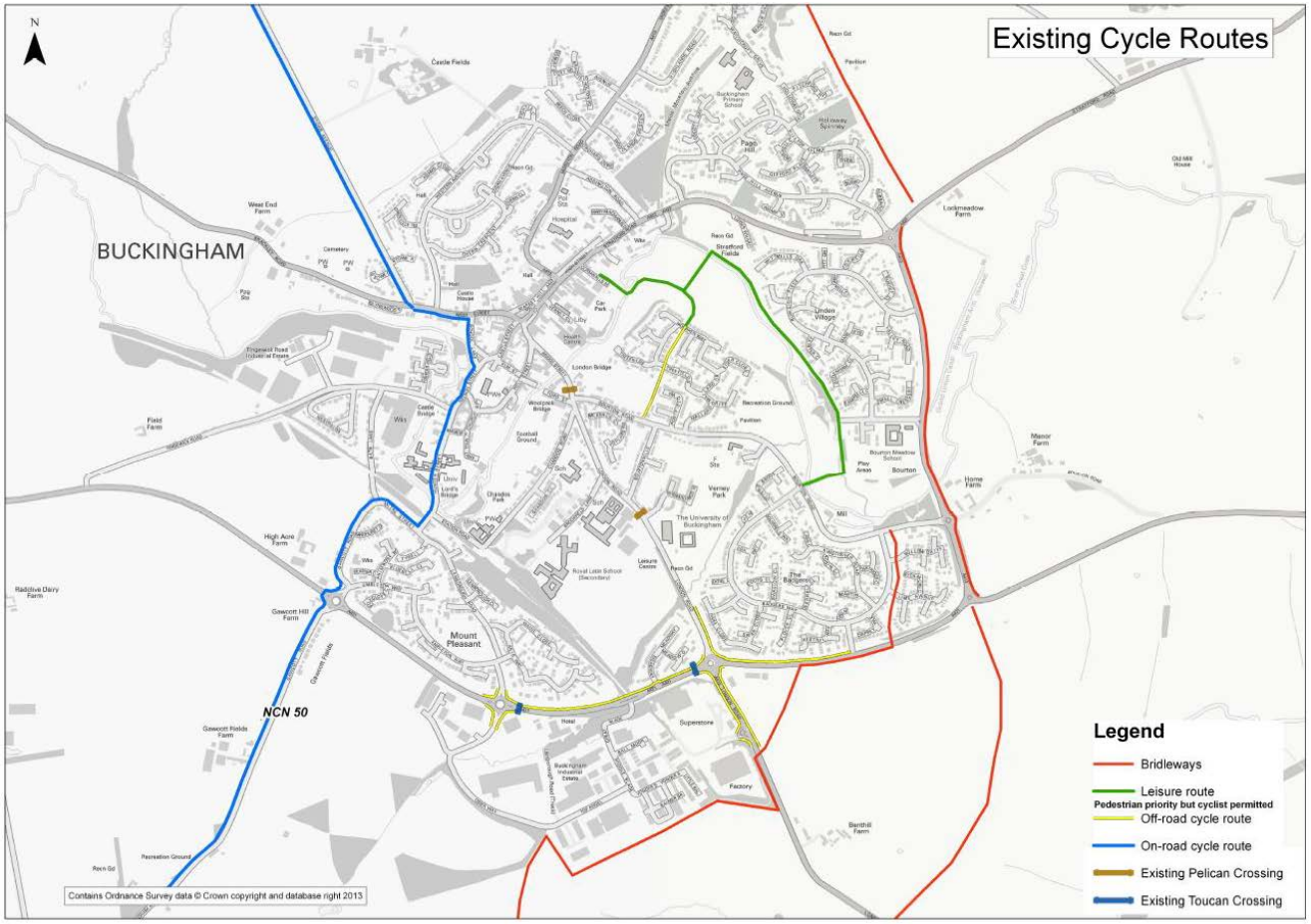
Figure 2.29: Existing Rights of Way in Buckingham



Cycling Network

2.5.4 Figure 2.30 shows the existing cycling network in Buckingham town as of May 2013. AECOM is not aware of any completed changes to the cycling network (excluding one currently under construction) since May 2013.

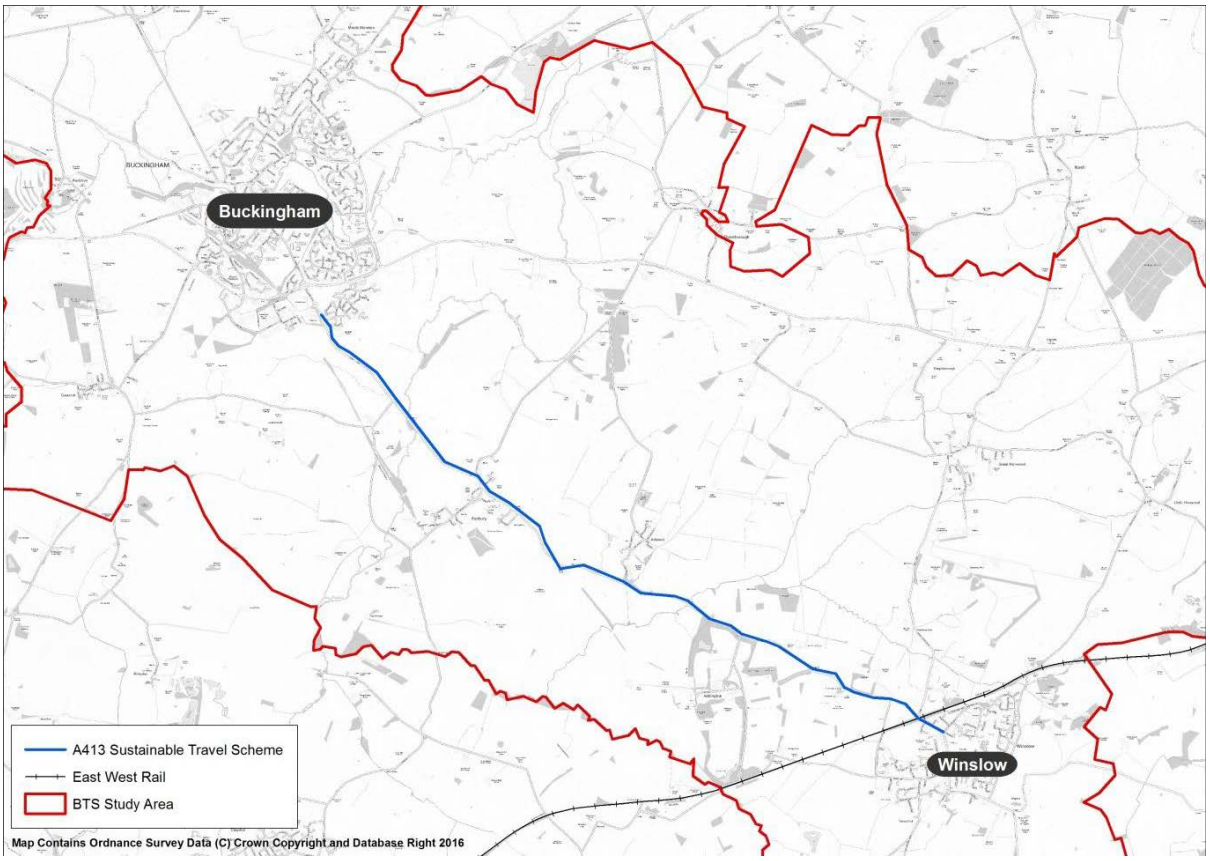
Figure 2.30: Existing Cycling Routes in Buckingham (May 2013)



2.5.5 The existing cycling network in Buckingham is limited, such that most cycle trips to or within the town must be made on-road. With the exception of the on-road NCN route 50 (in blue in Figure 2.30), there is currently no cycling route provision on the town's radial roads, many of which are 60mph single-carriageways.

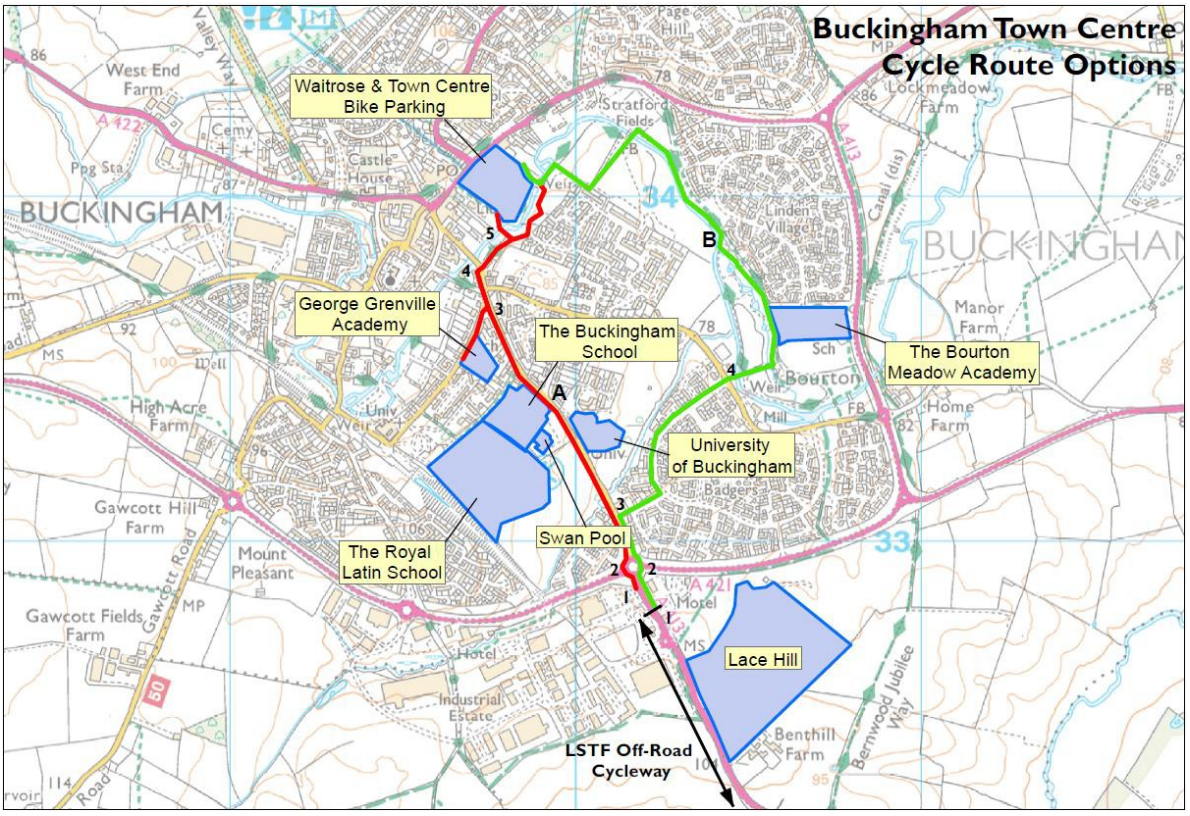
2.5.6 The issue of inter-urban cycling connectivity will be improved with the opening of the A413 Sustainable Travel Scheme (Figure 2.31). BTVLEP funding has facilitated the construction of a 9km shared cycle and footway link adjacent to the A413 (from Winslow to the southern edge of Buckingham) and aims to encourage walking and cycling along the corridor. The scheme is currently under construction and due to open in January 2017.

Figure 2.31: A413 Sustainable Travel Scheme



2.5.7 The A413 Sustainable Travel Scheme terminates at the A421 / London Rd (Tesco) roundabout and as such does not provide access to the town centre. To provide this access, S106 funding has been secured from the Lace Hill developers to extend the route to the town centre. The red alignment of this extension in Figure 2.32 has been confirmed as the Town Council's preferred option (green route has been discounted), however, is yet to be confirmed by engineers. The scheme is due to be implemented within the next 2 years.

Figure 2.32: Possible alignments of the Lace Hill – Buckingham town centre cycle route



2.6 Growth and Future Year Conditions

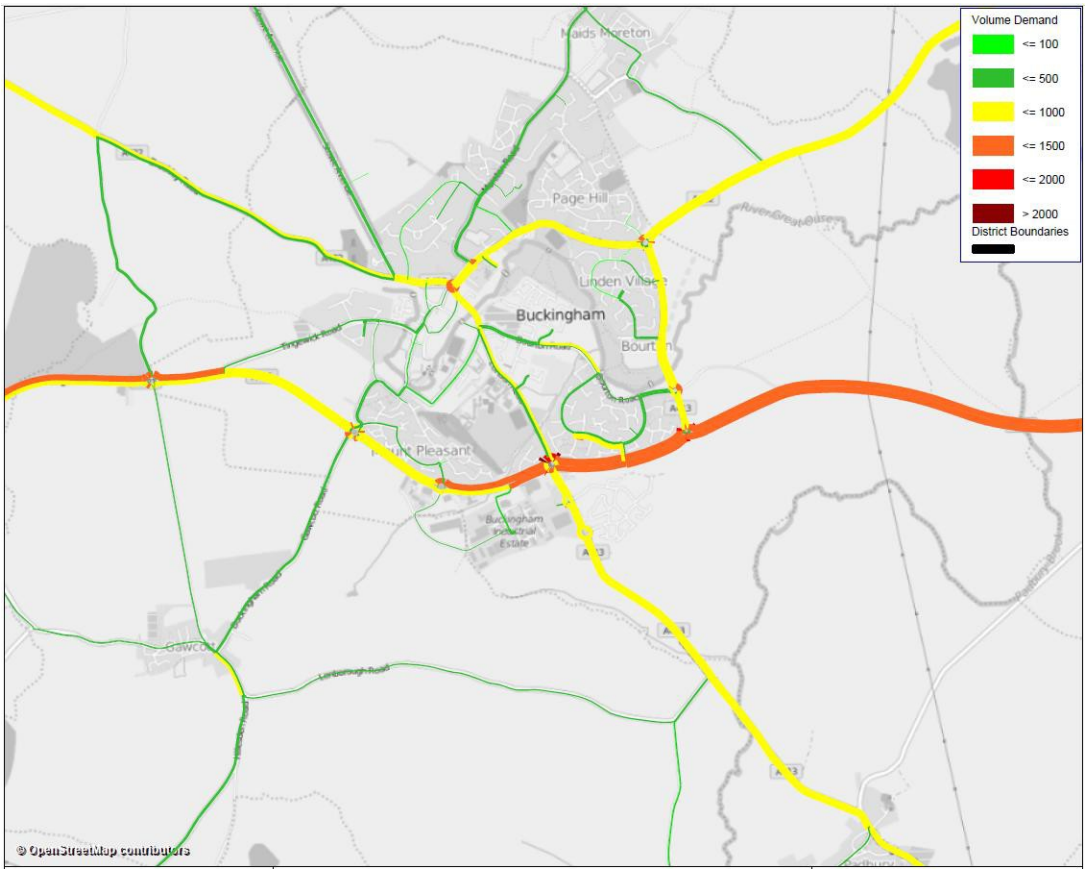
2033 Traffic Growth

2.6.1 The Countywide VISUM Model has been run to produce a 2033 Local Plan forecast[48]. Link flows for the Buckingham area are shown in Figure 2.33 and Figure 2.34 (AM and PM peak hours). Note that the link flows relate to the Do Something 1 scenario of the June 2016 forecast. The definition of this scenario is detailed in section 1.2.

2.6.2 Traffic volumes are estimated to increase on the A422, A421 and A413 compared with the base year. The links experiencing the greatest increase include:

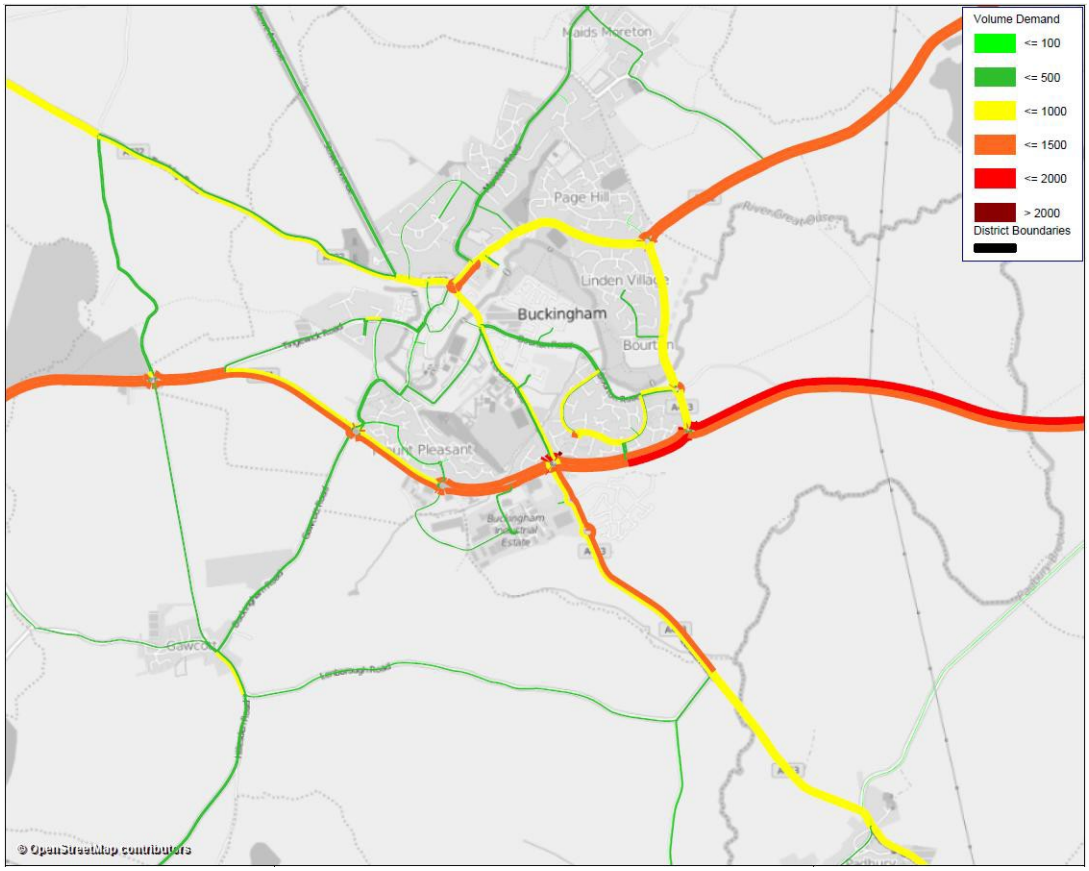
- A421 to the south of Buckingham and out towards Thornborough (up to 2000 vehicles per hour)
- A422 West Street / Stratford Road, and the A413 south towards Winslow.

Figure 2.33: AM Peak Link Flows in Buckingham, 2033[49]



[48]Modelling Report – Countywide Local Plan Modelling – June 2016, Jacobs

Figure 2.34: PM Peak Link Flows in Buckingham, 2033[50]



2033 Network Performance

2.6.3 2033 congestion ratio plots for the AM and PM peaks for the Buckingham area are shown in Figure 2.35 and Figure 2.36. As was defined in section 2.2.9, congestion ratio is defined as the ratio of the travel time in the model and the free flow travel time.

2.6.4 The majority of the road network has an estimated congestion ratio of 1-1.5 in both peaks, similar to the Base Year. There are, however, significantly more areas with a higher congestion ratio than in the Base Year model, particularly on the following roads/sections:

- High St through the town centre
- London Rd between A421 and High St)
- A421 (mainly towards the east of Buckingham)
- A422/West St

2.6.5 The currently available modelling outputs cannot be used to isolate the impact of the Local Plan growth planned in Buckingham. This is because the Do Something 1 scenario includes Local Plan growth for the whole county, rather than just Buckingham. It is likely, however, that the Local Plan growth in the town contributes to the higher levels of congestion in 2033 relative to 2013.

