Pre-Submission Bracknell Forest Local Plan to 2037

Transport Impact Report

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1 Introduction

1.1.1 Bracknell Forest Council (BFC) is developing a new Local Plan. The Bracknell Forest Local Plan (BFLP) explains how our growth needs up to 2037 will be met, allocates sites for development, and sets out the planning policies that will be used to assess planning applications.

1.1.2 Extensive consultation on the BFLP has already taken place:

- Issues and Options (2016)
- A Draft BFLP (February - March 2018)
- New Sites (September 2019) Revised Growth Strategy (October – December 2019

1.1.3 To illustrate the outcomes and requirements of the plan, this report provides an assessment of the journey times on key strategic routes before and after the introduction of the proposed developments. It also details the potential highway infrastructure mitigation measures required as a result of the various residential and commercial development impacts.

2 Pre-Submission Bracknell Forest Local Plan

2.1 The BFLP, once adopted, will identify sites to meet the Borough's development needs to 2037. In addition to housing it will also identify appropriate sites for economic development and travellers together with supporting infrastructure to reduce and mitigate the impact of the planned new development.

2.2 To ensure that appropriate infrastructure provision is made for the planned levels of development, an Infrastructure Delivery Plan (IDP) is being prepared in conjunction with the BFLP. This will also take account of and influence infrastructure providers' existing and future investment plans. The IDP will identify current and planned infrastructure provision and provide an assessment of the requirements arising from the projected development. Gaps in existing and planned infrastructure will be identified and an assessment made of the timing and cost of adding to this, along with the identification of potential funding sources.

2.3 The Council has undertaken several 'calls for sites' to identify sites that are available for development which are documented in the Strategic Housing Land Availability Assessment (SHELAA). The SHELAA provides a high-level appraisal of the submitted sites, which have then been subject to a Site Selection Methodology. the results of a Sustainability Appraisal have been important in making decisions on which sites are to be allocated for development to meet the Borough's growth needs.

2.4 The Pre-Submission (Regulation 19) BFLP covers a 17 year plan period 2020/21 to 2036/37. The BFLP allocates sites for an estimated capacity of 4,676 new homes, of which 3,726 are to be delivered within the plan period. This includes four strategic site allocations:

- Policy LP5 - land at Beaufort Park, Nine Mile Ride, Bracknell: approximately 226 residential units
- Policy LP6 - land east of Wokingham Road and South of Dukes Ride (Derby Field), Sandhurst: approximately 217 residential units
- Policy LP7 – Land at Jealott's Hill: mixed-use development including approximately 2,000 residential units (of which 1,350 to be delivered in the plan period), and 72,200 m^2 net of employment floorspace (of which a minimum of 38,750m^2 to be delivered in the plan period)
- Policy LP8 – The Peel Centre and the Point, Skimped Hill Lane, Bracknell: approximately 900 residential units (of which 600 to be delivered in the plan period), supermarket of approximately 3,000m^2, and 500m^2 gross of other commercial development.

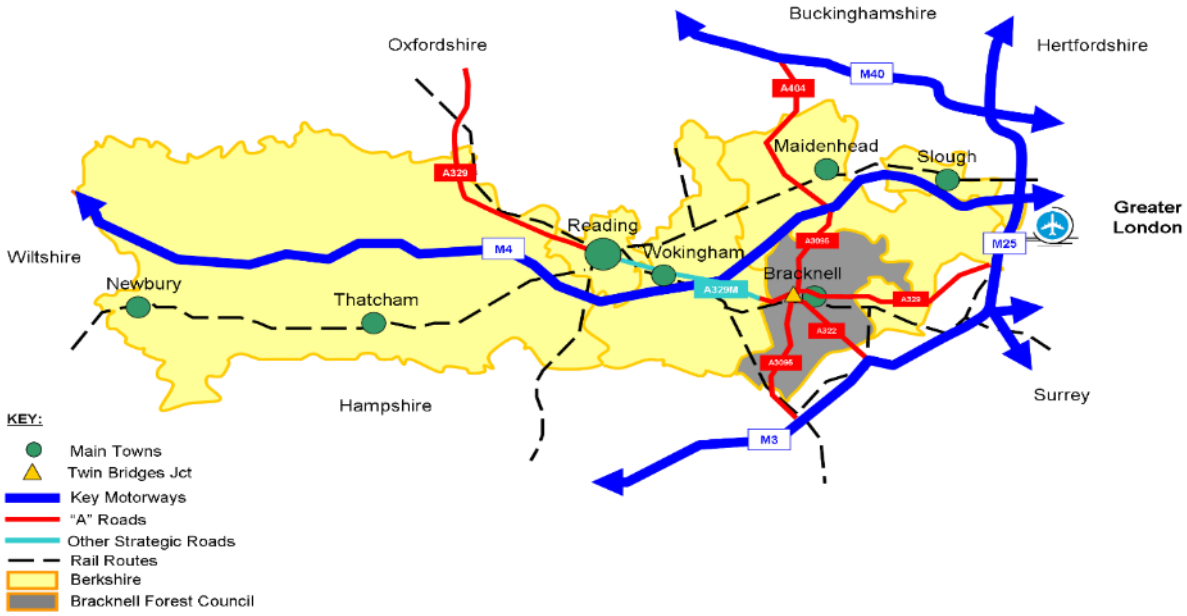
3 Bracknell Forest Transport Network

3.1 BACKGROUND

3.1.1 Bracknell Forest lies between two major (broadly) east-west corridors of movement converging in London (Fig 1). The northern corridor consists of the M4 and the A4, and the main Great Western Railway line, linking London (Paddington) with the west. The southern corridor consists of the M3 and A30 and the South Western Railway linking London (Waterloo) and the south west. Further to the north are other motorways, the M40 and A404(M). To the East, the M25 carries a significant amount of north / south traffic.

3.1.2 Bracknell Forest is in a prime location at the heart of the Thames Valley. It is situated at the end of the A329(M), 11 miles east of Reading, 9 miles south west of Windsor and 32 miles west of London. Junction 10 of the M4 is approximately 4.5 miles to the west and junction 3 of the M3 approximately 5 miles to the south east. There are good links to the regional airports via the M3, M4 and M25, especially Heathrow which is only 15 miles away. The M3 and M4 are linked together by the A322/A329/A3095 corridors that run through Bracknell and intersect at the Twin Bridges junction, also providing links between Reading and Guildford.

Figure 1: Strategic Transport Network – Berkshire



3.1.3 The Borough successfully unifies a prosperous economy, fuelled by excellent transport connectivity and high productivity which has attracted many regional and international headquarters, with an exemplary environment that is distinctly green in character, with expanses of open space, forests and a significant part of the internationally recognised Thames Basin Heaths Special Protected Area. The Borough's transport system plays a huge part in

facilitating this high quality of life we enjoy, by meeting the needs of the individual and remaining responsive to the changing needs of business.

3.2 HIGHWAY NETWORK

3.2.1 The pressures on Bracknell Forest's strategic and local road network are far ranging, with dominant flows focused on the M3-M4 corridor link, daily activity around our local schools, journeys to and from our town and retail centres and ongoing shifting patterns emerging from major development sites across the Borough.

3.2.2 Much of Bracknell Forest, including its road infrastructure, has been constructed during the past 50 years. Bracknell town itself was designated as a 'new town' in 1949 and built in response to post-war housing shortages. The layout of the central road network is generally typical of the time. Smaller villages and satellite towns such as Crowthorne and Sandhurst have more historic centres and road connections, yet also have a significant volume of 'newer' residential and commercial development. Many older roads have been upgraded as the Borough has grown, particularly since the 1980s.

3.2.3 Residential and commercial growth in the Borough has continued through to the present day with further growth linked to the new Town Centre regeneration alongside the existing, and emerging, Site Allocations Local Plan that will bring further additional homes.

3.2.4 In 2008 the Council adopted Core Strategy Development Plan Document which contained a vision for growth to 2026 and made provision for around 11,000 new dwellings, education, leisure and retail facilities. Sites were subsequently allocated in the Site Allocations Local Plan (2013). The new BFLP contains a vision to 2037.

3.2.5 This growth plan adopted in 2008 required the provision of necessary infrastructure including capacity improvements to many of the junctions along the Borough's strategic corridors such as the A322, A329 and A3095. To support this, a transport study was carried out to identify the extent of improvements needed to mitigate the impacts and therefore support future housing development. The study highlighted a number of corridors and junctions that would require improvement against the predicted traffic growth in 2026, and this was reflected by the inclusion of several large schemes in the adopted Local Transport Plan 3 Core Strategy and Implementation Plan 2011 – 2026 (LTP3). LTP3 contains many policies which support a more efficient, smarter and more sustainable highway network.

3.2.6 Some of the development sites required to deliver the level of growth identified within the 2008 Core Strategy have viability issues which have slowed their implementation. Therefore, in accordance with the National Planning Policy Framework, and to help achieve economic growth and bring forward development, the Council has worked proactively to support development needs. By delivering wider strategic infrastructure projects such as those listed in the LTP3, the Council can assist in achieving viability. Without this, the projects are either stalled, or reduce delivery of other vital infrastructure including affordable housing.

3.2.7 Working with the Thames Valley Berkshire Local Enterprise Partnership (TVBLEP), Bracknell Forest was able to include several vital infrastructure schemes as part of the Thames Valley Berkshire Strategic Economic Plan. This plan was submitted to Government in a bid to secure funding from the Local Growth Fund which is aimed at creating economic growth such as unlocking housing and commercial development. In addition, the Borough also bid directly to the Department for Transport (DfT) for funding through initiatives such as the Local Pinch Point Fund, The National Productivity Investment Fund, Access for All Rail Fund and the Local Sustainable Transport Fund. As a result, over a 10-year period, the Borough was able to secure nearly £30m towards infrastructure improvements aimed at unlocking growth and improving accessibility.

3.2.8 In allocating these funds, the Government and the TVBLEP have recognised that Bracknell Forest plays a major role in unlocking growth in the region and values its strategic importance with key corridors to the M3 and M4. As part of the overall transport plan for the corridors, the Borough's proposals included capacity improvements to several key junctions, incorporating a network management approach that utilises the advances in Intelligent Transport Systems (ITS) which maximise performance of junctions under traffic signal control.

3.2.9 Various layouts for these junctions have been examined over the years and whilst all delivered some improvement, they did require heavy investment for what is now considered little return in capacity improvement. Detailed modelling work has enabled the optimum schemes to be identified, balancing out the factors of land constraints and funds. Signalised junctions linked along a corridor represent the most cost-effective solution and are the most efficient within the space available whilst providing capacity up to 2026 and beyond.

3.2.10 Applying a corridor approach to these improvements has allowed us, and will continue to allow us, to achieve reliable journey times whilst at the same time enabling residents to travel within

the Borough without being penalised by the historical dominant flows using the A3095/A322/A329 corridors to travel between the M3 and M4. This approach and our continued investment in improving our Intelligent Transport Systems network will allow us to accommodate growth beyond 2026 with only limited further disruption to our key corridors. This is further evidenced in **Section 4** (Journey Time & Highway Mitigation) which outlines our approach.

3.3 INTELLIGENT TRANSPORT SYSTEMS (ITS) AND URBAN TRAFFIC MANAGEMENT AND CONTROL (UTMC)

3.3.1 The term 'Intelligent Transport Systems' refers to the application of information and communications technology to transport infrastructure, enabling data to be collected and shared in order to maximise the efficiency of the highway network.

3.3.2 ITS encompasses a range of technologies including traffic signals, real-time public transport information, in-vehicle satellite navigation systems and variable message signing to inform drivers of congestion ahead or availability of parking spaces. This can enable people to make more informed travel choices, make journeys more efficient and help to reduce the impact of transport on the environment.

3.3.3 As transport networks become more congested, and the business case for major new highway construction becomes more difficult, there is a growing need to adopt policies that manage demand and make use of existing assets.

3.3.4 Advances in technology are now such that ITS offers real possibilities for authorities to meet the challenge of a busier road network: by monitoring existing network performance, predicting what might happen in the future, and providing the means to manage demand proactively on an area-wide basis.

3.3.5 One of the earliest forms of ITS is traffic signals which can adapt to traffic conditions using sensors and basic computer control. This is better known in the industry as **Urban Traffic Management and Control (UTMC)** and involves modern adaptive systems that adjust the timing of traffic light phases in accordance with changing traffic patterns to minimise congestion.

3.3.6 To supplement this, the BFC UTMC system also gathers continuous data through Bluetooth journey time sensors, traffic count data, and roadworks information, which informs the way the system is run and helps build strategies to ensure optimum running of the network.

3.3.7 Like all technologies, ITS and UTMC are constantly evolving, and it is likely that improved sensor and connectivity technologies (sometimes referred to as IOT – Internet of Things) will

allow further development of traffic management and information systems in the years to come. Much of this data can be fed back to users via smart technology in their own vehicles and handheld devices. Connected vehicles and travellers can then create predictive network models using machine learning and artificial intelligence. Future Mobility is explored further in **Section 3.8**.

3.3.8 As development and population increase in Bracknell Forest over the period of the Local Plan, it is assumed that traffic is also likely to grow, increasing pressure on the road network. Applying adaptive UTMC technologies to key junctions, such as MOVA and SCOOT, is proven in delivering benefits across many junctions in the UK and can undoubtedly improve the efficiency of junction operation in Bracknell Forest over and above the forecast modelled results, which are based on fixed-time signal operation without UTMC technology. TRL (Transport Research Laboratory) and the DfT (Department for Transport) have conducted a number of trials that show an improvement in delay of around 12% - 27% (over good fixed time plans) as indicated in Traffic Advisory Leaflet (TAL) 4/95. The modelled scenarios are considered in detail in Section 4, and the application of UTMC mitigation measures are included with the most conservative estimate of 12% delay improvement.

3.4 PUBLIC TRANSPORT

3.4.1 Bracknell Forest is relatively well served by public transport, with the Borough's three main settlements having a rail station and regular bus services, providing connections around the Borough and to surrounding villages. Train stations at Bracknell and Martins Heron directly serve London Waterloo and Reading, while Crowthorne and Sandhurst are on the Guildford / Gatwick to Reading line.

3.4.2 Although the car is the dominant mode of travel in Bracknell Forest, annual survey data suggest that significant numbers commute in and out of the Borough by rail. Bus passenger numbers also remain fairly buoyant.

3.4.3 Bracknell Forest is expected to grow rapidly over the next ten years, and it is essential that increased transport choice is available to residents and visitors alike.

3.5 RAIL

3.5.1 Bracknell and Martin's Heron rail stations are on the Reading to London Waterloo line with trains operated by South Western Railway, and Crowthorne and Sandhurst stations are on the Reading – Guildford - Gatwick Airport line with trains operated by Great Western Railway.

3.5.2 The train features as one of the main alternative forms of transport to the car in Bracknell Forest and although it does not fall within the remit of the Council, as BFC has limited powers to develop and implement rail improvements (infrastructure or services), it contributes greatly in the access to employment and education. It is clear from records in the BFC annual Travel in Bracknell Report that this is becoming an increasingly popular way to travel.

3.5.3 LTP3 Policy TP4 states that BFC will encourage and support rail improvements including access, capacity, smart technology, ticketing and integration with other modes.

3.5.4 The Council continues to push for faster journey times, in particular on the Reading – Waterloo line. However, with many constraints along the route including slower speed limits and a two track layout with very few places for a fast train to pass a slower one, the line does not lend itself to express trains which require a third track for overtaking. In part, this has led to the collective stakeholders along the line also seeking improvements which prioritise train capacity over journey times in order to improve the service during peak periods and for commuters. Nonetheless, the authority continues to seek journey time improvements on this important rail line, as well as improvements to the journey experience such as better station facilities and greater Wi-Fi coverage on trains allowing passengers to make greater use of their time whilst travelling.

3.5.5 In response to this, the 2016 Route Specification produced by Network Rail included an increase in the number of carriages on trains on the Reading to Waterloo Line from 8 to 10 which required platform extensions at both Bracknell and Martins Heron. The Reading – Guildford - Gatwick Airport line has also seen improvements in frequency at Crowthorne station.

However, BFC continues to seek further improvements to the accessibility at the station, such as those achieved at Bracknell, by working in partnership with Great Western Railway to improve parking arrangements and Wokingham Borough Council on providing a bus service which will serve nearby developments in both Bracknell Forest and Wokingham boroughs.

3.6 BUSES

3.6.1 In 2019, buses accounted for 56% of public transport journeys by those living in England outside London, or an average 5.8 million passenger journeys each day. Despite a long-term shift to private car use, buses still support millions of essential daily trips, and for many people provide the only practical, frequently used method of transport, other than walking. Bus use is particularly common for people aged from 17 to 20 and over 70, and for females, most ethnic minority groups, and people on lower incomes. Reliable, affordable bus services contribute to achieving the policy objectives of two thirds of Government departments, from reducing health inequalities to access to justice.

3.6.2 Bus services are provided either on a commercial basis by private operators or, where not commercially viable, through the provision of financial subsidy from Councils. For commercial services, bus operators choose the route and timetable whereas for supported services the Council decides the routes and timetables on the basis of ‘social need’ and then seeks tenders from operators for the right to receive the subsidy and operate the service.

Bus operations in Bracknell Forest

3.6.3 Commercial routes provide for approximately 75% of all bus passenger journeys in Bracknell Forest and operate mainly to the south of the town centre or on inter-urban routes connecting Bracknell with other local towns.

3.6.4 To ensure bus services are provided to the wider area, and to important destinations outside the Borough not served by the commercial bus network, the Council procures additional bus services through competitive tenders. These 'supported' bus services outnumber the commercial routes but only account for the remaining 25% of bus passenger journeys. The majority of services in the Borough are operated by Courtney Buses, which was acquired by Reading Buses in 2018.

3.6.5 The number of people using bus services is affected by the range of destinations served, the frequency and quality of the bus services on offer and the availability and attractiveness of alternatives, such as the car. Data from the last available Census in 2011 show only 7% of commuter journeys in Bracknell Forest are made by bus, compared with 80% by car.

3.6.6 Bus use has seen a decline nationally since 2008, and the DfT assumes a number of factors which might explain this;

- Congestion
- Car ownership
- Online shopping
- Reductions in Local Authority supported services

3.6.7 It is likely that all these factors have played a role in the fluctuations of bus passenger numbers in Bracknell Forest over the last 20 years. However, whilst the Borough's levels of bus use per head of population are relatively low, prior to the Covid-19 pandemic there was a small increase in usage, bucking the national trend. This is likely to be due to the regenerated Town Centre which opened in Autumn 2017 which has seen shopper footfall increase dramatically to around 16 million per year (2018 figure). The Lexicon now attracts shoppers from surrounding postcodes as their destination of choice.

3.6.8 Looking to the future, a sustainable bus network will be essential to provide residents with a choice of modes for accessing a wide range of education, training, employment, shopping and leisure opportunities. Central Government has promised additional funding and a National Bus Strategy to support future services, however BFC will continue to require new developers to contribute towards the cost of local bus services through the potential allocation of the Community Infrastructure Levy (CIL) and Section 106 contributions secured prior to CIL being introduced. It may also be necessary to explore new and innovative funding models with developers, particularly at larger sites.

3.6.9 There is significant spare capacity in the existing bus network to accommodate more journeys. Operators and BFC will therefore continue working in partnership to encourage more people to use the services in line with LTP3 Policy T3. Increasing use of digital technology to find bus services, book tickets, track buses and check occupancy levels in real-time will help. Apps and web-based tools that facilitate better integration of bus journeys with other modes, so that seamless door-to-door journeys can be arranged, are expected in the not too distant future. Demand-responsive public transport, using smaller buses, running where and when needed rather than restricted to a pre-determined route and timetable will be explored. Keeping journey times to a minimum by providing priority to buses at traffic signals will also be possible.

3.6.10 A new BFC-led approach to Travel Planning is proposed for residential developments and this will help market bus services to new residents before car-based habits can become entrenched. Free taster tickets, signposting information, and personalised journey planning will all encourage residents to consider bus services.

3.6.11 These initiatives will benefit all future developments and residents in the Borough. At larger development sites additional and targeted measures will also be achievable. Existing services may need to be re-routed, new bus stop infrastructure providing safe and pleasant places to wait will be required, and dedicated services and/or buses will be amongst the options available.

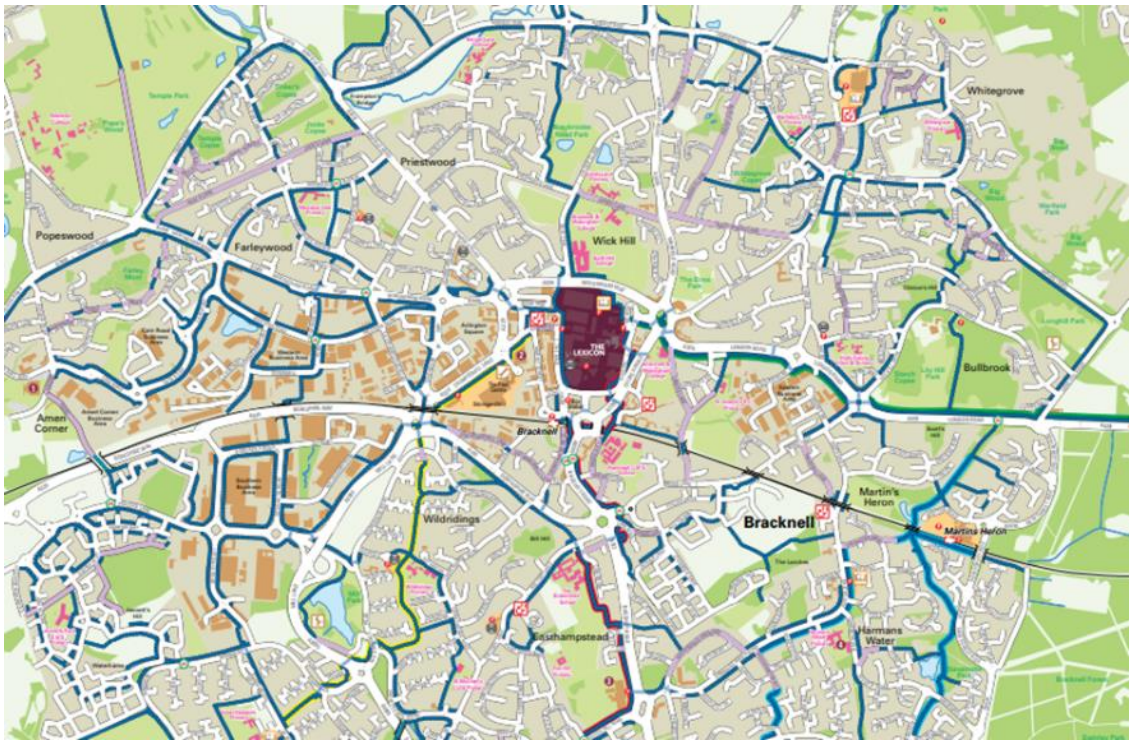
3.7 WALKING AND CYCLING

3.7.1 On average, one in five of the trips we make are less than one mile in length, and two out of every five trips are less than two miles, a distance which can be cycled in about 15 minutes. Unlike other modes, walking and cycling are means of travel which can be undertaken for both utility and leisure purposes, these modes can be enjoyable, rewarding means of travel, with many benefits.

3.7.2 Bracknell Forest is relatively flat, with few steep inclines, and the majority of physical characteristics needed to support walking and cycling already exist. Urban parts of the Borough have well-established traffic-free cycle networks which cater for many commuting and leisure trips. As a New Town, purpose-built cycle tracks were included in much of the development of Bracknell, and there are many underpasses that avoid the need to cross busy roads.

3.7.3 More recently, shared footway and cycle tracks have supplemented the segregated routes. Cycle routes have also been constructed in Sandhurst and Crowthorne, and whilst these networks are less comprehensive, they still provide useful links to jobs and leisure opportunities.

Figure 2 – BFC Cycle Network



3.7.4 In total, there are 13 kilometres of purpose-built cycleways, and over 100 kilometres of shared use and leisure routes. The cycleways offer a network of safe paths to cycle through populated areas, away from the road traffic. Central Government has promised new funding for improving walking and cycling infrastructure and BFC has produced an initial Local Cycling and Walking Infrastructure Plan (LCWIP) which assesses options for improvement in the Bracknell town area. This will be supplemented by schemes in other parts of the Borough which are identified

through discussion with local Parish and Town Councils, Ward Councillors and by suggestion from business groups and residents. A list of schemes under consideration is included at **Appendix A.**

3.7.5 BFC will continue to require developers to provide inclusive walking and cycling infrastructure to connect their sites to surrounding networks, in accordance with latest Government design guidance and LTP3 Policy T8 Walking and Cycling which promotes both modes. At larger sites, developments should be designed in a way that naturally gives priority to walking and cycling modes for local trips.

3.7.6 Although Bracknell Forest has a relatively large and comprehensive pedestrian and cycle network, census and travel survey results suggest levels of cycling and walking are similar to the national average, and actually lower than across the South East.

3.7.7 Through various surveys, feedback and anecdotal evidence, we have built up a picture of the main reasons and factors influencing people's decisions not to walk or cycle. These can be summarised as;

- Speed and convenience of car or other modes
- Safety concerns – on roads, or fear of anti-social behaviour on quiet routes and underpasses at night
- Lack of routes knowledge
- Time and practicality – too many tasks to walk or cycle (e.g., school run, after-work commitments, shopping)

3.7.8 It is clear that to encourage people to walk or cycle more often, building more infrastructure on its own is not the solution. To complement the existing network of cycleways, a programme of promotion and targeted marketing is required. Whilst a greater shift towards active travel modes such as walking and cycling, especially for short local journeys, will take time, a comprehensive programme of information and encouragement (embracing social media platforms), will help create the environment for change.

3.7.9 BFC is investigating the option to adopt the established 'My Journey' branded approach to sustainable travel promotion. My Journey consists of a series of events, competitions and information coordinated through a dedicated website. A new approach to developer contributions secured via the planning process is expected to help fund this work.

3.7.10 The Council also hopes to commission a series of short films to be broadcast through social media channels which will highlight and celebrate the network of walking and cycling paths that criss-cross the Borough. It is clear from the lockdown periods of the COVID19 pandemic that an appetite for more walking and cycling exists amongst residents. BFC will endeavour to build on this reconnection to the local environment and nurture a healthier, more active culture.

3.7.11 The increase in popularity of electric bikes is also likely to lead to more cycling. Greater distances can be cycled more comfortably, and shorter distances can be cycled with less effort.

This will make cycle commuting a more attractive option and will mean a greater diversity of people who may take up cycling.

3.8 FUTURE MOBILITY

3.8.1 Whilst planners and policymakers have long attempted to predict and provide for future mobility needs, the advances in data science, artificial intelligence and sensing technology have increased the speed of transport innovation.

3.8.2 This rapidly developing area could change all aspects of how we travel. It has the potential to make life easier, improve connectivity and accessibility, reduce congestion and cut carbon emissions. However, it will require a shift in terms of modal and work patterns, and much greater integration of our transport, digital and energy networks to succeed.

3.8.3 Data and connectivity are transforming journeys, for example allowing travellers to plan multi-stage journeys with confidence (whilst 'on the go') using a single application and payment. In parallel, vehicles and smart devices feed back information to network operators in real time allowing optimised fleet and network management. Similarly, emerging IoT (Internet of Things) technology will improve UTMC capabilities at key junctions and corridors, using wireless networks to connect multiple sensors and data feeds instead of inductive loops in the road surface, to further refine and manage traffic flow in real time, while feeding back further information to users.

3.8.4 Personal devices are also facilitating 'on-demand' travel through ride-hailing apps, and demand responsive bus services, which operate according to where and when people want to travel, rather than a fixed timetable.

3.8.5 Transport is becoming increasingly automated with driver-assisted vehicles, and it is becoming cleaner, with rapidly falling battery prices, improvements in energy density and electric motors, and developments in alternative fuels all having the potential to reduce emissions across a range of modes and which bring benefits to human health and the environment. Battery and

motor technology improvements are also facilitating new forms of micro-mobility, such as e-bikes, e-scooters, and lightweight electric freight vehicles which could replace diesel vans for local parcel deliveries.

3.8.6 People's individual trips are falling, likely in part due to flexible / home working, increased part-time or self-employment, and a reduction in shopping trips. However, population growth means overall road travel demand continues to grow, with generational differences (and needs) in transport choices increasingly apparent.

3.8.7 Younger people are less likely to own cars than previous generations and are driving less, due to factors such as staying in education for longer, moving into long-term employment and starting families later, along with the cost of driving. However, this is offset by an increasing proportion of the population who are over-65 and driving more. Loss of 'traditional' public transport and a lack of understanding or reluctance to use new technology may compound this further.

3.8.8 Given the diverse geography and demographics of Bracknell Forest, there will be no 'one size fits all' solution, and it is likely that a mix of future technologies, tailored to the lifestyles and needs of specific neighbourhoods will provide for a sustainable, realistic mobility network. This will mean some degree of acceptance of continued car ownership, particularly in the more rural areas of the Borough and its outer lying towns and villages, but with a greater focus on cleaner vehicles, reducing overall trips, and reducing car ownership within households. Cleaner vehicles in themselves do not solve the issues of congestion, parking, noise, dust and particulate pollution. We must also consider the safety, health and wellbeing issues that a reliance on motorised mobility will continue to create if left unchecked.

3.8.9 The successful and ongoing regeneration of Bracknell Town centre will provide an excellent foundation for opportunities to explore future mobility innovations. Shared vehicle ownership schemes can provide new transport options to the denser-built flats and apartments which have low car ownership levels, in addition to easy access to the rail and bus network. This could be mirrored in the towns of Crowthorne and Sandhurst, with their own shops, services and rail connections, with a positive ripple effect out to wider parts of the Borough.

3.8.10 It is clear that the emerging world of future mobility is fast moving and provides some exciting, cleaner opportunities and alternatives to modes that have become constrained by capacity in terms of their use and also the infrastructure carrying them. It is impossible to model what the future transport network will look like with complete accuracy, and whilst modelling techniques continue to improve, the Covid-19 pandemic shows how accepted norms, predictions and forecasts can be changed almost overnight. Nevertheless, critical variables and assumptions such as population and economic growth can be treated with a greater degree of certainty, and it is likely that pressures will continue around London and the South-East. Emerging technologies, changing lifestyles and work patterns will probably reduce 'peak hour' travel and congestion, but this may mean a greater demand on our travel systems throughout the day.

3.8.11 Whilst BFC can manage future demand and capacity on the Borough's network through appropriate physical engineering, this approach will ultimately have limitations. Technological solutions clearly have the ability to deliver improved future mobility for all users, within the constraints of the natural environment.

4 Journey Time & Highway Mitigation

4.1 INTRODUCTION

4.1.1 This chapter details journey time analysis undertaken following the introduction of the Local Plan along with the mitigation measures undertaken to highway infrastructure as a result of the impact of the traffic generated by the Local Plan development sites.

4.1.2 Each section details the junctions that are situated along identified journey time routes, followed by a section detailing additional key junctions elsewhere on the network which are identified for potential improvement in the future.

4.1.3 All traffic signalised junctions have been modelled using LinSig, whilst the roundabouts and priority junctions have been assessed using the Arcady and Picady modules in the software suite Junctions 9 respectively.

4.1.4 The LinSig assessments show the operation of the signalised junctions under fixed-time conditions and in isolation. All signalised junctions across the Borough currently operate under UTMC and actual performance would be improved over and above the outputs in the subsequent tables (see Sections 4.3 to 4.9). This is an important consideration when assessing forecast modelled journey times in the Bracknell Forest Multi-Modal Transport Model (BFMMTM) as such strategic models do not account for this additional benefit. The Arcady and Picady assessments show the geometric performance of each roundabout and priority junction modelled in isolation.

4.1.5 All junctions contained within the 2019 base model scenario have been assessed using manual classified counts undertaken in March 2019, unless otherwise stated. This information was used alongside Automatic Number Plate Recognition (ANPR) survey data and mobile network data to help develop a comprehensively rebuilt version of the strategic BFMMTM in 2019. None of this captured information could be used to identify individuals and it was only captured to develop accurate modelled travel patterns for the Borough. The model has been fully calibrated and validated in accordance with the DfT's WebTag guidance. Junction analyses where manual counts were not undertaken have utilised traffic flows extracted from the validated 2019 base model. All models were developed to represent the AM peak hour (0800-0900), an average inter-peak hour (1000-1600) and the PM peak hour (1700-1800).

4.1.6 The 2037 traffic flows, incorporating the BFLP, have been extracted from the BFMMTM. Mitigation measures have been developed for any junctions that are modelled to exceed capacity. These mitigation measures are initial concepts only and will be subject to full investigation through topographical survey, statutory undertaker searches and detailed design.

