BEGBROKE SCIENCE PARK

Transport Assessment

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1 Introduction

1.1 Background

1.1.1 IMA Transport Planning has been commissioned by the Chancellor, Masters and Scholars of the University of Oxford (University of Oxford) to advise on transport matters relating to development proposals at the Begbroke Science Park (BSP).

1.1.2 The University of Oxford is seeking to renew the time-expired outline permission for the development of the site (15/00309/OUT), previously described as the 'long term phase of site development' at BSP.

1.1.3 In August 2005 outline planning permission was granted for application 01/00664/OUT which was for an 'interim phase' of development at BSP (the 2005 permission). In April 2014 outline planning permission was granted for application 01/00662/OUT (the 2014 permission) which was for a 'long term phase' of development at BSP. An application for the variation of Condition 4 of the long-term phase of development (relating to the requirement for the development to be in accordance with a specified drawing) was granted consent on 20th May 2015 (application reference 15/00309/OUT – the 2015 permission).

1.1.4 The proposed development is intended to be in substantial accordance with the principles established through the 2014 and the 2015 outline permissions.

1.1.5 The long-term phase of the development allowed the floorspace on site to increase by around 21,236m^2 and a development pursuant to the long-term phase has been constructed on site (application reference 15/01105/REM) along with other development (e.g. 05/00845/F).

1.1.6 Condition 2 of outline permission 15/00309/OUT stated that:

> *In the case of reserved matters, application for approval shall be made not later than 1 May 2017.*

1.1.7 Hence, the outline consent relating to those areas for which reserved matters approval has not been granted has now lapsed.

1.1.8 The University of Oxford is seeking to obtain a new consent to allow development of those elements of the time-expired consent at Begbroke Science Park broadly in accordance with the principles established through the 2005 and 2015 permissions.

1.1.9 Preliminary discussions have been undertaken with Oxfordshire County Council (OCC) acting in its capacity as the Local Highway Authority (LHA) regarding the proposed trip prediction, parking provision and scope of assessment. OCC provided the following guidance in relation to consideration of future transport improvements.

- **A40-A44 Link Road** – OCC is undertaking further planning and modelling of the link road to take account of West Oxfordshire and Cherwell District Councils' Local Plan work. The link road currently does not have its full allocation of funding and also does not yet have planning permission. All of this could make delivery by 2020 challenging. OCC therefore advise that a sensitivity test is undertaken with and without the link road.
- **Eynsham P&R** site does not yet have planning permission and therefore is not permitted development. The planning application for the P&R will be submitted later this year. Subject to planning the P&R will open in 2020/21, so it should be included as a transport scheme in the 2025 assumptions as committed infrastructure.

1.2 Scope of Report

1.2.1 The Transport Assessment report firstly describes the site, including a review of the planning history of the site. The relevant National, Regional and Local Transport policy as it relates to the development in the local authority of Cherwell is then described.

1.2.2 The baseline transport data is described in Section 4 and the proposed development is described in Section 5.

1.2.3 Section 6 provides a prediction of travel demand associated with the development and Sections 7 and 8 then consider the transport implications of the proposed development. Finally, Section 9 summarises the key points of the report and conclusions are drawn.

2 Development Site

2.1 Site Description

2.1.1 Begbroke Science Park is located approximately 8km to the north-west of Oxford. Plan 1 shows the location of Begbroke Science Park. The existing layout of the site is shown on Plan 2.

2.1.2 Access to Begbroke Science Park is from the A44 Woodstock Road via a signal-controlled junction at Begbroke Hill, which was provided in association with the interim phase of development at the Science Park.

2.1.3 The former access to the site from Sandy Lane has been closed to general vehicular traffic since the opening of the new Begbroke Hill access road into the site, but still provides access to the site for pedestrians and cyclists. It also provides for emergency access.

2.1.4 Following the completion of the most recent major development on site, the extension to Centre of Innovation and Enterprise (CIE), around 14,200m^2 gross floor area (GFA) is currently provided at the Science Park.

2.1.5 There are around 30 companies and over 20 research groups currently at Begbroke Science Park. Companies at the Science Park are mainly science and research based, some of them University spin-outs, and many have links with either Oxford University or other local research-based organisations. Researchers from the Mathematical, Physical & Life Sciences and Medical Sciences Divisions of Oxford University work in inter-disciplinary groups at the Science Park.

2.1.6 At present, between 400 and 450 people (staff, researchers/Post-docs and employees) are typically based at the Begbroke Science Park on any one day. The existing split between University staff/researchers/Post-docs and employees of companies based at the Science Park is 50:50 ± 10, i.e. it oscillates in the range of 40:60 to 60:40 over time depending on individual research group and company makeup.

2.1.7 Conferencing and meeting facilities are provided at the Science Park and currently there are five versatile rooms on site, which can cater for events and meetings of between 5 and 90 guests (i.e. ancillary D1 use).

2.1.8 The grounds of the Science Park offer the scope for larger events, with capacity for up to 200 guests through the use of marquees, although such large events are rare (typically less than one per year). The University also runs a programme of Schools Events at the Science Park.

2.1.9 Parking for conferences and other events is controlled by Begbroke Science Park with all visitors to the site having to display a visitor's permit which is valid only for the day of the event.

2.1.10 Parking occurs in three main areas on site. There is a formal car park in the south-east corner of the site of 76 spaces (including 4 disabled spaces). There are also two unsurfaced and unmarked parking areas, one in the north-west corner of the site, adjacent to the main site entrance and one in the north-east corner of the site, the latter being signed as conference parking. It is understood that due to the poor surface in the parking area adjacent to the vehicle access road (Begbroke Hill) users on site are currently being advised to park in the conference parking area instead.

2.2 Planning History

2.2.1 Outline applications relating to an interim and a long-term phase of development at Begbroke Science Park were both submitted in 2001 and approved in 2005 and 2014 respectively (01/00664/OUT and 01/00662/OUT). The interim phase of the development, the CIE building and the IAT/OGT building, has been fully

implemented. Car parking on site associated with the interim phase of development was limited to 160 spaces.