[50] Source: Appendix A – Forecast Modelling Report – Countywide Local Plan Modelling – June 2016, Jacobs

Figure 2.35: AM Peak Performance Plots in Buckingham, 2033[51]

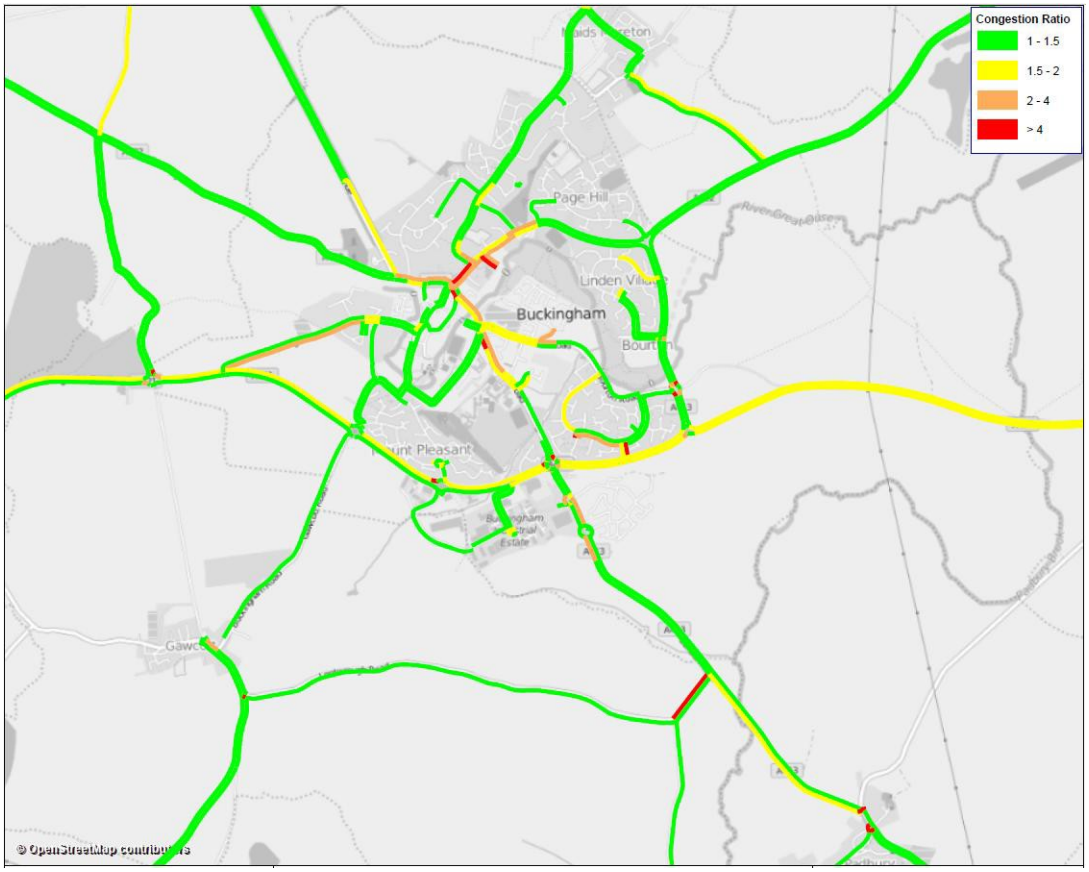
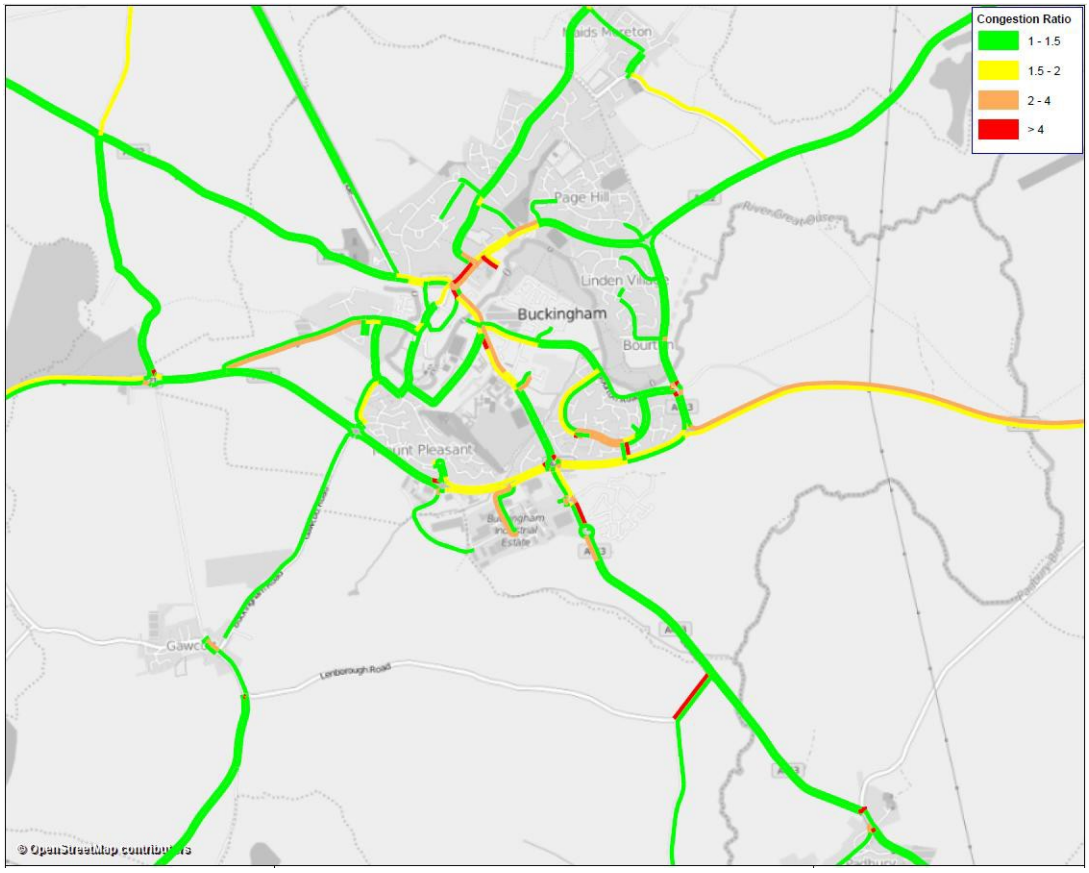


Figure 2.36: PM Peak Performance Plots in Buckingham, 2033[52]



[51] Source: Appendix A – Forecast Modelling Report – Countywide Local Plan Modelling – June 2016, Jacobs
[52] Source: Appendix A – Forecast Modelling Report – Countywide Local Plan Modelling – June 2016, Jacobs

Issues & Opportunities

3

3. Issues & Opportunities

3.1.1 This chapter sets out a Strength, Weakness, Opportunity and Threat (SWOT) analysis of the transport network in Buckingham. This analysis can be broken down into the following categories:

- Highway (Table 3.1)
- Public Transport (Table 3.2)
- Walking and Cycling (Table 3.3)

3.1.2 The SWOT analysis includes points raised by stakeholders at the BTS Workshop held in September 2016.

3.2 Highway

Table 3.1: Highway SWOT Analysis

<table>
<tr>
<td>Strengths
– Buckingham is located on the A421 east/west corridor of regional significance.</td>
<td>Weaknesses
– Congestion in the town centre[53]
- Base year and forecast year modelling shows that the High St experiences high levels of peak hour congestion, as do its main approach roads (i.e. West St, Bridge St and Moreton Rd).
– Through-traffic[53]
- Base year model select link plots show that a significant proportion of High St flow is through-traffic. See Table 2.7 for proportions. This through-traffic passes through one/both of the congested junctions identified in 2.2.10.
– Parking in Town Centre[54]
- The town's car parking facilities are perceived to be insufficient for the needs of drivers; however, this may be an issue of under-utilisation of the various car parks rather than overall insufficiency.
- Strong reliance among drivers on the town centre's main car park (Cornwalls Meadow)
– Perception of Speeding[54]
- Despite areas of reduced speed limits (e.g. A421 to the south of Buckingham – 40mph), there is a perception that speeding occurs on A-roads around the town. This is likely to be the case because many of these radial routes were designed for 60mph travel despite now being more residential in nature.
– HGV Volumes through town centre are perceived to be too high[55]
– Hazardous Junctions[56]
- A421 / London Rd roundabout
- Market Square / Bridge St / West St roundabout</td>
</tr>
<tr>
<td>Opportunities
– Discouraging through-traffic has the potential to significantly reduce congestion in the town centre.
– Modal shift away from car usage may be encouraged in the following ways:
- East-West rail station at Winslow
- Improved cycling/walking infrastructure
– Live parking availability data (potentially linked to sat-nav devices)</td>
<td>Threats
– Increased traffic on the A421 exacerbates severance between town centre and developments to the south.
– Modelling suggests that the congestion within the town centre and at A421 junctions will increase in the future.
– In addition to the existing safety concern, high-speed roads around Buckingham are likely to become the main access points for new developments (employment and dwelling sites) around the town, therefore compounding any speeding hazard in the future.
– Any improvements would most likely need to rely on limited funding from S106 contributions.
– Potential loss of government funding for schemes.</td>
</tr>
</table>

[53] BTS Steering Group Meeting 10th August 2016
[54] BCC Meeting with Warren Whyte (County Councillor for Buckingham East Division)
[55] Aylesbury Vale Advantage Ltd – Buckingham Town Centre: Parking and Sustainable Transport Study (Arup, February 2011)
[56] Collision data received from BCC 5th August 2016

3.3 Public Transport

Table 3.2: Public Transport SWOT Analysis

Strengths – Relatively good spatial coverage of bus services to/from many outlying villages (Figure 2.27 and Figure 2.28) as well as major destinations such as Milton Keynes, Aylesbury and Winslow. – Existing bus services provide direct connectivity to rail stations in Milton Keynes and Aylesbury. – Good coverage within the town itself that links many of the key trip generators/attractors.	**Weaknesses** – Bus frequency - The frequency of some bus services in/through the Buckingham is low, particularly those that connect the town to smaller outlying villages. – Lack of rail station - The town lacks a rail station and therefore cannot easily cater for longer distance public transport trips. – Bus stand capacity - At certain times, the main bus stand in the town cannot effectively handle the volume of buses and is at capacity[57]. - This presents a potential safety risk when buses have to load on the street. – Lack of bus connectivity between town centre and: - Employment areas: Buckingham Industrial Estate & (proposed) Silverstone Park - Leisure destination: Stowe National Trust property – It is outside the scope of this study to address, but issues have been identified with school buses causing blockages/congestion for other vehicles.
Opportunities – East-West Rail Station in Winslow - Improved linkages to several major economic centres and to London. – Potential new X444 bus route between High Wycombe and Northampton[58] – Promotion of Bicester North railway station as a means of accessing London.	**Threats** – New developments in Buckingham are built in areas with poor public transport coverage and consequently become highly car dependent. – Bus stand capacity may not be able to cope with additional bus services needed for new developments. – Town centre needs to remain accessible for buses or services may be altered/discontinued. – Potential further delays to the delivery of East-West Rail.

[57] BTS Workshop (September 2016)
[58] Buckingham Neighbourhood Development Plan, Made Version – Buckingham Town Council, October 2015

3.4 Walking/Cycling

Table 3.3: Walking/Cycling SWOT Analysis

Strengths – Buckingham is a compact town, and the topology lends itself to walking/cycling. – The town already has an existing Outline Cycle Strategy - The strategy was developed in May 2013 by BCC in liaison with the Town Council. – Existing walking routes - Circular Walk, Railway Walk	**Weaknesses** – Lack of off-road cycle paths[58,59] - Most significant issue is the lack of off-road cycle paths in the town and on the routes into/out of the town. Figure 2.30 illustrates the existing cycle routes within the town, and shows that most cycling trips between residential areas and the town centre need to be made on-road. - There are currently no off-road cycle links to surrounding urban areas. As shown in Figure 2.31 however, the A413 Sustainable Travel Scheme will provide a link to Winslow from January 2017. – The main obstacle to cycling is the narrowness of the town's streets due to its historical nature. – In places, pavements in the town are narrow and in a poor state of repair. – Flooding - Parts of the town are susceptible to flooding that severs walking/cycling routes[60].
Opportunities – Improving cycling infrastructure in the town can contribute to the fulfilment of many of the BTS objectives.	**Threats** – Some potential walking/cycling routes run through/adjacent to proposed developments, so should be protected to ensure they remain open and accessible. – Some of the potential cycle routes identified for Buckingham have not been assessed by engineers so are not necessarily feasible in terms of constructability. – Any improvements would most likely need to rely on limited funding from S106 contributions. – Potential loss of government funding for schemes.

[59] BTS Steering Group Meeting 10th August 2016

[60] http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=469500.0&y=233500.0&topic=floodmap&ep=map&scale=9&location=Buckingham,%20Buckinghamshire&lang=_e&layerGroups=default&distance=&textonly=off

Transport Improvement Options

4

4. Transport Improvements

4.1 Introduction

4.1.1 This chapter identifies transport improvement options that could be considered based on the issues and threats covered in chapter 3 and the fulfilment of the BTS objectives. Options are presented separately for the highway network, public transport and walking/cycling.

4.1.2 The chapter is divided as follows:

- Section 4.2 Transport Improvement Options – introduces the potential transport improvement options
- Section 4.3 Assessment of Transport Improvement Options – assessment of potential transport improvement options against BTS objectives, and consequent recommended prioritisation
- Section 4.5 Implementation of Transport Improvement Options – recommendations regarding the implementation of the potential schemes

4.2 Transport Improvement Options

Highway Options

4.2.1 Work undertaken for the Buckingham Area Transport Study[61] identified potential highway schemes that could be taken forward for further consideration for mitigating issues arising from growth in the town. These potential improvements have been discussed with the Steering Group and at the BTS Workshop (September 2016), and are shown with AECOM commentary in Table 4.1. The schemes are illustrated in *Appendix IV: Buckingham Options Package – Buckingham Area Transport Study (September 2015)*

[61] Buckinghamshire County Council: Buckingham Area Transport Study. Jacobs, September 2015 (Chapter 6)

Table 4.1: Buckingham Area Transport Study[62] – Highway Scheme Proposals with AECOM Comments

Scheme	Description	AECOM Comment
1. Route upgrade along the A413 and A421	Aim of increasing capacity and potentially easing congestion.	Likely to support BTS objective to reduce congestion in town centre if these improvements discourage town centre through-traffic. "Route upgrade" in this context may include dualling the road(s).
2. Western Link Rd	Single carriageway between Stowe Ave and A421 with aim of reducing traffic (including HGV) movements through the town centre.	Through-traffic constitutes a significant proportion of vehicular flow through Buckingham town centre (particularly A422 through-traffic – see Table 3.1), and could be encouraged to switch to the A421 corridor via the Western Link Rd. At the BTS Workshop (September 2016) it was highlighted that it is highly unlikely that this link can extend as far as Stowe Ave due to heritage/conservation issues. Instead, the scheme considered should be between the A421 and A422.
3. Buckingham Bypass running parallel to the A421	Could help ease congestion along the A421 and would tie into Western Link Rd.	It is understood that the bypass is unlikely to address congestion in the town centre and would require significant funding from currently unidentified sources[63].
4. Junction improvements package	Altering configuration and optimisation of signal timings as well as the introduction of a dedicated left-turn slip on the A422 / A413 Junction in the NE.	Any junction capacity improvements in the town are likely to attract more traffic and may generate congestion elsewhere in the network. However, the left turn slip at the A422/A413/Stratford Rd roundabout (left turn slip for A422 traffic approaching from the east) is likely to encourage users to re-route *around* rather than *through* the town centre, and is therefore likely to support BTS objectives.
5. Town centre route downgrade	Route downgrade of West St/Brackley Rd	Likely to be consistent with BTS objective to reduce congestion in the town centre by discouraging A422 through-traffic.

4.2.2 The assessment and prioritisation of these improvement options is discussed further in section 4.3 and 4.5.

Public Transport Options

4.2.3 This section introduces potential public transport schemes/initiatives in Buckingham. The assessment and prioritisation of these improvement options is discussed further in sections 4.3 and 4.5.

Bus Connection to Winslow

4.2.4 The new East-West rail station in Winslow will provide direct links to strategic destinations in the south-east that are currently relatively inconvenient to reach with public transport from Buckingham. It is consequently possible (subject to future usage) that the existing bus frequency to/from the town should increase to cater for additional users to/from Buckingham.

Town Centre Bus Stand Expansion/Relocation

4.2.5 Capacity issues at the town centre's bus stand on the High St were identified at the BTS Workshop (September 2016). At certain times, the bus loading space is insufficient, and buses are forced to load on the street. This is both inconvenient and presents a potential safety risk for passengers.

4.2.6 A potential solution to this issue would be an expansion and/or relocation of the existing bus stand, two potential options for which have been identified in previous work:

- Introduce a one-way system around the bus stand
- Relocate the bus stand to a potential development on Wharf Yard

4.2.7 Implementing any bus stand expansion/relocation should be preceded by further work to determine the further details of this transport improvement.

[62] Buckinghamshire County Council: Buckingham Area Transport Study. Jacobs, September 2015 (Chapter 6)
[63] BTS Steering Group Meeting 10th August 2016

Bus Coverage of New/Existing Developments

4.2.8 The existing coverage of the bus network within Buckingham is fairly comprehensive (Figure 2.28), however, the town's growth may leave certain areas without convenient bus accessibility. This includes residential developments as well as employment sites in Buckingham Industrial Estate and (proposed) Silverstone Park.

4.2.9 It may therefore be appropriate to implement new bus services and/or alter routes of existing services. Whilst it is beyond the scope of this strategy to define any detailed alternative bus routing, the following services would require relatively minimal alterations to cover developments to the south and west of the town, for example: 131, 132, and 133.

4.2.10 The *Buckingham Neighbourhood Development Plan*[64] also identifies the possibility of a new bus service (X444) between High Wycombe and Northampton[64]. This service (if routed via Winslow, Buckingham and Silverstone) has the potential to:

- Provide a link between Buckingham and Silverstone Park (significant proposed employment area)
- Provide a link between Buckingham and Stowe National Trust property (major tourist attraction)
- Increase the frequency of links to East-West Rail station in Winslow (complementing existing X60 connection)

Bus Usage Monitoring Program

4.2.11 Although there are no specifically identified bus services that are currently approaching capacity, it is recommended that bus usage is monitored over the lifetime of the BTS. It is an objective of the BTS to encourage bus usage, however, this would be undermined by bus services that are over capacity or too infrequent.

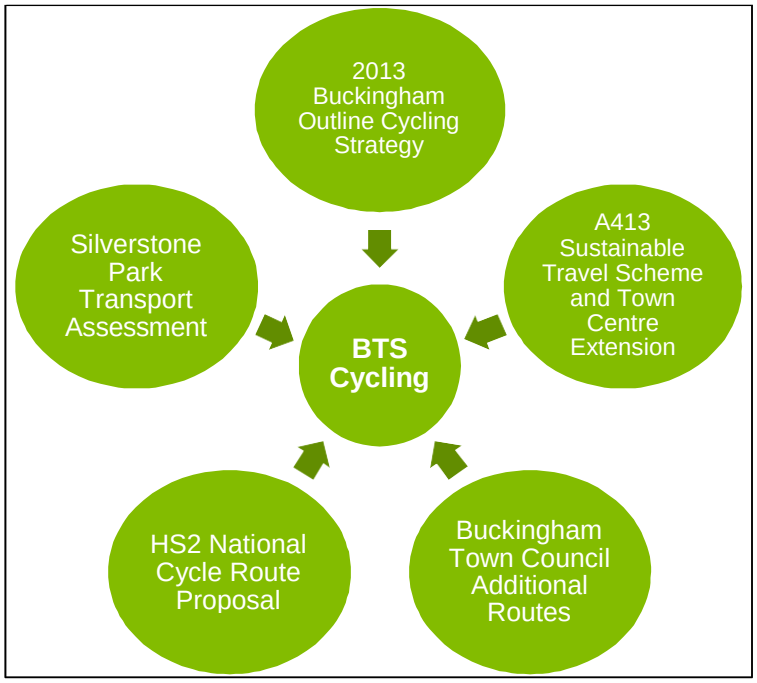
Walking/Cycling Options

Approach

4.2.12 A significant volume of work has already been undertaken at various times by various authorities/stakeholders regarding new cycling facilities in Buckingham. Given the objectives of the BTS, any proposals that increase rates of cycling in/around the town are in principle supported by the strategy, however, there are clearly certain cycling schemes with higher priority than others.

4.2.13 The role of the BTS in terms of cycling is therefore to collate the existing proposals and consolidate these into one consistent strategy. The inputs to the cycling element of the strategy are illustrated in Figure 4.1, and discussed in more detail below.

Figure 4.1: Inputs to BTS Cycling



[64] Made Version – Buckingham Town Council, October 2015

2013 Buckingham Outline Cycling Strategy

4.2.14 In May 2013, a Buckingham Outline Cycling Strategy was developed by BCC in liaison with the Town Council. Improving cycling infrastructure is considered to be a key area of improvement for the town due to its compact size and relatively flat topography.

4.2.15 The key elements of this strategy are as follows[65]:

- Make Buckingham a cycle-friendly town through increased visibility of opportunities to cycle through signing and cycle parking.
- Introduce signing that is consistent, clear, indicates distances in minutes (walking and cycling) and is sympathetic to the feel of the town.
- Introduce cycle parking at key locations, including covered parking to allow for commuter trips.
- Focus on longer trips (shorter distances are ideal for walking).
- Make the most of the existing off-street leisure network.
- Include aspirations for longer-distance trips to Winslow/Thornborough/Stowe in the Strategy.