4.1.7 Following the development of the BFLP 2037 strategic models that informed this analysis, a separate sensitivity test was undertaken by consultants for the Jealott's Hill site to examine the

impact of reducing the speed limit to 40mph along the A3095 Maidenhead Road as far as its intersection with the A330 Ascot Road at Hawthorn Hill. Local junction assessments that examine the impact of this potential measure are detailed in the document “Syngenta, Jealott’s Hill, Bracknell; Summary of Traffic Modelling Assessments”, which was produced by Evoke Transport in December 2020. Whilst this is a potential local measure associated with the Jealott’s Hill development for the BFLP, its impact on the wider strategic network will be marginal. Nevertheless, within each of the journey time route assessments below, there is an indication of how this one measure could affect the modelled times.

4.2 JOURNEY TIME ROUTES

4.2.1 All journey time assessments are taken from the respective AM (0800-0900) and PM (1700-1800) peak strategic models for 2019 and 2037.

4.2.2 Journey times for identified routes are presented for four modelled scenarios:

- 2019 Base Year
- 2037 Without the BFLP
- 2037 With the BFLP
- 2037 With the BFLP and a programme of mitigation schemes

4.2.3 An additional set of journey times is also presented to illustrate a modest level of reduction (12%) in journey times that can result from the implementation of existing Urban Traffic Management Control (UTMC) technology. Studies elsewhere have indicated that far greater reductions than this can be achieved, so the figures presented here are a conservative calculation. Further context is provided in paragraph 3.2.8.

4.2.4 Highway mitigation scheme details are outlined in the subsequent sections of this document. These seek to improve junction performance where future traffic demand resulting from the BFLP creates additional pressure to the local capacity.

4.2.5 Individual junction modelling demonstrates how these improvements will take effect in isolation, whilst the BFMMTM from which the journey time figures are taken can demonstrate the wider impacts of such schemes as routes become more or less attractive.

4.2.6 The analysis below looks at how the overall journey times change along each identified route, with outputs provided for each of the future scenarios. The commentary that follows each table of journey time routes examines the factors that influence these changes.

4.2.7 The twelve routes are colour-coded as illustrated in **Figure 3**, and **Tables 4.1 and 4.2** show the overall journey times recorded for each route and scenario in the AM and PM peak hours.

Figure 3 - Journey Time Routes

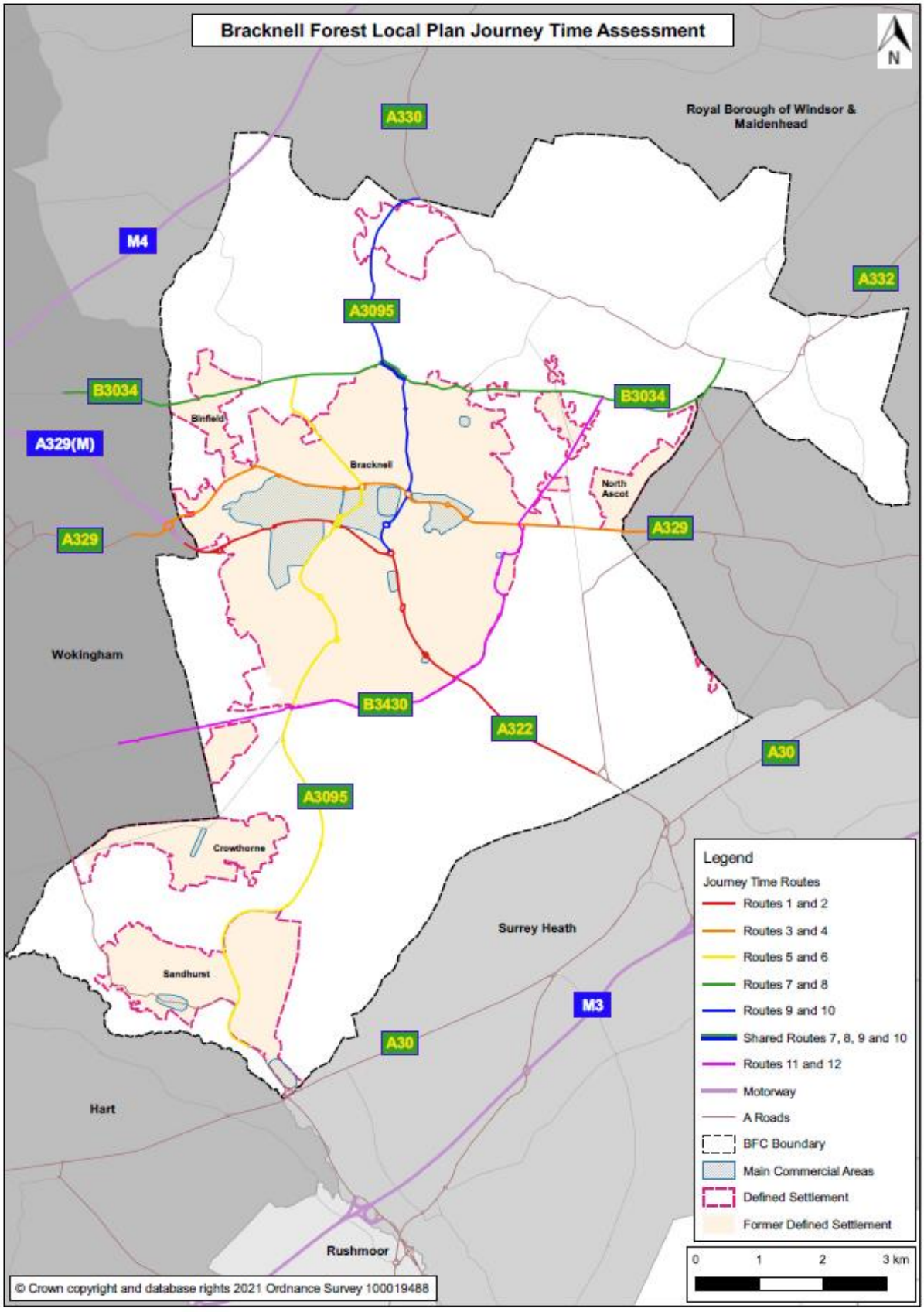


Table 4.1 AM Peak Journey Times

Route	AM Peak Journey Time Route	2019 AM Base	2037 AM No BFLP	2037 AM BFLP	2037 AM BFLP Mit	2037 AM BFLP Mit + UTMC*
		Min:Sec	Min:Sec	Min:Sec	Min:Sec	Min:Sec
1	A329/A322 Coppid Beech to Swinley Gyratory	12:53	15:25	16:46	16:57	16:17
2	A322/A329 Swinley Gyratory to Coppid Beech	13:33	15:29	16:19	16:18	15:36
3	London Rd, Wokingham to Heatherwood Roundabout, Ascot	16:34	18:09	19:50	19:58	18:42
4	Heatherwood Roundabout, Ascot to London Rd, Wokingham	17:08	19:32	20:31	20:31	19:07
5	A3095 Marshall Road to B3018 Binfield Road	19:34	19:41	20:53	20:54	19:33
6	B3018 Binfield Road to A3095 Marshall Road	17:53	19:17	20:53	20:40	18:55
7	B3034 Forest Rd from Warren House Rd to A330 Hatchet Lane	17:42	19:13	20:35	20:40	19:34
8	B3034 Forest Rd from A330 Hatchet Lane to Warren House Rd	15:56	17:02	18:05	18:04	17:25
9	Horse & Groom to A3095/A330 Ascot Road	10:24	10:44	13:42	13:55	13:07
10	A3095/A330 Ascot Road to Horse & Groom	09:50	10:05	12:35	12:34	11:44
11	New Wokingham Road to Locks Ride via B3430 Nine Mile Ride & New Forest Ride	17:13	20:25	22:21	21:50	20:36
12	Locks Ride to New Wokingham Ride via New Forest Ride & B3430 Nine Mile Ride	16:05	17:19	17:50	17:52	16:57

*The final column considers the impact of the added benefits of UTMC if this were to reduce delays at signals by just 12%. This is a most conservative estimate, as studies elsewhere have shown such systems can typically achieve between 12 – 27% reductions.

Table 4.2 PM Peak Journey Times

Route	PM Peak Journey Time Route	2019 PM Base	2037 PM No BFLP	2037 PM BFLP	2037 PM BFLP Mit	2037 PM BFLP Mit + UTMC*
		Min:Sec	Min:Sec	Min:Sec	Min:Sec	Min:Sec
1	A329/A322 Coppid Beech to Swinley Gyratory	12:41	14:24	15:42	15:39	14:57
2	A322/A329 Swinley Gyratory to Coppid Beech	14:25	17:39	16:27	16:45	15:55
3	London Rd, Wokingham to Heatherwood Roundabout, Ascot	17:12	18:20	20:08	20:03	18:36
4	Heatherwood Roundabout, Ascot to London Rd, Wokingham	17:33	19:35	21:27	21:17	19:57
5	A3095 Marshall Road to B3018 Binfield Road	19:02	19:31	21:49	21:49	20:30
6	B3018 Binfield Road to A3095 Marshall Road	18:14	19:27	24:26	22:01	20:11
7	B3034 Forest Rd from Warren House Rd to A330 Hatchet Lane	16:34	16:43	18:12	18:15	17:14
8	B3034 Forest Rd from A330 Hatchet Lane to Warren House Rd	16:31	18:03	19:21	19:10	18:32
9	Horse & Groom to A3095/A330 Ascot Road	09:31	09:52	12:30	11:52	11:07
10	A3095/A330 Ascot Road to Horse & Groom	13:10	13:31	14:28	15:49	14:55
11	New Wokingham Road to Locks Ride via B3430 Nine Mile Ride & New Forest Ride	16:10	18:05	18:48	18:50	17:46
12	Locks Ride to New Wokingham Ride via New Forest Ride & B3430 Nine Mile Ride	17:29	19:30	19:50	19:49	18:40

*The final column considers the impact of the added benefits of UTMC if this were to reduce delays at signals by just 12%. This is a most conservative estimate, as studies elsewhere have shown such systems can typically achieve between 12 – 27% reductions.

4.3 JOURNEY TIME ROUTES 1 & 2

4.3.1 Journey time Route 1 runs from the on-slip on to the A329 at Coppid Beech Roundabout to Swinley Bottom Gyratory via the A329 and A322. Journey time Route 2 is the reverse of this route.

4.3.2 The AM and PM peak hour modelled journey times for Routes 1 and 2 are presented in Table A below:

Table A – Routes 1 & 2 Journey Time Summary

Route	AM Peak Journey Time Route	2019 AM Base	2037 AM No BFLP	2037 AM BFLP	2037 AM BFLP Mit	2037 AM BFLP Mit + UTMC*
		Min:Sec	Min:Sec	Min:Sec	Min:Sec	Min:Sec
1	A329/A322 Coppid Beech to Swinley Gyratory	12:53	15:25	16:46	16:57	16:17
2	A322/A329 Swinley Gyratory to Coppid Beech	13:33	15:29	16:19	16:18	15:36
Route	**PM Peak Journey Time Route**	**2019 PM Base**	**2037 PM No BFLP**	**2037 PM BFLP**	**2037 PM BFLP Mit**	**2037 PM BFLP Mit + UTMC***
		Min:Sec	Min:Sec	Min:Sec	Min:Sec	Min:Sec
1	A329/A322 Coppid Beech to Swinley Gyratory	12:41	14:24	15:42	15:39	14:57
2	A322/A329 Swinley Gyratory to Coppid Beech	14:25	17:39	16:27	16:45	15:55

*The final column considers the impact of the added benefits of UTMC if this were to reduce delays at signals by just 12%. This is a most conservative estimate, as studies elsewhere have shown such systems can typically achieve between 12 – 27% reductions.

4.3.3 On Routes 1 and 2, the changes in overall journey times between 2019 and 2037 with BFLP are largely as expected and reflect the increase in travel demand that is predicted over that period. There is a reduction of over a minute in the PM peak with BFLP scenario on the northbound route (Route 2). This is because there are greater delays approaching the Twin Bridges roundabout from the A322 Downshire Way in the No BFLP scenario. The reason for this is that more traffic turns off Downshire Way into Wildridings Road in the BFLP scenario.

4.3.4 The introduction of various mitigation schemes around the Borough will always result in some movement of demand elsewhere as some routes become more or less attractive. This is reflected in the modest changes seen here when the schemes are introduced.

4.3.5 In the separate speed limit reduction sensitivity test detailed in paragraph 4.1.7, the recorded journey times in the AM peak were 16:16 for Route 1 and 15:46 for Route 2. In the PM peak, the recorded journey times were 15:10 for Route 1 and 15:59 for Route 2.

4.3.6 As mentioned above, the strategic model does not show the impact of additional network improvements such as UTMC. This has been demonstrated elsewhere to offer reductions in delays at signals of between 12 – 27%. Even the lowest value in this range of just 12% would see the 'with mitigation' times above fall below those for the 2037 BFLP scenario.

4.3.7 So, on this particular route we can expect journey time reductions in both peaks and directions following the introduction of mitigation schemes and UTMC.

JUNCTION 1 – JENNETT'S PARK ROUNDABOUT

4.3.8 Jennett's Park Roundabout is a three-arm partially signalised roundabout at the intersection of the A329 Berkshire Way and Vigar Way. There is also a separate jet lane on the A329 Berkshire Way for traffic heading eastbound towards Bracknell. The westbound arm on the A329 Berkshire Way is signalised in conjunction with the associated circulatory movement on the roundabout.

Figure A – Jennett's Park Roundabout

Image source: Google Maps. Image taken from Berkshire Way East; looking west.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	**Mean Max Queue**	**Deg Sat (%)**	**Mean Max Queue**
A329 East Left	10.8%	0.7	6.7%	0.6
A329 East Ahead	79.2%	7.2	85.5%	12.7
A329 East Ahead	79.2%	7.2	85.6%	12.7
Roundabout Circulatory East Ahead	80.5%	4.8	71.8%	4.8
Roundabout Circulatory East Ahead Right	80.3%	4.8	71.6%	4.8
Vigar Way Left	17.3%	0.5	9.4%	0.4
Vigar Way Left	50.3%	0.0	67.1%	0.0
Vigar Way Ahead	38.1%	0.0	60.7%	0.0
A329 West Ahead	45.9%	3.2	85.8%	8.5
A329 West Ahead	46.0%	3.5	85.9%	9.1
Cycle Time (s)	46		59	
Practical Reserve Capacity (%)	11.8		4.8	
Total Delay (pcuHr)	8.48		14.94	

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	**Mean Max Queue**	**Deg Sat (%)**	**Mean Max Queue**
A329 East Left	8.0%	1.0	26.4%	3.6
A329 East Ahead	90.0%	17.7	101.5%	30.5
A329 East Ahead	90.0%	17.7	101.5%	30.5
Roundabout Circulatory East Ahead	91.1%	12.4	100.2%	34.1
Roundabout Circulatory East Ahead Right	91.1%	12.4	100.1%	33.6
Vigar Way Left	42.1%	3.3	1.4%	0.1
Vigar Way Left	42.0%	0.0	53.4%	0.0
Vigar Way Ahead	44.9%	0.0	57.1%	0.0
A329 West Ahead	39.8%	6.2	59.4%	9.9
A329 West Ahead	39.7%	6.6	59.4%	10.6
Cycle Time (s)	90s		90s	
Practical Reserve Capacity (%)	-1.2		-12.8	
Total Delay (pcuHr)	19.64		42.72	

4.3.9 This junction is modelled to be approaching capacity in both the AM and PM peaks, but with minimal levels of queuing and delay on all arms. As noted, this does not take account of the effect of UTMC on the junction which will cause the junction to operate far more efficiently. In the 2037 + BFLP scenario, the junction is forecast to exceed capacity and will require mitigation to operate within capacity.

4.3.10 It is proposed to introduce additional traffic signal control on the Vigar Way arm of the roundabout linked to the existing signal control. This measure will enable more controlled interaction between traffic leaving Bracknell and traffic from the Jennett's Park development, allowing easier access towards the M4 on the strategic road network. It will also build upon the success of introducing signal control to the A329 Berkshire Way east arm in 2015.

Figure B – Jennett's Park Roundabout with concept mitigation

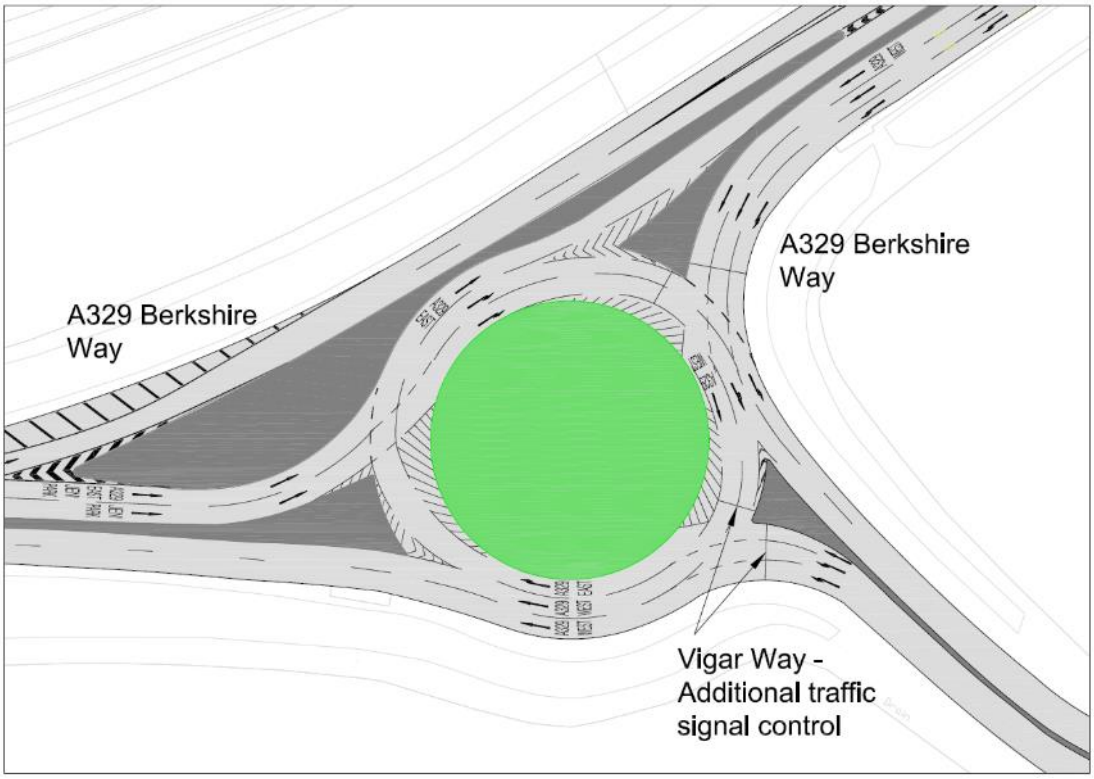


Table C – 2037 + BFLP Modelling Outputs + concept improvements

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	**Mean Max Queue**	**Deg Sat (%)**	**Mean Max Queue**
A329 East Left	5.4%	0.4	19.0%	2.6
A329 East Ahead	52.9%	5.5	61.8%	12.6
A329 East Ahead	68.4%	8.1	84.5%	21.7
Vigar Way Left	82.0%	7.0	83.2%	12.9
Vigar Way Left	82.2%	7.5	83.2%	13.8
Vigar Way Ahead	36.7%	2.8	1.1%	0.1
A329 West Ahead	42.2%	0.5	53.4%	0.0
A329 West Ahead	44.8%	0.6	57.1%	0.0
Roundabout Circulatory East Ahead	73.3%	4.8	81.9%	12.1
Roundabout Circulatory East Ahead Right	72.8%	5.1	81.9%	13.0
Roundabout Circulatory South Ahead	61.3%	2.1	63.0%	1.3
Roundabout Circulatory South Ahead Right	79.4%	1.7	86.1%	0.6
Cycle Time (s)	50s		90s	
Practical Reserve Capacity (%)	9.5%		4.5%	
Total Delay (pcuHr)	14.66		26.46	

JUNCTION 2 – DONCASTLE ROUNDABOUT

4.3.11 The Doncastle Road roundabout is a standard three arm roundabout. The A329 Berkshire Way provides the two main feeder arms which are dual carriageways and have no pedestrian or cycle facilities. Doncastle Road provides access to the Southern Business Area.

Figure A – Doncastle Roundabout

Image source: Google Maps. Image taken from A329 Berkshire Way West; looking east.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	**Queue**	**Delay (s)**	**RFC**	**Queue**	**Delay (s)**
Berkshire Way East	0.59	2	3.91	0.61	2	3.46
Doncastle Road	0.24	1	4.06	0.57	2	8.83
Berkshire Way West	0.84	6	7.90	0.71	3	4.41

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	**Queue**	**Delay**	**RFC**	**Queue**	**Delay**
Berkshire Way East	0.59	2	4.23	0.68	3	4.42
Doncastle Road	0.49	1	5.39	0.57	2	10.83
Berkshire Way West	0.89	8	11.13	0.72	3	4.44

4.3.12 In the 2019 Base scenario, this junction is modelled to be operating within capacity for the PM peak hour but exceeding capacity for the AM peak hour.

4.3.13 The roundabout in the 2037 + BFLP scenario is forecast to exceed capacity in the AM peak hour and mitigation would be required on the Berkshire Way West arm. This will be a minor increase in the flare approaching the junction to allow for more capacity heading towards the Southern Industrial Area and towards Bracknell Town Centre. The red line on Figure B indicates the existing kerb line.

Figure B – Doncastle Roundabout with concept mitigation

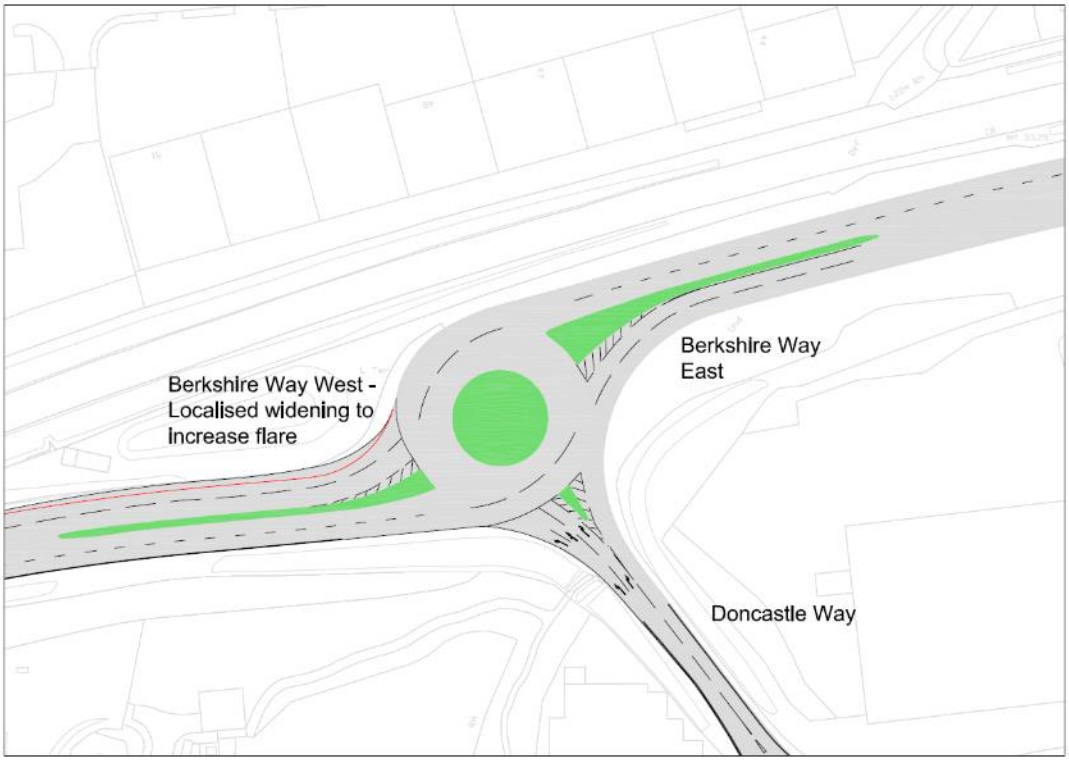


Table C – 2037 + BFLP Modelling Outputs with concept improvements

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	**Queue**	**Delay**	**RFC**	**Queue**	**Delay**
Berkshire Way East	0.59	2	4.23	0.68	3	4.42
Doncastle Road	0.48	1	5.39	0.57	2	10.83
Berkshire Way West	0.83	5	6.62	0.67	3	3.47

JUNCTION 3 – TWIN BRIDGES GYRATORY

4.3.14 The Twin Bridges Gyratory is situated at the intersection of the A322, A329 and A3095, and occupies a strategic position within the Bracknell highway network. It also serves to connect the town with the M3 and M4 via the A322 and A329 respectively.

4.3.15 It is a large six-armed signalised gyratory operating under UTMC. The section to the south of the railway line is fed by three dual carriageways, whilst the northern section is fed by access arms to industrial, office and retail developments.

4.3.16 There is no direct interaction between traffic and pedestrians or cyclists as footways and cycleways are located below the circulatory carriageway.

Figure A – Twin Bridges Gyratory

Image source: Google Maps. Image taken from A329 Berkshire Way; looking east.

Figure B – Twin Bridges Gyratory

Image source: Google Maps. Image taken from Downshire Way North; looking south.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	**Mean Max Queue**	**Deg Sat (%)**	**Mean Max Queue**
J1: Twin Bridges North	**69.7%**	**-**	**62.7%**	**-**
Easthampstead Road Ahead Left	24.7%	2.3	34.5%	4.0
Easthampstead Road Ahead	22.2%	2.8	36.6%	5.6
Circ ER Right Ahead	69.7%	13.0	47.9%	6.4
Circ ER Right	48.8%	6.2	35.5%	4.7
Downshire Way North Ahead Left	58.1%	5.2	53.3%	4.9
Downshire Way North Ahead	59.4%	5.6	49.6%	4.7
Circ DWN Ahead	6.6%	0.2	12.4%	0.4
Circ DWN Right Ahead	43.5%	0.8	37.5%	1.5
Circ DWN Right	10.5%	1.1	21.1%	2.1
Skimped Hill Lane Left	32.4%	4.7	47.1%	7.8
Skimped Hill Lane Left	37.8%	6.2	50.8%	9.2
Circ SHL Ahead	44.2%	1.0	45.5%	1.6
Circ SHL Ahead	56.3%	1.3	62.7%	2.3
J2: Twin Bridges South	**83.9%**	**-**	**86.1%**	**-**
Road under rail bridge Ahead Left	62.1%	5.6	73.9%	7.9
Road under rail bridge Ahead	67.2%	3.4	81.5%	10.7
Circ @ Bridge Right	50.0%	3.7	72.0%	12.5
Circ @ Bridge Right	67.7%	2.1	64.4%	8.3
Circ @ Bridge Right	13.1%	0.1	26.5%	0.8
Downshire Way Ahead Left	73.2%	11.2	86.1%	14.6
Downshire Way Ahead	9.5%	1.4	7.8%	1.0
Circ @ Down Right	50.0%	1.4	57.1%	2.5
Circ @ Down Right	47.0%	1.9	54.1%	2.5
Circ @ Down Right	40.8%	0.4	40.6%	0.3
Mill Lane Ahead Left	78.6%	16.7	56.8%	8.7
Mill Lane Ahead	78.3%	16.7	54.5%	8.6
Circ @ Mill Ahead	59.3%	5.9	52.8%	4.1
Circ @ Mill Right Ahead	68.1%	5.6	64.8%	4.1
Circ @ Mill Right	9.4%	0.7	5.4%	0.1
Berkshire Way Ahead Left	83.9%	16.1	74.2%	14.5
Berkshire Way Ahead	74.8%	15.3	66.7%	13.7

Circ @ Berk Ahead	81.5%	5.3	52.4%	2.7
Circ @ Berk Ahead	68.1%	3.2	40.9%	1.9
Circ @ Berk Right	10.9%	0.2	12.6%	0.2
Cycle Time (s)	90		90	
Practical Reserve Capacity (%)	7.2		4.6	
Total Delay (pcuHr)	57.99		55.41	

4.3.17 This junction is modelled to be operating with reserve capacity in both the AM and PM peaks, but with some queuing on the circulatory carriageway. As noted, this does not take account of the effect of UTMC on the junction which will cause the junction to operate far more efficiently.

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	**Mean Max Queue**	**Deg Sat (%)**	**Mean Max Queue**
J1: Twin Bridges North	**100.0%**	**-**	**103.6%**	**-**
Easthampstead Road Ahead Left	66.2%	8.3	90.3%	17.5
Easthampstead Road Ahead	8.1%	0.9	60.0%	8.9
Circ ER Right Ahead	99.5%	21.4	94.1%	24.6
Circ ER Right	58.3%	2.4	65.6%	7.3
Downshire Way North Ahead Left	63.0%	6.6	72.4%	7.0
Downshire Way North Ahead	61.1%	6.7	68.5%	6.7
Circ DWN Ahead	29.4%	1.7	48.0%	2.8
Circ DWN Right Ahead	70.3%	12.5	78.5%	19.2
Circ DWN Right	3.2%	1.1	27.3%	7.6
Skimped Hill Lane Left	29.8%	4.1	60.3%	11.4
Skimped Hill Lane Left	45.6%	7.8	67.1%	14.6
Circ SHL Ahead	100.0%	13.7	103.6%	29.4
Circ SHL Ahead	59.7%	1.4	102.3%	23.1
J2: Twin Bridges South	**100.2%**	**-**	**104.5%**	**-**
Road under rail bridge Ahead Left	98.0%	19.0	101.9%	48.3
Road under rail bridge Ahead	97.7%	24.6	104.5%	63.5
Circ @ Bridge Right	7.5%	1.4	51.3%	7.3
Circ @ Bridge Right	51.3%	1.4	65.5%	9.7
Circ @ Bridge Right	6.3%	0.0	31.4%	1.8
Downshire Way Ahead Left	95.7%	29.9	103.7%	50.7

Downshire Way Ahead	17.5%	2.7	17.3%	2.3
Circ @ Down Right	52.1%	1.5	55.7%	3.6
Circ @ Down Right	34.7%	1.5	54.1%	4.4
Circ @ Down Right	80.1%	12.4	65.0%	3.6
Mill Lane Ahead Left	0.0%	16.7	85.6%	21.1
Mill Lane Ahead	97.5%	34.8	86.4%	21.5
Circ @ Mill Ahead	97.3%	21.5	81.2%	11.0
Circ @ Mill Right Ahead	98.2%	21.8	99.3%	11.0
Circ @ Mill Right	23.9%	1.9	13.9%	1.7
Berkshire Way Ahead Left	99.8%	28.5	80.8%	12.2
Berkshire Way Ahead	97.1%	21.4	66.1%	12.0
Circ @ Berk Ahead	100.2%	36.1	97.8%	19.7
Circ @ Berk Ahead	77.6%	7.1	71.1%	4.1
Circ @ Berk Right	11.8%	0.4	18.9%	0.3
Cycle Time (s)	90		90	
Practical Reserve Capacity (%)	-11.3		-16.1	
Total Delay (pcuHr)	132.29		213.44	

4.3.18 In the 2037 + BFLP scenario, the junction is predicted to exceed capacity, with particularly high queue levels heading south under the rail bridge.

4.3.19 It should be noted that this modelling does not factor for UTMC on the junction which could enhance its performance by between 12% and 27% over and above the fixed time model that has been used to demonstrate the capacity.

JUNCTION 4 – DOWNSHIRE WAY WIDENING

4.3.20 At the time of the surveys (March 2019) that were used to build the new base year transport model, works were under way to upgrade this key strategic link to a dual carriageway.

4.3.21 This section of the A322 is now fully open with two running lanes in both directions and signal-controlled access into Old Bracknell Lane. The signals also support the ambulance station with the fire station continuing to operate using Wig-Wags to control traffic.

Figure A – Downshire Way Widening

Image source: Bracknell Forest Council. Image taken from A322 Downshire Way; looking south east.

JUNCTION 5 – HORSE AND GROOM ROUNDABOUT

4.3.22 The Horse and Groom roundabout is a large partially signalised roundabout with six arms. The A322 Downshire Way and the A322 Bagshot Road South are the main feeder arms of the junction. The A322 Downshire Way and both the A3095 and A322 Bagshot Road arms of the junction are signalised with the remaining three arms of Broad Lane, Lime Walk and Rectory Lane operating under a conventional priority system.

4.3.23 Pedestrian, cycle and crossing facilities are located on the A322 Downshire Way and Broad Lane arms of the junction.