2.2.2 The outline application for the long-term phase of development (01/00662/OUT) provided consent for additional research buildings at Begbroke Science Park with up to 21,236m2of further floorspace. Car parking on site associated with the long-term phase of development was limited to not more than 260 spaces.

2.2.3 An application for the variation of Condition 4 (relating to the requirement for the development to be in accordance with a specified drawing) of the long-term phase of development (01/00662/OUT) was granted consent on 20th May 2015 (application reference 15/00309/OUT).

2.2.4 Condition 2 of outline application 15/00309/OUT stated that:

> *In the case of reserved matters, application for approval shall be made not later than 1 May 2017.*

2.2.5 Hence, the outline consent relating to those areas for which reserved matters approval has not been granted has now lapsed. The outline planning consent (ref 01/00662/OUT) included a number of restrictions regarding the type of development which can be provided at Begbroke Science Park. Condition 6 was worded as follows:

> *No more than 20% of the approved floorspace shall be occupied by uses falling within Class B1(a) of the Schedule to the Town and Country Planning (Use Classes) (Amendment) (England) Order 2005.*

2.2.6 Condition 7 was worded as follows:

> *Other than what is permitted by condition 6, the premises shall be used only for the purposes falling with class B1(b) and B1(c) and ancillary D1 uses as specified in the Schedule to the Town and Country Planning (Use Classes) (Amendment) (England) Order 2005 and for no other purpose.*

2.2.7 Condition 8 was worded as follows:

> *Further to condition 7, the premises shall only be occupied where consultation and liaison with staff of the University of Oxford or another research institution or company within Oxfordshire is an integral part of the research and development process, and shall not involve any manufacture other than the manufacture of prototypes.*

2.2.8 The same reason was given in relation to the above 3 conditions, that being:

> *Reason - In order to maintain the research and development focus of the Begbroke Science Park and to comply with Government Guidance contained within the National Planning Policy Framework.*

2.2.9 The first reserved matters application associated with the long-term phase of development for an extension to the CIE building was consented in June 2015 (application reference 15/01105/REM) and has been fully constructed.

2.3 Extent of Assessed Highway Network

2.3.1 This transport assessment will consider the implications of the proposed development on the following junctions and the links in between:

- A44/Begbroke Hill signal junction (site access);
- A44/Fernhill Road/Spring Hill Road roundabout;
- A44/Langford Lane signal junction;
- A44/A4095 (Bladon) roundabout junction;
- A44/Sandy Lane roundabout junction;

- A44/Cassington Road roundabout junction and
- A44/A4260 (Loop Farm) roundabout junction.

3 Transport Planning Policy

3.1 Introduction

3.1.1 This section provides an overview of planning policy in terms of transport as it currently relates to research and development schemes in the district of Cherwell.

3.1.2 The following national and local policy documents are considered:

- National Planning Policy Framework (March 2012)
- Connecting Oxfordshire – Local Transport Plan 2015-2031
- Cherwell District Local Plan

3.2 National Planning Policy Framework (March 2012)

3.2.1 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England, and how they are expected to be applied by local authorities when producing their own Development Plans, Neighbourhood Plans and undertaking development management.

3.2.2 A presumption in favour of sustainable development lies at the core of the Framework, which quotes a United Nations General Assembly definition of sustainable development as meeting the needs of the present without compromising the ability of future generations to meet their own needs.

3.2.3 With specific reference to transport, the core principles set out in paragraph 17 states that planning should:

> *"Actively manage patterns of growth to make the fullest possible use of public transport, walking and cycling, and focus significant development in locations which are or can be made sustainable."*

3.2.4 Section 4 of the NPPF addresses the duty of local authorities to promote sustainable transport within and around their area. It requires developments that generate significant travel demand to be supported by a Transport Statement or Assessment, and states that planning policies and decisions should consider whether:

- The opportunities for sustainable transport modes have been taken up… to reduce the need for major transport infrastructure;
- Safe and suitable access to the site can be achieved for all people;
- Improvements can be undertaken… that cost effectively limit the significant impacts of the development.

3.2.5 Subject to those considerations, the NPPF states that development should not be prevented or refused on transport grounds unless the residual impacts of development are severe.

3.2.6 The locational themes of the previous PPG13 are preserved in the NPPF, with a balance of land uses encouraged to minimise journey lengths and enable travel by more sustainable modes. Development that generates significant movement should be located to minimise the need to travel, whilst maximising use of sustainable modes. Developments should be located and designed to:

- Accommodate the efficient delivery of goods and supplies;
- Give priority to pedestrian and cycle movements, and have access to high quality public transport facilities
- Create safe and secure layouts which minimise conflicts between traffic and cyclists or pedestrian;

- Incorporate facilities for charging plug-in and other ultra-low emission vehicles; and
- Consider the needs of disabled people by all modes of transport.

3.2.7 Travel Plans are recognised as a key tool in facilitating the above aims and will be expected from all developments that generate significant amounts of movement.

3.2.8 With regards to parking, paragraph 39 states that when setting local parking standards for development, local planning authorities should take into account the accessibility of the development, the type, mix and use of development, the availability of and opportunities for public transport, local car ownership levels, and an overall need to reduce the use of high-emission vehicles.

3.2.9 In addition, the NPPF states that in order to provide the social, recreational, and cultural facilities and services the community needs, planning policy and decisions should plan positively for the provision and use of shared space, and ensure that established shops, facilities and services are able to develop and modernise in a sustainable manner, so that they are retained for the benefit of the community.