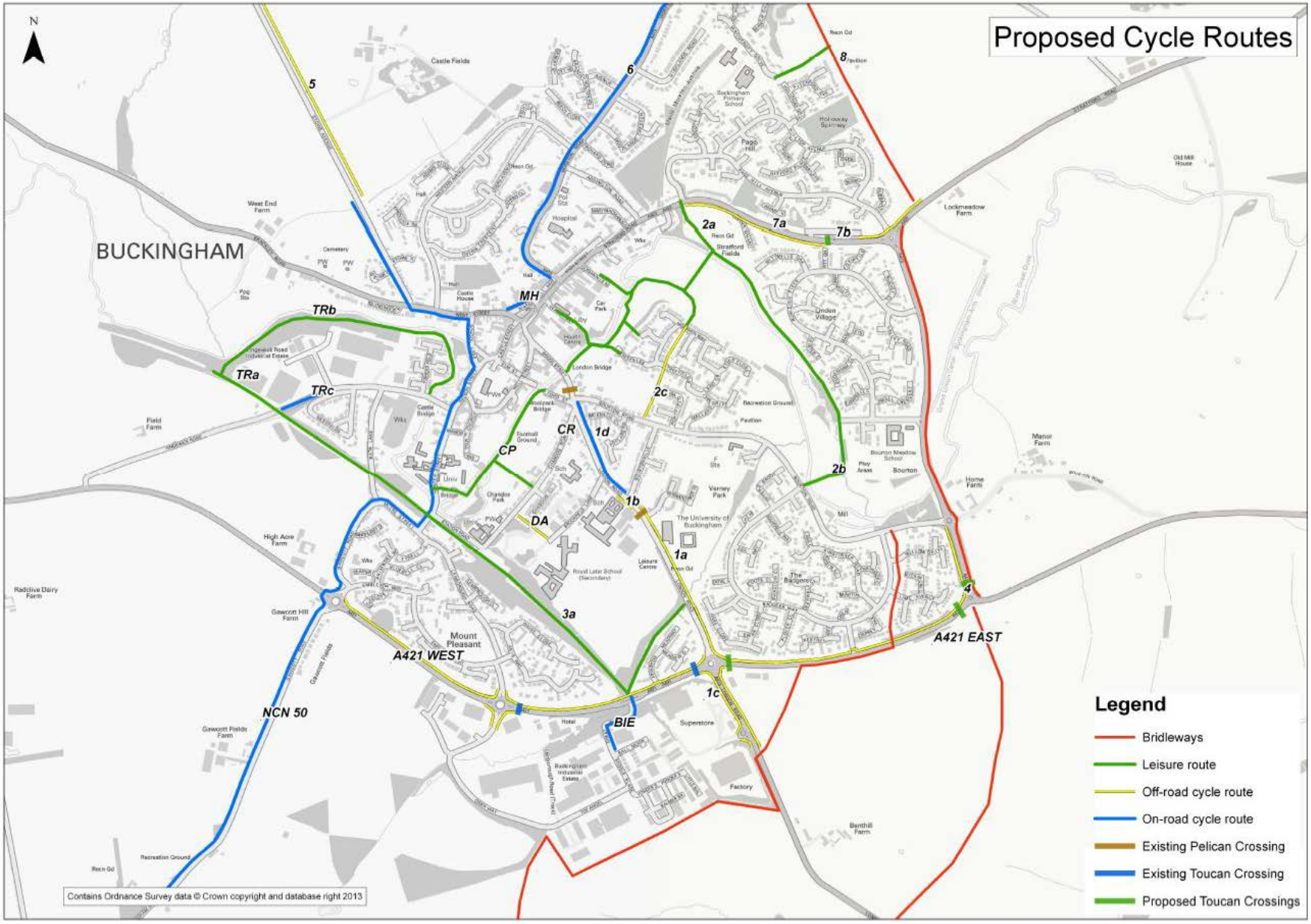
4.2.16 A number of new cycle routes were defined as part of this strategy, as shown in Figure 4.2 and detailed in *Appendix V: Buckingham Outline Cycling Strategy*. Note that:

- Schemes 1 – 8 are defined in priority order
- The final five schemes in Table 7.5 are to be investigated in line with future development.

4.2.17 Further details of these cycle routes can be found in *Buckingham Cycle Routes - Route Notes*.

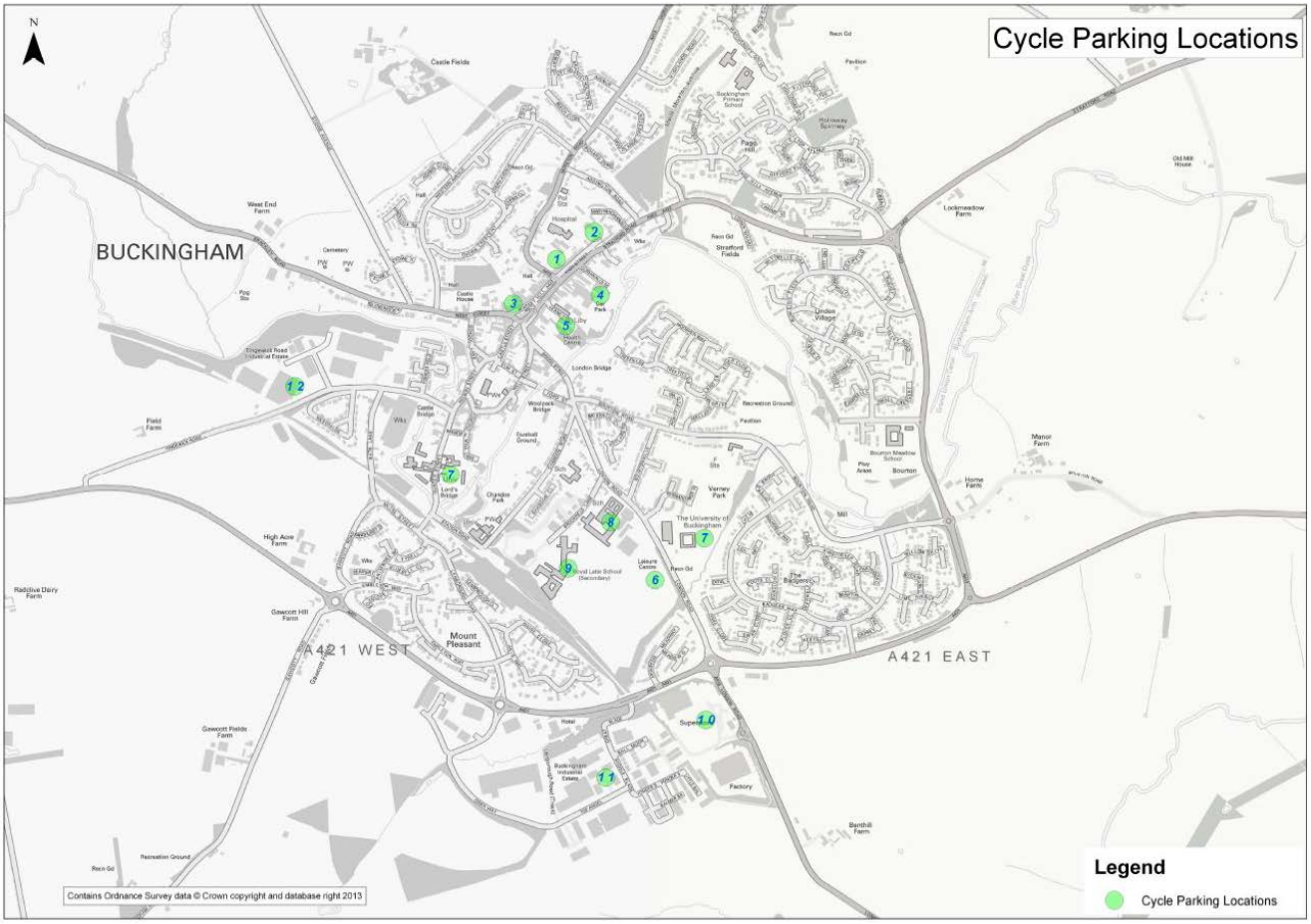
[65] Buckingham Outline Cycling Strategy Note

Figure 4.2: Cycle routes in the 2013 Buckingham Outline Cycling Strategy



4.2.18 In addition to the cycle routes identified in the outline cycle strategy, several locations have been proposed for cycle parking facilities, as shown in Figure 4.3.

Figure 4.3: Cycle parking facilities in the 2013 Buckingham Outline Cycling Strategy



Buckingham Town Council Additional Routes

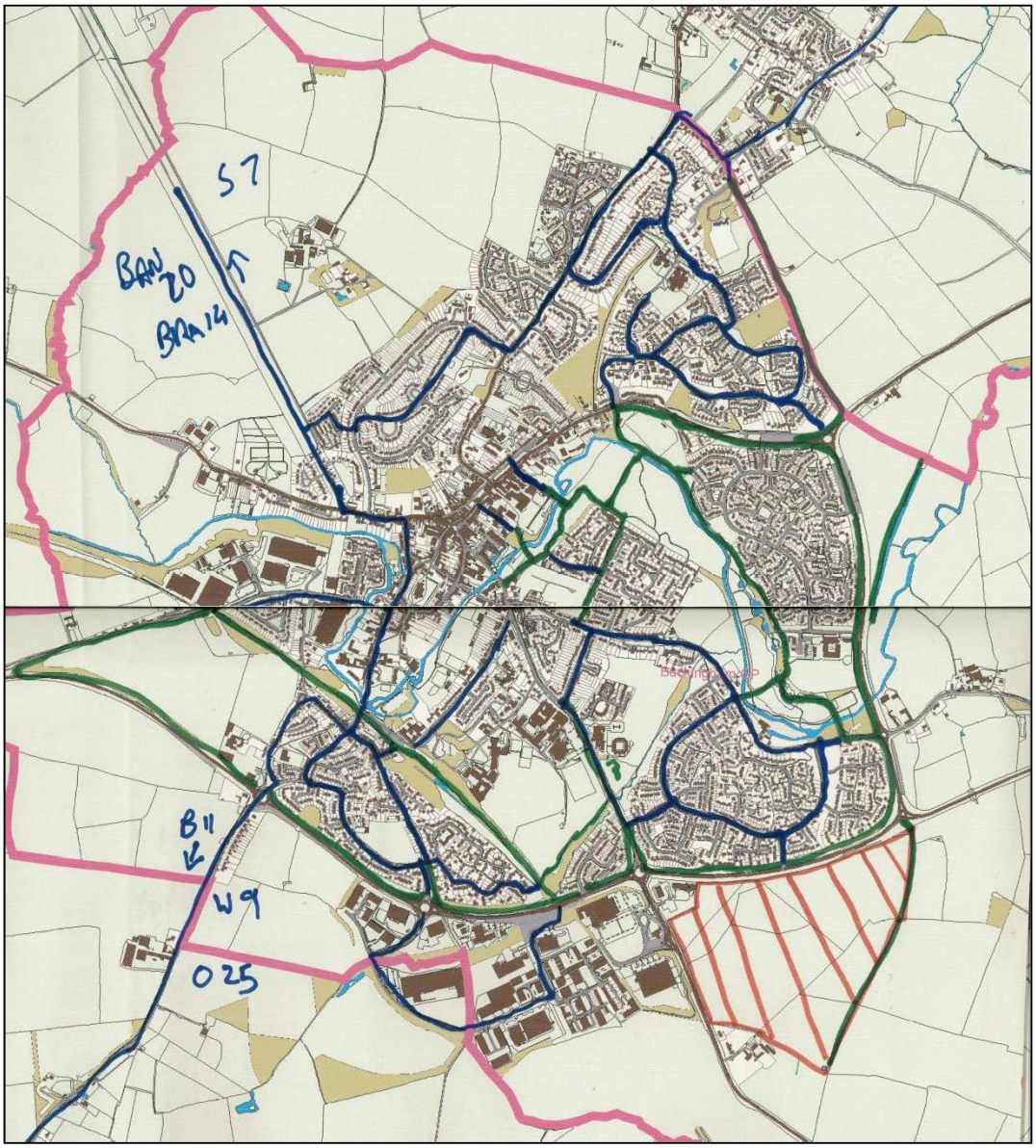
4.2.19 Subsequent to the 2013 Buckingham Outline Cycling Strategy, further proposals were made to enhance the cycling network using S106 funding from the Lace Hill development[66] – see Table 4.2 and Figure 4.4. Green routes are envisaged to be off-road, whilst blue routes are envisaged to be on-road (on quieter streets). It should be noted that these proposals have not been assessed by engineers.

Table 4.2: Buckingham Town Council Additional Route Types

Cycling Route Type	Description
Quiet Roads	On-road in quiet residential areas. Low cost – signage is the only substantial requirement.
Local Trips/Leisure	A single off-road route from Stratford Rd car park to the end of the Railway Walk on Tingewick Road via A413 and A421.
Local Trips	Cycle routes to connect key destinations in the town: primary schools, secondary schools, University sites, industrial estate, supermarkets, the Swan pool and the town centre.
Commuters	Routes to the three main exits of the town for quiet cycling routes i.e. Gawcott Rd, Stowe Ave and through Maids Moreton. It is envisaged that these can link onto quiet routes (not shown) to Bicester, Winslow, Oxford, Silverstone, Brackley, Banbury, Stony Stratford and Milton Keynes.

[66] Buckingham Town Council Planning Committee 1st December 2014.

Figure 4.4: Buckingham Town Council Additional Routes[67]



4.2.20 In addition to the routes shown in Table 4.2 and Figure 4.4, two longer distance routes to the east have also been proposed by the town council (Figure 4.5 and Figure 4.6). These two routes are predominantly on-road routes to Stony Stratford and central Milton Keynes, respectively.

[67] MX-3114N_20141212_142112 cycle routes (north) and MX-3114N_20141212_142236 cycle routes (south)

Figure 4.5: Buckingham Town Council Additional Routes (Buckingham to Central MK)[68]

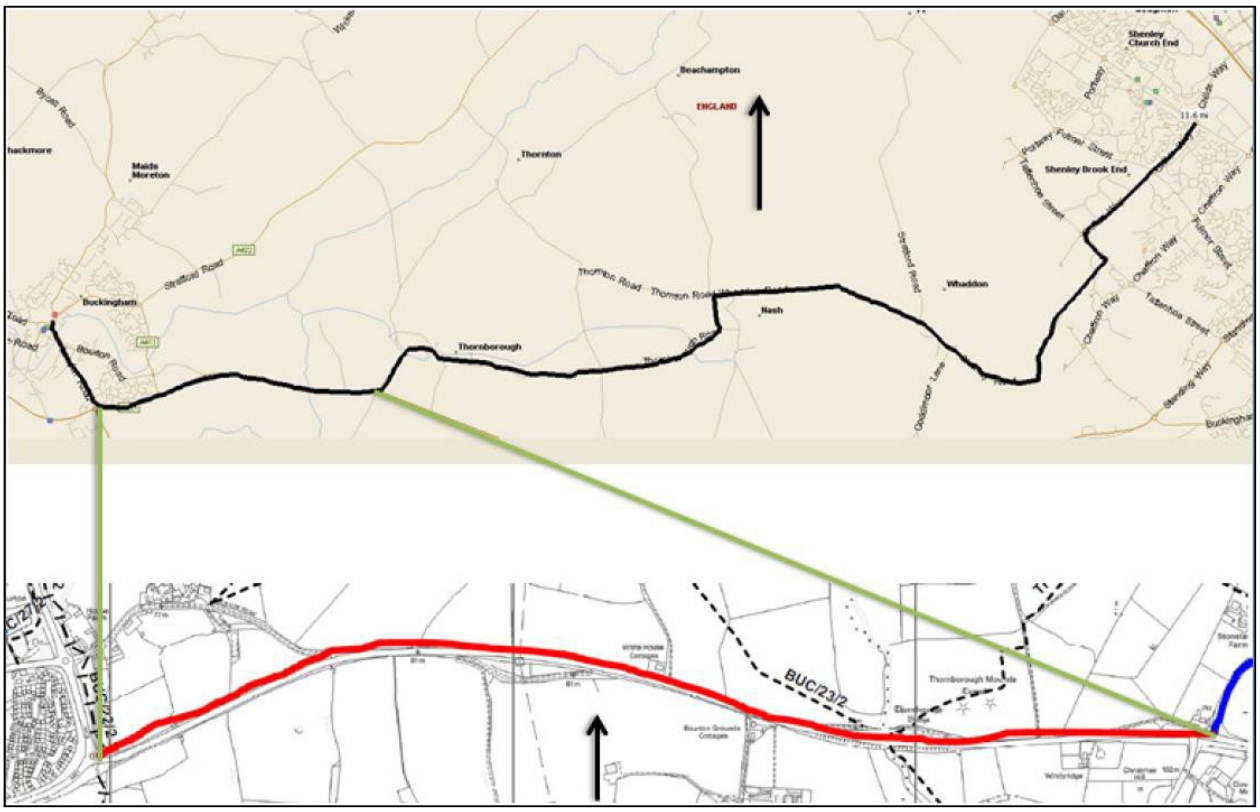
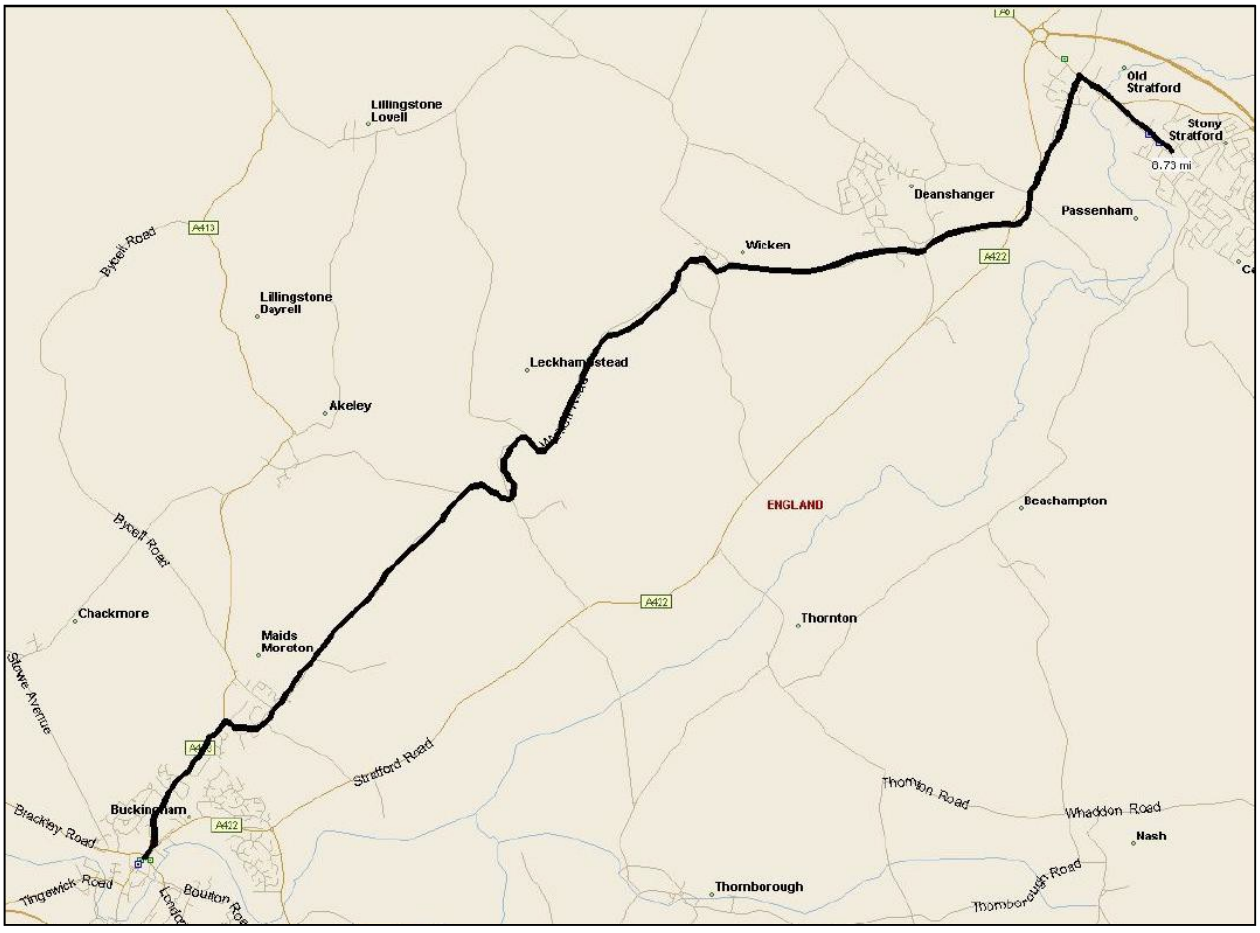


Figure 4.6: Buckingham Town Council Additional Routes (Buckingham to Stony Stratford)[69]



[68] BuckinghamToCentralMK
[69] BuckinghamToStoney

High Speed 2 National Cycle Route Proposal

4.2.21 Feasibility work has been progressed by the Department for Transport to create a continuous cycle route between London, Birmingham, Manchester and Leeds[70]. It is envisaged that the cycle route will be within 3 miles of the planned HS2 alignment, each section of which should serve as an important facility at a local level.