Figure A – Horse and Groom Roundabout

Image source: Google Maps. Image taken from A322 Downshire Way; looking east.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	**Mean Max Queue**	**Deg Sat (%)**	**Mean Max Queue**
A3095 Bagshot Road SB Left	40.3%	3.3	64.9%	6.5
A3095 Bagshot Road SB Left	40.6%	3.4	65.0%	6.6
A3095 Bagshot Road SB Left	0.0%	0.0	7.2%	0.5
Circ @ Bagshot SB Ahead	23.5%	1.5	49.4%	4.6
Circ @ Bagshot SB Ahead	52.4%	2.2	74.5%	7.1
Circ @ Bagshot SB Ahead	34.7%	0.9	60.5%	1.4
Broad Lane Left	44.6%	1.3	49.2%	1.4
Broad Lane Left	22.0%	0.5	28.6%	0.6
Lime Walk Ahead Left	3.3%	0.0	7.3%	0.1
A322 Bagshot Road NB Left	60.5%	6.8	68.5%	8.0
A322 Bagshot Road NB Left	81.2%	9.3	79.6%	9.2
Circ @ Bagshot NB Ahead	82.7%	6.8	79.4%	7.6
Circ @ Bagshot NB Right	30.0%	1.6	11.9%	0.8
Circ @ Bagshot NB Right	31.8%	1.9	30.2%	2.1
Rectory Lane Left U-Turn	28.4%	1.0	24.5%	0.8
Rectory Lane Left	14.9%	0.4	12.3%	0.4
A322 Downshire Way Ahead Left	60.3%	5.0	67.2%	6.8
A322 Downshire Way Ahead	49.1%	3.6	65.8%	6.6
Circ @ A322 Downshire Ahead	56.0%	5.2	50.5%	3.3
Circ @ A322 Downshire Right Ahead	65.0%	7.4	58.0%	5.8
Circ @ Downshire Right	15.0%	0.8	16.5%	0.7
A322 Downshire Way Pedestrian Crossing Ahead	54.8%	2.6	50.6%	2.8
A322 Downshire Way Pedestrian Crossing Ahead	28.5%	0.7	41.0%	1.6
Cycle Time (s)	50		50	
Practical Reserve Capacity (%)	8.8		13.1	
Total Delay (pcuHr)	27.15		33.71	

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	**Mean Max Queue**	**Deg Sat (%)**	**Mean Max Queue**
A3095 Bagshot Road SB Left	47.6%	3.7	76.7%	13.3
A3095 Bagshot Road SB Left	47.7%	3.7	76.9%	13.4
A3095 Bagshot Road SB Left	9.1%	0.6	6.6%	0.7
Circ @ Bagshot SB Ahead	33.3%	0.9	65.6%	11.1
Circ @ Bagshot SB Ahead	57.8%	2.7	69.4%	12.5
Circ @ Bagshot SB Ahead	35.6%	0.8	72.1%	12.3
Broad Lane Left	53.4%	1.5	49.8%	1.9
Broad Lane Left	46.6%	1.1	45.2%	1.6
Lime Walk Ahead Left	6.2%	0.1	13.4%	0.3
A322 Bagshot Road NB Left	67.8%	7.1	72.7%	12.0
A322 Bagshot Road NB Left	88.1%	11.6	85.7%	12.5
Circ @ Bagshot NB Ahead	61.9%	3.6	86.6%	16.3
Circ @ Bagshot NB Right	78.2%	5.1	8.4%	0.9
Circ @ Bagshot NB Right	85.0%	6.3	27.6%	3.1
Rectory Lane Left U-Turn	48.5%	1.5	36.9%	2.1
Rectory Lane Left	20.5%	0.5	17.3%	0.7
A322 Downshire Way Ahead Left	69.1%	5.0	63.7%	8.4
A322 Downshire Way Ahead	49.8%	3.2	69.6%	11.0
Circ @ A322 Downshire Ahead	63.5%	4.8	55.5%	5.5
Circ @ A322 Downshire Right Ahead	69.9%	7.5	55.2%	7.6
Circ @ Downshire Right	15.8%	0.6	31.0%	2.5
A322 Downshire Way Pedestrian Crossing Ahead	82.2%	8.0	55.4%	2.0
A322 Downshire Way Pedestrian Crossing Ahead	57.2%	5.2	24.5%	1.3
Cycle Time (s)	43		75	
Practical Reserve Capacity (%)	2.1		3.9	
Total Delay (pcuHr)	38.70		50.66	

4.3.24 This junction is modelled to operate within capacity for both the AM and PM peak hours in the 2019 base scenario and to continue to do so in the 2037 + BFLP scenarios.

JUNCTION 6 – SPORTS CENTRE ROUNDABOUT

4.3.25 The Sports Centre roundabout currently operates as a four arm partially signalised roundabout. The traffic signals operate under UTMC on the main A322 arms. The signal control was introduced to allow traffic from Nightingale Crescent to the east and South Hill Road to the west to access the roundabout more easily. This improvement led to reduced levels of queuing and delay.

4.3.26 There are currently safety improvement proposals to provide additional circulatory stacking space for east/west and west/east movements. These improvements will remove conflict points, significantly reducing the level of blocking in the north/south and south/north directions of travel. They will also provide additional capacity on Nightingale Crescent for traffic heading from the roundabout into the Crown Wood and Hanworth areas of Bracknell along Opladen Way and Harmanswater Road.

Figure A – Sports Centre Roundabout

Image source: Google Maps. Image taken from A322 Bagshot Road; looking south.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	**Mean Max Queue**	**Deg Sat (%)**	**Mean Max Queue**
A322 North Ahead Left	46.1%	4.6	68.8%	8.2
A322 North Ahead	42.9%	4.8	61.2%	8.2
Circ A322N Right Ahead	36.2%	1.0	41.4%	1.6
Circ A322N Right	53.1%	2.0	49.3%	2.1
Opladen Way Left	75.4%	11.0	65.6%	7.2
Opladen Way Left	71.2%	10.5	57.9%	7.5
A322 South Ahead Left	49.1%	1.9	68.0%	3.2
A322 South Ahead	54.9%	2.8	60.3%	3.6
Circ A322S Ahead	46.2%	3.8	62.4%	5.0
Circ A322S Right Ahead	46.2%	3.8	62.4%	5.0
South Hill Road Left	63.1%	5.3	51.1%	4.2
South Hill Road Left	63.1%	5.2	51.0%	4.4
Cycle Time (s)	54		55	
Practical Reserve Capacity (%)	19.4		30.8	
Total Delay (pcuHr)	19.88		21.66	

Figure B – Sports Centre Roundabout Proposals (Implemented 2021)

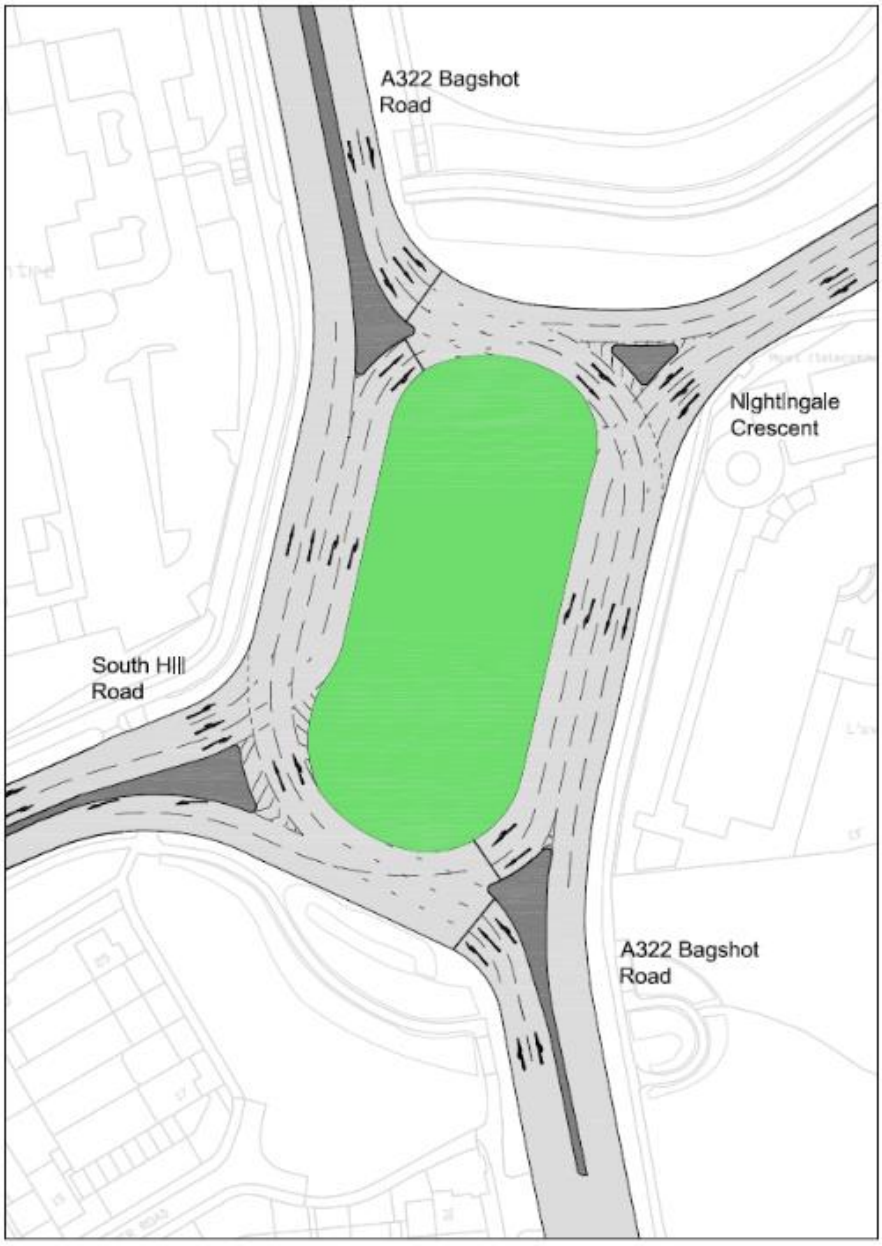


Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	**Mean Max Queue**	**Deg Sat (%)**	**Mean Max Queue**
A322 North Ahead Left	49.3%	4.2	69.5%	6.7
A322 North Ahead	44.7%	4.2	61.3%	7.0
Circ A322N Right Ahead	47.8%	1.6	50.3%	1.9
Circ A322N Right	61.3%	2.7	38.3%	1.2
Opladen Way Left	88.0%	13.8	63.0%	5.3
Opladen Way Left	86.3%	13.9	53.7%	5.7
A322 South Ahead Left	76.7%	4.7	69.6%	3.0
A322 South Ahead	63.3%	2.6	50.8%	1.9
Circ A322S Ahead	54.1%	3.0	64.5%	4.6
Circ A322S Right Ahead	57.9%	3.9	64.0%	4.8
South Hill Road Left	71.6%	5.3	63.9%	3.9
South Hill Road Left	74.1%	5.8	64.0%	4.2
Cycle Time (s)	45		46	
Practical Reserve Capacity (%)	2.2		29.2	
Total Delay (pcuHr)	28.41		19.71	

4.3.27 Whilst this junction is modelled to operate within capacity during both the AM and PM peak hours, the junction still experiences some queuing during these periods. The proposed improvement measures will help to reduce this level of queuing by removing the conflict points.

4.3.28 This junction with its associated improvements is modelled to continue to operate within capacity in the 2037 + BFLP scenario.

JUNCTION 7 – BIRCH HILL ROUNDABOUT

4.3.29 Birch Hill Roundabout is a 'through–about' located on the A322 Bagshot Road to the south of the town centre, providing access to strategic road network for the southern residential areas of Bracknell and a connection to the M3.

4.3.30 The current layout is a four arm fully signalised roundabout with signalised fly-throughs northbound and southbound on the A322 Bagshot Road to facilitate maximum capacity for the dominant through movements. The side arms of Opladen Way and Ringmead offer access to residential areas of Crown Wood and Birch Hill respectively.

4.3.31 The junction benefits from pedestrian and cycle-free traffic as their facilities are located below the carriageway, meaning vehicular traffic is not disrupted.

Figure A – Birch Hill Roundabout

Image source: Google Maps. Image taken from A322 Bagshot Road; looking south-east.

4.3.32 This junction is modelled to operate within capacity for the AM and PM peak hours in the 2019 base and 2037 + BFLP scenarios.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	**Mean Max Queue**	**Deg Sat (%)**	**Mean Max Queue**
A322 Bagshot Road Southbound Left	10.7%	0.8	15.3%	1.1
A322 Bagshot Road Southbound Ahead	19.0%	1.4	39.0%	3.2
A322 Bagshot Road Southbound Ahead	36.1%	3.0	44.8%	4.0
A322 Bagshot Road Southbound Ahead	36.1%	3.0	44.8%	4.0
A322 Bagshot Road Southbound Ahead	36.0%	3.0	44.7%	4.0
Circ Eastbound Ahead	43.2%	2.7	58.6%	3.8
Circ Eastbound Right	52.1%	3.3	35.9%	1.9
Opladen Way Left	13.7%	0.9	4.0%	0.2
Opladen Way Ahead	36.3%	2.6	39.5%	2.5
Circ Opladen Ahead	28.2%	0.7	15.4%	0.6
Circ Opladen Right	18.2%	1.1	33.4%	1.8
A322 Bagshot Road Northbound Left	29.0%	2.3	61.4%	6.3
A322 Bagshot Road Northbound Ahead	2.2%	0.1	4.6%	0.3
A322 Bagshot Road Northbound Ahead	51.6%	4.9	50.6%	4.7
A322 Bagshot Road Northbound Ahead	51.6%	4.9	50.6%	4.7
A322 Bagshot Road Northbound Ahead	51.5%	4.8	50.4%	4.7
Circ Westbound Ahead	49.5%	2.7	57.1%	3.6
Circ Westbound Right Ahead	49.5%	2.8	57.5%	3.7
Ringmead Left	24.0%	1.8	23.7%	1.7
Ringmead Ahead	36.9%	3.0	31.9%	2.5
Circ Ringmead Ahead	21.3%	1.1	10.5%	0.5
Circ Ringmead Right	6.5%	0.2	12.7%	0.5
A322 SB Onslip Ahead	46.4%	1.6	20.4%	0.5
A322 SB Onslip Ahead	46.1%	1.6	20.1%	0.5
A322 NB Onslip Ahead	37.0%	2.3	35.6%	2.0
A322 NB Onslip Ahead	36.8%	2.3	35.4%	2.0
A322 NB Centre Ahead	53.6%	2.2	46.8%	1.6
A322 NB Centre Ahead	53.6%	2.2	46.8%	1.6
A322 NB Centre Ahead	53.5%	2.2	46.7%	1.6
A322 SB Centre Ahead	29.9%	0.3	41.5%	0.5
A322 SB Centre Ahead	29.9%	0.3	41.5%	0.5
A322 SB Centre Ahead	29.8%	0.3	41.4%	0.5
Cycle Time (s)	50		50	
Practical Reserve Capacity (%)	67.8		46.5	
Total Delay (pcuHr)	25.97		27.99	

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	**Mean Max Queue**	**Deg Sat (%)**	**Mean Max Queue**
A322 Bagshot Road Southbound Left	14.1%	0.9	29.9%	2.2
A322 Bagshot Road Southbound Ahead	19.4%	1.2	63.9%	6.0
A322 Bagshot Road Southbound Ahead	51.3%	3.9	44.8%	3.7
A322 Bagshot Road Southbound Ahead	51.3%	3.9	44.8%	3.7
A322 Bagshot Road Southbound Ahead	51.1%	3.9	44.8%	3.7
Circ Eastbound Ahead	30.8%	3.0	35.1%	2.4
Circ Eastbound Right	68.6%	6.6	73.1%	6.1
Opladen Way Left	1.5%	0.1	8.8%	0.4
Opladen Way Ahead	48.9%	3.7	50.7%	3.1
Circ Opladen Ahead	54.9%	1.2	39.0%	0.9
Circ Opladen Right	12.4%	1.6	42.6%	3.4
A322 Bagshot Road Northbound Left	49.5%	4.5	78.3%	9.9
A322 Bagshot Road Northbound Ahead	20.7%	1.5	11.4%	0.8
A322 Bagshot Road Northbound Ahead	52.9%	4.9	43.7%	3.9
A322 Bagshot Road Northbound Ahead	52.9%	4.9	43.7%	3.9
A322 Bagshot Road Northbound Ahead	52.8%	4.9	43.8%	3.9
Circ Westbound Ahead	41.3%	2.4	78.5%	6.3
Circ Westbound Right Ahead	40.3%	2.6	78.7%	6.4
Ringmead Left	60.7%	6.4	23.4%	1.8
Ringmead Ahead	48.1%	4.5	49.4%	4.6
Circ Ringmead Ahead	35.3%	2.0	30.8%	2.1
Circ Ringmead Right	49.7%	2.6	24.8%	0.8
A322 SB Onslip Ahead	53.8%	1.8	58.1%	1.9
A322 SB Onslip Ahead	53.6%	1.8	57.8%	1.9
A322 NB Onslip Ahead	56.0%	3.9	32.8%	2.3
A322 NB Onslip Ahead	55.7%	3.8	32.6%	2.3
A322 NB Centre Ahead	66.8%	2.6	49.4%	2.1
A322 NB Centre Ahead	66.8%	2.6	49.4%	2.1
A322 NB Centre Ahead	66.7%	2.6	49.5%	2.2
A322 SB Centre Ahead	33.5%	0.3	33.6%	0.3
A322 SB Centre Ahead	33.5%	0.3	33.6%	0.3
A322 SB Centre Ahead	33.4%	0.3	33.6%	0.3
Cycle Time (s)	50		50	
Practical Reserve Capacity (%)	31.2		14.4	
Total Delay (pcuHr)	38.01		39.68	

JUNCTION 8 – CORAL REEF CROSSROADS

4.3.33 Located on the urban boundary of Bracknell, Coral Reef crossroads operates as a four-arm signalised junction with dedicated right turn lanes from the north and south. It sits at the intersection of the A322 Bagshot Road / B3430 Nine Mile Ride / New Forest Ride.

4.3.34 The traffic signals operate under UTMC.

Figure A – Coral Reef Signalised Junction

Image source: Google Maps. Image taken from A322 Bagshot Road; looking south-east.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	**Mean Max Queue**	**Deg Sat (%)**	**Mean Max Queue**
A322 (Eastbound) Left Ahead	54.1 : 54.1%	7.3	68.9 : 68.9%	10.0
A322 (Eastbound) Ahead Right	40.6 : 67.5%	6.9	57.8 : 64.1%	9.5
New Forest Ride Left Ahead	76.1 : 76.1%	5.5	80.3 : 80.3%	6.1
New Forest Ride Right Ahead	61.7%	4.0	76.1%	5.5
A322 (Westbound) Ahead Left	77.3 : 77.4%	17.0	85.3 : 85.4%	19.5
A322 (Westbound) Ahead Right	69.0 : 69.0%	14.1	80.8 : 80.6%	17.6
B3430 Nine Mile Ride Left Ahead	72.0%	6.7	83.1%	10.0
B3430 Nine Mile Ride Right	55.2 : 55.2%	4.4	33.9 : 33.9%	2.7
Cycle Time (s)	90		90	
Practical Reserve Capacity (%)	16.3		5.4	
Total Delay (pcuHr)	36.93		47.78	

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	**Mean Max Queue**	**Deg Sat (%)**	**Mean Max Queue**
A322 (Eastbound) Left Ahead	63.3%	9.1	70.6%	10.4
A322 (Eastbound) Ahead Right	35.5%	9.1	47.5%	10.5
New Forest Ride Left Ahead	81.7%	6.4	83.0%	6.1
New Forest Ride Right Ahead	80.3%	6.1	74.7%	4.8
A322 (Westbound) Ahead Left	81.2%	18.7	84.4%	19.9
A322 (Westbound) Ahead Right	73.6%	15.7	81.3%	17.6
B3430 Nine Mile Ride Left Ahead	78.8%	7.6	86.3%	10.4
B3430 Nine Mile Ride Right	53.9%	4.3	41.2%	3.3
Cycle Time (s)	90		90	
Practical Reserve Capacity (%)	10.2		4.3	
Total Delay (pcuHr)	42.34		48.57	

4.3.35 This junction is modelled to be operating with reserve capacity in both the AM and PM peaks, but with some queuing on the main A322 arms. As noted, this does not take account of the effect of UTMC on the junction which will cause the junction to operate far more efficiently. This junction is modelled to continue to operate within capacity in the 2037 + BFLP scenario.

JUNCTION 9 – SWINLEY BOTTOM GYRATORY

4.3.36 This junction is located to the south of Bracknell on the intersection between the A322 Bagshot Road (to Bracknell) and the A332 Swinley Road (to Ascot). The current layout is a three arm partially signalised roundabout with dual carriageway approaches from the A322 North and A322 South and a flared 2 lane approach from the A332 Swinley Road. The A322 Bagshot Road southbound approach from Bracknell is signalised and the A332 Swinley Road from Ascot operates under give way control. The A322 Bagshot Road northbound dual carriageway approach splits approximately 150 metres from the junction where the two lanes diverge to create a dedicated free-flow ahead movement and a signalised right turn towards the A332 Swinley Road.

Figure A – Swinley Bottom Gyratory

Image source: Google Maps. Image taken from A322 Bracknell Road; looking north-west.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	**Mean Max Queue**	**Deg Sat (%)**	**Mean Max Queue**
A322 Southbound Ahead	71.8%	6.1	70.8%	6.1
A322 Southbound Ahead	71.9%	6.2	70.9%	6.2
A322 Right Ahead	67.5%	3.5	70.7%	3.9
A322 Right Ahead	67.7%	3.5	70.9%	3.9
A332 Swinley Road Right	7.4%	0.0	9.6%	0.1
A332 Swinley Road Ahead	54.8%	1.8	57.0%	2.0
A332 Swinley Road Ahead	17.9%	0.5	20.9%	0.5
Cycle Time (s)	33		34	
Practical Reserve Capacity (%)	25.1		26.9	
Total Delay (pcuHr)	9.79		10.22	

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	**Mean Max Queue**	**Deg Sat (%)**	**Mean Max Queue**
A322 Southbound Ahead	80.8%	9.7	72.1%	7.7
A322 Southbound Ahead	80.9%	9.7	72.1%	7.7
A322 Right Ahead	79.8%	6.5	72.3%	5.1
A322 Right Ahead	79.8%	6.5	72.3%	5.1
A332 Swinley Road Right	17.1%	0.1	26.6%	0.2
A332 Swinley Road Ahead	74.9%	5.1	69.4%	4.0
A332 Swinley Road Ahead	46.7%	2.2	39.5%	1.7
Cycle Time (s)	42		42	
Practical Reserve Capacity (%)	11.3		24.4	
Total Delay (pcuHr)	17.57		12.88	

4.3.37 This junction is modelled to operate within capacity for both the AM and PM peak hours in the 2019 base scenario.

4.3.38 This junction is modelled to continue to operate within capacity in the 2037 + BFLP scenario.

4.4 JOURNEY TIME ROUTES 3 & 4

4.4.1 Journey time Route 3 runs from William Heelas Way, Wokingham to the Heatherwood Roundabout in the Royal Borough of Windsor and Maidenhead on the A329 London Road. This route travels along the B3408 and the A329. Journey time Route 4 is the reverse of this route.

4.4.2 The journey times presented below cover these entire routes, but the analysis that follows assesses junctions within Bracknell Forest.

Table A – Routes 3 & 4 Journey Time Summary

Route	AM Peak Journey Time Route	2019 AM Base	2037 AM No BFLP	2037 AM BFLP	2037 AM BFLP Mit	2037 AM BFLP Mit + UTMC*
		Min:Sec	Min:Sec	Min:Sec	Min:Sec	Min:Sec
3	London Rd Wokingham to Heatherwood Roundabout	16:34	18:09	19:50	19:58	18:42
4	Heatherwood Roundabout to London Rd Wokingham	17:08	19:32	20:31	20:31	19:07
Route	**PM Peak Journey Time Route**	**2019 PM Base**	**2037 PM No BFLP**	**2037 PM BFLP**	**2037 PM BFLP Mit ***	**2037 PM BFLP Mit + UTMC***
		Min:Sec	Min:Sec	Min:Sec	Min:Sec	Min:Sec
3	London Rd Wokingham to Heatherwood Roundabout	17:12	18:20	20:08	20:03	18:36
4	Heatherwood Roundabout to London Rd Wokingham	17:33	19:35	21:27	21:17	19:57

*The final column considers the impact of the added benefits of UTMC if this were to reduce delays at signals by just 12%. This is a most conservative estimate, as studies elsewhere have shown such systems can typically achieve between 12 – 27% reductions.

4.4.3 On Routes 3 and 4 the changes in overall journey times between 2019 and 2037 with LP are largely as expected and reflect the increase in travel demand that is predicted over that period.

4.4.4 The introduction of various mitigation schemes around the borough will always result in some movement of demand elsewhere as some routes become more or less attractive. This is reflected in the modest changes seen here when the schemes are introduced.

4.4.5 In the separate speed limit reduction sensitivity test detailed in paragraph 4.1.7, the recorded journey times in the AM peak were 18:45 for Route 3 and 19:47 for Route 4. In the PM peak, the recorded journey times were 19:11 for Route 3 and 20:22 for Route 4.

4.4.6 As mentioned above, the strategic model does not show the impact of additional network improvements such as UTMC. This has been demonstrated elsewhere to offer reductions in delays at signals of between 12 – 27%. Even the lowest value in this range of just 12% would see the 'with mitigation' times above fall below those for the 2037 BFLP scenario.

4.4.7 So, on this particular route we can expect journey time reductions in both peaks and directions following the introduction of mitigation schemes and UTMC.

JUNCTION 1 - AMEN CORNER SPINE ROAD

4.4.8 The B3408 London Road between the John Nike Way junction and the Coppid Beech Roundabout is a dual carriageway with a pedestrian / cycle crossing facility located some 150m west of the John Nike Way signalised junction. On the westbound side of the carriageway is the junction of the B3408 London Road / London Road which is a simple left in, left out junction serving a few properties on London Road.

4.4.9 As part of the Amen Corner South development, it is proposed to introduce a new spine road to serve it linking between the roundabout of John Nike Way and Beehive Road and the B3408 London Road.

Figure A – Amen Corner Spine Road

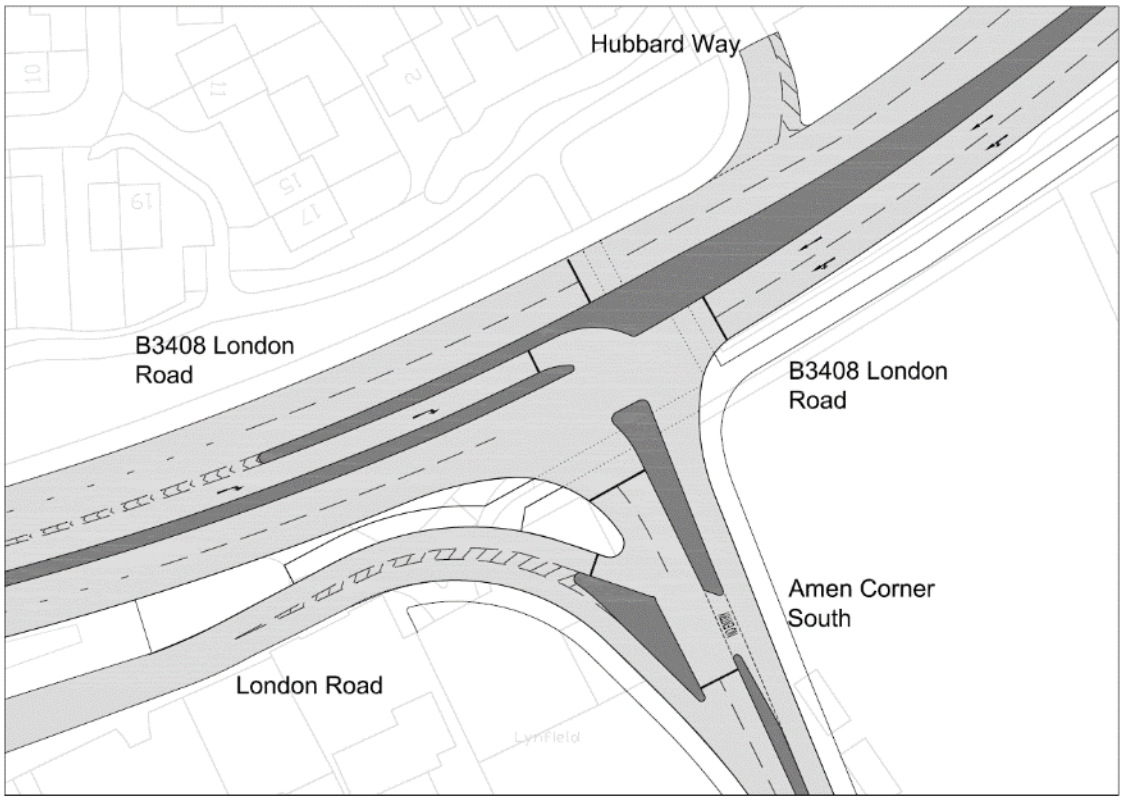


Table A – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
B3408 London Road (W) Ahead	45.2%	5.0	44.8%	5.0
B3408 London Road (W) Ahead	47.2%	5.8	46.8%	5.8
B3408London Road (W) Right	79.6%	9.3	11.6%	0.9
B3408 London Road (E) Internal Left Ahead	76.4%	10.7	82.1%	12.9
B3408 London Road (E) Internal Ahead	76.4%	10.7	82.2%	13.0
Spine Road Left	30.6%	2.4	78.6%	8.1
Spine Road Left	31.6%	2.6	78.9%	8.6
Old London Road Right	3.8%	0.2	1.4%	0.1
Spine Road Approach Ahead Left	18.3%	0.9	41.4%	2.3
Cycle Time (s)	70		70	
Practical Reserve Capacity (%)	13.0		9.5	
Total Delay (pcuHr)	18.23		22.56	

JUNCTION 2 - JOHN NIKE WAY

4.4.10 Located to the west of Bracknell, this junction takes the form of a four-arm signalised junction at the intersection of the B3408 London Road / John Nike Way / Chapman Drive operating under MOVA.

4.4.11 It provides the primary access point to the new Amen Corner North Development via Chapman Drive. A secondary left-in only access point to the Amen Corner North development is located approximately 120m to the west of the junction via Hubbard Road.

Figure A – John Nike Way Signals

Image source: Google Maps. Image taken from B3408 London Road; looking east.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
B3408 London Road Eastbound Ahead Left	29.0%	5.9	35.6%	7.6
B3408 London Road Eastbound Ahead	30.3%	6.6	36.8%	8.4
B3408 London Road Eastbound Right	83.2%	22.0	26.4%	4.5
B3408 London Road Westbound Left Ahead	83.2%	16.2	63.7%	12.5
B3408 London Road Westbound Ahead Right	84.9%	18.3	66.0%	14.2
John Nike Way Left	19.3%	2.1	65.0%	9.2
John Nike Way Right Ahead	16.1%	0.9	34.6%	2.1
Chapman Drive Left Ahead Right	35.5%	1.9	14.0%	0.7
Cycle Time (s)	120		120	
Practical Reserve Capacity (%)	6.0		36.4	
Total Delay (pcuHr)	30.03		23.14	

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
B3408 London Road Eastbound Ahead Left	38.9%	7.2	52.8%	8.7
B3408 London Road Eastbound Ahead	40.3%	8.0	54.5%	9.8
B3408 London Road Eastbound Right	87.7%	19.1	66.0%	9.8
B3408 London Road Westbound Left Ahead	85.4%	15.3	65.4%	8.3
B3408 London Road Westbound Ahead Right	86.4	16.9	67.4	9.1
John Nike Way Left	15.8%	1.4	47.0%	4.5
John Nike Way Right Ahead	8.1%	0.5	4.0%	0.2
Chapman Drive Left Ahead	51.3%	2.9	23.5%	1.2

Right				
Cycle Time (s)	103		90	
Practical Reserve Capacity (%)	2.6		33.6	
Total Delay (pcuHr)	30.84		21.45	

4.4.12 This junction is modelled to be operating with reserve capacity in both the AM and PM peaks, but with some queuing on the main B3408 London Road approaches. As noted, this does not take account of the effect of UTMC on the junction which will cause the junction to operate far more efficiently. In the 2037 + BFLP scenario, the junction is predicted to continue to operate within capacity.

JUNCTION 3 - SHOULDER OF MUTTON JUNCTION

4.4.13 At the date of the surveys (March 2019) that were used to build the base year transport model, the junction of St Mark's Road / B3408 London Road / Beehive Road, colloquially known as the Shoulder of Mutton was in the design stages with a view to upgrading the junction.

4.4.14 The revised layout is now in place. This operates with signalisation only at the junction of the B3408 London Road / St. Mark's Road and with the junction of Beehive Road / B3408 London Road operating under give way priority. Therefore, for the purposes of this report the 'as built' layout has been tested.