3.3 Connecting Oxfordshire – Local Transport Plan 2015-2031

3.3.1 The Local Transport Plan for Oxfordshire contains several provisions that are directly relevant to proposed development at Begbroke. These include:

- Proposals for a park and ride at Upper Campsfield Road (Oxford Airport – labelled, erroneously, as Langford Lane on some plans)
- Proposals for premium bus routes on the A44, and Rapid Transit Routes via Kidlington
- A Science Transit Strategy that defines a high-level vision for the use of technology to integrate transport modes

3.3.2 The location of the proposed Oxford Airport P&R would be well placed to intercept trips inbound to Oxford from the A44/A4260 north. Bus services to the P&R site would be likely to route via the A44/Langford Lane/A4260 (through Kidlington) and so could additionally serve Oxford Airport. It is understood the site would provide around 1100 spaces.

3.3.3 The premium bus services would be relatively high frequency and will involve high quality vehicles. The services would generally focus on the city centre and serve more distant settlements and park and ride locations. The rapid transit routes would be higher frequency and serve the eastern arc (John Radcliffe, Headington, Oxford Business Park) as well as the city centre.

3.3.4 With regards to transport infrastructure of relevance to Begbroke, the Local Transport Plan includes an A40/A44 link as a strategic objective, which would improve road transport connections between the A44 (which provides access to Begbroke) and the A40 (west) without the need for traffic to pass use the A34 Pear Tree Roundabout, the A4144/A40 Wolvercote Roundabout and the link between those two junctions, which includes the access to the Pear Tree Park and Ride.

3.4 Cherwell District Local Plan Parts 1 and 2 (2011-31)

3.4.1 Part 1 of the Cherwell Local Plan, covering the needs of Cherwell District, has been adopted and is now the statutory development plan for much of the district.

3.4.2 Policy Kidlington 1: Accommodating High Value Employment Needs indicates that Cherwell District Council will undertake a small scale local review of the Green Belt to accommodate identified high value employment needs at two distinct and separate locations:

(A) Langford Lane/Oxford Technology Park/London Oxford Airport; and

(B) Begbroke Science Park

3.4.3 The policy states that amongst other things a Transport Assessment and Travel Plan should accompany any development proposals which should show how public transport links to the area will be improved.

3.4.4 Policy SLE 4: Improved Transport and Connections indicates that Cherwell District Council will support the implementation of the proposals in the Movement Strategies and the Local Transport Plan to deliver key connections, to support modal shift and to support more suitable locations for employment and housing growth.

3.4.5 Policy SLE 4 states that:

New development in the District will be required to provide financial and/or in-kind contributions to mitigate the transport impacts of development.

All developments where reasonable to do so, should facilitate the use of sustainable modes of transport to make the fullest possible use of public transport, walking and cycling. Encouragement will be given to solutions which support reductions in greenhouse gas emissions and reduce congestion. Development which is not suitable for the roads that serve the development and which have a severe traffic impact will not be supported.

3.4.6 Policy INF 1: Infrastructure states that the Council's approach to infrastructure planning in the District will identify the infrastructure required to meet the District's growth, to support strategic site allocations and to ensure delivery by:

Working with partners, including central Government, and other local authorities, to provide physical, community and green infrastructure

Identifying infrastructure needs and costs, phasing of development, funding sources and responsibilities for delivery

Completing a Developer Contributions SPD to set out the Council's approach to the provision of essential infrastructure including affordable housing, education, transport, health, flood defences and open space

Development proposals will be required to demonstrate that infrastructure requirements can be met including the provision of transport, education, health, social and community facilities.

3.4.7 Specific schemes and projects are included in the Infrastructure Delivery Plan in Appendix 8 of the Local Plan. Extracts from the Council's Infrastructure Delivery Plan Update dated December 2017 Kidlington and Rural Areas Projects are included as Appendix 1 of this report.

3.4.8 The Interactive Local Plan Appendix B on Cherwell's website includes parking standards for new development within the District. Begbroke Science Park lies within a Type 2 area and the maximum parking standards for B1 land use in a Type 2 area is 1 space per 30sm^2.

3.4.9 Part 2 of the Plan, which is currently in preparation, will contain detailed planning policies to assist the implementation of strategic policies and the development management process. It will also identify smaller, non-strategic development sites for housing, employment, open space and recreation, travelling communities and other land uses, in accordance with the overall development strategy set out in Local Plan Part 1.

3.4.10 It will also include a small-scale Green Belt Review to accommodate the expansion of the Science Park beyond its current boundaries as exceptional circumstances exist to deliver employment growth in this location (established at the Part 1 stage).

3.4.11 A partial review of the Cherwell Local Plan Part 1 is currently in progress, this review being specifically directed at helping to address Oxford's unmet housing needs, and makes specific reference to sites being well connected to Oxford.

3.4.12 There is no specific reference to sites being well connected to each other or to their immediate locality, although the need to create balanced and sustainable communities and to respect the Cherwell (district) context can be regarded as identifying this need in general terms.

3.4.13 Overall the Cherwell Local Plan Part 1 Review identifies 7 sites that would jointly provide a total of 4400 dwellings and associated facilities as part of the Oxford housing needs provision, with other districts also contributing towards Oxford's unmet housing needs.

3.4.14 One of these sites, PR8 is on land surrounding and including the Begbroke Science Park. This proposed allocation is the largest of the sites and would provide some 1950 dwellings. Provision is also made in the proposed allocation for primary and secondary schools, a local centre, the reservation of land to provide a rail halt/station, and the reservation of 14.7Ha of land for the potential expansion of the Begbroke Science Park.

3.4.15 The review also sets out requirements for transport infrastructure to be provided to facilitate travel to and from the proposed allocation sites, and to mitigate the transport impacts, some of which would be provided as part of the allocation, with the more strategic elements being funded through CIL/developer contributions.

3.4.16 Strategic transport improvements include the London Oxford Airport Park and Ride, and improvements to the A44 and A4260 corridors, most notably to provide improved public transport, cycling and walking facilities. These requirements are in line with the Oxford Transport Strategy, which sets out that the provision of more road space is not an option, and so places the emphasis on park & ride, mass transit, walking and cycling, and the management of traffic and travel demand.