4.2.22 There are two sections of the cycle route of relevance to Buckingham:

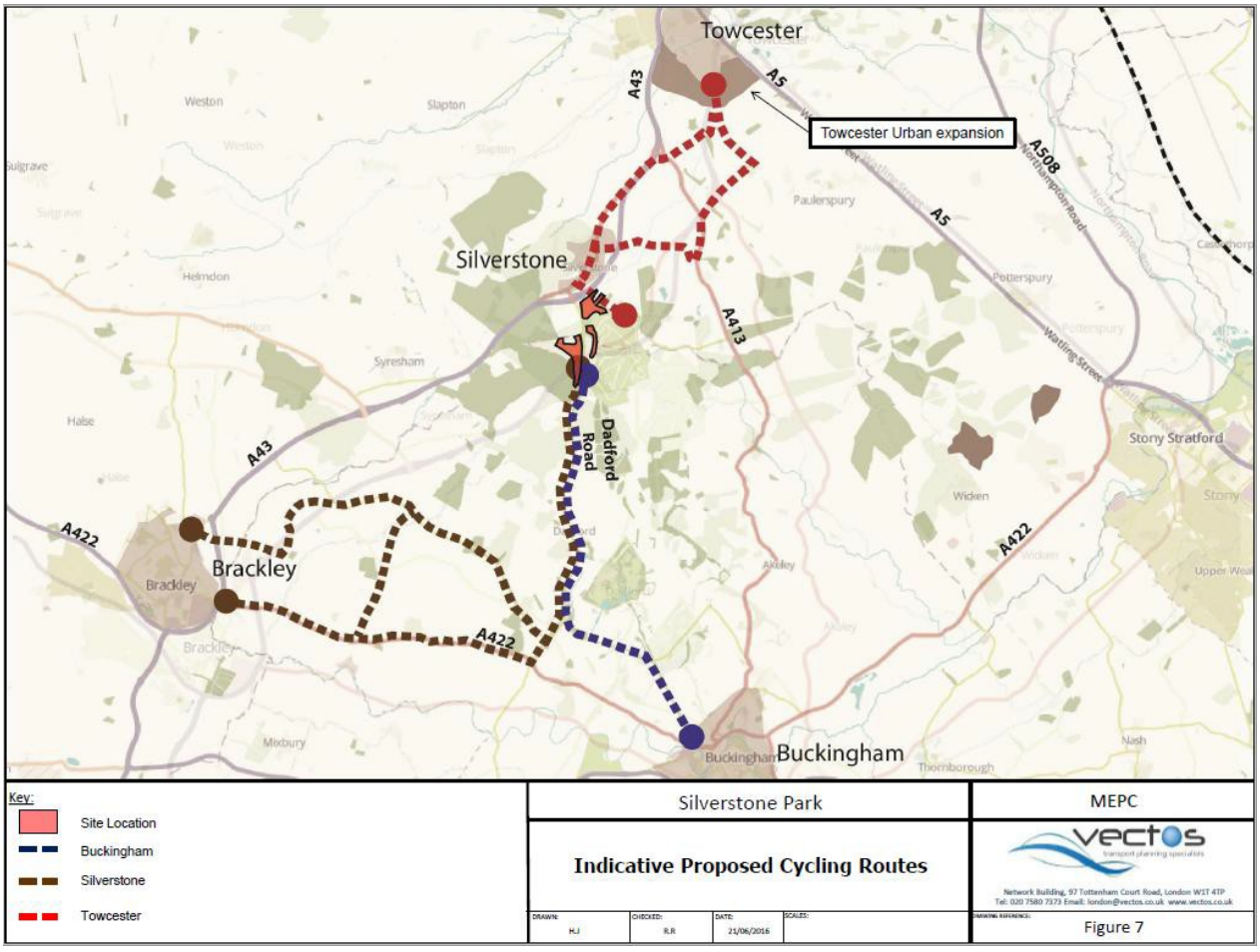
- Brackley to Buckingham (off-road disused railway line)
- Buckingham to Waddesdon Manor (predominantly on-road alignment)

Buckingham to Silverstone Park

4.2.23 Silverstone Park is a proposed development (~20 hectares) in the north of the study area with a combination of B1a, B1c, B2, B8, education, student residence, promotional automotive display and hotel floor space[71].

4.2.24 Proposed transport infrastructure associated with this development includes cycling routes, as illustrated in Figure 4.7. The route to Buckingham via Dadford Rd is assumed to be on-road, however, BCC's preference is for an off-road alignment.

Figure 4.7: Cycling routes associated with the Silverstone Park development[71]



A413 Sustainable Travel Scheme and Town Centre Extension

4.2.25 Subsequent to the publication of the Buckingham Outline Cycling Strategy, funding was received from the BTVLEP for the A413 Sustainable Travel Scheme (currently under construction), and from the Lace Hill Development for the town centre extension. Details of these schemes can be found in section 2.5. Combined, these cycle routes will provide a continuous cycle route between the town centres of Winslow and Buckingham.

[70] National Cycleway in association with HS2: Preliminary Feasibility Study. Banbury, Brackley, Buckingham and Waddesdon: Fieldwork Note Annex B16. Route maps and notes. December 2015.
[71] Environment Statement Technical Appendix J – Transport Assessment. June 2016.

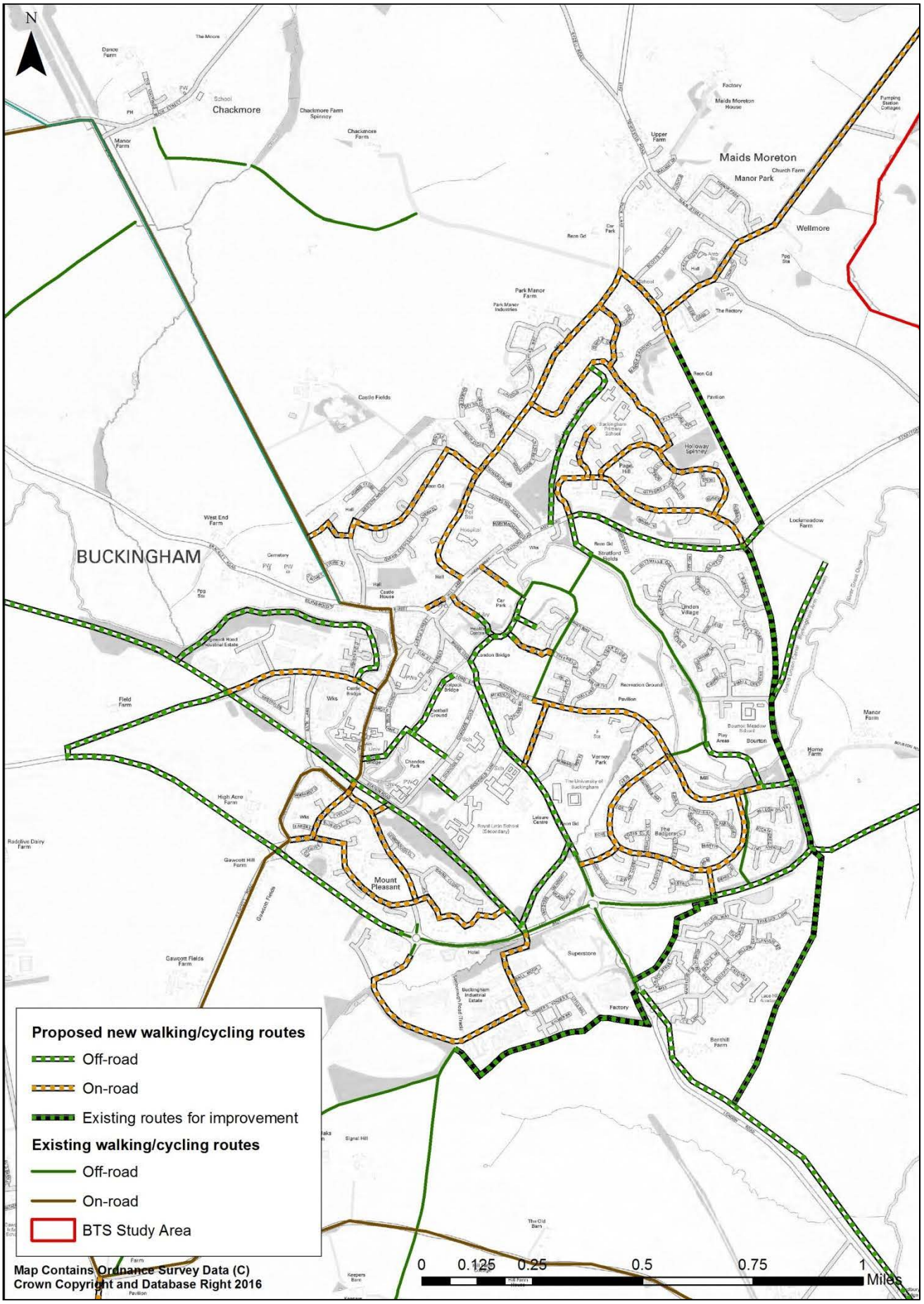
4.2.26 Cyclists may also make use of the National Cycle Network Route 51 that passes through Winslow, providing onward access to Milton Keynes and Bicester (see Figure 4.9).

Summary: BTS Walking/Cycling

4.2.27 Given that many of the potential cycle routes were defined at different times by different local authorities/stakeholders, there is some level of duplication (particularly within the town). Despite this duplication, the existing cycle route proposals can be collated into a consolidated network within the town and to neighbouring urban centres, as illustrated in Figure 4.8 and Figure 4.9, respectively.

4.2.28 Collectively, the existing and potential new cycle routes in Buckingham create a comprehensive cycling network that links the main residential areas to the town centre. Furthermore, there are significant number of off-road cycle routes which would be expected to provide a more attractive cycling environment compared to on-road routes.

Figure 4.8: Potential walking/cycling routes in Buckingham (all sources)

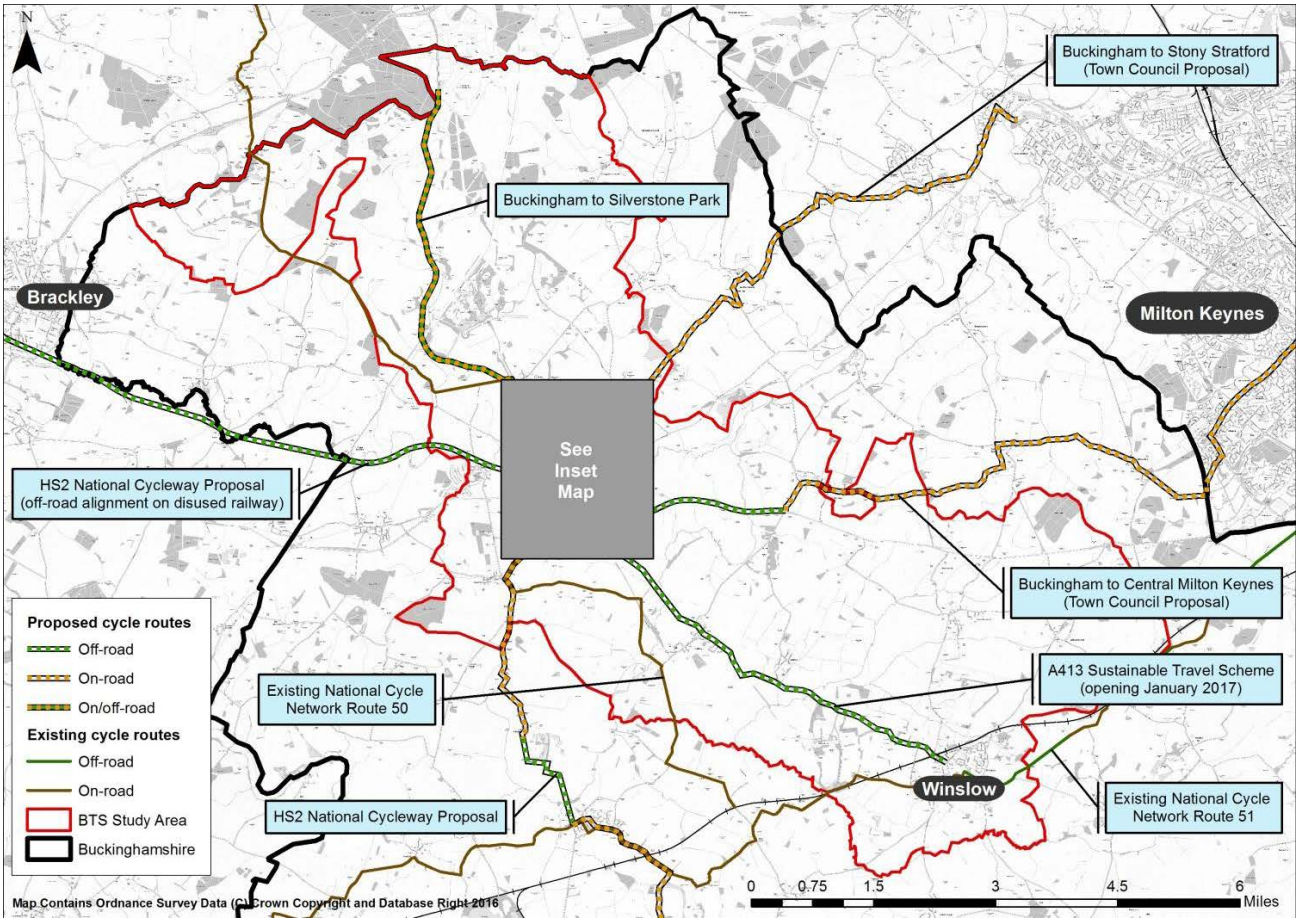


4.2.29 Similar to the routes within the town, the coverage of longer distance cycle routes to neighbouring urban areas is relatively comprehensive and has the potential to offer connectivity to destinations as shown in Table 4.3. Some of the routes have on-road alignments, however, generally make use of quieter roads which are more favourable for cycling. Note that the approximate cycle times make an allowance for inclines along the route.

Table 4.3: Potential inter-urban cycle routes

Destination	On/off-road	Route Source	Approximate Distance (miles)	Approximate Cycle Time (mins)
Winslow (East West Rail Station)	Off-road	A413 Sustainable Travel Scheme	6.5 miles	35 mins
Milton Keynes (key commuting destination)	On/off-road	Town Council Proposal	14 miles	70 mins
Silverstone Park (planned development)	On-road (BCC preference for off-road, however)	Silverstone Park Proposal	6.5 miles	40 mins
Brackley (and beyond to Banbury)	Off-road	HS2 National Cycleway Proposal	7.5 miles	40 mins
Aylesbury (key commuting destination)	On/off-road	HS2 National Cycleway Proposal	18.5 miles	95 mins

Figure 4.9: Potential inter-urban cycle routes around Buckingham (all sources)



4.3 Assessment of Transport Improvement Options

Assessment Approach

4.3.1 As shown in the previous section, several potential transport improvement options exist in Buckingham across the highway, public transport and walking/cycling categories. Some options, however, support the objectives of the BTS more strongly than others, and have been assessed using the proformas shown in this section.

4.3.2 The proformas are intended to provide a consistent summary of each improvement option and include a high level qualitative assessment of the fit with the strategy objectives, transport benefits, and potential feasibility and deliverability risks. The results of this assessment process ultimately inform the scheme prioritisation.

4.3.3 The proformas cover the issues that should be considered at an early stage in a transport improvement assessment. At this stage, the proformas are largely qualitative, and based on the information that is currently available. However, it is expected that following the adoption of the BTS, these will be developed in more detail with supporting quantitative evidence to form a full business case appropriate for funding applications.

Highway Assessment

4.3.4 In this section, the schemes identified in Table 4.1 are assessed according to the strategy objectives.

Highway Modelling Results – Initial Evidence Base

4.3.5 To aid in the assessment of the highway improvement options, the following schemes were modelled in the "with mitigation scenario" of the Countywide VISUM model (note that not all schemes have been considered as part of the BTS – this is specified where applicable):

- Western Link Rd
- Route Downgrade (West St)
- A413/A422 Roundabout Left Turn Dedicated Slip
- A421 Roundabout Capacity Enhancements (London Rd and Gawcott Rd roundabouts)
- Dualling of A421 south of Buckingham
- Dualling of the A421 between Buckingham and Milton Keynes (not assessed as part of the initial development of the BTS)
- A new link road to the A421 from Winslow (not assessed as part of the initial development of the BTS)
- Mitigation measures identified in Winslow New Settlement Study (not assessed as part of the initial development of the BTS)

4.3.6 At this stage, these results should be interpreted at a high strategic level as they still rely on initial modelling work. It is noted that as the transport improvements are progressed, further model development will need to take place to be able to test schemes for feasibility and business cases.

4.3.7 Figure 4.10 and Figure 4.11 show the flow difference between the *DS1 with mitigation* scenario and *DS1 without mitigation* scenario for the AM and PM peaks, respectively. Figure 4.12 and Figure 4.13 show the congestion ratio[72] for the *with mitigation* scenario only. Congestion ratio plots for the *without mitigation* scenario are shown in Figure 2.35 and Figure 2.36.

4.3.8 In summary, the modelled mitigation measures lead to a reduction in vehicle flows within the town centre in both peak hours. This is particularly the case at the two most congested High St junctions. It is likely that the increase on the A413 to the east of the town, the increase on the A421 to the south of the town, and the use of the Western Link Rd are related to this reduction through the town centre.

4.3.9 In terms of congestion, modelling suggests a partial alleviation of congestion in the town centre relative to the *without mitigation* scenario. There are, however, sections of the High St, West St and Bridge St where the congestion ratio remains between 2 and 4 despite the flow reduction.

[72] Congestion ratio is defined as the ratio of the travel time in the model and the free flow travel time.

Figure 4.10: AM Peak Flow Difference – DS1 with mitigation minus 2033 DS1 without mitigation, 2033

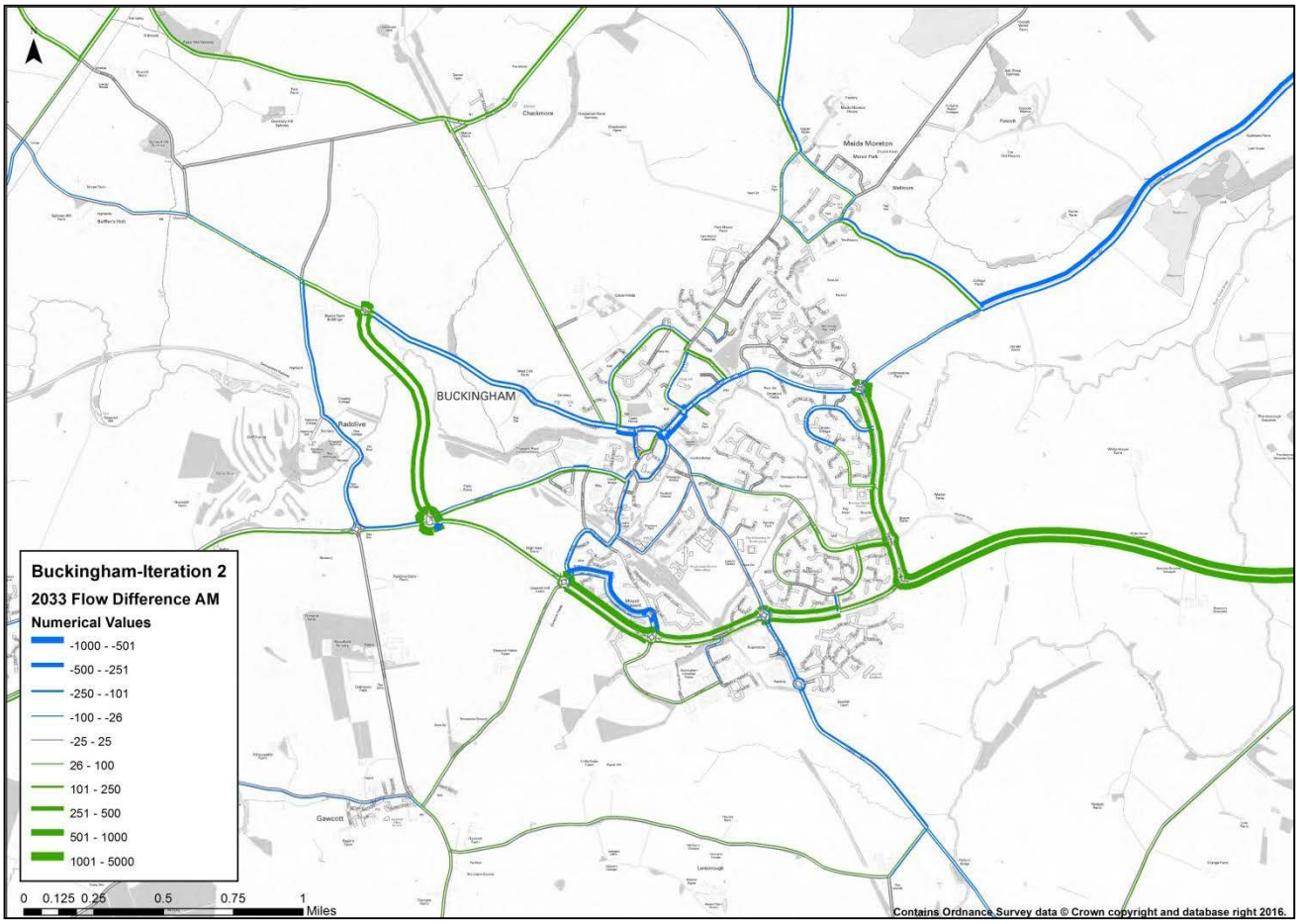


Figure 4.11: PM Peak Flow Difference – DS1 with mitigation minus 2033 DS1 without mitigation, 2033