Figure A – Shoulder of Mutton

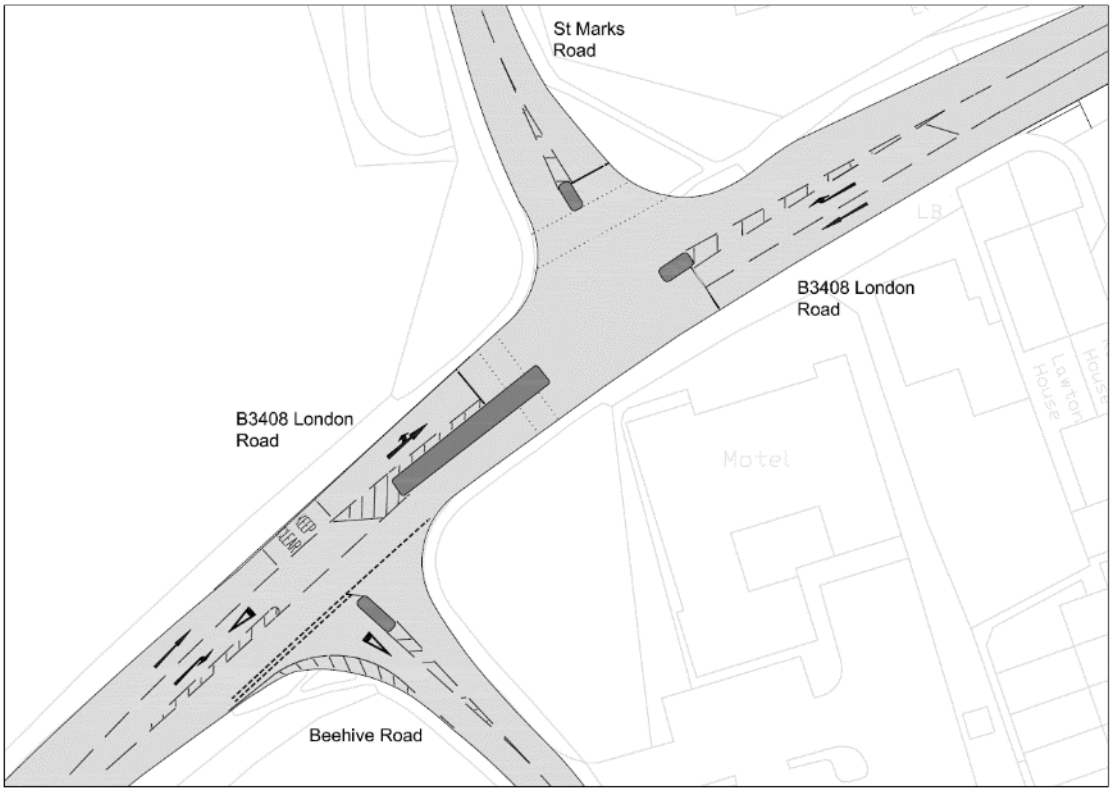


Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
B3408 London Rd (E) Ahead	56.8%	10.4	63.0%	11.6
B3408 London Rd (E) Right	4.7%	0.2	12.1%	0.5
B3408 London Rd (E) Centre Left Ahead	42.2%	0.6	44.7%	0.6
Beehive Rd Right Left	12.1%	0.1	10.5%	0.1
B3408 London Rd (W) Ahead	36.3%	0.3	44.7%	0.4
B3408 London Rd (W) Right	1.8%	0.0	7.8%	0.0
B3408 London Rd (W) Centre Left Ahead	68.2%	8.4	76.8%	10.9
St Marks Rd Left	2.4%	0.0	2.3%	0.0
St Marks Rd Right	68.9%	7.1	78.2%	6.1
Cycle Time (s)	90		84	
Practical Reserve Capacity (%)	30.5		15.1	
Total Delay (pcuHr)	10.10		11.92	

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
B3408 London Rd (E) Ahead	61.1%	11.6	65.8%	13.4
B3408 London Rd (E) Right	0.0%	0.0	0.6%	0.0
B3408 London Rd (E) Centre Left Ahead	45.1%	0.7	46.7%	0.6
Beehive Rd Right Left	16.3%	0.1	4.2%	0.0
B3408 London Rd (W) Ahead	40.5%	0.3	47.3%	0.4
B3408 London Rd (W) Right	17.8%	0.1	23.0%	0.1
B3408 London Rd (W) Centre Left Ahead	73.6%	10.5	75.6%	11.9
St Marks Rd Left	0.0%	0.0	0.0%	0.0
St Marks Rd Right	73.8%	7.5	72.7%	5.4
Cycle Time (s)	90		90	
Practical Reserve Capacity (%)	21.9		19.1	
Total Delay (pcuHr)	11.78		11.63	

4.4.15 The revised junction layout is modelled to operate well in both the AM and PM peak hours for both the 2019 and 2037 + BFLP scenarios with only minor queue levels in both.

JUNCTION 4 - POPESWOOD ROUNDABOUT

4.4.16 This is a conventional four arm roundabout. The B3408 Wokingham Road and the B3408 London Road are the main feeder arms with Popeswood Road and Temple Way making the other two arms. Each arm is a single carriageway approach, flaring to two lanes at the respective roundabout entry apart from the B3408 Wokingham Road which flares to three lanes. Each approach has dropped kerbs for pedestrian and cycle use and an off carriageway shared pedestrian / cycleway running between the B3408 Wokingham Road and the B3408 London Road.

Figure A – Popeswood Roundabout

Image source: Google Maps. Image taken from B3408 London Road; looking east.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Temple Way	0.63	2	8.88	0.34	1	4.02
B3408 Wokingham Road	0.38	1	2.96	0.57	2	4.15
B3408 London Road	0.42	2	3.97	0.53	3	5.37
Popeswood Road	0.57	2	8.55	0.33	1	6.46

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay	RFC	Queue	Delay
Temple Way	0.82	5	20.09	0.41	1	5.03
B3408 Wokingham Road	0.45	1	3.49	0.65	2	5.28
B3408 London Road	0.51	1	5.06	0.64	2	7.94
Popeswood Road	0.83	5	23.24	0.53	2	10.42

4.4.17 This junction is modelled to operate within capacity for both the AM and PM peak hours in both the 2019 base 2037 + LP scenarios.

JUNCTION 5 - ROUNDS HILL ROUNDABOUT

4.4.18 This is a standard roundabout with five flared approaches. The B3408 Wokingham Road is the main feeder which flares to two lanes both east and west. Western Road also flares to two lanes. Moordale Avenue and Turnpike Road are both flared single lane entries into the roundabout. Dropped kerbs and tactile paving have been added on the sides of the road and on the islands of each approach for pedestrian use. Western Road provides a link to the Western Industrial Area.

Figure A – Rounds Hill Roundabout

Image source: Google Maps. Image taken from Turnpike Road; looking north-west.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Moordale Avenue	0.57	2	22.65	0.06	1	6.09
B3408 Wokingham Road E	0.70	3	8.73	0.49	1	3.96
Western Road	0.23	1	3.91	0.74	3	12.91
Turnpike Road	0.33	1	8.24	0.34	1	16.89
B3408 Wokingham Road W	0.83	5	13.48	0.47	1	4.67

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Moordale Avenue	1.52	95	661.60	0.45	1	13.52
B3408 Wokingham Road E	0.71	3	9.34	0.59	2	5.50
Western Road	0.26	1	3.83	1.24	141	393.71
Turnpike Road	0.53	2	11.56	1.06	15	223.38
B3408 Wokingham Road W	0.93	11	30.18	0.70	3	9.64

4.4.19 This junction is modelled to operate within capacity for both the AM and PM peak hours in the 2019 base scenario, although the Wokingham Road W arm is approaching capacity.

4.4.20 The 2037 + BFLP scenario reveals the junction is forecast to be operating significantly over capacity on the Moordale Avenue, Turnpike Road, Western Avenue and the B3408 Wokingham Road West arms of the junction with excessive levels of queuing and delay.

4.4.21 Capacity improvements introduced at these arms in the form of minor widening and increased flare lengths will bring the junction back to operating within capacity. The existing kerb line is indicated in red on Figure B.

Figure B – Rounds Hill Roundabout with concept mitigation

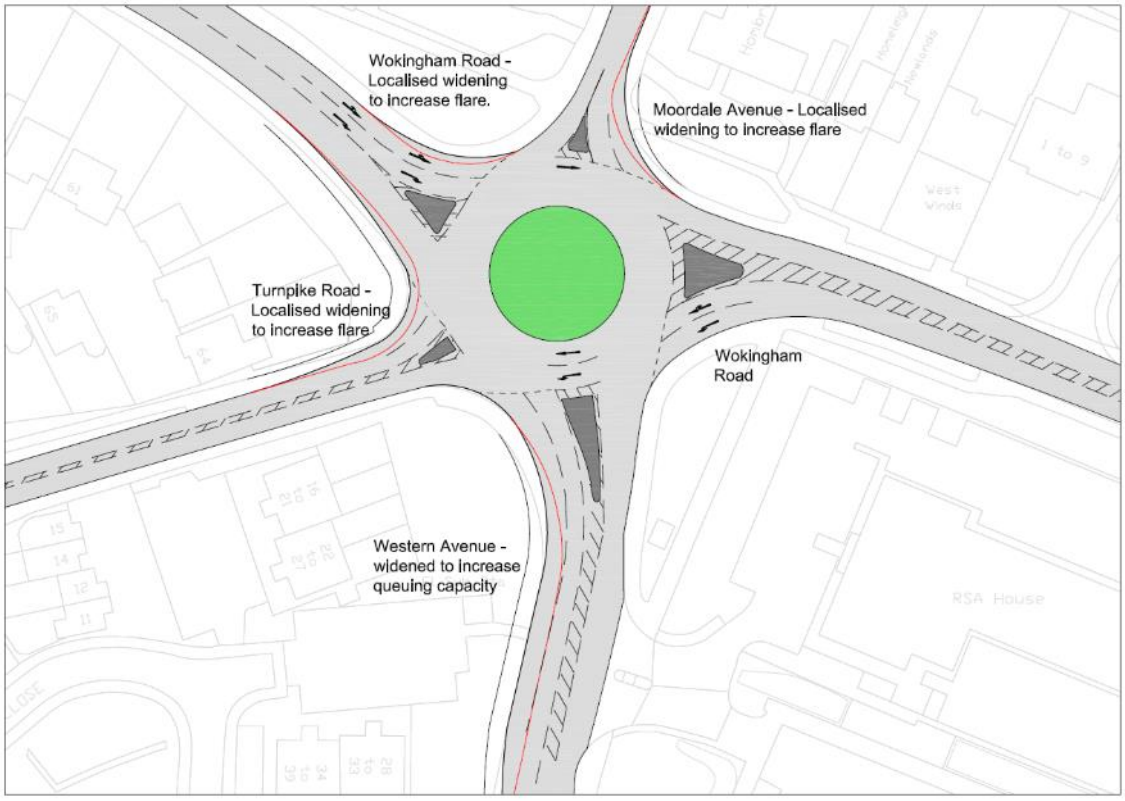


Table C – 2037 + BFLP with mitigation Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Moordale Avenue	0.84	5	34.17	0.29	1	6.74
B3408 Wokingham Road E	0.77	4	12.95	0.58	2	5.38
Western Road	0.17	1	2.19	0.76	4	8.36
Turnpike Road	0.38	1	6.31	0.74	3	42.68
B3408 Wokingham Road W	0.81	5	11.62	0.65	2	7.81

JUNCTION 6 – SPERRY'S ROUNDABOUT

4.4.22 This is a large standard roundabout with four flared approaches at the intersection of the B3408 Wokingham Road (east and west) and Downshire Way (north and south). All arms join the roundabout as two-lane entries apart from the B3408 Wokingham Road East where an additional lane provides a dedicated left turn movement to Downshire Way South. The main through route is east to west and vice versa. Dropped kerbs and tactile paving are present on all arms for pedestrian and cycle use.

Figure A – Sperry's Roundabout

Image source: Google Maps. Image taken from B3408 London Road; looking east.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Downshire Way N	0.17	1	3.74	0.14	1	3.72
B3408 Wokingham Road E	0.48	1	2.67	0.34	1	1.99
Downshire Way S	0.48	1	3.99	0.67	2	5.98
B3408 Wokingham Road W	0.56	2	4.70	0.54	2	5.01

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Downshire Way N	0.68	3	10.25	0.26	1	4.85
B3408 Wokingham Road E	0.60	2	3.84	0.36	1	2.08
Downshire Way S	0.62	2	5.42	0.82	5	11.03
B3408 Wokingham Road W	0.69	3	7.29	0.63	2	6.64

4.4.23 This junction is modelled to operate within capacity for the AM and PM peak hours in both the 2019 base scenario and the 2037 + BFLP scenario.

JUNCTION 7 - WESTERN ROUNDABOUT

4.4.24 Situated at the intersection of the B3408 Wokingham Road / B3018 Binfield Road / Millennium Way / Bond Way / A3095 Skimped Hill Lane, the Western Roundabout currently operates as a standard five-arm roundabout.

4.4.25 In the centre of the roundabout, pedestrian and cycle routes through subways connect Priestwood / Garth Ward to the Town Centre. As a result, the preferred solution would ideally remain in the confines of the existing road layout.

Figure A – Western Roundabout

Image source: Google Maps. Image taken from B3408 London Road; looking east.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
B3018 Binfield Road	0.51	1	7.86	0.54	2	10.24
Millennium Way	0.73	2	5.78	0.51	2	3.33
Bond Way	0.18	1	3.20	0.31	1	3.19
A3095 Skimped Hill Lane	0.53	2	4.48	0.64	2	5.54
B3408 Wokingham Road	0.60	2	5.04	0.80	4	11.38

4.4.26 As part of future improvement works associated with the Local Plan and through observations of traffic behaviour at this junction, Western Roundabout was identified for the introduction of traffic signal control on the Millennium Way, the A3095 Skimped Hill Lane and the B3408 Wokingham Road arms of the junction. This measure will help control the circulatory flow on the roundabout allowing all arms of the junction a better opportunity to release flow through the junction.

Figure B – Western Roundabout with concept mitigation

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
B3408 Wokingham Road Left Ahead	60.3%	6.4	77.3%	9.5
B3408 Wokingham Road Ahead	60.4%	6.4	77.3%	9.5
B3018 Binfield Road Left Ahead	34.3%	0.9	37.0%	1.3
B3018 Binfield Road Ahead	70.1%	3.1	76.6%	4.3
Millennium Way Left Ahead	48.3%	4.5	61.4%	6.6
Millennium Way Ahead	83.9%	11.4	61.5%	6.4
Bond Way Left Ahead	8. 9%	0.0	15.8%	0.1
Bond Way Ahead	8.0%	0.1	12.1%	0.3
A3095 Skimped Hill Lane Left Ahead	81.0%	8.0	55.0%	5.0
A3095 Skimped Hill Lane Ahead	75.6%	7.0	51.9%	4.6
MW Circ Ahead	29.9%	1.7	31.7%	2.1
MW Circ Right	81.8%	7.9	63.3%	3.7
SHL Circ Ahead	85.8%	10.2	71.7%	3.7
SHL Circ Right	9.4%	0.3	24.5%	1.2
WR Circ Ahead Right	35.5%	1.8	44.0%	3.3
WR Circ Right	68.9%	1.8	53.0%	2.2
Cycle Time (s)	45		46	
Practical Reserve Capacity (%)	4.9		16.5	
Total Delay (pcuHr)	30.25		26.56	

4.4.27 The junction is modelled to operate well with the proposed signals in the 2037 + BFLP scenario for both the AM and PM peak hours.

JUNCTION 8 - MET OFFICE ROUNDABOUT

4.4.28 The Met Office roundabout is situated to the east of the Town Centre at the intersection of the A329 London Road and the A3095 Church Road providing access to 'The Ring'. It forms a six arm, signal controlled gyratory with operating under UTMC. The traffic is loaded onto this junction mainly via Millennium Way, the A329 London Road and the A3095 Church Road.

4.4.29 There is no interaction between traffic and pedestrians/cyclists due to the subway network that runs through the centre of the roundabout.

Figure A – Met Office Roundabout

Image source: Google Maps. Image taken from A3095 Church Road; looking north.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
Circ@Weather Way Left	71.1%	6.7	49.4%	2.4
Circ@Weather Way Ahead Left	72.6%	4.7	47.3%	1.1
Circ@Weather Way Ahead	18.1%	3.0	20.3%	0.1
Weather Way Left U-Turn	3.1%	0.1	5.6%	0.2
Weather Way Left	1.7%	0.1	1.9%	0.1
Circ@Millennium Way Ahead	69.0%	1.0	55.6%	0.7
Circ@Millennium Way Right	23.1%	0.3	29.0%	0.6
Circ@Millennium Way Right	16.7%	0.1	26.8%	0.3
Millennium Way Ahead	52.4%	4.3	56.8%	4.6
Millennium Way Ahead	41.3%	4.0	47.0%	4.6
Circ@Warfield Road Ahead	37.4%	2.5	45.4%	3.0
Circ@Warfield Road Right	48.5%	2.2	48.3%	1.7
Circ@Warfield Road Right	38.4%	0.8	58.6%	1.7
Warfield Road Ahead Left	61.2%	4.2	58.3%	4.0
Circ@Park Road Ahead	70.7%	7.8	59.6%	3.0
Circ@Park Road Right Ahead	57.0%	4.4	59.1%	3.6

Circ@Park Road Right	40.7%	1.9	33.8%	3.6
Park Road Left	64.3%	5.8	54.9%	3.9
Circ@London Road Ahead	62.2%	6.3	40.6%	3.0
Circ@London Road Right Ahead	71.4%	2.2	54.5%	3.0
A329 London Road Left U-Turn	73.6%	6.6	57.8%	4.3
A329 London Road Left	58.2%	5.4	31.4%	2.2
Circ@Church Road Right Ahead	30.4%	1.4	17.0%	1.1
Circ@Church Road Right	71.2%	8.9	47.2%	1.1
Circ@Church Road Right	70.3%	7.3	34.0%	1.8
A3095 Church Road Ahead Left	43.8%	3.3	27.7%	1.7
A3095 Church Road Ahead	49.9%	4.2	51.3%	3.7
Cycle Time (s)	48		45	
Practical Reserve Capacity (%)	22.3		50.9	
Total Delay (pcuHr)	33.56		22.98	

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
Circ@Weather Way Left	44.7%	6.1	70.2%	4.7
Circ@Weather Way Ahead Left	72.3%	3.0	60.7%	0.5
Circ@Weather Way Ahead	7.3%	0.5	26.3%	0.0
Weather Way Left U-Turn	28.0%	1.4	42.6%	2.1
Weather Way Left	8.6%	0.4	7.9%	0.3
Circ@Millennium Way Ahead	83.9%	11.9	73.9%	1.6
Circ@Millennium Way Right	18.8%	1.9	34.3%	0.5
Circ@Millennium Way Right	3.5%	0.1	30.8%	0.4
Millennium Way Ahead	76.9%	10.2	72.9%	7.0
Millennium Way Ahead	60.9%	10.8	72.5%	8.5
Circ@Warfield Road Ahead	67.8%	11.8	68.4%	4.7
Circ@Warfield Road Right	46.5%	1.1	58.2%	2.1
Circ@Warfield Road Right	65.6%	1.0	70.4%	1.0
Warfield Road Ahead Left	73.2%	9.9	73.1%	5.3
Circ@Park Road Ahead	64.6%	11.1	57.5%	1.4
Circ@Park Road Right Ahead	48.0%	8.3	70.0%	5.4
Circ@Park Road Right	56.8%	8.9	28.4%	1.7
Park Road Left	76.4%	10.6	50.6%	3.0
Circ@London Road Ahead	61.8%	5.6	70.7%	3.5
Circ@London Road Right Ahead	86.3%	10.4	54.3%	2.8
A329 London Road Left U-Turn	85.6%	13.4	63.6%	5.1
A329 London Road Left	80.2%	13.7	50.6%	4.3
Circ@Church Road Right Ahead	71.1%	11.3	24.0%	0.7
Circ@Church Road Right	80.2%	12.1	56.5%	5.3
Circ@Church Road Right	72.1%	13.3	40.4%	4.6
A3095 Church Road Ahead Left	48.0%	6.2	65.1%	4.4
A3095 Church Road Ahead	64.3%	8.9	63.7%	4.7
Cycle Time (s)	76		43	
Practical Reserve Capacity (%)	4.3		21.9	
Total Delay (pcuHr)	61.19		32.45	

4.4.30 This junction is modelled to be operating with reserve capacity in both the AM and PM peaks, but with some queuing on the main circulatory carriageways. As noted, this does not take account of the effect of UTMC on the junction which will cause the junction to operate far more

efficiently. In the 2037 + BFLP scenario, the junction is predicted to continue to operate within capacity.

JUNCTION 9 - EASTERN ROAD ROUNDABOUT

4.4.31 This is a conventional four arm roundabout, with the main through route being the A329 London Road East and West. The two feeder arms, Bay Road and Eastern Road, are single carriageway roads serving the local residential area and the Eastern Industrial Area respectively.

4.4.32 The junction benefits from pedestrian and cycle-free traffic with subways providing a safe way of negotiating the junction for all road users.

Figure A – Eastern Road Roundabout

Image source: Google Maps. Image taken from A329 London Road; looking east.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Bay Road	0.26	1	4.46	0.21	1	3.17
A329 London Road East	0.64	2	5.05	0.46	1	3.11
Eastern Road	0.08	1	4.83	0.14	1	4.20
A329 London Road West	0.41	1	2.88	0.09	1	1.91

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Bay Road	0.63	2	8.89	0.80	4	20.79
A329 London Road East	0.79	4	9.93	0.61	2	4.66
Eastern Road	0.21	1	7.47	0.25	1	5.98
A329 London Road West	0.42	1	3.17	0.70	3	6.14

4.4.33 This junction is modelled to operate within capacity for the AM and PM peak hours in both the 2019 base and 2037 + BFLP scenarios.

JUNCTION 10 - RUNNING HORSE ROUNDABOUT

4.4.34 Located to the east of the Town Centre, this junction is at the intersection of the A329 London Road / Lily Hill Road / Broad Lane.

4.4.35 Pedestrian/cycle subway facilities run through the central island of the roundabout and around its periphery.

Figure A – Running Horse Roundabout Existing

Image source: Google Maps. Image taken from A329 London Road; looking east.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Lily Hill Drive	0.25	1	4.81	0.33	1	7.01
A329 London Road East	0.56	2	5.30	0.47	1	4.89
Broad Lane	0.93	10	41.26	0.61	2	7.50
A329 London Road West	0.41	1	3.30	0.66	2	5.55

4.4.36 This junction is predicted to operate within capacity for the AM and PM peak hours apart from the Broad Lane arm in the AM peak, which is modelled to operate over capacity with increasing queue levels.

4.4.37 Due to the subways surrounding the junction, improvement options are limited or very costly. An option for improvement would be to work with the existing junction layout and add signalisation at key points on the junction, specifically the A329 London Road which would allow vehicles approaching from the side roads of Broad Lane and Lily Hill Drive more opportunity use the junction with a lower level of delay, therefore reducing queue levels. Also introduced would be spiral markings around the roundabout to route vehicles.

Figure B – Running Horse Roundabout with concept mitigation

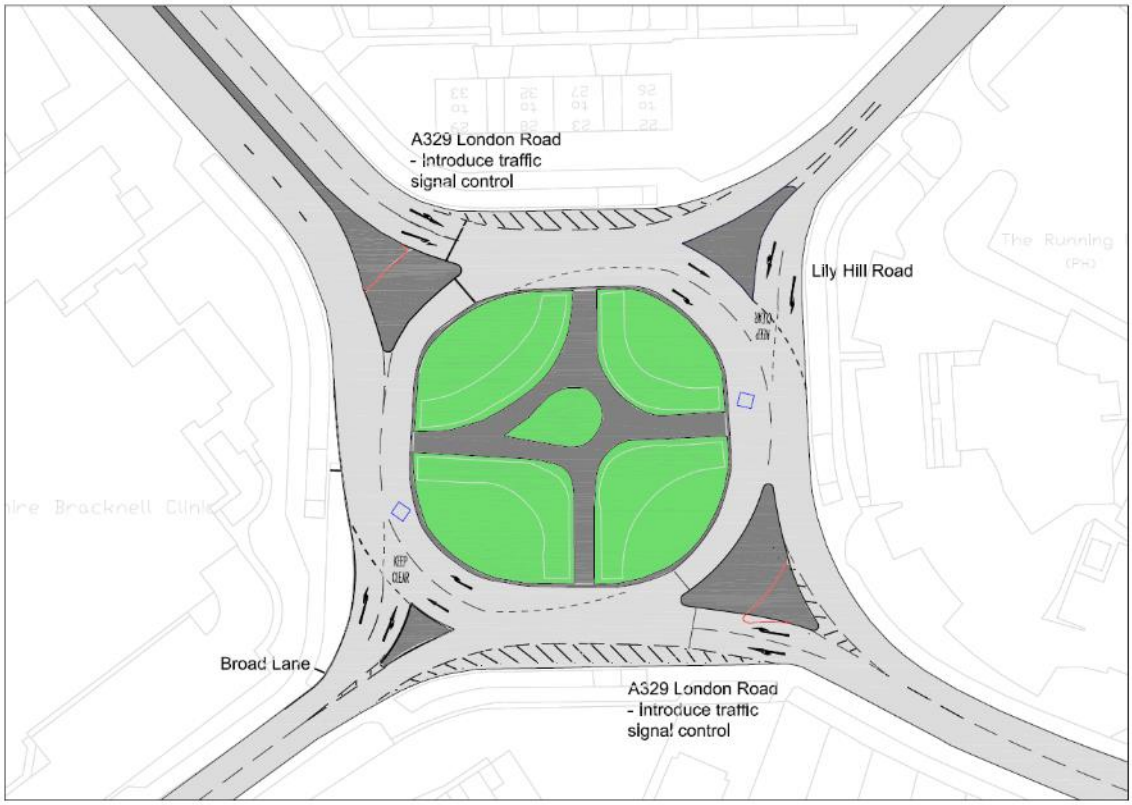


Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
A329 London Road E Ahead Left	73.9%	8.2	88.5%	15.1
A329 London Road E Ahead	0.7%	0.0	0.1%	0.0
Broad Lane Left	83.3%	6.3	62.9%	0.8
Broad Lane Ahead	50.8%	0.5	26.7%	0.2
A329 London Road W Ahead Left	51.4%	4.1	61.0%	7.8
A329 London Road W Ahead	25.9%	1.7	43.7%	4.6
Lily Hill Drive Ahead Left	18.3%	0.1	16.8%	0.4
LRE Circ Right Ahead	70.1%	4.7	85.9%	12.5
LRW Circ Right Ahead	54.9%	4.2	54.8%	3.6
Cycle Time (s)	40		56	
Practical Reserve Capacity (%)	8.1		1.7	
Total Delay (pcuHr)	12.09		17.92	

4.4.38 In the 2037 + BFLP scenario, the junction is predicted to operate within capacity for the AM and PM peak hours. The operation would be further improved and made more efficient using UTMC.

JUNCTION 11 - MARTINS HERON SIGNALISED JUNCTION

4.4.39 In February 2019, the roundabout at the intersection of the A329 London Road / Long Hill Road / New Forest Ride was replaced with a four-arm signal-controlled junction running under UTMC.

4.4.40 Due to land constraints and the volume of traffic moving across the junction, each arm operates under its own stage with pedestrian / cycle facilities located on the London Road Eastbound arm of the junction.

Figure A – Martins Heron Signalised Junction

Image source: Google Maps. Image taken from A329 London Road; looking east.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
Long Hill Road Left Ahead Right	61.4%	3.8	72.5%	6.1
A329 London Rd WB Left Ahead	71.2%	7.5	72.5%	10.4
A329 London Rd WB Right Ahead	67.0%	7.1	68.4%	10.1
New Forest Ride Ahead Left	70.9%	5.7	75.0%	6.1
New Forest Ride Right	38.3%	3.5	50.7%	3.9
A329 London Rd EB Ahead Left	71.3%	5.7	74.0%	9.0
A329 London Rd EB Ahead Right	66.9%	5.4	70.7%	8.8
Cycle Time (s)	76		90	
Practical Reserve Capacity (%)	26.2		19.9	
Total Delay (pcuHr)	22.90		30.12	

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
A329 Long Hill Road Left Ahead Right	65.7%	4.7	84.6%	8.3
A329 London Rd WB Left Ahead	68.7%	9.3	81.6%	13.5
A329 London Rd WB Right Ahead	64.2%	9.0	76.1%	12.6
New Forest Ride Ahead Left	68.6%	6.4	81.9%	8.1
New Forest Ride Right	44.1%	4.5	56.7%	4.8
A329 London Rd EB Ahead Left	71.2%	8.2	82.7%	10.7
A329 London Rd EB Ahead Right	66.9%	7.9	78.7%	10.1
Cycle Time (s)	90		90	
Practical Reserve Capacity (%)	263..4		6.3	
Total Delay (pcuHr)	26.86		38.15	

4.4.41 This junction is modelled to be operating with reserve capacity in both the AM and PM peaks, but with some queuing on all approaches. As noted, this does not take account of the effect of UTMC on the junction which will cause the junction to operate far more efficiently. In the 2037 + BFLP scenario, the junction is predicted to continue to operate within capacity.

JUNCTION 12 - SWINLEY ROAD / PRIORY ROAD JUNCTION

4.4.42 This is a four arm, signal controlled junction. The main road, the A329 London Road, has two lane approaches from both the east and west direction providing dedicated right turn lanes into both the B3017 Swinley Road and the B3017 Priory Road

4.4.43 Pedestrians as well as cyclists benefit from signalised crossing facilities on the B3017 Priory Road and a signalised pedestrian facility on the western approach of the A329 London Road.

Figure A – Swinley Road / Priory Road

Image source: Google Maps. Image taken from A329 London Road; looking east.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
A329 London Road West	51.7%	7.3	62.3%	11.5
B3017 Priory Road Right	66.8%	8.5	46.1%	5.1
A329 London Road East	66.3%	12.3	75.6%	15.9
B3017 Swinley Road	61.0%	7.3	76.0%	10.4
Cycle Time (s)	90		90	
Practical Reserve Capacity (%)	34.7		18.4	
Total Delay (pcuHr)	13.96		15.78	

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
A329 London Road West	84.1%	25.9	67.0%	13.7
B3017 Priory Road Right	77.0%	16.6	86.3%	13.2
A329 London Road East	89.5%	30.1	86.7%	22.9
B3017 Swinley Road	88.4%	12.8	81.2%	11.8
Cycle Time (s)	119		90	
Practical Reserve Capacity (%)	0.6		3.8	
Total Delay (pcuHr)	32.56		24.21	

4.4.44 This junction is modelled to be operating with reserve capacity in both the AM and PM peaks, but with some queuing on all approaches. As noted, this does not take account of the effect of UTMC on the junction which will cause the junction to operate far more efficiently. In the 2037 + BFLP scenario, the junction is predicted to continue to operate within capacity.

JUNCTION 13 - FERNBANK ROAD JUNCTION

4.4.45 This is a conventional signalised 'T' junction with Fernbank Road being the minor arm. The eastern approach of the A329 London Road has a dedicated right turn lane turning into Fernbank Road, whilst the A329 London Road West is a two-lane approach catering for the left turns in the left hand lane.

4.4.46 Pedestrians as well as cyclists benefit from a signalised crossing facility on Fernbank Road and a signalised pedestrian facility on the A329 London Road western approach.

Figure A – London Road / Fernbank Road

Image source: Google Maps. Image taken from A329 London Road; looking east.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
A329 London Road West Left Ahead	58.7%	3.9	57.2%	5.5
Fernbank Road Left	15.4%	0.9	24.1%	1.1
Fernbank Road Right	59.0%	4.6	67.8%	4.4
A329 London Road East Ahead Right	53.7%	4.6	67.0%	7.2
Cycle Time (s)	50		50	
Practical Reserve Capacity (%)	52.6		32.7	
Total Delay (pcuHr)	7.56		9.12	

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
A329 London Road West Left Ahead	82.1%	7.9	58.2%	5.1
Fernbank Road Left	7.9%	0.4	32.6%	1.3
Fernbank Road Right	83.3%	7.1	71.3%	3.9
A329 London Road East Ahead Right	62.4%	5.9	76.5%	8.9
Cycle Time (s)	45		45	
Practical Reserve Capacity (%)	8.0		17.6	
Total Delay (pcuHr)	12.57		9.74	

4.4.47 This junction is modelled to operate within capacity for the AM and PM peak hours in both the 2019 base and 2037 + BFLP scenarios.