4 Baseline Transport Conditions

4.1 Introduction

4.1.1 This section considers baseline transport data, starting with the non-car modes of travel, to establish the existing accessibility of the site.

4.1.2 The University's website provides information regarding sustainable travel to Begbroke Science Park, as can be seen from the link below:

http://www.begbroke.ox.ac.uk/home/contact-us/getting-here

4.2 Pedestrian Access

4.2.1 The main points of pedestrian access to Begbroke Science Park are from the A44, via Begbroke Hill (the main access into the site), and from Sandy Lane.

4.2.2 A shared foot/cycleway runs along the northern side of Begbroke Hill access road into the site, this linking with the shared footway/cycleways that run north-south along both sides of the A44 Woodstock Road at this point.

4.2.3 Signalised pedestrian crossing facilities are provided across Begbroke Hill and the northern arm of the A44 Woodstock Road as part of the traffic signal controlled junction.

4.2.4 The access to the site from Sandy Lane is, since the opening of the Begbroke Hill access, closed to general vehicular traffic but can be used by pedestrians and cyclists. It also provides for emergency access.

4.2.5 Footways are provided on Sandy Lane to the west of the Begbroke Science Park access. Immediately west of the access, a private shared footway/cycleway has been provided by the University just inside the existing hedged boundary on the north side of Sandy Lane. This links in with the adopted footway on the north side of Sandy Lane some 220m west of the site access.

4.2.6 From this point westwards, a continuous but narrow footway is provided on the south side of Sandy Lane, but the footway on the north side terminates just west of Livingstone Close, then recommences around 125m west, immediately west of the access to Yarnton Nurseries Garden Centre. From here it continues to around 35m past Poppy Close, where it terminates again. There is then no footway through to the A44 on the north side of Sandy Lane, a distance of around 100m. Hence footway provision on the north side of Sandy Lane to the west of the Begbroke Science Park access is intermittent.

4.2.7 To the east of the Begbroke Science Park access there is no provision for pedestrians between the site access and the Oxford Canal, a distance of some 1.2km. Sandy Lane is rural in nature. At a point around 50m west of the Science Park access, the speed limit changes from 30mph to the national speed limit of 60mph, and the 60mph speed limit then applies eastwards to just south of the Oxford Canal, where it changes to 30mph, entering the urban area of Kidlington.

4.2.8 The public footpaths running through and close to the site are shown in the inset on Plan 1.

4.2.9 Public footpaths 124/8 and 420/3 run along the eastern side of the Science Park access from Sandy Lane, with public footpath 124/8 then following the south-eastern and eastern Begbroke Science Park boundary. From the north-eastern corner of the site boundary, public footpath 124/8 continues to head northwards and connects to public footpath 124/7, which runs in a broad east-west alignment and provides a connection to Kidlington to the east by way of Partridge Place. This requires walkers to cross the railway line by way of a signalled pedestrian level crossing. The above footways are unlit and unmade, and in wet conditions muddy, making them unsuitable for continuous access.

4.2.10 The residential areas of Yarnton, to the south of the Science Park are within walking distance of the site.

4.2.11 The University of Oxford agreed, as part of a Section 106 Agreement dated August 2005, to provide a new signal controlled pedestrian crossing across the A44 in the vicinity of the A44 roundabout with Sandy Lane. This obligation has been discharged through Oxfordshire County Council, on behalf of the University, providing a new pedestrian crossing across the A44 in the vicinity of Gravel Pits Lane, as shown on Plan 1.

4.3 Cycle Access

4.3.1 Cycle access to Begbroke Science Park is also from the A44 Woodstock Road, via Begbroke Hill, or from Sandy Lane. Plan 3 shows the existing cycle network in the vicinity of the site.

4.3.2 A shared foot/cycleway runs along the northern side of the Begbroke Hill access road into the site and signalised crossing facilities are provided at the site access junction with the A44 Woodstock Road as described above.

4.3.3 The access from Sandy Lane is closed to general vehicular traffic but can be used by cyclists. A short section of off-road shared foot/cycleway adjacent to Sandy Lane is provided to the west of the Science Park access along the southern boundary of the site. Sandy Lane is a relatively lightly trafficked road and is considered to be a suitable route for cyclists to use.

4.3.4 The shared cycleway along the western side of A44 Woodstock Road forms part of the long distance national cycle network (NCN) Route 5. At a local level this route provides a mainly traffic free cycle link to Oxford to the south, and Begbroke and Woodstock to the north.

4.3.5 Currently the surface and width of this route are of a low standard and some of the road crossings are awkward and in need of improvement. The main barrier to the success of this route is the Pear Tree Roundabout. This is a high-speed roundabout with wide carriageways to cross, and cyclists are currently required to do so unaided. Hence this presents a barrier to cycling to and from Oxford, particularly in peak traffic periods.

4.3.6 The route northwards on the A44 towards Woodstock and Bladon, which can be made on either side of the A44, is of reasonable quality. On the east side of the A44 at its junction with Langford Lane, cycles have to cross Langford Lane unaided, and all crossing points at the Bladon roundabout are unaided which presents a barrier to cycling.

4.3.7 To the east of the site national cycle network Route 51 runs through Kidlington on quiet roads and shared cycleways, and to the south of Kidlington, adjacent to the A4260 towards Oxford Parkway Station and Oxford City Centre by way of the A4165. This route can be accessed from the site via Sandy Lane and Yarnton Road. To the south of Kidlington, the main obstacle to cycling on this route is the Kidlington Roundabout, at which cyclists are required to cross the wide carriageway approaches and exits unaided.

4.3.8 To the north of Kidlington, Route 51 connects to Bicester.

4.3.9 Sandy Lane also provides access to the traffic free route into Oxford city centre running alongside the Oxford Canal. Whilst this route is not a signed cycle route it is a popular route with cyclists, although it is largely unsurfaced and in wet conditions is not suitable as a commuting route.