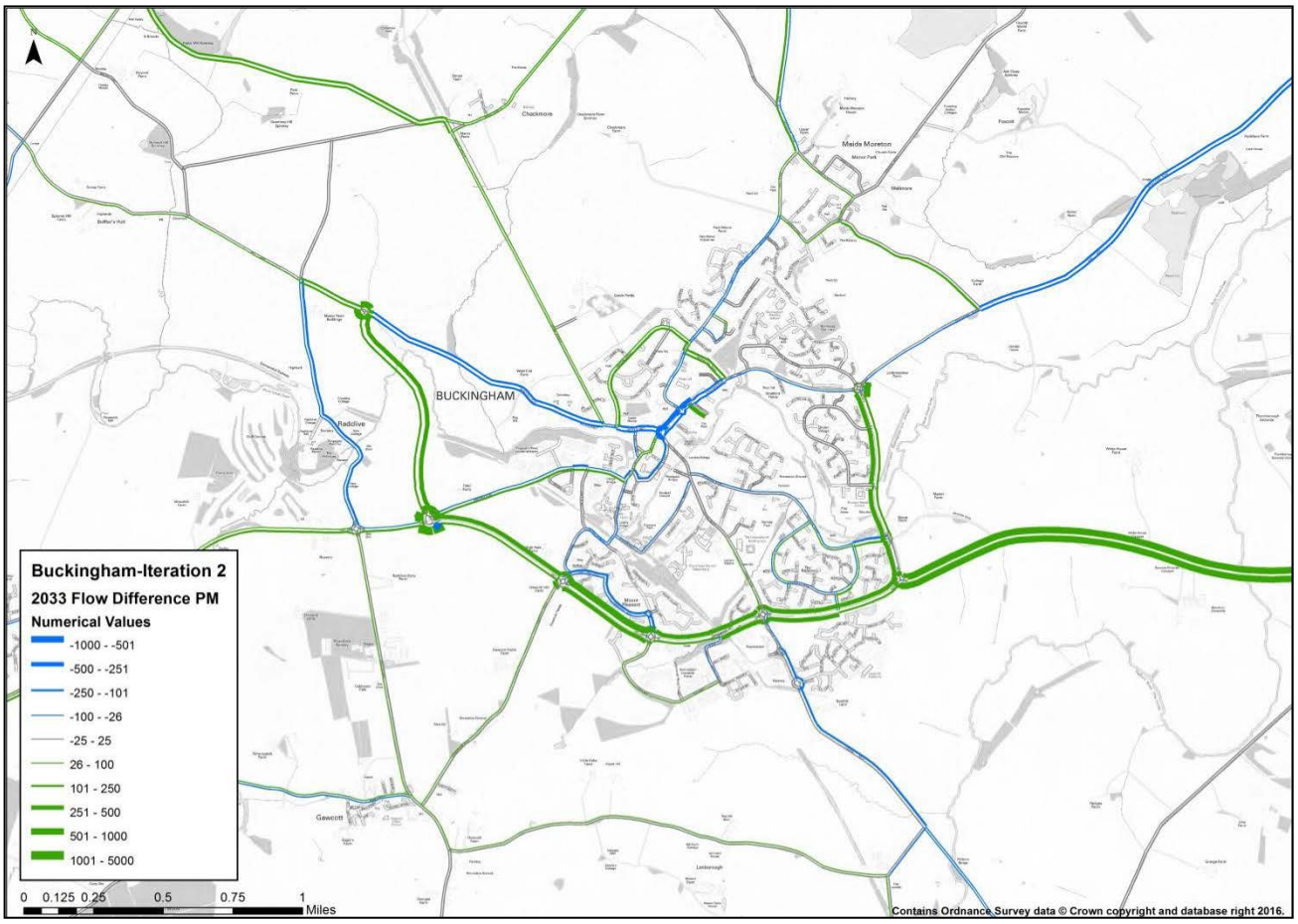


Figure 4.12: AM Peak with mitigation – Performance Plots in Buckingham, 2033[73]

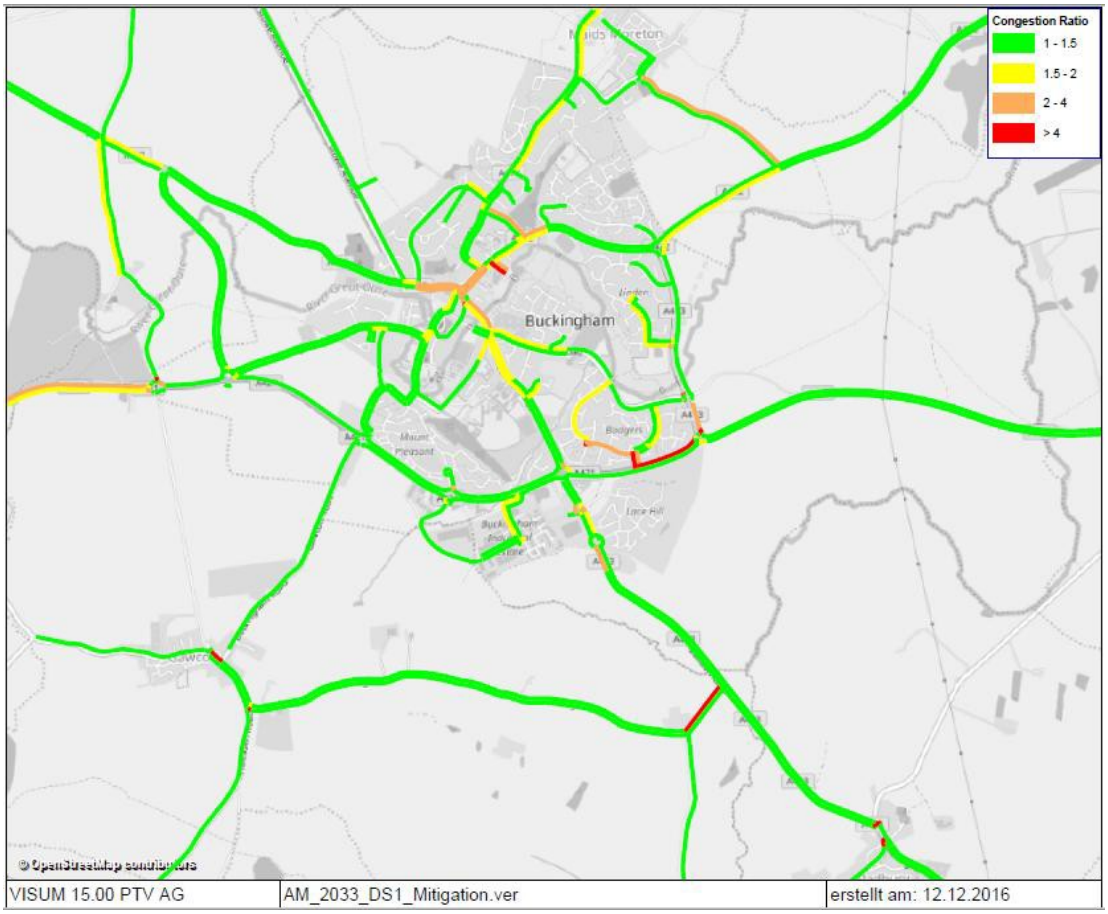
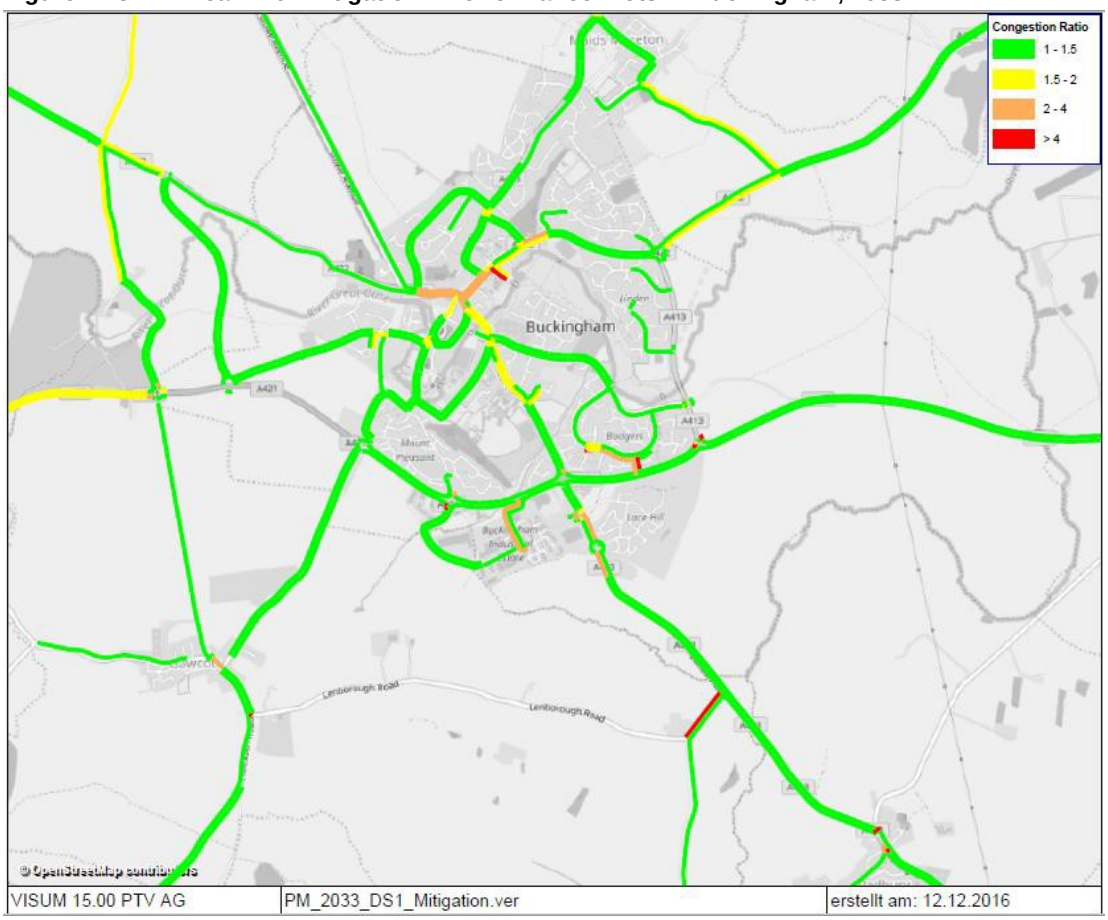


Figure 4.13: PM Peak with mitigation – Performance Plots in Buckingham, 2033[73]



[73] Countywide Model Outputs, Jacobs December 2016

Highway Assessment Proformas

Table 4.4: Western Link Rd – Assessment

Transport Improvement					
Reference			Type	Highway	
Name	Western Link Rd				
Description	Introduction of a new (single carriageway) Western Link Road between the A422 and A421 with aim of reducing traffic (including HGV) movements through the town. Through-traffic constitutes a significant proportion of vehicular flow through Buckingham town centre.				
Strategic Fit					
Buckingham Transport Strategy Objectives					
1	2	3	4	5	6
Behaviour Change – 'make it easier and more attractive to travel by active travel and public transport in particular within Buckingham'	Ease of movement in town centre – 'improve transport access and movement in town centre'	Improving Transport Options – 'improve accessibility into Buckingham and to other urban centres / new growth areas'	Improve Journey Time Reliability	Managing congestion – 'minimise the impact of future growth on traffic levels, congestion and air quality'	Transport Safety – 'reduce the risk of death or injury on the transport network'
	✔✔	✔✔✔	✔✔	✔✔✔	✔✔
Scale of Impact		High	Public Support		
Transport Benefits					
Economic Growth		High	Wellbeing / Accidents		Moderate
Socio-Distributional		Low	Local environment		Low
Implementation					
Status	Concept	Timescale	Long Term		
Indicative Cost	High	Likely Promoter	BCC		
Indicative Delivery Risk Assessment					
Feasibility Risk		High	Deliverability Risk		High
Assumptions					

Table 4.5: Route Downgrade (West St) – Assessment

Transport Improvement					
Reference			Type	Highway	
Name	Route Downgrade (West St)				
Description	The introduction of a route downgrade along West St with the aim of discouraging A422 through-traffic. West St is extremely narrow and not suitable for two-directional traffic, particularly in the peak hours.				
Strategic Fit					
Buckingham Transport Strategy Objectives					
1	2	3	4	5	6
Behaviour Change – 'make it easier and more attractive to travel by active travel and public transport in particular within Buckingham'	Ease of movement in town centre – 'improve transport access and movement in town centre'	Improving Transport Options – 'improve accessibility into Buckingham and to other urban centres / new growth areas'	Improve Journey Time Reliability	Managing congestion – 'minimise the impact of future growth on traffic levels, congestion and air quality'	Transport Safety – 'reduce the risk of death or injury on the transport network'
✔✔	✔✔		✔✔	✔✔	✔✔
Scale of Impact		Moderate	Public Support		
Transport Benefits					
Economic Growth		Moderate	Wellbeing / Accidents	Moderate	
Socio-Distributional		Low	Local environment	High	
Implementation					
Status	Concept	Timescale	Long Term (due to dependency on Western Link Rd)		
Indicative Cost	Low	Likely Promoter	BCC		
Indicative Delivery Risk Assessment					
Feasibility Risk		Low	Deliverability Risk	Low	
Assumptions					
The through-traffic this scheme aims to discourage would need an alternative route, and as such is unlikely to be feasible before/without the implementation of the Western Link Rd. The design/nature of the scheme has not been defined in detail, however, may involve an element of traffic calming e.g. chicanes.					

Table 4.6: A413/A422 Left Turn Dedicated Slip – Assessment

Transport Improvement					
Reference			Type	Highway	
Name	A413/A422 Roundabout Left Turn Dedicated Slip				
Description	The introduction of a dedicated left-turn slip on the A422/A413 Junction in the NE to encourage users the re-route around the town rather than through the town centre. Funding for this scheme has already been secured through S106 contributions.				
Strategic Fit					
Buckingham Transport Strategy Objectives					
1	2	3	4	5	6
Behaviour Change – 'make it easier and more attractive to travel by active travel and public transport in particular within Buckingham'	Ease of movement in town centre – 'improve transport access and movement in town centre'	Improving Transport Options – 'improve accessibility into Buckingham and to other urban centres / new growth areas'	Improve Journey Time Reliability	Managing congestion – 'minimise the impact of future growth on traffic levels, congestion and air quality'	Transport Safety – 'reduce the risk of death or injury on the transport network'
	✔✔	✔	✔	✔✔	✔✔
Scale of Impact		Low	Public Support		
Transport Benefits					
Economic Growth		Moderate	Wellbeing / Accidents		Moderate
Socio-Distributional		Low	Local environment		Moderate
Implementation					
Status	Concept	Timescale	Medium term		
Indicative Cost	Low	Likely Promoter	BCC		
Indicative Delivery Risk Assessment					
Feasibility Risk		Moderate	Deliverability Risk		Moderate
Assumptions					

Table 4.7: A421/A413 Route Upgrades & A421 Roundabout Capacity Enhancements – Assessment

Transport Improvement					
Reference			Type	Highway	
Name	A421/A413 Route Upgrades & A421 Roundabout Capacity Enhancements				
Description	Increasing capacity on the A421/A413 to potentially ease congestion and discourage town centre through-traffic.				
Strategic Fit					
Buckingham Transport Strategy Objectives					
1	2	3	4	5	6
Behaviour Change – 'make it easier and more attractive to travel by active travel and public transport in particular within Buckingham'	Ease of movement in town centre – 'improve transport access and movement in town centre'	Improving Transport Options – 'improve accessibility into Buckingham and to other urban centres / new growth areas'	Improve Journey Time Reliability	Managing congestion – 'minimise the impact of future growth on traffic levels, congestion and air quality'	Transport Safety – 'reduce the risk of death or injury on the transport network'
✔	✔	✔✔	✔✔	✔✔	✔
Scale of Impact		Moderate	Public Support		
Transport Benefits					
Economic Growth		Moderate	Wellbeing / Accidents		Moderate
Socio-Distributional		Low	Local environment		Moderate
Implementation					
Status	Concept	Timescale	Medium Term		
Indicative Cost	Medium	Likely Promoter	BCC		
Indicative Delivery Risk Assessment					
Feasibility Risk		Moderate	Deliverability Risk		Moderate
Assumptions					

Unassessed Highway Schemes

4.3.10 The potential junction capacity enhancements in the town centre (introduced in Table 4.1) are not shown in the above assessment proformas because:

- They are likely to increase traffic through the town centre
- Any increase in traffic in the town centre is likely to cause congestion at other local junctions
- It is unlikely that junction capacity enhancements would support any of the BTS objectives

4.3.11 A bypass running parallel to the A421 is understood to have been discounted because it:

- Is unlikely to address congestion in the town centre
- Would require significant funding from currently unidentified sources

4.3.12 During the BTS Workshop held in September 2016, a potential highway scheme was identified to make Castle St one-way. Castle St is narrow and leads directly to the congested Market Square / Bridge St / West St roundabout. Applying a one-way restriction, however, would potentially encourage re-routing onto the parallel (extremely narrow) School Ln and West St. Modelling results suggest that existing flow on the link is fewer than 200 vehicles per hour, and that the link is not used by significant volumes of through-traffic (see *Appendix VI: Castle St Base Year Model Flow*). On the basis of these modelling observations, it is not proposed to incorporate this scheme as part of the BTS.

Public Transport Assessment

4.3.13 In this section the public transport improvements introduced in section 4.2 are assessed according to the strategy objectives. At this stage, these proformas are largely qualitative, and based on the information that is currently available. The quantitative evidence base to underpin the public transport improvement options is yet to be developed, and should be considered in further work.

4.3.14 Note that the Bus Usage Monitoring Program is not covered by an assessment due to the nature of the initiative.

Table 4.8: Bus Connection to Winslow – Assessment

Transport Improvement					
Reference		Type	Public Transport		
Name	Bus Connection to Winslow				
Description	Potential increase in the frequency of the bus connections to Winslow to cater for increased demand (due to the opening of the East-West Rail station).				
Strategic Fit					
Buckingham Transport Strategy Objectives					
1	2	3	4	5	6
Behaviour Change – 'make it easier and more attractive to travel by active travel and public transport in particular within Buckingham'	Ease of movement in town centre – 'improve transport access and movement in town centre'	Improving Transport Options – 'improve accessibility into Buckingham and to other urban centres / new growth areas'	Improve Journey Time Reliability	Managing congestion – 'minimise the impact of future growth on traffic levels, congestion and air quality'	Transport Safety – 'reduce the risk of death or injury on the transport network'
✔✔		✔✔	✔	✔✔	
Scale of Impact		Moderate	Public Support		
Transport Benefits					
Economic Growth		Moderate	Wellbeing / Accidents		Moderate
Socio-Distributional		Moderate	Local environment		Moderate
Implementation					
Status	Concept	Timescale	Medium Term (following opening of Winslow Station)		
Indicative Cost	Negligible	Likely Promoter	Local bus operators, BCC		
Indicative Delivery Risk Assessment					
Feasibility Risk		Low	Deliverability Risk		Low
Assumptions					
The necessity of this scheme depends on the extent to which the existing service frequency becomes inadequate for passenger demand.					

Table 4.9: Town Centre Bus Stand Expansion/Relocation – Assessment

Transport Improvement					
Reference		Type	Public Transport		
Name	Town Centre Bus Stand				
Description	Expansion and/or relocation of the town centre bus stand. Two potential options have been identified in previous work: – Introduce a one-way system around the bus stand – Relocate the bus stand to a potential development on Wharf Yard				
Strategic Fit					
Buckingham Transport Strategy Objectives					
1	2	3	4	5	6
Behaviour Change – 'make it easier and more attractive to travel by active travel and public transport in particular within Buckingham'	Ease of movement in town centre – 'improve transport access and movement in town centre'	Improving Transport Options – 'improve accessibility into Buckingham and to other urban centres / new growth areas'	Improve Journey Time Reliability	Managing congestion – 'minimise the impact of future growth on traffic levels, congestion and air quality'	Transport Safety – 'reduce the risk of death or injury on the transport network'
✔✔	✔✔	✔✔		✔✔	✔✔
Scale of Impact		Moderate	Public Support		
Transport Benefits					
Economic Growth		Moderate	Wellbeing / Accidents		Moderate
Socio-Distributional		Moderate	Local environment		Moderate
Implementation					
Status	Concept	Timescale	Medium Term		
Indicative Cost	Medium	Likely Promoter	Local bus operators, BCC		
Indicative Delivery Risk Assessment					
Feasibility Risk		Medium	Deliverability Risk		Medium
Assumptions					
AECOM has not undertaken a review of capacity issues at the bus stand, and as such cannot independently verify the need for bus stand expansion/relocation. The recommendation to expand/relocate the bus station is based on comments made during the BTS workshop (September 2016).					