4.5 JOURNEY TIME ROUTES 5 & 6

4.5.1 Journey time Route 5 runs from the Marshall Road / Raeburn Way Roundabout, College Town to the junction of Binfield Road / Forest Road via the A3095 and A329. Journey time Route 6 is the reverse of this route

Table A – Routes 5 & 6 Journey Time Summary

Route	AM Peak Journey Time Route	2019 AM Base	2037 AM No BFLP	2037 AM BFLP	2037 AM BFLP Mit	2037 AM BFLP Mit + UTMC*
		Min:Sec	Min:Sec	Min:Sec	Min:Sec	Min:Sec
5	Marshall Road to Binfield Road	19:34	19:41	20:53	20:54	19:33
6	Binfield Road to Marshall Road	17:53	19:17	20:53	20:40	18:55
Route	**PM Peak Journey Time Route**	**2019 PM Base**	**2037 PM No BFLP**	**2037 PM BFLP**	**2037 PM BFLP Mit**	**2037 PM BFLP Mit + UTMC***
		Min:Sec	Min:Sec	Min:Sec	Min:Sec	Min:Sec
5	Marshall Road to Binfield Road	19:02	19:31	21:49	21:49	20:30
6	Binfield Road to Marshall Road	18:14	19:27	24:26	22:01	20:11

*The final column considers the impact of the added benefits of UTMC if this were to reduce delays at signals by just 12%. This is a most conservative estimate, as studies elsewhere have shown such systems can typically achieve between 12 – 27% reductions.

4.5.2 On Routes 5 and 6, the changes in overall journey times between 2019 and 2037 with BFLP are largely as expected and reflect the increase in travel demand that is predicted over that period.

4.5.3 The introduction of various mitigation schemes around the borough will always result in some movement of demand elsewhere as some routes become more or less attractive. This is reflected in the modest changes seen here when the schemes are introduced.

4.5.4 In the separate speed limit reduction sensitivity test detailed in paragraph 4.1.7, the recorded journey times in the AM peak were 19:59 for Route 5 and 19:46 for Route 6. In the PM peak, the recorded journey times were 20:51 for Route 5 and 20:56 for Route 6.

4.5.5 As mentioned above, the strategic model does not show the impact of additional network improvements such as UTMC. This has been demonstrated elsewhere to offer reductions in delays at signals of between 12 – 27%. Even the lowest value in this range of just 12% would see the 'with mitigation' times above fall below those for the 2037 BFLP scenario.

4.5.6 So, on this particular route we can expect journey time reductions in both peaks and directions following the introduction of mitigation schemes and UTMC.

JUNCTION 1 - RAEBURN WAY ROUNDABOUT

4.5.7 This junction takes the form of a standard four-arm roundabout and is sited at the intersection of A321 Marshall Road / Raeburn Way / Access to Shepherd Meadows Car Park.

4.5.8 Raeburn Way and the car park access are each single carriageway approaches flaring at the entry to the roundabout and the A321 Marshall Road East is a single carriageway approach flaring to two lanes at the entry to the roundabout. The A321 Marshall Road West, on the other hand, houses a toucan crossing on the approach to the junction, resulting in a two-lane approach to the roundabout.

4.5.9 This junction has been modelled using turning flows from the 2019 base transport model.

Figure A – Raeburn Way Roundabout

Image source: Google Maps. Image taken from A321 Marshall Road; looking north.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
A321 Marshall Road West	0.81	5	10.74	0.66	2	6.33
Raeburn Way	0.32	1	11.75	0.23	1	7.37
A321 Marshall Road East	0.57	2	6.17	0.97	17	47.24
Car Park	0.00	0	0	0.00	0	0

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
A321 Marshall Road West	0.94	13	28.39	0.69	3	6.76
Raeburn Way	0.44	1	18.78	0.24	1	7.95
A321 Marshall Road East	0.56	2	6.23	1.02	34	83.29
Car Park	0.00	0	0.00	0.00	0	0

4.5.10 This junction is modelled to operate within capacity for the AM peak hour, but over capacity in the PM peak hour in the 2019 base scenario on the A321 Marshall Road East arm of the junction.

4.5.11 The 2037 + BFLP scenario operates over capacity on the A321 Marshall Road West and East in the AM and PM peak hours respectively.

4.5.12 To mitigate against this, it is proposed to introduce additional capacity at the junction through minor flare increases on both the Marshall Road West and Marshall Road East arms of the junction reduce queuing and delay.

4.5.13 The existing kerb line is indicated on Figure B in red.

Figure B - Raeburn Way Roundabout with concept mitigation

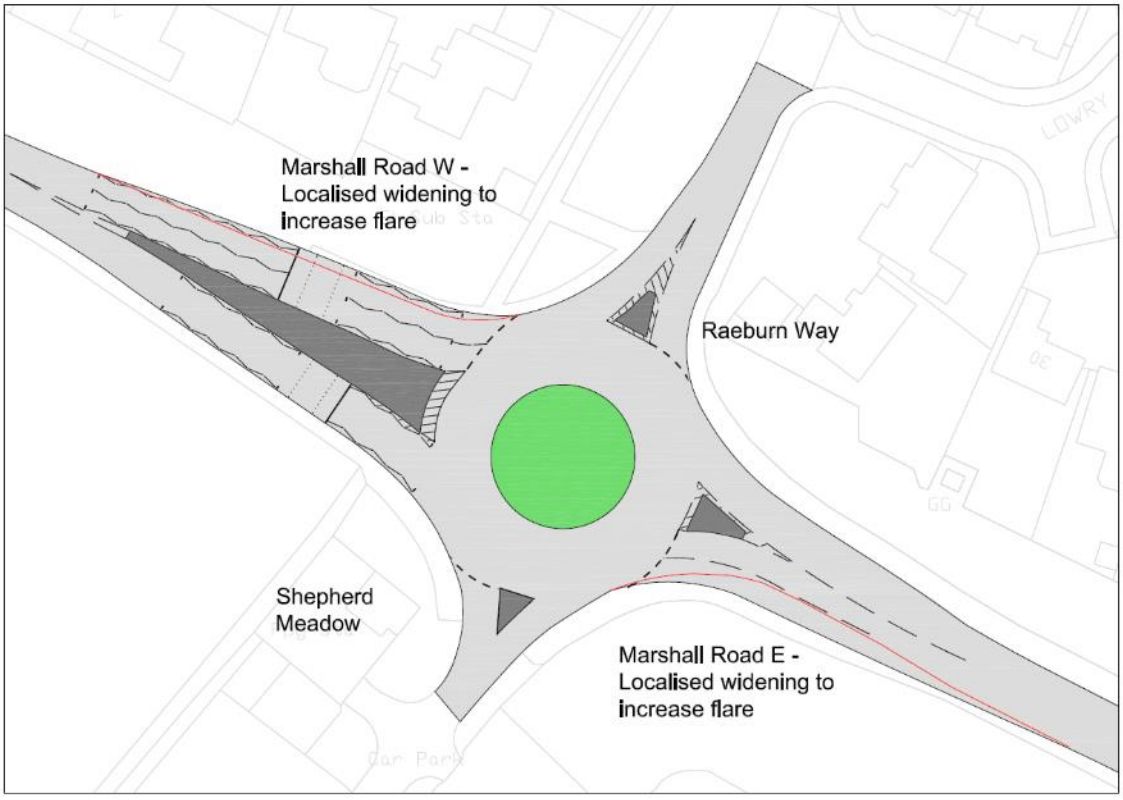


Table C – 2037 + BFLP + Modelling Outputs with concept improvements

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
A321 Marshall Road West	0.77	4	7.14	0.56	2	3.94
Raeburn Way	0.44	1	19.08	0.24	1	7.95
A321 Marshall Road East	0.44	1	3.69	0.78	4	9.44
Car Park	0.00	0	0.00	0.00	0	0.00

4.5.14 The introduction of the mitigation measure has brought the junction within capacity.

JUNCTION 2 - RACKSTRAW JUNCTION

4.5.16 This junction sits at the intersection of the A3095 Rackstraw Road / Yorktown Road / A321 Marshall Road and takes the form of a large four-armed signalised junction.

4.5.17 Dedicated right turn facilities are provided on the A3095 Rackstraw Road and Yorktown Road West, however the right turn movement from the A321 Marshall Road to Yorktown Road East is banned. Yorktown Road East provides two lanes allowing for left / straight ahead and right / straight ahead respectively.

4.5.18 Pedestrian / cycle facilities can be found on all arms apart from Yorktown Road East.

Figure A – Rackstraw Road Signals

Image source: Google Maps. Image taken from A321 Marshall Road; looking north.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
Yorktown Road West Left Ahead	82.2%	18.2	90.7%	20.9
Yorktown Road West Right	74.7%	16.4	44.4%	7.9
A3095 Rackstraw Road North Left Ahead	76.9%	18.5	65.8%	14.2
A3095 Rackstraw Road North Ahead	73.8%	18.6	62.1%	14.0
A3095 Rackstraw Road North Right	80.1%	11.8	85.9%	9.6
Yorktown Road East Left	1.1%	0.1	3.4%	0.3
Yorktown Road East Ahead Right	79.7%	9.2	91.4%	15.4
A321 Marshall Road Left	31.4%	6.1	43.2%	9.1
A321 Marshall Road Ahead	83.6%	10.0	91.6%	15.9
A321 Marshall Road Ahead	83.6%	10.0	91.4%	15.8
A321 Marshall Road Southbound	43.2%	16.4	30.2%	7.9
A321 Marshall Road Southbound	33.3%	18.7	26.8%	14.0
Cycle Time (s)	120		120	
Practical Reserve Capacity (%)	7.6		-1.8	
Total Delay (pcuHr)	53.51		59.56	

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
Yorktown Road West Left Ahead	85.9%	17.4	87.5%	18.3
Yorktown Road West Right	84.3%	17.8	84.6%	18.0
A3095 Rackstraw Road North Left Ahead	88.5%	21.7	57.9%	12.1
A3095 Rackstraw Road North Ahead	87.5%	22.3	54.5%	12.0
A3095 Rackstraw Road North Right	72.6%	7.8	83.7%	9.5
Yorktown Road East Left	0.8%	0.1	0.0%	0.0
Yorktown Road East Ahead Right	85.5%	9.0	88.3%	13.0
A321 Marshall Road Left	43.6%	8.2	52.7%	11.8
A321 Marshall Road Ahead	49.3%	4.7	87.9%	14.7
A321 Marshall Road Ahead	49.3%	4.7	87.6%	14.7
A321 Marshall Road Southbound	85.9%	17.4	87.5%	18.3
A321 Marshall Road Southbound	84.3%	17.8	84.6%	18.0
Cycle Time (s)	106		118	
Practical Reserve Capacity (%)	1.7		1.9	
Total Delay (pcuHr)	52.54		58.10	

4.5.19 This junction is modelled to be operating with reserve capacity in the AM peak, but marginally over capacity in the PM peak with some queuing on all approaches. As noted, this does not take account of the effect of UTMC on the junction which will cause the junction to operate far more efficiently.

4.5.20 In the 2037 + BFLP scenario, the junction is forecast to operate within capacity, albeit with queuing on all approaches.

JUNCTION 3 - OWLSMOOR ROAD / EVENLODE WAY ROUNDABOUT

4.5.21 This junction takes the form of a standard four-arm roundabout and is sited at the intersection of the A3095 Rackstraw Road / Owlsmoor Road / Evenlode Way. Each arm is a single carriageway approach flaring to two lanes at their respective entry points onto the roundabout.

4.5.22 This junction has been modelled using turning flows from the 2019 base transport model.

Figure A - Evenlode Way Roundabout

Image source: Google Maps. Image taken from Evenlode Way; looking east.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
A3095 Rackstraw Road North	0.79	4	13.27	0.64	2	8.02
Owlsmoor Road	0.48	1	9.15	0.40	1	6.77
A3095 Rackstraw Road South	0.50	1	4.27	0.77	4	9.76
Evenlode Way	0.39	1	6.55	0.40	1	7.75

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
A3095 Rackstraw Road North	0.93	12	35.09	0.67	2	8.57
Owlsmoor Road	0.57	2	12.86	0.36	1	6.47
A3095 Rackstraw Road South	0.48	1	4.18	0.80	4	10.82
Evenlode Way	0.39	1	6.37	0.41	1	8.24

4.5.23 This junction is modelled to operate within capacity for both the AM and PM peak hours in the 2019 base scenario.

4.5.24 The 2037 scenario exceeds capacity in the AM peak hour. To mitigate against this a minor capacity improvement is to be introduced on Rackstraw Road North. This measure will reduce the level of queuing at the junction with only a minor modification to the current layout of the junction.

4.5.25 The existing kerb line is indicated on Figure B in red.

Figure B - Evenlode Way Roundabout with concept mitigation

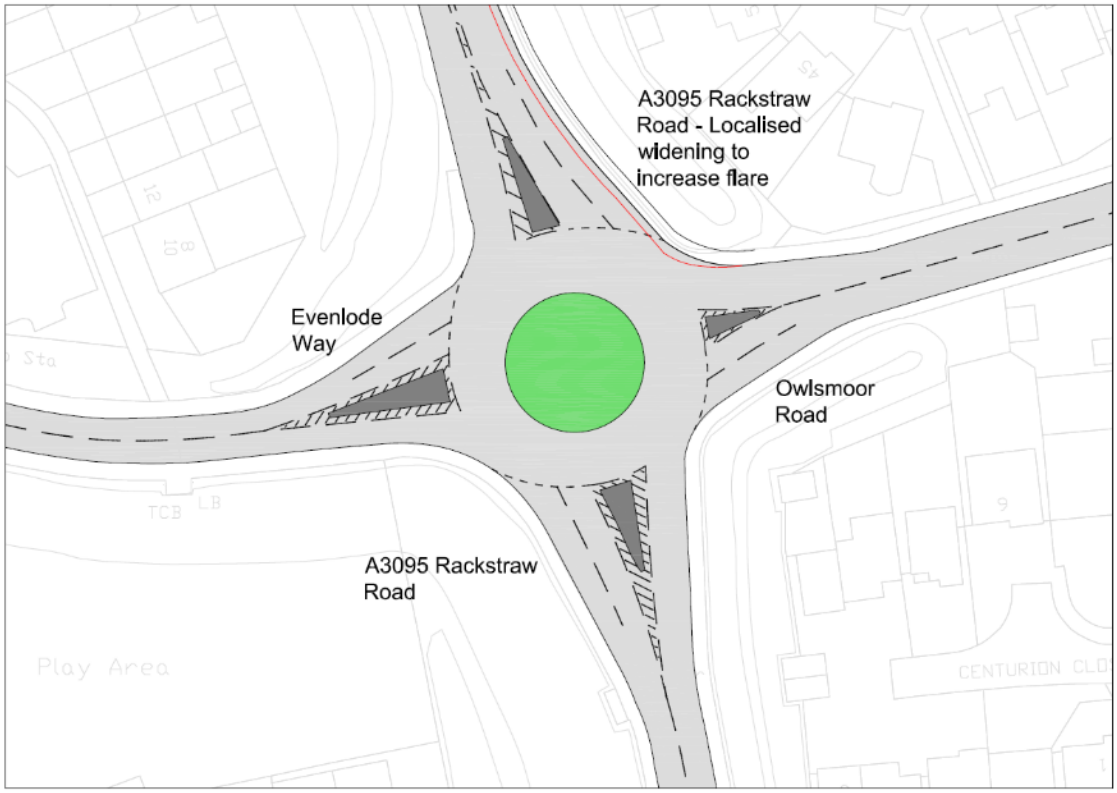


Table C – 2037 + BFLP + Modelling Outputs with concept improvements

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
A3095 Rackstraw Road North	0.83	5	14.64	0.59	2	6.23
Owlsmoor Road	0.57	2	13.01	0.36	1	6.47
A3095 Rackstraw Road South	0.48	1	4.18	0.80	4	10.82
Evenlode Way	0.39	1	6.37	0.41	1	8.24

4.5.26 By increasing the flare length on the Rackstraw Road North arm, the junction now is modelled to operate within capacity.

JUNCTION 4 - ABINGDON ROAD ROUNDABOUT

4.5.27 This junction takes the form of a standard four-arm roundabout and is sited at the intersection of the A3095 Rackstraw Road / Acacia Avenue / Abingdon Road. Each arm is a single carriageway approach flaring to two lanes at their respective entry points on to the roundabout.

4.5.28 This junction has been modelled using turning flows from the 2019 base transport model.

Figure A – Abingdon Road Roundabout

Image source: Google Maps. Image taken from Abingdon Road; looking east.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
A3095 Rackstraw Road North	0.58	2	6.35	0.65	2	7.65
Acacia Avenue	0.41	1	7.39	0.17	1	5.02
A3095 Rackstraw Road South	0.39	1	4.51	0.48	1	5.17
Abingdon Road	0.07	1	3.76	0.05	1	3.77

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
A3095 Rackstraw Road North	0.73	3	9.88	0.67	2	8.04
Acacia Avenue	0.46	1	9.46	0.17	1	5.24
A3095 Rackstraw Road South	0.38	1	4.49	0.52	2	5.74
Abingdon Road	0.07	1	3.72	0.05	1	3.94

4.5.29 This junction is modelled to operate within capacity for the AM and PM peak hours in both the 2019 base and 2037 + BFLP scenarios.

JUNCTION 5 - OWLSMOOR ROAD JUNCTION

4.5.30 Constructed in 2019, this junction operates as a three-arm signalised junction at the junction of the A3095 Rackstraw Road and Owlsmoor Road. There is a dedicated right turn lane into Owlsmoor Road from Rackstraw Road West.

4.5.31 At the same time, a formal pedestrian and cycle crossing was provided to allow access between the Owlsmoor development and South Road to replace the previous uncontrolled crossing point across the high-speed A3095 Rackstraw Road.

Figure A – Owlsmoor Road Signals

Image source: Google Maps. Image taken from A3095 Rackstraw Road; looking west.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
A3095 Rackstraw Road West Ahead Right	50.6%	8.7	56.5%	10.4
A3095 Rackstraw Road East Ahead Left	76.1%	18.6	88.1%	27.1
Owlsmoor Road Left Right	70.0%	4.1	44.4%	2.2
Cycle Time (s)	90		90	
Practical Reserve Capacity (%)	18.3		2.2	
Total Delay (pcuHr)	9.21		11.48	

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
A3095 Rackstraw Road West Ahead Right	45.2%	9.0	55.2	11.3
A3095 Rackstraw Road East Ahead Left	88.6%	32.8	87.9%	29.3
Owlsmoor Road Left Right	84.6%	9.2	81.3%	7.6
Cycle Time (s)	110		101	
Practical Reserve Capacity (%)	1.6		2.4	
Total Delay (pcuHr)	16.21		15.26	

4.5.32 This junction is modelled to be operating with reserve capacity in both the AM and PM peaks, but with some queuing on all approaches. As noted, this does not take account of the effect of UTMC on the junction which will cause it to operate far more efficiently. In the 2037 + BFLP scenario, the junction is predicted to continue operating within capacity with some level of queuing on the approaches.

JUNCTION 6 - MAGDALENE ROAD ROUNDABOUT

4.5.33 This junction is sited at the intersection of A3095 Foresters Way / Magdalene Road / A3095 Rackstraw Road. It takes the form of a standard three-arm roundabout with two-lane flared entries on each arm.

4.5.34 The main thoroughfare is the A3095 Foresters Way to the A3095 Rackstraw Road and vice versa, whilst Magdalene Road serves as the access road to an isolated parcel of the Owlsmoor residential development.

4.5.35 This junction has been modelled using turning flows from the 2019 base transport model.

Figure A – Magdalene Road Roundabout

Image source: Google Maps. Image taken from A3095 Rackstraw Road; looking north.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
A3095 Foresters Way	0.52	2	4.49	0.72	3	7.79
Magdelene Road	0.30	1	5.70	0.11	1	5.37
A3095 Rackstraw Road	0.49	1	4.11	0.46	1	3.79

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
A3095 Foresters Way	0.65	2	6.14	0.74	3	8.46
Magdelene Road	0.35	1	7.22	0.12	1	5.62
A3095 Rackstraw Road	0.50	1	4.19	0.54	2	4.43

4.5.36 This junction is modelled to operate within capacity for the AM and PM peak hours in both the 2019 base and 2037 + BFLP scenarios.

JUNCTION 7 - THE BROADMOOR DEVELOPMENT ACCESS ROUNDABOUT

4.5.37 This junction was constructed to provide access to the new Broadmoor development from the A3095 Foresters Way.

4.5.38 It is a three-armed roundabout located where the A3095 Foresters Way meets Joshua Jebb Way. The A3095 Foresters Way arms of the junction have flared two lane entries, whilst Joshua Jebb Way joins the junction as a wide single lane entry.

4.5.39 This junction has been modelled using turning flows from the 2019 base transport model.

Figure A – Broadmoor Development Roundabout

Image source: Google Maps. Image taken from A3095 Foresters Way; looking south.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
A3095 Foresters Road North	0.49	1	4.00	0.66	2	5.97
A3095 Foresters Road South	0.43	1	3.17	0.35	1	2.79
Joshua Jebb Way	0.00	0	0.00	0.02	0	4.10

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
A3095 Foresters Road North	0.60	2	5.20	0.67	3	6.28
A3095 Foresters Road South	0.43	1	3.17	0.42	1	3.12
Joshua Jebb Way	0.03	0	4.48	0.04	0	4.48

4.5.40 This junction is modelled to operate within capacity for the AM and PM peak hours in both the 2019 base and 2037 + BFLP scenarios.

JUNCTION 8 - FORESTERS ROUNDABOUT

4.5.41 The junction of the B3348 Bracknell Road / A3095 Foresters Way takes the form of a standard roundabout with an associated jet lane that allows south-west to north movements from the B3348 Bracknell Road to the A3095 Foresters Way. A fourth arm provides access to a small parking area for visitors to Swinley Forest.

Figure A – B3348 Bracknell Road / A3095 Foresters Way

Image source: Google Maps. Image taken from A3095 Foresters Way; looking north.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
A3095 Foresters Road North	0.57	2	3.18	0.70	3	4.59
Minor Access Road	0.04	1	15.38	0.34	1	85.94
A3095 Foresters Road South	0.64	2	7.15	0.54	2	5.80
B3348 Bracknell Road	0.20	1	4.50	0.54	2	7.10

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
A3095 Foresters Road North	0.59	2	3.32	0.71	3	4.55
Minor Access Road	0.00	0	0.00	0.00	0	0.00
A3095 Foresters Road South	0.59	2	6.32	0.65	2	7.96
B3348 Bracknell Road	0.19	1	4.18	0.15	1	4.25

4.5.42 This junction is modelled to operate within capacity for the AM and PM peak hours in both the 2019 base and 2037 + BFLP scenarios.

JUNCTION 9 - GOLDEN RETRIEVER ROUNDABOUT

4.5.43 This is currently a large four arm standard roundabout with a signalised pedestrian crossing on the B3430 Nine Mile Ride West arm. This junction suffers congestion in the northbound direction from the south and from the B3430 Nine Mile Ride East.

Figure A – Golden Retriever Roundabout

Image source: Google Maps. Image taken from A3095 Foresters Way; looking north.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
A3095 Crowthorne Road	0.84	6	14.19	0.94	13	33.63
B3430 Nine Mile Ride East	0.76	4	14.94	0.89	7	35.64
A3095 Foresters Way	0.76	4	7.06	0.56	2	3.84
B3430 Nine Mile Ride West	0.65	2	9.79	0.55	2	5.87

4.5.44 The junction is modelled to operate over capacity in the 2019 PM scenario, therefore as part of improvements to the A3095 corridor this junction is being upgraded to a fully signalised crossroads. This will provide additional control and capacity enabling a reduction to queuing

and delay, and will also have the added benefit of the introduction of UTMC to provide further control at the new junction.

Figure B Golden Retriever junction improvement (implementation 2021)

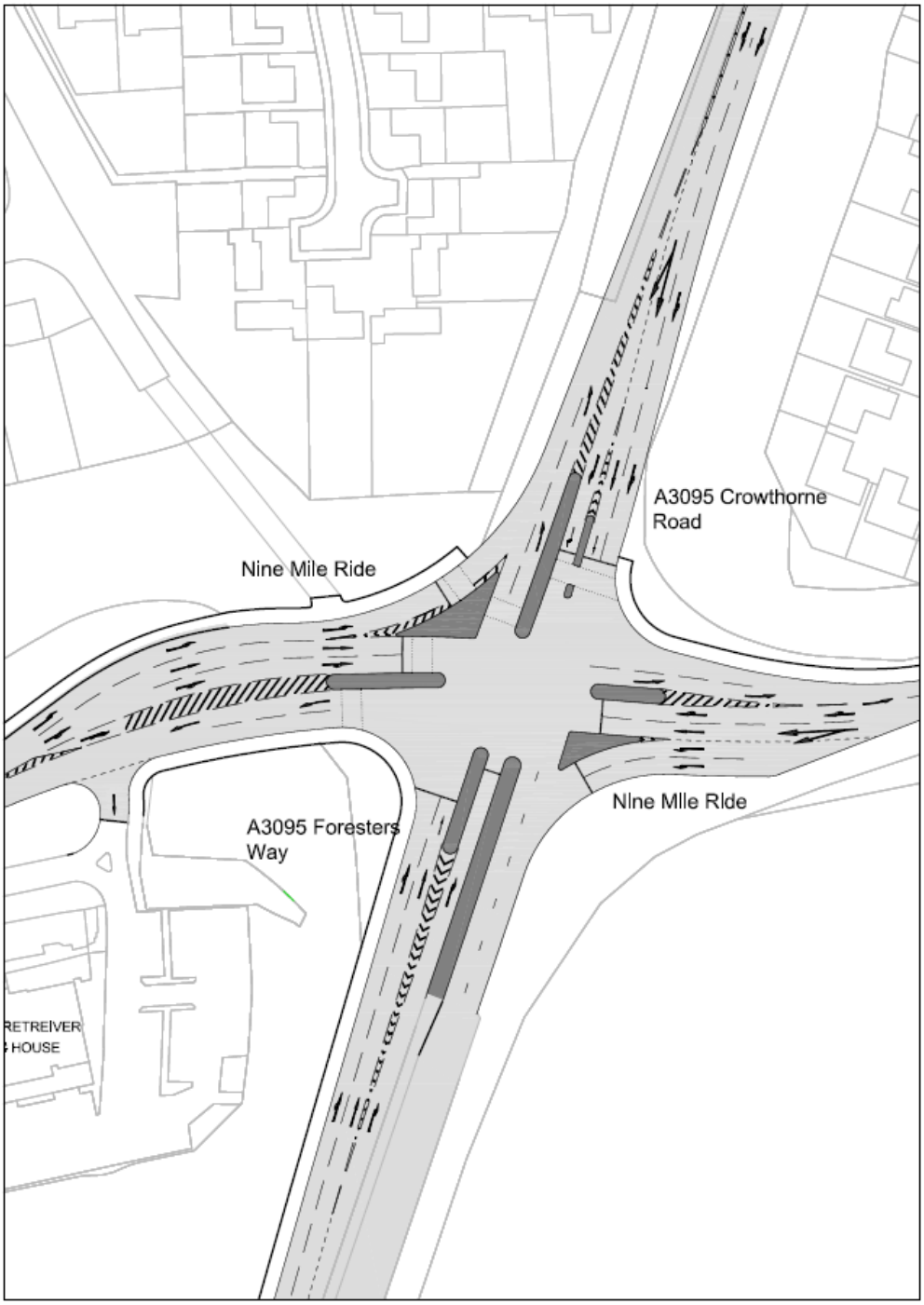


Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
A3095 (N) Left Ahead	A3095 (N) Left Ahead	67.6%	78.3%	11.9
A3095 (N) Ahead Right	A3095 (N) Ahead Right	83.3%	81.9%	12.5
B3430 Nine Mile Ride (E) Left	Nine Mile Ride (E) Left	31.6%	38.3%	3.0
B3430 Nine Mile Ride (E) Ahead	Nine Mile Ride (E) Ahead	73.4%	57.6%	3.2
B3430 Nine Mile Ride (E) Right Ahead	Nine Mile Ride (E) Right Ahead	73.0%	57.7%	3.2
A3095 (S) Ahead Left	A3095 (S) Ahead Left	80.5%	72.4%	10.5
A3095 (S) Ahead Right	A3095 (S) Ahead Right	84.6%	70.5%	11.6
B3430 Nine Mile Ride (W) Left	Nine Mile Ride (W) Left	73.9%	65.8%	4.6
B3430 Nine Mile Ride (W) Ahead Right	Nine Mile Ride (W) Ahead Right	67.8%	79.6%	5.3
Cycle Time (s)	77		68	
Practical Reserve Capacity (%)	6.4		9.9	
Total Delay (pcuHr)	39.86		35.00	

JUNCTION 10 - HANWORTH ROUNDABOUT

4.5.45 At the time of model construction, this junction operated as a partially signalised standard five arm roundabout at the intersection of South Hill Road / Hanworth Road / A3095 Crowthorne Road / Great Hollands Road / A3095 Mill Lane. The Hanworth Road and Crowthorne Road arms of the roundabout are signal controlled during peak hours only.

Figure A – Hanworth Roundabout

Image source: Google Maps. Image taken from A3095 Crowthorne Road; looking north.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
A3095 Mill Lane Ahead Left	53.0%	0.6	42.6%	0.7
A3095 Mill Lane Ahead	42.4%	0.4	49.7%	1.0
South Hill Rd Ahead Left	78.3%	3.0	53.7%	0.8
Hanworth Rd Circ Ahead	65.0%	6.4	68.5%	9.4
Hanworth Rd Circ Right Ahead	65.0%	6.8	42.8%	4.1
Hanworth Rd Circ Right	20.1%	1.5	1.5%	0.1
Hanworth Rd Ahead	70.8%	7.4	66.1%	5.4
Hanworth Rd Ahead	62.5%	6.2	48.8%	3.5
Crowthorne Rd Circ Ahead	31.9%	2.1	23.5%	2.2
Crowthorne Rd Circ Right	58.2%	5.1	1.5%	0.1
Crowthorne Rd Circ Right	70.8%	6.7	24.0%	1.7
A3095 Crowthorne Rd Ahead Left	75.6%	9.1	75.8%	6.6
A3095 Crowthorne Rd Ahead	72.6%	8.4	77.8%	6.6
Great Hollands Rd Ahead Left	76.2%	3.4	57.8%	3.1
Great Hollands Rd Ahead	48.6%	1.5	79.0%	6.1
Cycle Time (s)	50		51	
Practical Reserve Capacity (%)	14.9		13.9	
Total Delay (pcuHr)	27.87		22.53	

4.5.46 Whilst operating within capacity for the 2019 scenario, previous studies have identified issues with capacity at this junction. Therefore, as part of the improvements to the A3095 corridor, junction works are underway to help maintain consistent journey times along the corridor. The improvements to the junction are to signalise all arms of the roundabout apart from South Hill Road, including a southbound fly-through from the A3095 Mill Lane to the A3095 Crowthorne Road.

Figure B – Hanworth Roundabout junction improvement (implementation 2021)

Table B – Revised Layout 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
A3095 Mill Lane Left Ahead	70.2%	15.7	54.5%	6.9
A3095 Mill Lane Ahead	22.5%	3.5	30.8%	3.6
Mill Lane Ahead	25.0%	3.9	33.8%	4.0
South Hill Road Left	41.6%	0.4	36.0%	1.3
Hanworth Road Ahead	8.7%	1.0	22.5%	3.2
Hanworth Road Ahead	47.3%	7.6	30.7%	4.7
Hanworth Road Ahead	64.5%	11.9	62.4%	11.0
A3095 Crowthorne Road Ahead	57.9%	9.2	21.5%	2.6
A3095 Crowthorne Road Ahead	68.7%	11.0	35.2%	4.1
A3095 Crowthorne Road Left Ahead	13.3%	1.6	28.7%	3.3
A3095 Crowthorne Road Ahead	23.7%	3.2	42.2%	5.4
Great Hollands Road Ahead Left	85.4%	12.0	14.2%	1.7
Great Hollands Road Ahead	88.3%	13.0	70.8%	14.4
Southbound Flythrough Ahead	37.2%	5.0	30.4%	3.6
Southbound Flythrough Ahead	38.8%	5.7	31.1%	0.5
Cycle Time (s)	90		90	
Practical Reserve Capacity (%)	1.3		27.1	
Total Delay (pcuHr)	68.36		41.63	

JUNCTION 11 - WILDRIDINGS ROUNDABOUT

4.5.47 This junction currently operates as a partially signalised four-arm roundabout at the intersection of Wildridings Road / A3095 Mill Lane / Ringmead.

4.5.48 The roundabout operates AM peak hour signals at the northbound entry from the A3095 Mill Lane and operates as a standard roundabout at all other times. Both the A3095 approaches are dual carriageway, flaring to three lanes at entry, whilst the Wildridings Road and Ringmead arms are two lane approaches flaring to wide two-lane entries on to the roundabout.