4.3.10 Begbroke Science Park is accessible by bicycle from Kidlington, Begbroke, Woodstock, Oxford and surrounding villages, save that at present there are barriers generally in the form of large roundabouts at which crossing for cyclists is not aided.

4.3.11 The existing cycle parking provision on site is shown on Plan 2. At present there are a total of 40 stands on site (7 butterfly style and 33 Sheffield style) providing 73 parking spaces, one space of which is used for the Science Park bike. The Science Park bike is available for use by staff and students via a key available from reception. A total of 8 showers with changing and locker facilities are provided on site, as shown on Plan 2.

4.3.12 Spot checks of the number of cycles parked on site on two days in March 2018 recorded a total of 28 and 36 cycles respectively, this represents a maximum occupancy of 49%.

4.3.13 OXONBIKE is a self-service cycle hire scheme for getting around Oxford quickly and cheaply. Bicycles can be hired and returned at any OXONBIKE docking stations, located in and around Oxford. As part of the expansion of the OXONBIKE network, a new site has been installed at Begbroke Science Park, with eight docking stations for electric bicycles; these are now in full operation. Electronic bicycles are available for use by staff and students at Begbroke Science Park.

4.3.14 Existing OXONBIKE sites are located at 15 locations within the city, a number of which are University of Oxford sites including the University Science Area, Old Road Campus, Warneford Hospital, Churchill Hospital, John Radcliffe Hospital and Nuffield Orthopaedic Centre.

4.4 Public Transport

4.4.1 The nearest bus stops to the Begbroke Science Park are situated on the A44 Woodstock Road in the vicinity of the A44 roundabout with Sandy Lane. Access to these stops is via the Begbroke Hill access road into the site. The stops are around a 930m or 12 minute walk from the site.

4.4.2 These stops currently serve the S3 Oxford to Chipping Norton/Charlbury bus route operated by Stagecoach; this route is shown on Plan 4.

4.4.3 The S3 service calls at both Oxford Railway Station and at the Gloucester Green bus station in Oxford city centre, allowing for public transport connections to be easily made to rail and other services nationally. A PlusBus ticket adds unlimited urban bus travel to a train ticket and Begbroke Science Park is situated within the Oxford PlusBus zone.

4.4.4 The S3 operates with a typical weekday daytime frequency of 20 minutes at peak hours and 30 minutes within off peak hours. After around 19:00 hours the frequency changes to hourly. Services are available from early in the morning until late in the evening. The Saturday/Sunday service is essentially half hourly reducing to hourly after around 19:00 hours.

4.4.5 Mainline and local rail services can be caught from Oxford Railway Station, with direct services to/from Didcot, Reading, London, Birmingham, Manchester and Leeds, as well as intermediate stations, being available. Connecting services from Didcot Parkway provide links to Swindon, Bath, Bristol and Cardiff from Oxford.

4.4.6 Oxford Railway Station is around 7.5km, as the crow flies, to the south of Begbroke Science Park. Oxford Parkway Railway station is closer to Begbroke Science Park, around 2.7km to the southeast of the site as the crow flies.

4.4.7 At present there is no direct bus service between the site and Oxford Parkway Railway Station, however the site is within a 4km (15 minute) cycle ride of the Station, and covered and secure cycle parking is provided at the Parkway Station. Parkway serves half hourly trains to/from Oxford Railway Station and London Marylebone via Bicester Village.

4.5 University Minibus

4.5.1 Begbroke Science Park operates a private minibus service that is free of charge to all University members, companies and visitors.

4.5.2 The minibus service operates between Oxford city centre (Broad Street) and Begbroke Science Park and calls at the Sherrington Road Science Area, Parks Road Materials Laboratory and Banbury Road outside BBC Oxford (as a request stop). The Broad Street stops are around a 15-minute walk from Oxford Railway Station.

4.5.3 The University currently operates 32 services per day between 07:10 and 19:10 hours, typically at 15 to 20 minute intervals. The minibus timetable service is available at Begbroke Science Park's website.

4.5.4 The following link provides information on Begbroke Science Park's minibus timetable:

http://www.begbroke.ox.ac.uk/wp-content/uploads/2014/02/timetable.jpg

4.5.5 Additional taxis have, on occasions, been laid on to provide additional capacity in the later afternoon/early evening peak to meet demand.

4.6 Vehicle Access - Operation of Local Highway Network

4.6.1 The operation of the local highway network in the vicinity of the site has been observed on a number of occasions in both the AM and PM peak periods.

4.6.2 Vehicular access to the site is undertaken via a signal-controlled junction with the A44 Woodstock Road.

4.6.3 Begbroke Hill is an unlit private access road and subject to a speed limit of 30mph. A footway is provided on the northern side of Begbroke Hill. Begbroke Hill is a single carriageway which flares into two lanes on the approach to the signal junction.

4.6.4 The A44 Woodstock Road in the vicinity of the site access junction is a street lit dual carriageway which is subject to a speed limit of 50mph. A 40m long (7 car length) right-turn lane is provided on the A44 Woodstock Road to serve traffic turning into the site, this lane being fully signalled so that traffic can only turn right under a green signal, with traffic southbound on the A44 and from the site access stopped by a red signal. The junction operates with three traffic stages, these being: the ahead movements on the A44 running together; the northbound ahead movement and right turn movement from the A44 into the site running together; and the site access running. As indicated above, pedestrians and cycles are provided with signalled crossings across Begbroke Hill and the A44 which fit in with the vehicle signals, the only exception being the crossing across the western carriageway of the A44, which if called means the northbound ahead movement on the A44 is stopped so that pedestrians and cycle can be given a green signal when the right turn from the A44 into the site runs.

4.6.5 The site access junction has been observed to operate within capacity in both the AM and PM peak periods with no significant level of queueing and with waiting traffic clearing within a single cycle.