Table 4.10: Bus Coverage of New/Existing Developments – Assessment

Transport Improvement					
Reference			Type	Public Transport	
Name	Bus Coverage of New/Existing Developments				
Description	Implementation of new bus services and/or alteration of existing services to cover new/existing developments in Buckingham.				
Strategic Fit					
Buckingham Transport Strategy Objectives					
1	2	3	4	5	6
Behaviour Change – 'make it easier and more attractive to travel by active travel and public transport in particular within Buckingham'	Ease of movement in town centre – 'improve transport access and movement in town centre'	Improving Transport Options – 'improve accessibility into Buckingham and to other urban centres / new growth areas'	Improve Journey Time Reliability	Managing congestion – 'minimise the impact of future growth on traffic levels, congestion and air quality'	Transport Safety – 'reduce the risk of death or injury on the transport network'
✔✔	✔✔	✔✔✔		✔✔	✔
Scale of Impact		Moderate	Public Support		
Transport Benefits					
Economic Growth		Moderate	Wellbeing / Accidents		Moderate
Socio-Distributional		Moderate	Local environment		Moderate
Implementation					
Status	Concept	Timescale	Medium/long term		
Indicative Cost	Negligible	Likely Promoter	Local bus operators, BCC		
Indicative Delivery Risk Assessment					
Feasibility Risk		Low	Deliverability Risk		Low
Assumptions					
Without knowing the likely internal distributor road structure in the new developments, recommending detailed route information is not possible and not within the scope of the strategy. It is, however, assumed that bus stops can be placed within reasonable walking distance of new dwellings.					

Walking/Cycling Assessment

4.3.15 Significant progress has already been made by various authorities/stakeholders to develop cycling in Buckingham, as introduced in section 4.2. The town's compact size, topography and public support for cycling means it features centrally in the BTS.

4.3.16 At this stage, these proformas are largely qualitative, and based on the information that is currently available. The quantitative evidence base to underpin the walking/cycling improvement options is yet to be developed, and should be considered in further work.

Inter-urban cycling routes

Table 4.11: Buckingham to Milton Keynes – Assessment

Transport Improvement					
Reference			Type	Cycle	
Name	Buckingham to Milton Keynes				
Description	The potential route to Milton Keynes is mainly on-road, however, there is a short off-road section near Buckingham adjacent to the A421.				
Strategic Fit					
Buckingham Transport Strategy Objectives					
1	2	3	4	5	6
Behaviour Change – 'make it easier and more attractive to travel by active travel and public transport in particular within Buckingham'	Ease of movement in town centre – 'improve transport access and movement in town centre'	Improving Transport Options – 'improve accessibility into Buckingham and to other urban centres / new growth areas'	Improve Journey Time Reliability	Managing congestion – 'minimise the impact of future growth on traffic levels, congestion and air quality'	Transport Safety – 'reduce the risk of death or injury on the transport network'
✔	✔	✔✔✔	✔	✔✔	✔
Scale of Impact		Moderate	Public Support		High
Transport Benefits					
Economic Growth		Moderate	Wellbeing / Accidents		Moderate
Socio-Distributional		Moderate	Local environment		Moderate
Implementation					
Status	Concept	Timescale	Short / Medium Term		
Indicative Cost	Medium	Likely Promoter	BCC, Buckingham Town Council		
Indicative Delivery Risk Assessment					
Feasibility Risk		Moderate	Deliverability Risk		Moderate
Assumptions					
Improved wellbeing and local environmental conditions (reduced noise and pollution) can be expected if there is a consistent modal shift from car to cycle. It is understood that there is significant public support to support the new initiatives and reduce congestion within the town centre.					

Table 4.12: Buckingham to Stony Stratford – Assessment

Transport Improvement					
Reference		Type	Cycle		
Name	Buckingham to Stony Stratford				
Description	The section of the national cycleway associated with HS2 between Buckingham and Brackley is mainly off-road and follows the alignment of the disused railway line.				
Strategic Fit					
Buckingham Transport Strategy Objectives					
1	2	3	4	5	6
Behaviour Change – 'make it easier and more attractive to travel by active travel and public transport in particular within Buckingham'	Ease of movement in town centre – 'improve transport access and movement in town centre'	Improving Transport Options – 'improve accessibility into Buckingham and to other urban centres / new growth areas'	Improve Journey Time Reliability	Managing congestion – 'minimise the impact of future growth on traffic levels, congestion and air quality'	Transport Safety – 'reduce the risk of death or injury on the transport network'
✔	✔	✔	✔	✔✔	✔
Scale of Impact		Moderate	Public Support		High
Transport Benefits					
Economic Growth		Moderate	Wellbeing / Accidents		Moderate
Socio-Distributional		Moderate	Local environment		Moderate
Implementation					
Status	Concept	Timescale	Short / Medium Term		
Indicative Cost	Medium	Likely Promoter	BCC, Buckingham Town Council		
Indicative Delivery Risk Assessment					
Feasibility Risk		Moderate	Deliverability Risk		Moderate
Assumptions					
Improved wellbeing and local environmental conditions (reduced noise and pollution) can be expected if there is a consistent modal shift from car to cycle. It is understood that there is significant public support to support the new initiatives and reduce congestion within the town centre.					

Table 4.13: HS2 National Cycleway – Buckingham to Waddesdon Manor – Assessment

Transport Improvement					
Reference			Type	Cycle	
Name	Buckingham to Waddesdon Manor				
Description	The section of the national cycleway associated with HS2 between Buckingham and Waddesdon Manor is mainly on-road, and partially shares its alignment with National Cycle Network routes 50 and 51.				
Strategic Fit					
Buckingham Transport Strategy Objectives					
1	2	3	4	5	6
Behaviour Change – 'make it easier and more attractive to travel by active travel and public transport in particular within Buckingham'	Ease of movement in town centre – 'improve transport access and movement in town centre'	Improving Transport Options – 'improve accessibility into Buckingham and to other urban centres / new growth areas'	Improve Journey Time Reliability	Managing congestion – 'minimise the impact of future growth on traffic levels, congestion and air quality'	Transport Safety – 'reduce the risk of death or injury on the transport network'
✔	✔	✔	✔	✔✔	✔
Scale of Impact		Moderate	Public Support		High
Transport Benefits					
Economic Growth		Moderate	Wellbeing / Accidents		Moderate
Socio-Distributional		Moderate	Local environment		Moderate
Implementation					
Status	Concept	Timescale	Medium / Long Term (potential dependency on HS2)		
Indicative Cost	Medium	Likely Promoter	HS2, BCC		
Indicative Delivery Risk Assessment					
Feasibility Risk		Moderate	Deliverability Risk		Moderate
Assumptions					
Improved wellbeing and local environmental conditions (reduced noise and pollution) can be expected if there is a consistent modal shift from car to cycle. It is understood that there is significant public support to support the new initiatives and reduce congestion within the town centre.					

Table 4.14: HS2 National Cycleway – Buckingham to Brackley – Assessment

Transport Improvement					
Reference			Type	Cycle	
Name	Buckingham to Brackley				
Description	The section of the national cycleway associated with HS2 between Buckingham and Brackley is mainly off-road and follows the alignment of the disused railway line.				
Strategic Fit					
Buckingham Transport Strategy Objectives					
1	2	3	4	5	6
Behaviour Change – 'make it easier and more attractive to travel by active travel and public transport in particular within Buckingham'	Ease of movement in town centre – 'improve transport access and movement in town centre'	Improving Transport Options – 'improve accessibility into Buckingham and to other urban centres / new growth areas'	Improve Journey Time Reliability	Managing congestion – 'minimise the impact of future growth on traffic levels, congestion and air quality'	Transport Safety – 'reduce the risk of death or injury on the transport network'
✔	✔	✔	✔	✔✔	✔✔
Scale of Impact		Moderate	Public Support		High
Transport Benefits					
Economic Growth		Moderate	Wellbeing / Accidents		Moderate
Socio-Distributional		Moderate	Local environment		Moderate
Implementation					
Status	Concept	Timescale	Medium / Long Term (potential dependency on HS2)		
Indicative Cost	Medium	Likely Promoter	HS2, BCC		
Indicative Delivery Risk Assessment					
Feasibility Risk		Moderate	Deliverability Risk		Moderate
Assumptions					
Improved wellbeing and local environmental conditions (reduced noise and pollution) can be expected if there is a consistent modal shift from car to cycle. It is understood that there is significant public support to support the new initiatives and reduce congestion within the town centre.					

Table 4.15: Buckingham to Silverstone Park – Assessment

Transport Improvement					
Reference			Type	Cycle	
Name	Buckingham to Silverstone Park				
Description	The Transport Assessment of the proposed development in Silverstone Park includes a cycle path to Buckingham. At present, the cycle path is assumed to be on-road, however, an off-road alignment is BCC's preference. It is likely that an off-road alignment would produce a greater up-take in the use of the route.				
Strategic Fit					
Buckingham Transport Strategy Objectives					
1	2	3	4	5	6
Behaviour Change – 'make it easier and more attractive to travel by active travel and public transport in particular within Buckingham'	Ease of movement in town centre – 'improve transport access and movement in town centre'	Improving Transport Options – 'improve accessibility into Buckingham and to other urban centres / new growth areas'	Improve Journey Time Reliability	Managing congestion – 'minimise the impact of future growth on traffic levels, congestion and air quality'	Transport Safety – 'reduce the risk of death or injury on the transport network'
✔	✔	✔✔✔	✔	✔✔✔	✔
Scale of Impact		Moderate	Public Support		High
Transport Benefits					
Economic Growth		Moderate	Wellbeing / Accidents		Moderate
Socio-Distributional		Moderate	Local environment		Moderate
Implementation					
Status	Concept	Timescale	Short / Medium Term		
Indicative Cost	Medium	Likely Promoter	Silverstone Park, BCC		
Indicative Delivery Risk Assessment					
Feasibility Risk		Moderate	Deliverability Risk		Moderate
Assumptions					
Improved wellbeing and local environmental conditions (reduced noise and pollution) can be expected if there is a consistent modal shift from car to cycle. It is understood that there is significant public support to support the new initiatives and reduce congestion within the town centre.					

Cycling routes within Buckingham

4.3.17 Cycling routes within Buckingham have not been individually assessed, however, a collective assessment is shown in Table 4.16.

4.3.18 In addition, the routes within the town that have the greatest potential to contribute to the BTS objectives are shown in Table 4.17 including (where available) the ranking in the *Buckingham Outline Cycling Strategy* (see *Appendix V: Buckingham Outline Cycling Strategy*).

Table 4.16: Cycle routes within Buckingham – Assessment

Transport Improvement					
Reference			Type	Cycle	
Name	Cycle routes within Buckingham				
Description	The improvement of cycling infrastructure within the town is key due to its compact size and relatively flat topography. The main aim is to make Buckingham a cycle-friendly town through increased visibility of opportunities to cycle through signing and cycle parking. A mixture of on road and off road cycling routes have been suggested by different local stakeholders.				
Strategic Fit					
Buckingham Transport Strategy Objectives					
1	2	3	4	5	6
Behaviour Change – 'make it easier and more attractive to travel by active travel and public transport in particular within Buckingham'	Ease of movement in town centre – 'improve transport access and movement in town centre'	Improving Transport Options – 'improve accessibility into Buckingham and to other urban centres / new growth areas'	Improve Journey Time Reliability	Managing congestion – 'minimise the impact of future growth on traffic levels, congestion and air quality'	Transport Safety – 'reduce the risk of death or injury on the transport network'
✔✔✔	✔✔✔		✔✔	✔✔	✔✔
Scale of Impact		Moderate	Public Support		High
Transport Benefits					
Economic Growth		Moderate	Wellbeing / Accidents		High
Socio-Distributional		Moderate	Local environment		High
Implementation					
Status	Concept	Timescale	Short / Medium term		
Indicative Cost	Medium	Likely Promoter	BCC, BTVLEP, Buckingham Town Council		
Indicative Delivery Risk Assessment					
Feasibility Risk		Moderate	Deliverability Risk		Low
Assumptions					
Improved wellbeing and local environmental conditions (reduced noise and pollution) can be expected if there is a consistent modal shift from car to cycle. It is understood that there is significant public support to support the new initiatives and reduce congestion within the town centre.					

Table 4.17: High Priority Cycling Routes within Buckingham

Route	AECOM Comment	Buckingham Outline Cycling Strategy Ranking
London Rd (between A421 and town centre)	Could improve cycling accessibility along this key radial route between the town centre and employment/commercial areas south of the A421. Would also provide access to residential areas between the town centre and A421, and Buckingham's two secondary schools.	1
Tingewick Rd (between A421 and town centre)	Could improve cycling accessibility to the planned residential and employment growth areas to the west of the town.	Not ranked
Railway Cycle Path (between development in the west and A421)	Could improve cycling accessibility for both existing and planned developments to the south and west of the town.	3
Moreton Rd (between Maids Moreton and town centre)	Could improve cycling accessibility between Maids Moreton and Buckingham, including planned residential growth the north of the town.	6

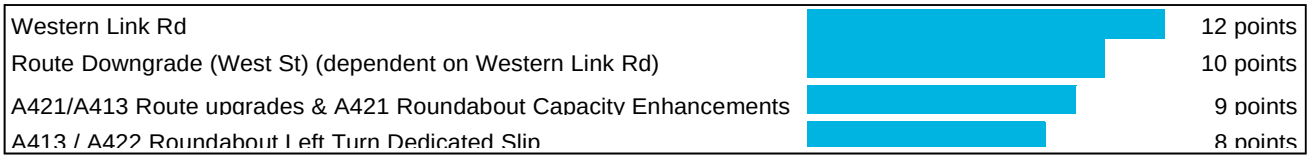
4.4 Prioritisation of Transport Improvement Options

Prioritisation Approach

4.4.1 The prioritisation of improvement options is determined primarily according to the extent to which the scheme is expected to meet the stated strategy objectives (assessment points shown section 4.3 proformas).

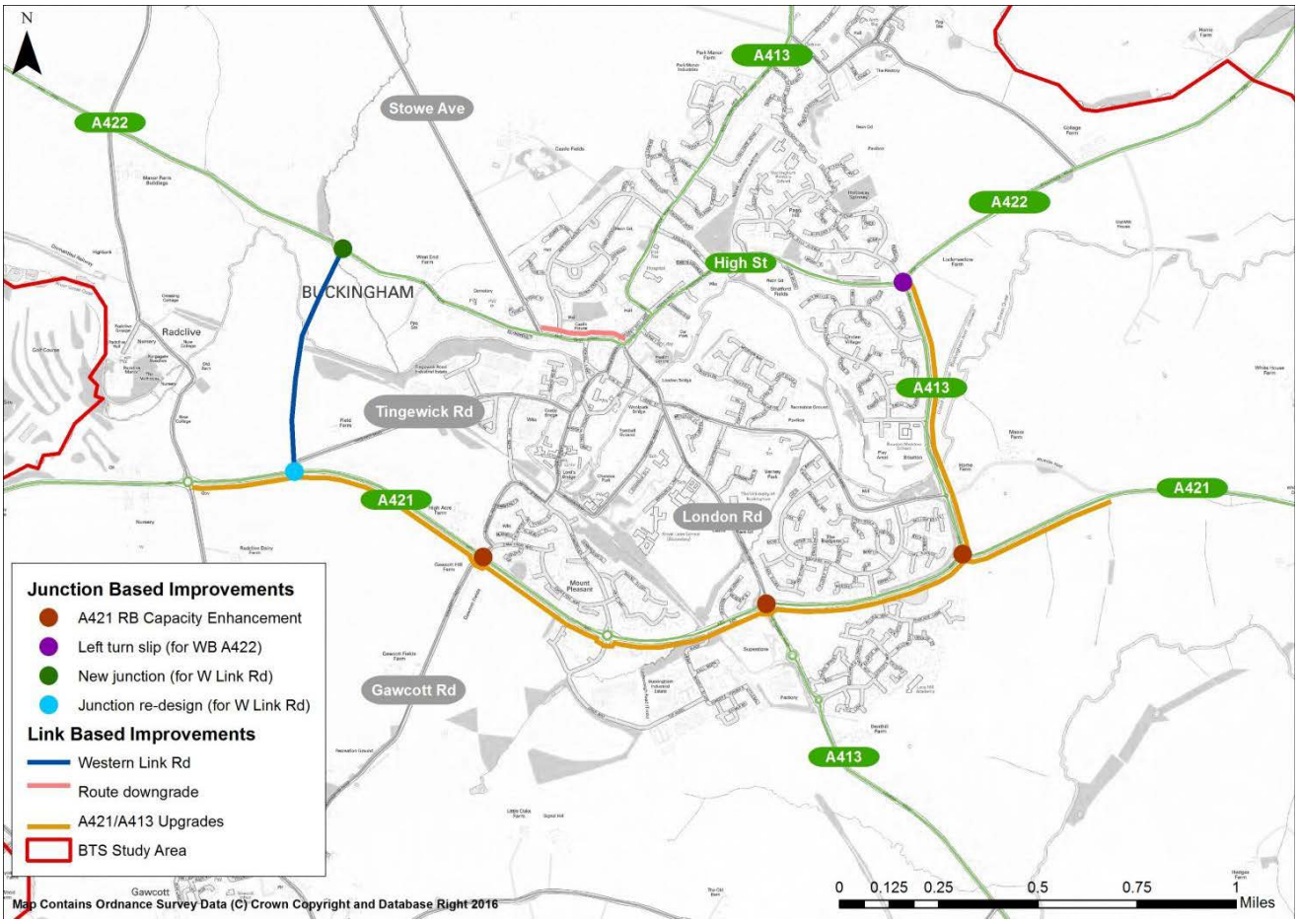
Highway Prioritisation

4.4.2 Ranked in descending order in terms of their contribution to the BTS objectives (qualitative assessment proformas shown in section 4.3) the recommended prioritisation of highway improvements is as follows:



4.4.3 Note that this ranking is subject to change following the consideration of further strategic modelling work.

Figure 4.14: Recommended Highway Improvement Options



Public Transport

4.4.4 Ranked in descending order in terms of their contribution to the BTS objectives, (qualitative assessment proformas shown in section 4.3) the recommended prioritisation of public transport improvements is as follows:

Town Centre Bus Stand	10 points
Bus Coverage of New/Existing Developments	9 points
Bus Connection to Winslow	8 points
Bus Usage Monitoring Program	Not assessed due to nature of the initiative.

Walking/Cycling

4.4.5 Ranked in descending order in terms of their likely contribution to the BTS objectives, (qualitative assessment proformas shown in section 4.3) the recommended prioritisation of inter-urban cycling schemes s as follows:

Buckingham to Silverstone Park	10 points
Buckingham to Milton Keynes	9 points
HS2 National Cycleway – Buckingham to Brackley	8 points
Buckingham to Stony Stratford	7 points
HS2 National Cycleway – Buckingham to Waddesdon Manor	7 points

4.4.6 The cycling routes within the town have not been ranked in this manner; however, those that have the greatest potential to contribute to the BTS objectives are shown in Table 4.17.

4.4.7 The potential cycle parking facilities outlined in Figure 4.3 are integral to the promotion of cycling within and to the town, and as such should also be progressed through the lifetime of the strategy.

4.5 Implementation of Transport Improvement Options

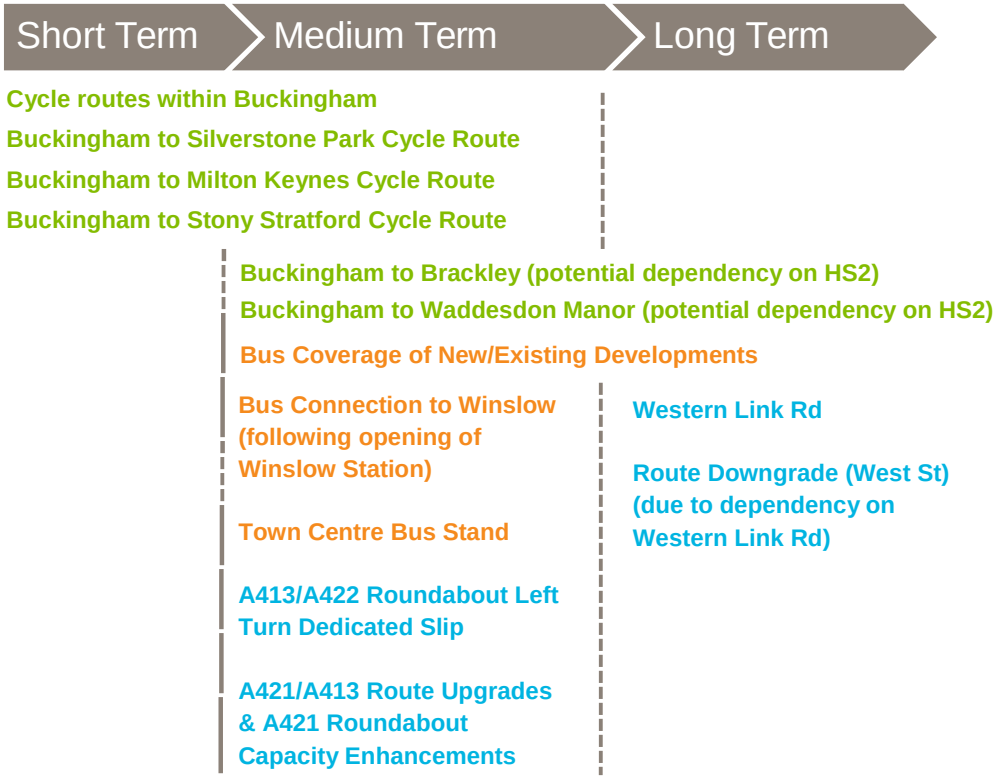
Implementation

Phasing

4.5.1 The phasing of growth over time in a given study area typically determines the implementation plan of transport improvements. In the case of Buckingham, however, AECOM understands that growth phasing information is not available. As a next step, work to determine the phasing of growth within the town is necessary due to its potential implications for the implementation of the BTS.