Figure A – Wildridings Roundabout

Image source: Google Maps. Image taken from A3095 Mill Lane; looking north.

Table A – 2019 Base Modelling Outputs AM Peak

	AM Peak (0800 – 0900)	
	Deg Sat (%)	Mean Max Queue
A3095 Mill Lane North Left Ahead	57.2%	0.7
A3095 Mill Lane North Ahead	50.8%	0.5
Wildridings Road Left	34.2%	0.3
Wildridings Road Ahead	47.5%	0.5
A3095 Mill Lane South Left Ahead	69.3%	15.7
A3095 Mill Lane South Ahead	69.4%	15.9
Ringmead Left	70.1%	5.9
Ringmead Ahead	51.8%	3.3
Circulatory Signals Ahead	70.2%	9.0
Circulatory Signals Ahead Right	62.3%	8.1
Cycle Time (s)	90	
Practical Reserve Capacity (%)	28.1	
Total Delay (pcuHr)	19.11	

Table B – 2019 Base Modelling Outputs PM Peak

	AM Peak (0800 – 0900)		
	RFC	Queue	Delay (s)
Wildridings Road	0.51	2	7.87
A3095 Mill Lane South	0.51	2	5.63
Ringmead	0.33	1	3.86
A3095 Mill Lane North	0.99	33	44.56

Table C – 2037 + BFLP Modelling Outputs AM Peak

	AM Peak (0800 – 0900)	
	Deg Sat (%)	Mean Max Queue
A3095 Mill Lane North Left Ahead	82.6%	3.1
A3095 Mill Lane North Ahead	80.7%	2.0
Wildridings Road Left	40.9%	0.3
Wildridings Road Ahead	78.9%	2.6
A3095 Mill Lane South Left Ahead	89.2%	29.7
A3095 Mill Lane South Ahead	88.9%	29.4
Ringmead Left	90.3%	14.3
Ringmead Ahead	61.1%	3.6
Circulatory Signals Ahead	71.0%	8.5
Circulatory Signals Ahead Right	87.5%	13.2
Cycle Time (s)	90	
Practical Reserve Capacity (%)	-0.4	
Total Delay (pcuHr)	40.21	

Table D – 2037 + BFLP Modelling Outputs PM Peak

	AM Peak (0800 – 0900)		
	RFC	Queue	Delay (s)
Wildridings Road	0.55	3	7.87
A3095 Mill Lane South	0.68	3	8.86
Ringmead	0.60	2	8.25
A3095 Mill Lane North	0.96	17	26.78

4.5.49 The junction is shown to operate at capacity in the 2037 AM peak scenario and over capacity in the PM peak hour for both the 2019 and 2037 scenarios.

4.5.50 An option for improvement would be to introduce localised widening on the A3095 Mill Lane North arm of the junction, increasing the flare length entering the junction. This arm caters for significant levels of traffic, particularly turning right into the Great Hollands residential area. This measure would provide a simple solution to increase the capacity at the junction and increase the numbers of vehicles getting through it.

4.5.51 The existing kerb line is indicated in red on Figure B.

Figure B – Wildridings Roundabout with concept mitigation

Table E – 2037 + BFLP + Mitigation Modelling Outputs AM Peak

	AM Peak (0800 – 0900)	
	Deg Sat (%)	Mean Max Queue
A3095 Mill Lane North Left Ahead	82.6%	3.1
A3095 Mill Lane North Ahead	80.7%	2.0
Wildridings Road Left	40.9%	0.3
Wildridings Road Ahead	78.9%	2.6
A3095 Mill Lane South Left Ahead	89.2%	29.7
A3095 Mill Lane South Ahead	88.9%	29.4
Ringmead Left	90.3%	14.3
Ringmead Ahead	61.1%	3.6
Circulatory Signals Ahead	71.0%	8.5
Circulatory Signals Ahead Right	87.5%	13.2
Cycle Time (s)	90	
Practical Reserve Capacity (%)	-0.4	
Total Delay (pcuHr)	40.21	

Table F – 2037 + BFLP + Mitigation Modelling Outputs PM Peak

	AM Peak (0800 – 0900)		
	RFC	Queue	Delay (s)
Wildridings Road	0.55	2	8.02
A3095 Mill Lane South	0.64	2	7.19
Ringmead	0.60	2	8.19
A3095 Mill Lane North	0.85	6	8.57

4.5.52 Whilst the improvement measures show little difference for the AM peak hour with the junction continuing to operate at capacity, the PM peak hour shows a notable improvement to queue length and delay.

JUNCTION 12 - TWIN BRIDGES

4.5.53 This junction is detailed as part of the analysis of the Journey Time Routes 1 & 2. Please refer to page 35 for details.

JUNCTION 13 - HONEYWELL ROUNDABOUT

4.5.54 Located on the edge of the Town Centre, the Honeywell Roundabout is a standard roundabout formed of five arms. One arm accesses the local Honeywell building, whilst another leads to the Peel Centre retail park.

4.5.55 The remaining arms are the A329 Skimped Hill Lane (West), the A329 Skimped Hill Lane (North) and Skimped Hill Lane (East) which leads to Market Street.

Figure A – Honeywell Roundabout

Image source: Google Maps. Image taken from A329 Skimped Hill Lane; looking east.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
A329 Skimped Hill Lane North	0.65	2	6.64	0.67	2	7.36
Skimped Hill Lane East	0.51	2	5.77	0.82	5	17.06
Peel Centre	0.09	1	4.57	0.55	2	10.57
A329 Skimped Hill Lane West	0.30	1	2.26	0.33	1	2.58
Honeywell	0.01	0	4.97	0.12	1	7.52

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
A329 Skimped Hill Lane North	0.66	2	8.18	1.13	73	211.11
Skimped Hill Lane East	0.89	7	27.93	1.16	61	290.27
Peel Centre	0.37	1	9.93	0.72	3	21.29
A329 Skimped Hill Lane West	0.59	2	4.09	0.74	3	6.44
Honeywell	0.06	1	11.36	0.47	1	45.99

4.5.56 This junction is modelled to operate within capacity for both the AM and PM peak hours in the 2019 base scenario, although the Skimped Hill Lane East arm is approaching capacity in the PM peak.

4.5.57 The 2037 scenario sees the existing junction configuration exceed capacity in both the AM and PM peak hours, so there is scope to develop an improvement that will complement detailed access designs for the Peel Centre site.

JUNCTION 14 - WESTERN ROUNDABOUT

4.5.58 This junction is detailed as part of the analysis of the Journey Time Routes 3 & 4. Please refer to page 70 for details.

JUNCTION 15 - FRAMPTONS BRIDGE ROUNDABOUT

4.5.59 The Framptons Bridge roundabout is a standard three-arm roundabout sited at the point where Harvest Ride meets the B3018 Binfield Road.

4.5.60 All approaches are flared to two lane entries to the roundabout and dropped kerbs are also present on all arms to reduce the conflict between cyclists and general traffic. Informal crossing points are located on the two B3018 Binfield Road arms of the roundabout.

Figure A – Framptons Bridge Roundabout

Image source: Google Maps. Image taken from B3018 Binfield Road; looking north.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
B3018 Binfield Road North	0.4	1	3.02	0.42	1	3.17
Harvest Ride	0.4	1	3.72	0.32	1	3.08
B3018 Binfield Road South	0.38	1	4.25	0.43	1	4.42

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
B3018 Binfield Road North	0.38	1	3.24	0.39	1	3.25
Harvest Ride	0.46	1	3.99	0.47	1	4.01
B3018 Binfield Road South	0.52	2	5.03	0.56	2	5.50

4.5.61 This junction is modelled to operate within capacity for the AM and PM peak hours in both the 2019 base and 2037 + BFLP scenarios.

JUNCTION 16 – TEMPLE PARK ROUNDABOUT

4.5.62 The Temple Way roundabout is a standard three-arm roundabout sited at the point where Temple Way meets the B3018 Binfield Road.

4.5.63 All approaches are flared to two lane entries to the roundabout and dropped kerbs are also present on all arms to reduce the conflict between cyclists and general traffic. Informal crossing points are located on the B3018 Binfield Road East and Temple Way arms of the roundabout.

Figure A – Temple Park Roundabout

Image source: Google Maps. Image taken from B3018 Binfield Road; looking north.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
B3018 Binfield Road North	0.51	1	5.76	0.49	1	5.71
B3018 Binfield Road South	0.46	1	3.94	0.46	1	3.87
Temple Way	0.40	1	4.30	0.47	1	4.80

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
B3018 Binfield Road North	0.44	1	5.19	0.47	1	5.25
B3018 Binfield Road South	0.37	1	3.40	0.39	1	3.51
Temple Way	0.41	1	4.37	0.43	1	4.40

4.5.64 This junction is modelled to operate within capacity for the AM and PM peak hours in both the 2019 base and 2037 + BFLP scenarios.

JUNCTION 17 - BINFIELD ROAD / FOREST ROAD

4.5.65 This junction currently operates as a staggered priority junction at the intersection of the B3018 Binfield Road / B3034 Forest Road / Hazlewood Lane. There is a right turn refuge on the B3034 Forest Road for traffic wishing to turn right into the B3018 Binfield Road whilst the B3018 Binfield Road itself has a short flare at the junction entry to allow separate right and left turn movements.

Figure A – Binfield Road / Forest Road junction

Image source: Google Maps. Image taken from B3018 Binfield Road; looking north.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Hazelwood Lane – Ahead & Left	0.03	1	10.12	0.01	1	9.66
Hazelwood Lane – Ahead & Right	0.03	1	12.99	0.01	1	14.06
B3034 Forest Road West – Right	0.72	3	22.56	0.73	3	24.07
B3018 Binfield Road – Ahead & Left	0.61	2	14.06	0.67	3	17.58
B3018 Binfield Road – Ahead & Right	0.48	1	18.50	0.50	2	19.65
B3034 Forest Road East - Right	0.00	0	7.93	0.00	0	7.58

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Hazelwood Lane – Ahead & Left	0.20	1	15.20	0.09	1	12.65
Hazelwood Lane – Ahead & Right	0.17	1	20.59	0.08	1	18.96
B3034 Forest Road West – Right	0.55	2	16.32	0.71	2	27.35
B3018 Binfield Road – Ahead & Left	0.87	13	58.81	1.12	27	236.27
B3018 Binfield Road – Ahead & Right	0.86	9	80.17	1.11	18	254.92
B3034 Forest Road East - Right	0.03	0	8.61	0.05	0	8.42

4.5.66 This junction is modelled to operate within capacity for both the AM and PM peak hours in the 2019 base scenario, however in the 2037 + BFLP scenario, the B3018 Binfield Road is modelled to operate over capacity.

4.5.67 This could be mitigated through some minor localised widening to provide more capacity at the junction with options to be examined in further detail. This measure would provide additional capacity for vehicles turning left and right and split the queues such that drivers wishing to turn left are not delayed by those wishing to turn right.

4.5.68 The existing kerb line is indicated on figure B in red.

Figure B - Binfield Road / Forest Road with concept mitigation

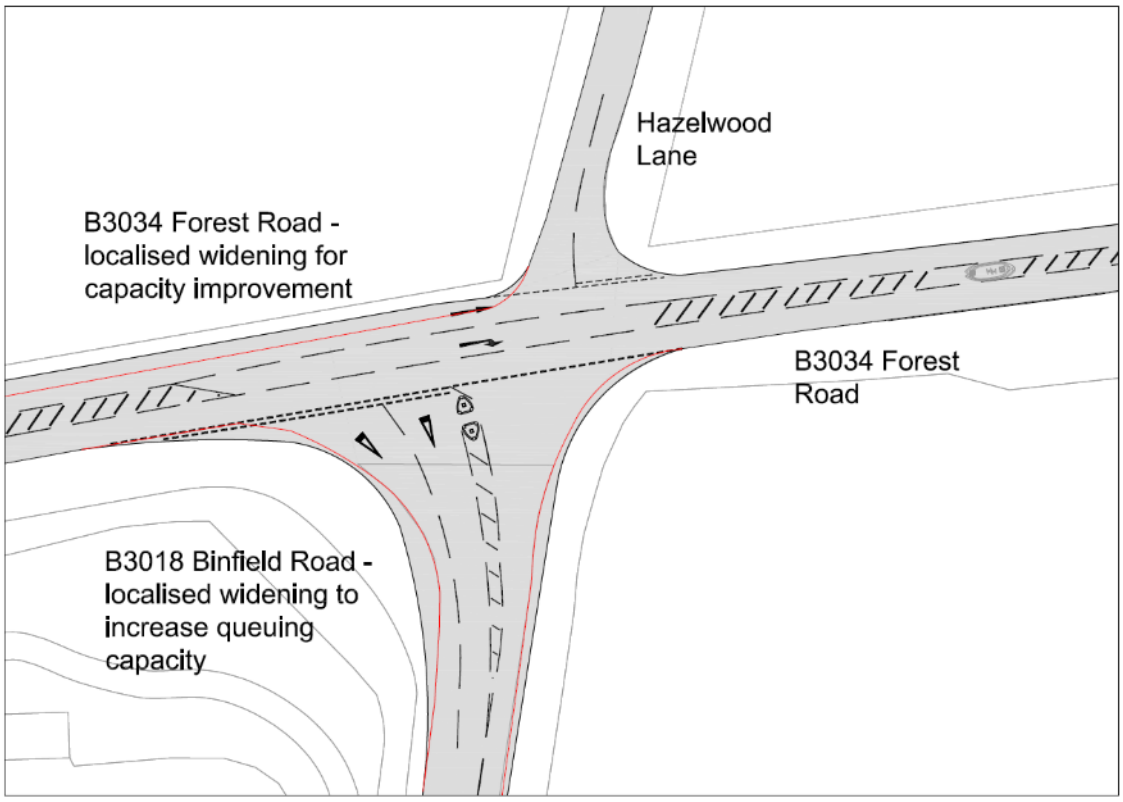


Table C – 2037 + BFLP + Mitigation Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Hazelwood Lane – Ahead & Left	0.19	1	13.97	0.08	1	11.75
Hazelwood Lane – Ahead & Right	0.16	1	18.73	0.07	1	17.34
B3034 Forest Road West – Right	0.54	2	15.52	0.69	3	24.75
B3018 Binfield Road – Ahead & Left	0.68	2	23.45	0.85	5	49.08
B3018 Binfield Road – Ahead & Right	0.68	3	34.40	0.85	5	69.08
B3034 Forest Road East - Right	0.02	0	7.45	0.04	0	7.29

4.5.69 The concept mitigation measures are forecast to being the junction back within capacity.

4.6 JOURNEY TIME ROUTES 7 & 8

4.6.1 Journey time Route 7 runs along the B3034 Forest Road from its junction with Warren House Road to its junction with the A330 Hatchet Lane on the border with the Royal Borough of Windsor & Maidenhead. Journey time Route 8 is the reverse of this route. The journey times presented below cover these entire routes, but the analysis that follows assesses junctions within Bracknell Forest.

Table A – Routes 7 & 8 Journey Time Summary

Route	AM Peak Journey Time Route	2019 AM Base	2037 AM No BFLP	2037 AM BFLP	2037 AM BFLP Mit	2037 AM BFLP Mit + UTMC*
		Min:Sec	Min:Sec	Min:Sec	Min:Sec	Min:Sec
7	Forest Rd from Warren House Rd to Hatchet Lane	17:42	19:13	20:35	20:40	19:34
8	Forest Rd from Hatchet Lane to Warren House Rd	15:56	17:02	18:05	18:04	17:25
Route	**PM Peak Journey Time Route**	**2019 PM Base**	**2037 PM No BFLP**	**2037 PM BFLP**	**2037 PM BFLP Mit**	**2037 PM BFLP Mit + UTMC***
		Min:Sec	Min:Sec	Min:Sec	Min:Sec	Min:Sec
7	Forest Rd from Warren House Rd to Hatchet Lane	16:34	16:43	18:12	18:15	17:14
8	Forest Rd from Hatchet Lane to Warren House Rd	16:31	18:03	19:21	19:10	18:32

*The final column considers the impact of the added benefits of UTMC if this were to reduce delays at signals by just 12%. This is a most conservative estimate, as studies elsewhere have shown such systems can typically achieve between 12 – 27% reductions.

4.6.2 On Routes 7 and 8, the changes in overall journey times between 2019 and 2037 with LP are largely as expected and reflect the increase in travel demand that is predicted over that period.

4.6.3 The introduction of various mitigation schemes around the borough will always result in some movement of demand elsewhere as some routes become more or less attractive. This is reflected in the modest changes seen here when the schemes are introduced.

4.6.4 In the separate speed limit reduction sensitivity test detailed in paragraph 4.1.7, the recorded journey times in the AM peak were 20:13 for Route 7 and 17:20 for Route 8. In the PM peak, the recorded journey times were 17:48 for Route 7 and 18:25 for Route 8.

4.6.5 As mentioned above, the strategic model does not show the impact of additional network improvements such as UTMC. This has been demonstrated elsewhere to offer reductions in

delays at signals of between 12 – 27%. Even the lowest value in this range of just 12% would see the 'with mitigation' times above fall below those for the 2037 BFLP scenario.

4.6.6 So, on this particular route we can expect journey time reductions in both peaks and directions following the introduction of mitigation schemes and UTMC.

JUNCTION 1 - TERRACE ROAD ROUNDABOUT

4.6.7 This mini roundabout is located at the junction of the B3034 Forest Road / Terrace Road North / Terrace Road South. All arms are single carriageway approaches with the B3034 Forest Road East and West flaring to two lanes at their respective roundabout entries.

Figure A – Terrace Road roundabout

Image source: Google Maps. Image taken from B3034 Forest Road; looking west.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Terrace Road North	0.49	1	14.14	0.46	1	11.22
B3034 Forest Road East	0.57	2	11.76	0.56	2	10.24
Terrace Road South	0.50	1	11.56	0.65	2	17.15
B3034 Forest Road West	0.73	3	15.64	0.46	1	8.20

Table B – 2037 + LP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Terrace Road North	0.75	3	34.10	0.48	1	13.27
B3034 Forest Road East	0.94	10	59.26	0.74	3	17.35
Terrace Road South	0.76	3	27.19	1.02	19	125.78
B3034 Forest Road West	0.96	13	60.38	0.62	2	12.14

4.6.8 The junction is forecast to exceed capacity in the 2037 + BFLP scenario (both AM and PM). Capacity improvements at the junction could be to further increase the flare on the B3034 Forest Road West arm and realignment of the islands on the B3034 Forest Road East arm to provide more entry width. The refuge islands on Terrace Road North and the central painted island of the mini roundabout would be repositioned to suit the new layout.

4.6.9 The existing kerb line and island positions are indicated on Figure B in red.

Figure B – Terrace Road roundabout with concept mitigation

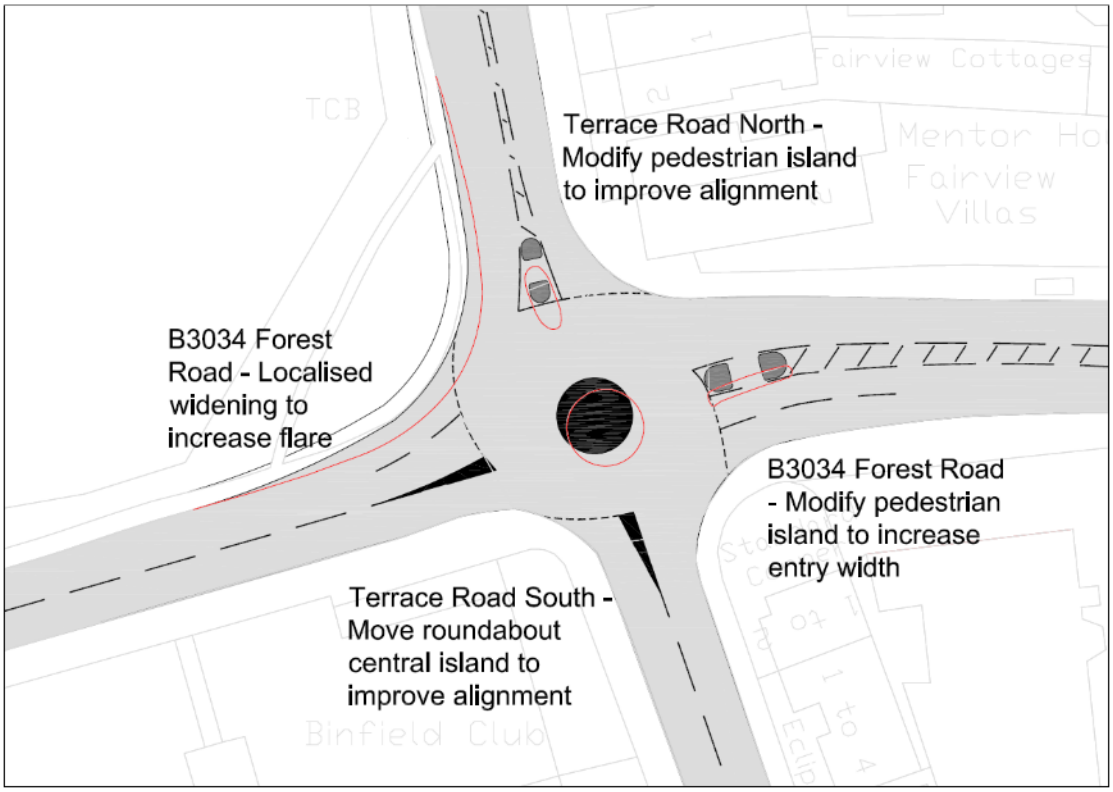


Table C – 2037 + BFLP Modelling Outputs with concept improvements

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Terrace Road North	0.76	3	35.68	0.48	1	13.43
B3034 Forest Road East	0.78	4	19.93	0.62	2	10.21
Terrace Road South	0.58	2	12.32	0.77	4	23.07
B3034 Forest Road West	0.78	4	16.34	0.50	1	7.75

4.6.10 This junction is modelled to operate within capacity for both the AM and PM peak hours in the 2019 base scenario, although the B3034 Forest Road West arm of the junction is noted to be approaching capacity.

4.6.11 The minor mitigation measure introduced solves this issue as noted in the 2037 + BFLP results.

JUNCTION 2 - FOREST ROAD / CHURCH LANE

4.6.12 The junction of Church Lane / B3034 Forest Road currently operates as a simple priority junction with tight turning manoeuvres, particularly the left turn from the B3034 Forest Road into Church Lane. The junction is subject to a 40mph speed limit, with speed reduction measures in place heading westbound on Forest Road.

Figure A – Forest Road / Church Lane junction

Image source: Google Maps. Image taken from B3034 Forest Road; looking east

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Church Lane Left	0.36	1	8.83	0.45	1	10.18
Church Lane Right	0.01	1	9.11	0.03	1	10.56
B3034 Forest Road East Right	0.41	1	9.69	0.49	2	10.59

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Church Lane Left	0.48	1	11.65	0.52	2	11.93
Church Lane Right	0.00	0	0.00	0.00	0	0.00
B3034 Forest Road East Right	0.46	1	10.69	0.63	3	12.72

4.6.13 This junction is modelled to operate within capacity for both the AM and PM peak hours in the 2019 and 2037 + LP scenario.

4.6.14 There is an arrangement to provide a developer-funded roundabout improvement here, although more recent assessments indicate this solution won't provide any improvement in capacity. However, it will assist in managing vehicle speeds and improving safety along this route.

JUNCTION 3 – PITTS BRIDGE

4.6.15 Located to the north of the town centre on the B3034 Forest Road, Pitts Bridge is currently signal-controlled, due to the width of the bridge deck from east to west. The Binfield Neighbourhood Plan identifies this junction for further consideration when assessing the impact of future development.

4.6.16 As part of the strategic modelling exercise, allowance has been made for the bridge deck to be widened to allow for two-way movements along the B3034 Forest Road and as a result the signalisation removed. This measure is forecast to produce a reduction in delay and queuing alongside an improvement to journey times on the link.

4.6.17 However, it is noted that the bridge structure itself is a grade 2 listed structure which will result in additional considerations, work and costs.

Figure A – Pitts Bridge

Image source: Google Maps. Image taken from B3034 Forest Road; looking west

4.6.18 A separate model test run has been undertaken to examine the impact of retaining the existing shuttle signals at Pitts Bridge. In a strategic model, a change on one key link can have wider impacts beyond the road directly affected as some traffic demand will find alternative routes. This can in-turn impact upon other journeys, even if only by a few seconds, whilst others are displaced from those routes if better alternatives exist.

4.6.19 In this case the results show that retaining the Pitts Bridge shuttle signals has minimal impact upon the AM peak and PM peak journey times across the strategic network. Therefore, whilst the bridge widening is retained within the overall journey time modelling, the derived benefit can be considered further at later stages of the BFLP implementation.

JUNCTION 4 - BINFIELD ROAD / FOREST ROAD

4.6.20 This junction has been assessed as part of the analysis for Journey Time Routes 5 & 6. Please refer to page 125 for details.

JUNCTION 5 - WEST END ROUNDABOUT

4.6.21 Introduced as the northern junction on the Warfield Link Road, West End Roundabout is a standard three-arm roundabout comprising the B3034 Forest Road / Ellison Road. The B3034 Forest Road West and Ellison Road are single lane approaches with flared entries onto the roundabout, whilst the B3034 Forest Road East is a single lane approach that widens to two lanes at the entry to the roundabout.

Figure A – West End Roundabout

Image source: Google Maps. Image taken from Ellison Road; looking north.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
B3034 Forest Road East	0.19	1	2.30	0.25	1	2.42
Ellison Road	0.20	1	6.24	0.15	1	5.90
B3034 Forest Road West	0.32	1	4.23	0.26	1	3.85

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
B3034 Forest Road East	0.47	1	3.50	0.66	2	5.48
Ellison Road	0.59	2	13.91	0.61	2	16.75
B3034 Forest Road West	0.59	2	7.97	0.53	2	6.81

4.6.22 This junction is modelled to operate within capacity for the AM and PM peak hours in both the 2019 base and 2037 + BFLP scenarios.

JUNCTION 6 - THREE-LEGGED CROSS

4.6.23 As part of the Warfield development, the junction of the B3034 Forest Road / A3095 Maidenhead Road, locally known as Three-Legged Cross, was upgraded to be a signalised junction allowing more evenly distributed priority movements around the junction rather than operating as a simple priority intersection.

4.6.24 The B3034 Forest Road West has a two-lane approach allowing for separate right and left turn movements, whilst the A3095 Maidenhead Road and the B3034 Forest Road West are single lane approaches. The B3034 Forest Road West also features an access into what is currently known as 'Spice Lounge', a takeaway and delivery business.

Figure A – Three-Legged Cross junction

Image source: Google Maps. Image taken from A3095 Maidenhead Road; looking south.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	**Mean Max Queue**	**Deg Sat (%)**	**Mean Max Queue**
B3034 Forest Road West Left	31.6%	6.0	20.4%	3.5
B3034 Forest Road West Ahead	71.3%	5.1	76.5%	4.9
A3095 Maidenhead Road Right Left	73.8%	16.3	83.6%	23.8
A3095 Forest Road East Ahead Right	74.8%	17.7	82.0%	17.7
Cycle Time (s)	120		120	
Practical Reserve Capacity (%)	20.4		7.7	
Total Delay (pcuHr)	7.7		19.04	

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
B3034 Forest Road West Left	74.0%	19.4	51.6%	11.4
B3034 Forest Road West Ahead	111.7%	20.3	118.9%	21.7
A3095 Maidenhead Road Right Left	118.9%	104.2	136.4%	242.5
A3095 Forest Road East Ahead Right	120.1%	119.2	133.3%	122.5
Cycle Time (s)	120		120	
Practical Reserve Capacity (%)	-33.5		-51.6	
Total Delay (pcuHr)	209.84		345.99	

4.6.25 This junction is modelled to be operating with reserve capacity in both the AM and PM peaks for the 2019 scenario, however there are long queues forming on the A3095 Maidenhead Road and the B3034 Forest Road East arms of the junction. As noted, this does not take account of the effect of UTMC on the junction which will cause it to operate far more efficiently.

4.6.26 In the 2037 + BFLP scenario, the junction is forecast to significantly exceed capacity, as a result of the proposed development at Jealotts Hill and will require mitigation for it to operate within capacity. In addition, space is required to accommodate pedestrian and cycling facilities heading north/south between the development area and the existing pedestrian / cycling

facilities providing much needed infrastructure and connectivity to promote more sustainable travel in a safe and attractive way.

4.6.27 Figure B illustrates the concept mitigation measures, which require land to be acquired outside the highway boundary, with the existing island and kerb line positions highlighted in red.

Figure B – Three-Legged Cross with concept mitigation

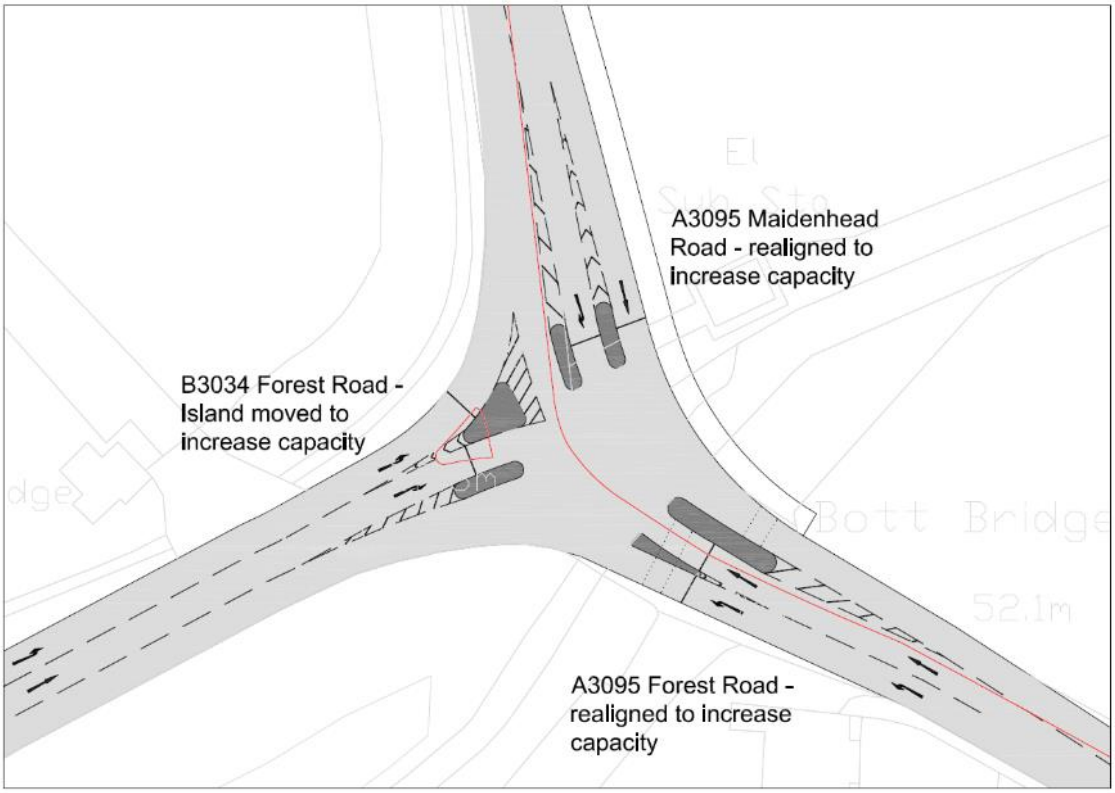


Table C – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
B3034 Forest Road West Left	79.7%	12.1	88.7%	18.1
B3034 Forest Road West Ahead	83.1%	15.5	88.2%	13.1
A3095 Maidenhead Road Right Left	82.7%	17.5	56.9%	9.0
A3095 Forest Road East Ahead Right	76.2%	6.1	78.3%	5.1
Cycle Time (s)	180		158	
Practical Reserve Capacity (%)	8.2		1.5	
Total Delay (pcuHr)	23.41		22.73	

JUNCTION 7 - PLOUGH AND HARROW

4.6.28 The junction of the A3095 Warfield Street / Osborne Lane / B3034 Warfield Street / A3095 Newell Green is currently a four-arm signalised junction operating under UTMC. Pedestrian crossing points are provided on the A3095 Warfield Street and Osborne Lane arms of the junction.

Figure A – Plough and Harrow junction

Image source: Google Maps. Image taken from Warfield Street; looking east.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
A3095 Newell Green Left Ahead Right	84.9%	14.8	85.6%	13.2
A3095 Warfield Street West Right Left Ahead	84.1%	12.4	87.0%	17.8
Osborne Lane Ahead Right Left	5.6%	0.3	38.1%	2.0
B3034 Warfield Street East Left Ahead Right	71.4%	4.4	83.5%	7.0
Cycle Time (s)	90		97	
Practical Reserve Capacity (%)	6.0		3.5	
Total Delay (pcuHr)	15.88		20.24	

4.6.29 This junction is modelled to be operating with reserve capacity in both the AM and PM peaks, but is subject to queuing on all approaches apart from Osborne Lane. As noted, this does not take account of the effect of UTMC on the junction which will cause it to operate far more efficiently.