4.6.6 To the north of the site access junction the A44 Woodstock Road narrows to a single lane on the approach to the roundabout junction with Spring Hill Road by means of the introduction of hatched road markings rather than the overall road width physically reducing. A similar lane reduction is also provided on the southbound A44 approach to the roundabout.

4.6.7 Woodstock Road East runs parallel to the main A44 and provides access to Fernhill Road. Left-in and left-out slip roads to the north and south of the roundabout provides access to and from the A44, northbound traffic on the A44 Woodstock Road wanting to turn into Woodstock Road East has to U-turn at the roundabout and likewise traffic from Woodstock Road East which wants to head northbound on the A44 also has to U-turn at the roundabout.

4.6.8 The A44/Springhill Road roundabout has typically been observed to be generally free-flowing in both the AM and PM peak periods, short periods of queueing have been observed on the A44 approaches, which is as a result of traffic reducing to a single lane, however any queueing observed was not sustained.

4.6.9 To the north of the A44/Springhill Road roundabout the A44 Woodstock Road connects to Langford Lane at a signal-controlled junction. The A44 Woodstock Road in the vicinity of Langford Lane junction is street lit dual carriageway and subject to a speed limit of 50mph. A short, separately signal-controlled, right-turn lane is provided on the A44 Woodstock Road at the Langford Lane junction.

4.6.10 A left-turn slip road is provided from the A44 to Langford Lane and a left-turn slip road is also provided from Langford Lane onto the A44. Langford Lane widens to two right turn lanes on the approach to the signal junction.

4.6.11 The A44/Langford Lane signal junction has been observed to generally operate within capacity in both the AM and PM peak periods with no significant level of queueing and with waiting traffic typically clearing within a single cycle.

4.6.12 Langford Lane serves an existing commercial and employment development, including Oxford Airport and in the PM peak relatively short periods of queueing has been observed on the Langford Lane approach to the junction. This tends to be confined to a short period around 17.15 hours, which coincides with traffic exiting the employment areas along Langford Lane.

4.6.13 To the east of the signal junction, Langford Lane is an unlit single carriageway subject to the national speed limit and with a footway along the southern side of the road. Around 500m to the east of the A44 junction the speed limit on Langford Lane changes to 30mph and streetlighting is provided.

4.6.14 At its eastern end Langford Lane connects to the A4260 Banbury Road at a signal-controlled junction. As with the A44 junction, this junction works within capacity, with the only notable queueing being observed around 17.15 when traffic exits the employment areas along Langford Lane.

4.6.15 To the north of Langford Lane the A44 Woodstock Road connects to the A4095 Upper Campsfield/Bladon Road at the four arm Bladon roundabout. The fourth arm of the Bladon roundabout is the A44 Oxford Road which heads northwards towards Woodstock.

4.6.16 The A44 Oxford Road and A4095 approaches to the roundabout are all single carriageways. The A44 Woodstock Road dual carriageway maintains a two-lane approach to the roundabout.

4.6.17 The Bladon roundabout has typically been observed to be generally free-flowing in both the AM and PM peak periods, however short periods of queueing have been observed on all the A44 Oxford Road, A4095 Bladon and Upper Campsfield Road approaches but the level of queueing was typically short-lived and not sustained for any long period. Traffic was observed to be slow flowing away from the roundabout on the A4095 Bladon Road in the PM peak, however this did not interfere with the roundabout operation.

4.6.18 To the south of the Begbroke Hill site access the A44 Woodstock Road joins Sandy Lane and Rutten Lane at a four-arm roundabout junction. On the A44 Woodstock Road approaches to the roundabout the dual carriageways narrow to single lane by means of the introduction of hatched road markings rather than the overall road width physically reducing. This roundabout has been observed to operate in a free-flowing manner in both the AM and PM peak periods, although again on occasions some queueing has been observed at busier times which is linked with the A44 reducing from two lanes to one.

4.6.19 Sandy Lane provides a connection from the A44 to Kidlington to the east. Sandy Lane is relatively narrow in places, and to the east of the former vehicle access to Begbroke Science Park there are two 90-degree bends before it crosses a railway line at a barrier-controlled level crossing. Further to the east Sandy Lane crosses the Oxford Canal via a signal controlled single lane humpback bridge and then becomes Yarnton Lane. The bridge is subject to a 3 Tonne weight limit and is traffic signal controlled as it is only wide enough to accommodate one-way traffic. The bridge also has no footways, but at present pedestrian flows along Sandy Lane are very limited.

4.6.20 Yarnton Lane continues north-eastwards and joins the A4260 in the centre of Kidlington at a signalled controlled junction.

4.6.21 To the south-east of the Sandy Lane roundabout, the A44 Woodstock Road connects to Cassington Road at a three-arm roundabout. The A44 southbound dual carriageway approach to the roundabout maintains two-lanes all the way to the give-way to the roundabout. Cassington Road provides an alternative route, through the village of Cassington, to the A40 from the A44. This roundabout has been observed to operate in a generally free-flowing manner in both the AM and PM peak periods. Periods of queueing have been observed on the Cassington Road approach to the roundabout in the AM peak. Some queueing has also been observed southbound on the A44, however this is associated with the A44 reducing to a single carriageway road south of the Cassington Road Roundabout.

4.6.22 To the south of the Cassington Road roundabout the A44 Woodstock Road becomes a single carriageway, crossing both the railway line and Oxford Canal, and joins the A4260 Frieze Way at the Loop Farm roundabout. In the AM peak queueing has been observed on both the A44 Woodstock Road southbound and A4260 Frieze Way approaches to the roundabout. This appears to be generally as a result of slow moving traffic on the A44 southbound exit away from the junction towards the grade separated A34/A44 roundabout and then southwards on the A44 to the Wolvercote Roundabout.