4.5.2 Despite this uncertainty, a high level timeline of the potential implementation phasing is possible, and is shown below. This phasing is based on a number of factors, including:

- Inter-dependencies with developments and other transport improvements
- The scale of the preparatory work
- Available funding sources



Funding

4.5.3 Indicative costs are shown in the transport improvement proformas in section 4.3. The funding for future transport improvement options in Buckingham is likely to rely principally on S106 contributions from developers[74]. As shown in Figure 1.5, however, much of the planned residential development in Buckingham is already committed, and as such this may limit the availability of further funding.

4.5.4 In the absence of alternative sources of funding, it is therefore the uncommitted growth that will principally determine the financial feasibility of transport improvements in the town.

Constructability

4.5.5 In terms of constructability, it is beyond the scope of this study to consider each potential transport improvement, however, this should be considered as schemes develop. It is recognised that Buckingham faces a number of natural, physical, historical and heritage constraints that may affect the viability of transport improvements.

[74] BTS Steering Group Meeting 10th August 2016

Monitoring and Reviewing the Strategy

5

5. Monitoring and Reviewing the Strategy

5.1 Monitoring Plan

5.1.1 The Department for Transport (DfT) considers monitoring and evaluation to be an important element in project planning in order to identify after implementation whether the desired outcomes of a transport improvement are being achieved. Therefore, a plan needs to be put in place during the planning phase in order to ensure sufficient baseline and future evidence is gathered in order to adequately evaluate the actual benefits.

5.1.2 The DfT's three main objectives for monitoring and evaluation include:

- To establish a proportionate monitoring and evaluation programme to ensure that the cost of the monitoring activities is proportionate to the size of the initiative or returns which can be generated by the investment;
- To ensure a robust governance framework which incentivises the delivery of good quality monitoring and evaluation; and
- Embed a culture of monitoring and evaluation to fully embrace learning about what works and why / why not.

5.1.3 A strategy monitoring plan has been developed for the BTS proportionate to the level of detail of the transport improvements identified, in order to set out a plan for monitoring the overall performance of the strategy over time. The strategy monitoring plan will be essential in determining the overall success of the BTS since monitoring and reviewing the transport strategy enables BCC to regularly assess the effectiveness of the strategy and review its policies over time in the context of what will most likely be a changing policy environment over the lifetime of the strategy. The requirements for the monitoring plan need to be considered at an early stage of the process to ensure proportionate funding and mechanisms are in place at the outset, so the benefits of interventions can be fully captured. The monitoring plan is shown in Table 5.1.

5.1.4 Many of the timeframes for impacts and monitoring are indicative only and highly dependent on the implementation of the transport improvements.

5.1.5 Much of the baseline information for the performance indicators above is currently available and has been presented either in Chapter 2 of this report. However, there are a number of indicators listed that are currently not available, and the strategy would benefit from these being collected prior to improvements being put in place, such as:

- A PERS audit in the town centre and around key destinations;
- Community surveys to gauge public opinion on the quality of the shared path network and public spaces and their current access to travel information;
- Traffic surveys; and
- Bus and rail operators' data on the no. of services currently running to schedule.

5.1.6 Further work will also need to be undertaken in the next stages to determine the availability of the data for measuring the suggested performance indicators. Some of these may come from existing sources (e.g. the LTP monitoring data).

5.1.7 It should be noted many of the longer term highway improvements will not show significant benefits until after all the associated construction traffic ceases and road users adapt their routing according. Consequently, some of the indicators related to highway improvements should continue to be collected beyond the lifetime of the strategy to determine the true impacts.

Table 5.1: Strategy Monitoring Plan

Objective	Performance Indicators	Data Source	Suggested Frequency of Data Collection
1. Behaviour Change – 'make it easier and more attractive to travel by active travel and public transport in particular within Buckingham'	Levels of walking/cycling	Census Journey to Work Mode Share Bicycle counts (automatic, manual, video). Household/workplace/school travel survey	Every 10 years
	Levels of public transport usage	Census Journey to Work Mode Share	Every 10 years
		Bus passenger counts	Every 5 years
2. Ease of movement in town centre – 'improve transport access and movement in town centre'	Traffic volumes on congested routes in the town centre, particularly the High St	Traffic surveys	Before and after implementation of key schemes intended to meet this objective i.e. Western Link Rd, West St Route Downgrade, and A413/A422 Roundabout Left Turn dedicated slip.
	Levels of walking/cycling and public transport use for trips to town centre	See objective 1	See objective 1
3. Improving Transport Options – 'improve accessibility into Buckingham and to other urban centres / new growth areas'	Public transport service (coverage, frequency and punctuality) to surrounding urban centres	Transport for Buckinghamshire Bus and rail operators' data / GPS tracking	Every 5 years
	Accessibility to employment areas	Census / Nomis data	Every 10 years
	Existing shared path links to new development	Buckingham walking/cycling network	Every 5 years
	Queue lengths and delays at key junctions on strategic roads	Traffic surveys	Before and after implementation of highway schemes.
4. Improving Journey Times – 'improve journey time reliability'	Private vehicle journey time reliability	Trafficmaster	Every 5 years
	Public transport journey time reliability	Bus and rail operators' data / GPS tracking	Every 5 years
5. Managing congestion – 'minimise the impact of future growth on traffic levels, congestion and air quality'	Queue lengths and delays at key junctions on strategic roads	Traffic surveys	Before and after implementation of highway schemes.
	Journey to Work private vehicle mode share	Census Journey to Work Mode Share	Every 10 years
	Annual mean concentration of NO_2 levels	Air quality data collection	Every 5 years
	Operational CO_2 emissions	Air quality data collection	Every 5 years
6. Transport Safety – 'reduce the risk of death or injury on the transport network'	No. of people killed or seriously injured in road traffic incidents	Road accident and safety statistics from BCC and DfT	Every 3 years
	Satisfaction survey on public perception of personal safety on the transport network	Community surveys	Every 5 years

5.2 Reviewing the Strategy

5.2.1 Reviewing the strategy is also an important consideration to ensure a plan is in place from the beginning to continually review its policy context and progress. As the strategy takes a long term view, it is most likely it will evolve over time to remain relevant to local, regional and national policy. The progress of the strategy will be linked to the outcomes set out in the Monitoring Plan, and as such, updating data against the performance indicators should form part of this review.

5.2.2 Transport strategies of this size are typically reviewed at least every two years and should consider the following:

- Any changes in policy context at a local, regional and national level and therefore future funding opportunities;
- Potential changes to the strategy objectives in consideration of the contextual changes above;
- Whether the scale of growth and phasing has changed and will impact the transport proposals;
- Ensure that any upcoming schemes in the strategy match with the availability of upcoming funding opportunities;
- Consider the outcomes of the ongoing monitoring plan to identify where objectives are being met;
- Consider outcomes from specific schemes and whether key learnings can be taken from these in the development of new schemes.
- Determine whether new and emerging data collection technology can be used in monitoring the strategy.

5.2.3 By reviewing the strategy regularly there will be opportunity to take advantage of future policy, funding and innovations in transport technology and data collection.

5.3 Risk Register

5.3.1 This section seeks to highlight potential risks to the success of the strategy early on so that preventative actions can be included in the planning for each transport improvement to ensure its success in achieving the strategy objectives. This is by no means an exhaustive list for each element of the strategy and a full risk assessment for each individual improvement will need to be undertaken when concept and detailed designs are being undertaken.

Highway

Risk	Effect	Likelihood	Impact	Risk Rating	Actions
Highway improvements unlock latent demand on the highway network	Any benefits of highway schemes are neutralised by the additional vehicles.	High	High	High	Ensure that bus and walking/cycling improvements are implemented simultaneously or immediately after the highway improvements.
Highway improvements do not adequately discourage through-traffic in Buckingham.	Congestion in the town centre worsens.	Moderate	High	Moderate	Current mitigation modelling being undertaken separately to this study is testing the impact to the road network with the new highway schemes in place, and should determine their likely impacts.
Highway improvements create long term congestion and delay during construction.	Buckingham becomes a less attractive destination.	Moderate	High	Moderate	Ensure highway improvements are appropriately phased so that simultaneous construction work is minimised.
Delay in implementation of highway schemes.	Continuing increase in congestion and delays in the town.	Moderate	High	Moderate	Ensure plans are put in place early in the life of the strategy to ensure the roads are prioritised according to need. Progress with bus and walking/cycling programmes to encourage mode shift.

Public Transport

Risk	Effect	Likelihood	Impact	Risk Rating	Actions
Re-routed/new bus services are not aligned with areas of demand for the services	Low passenger demand on re-routed/new bus services.	Moderate	Moderate	Moderate	Work should be undertaken to estimate the likely users of a re-routed/new bus service prior to implementation.
Lack of space to implement town centre bus stand expansion.	Bus stand cannot be expanded in proposed location	Moderate	High	Moderate	Alternative approach needed to expand bus capacity in town centre.
New developments are not adequately covered by bus services.	New residents develop reliance on private vehicle transport.	Low	Moderate	Moderate	Ensure that bus services are updated with the phasing of residential and employment developments in mind.

Walking/Cycling

Risk	Effect	Likelihood	Impact	Risk Rating	Actions
Constructability issues prevent the implementation of some cycle routes in Buckingham.	Cycling infrastructure insufficient for needs of town.	High	Moderate	Moderate	Ensure that efforts are made to progress with cycle routes without constructability issues such that network coverage improves where possible.
New cycle routes are not aligned with areas of demand for cycling	Cycling uptake is limited.	Moderate	High	Moderate	Work should be undertaken to estimate the likely users of new cycle routes prior to implementation.
Additional cycle parking capacity is either insufficient and/or inappropriately located	Cycling uptake is limited.	Low	Moderate	Moderate	Work should be undertaken to quantify the likely additional need for cycling parking and its appropriate location.
New developments are not adequately covered by walking/cycling network.	New residents develop reliance on private vehicle transport.	Moderate	High	Moderate	Ensure that walking/cycling infrastructure is constructed with the phasing of residential and employment developments in mind.

BTS Summary and Discussion

6

6. BTS Summary and Discussion

6.1.1 Buckingham is a historical market town in northern Buckinghamshire that lies on the strategic road network between Milton Keynes and the M40. The historical town acts as a local centre for several outlying villages, and is expected to experience significant growth over the next 20 years as part of the Vale of Aylesbury Local Plan.

6.1.2 The town has a housing requirement of 2,571 dwellings over the lifetime of the Local Plan, 1,393 of which are already committed, and 621 of which are already completed (see section 1.2.49). This leaves a residual requirement of 557 dwellings to be allocated. The proposed growth is generally focussed on the town's western and southern edges.

6.1.3 A significant amount of work has already been undertaken in Buckingham in relation to the planning of future transport infrastructure. Of particular note are the *Buckingham Area Transport Study*[75] and the 2013 *Buckingham Outline Cycling Strategy*.

6.1.4 The BTS includes a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis by transport mode, acting as a basis for the generation of new potential schemes. The strategy also ties together the transport improvement proposals from previous work, as well as inputs from various authorities/stakeholders on the future of transport infrastructure in Buckingham[76].

6.1.5 The three transport modes considered in the BTS are highway, public transport and walking/cycling.

- Highway: the main issue is congestion in the town centre, much of which can be attributed to through-traffic. All highway improvements recommended in the strategy are aimed at reducing through-traffic as a means of alleviating town centre congestion.
- Public transport: the main issues are the capacity of the town centre bus stand and ensuring good coverage of new developments once they come forward. The recommended public transport improvements therefore include (among others) the expansion/relocation of the town centre bus stand and re-routing/creation of new bus routes serving the town.
- Walking/cycling: the historical nature and physical constraints of the town have acted as a hindrance to walking/cycling. The BTS therefore includes a set of intra- and inter-urban walking/cycling routes that have the potential to provide comprehensive coverage for residents, workers and visitors. Due to popular support, compact size of the town, and fit with the BTS objectives, walking/cycling is a major focus of the strategy.

6.1.6 The potential transport improvements are subsequently assessed and ranked according to their likely contribution to the BTS objectives. At this stage, the evidence base underpinning the transport improvements is largely qualitative and high level, and as such requires further attention as the strategy is implemented.

6.1.7 Recommendations are made regarding the likely implementation timescales considering scheme interdependencies, the scale of preparatory work, and funding availability.

6.1.8 Finally, in order to quantify the extent to which the strategy objectives are met over the lifetime of the BTS, a monitoring plan is set out that identifies the relevant data collection requirements. Some data will require collection on regular intervals, whereas other data should be collected before and after scheme implementation, for example.

[75] Jacobs, September 2015
[76] BTS Workshop, September 2016

6.1.9 The BTS is intended to determine the overall direction of planning growth and transport infrastructure in Buckingham over the next 20 years. To facilitate the progression of transport schemes and interventions which are likely to be required to successfully facilitate the planned growth, it is important to consider the following:

- Highway: initial strategic modelling already provides a high level evidence base for the potential highway schemes in the BTS. As a next step, feasibility of schemes should be assessed using early option generation and sifting processes. Examples of best practice and lessons learnt should be referred to during option sifting/scheme design. This will help create initial scheme details/designs which can then be assessed by stakeholders, defined, prioritised and progressed to business cases where appropriate. This will ensure the interventions provide value for money.
- Public transport: the implementation of the public transport improvements should be preceded by work to understand the likely users/benefits and feasibility. This will ensure future proofing of potential interventions and seek to maximise a step change in modal shift, whilst also enabling innovative approaches to be incorporated.
- Walking/cycling: a holistic approach across Buckingham should be taken forward to estimate the likely users and benefits of the proposed walking and cycling infrastructure. Furthermore, scheme design should be considered to ensure any potential constraints are identified early on in the process and therefore overcome efficiently.

6.1.10 In addition to these mode specific next steps, the likely phasing of developments in the study area should also be investigated due to its relevance for the prioritisation and implementation of transport improvements.

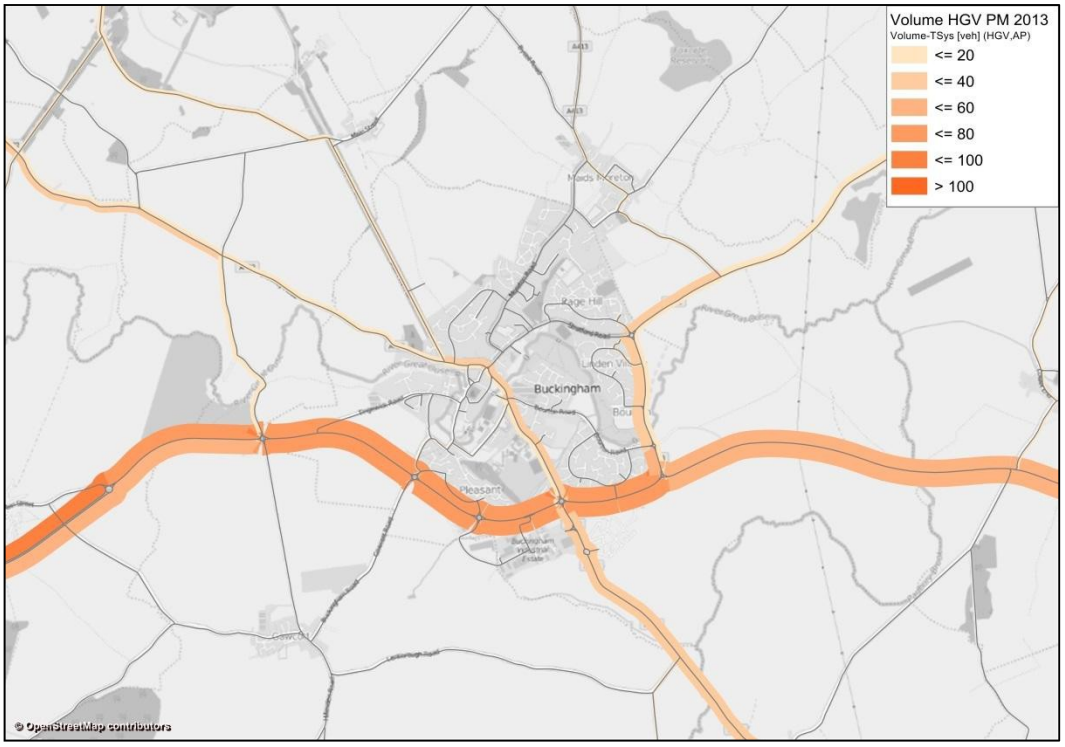
Appendices

6

7. Appendices

7.1 Appendix I: 2013 Model HGV Volumes

Figure 7.1: PM HGV Flows in Buckingham, 2013[77]



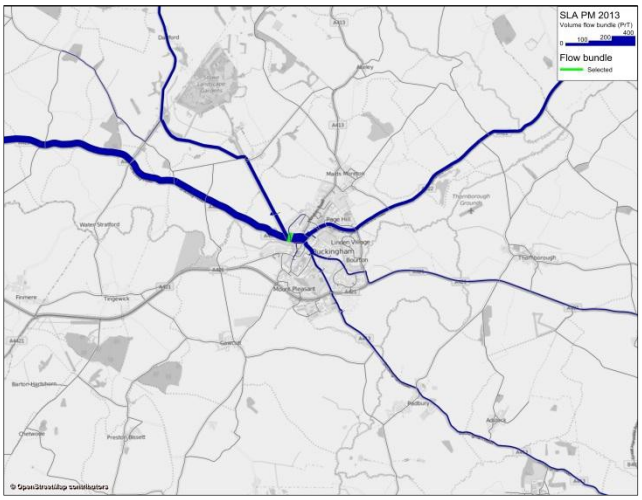
[77] Source: Buckinghamshire Countywide VISUM Model

7.2 Appendix II: PM Peak Select Link Analysis Plots

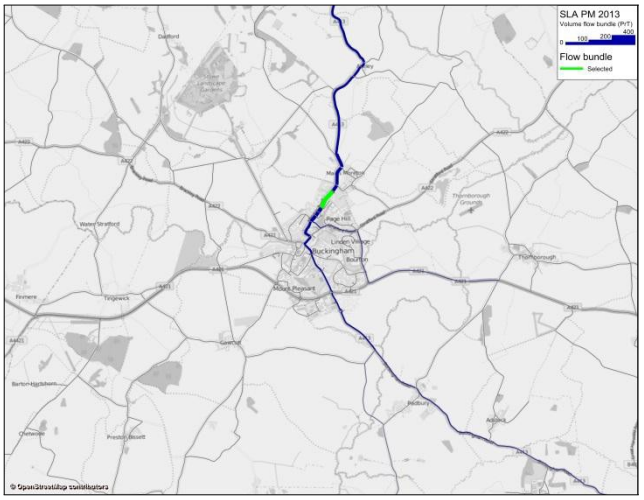
Figure 7.2: PM Peak Select Link Analysis (Inbound) [78]