4.6.30 As part of the existing Warfield masterplan development, it is proposed to remove the traffic signals from this junction and replace it with a standard priority junction at Osborne Lane and a new four arm roundabout approximately 60m to the south-east. This would include approaches from the B3034 Warfield Street, B3034 Warfield Street, A3095 Newell Green, and a new access to the Warfield development to the south. This arrangement would be more in keeping with the surroundings.

4.6.31 The layout is illustrated in Figure B with the existing kerb line shown in red.

Figure B – Plough and Harrow with concept mitigation

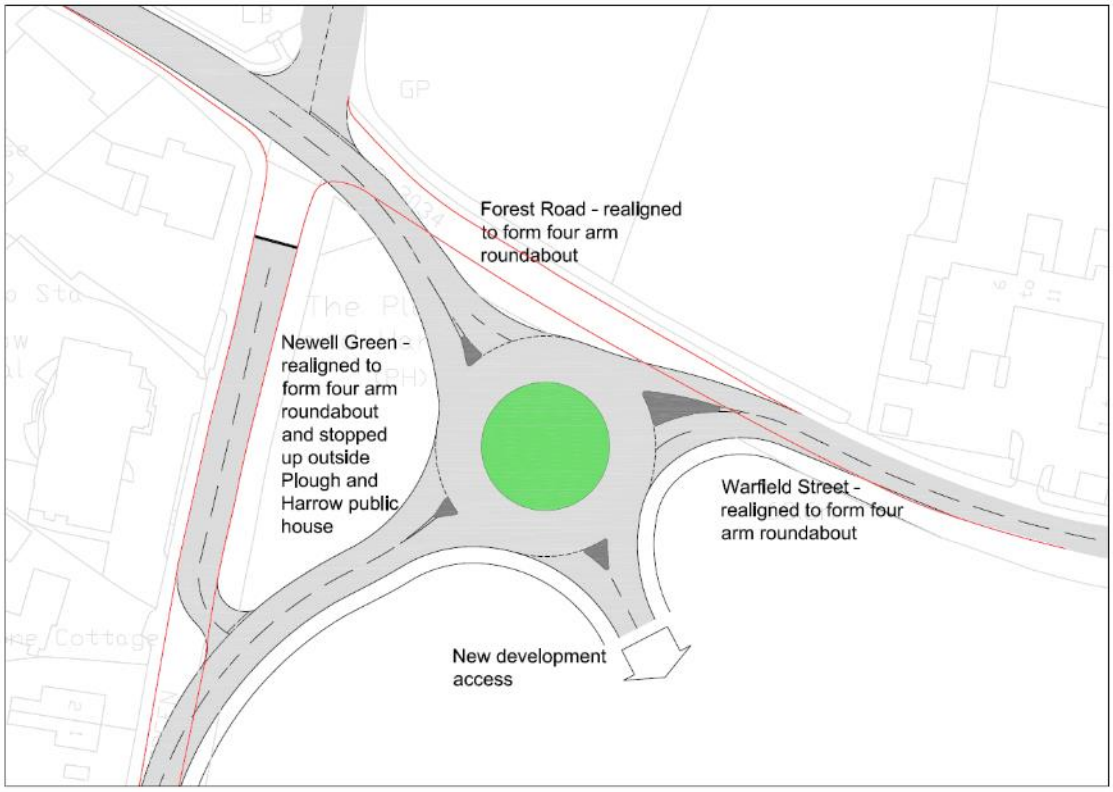


Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
A3095 Warfield Street	0.45	1	4.41	0.55	2	4.98
B3034 Warfield Street	0.58	2	7.64	0.49	1	6.66
Development Access	0.03	0	4.44	0.01	0	4.29
A3095 Newell Green	0.59	2	7.98	0.34	1	4.72

4.6.32 In the 2037 + BFLP scenario, the new roundabout is predicted to continue to operate within capacity.

JUNCTION 8 - FIVE WAYS

4.6.33 Located to the north-east of the town centre, this junction currently takes the form of a crossroads combined with a priority junction due to the presence of a large sequoia on the island between the arms of the B3034 Warfield Street and the B3022 Bracknell Road. The junction currently operates over capacity and visibility at the junction is poor, particularly from the B3034 Forest Road.

Figure A – Five Ways Existing

Image source: Google Maps. Image taken from Jigs Lane North; looking north.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
B3034 Warfield Street - Left	0.09	1	6.69	0.04	1	5.71
B3034 Warfield Street – Ahead & Right	0.22	1	8.97	0.17	1	8.04
Jigs Lane North	0.89	10	37.83	0.15	1	6.53
B3034 Forest Road - Left	0.53	2	13.64	0.04	1	6.66
B3034 Forest Road – Ahead & Right	0.22	1	16.30	0.31	1	13.19
B3022 Bracknell Road	0.08	1	5.37	0.12	1	4.54

4.6.34 This junction is modelled to operate mostly within capacity for both the AM and PM peak hours in the 2019 base scenario, however it is noted that the Jigs Lane North arm is over capacity in the AM peak, with queues forming due to turning vehicles onto Warfield Street and Forest Road.

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4.6.35 This junction is also included within the existing Warfield masterplan proposals. A concept developed for improvement to the junction is to introduce a 28m ICD roundabout to the south of the existing junction formed of three arms (B3022 Bracknell Road / B3034 Forest Road / Jigs Lane North). This concept will not only increase capacity at the junction, but it will also help to control speeds and enhance safety by improving visibility there.

4.6.36 Figure B illustrates the potential concept with the existing kerb lines indicated in red.

4.6.37 The B3034 Warfield Street arm will remain as existing in the form of a priority junction with Bracknell Road. This will allow for the retention of the mature sequoia tree.

Figure B – Five Ways with concept mitigation

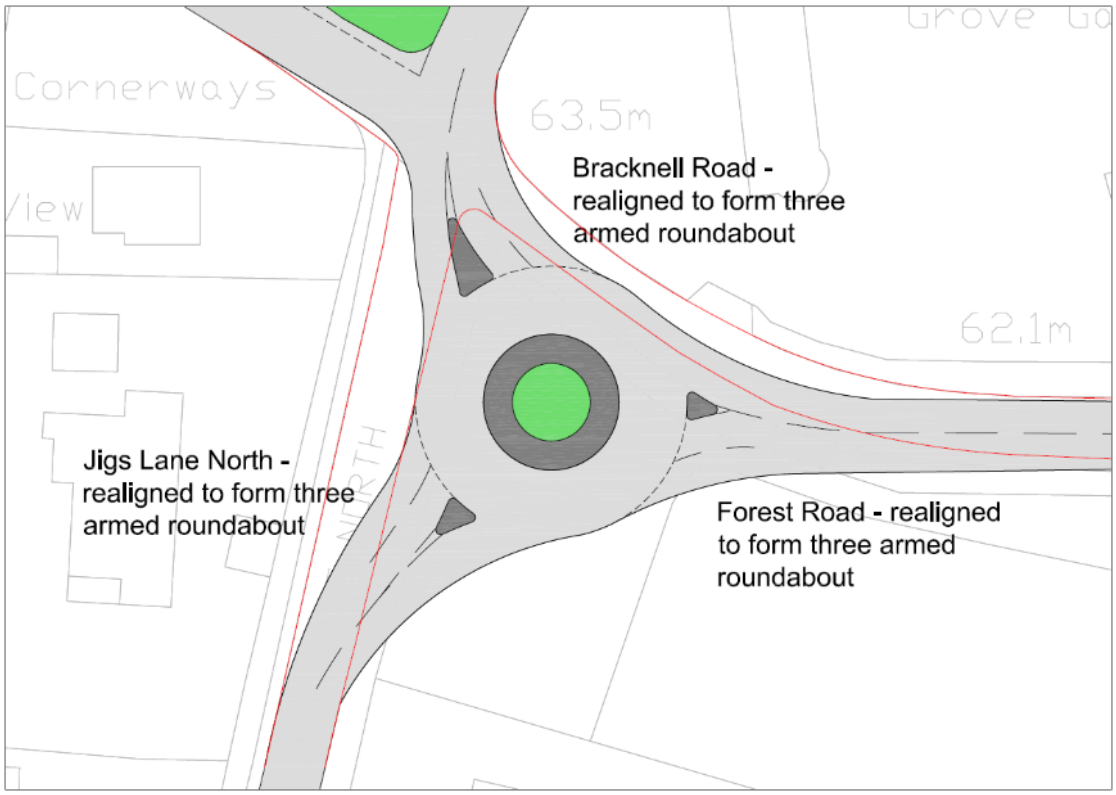

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay	RFC	Queue	Delay
B3022 Bracknell Road	0.58	2	5.92	0.61	2	6.31
B3034 Forest Road	0.36	1	5.03	0.34	1	5.59
Jigs Lane North	0.71	3	9.03	0.47	1	4.97

4.6.38 The roundabout in the 2037 + BFLP scenario sees an improvement in terms of capacity along with queue lengths.

JUNCTION 9 - CHAVEY DOWN CROSSROADS

4.6.39 The junction of the B3034 Forest Road / B3017 Chavey Down Road currently operates as a four-arm signalised junction. Controlled pedestrian crossing points are provided on all arms of the junction.

Figure A – Chavey Down Crossroads

Image source: Google Maps. Image taken from B3034 Forest Road; looking east.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
B3017 Chavey Down Road N Right Ahead Left	87.5%	9.4	80.3%	6.4
B3034 Forest Road East Right Ahead Left	85.0%	11.7	85.7%	14.7
B3017 Chavey Down Road S Ahead Left Right	88.9%	14.1	80.5%	7.1
B3034 Forest Road West Left Right Ahead	87.0%	15.7	84.7%	10.1
Cycle Time (s)	120		100	
Practical Reserve Capacity (%)	1.2		5.0	
Total Delay (pcuHr)	27.63		20.79	

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
B3017 Chavey Down Road N Right Ahead Left	82.2%	6.7	75.6%	6.0
B3034 Forest Road East Right Ahead Left	87.9%	8.9	81.8%	13.2
B3017 Chavey Down Road S Ahead Left Right	86.7%	9.1	79.8%	5.9
B3034 Forest Road West Left Right Ahead	89.3%	14.2	79.7%	6.8
Cycle Time (s)	90		90	
Practical Reserve Capacity (%)	0.8		10.1	
Total Delay (pcuHr)	22.82		17.06	

4.6.40 This junction is modelled to operate within capacity for the AM and PM peak hours in both the 2019 base and 2037 + BFLP scenarios.

JUNCTION 10 - LOCKS RIDE / FOREST ROAD

4.6.41 This is a four-arm priority junction where the B3034 Forest Road is intersected by Locks Ride and Braziers Lane. The junction is well trafficked on all arms, with the heaviest flow being that on the B3034 Forest Road. Visibility is poor around the junction, particularly from Braziers Lane.

Figure A – Locks Ride / Forest Road junction

Image source: Google Maps. Image taken from B3034 Forest Road; looking east.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Braziers Lane	0.55	2	27.50	0.69	3	36.20
B3034 Forest Road West	0.05	1	4.40	0.02	1	5.23
Locks Ride Left	0.39	1	19.23	0.27	1	15.89
Locks Ride Ahead & Right	0.48	1	20.62	0.47	1	20.74
B3034 Forest Road East	0.10	1	8.21	0.03	1	6.71

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Braziers Lane	0.23	1	14.29	0.43	1	18.11
B3034 Forest Road West	0.00	1	0.00	0.00	0	0.00
Locks Ride Left	0.19	1	12.03	0.10	1	11.82
Locks Ride Ahead & Right	0.35	1	13.35	0.36	1	15.48
B3034 Forest Road East	0.00	0	0.00	0.00	0	0.00

4.6.42 This junction is modelled to operate within capacity for the AM and PM peak hours in both the 2019 base and 2037 + BFLP scenarios.

JUNCTION 11 - FOREST ROAD / HATCHET LANE

4.6.43 The junction of the B3034 Forest Road / A330 Hatchet Lane lies at the borough boundary with the Royal Borough of Windsor and Maidenhead. It is a simple priority junction, however due to the acute angle at which Forest Road approaches Hatchet Lane and the availability of third-party land, physical modifications to the layout are challenging.

Figure A – Forest Road / Hatchet Lane junction

Image source: Google Maps. Image taken from A330 Hatchet Lane; looking south.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
B3034 Forest Road Left	1.11	24	229.16	0.57	2	19.70
B3034 Forest Road Right	1.10	22	232.52	0.70	3	29.24
A330 Hatchet Lane North Right	0.29	1	8.23	0.29	1	8.96

4.6.44 This junction is under significant pressure in the AM peak with the Forest Road arm of the junction operating over capacity and long queues forming.

4.6.45 As a result, an option for mitigation would be to provide some localised widening to increase the flare and storage capacity for vehicles coming from the B3034 Forest Road. This would reduce the current delay caused by the split of vehicles queuing to turn left or right. A right turn

facility from the A330 Hatchet Lane to the B3034 Forest Road would also be provided to reduce any blocking back on A330 Hatchet Lane.

4.6.46 The existing kerb line is indicated on Figure B in red.

Figure B – Forest Road / Hatchet Lane with concept mitigation

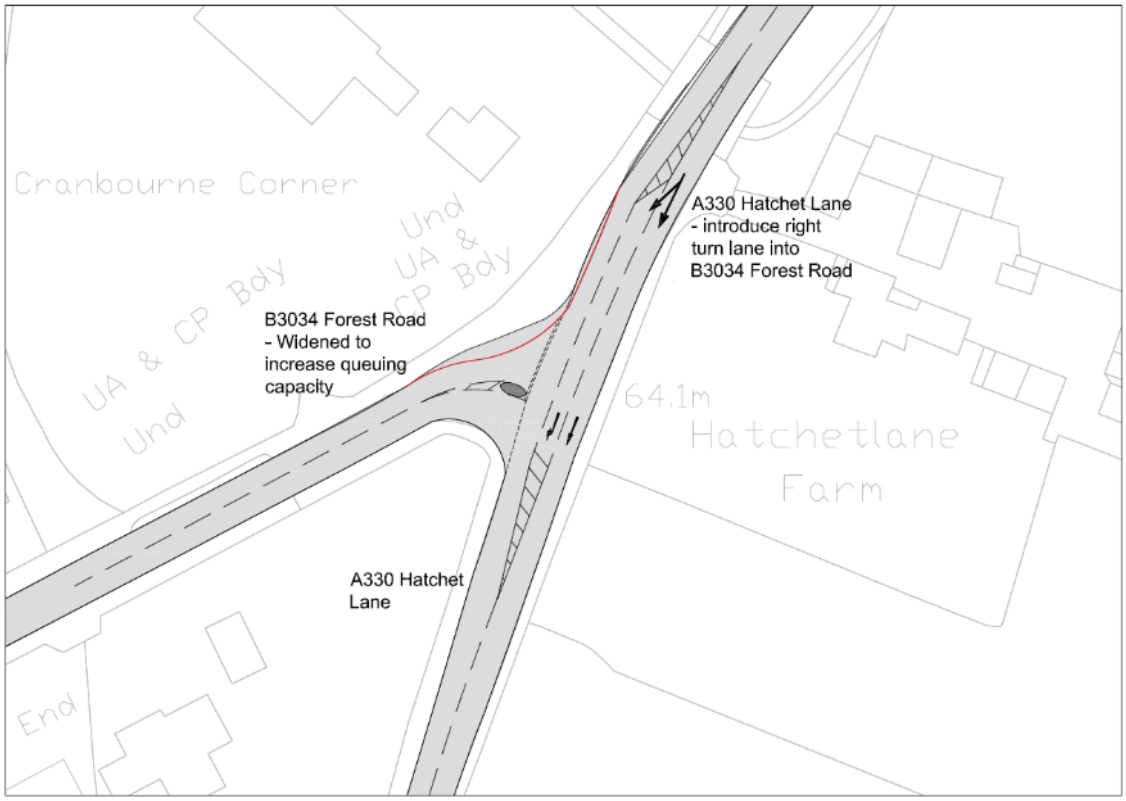

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
B3034 Forest Road Left	0.83	4	48.47	0.33	1	10.68
B3034 Forest Road Right	0.84	5	57.31	0.50	1	16.51
A330 Hatchet Lane North Right	0.14	1	7.55	0.23	1	9.02

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4.7 JOURNEY TIME ROUTES 9 & 10

4.7.1 Journey time Route 9 runs from Horse and Groom Roundabout to the A330 Ascot Road along the A3095. Journey time Route 10 is the reverse of this route.

Table A – Routes 9 & 10 Journey Time Summary

Route	AM Peak Journey Time Route	2019 AM Base	2037 AM No BFLP	2037 AM BFLP	2037 AM BFLP Mit	2037 AM BFLP Mit + UTMC*
		Min:Sec	Min:Sec	Min:Sec	Min:Sec	Min:Sec
9	Horse & Groom to A3095/A330 Ascot Road	10:24	10:44	13:42	13:55	13:07
10	A3095/A330 Ascot Road to Horse & Groom	09:50	10:05	12:35	12:34	11:44
Route	**PM Peak Journey Time Route**	**2019 PM Base**	**2037 PM No BFLP**	**2037 PM BFLP**	**2037 PM BFLP Mit**	**2037 PM BFLP Mit + UTMC***
		Min:Sec	Min:Sec	Min:Sec	Min:Sec	Min:Sec
9	Horse & Groom to A3095/A330 Ascot Road	09:31	09:52	12:30	11:52	11:07
10	A3095/A330 Ascot Road to Horse & Groom	13:10	13:31	14:28	15:49	14:55

*The final column considers the impact of the added benefits of UTMC if this were to reduce delays at signals by just 12%. This is a most conservative estimate, as studies elsewhere have shown such systems can typically achieve between 12 – 27% reductions.

4.7.2 On Routes 9 and 10, the changes in overall journey times between 2019 and 2037 with LP are largely as expected and reflect the increase in travel demand that is predicted over that period. It is noted that the introduction of mitigation schemes elsewhere does shift some demand around the network, and here we can see in the PM peak that some additional delay occurs on route 10.

4.7.3 This is due a longer delay on the A3095 Newell Green southbound approaching the roundabout junction with Harvest Ride which results from a slightly higher circulatory demand that forces more drivers to give way, thus increasing the journey time.

4.7.4 In the separate speed limit reduction sensitivity test detailed in paragraph 4.1.7, the recorded journey times in the AM peak were 13:27 for Route 9 and 12:06 for Route 10. In the PM peak, the recorded journey times were 11:18 for Route 9 and 15:45 for Route 10. These potential journey time reductions in the PM peak are quite substantial and will be the result of some traffic being displaced to alternative routes.

4.7.5 As mentioned above, the strategic model does not show the impact of additional network improvements such as UTMC. This has been demonstrated elsewhere to offer reductions in delays at signals of between 12 – 27%. Even the lowest value in this range of just 12% would see the PM 'with mitigation' time above for route 10 fall to within 27 seconds of that for the 2037 BFLP scenario, whilst the other times all reduce.

JUNCTION 1 - HORSE AND GROOM ROUNDABOUT

4.7.6 This junction is detailed as part of the analysis of the Journey Time Routes 3 & 4. Please refer to page 40 for details

JUNCTION 2 - STATION ROUNDABOUT

4.7.7 Station roundabout is a five-arm partially signalised roundabout at the intersection of Station Way / A3095 Church Road / Hazell Hill / A3095 Bagshot Road / Market Street. Signal control is present at the A3095 Bagshot Road and Market Street arms and is operated by UTMC.

Figure A – Station Roundabout

Image source: Google Maps. Image taken from Station Way; looking south.

Figure B – Station Roundabout

Image source: Google Maps. Image taken from Market Street; looking east.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
Market Street Left Ahead	59.1%	3.8	45.4%	3.6
Station Way Ahead Left	8.2%	0.1	18.2%	0.3
Station Way Ahead	3.8%	0.0	17.6%	0.3
Hazell Lane Left	32.7%	0.4	3.7%	0.0
A3095 Bagshot Road Ahead	41.4%	3.8	28.0%	2.3
A3095 Bagshot Road Ahead	79.2%	8.6	43.2%	2.3
Circ Market Street Ahead Right	49.0%	3.1	34.0%	1.1
Circ Market Street Right	49.6%	1.6	34.7%	1.3
Circ Bagshot Road Right	77.3%	6.5	45.1%	2.5
A3095 Church Road Left	60.9%	1.4	71.1%	3.3
A3095 Church Road Left	60.9%	1.4	71.1%	3.3
Cycle Time (s)	50		50	
Practical Reserve Capacity (%)	13.6		26.6	
Total Delay (pcuHr)	14.30		9.76	

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
Market Street Left Ahead	59.6%	3.7	54.8%	5.0
Station Way Ahead Left	25.6%	0.7	58.6%	1.9
Station Way Ahead	25.3%	0.7	58.6%	1.9
Hazell Lane Left	37.5%	0.8	8.2%	0.1
A3095 Bagshot Road Ahead	79.9%	11.9	46.1%	4.4
A3095 Bagshot Road Ahead	79.5%	12.4	25.3%	2.1
Circ Market Street Ahead Right	70.6%	3.2	50.8%	1.9
Circ Market Street Right	66.3%	11.9	38.5%	2.0
Circ Bagshot Road Right	80.3%	10.2	50.0%	2.8
A3095 Church Road Left	54.5%	1.8	57.6%	2.2
A3095 Church Road Left	54.5%	1.8	57.6%	2.2
Cycle Time (s)	60		50	
Practical Reserve Capacity (%)	12.0		53.7	
Total Delay (pcuHr)	21.81		11.47	

4.7.8 This junction is modelled to operate within capacity for the AM and PM peak hours in both the 2019 base and 2037 + BFLP scenarios.

JUNCTION 3 - MET OFFICE ROUNDABOUT

4.7.9 This junction is detailed as part of the analysis of the Journey Time Routes 3 & 4. Please refer to page 73 for details.

JUNCTION 4 - WARFIELD ROUNDABOUT

4.7.10 This junction takes the form of a standard four-arm roundabout and is sited at the intersection of the A3095 Newell Green / Harvest Ride / A3095 Warfield Road. Each arm is a single carriageway approach flaring to two lanes at their respective entry points on to the roundabout.

Figure A – Warfield Roundabout

Image source: Google Maps. Image taken from A3095 Warfield Road; looking north.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
A3095 Newell Green	0.31	1	4.22	0.52	2	6.15
Harvest Ride East	0.66	2	6.73	0.63	2	6.37
A3095 Warfield Road	0.67	2	8.61	0.51	1	5.78
Harvest Ride West	0.50	1	5.35	0.52	2	4.98

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
A3095 Newell Green	0.34	1	3.48	0.36	1	3.90
Harvest Ride East	0.36	1	3.64	0.32	1	3.46
A3095 Warfield Road	0.38	1	3.87	0.38	1	3.90
Harvest Ride West	0.35	1	3.58	0.35	1	3.43

4.7.11 This junction is modelled to operate within capacity for the AM and PM peak hours in both the 2019 base and 2037 + BFLP scenarios.

JUNCTION 5 - PLOUGH AND HARROW

4.7.13 This junction is detailed as part of the analysis of the Journey Time Routes 7 & 8. Please refer to page 142 for details.

JUNCTION 6 - THREE-LEGGED CROSS

4.7.14 This junction is detailed as part of the analysis of the Journey Time Routes 7 & 8. Please refer to page 139 for details.

JUNCTION 7 - MAIDENHEAD ROAD / ASCOT ROAD JUNCTION

4.7.15 Located at the very north of the Borough, the junction of the A3095 Maidenhead Road / A330 Ascot Road has rather an unusual configuration. Located around a mature oak tree, the two roads meet in the form of a priority junction with a separate feeder junction between the two roads. This results in a triangular island upon which the oak tree sits. The A330 Ascot Road is the main through road.

Figure A – Maidenhead Road / Ascot Road junction

Image source: Google Maps. Image taken from A3095 Maidenhead Road; looking north.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Queue	Delay (s)	Queue	Delay (s)
Junction 1.1				
A330 Ascot Road	13	46.03	0	0.0
A3095 Maidenhead Road	1	11.95	0	9.53
A330 North	0	0.0	0	0.0
Junction 1.2				
A330 Ascot Road South	0	0.0	0	0.0
A3095 Maidenhead Road	4	25.30	0	7.55
A330 Ascot Road North	8	45.35	13	74.16
Junction 1.3				
A330 Ascot Road	0	0.0	0	0.0
A3095 Maidenhead Road	2	12.58	2	12.43
A330 North	31	127.87	90	402.49

4.7.16 The junction is modelled to operate with some level of delay on all three priority nodes whilst the A330 North arm is modelled to operate with significant levels of queuing. Note the Junctions 9 linked function has been used, therefore no RFCs are produced.

4.7.17 Whilst the 'linked junctions' function used to model this current junction arrangement is the most appropriate method for this particular junction, it is known that this function should be used with caution and should only be used as a guide as it has its limitations.

4.7.18 Observations of this junction in the existing scenario do not show queues to the extent shown within the modelling, however it is also clear that improvements will be required at this junction to cater for the additional forecast traffic in future scenarios.

4.7.19 As part of the Jealott's Hill development, a roundabout located to the south of the existing junction would provide continued access to Maidenhead Road, Ascot Road and to the development site, and would significantly increase capacity for all movements.

Figure B – A3095 Maidenhead Road / A330 Ascot Road with concept mitigation

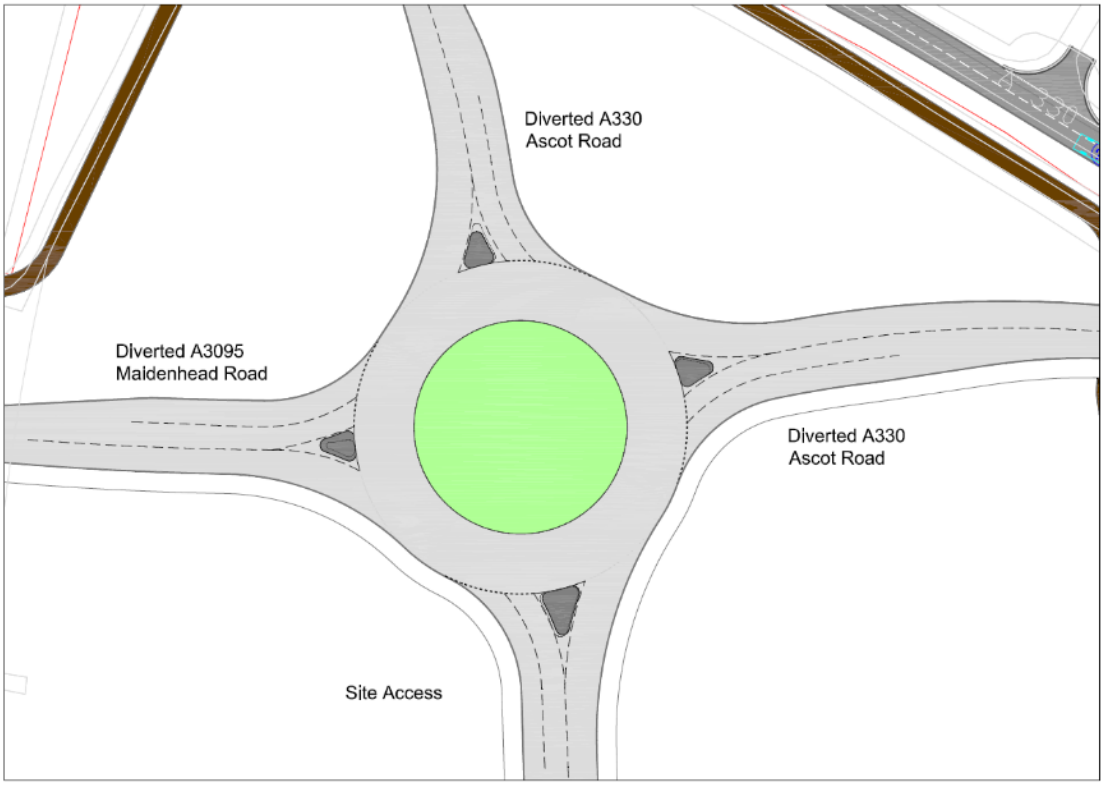

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
A330 Ascot Road North	0.49	1	4.57	0.88	8	20.12
A330 Ascot Road South	0.47	1	4.46	0.35	1	4.18
Syngenta Access	0.02	0	2.97	0.16	1	4.00
A330 Maidenhead Road	0.54	2	4.74	0.50	1	4.46

4.8 JOURNEY TIME ROUTES 11 & 12

4.8.1 Journey time Route 11 runs from the B3430 Nine Mile Ride between Honey Hill and Old Wokingham Road to the junction of the B3034 Forest Road / Braziers Lane / Locks Ride. Journey time Route 12 is the reverse of this route. The western end of this route is within Wokingham Borough. The journey times presented below cover these entire routes, but the analysis that follows assesses junctions within Bracknell Forest.

Table A – Routes 11 & 12 Journey Time Summary

Route	AM Peak Journey Time Route	2019 AM Base	2037 AM No BFLP	2037 AM BFLP	2037 AM BFLP Mit	2037 AM BFLP Mit + UTMC*
		Min:Sec	Min:Sec	Min:Sec	Min:Sec	Min:Sec
11	New Wokingham Road to Locks Ride via Nine Mile Ride & New Forest Ride	17:13	20:25	22:21	21:50	20:36
12	Locks Ride to New Wokingham Ride via New Forest Ride & Nine Mile Ride	16:05	17:19	17:50	17:52	16:57
Route	**PM Peak Journey Time Route**	**2019 PM Base**	**2037 PM No BFLP**	**2037 PM BFLP**	**2037 PM BFLP Mit**	**2037 PM BFLP Mit + UTMC***
		Min:Sec	Min:Sec	Min:Sec	Min:Sec	Min:Sec
11	New Wokingham Road to Locks Ride via Nine Mile Ride & New Forest Ride	16:10	18:05	18:48	18:50	17:46
12	Locks Ride to New Wokingham Ride via New Forest Ride & Nine Mile Ride	17:29	19:30	19:50	19:49	18:40

*The final column considers the impact of the added benefits of UTMC if this were to reduce delays at signals by just 12%. This is a most conservative estimate, as studies elsewhere have shown such systems can typically achieve between 12 – 27% reductions.

4.8.2 On Routes 11 and 12, the changes in overall journey times between 2019 and 2037 with BFLP are largely as expected and reflect the increase in travel demand that is predicted over that period.

4.8.3 The introduction of various mitigation schemes around the borough will always result in some movement of demand elsewhere as some routes become more or less attractive. This is reflected in the modest changes seen here when the schemes are introduced.

4.8.4 In the separate speed limit reduction sensitivity test detailed in paragraph 4.1.7, the recorded journey times in the AM peak were 21:36 for Route 11 and 17:12 for Route 12. In the PM peak, the recorded journey times were 18:10 for Route 11 and 19:10 for Route 12.

4.8.5 As mentioned above, the strategic model does not show the impact of additional network improvements such as UTMC. This has been demonstrated elsewhere to offer reductions in delays at signals of between 12 – 27%. Even the lowest value in this range of just 12% would see the 'with mitigation' times above fall below those for the 2037 BFLP scenario.

4.8.6 So, on this particular route we can expect journey time reductions in both peaks and directions following the introduction of mitigation schemes and UTMC.

JUNCTION 1 - B3430 NINE MILE RIDE / OLD WOKINGHAM ROAD ROUNDABOUT

4.8.7 This junction takes the form of a standard four-arm roundabout and is sited at the intersection of Old Wokingham Road / B3430 Nine Mile Ride. Each arm is a single carriageway approach flaring to two lanes at their respective entry points on to the roundabout.

Figure A – Nine Mile Ride / Old Wokingham Roundabout

Image source: Google Maps. Image taken from B3430 Nine Mile Ride; looking west.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Old Wokingham Road N	0.43	1	4.32	0.53	2	4.73
B3430 Nine Mile Ride East	0.36	1	3.45	0.46	1	4.32
Old Wokingham Road S	0.51	1	5.32	0.21	1	3.35
B3430 Nine Mile Ride West	0.49	1	5.95	0.44	1	4.50

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Old Wokingham Road N	0.53	2	4.92	0.71	3	7.36
B3430 Nine Mile Ride East	0.47	1	4.42	0.43	1	4.59
Old Wokingham Road S	0.56	2	6.07	0.30	1	3.76
B3430 Nine Mile Ride West	0.61	2	8.74	0.36	1	4.17

4.8.8 This junction is modelled to operate within capacity for the AM and PM peak hours in both the 2019 base and 2037 + BFLP scenarios.