4.7 Personal Injury Collision Data

4.7.1 Personal Injury Data has been obtained from OCC for the five-year period between 01/01/2012 and 30/04/2017. The personal injury data for the assessment network has been summarised in Appendix 2.

Bladon Roundabout

4.7.2 In the five-year period there were 16 personal injury accidents recorded at the Bladon roundabout, three of which were classified as serious, with the remaining 13 being classified as being slight.

4.7.3 The first serious incident occurred during the day in dry conditions and involved a motorcyclist braking too late and losing control. The second occurred at night in dry conditions and involved a drunk car driver failing to negotiate the roundabout. The final serious incident occurred at night during dry conditions and involved an inexperienced driver losing control at the roundabout.

4.7.4 Of the thirteen slight incidents four were rear end shunts on the approach to the roundabout, three were changing lane, three were vehicles failing to give-way, two were due to drivers losing control (one motorcyclist and one driver in wet/damp conditions) and one involved a medical incident. Six of the thirteen slight incidents involved either cyclist or motorcyclists. Three of incidents occurred during wet/damp conditions and also 3 incidents occurred during dark conditions.

A44 Bladon Roundabout – Langford Lane Highway Link

4.7.5 There was one recorded incident on the highway link between the Bladon roundabout and the Langford Lane signal junction which was classified as being serious and involved a car driver losing control, the car skidding off the carriageway and overturning.

A44/Langford Lane Signal Junction

4.7.6 In the five-year period there were 13 personal injury accidents at the Langford Lane signal junction, one of which was fatal and one which was classified as serious. Both the fatal and serious incidents involved cars which ignored a red signal and a car turning right being hit. Both incidents occurred during the daytime in dry conditions.

4.7.7 Of the eleven slight incidents six were rear end shunts in either slow or queueing traffic, four incidents involved vehicles failing to stop at a red light and one incident involved a motorcyclist changing lanes. One of the slight incidents occurred during dark conditions and another incident occurred during damp/wet conditions.

A44 Langford Lane – Spring Hill Road Highway Link

4.7.8 In the five-year period there were two incidents on highway link between the Langford Lane signal junction and the Spring Hill Road roundabout, both of which were classified as being slight. Both incidents were rear end shunts of vehicles slowing to either turn or for queueing traffic and occurred during daylight in dry conditions.

A44/Spring Hill Road Roundabout

4.7.9 In the five-year period there were 4 personal injury accidents at the Spring Hill Road Roundabout, one of which was fatal, one which was classified as serious and two slight incidents.

4.7.10 The fatal incident involved a motorcyclist braking hard on the approach to the roundabout losing control and hitting a sign on the roundabout and occurred in dry conditions in the dark.

4.7.11 The serious incident occurred during the daytime in dry conditions and involved the driver of a light goods vehicle failing to negotiate the roundabout, losing control and hitting a bus shelter.

4.7.12 One of the two slight incidents involved a cyclist on the cycle path adjacent to the roundabout having a medical incident and falling from their cycle. The second involved a car failing to give-way to a motorcyclist who then swerved, hitting a barrier.

A44 Spring Hill Road – Begbroke Hill Highway Link

4.7.13 In the five-year period there were no incidents recorded on the highway link between the Spring Hill Road Roundabout and the Begbroke Hill signal junction.

A44/Begbroke Hill Signal Junction

4.7.14 In the five-year period there were two incidents recorded at the Begbroke Hill signal junction, one of which was serious and one which was slight.

4.7.15 The serious incident occurred during daylight in dry conditions and involved a cyclist riding into the rear of the stationary vehicle in front. The slight incident occurred during daylight in dry conditions and involved a car failing to stop at a red light and colliding with a turning vehicle.

A44/Sandy Lane Roundabout

4.7.16 In the five-year period there have been six incidents recorded at the A44/Sandy Lane roundabout, two of which were serious and four of which were slight. The two serious incidents both involved motorcyclists and both occurred during daylight in dry conditions. In the first a motorcyclist negotiating the roundabout hit gravel on the carriageway and lost control and in the second a car changing lanes without signalling hit a motorcyclist, causing them to fall.

4.7.17 Two of the slight incidents were both rear end shunts on the approach to the roundabout, both in dry conditions with one in daylight and one in the dark. One of the incidents involved a car passing too close to a pedestrian on Sandy Lane and clipping them with a wing mirror. The last incident involved a motorcyclist failing to see the roundabout in foggy conditions.

A44/Sandy Lane – Cassington Road Highway Link

4.7.18 In the five-year period there were seven incidents recorded on the highway link between Sandy Lane and Cassington Road, two of which were serious and the remaining five incidents were slight. The first serious incident occurred during daylight in wet/damp conditions in which a car negotiating a bend lost control and crossed over to the other carriageway and hit an oncoming car. The second incident occurred during the dark and in dry conditions and involved a HGV colliding with a teenage pedestrian crossing the road.

4.7.19 Two of the recorded slight incidents were rear end shunts, one involving a vehicle which slowed for no obvious reason and the other in queueing traffic at a red light (pedestrian crossing). One incident which occurred during daylight dry conditions involved a motorcyclist braking hard and losing control and another involved a light goods vehicle losing control in wet/damp conditions during the dark and hitting a tree. There were no details given of the last incident, other than it occurred during the daylight, in wet/damp conditions and involved a car and a cyclist.

A44/ Cassington Road Roundabout

4.7.20 In the five-year period there were three recorded incidents all of which were slight and occurred during daylight. Two incidents occurred in wet/damp conditions, the first was a rear end shunt on the approach to the roundabout and the second a car changing lane whilst negotiating the roundabout collided with another car. In the final incident a car hit a pedestrian crossing from a splitter island.

A44/Cassington Road – A4260 Frieze Way Highway Link

4.7.21 In the five-year period there were 6 recorded slight incidents on the highway link between the A44 Cassington Road and A4260 Frieze Way (Loop Farm) roundabouts, all of which were rear end shunts which occurred during daylight. Three of the six incidents were in damp/wet conditions and one involved a motorcyclist.