Nelson Street

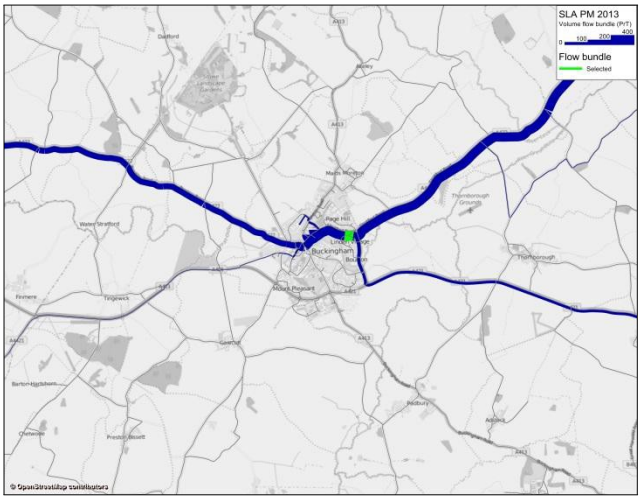
West Street



Moreton Road



Stratford Road



Bourton Road

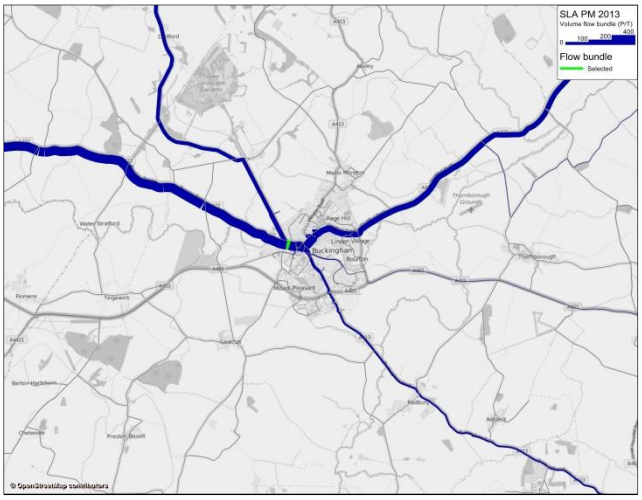
London Road

[78] Source: Buckinghamshire Countywide VISUM Model

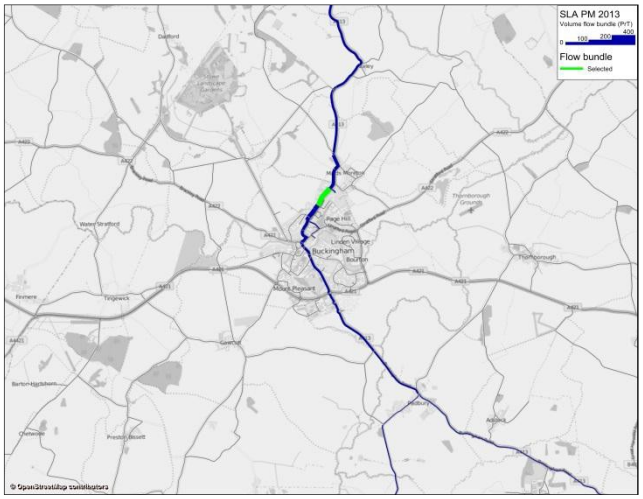
Figure 7.3: PM Peak Select Link Analysis (Outbound) [79]

Nelson Street

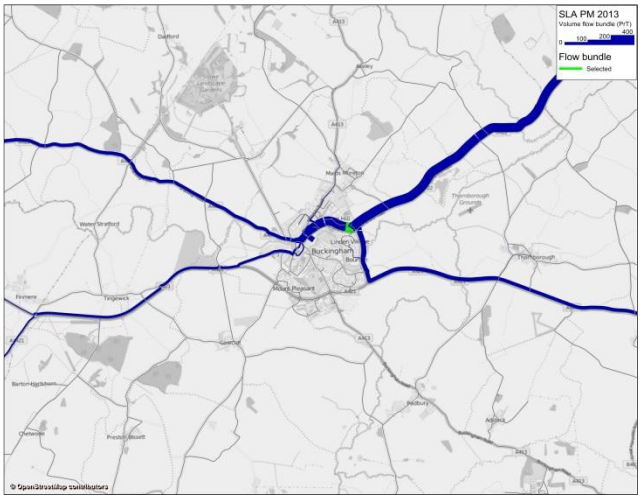
West Street



Moreton Road



Stratford Road



Bourton Road

London Road

[79] Source: Buckinghamshire Countywide VISUM Model

7.3 Appendix III: Train frequencies from alternative stations

Table 7.1: Aylesbury Vale Parkway Station train frequencies and journey times

Aylesbury Vale Parkway Station	*Aylesbury Vale Parkway to London*		*London to Aylesbury Vale Parkway*	
	Frequency	***Journey Times***	***Frequency***	***Journey Times***
AM peak (8 -10am)	1-2 per hour	64-67 mins	1 per our	66 mins
PM Peak (4 - 6 pm)	1-2 per hour	65-67 mins	2 per our	61-74 mins
Interpeak (10am - 4pm)	1-2 per hour	67 mins	1 per our	66-67 mins
Saturday	1 per hour	67 mins	1 per our	66 mins
Sunday	1 per our	67 mins	1 per our	66 mins

Table 7.2: Bicester Town Station train frequencies and journey times

Bicester Town Station	*Bicester Town to London Marylebone*		*London Marylebone to Bicester Town*	
	Frequency	***Journey Times***	***Frequency***	***Journey Times***
AM peak (8 -10am)	3 per hour	46-67 mins	2 per hour	47-53 mins
PM Peak (4 - 6 pm)	2 per hour	48-57 mins	2 per hour	46-51 mins
Interpeak (10am - 4pm)	2 per hour	47-56 mins	2 per hour	46-48 mins
Saturday	2 per hour	49-52 mins	2 per hour	43-49 mins
Sunday	2 per hour	49-52 mins	2 per hour	48-49 mins

Table 7.3: Bletchley Station train frequencies and journey times

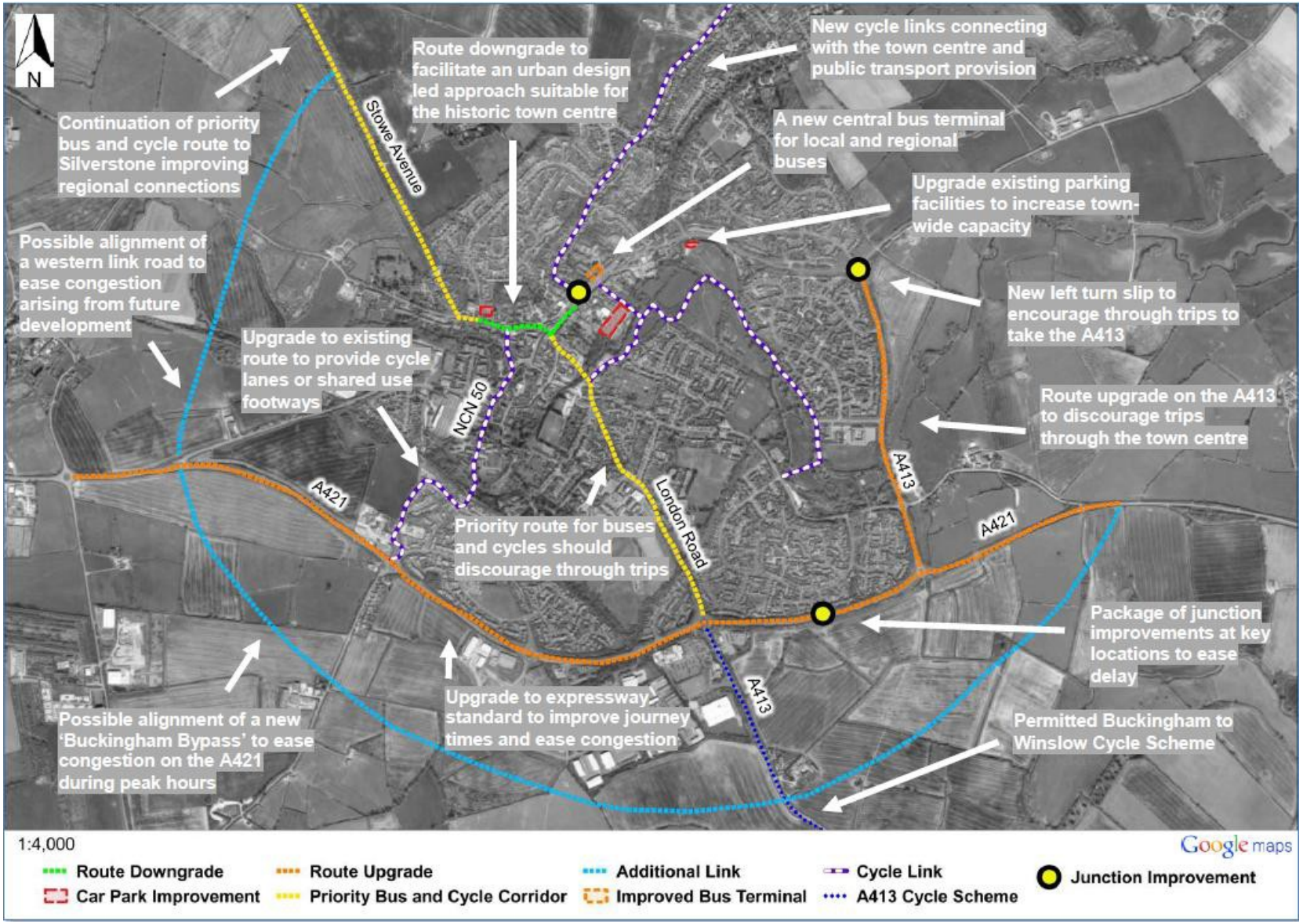
Bletchley Station	*Bletchley to London Euston*		*London Euston to Bletchley*	
	Frequency	***Journey Times***	***Frequency***	***Journey Times***
AM peak (8 -10am)	3-5 per hour	39-56 mins	3-4 per hour	34-51 mins
PM Peak (4 - 6 pm)	3 per hour	41-53 mins	3-5 per hour	36-60 mins
Interpeak (10am - 4pm)	3 per hour	41-53 mins	3 per hour	36-54 mins
Saturday	3 per hour	41-54 mins	3 per hour	36-53 mins
Sunday	2 per hour	59-61 mins	2 per hour	47-56 mins

Table 7.4: Wolverton Station train frequencies and journey times

Wolverton Station	*Wolverton to London Euston*		*London Euston to Wolverton*	
	Frequency	***Journey Times***	***Frequency***	***Journey Times***
AM peak (8 -10am)	2 per hour	46-60 mins	2 per hour	45-58 mins
PM Peak (4 - 6 pm)	2 per hour	50-63 mins	2 per hour	44-61 mins
Interpeak (10am - 4pm)	2 per hour	50-62 mins	2 per hour	45-58 mins
Saturday	2 per hour	50-63 mins	2 per hour	44-61 mins
Sunday	1-2 per hour	60-68 mins	1-2 per hour	57-68 mins

7.4 Appendix IV: Buckingham Options Package – Buckingham Area Transport Study (September 2015)

Figure 7.4: Buckingham Options Package. Source: Buckinghamshire County Council – Buckingham Area Transport Study. Jacobs, September 2015 (Chapter 6)



7.5 Appendix V: Buckingham Outline Cycling Strategy

Table 7.5: Proposed cycle routes in the Buckingham Outline Cycling Strategy

☒ Priority	**1**	**London Road**
	a	Off-road (3m unsegregated shared use footway/cycle route plus a verge where possible) from the A421 to Bourtonville, signed links to Circular Walk, Riverside Walk and Badgers Way
	b	Off-road (3m unsegregated shared use footway/cycle route plus a verge where possible) outside the Leisure Centre and Schools to Brookfield Lane
	c	Direct cycle access from the A421 to the Tesco superstore
	d	On-road (advisory cycle lane) southbound between Bourton Road and Bourtonville to offer up-hill protection
	2	**Riverside Walk/Bourton Rd**
	a	Widen unsegregated shared use Riverside paths to 3m and apply maintenance, where required
	b	Enhance cycle access from Bourton Road, installing dropped kerbs, half barriers and refreshed markings
	c	Improved cycle access to cycle path through Treefields, including signage and cycle markings, a short length of parking restrictions may also be necessary to improve visibility of the route from Bourton Road currently obscured by parked cars
	3	**Railway Walk**
	a	Replace barriers throughout the route with cycle-friendly alternatives
	b	Enhance surface of the route for cyclists
	c	*Creation of the route as a public bridleway to secure walking and cycling rights in perpetuity (AECOM Addition during BTS Development).*
	4	**A421 –** Widen and extend off-road route (3m unsegregated shared use footway/cycle route plus a verge where possible) to Bourton Road in the east
	5	**Stowe Avenue (NCN 50) –** Off-road route to Stowe in the north
	6	**A413 Moreton Road –** Provide out-bound (uphill) advisory cycle lane from beyond the on-street parking close to Market Hill to the new residential development
	7	**A422 Stratford Road**
	a	Off-street (3m unsegregated shared use footway/cycle route plus a verge where possible) from the Riverside Walk to the Hollow Way, with improved route to bypass the A422/A413 roundabout
	b	Investigate formal crossing point, e.g. Toucan or Zebra, over the A422 Stratford Road
	8	**Hollow Way (Bridleway) –** Widen and enhance surface of the route for cyclists
	CP	**Circular Walk (Chandos Park)**
	a	Convert paths to shared use, widening to 3m in width where possible
	b	Enhance cycle access over the footbridge near the University, installing dropped kerbs and stair ramps/channels/gutter's at the stepped access
	DA	**Dark Alley / Brookfield Lane** – Adjust half barriers, improve surface and implement signing/markings to make route accessible to cyclists.
	MH	**A422 Market Hill** – Previous recommendations included closing the western section of Market Hill to vehicular traffic, with the exception of deliveries, providing a route for cyclists and pedestrians
To investigate in line with future devs'	**CR**	**Chandos Road** – Improvements to the Chandos Road junction with London Road for cyclists and pedestrians.
	A421 West	**A421 –** Widen and extend off-road route (3m unsegregated shared use footway/cycle route plus a verge where possible) to Gawcott Road in the east
	TR	**Tingewick Road/Railway Walk**
	a	Widen and extend Railway Walk route north of Tingewick Road in line with potential development. Widen and extend riverside path westwards (behind the Industrial Estate and Fishers Field) to connect
	b	Enhance cycle access between the Railway Walk and Tingewick Road
	c	Extend the 30mph speed limit/reduce vehicular speeds within the vicinity of the access to the Railway Walk on Tingewick Road, install advisory cycle lanes from the Railway Walk eastwards
	A413 / A421 East	**A413/A421 Eastern Roundabout –** Circular Walk (Chandos Park)
	BIE	**Buckingham Industrial Estate** – Improved access to Buckingham Industrial Estate, through widening and converting the southern footway to a shared use footway/cycle route. Alternatively, on-road advisory cycle lanes could be investigated.

7.6 Appendix VI: Castle St Base Year Model Flow

Figure 7.5: AM Peak Link Flow in Buckingham, 2013[80]

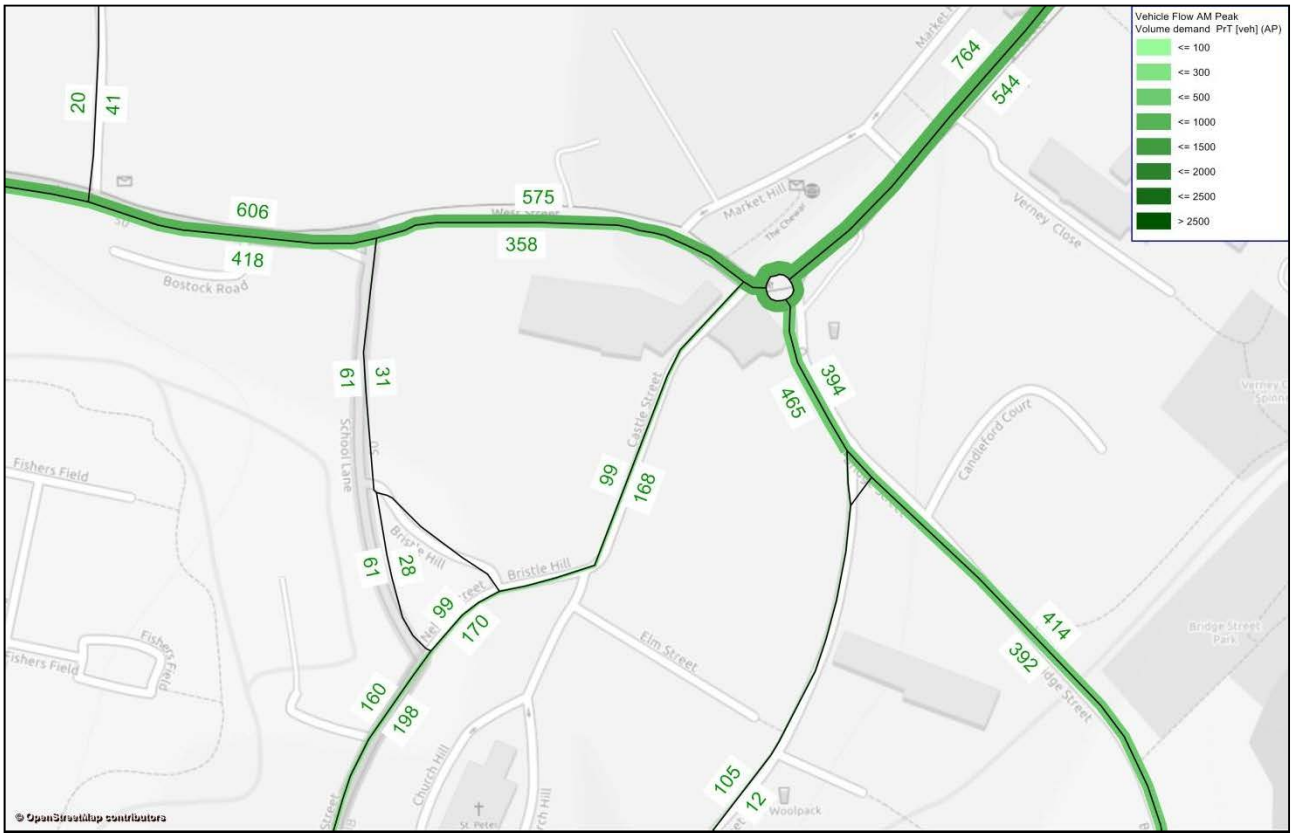
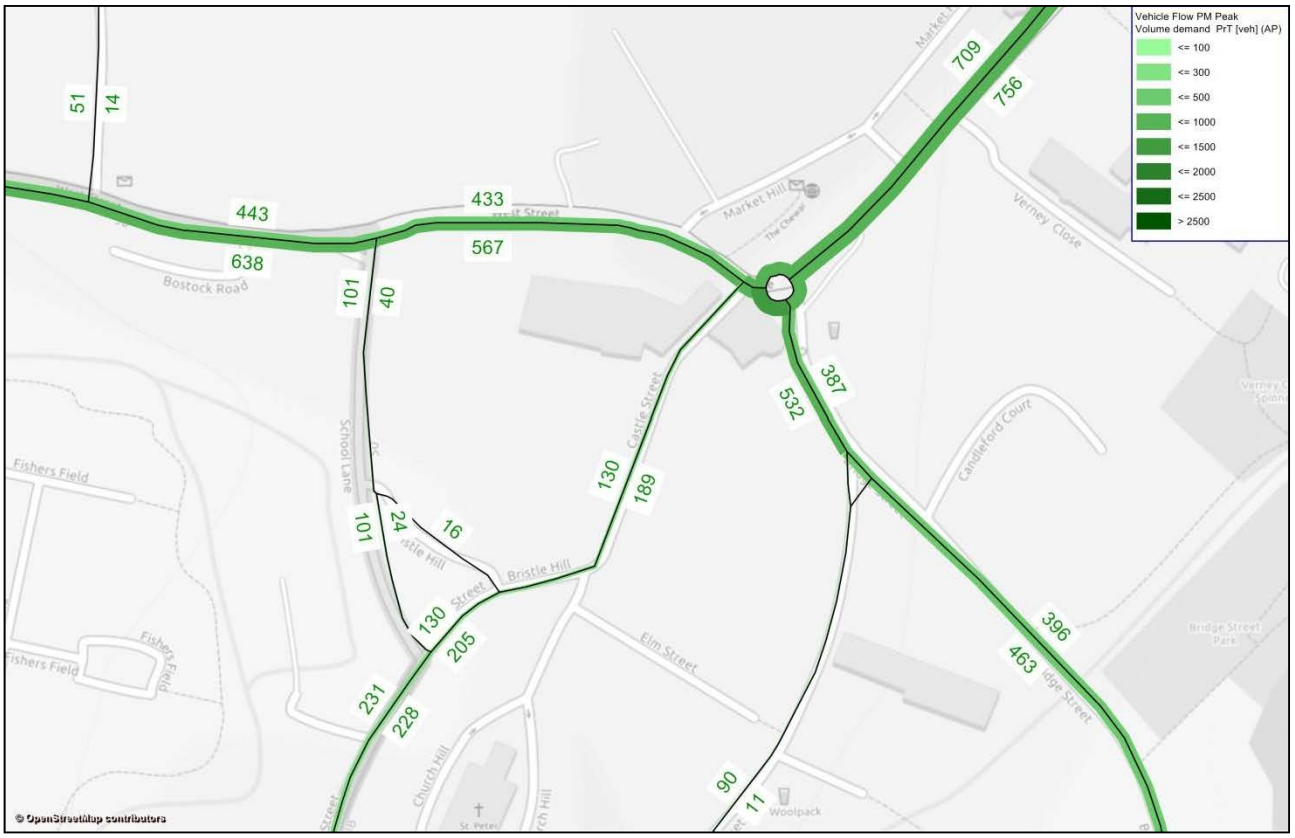


Figure 7.6: PM Peak Link Flow in Buckingham, 2013[81]



[80] Source: Buckingham Area Transport Study. September 2015, Jacobs
[81] Source: Buckingham Area Transport Study. September 2015, Jacobs

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