JUNCTION 2 - TRL ROUNDABOUT - NINE MILE RIDE / TRL ACCESS

4.8.9 This junction is a three-arm standard roundabout providing access from the new TRL development via Buckler Ride to the B3430 Nine Mile Ride. Each arm is a single carriageway approach, flaring to two lanes at the entrance to the roundabout.

4.8.10 Pedestrians and cyclists are catered for via uncontrolled crossing points on Buckler Rise and the B3034 Nine Mile Ride East.

4.8.11 This junction has been modelled using turning flows from the 2019 base transport model

Figure A – TRL Roundabout existing highway layout

Image source: Google Maps. Image taken from TRL Access Arm; looking north.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Nine Mile Ride East	0.38	1	3.80	0.40	1	3.80
TRL Access	0.00	0	0.00	0.05	1	3.08
Nine Mile Ride West	0.50	1	4.51	0.47	1	4.29

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Nine Mile Ride East	0.47	1	4.75	0.46	1	4.43
TRL Access	0.33	1	4.09	0.19	1	3.46
Nine Mile Ride West	0.49	1	4.89	0.46	1	4.58

4.8.12 This junction is modelled to operate within capacity for the AM and PM peak hours in both the 2019 base and 2037 + BFLP scenarios.

JUNCTION 3 - GOLDEN RETRIEVER ROUNDABOUT

4.8.13 This junction is detailed as part of the analysis of the Journey Time Routes 5 & 6. Please refer to page 107 for details.

JUNCTION 4 - CORAL REEF SIGNALISED CROSSROADS

4.8.14 This junction is detailed as part of the analysis of the Journey Time Routes 1 & 2. Please refer to page 50 for details.

JUNCTION 5 - MARTINS HERON SIGNALISED CROSSROADS

4.8.15 This junction is detailed as part of the analysis of the Journey Time Routes 3 & 4. Please refer to page 81 for details.

JUNCTION 6 - LOCKS RIDE / LONG HILL ROAD

4.8.16 This junction is located to the north-east of the Town Centre and is at the intersection of the B3017 Locks Ride / B3017 Priory Road / Long Hill Road. It currently takes the form of a standard priority T-junction.

Figure A – Locks Ride / Long Hill Road junction

Image source: Google Maps. Image taken from B3017 Locks Ride; looking south.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Long Hill Road Left	0.44	1	20.26	0.19	1	8.57
Long Hill Road Right	0.80	4	40.03	0.58	2	18.46
B3017 Priory Road	0.02	0	7.33	0.04	0.0	7.65

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Long Hill Road Left	1.05	17	186.23	0.65	2	19.46
Long Hill Road Right	1.05	18	179.35	0.49	1	18.68
B3017 Priory Road	0.19	1	8.80	0.30	1	10.48

4.8.17 This junction is modelled to operate within capacity for both the AM and PM peak hours in the 2019 base scenario, although the right turn manoeuvre from the B3017 Locks Ride does operate marginally over capacity.

4.8.18 There are several challenges associated with any improvement to this junction, including the difference in gradient between Long Hill Road and the B3017 Locks Ride. Improvements to the junction are also hindered by land ownership and ensuring that the improvement can be located within the highway boundary.

4.8.19 Options for improvement revolved around changing the priority at the junction to make the main through route from Long Hill Road to the B3017 Locks Ride. The Priory Lane arm of the junction would need slight realignment to control speeds and safety at the junction.

4.8.20 This improvement is illustrated on Figure B with the existing kerb line shown in red.

Figure B – B3017 Locks Ride / Long Hill Road with concept mitigation

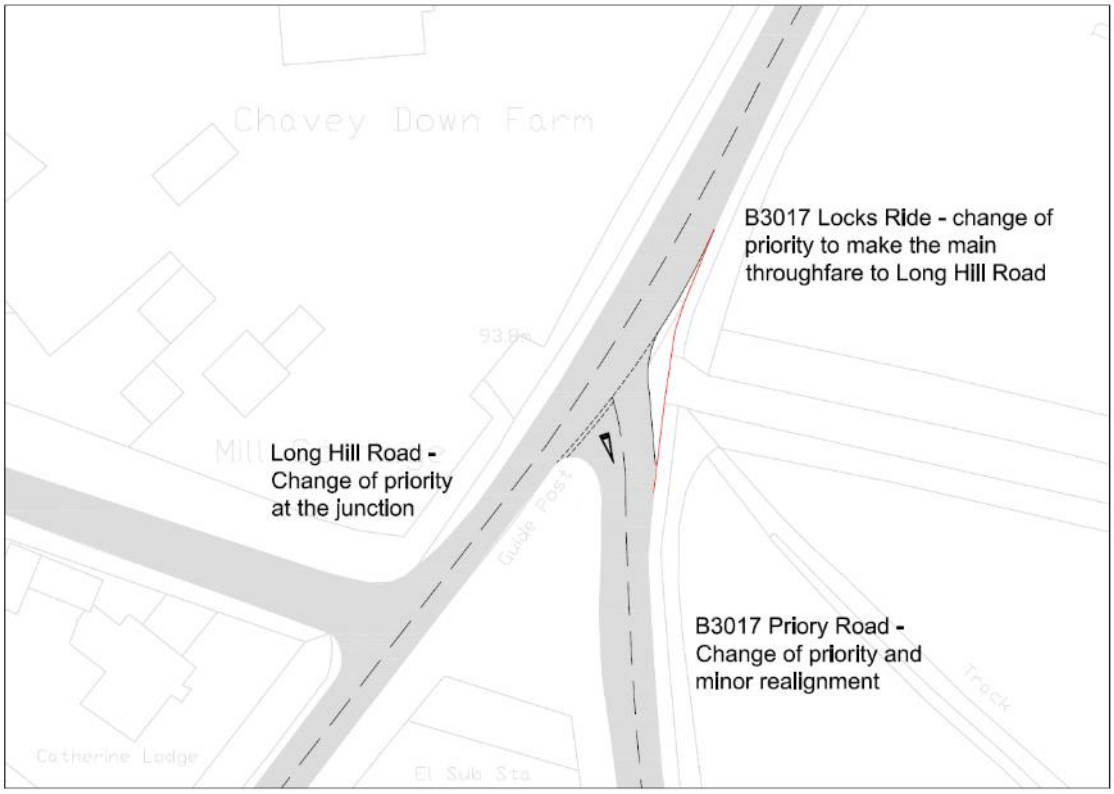

Table C – 2037 + BFLP + Mitigation Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
B3017 Priory Road Left	0.28	1	14.28	0.51	1	24.93
B3017 Priory Road Right	0.75	3	44.18	0.81	4	60.78
Long Hill Road	0.58	2	16.02	0.66	2	20.39

JUNCTION 7 - FOREST ROAD / LOCKS RIDE

4.8.21 This junction has been analysed as part of Journey Time Routes 7 & 8. Please refer to page 149 for details.

4.9 OTHER KEY JUNCTIONS

JUNCTION 1 – EASTHAMPSTEAD ROAD / OLD WOKINGHAM ROAD

4.9.1 Currently this junction is in the form of a standard T-junction at the intersection of Easthampstead Road and Old Wokingham Road. It has been subject to several safety studies in recent years; however, the safety record is still undesirable.

Figure A – Easthampstead Road / Old Wokingham Road junction

Image source: Google Maps. Image taken from Old Wokingham Road; looking south.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Easthampstead Road Left	0.19	1	10.93	0.13	1	9.46
Easthampstead Road Right	0.51	2	27.62	0.48	1	24.11
Old Wokingham Road North Right	0.29	1	6.04	0.24	1	4.89

4.9.2 An initial concept that was explored was the introduction of traffic signal control. This would reduce the conflict points at the junction resulting in an improvement to safety, whilst maintaining good levels of capacity through the junction

4.9.3 This concept design could be delivered within the highway boundary; however, consideration must be given to the private driveway to the east of the junction.

Figure B – Easthampstead Road / Old Wokingham Road with concept mitigation

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)		PM Peak (1700 – 1800)	
	Deg Sat (%)	Mean Max Queue	Deg Sat (%)	Mean Max Queue
Old Wokingham Road South	73.7%	10.6	47.0%	4.5
Easthampstead Road	14.6%	0.6	61.4%	3.1
Old Wokingham Road North	56.2%	6.5	76.9%	12.2
Cycle Time (s)	55		55	
Practical Reserve Capacity (%)	22.1		17.1	
Total Delay (pcuHr)	4.67		6.21	

4.9.4 This junction is modelled to operate within capacity for both the AM and PM peak hours in the 2019 base scenario.

JUNCTION 2 – WATERLOO ROAD / OLD WOKINGHAM ROAD

4.9.5 Located on the western boundary of the Borough, the junction of Waterloo Road / Peacock Lane / Old Wokingham Road currently takes the form of a priority junction which suffers with queuing and delay, particularly for the right turn movements into and out of Waterloo Road.

Figure A – Waterloo Road / Old Wokingham Road junction

Image source: Google Maps. Image taken from Peacock Lane; looking west.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Waterloo Road Left	0.31	1	12.74	0.44	1	14.65
Waterloo Road Right	0.34	1	33.28	0.41	1	38.3
Peacock Lane	0.57	3	10.10	0.79	8	15.85

4.9.6 There are currently significant levels of development being undertaken over the borough boundary in Wokingham, and as a result this junction is anticipated to face further traffic pressures generated by this.

4.9.7 Options for junction improvement were therefore investigated to mitigate these traffic pressures, with the most favourable being a roundabout. This would also be in keeping with the style of junction favoured further east along Peacock Lane and would allow for the connection of the existing footway / cycleway network in Bracknell to proposed new connections in Wokingham.

4.9.8 Figure B illustrates the concept roundabout, with the existing kerb lines indicated in red.

Figure B – Waterloo Road / Old Wokingham Road with concept mitigation

Table B – 2037 + BFLP roundabout Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Peacock Lane	0.59	2	5.18	0.82	5	11.72
Old Wokingham Road	0.48	1	4.11	0.38	1	3.60
Waterloo Road	0.75	3	11.82	0.76	4	11.46

JUNCTION 3 – POPESWOOD ROAD / ST. MARK'S ROAD

4.9.9 This junction is located to the west of the Town Centre in Binfield and takes the form of a standard priority T-junction with the minor arm being Popeswood Road.

Figure A – Popeswood Road / St. Mark's Road junction

Image source: Google Maps. Image taken from St. Mark's Road; looking south.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Popeswood Road Left	0.07	1	19.53	0.98	2	412.35
Popeswood Road Right	0.77	4	39.47	0.98	12	107.72
St Mark's Road South Right	0.03	1	8.90	0.02	1	7.40

4.9.10 This junction is under pressure in the PM peak, with Popeswood Road operating over capacity for both the right and left turn manoeuvres.

4.9.11 Due to the nature of the traffic flow interacting between these roads, it is proposed to alter the priority at the junction so the main through route is between St. Mark's Road North and Popeswood Road, with St Mark's Road South operating as the minor arm of the junction.

Figure B – Popeswood Road / St. Mark's Road with concept mitigation

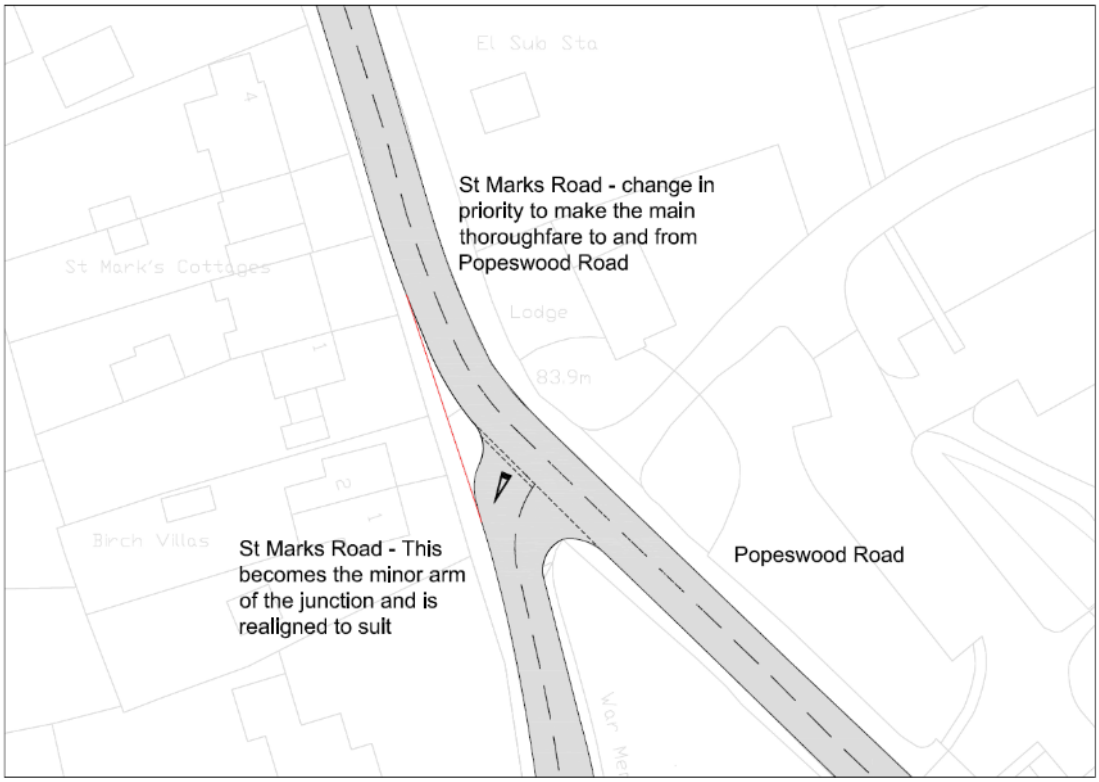

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
St Mark's Road South Left	0.38	1	10.13	0.46	1	12.24
St Mark's Road South Left	0.00	0	0	0.0	0	0.0
St Mark's Road North	0.59	2	17.72	0.41	1	12.99

4.9.12 As a result of the change in priority, the junction is predicted to operate well within capacity and with improved manoeuvrability at the junction.

JUNCTION 4 – MAIDENS GREEN CROSSROADS

4.9.13 This junction is situated in the north east of the Borough is at the intersection of the A330 Maidens Green / B3022 Bracknell Road / A330 Cocks Lane / Winkfield Lane. All the approach roads are single carriageway and subject to a 30mph speed limit.

Figure A – Maidens Green Crossroads

Image source: Google Maps. Image taken from A330 Maidens Green; looking west.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
B3022 Bracknell Road Left	0.76	3	44.23	0.53	2	16.72
B3022 Bracknell Road Right	0.78	4	53.62	0.46	1	20.72
A330 Maidens Green	0	0	0.00	0	0	5.03
Winkfield Lane Left	0.16	1	12.33	0.23	1	14.07
Winkfield Lane Right	0.17	1	12.31	0.23	1	13.47
A330 Cocks Lane	0.24	1	6.95	0.29	1	7.58

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
B3022 Bracknell Road Left	1.11	25	227.03	0.70	3	36.62
B3022 Bracknell Road Right	1.09	17	252.97	0.72	3	52.39
A330 Maidens Green	0.00	0	0.00	0.00	0	0.00
Winkfield Lane Left	0.11	1	12.31	0.12	1	12.97
Winkfield Lane Right	0.11	1	11.93	0.12	1	12.53
A330 Cocks Lane	0.26	1	6.68	0.61	3	14.23

4.9.14 This junction is modelled to operate within capacity for both the AM and PM peak hours in the 2019 base scenario, however due to the impacts from the development proposed at Jealotts Hill the junction is modelled to exceed capacity in the 2037 + LP scenario.

4.9.15 This junction has been subject to several safety schemes in the past due to the accident record surrounding it. Therefore, it is proposed to change the form of the junction to a three-arm roundabout approximately 45m to the south east of the existing junction, with Winkfield Lane now joining the A330 Cocks Lane at a T-junction. The proposed changes will require land to be acquired outside the highway boundary but will create more capacity, reduce speeds and improve safety. This improvement will also reduce pressure on other roads in the area such as Malt Hill and Maidenhead Road at the Three Legged Cross junction.

Figure B – Maiden's Green with concept mitigation

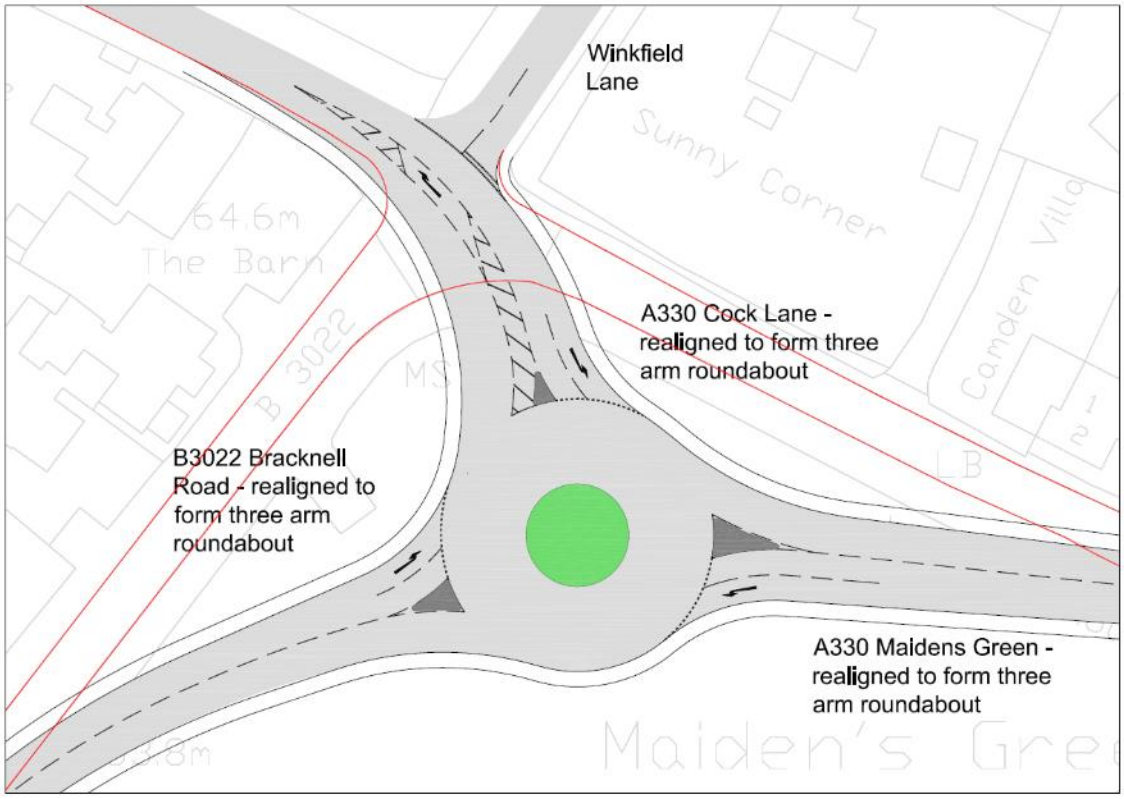

Table C – 2037 + BFLP with mitigation Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
A330 Maidens Green	0.20	1	2.87	0.23	1	3.15
B3022 Bracknell Road	0.46	1	5.08	0.32	1	4.04
A330 Cocks Lane	0.32	1	3.69	0.34	1	3.70

4.9.16 The junction is modelled to operate within capacity with significant improvements to queuing and delay.

JUNCTION 5 – HIGH STREET, CROWTHORNE

4.9.17 Currently, the junction between the B3348 Bracknell Road, B3348 Duke's Ride and High Street is a mini roundabout. The junction is currently modelled to be over capacity with queues stretching along High Street in the AM Peak and Bracknell Road in the PM peak. It is noted that the proximity of the junction of the B3348 Bracknell Road and Upper Broadmoor Road reduces the available stacking space at the junction.

Figure A – High Street existing highway layout

Image source: Google Maps. Image taken from B3348 Bracknell Road; looking west.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
B3348 Bracknell Road	0.94	11	47.23	0.94	11	44.91
High Street	1.00	18	98.82	0.72	3	18.744
B3348 Duke's Ride	0.82	5	29.37	0.50	1	9.36

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
B3348 Bracknell Road	0.97	15	60.61	0.89	8	30.90
High Street	1.02	21	112.33	0.75	3	21.48
B3348 Duke's Ride	0.92	9	54.80	0.51	2	10.39

4.9.18 This junction is modelled to operate over capacity in both the AM and PM peaks, particularly the AM peak with significant queueing levels seen on both the B3348 Bracknell Road and High Street.

4.9.19 The mitigation measure to resolve this is to increase the size of the mini roundabout, re-align the kerb-lines at the entry to High Street and on the B3348 Bracknell Road and provide more capacity at the mini roundabout. Upper Broadmoor Road will also be realigned to provide more queuing capacity on the B3348 Bracknell Road.

Figure B – High Street, Crowthorne with concept mitigation

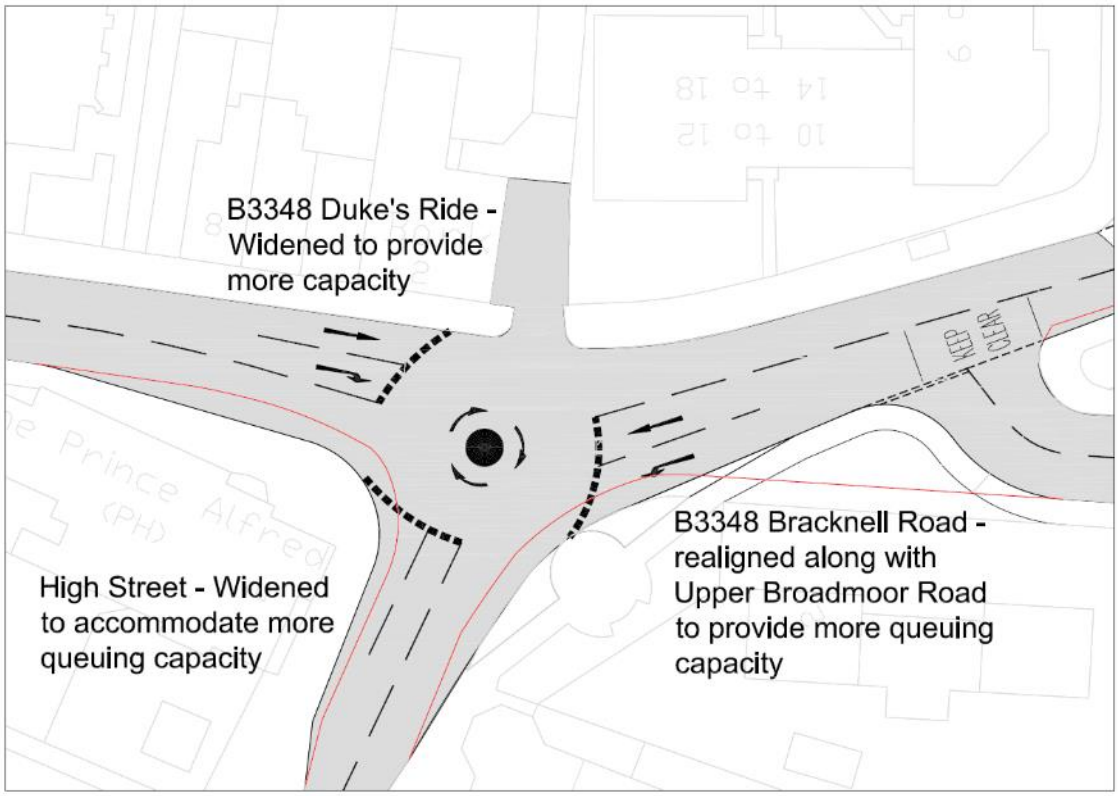

Table C – 2037 + BFLP + Mitigation Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
B3348 Bracknell Road	0.75	3	11.69	0.70	3	9.22
High Street	0.79	4	20.61	0.59	2	10.11
B3348 Duke's Ride	0.72	3	15.27	0.40	1	6.50

4.9.20 The mitigation measures introduced offer a significant improvement in all modelled scenarios.

JUNCTION 6 – COUNTY LANE ROUNDABOUT

4.9.21 Currently, the junction between the County Lane and Jigs Lane North is a standard roundabout providing access to a large supermarket. The junction is currently modelled to be operate within capacity; however, it is approaching capacity in the PM peak.

Figure A – County Lane Roundabout existing highway layout

Image source: Google Maps. Image taken from County Lane; looking west.

Table A – 2019 Base Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Jigs Lane North (N)	0.49	1	5.81	0.84	5	20.19
County Lane (E)	0.32	1	5.07	0.21	1	5.68
Jigs Lane North (S)	0.31	1	4.21	0.58	2	6.66
County Lane (W)	0.67	2	7.25	0.65	2	6.83

Table B – 2037 + BFLP Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Jigs Lane North (N)	0.58	2	6.98	0.90	8	29.01
County Lane (E)	0.37	1	5.54	0.27	1	6.36
Jigs Lane North (S)	0.32	1	4.30	0.57	2	6.95
County Lane (W)	0.72	3	9.40	0.63	2	6.94

4.9.22 The 2037 + BFLP PM scenario shows capacity to be exceeded with increasing levels of queuing and delay.

4.9.23 The mitigation measure to resolve this is to introduce additional flaring on the northern arm of the roundabout to generate more capacity.

Figure B – County Lane Roundabout with concept mitigation

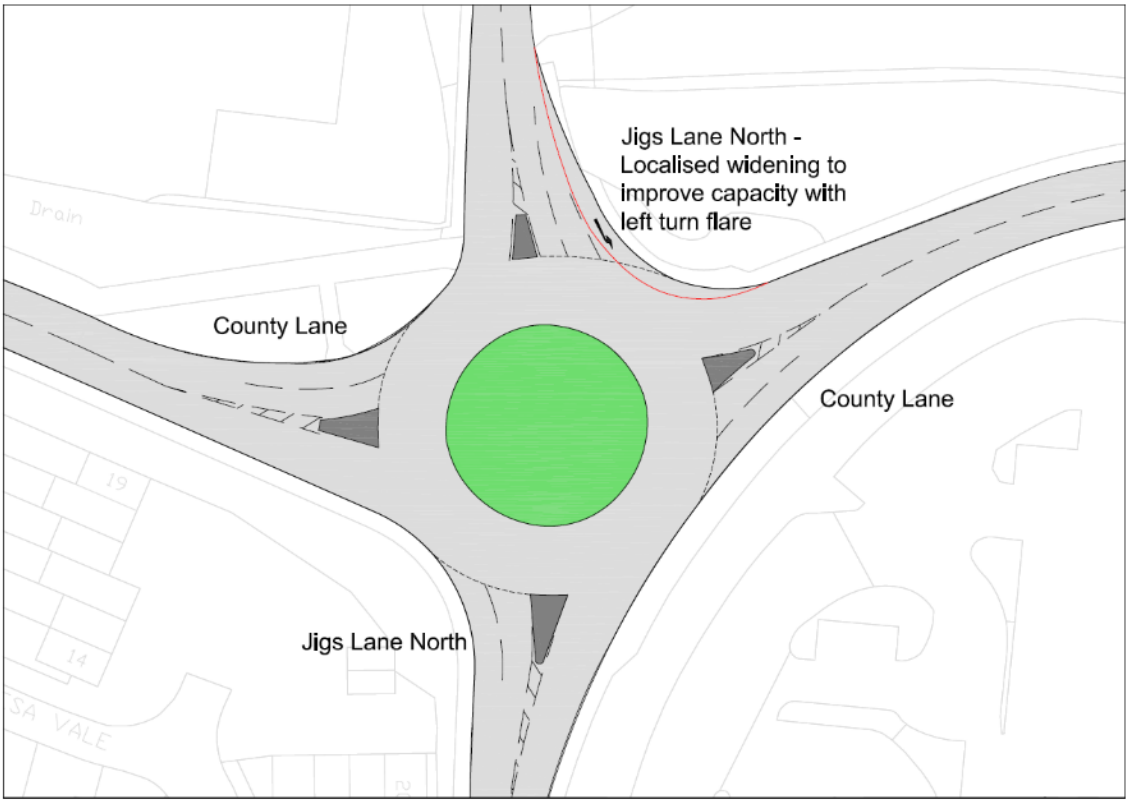

Table C – 2037 + BFLP + Mitigation Modelling Outputs

	AM Peak (0800 – 0900)			PM Peak (1700 – 1800)		
	RFC	Queue	Delay (s)	RFC	Queue	Delay (s)
Jigs Lane North (N)	0.48	1	4.74	0.74	3	10.32
County Lane (E)	0.37	1	5.54	0.27	1	6.38
Jigs Lane North (S)	0.32	1	4.30	0.57	2	6.97
County Lane (W)	0.72	3	9.40	0.63	2	6.94

4.9.24 The mitigation measure introduced offers a significant improvement to the PM peak scenario.

5 Summary

5.1.1 Whilst the modelled journey times considered in this report reflect a ‘business as usual’ trend of growth, there are many unknown variables that could have an effect on our travel patterns and habits in the period to 2037. The Covid-19 pandemic showed just how quickly accepted norms and assumptions could be turned upside-down, and it no doubt accelerated trends driven by technology which will continue to evolve throughout the life of this plan.

5.1.2 BFC is committed to exploring, developing and delivering on advancements in future mobility technologies, particularly where they show the potential to improve accessibility and quality of life for residents of the Borough. These technologies will likely complement our collective efforts towards carbon neutrality by 2050 and actions to improve air quality, and continue to make Bracknell Forest an appealing, attractive place to live and work

Specific junctions – Reference index

Direct links

Appendix A – Cycle Network Improvements

Cycle Network Improvements for investigation

Location	Parish
Tilehurst Lane / York Road	Binfield
Tilehurst Lane / York Road	Binfield
Forest Road to Temple Way (adj Binfield Road)	Binfield
Beehive Road (to junction with Cain Rd)	Binfield
Jocks Lane (lighting scheme)	Binfield
Murrell Hill Lane (lighting scheme)	Binfield
London Road	Binfield
Warfield Rd/Holly Spring/Sandy Lane junction improvement (LCWIP)	Bracknell Town
Bay Rd/Deepfield Rd junction improvement (LCWIP)	Bracknell Town
Opladen Way (LCWIP)	Bracknell Town
Reeds Hill/Haversham Drive/Redvers Rd junction improvement (LCWIP)	Bracknell Town
Pndmoor Rd/Redvers Rd junction improvement	Bracknell Town
Kennel Lane/ Shepherds Lane junction improvement	Bracknell Town
Lily Hill Road	Bracknell Town
Nine Mile Ride Footpath(TRL to Coral Reef)	Bracknell Town
Nine Mile Ride (TRL to Pinewood roundabout)	Bracknell Town
Quintilis	Bracknell Town
Ringmead - Quintillis to Coral Reef (LCWIP)	Bracknell Town
Ringmead - Woodenhill to Vandyke (LCWIP)	Bracknell Town
Shepherds Lane (LCWIP)	Bracknell Town
South Road (TRL to EPC)	Bracknell Town
Stoney Road/Binfield Rd/Shepherds Lane junction improvement	Bracknell Town
Woodenhill	Bracknell Town

Wildridings Road (link adjacent - to existing footway cycleway)	Bracknell Town
Market Street (Skimped Hill Lane to Peel Centre link) (LCWIP)	Bracknell Town
Peacock Lane (Jennetts Park) to Waterloo Road and Wokingham S. Dist Road	Bracknell Town
Toucan crossing by Frampton Bridge roundabout	Bracknell Town
Dukes Ride (from Crowthorne rail station to Bracknell Rd)	Crowthorne
Sandhurst Road	Crowthorne
South Road (Rackstraw to Lower Broadmoor Rd)	Crowthorne
Cheviot Footpath	Sandhurst Town
Magdalene Road / College town Road / Yorktown Road	Sandhurst Town
Park Road	Sandhurst Town
Rackstraw Road - from South Road to Snaprails	Sandhurst Town
Rackstraw Road - from South Road to Magdalene Road (south side)	Sandhurst Town
The Broadway	Sandhurst Town
Yorktown Road - extend existing route from Mem Park to Swan Lane	Sandhurst Town
Wellington Road	Sandhurst Town
Crowthorne Road (by Sandhurst rail station)	Sandhurst Town
High St (Sandhurst, Lower Church Rd to Rail station)	Sandhurst Town
Holly Spring Lane	Warfield
County Lane (by Tesco delivery entrance)	Warfield
Fernbank Rd	Winkfield
New Road	Winkfield
Forest Road (from Strawberry Hill to Chavey Down Road)	Winkfield
Forest Road (from Chavey Down Road to Hatchet Lane)	Winkfield
Hatchet Lane	Winkfield
Locks Ride (inc. Long Hill Rd)	Winkfield

Local Cycling and Walking Infrastructure Plan
https://www.bracknell-forest.gov.uk/sites/default/files/documents/local-cycling-and-walking-infrastructure-plan.pdf