A44/ A4260 Frieze Way (Loop Farm) Roundabout

4.7.22 In the five-year period there were 3 recorded incidents at the Loop Farm roundabout, one of which was serious. All the incidents occurred during daylight and in dry conditions. The serious incident involved a cyclist changing lanes and failing to give-way to a car, causing the rider to fall. The two slight incidents both involved cars failing to negotiate a bend, one driver failed a breath test.

Overall Summary

4.7.23 The overall number and type of incidents recorded within the study area over the examined period are typical of the type and severity expected to occur within a busy highway network.

4.7.24 The number of collisions at the Bladon Roundabout and the A44/Langford Lane signals junctions are quite high at 3.2 accidents per year and 2.6 accidents per year respectively.

4.7.25 At the Bladon Roundabout, 6 out of 13 accidents involved cyclists or motorcycles, which is likely to be linked with the high-speed nature of the roundabout, combined, in the case of cyclists with the lack of assisted crossing facilities.

4.7.26 At Langford Lane, rear end shunts are high, making up 6 of the 11 accidents.

4.8 Base Traffic Data

4.8.1 Traffic surveys at the following junctions within the highway network assessment area were undertaken on Thursday 29th June 2017 from 07:00-19:00.

- A44/Begbroke Hill signal junction (site access);
- A44/Fernhill Road/Spring Hill Road roundabout;
- A44/Langford Lane signal junction;
- A44/A4095 (Bladon) roundabout junction;
- A44/Sandy Lane roundabout junction;
- A44/Cassington Road roundabout junction and
- A44/A4260 (Loop Farm) roundabout junction.

4.8.2 Surveyed AM and PM traffic flows, converted into passenger car units (PCU), are shown on Figures 1 and 2 respectively.

4.9 Existing Begbroke Science Park Trips

4.9.1 Table 1 provides a summary of arrivals and departures at Begbroke Science Park and the resulting trip rates based on the existing floor area at the Science Park of 14,200m^2.

Period	Surveyed Trips			Trip Rate per 100m^2 GFA		
	Arrival	Depart	Two-Way	Arrival	Depart	Two-Way
AM Peak	90	12	102	0.634	0.085	0.718
PM Peak	10	78	88	0.070	0.549	0.620

Table 1: Surveyed Begbroke Science Park Trips and Trip Rates

4.9.2 As a comparison, Table 2 summarises the best-case trip rates from the Transport Assessment submitted with the access road application (ref: 11-00069-FUL), and those obtained from the recent traffic survey.

Period	Access Road TA Trip Rates (/100m^2)			Surveyed Trip Rate per 100m^2 GFA		
	Arrival	Depart	Two-Way	Arrival	Depart	Two-Way
AM Peak	0.678	0.137	0.815	0.634	0.085	0.718
PM Peak	0.014	0.565	0.579	0.070	0.549	0.620

Table 2: Comparison of Trip Rates

4.9.3 It can be seen from Table 2 that the surveyed AM peak trip rates are lower than the best-case trip rates previously assumed for the access road application, with the two-way trip rate being 11.9% lower than previously assumed.

4.9.4 The PM peak departure trip rate is also slightly lower, but the PM peak arrival trip rate is higher so that the combined two-way PM peak trip rate is higher by 7.1%, but is lower than the AM peak trip rate.

4.9.5 In the AM peak 66% of arrivals to the Science Park arrived from the south and 34% from the north and in the PM peak 69% of departures are to the south and 31% are to the north.

4.9.6 For the assessment of the proposed development, beyond the site access junction, the distribution of existing Begbroke Science Park trips will be based on data from Office for National Statistics. Travel to work data from the Census Table WU03EW - *Location of usual residence and place of work by method of travel to work* has been obtained for the Super Output Area Middle Layer of Cherwell 019, which covers the development site, with assumed routing being based on Google Maps directions.

4.9.7 Table 3 provides a summary of the predicted distribution of Begbroke Science Park trips based on Census data and also for comparison the distribution based on the postcode data provided by car drivers in the 2015 Travel Survey at the Science Park.

Network Entry/Exit Point	Works in Cherwell 019	2015 BSP Travel Survey
A4095 (E)	7%	10%
A44 (N)	10%	8%
A4095 (W)	15%	6%
Langford Lane	2%	2%
Sandy Lane	2%	5%
A4260 (Frieze Way)	4%	2%
A34 (E)	23%	15%
A44 (S)	8%	19%
A34(W)	25%	29%
Cassington Road	4%	5%
Total	100%	100%

Table 3: Existing Distribution of BSP Trips – Census and 2015 Travel Survey

4.9.8 The distribution based on the Census predicts that 66% of trips would be from the south and 34% from the north, which matches the surveyed distribution of arrivals in the AM peak. The distribution based on the 2015 Travel Survey predicts a higher percentage of trips would be from the south (74%).

4.9.9 Figures 3 and 4 show the existing trips associated with the Begbroke Science Park distributed onto the wider highway network. The 2017 background flows (Figures 3 & 4 subtracted from Figures 1 & 2) are shown on Figures 5 and 6 for the AM and PM peak periods.

4.10 Existing Parking Demand

4.10.1 The existing parking accumulation on site has been calculated using the arrival and departure pattern of cars to the site and based on 17 cars already being parked on site prior to the survey, as summarised in Table 4.

4.10.2 Spot checks of the number of cars parked on site at between 10:30 to 11:00 were undertaken on two weekdays in March 2018, which recorded between 173 and 201 cars parked on site.

Time	Arrival	Depart	Total	Accumulation
07:00-08:00	36	3	39	50
08:00-09:00	86	9	95	127
09:00-10:00	57	9	66	175
10:00-11:00	19	6	25	188
11:00-12:00	17	12	29	193
12:00-13:00	14	47	61	160
13:00-14:00	32	23	55	169
14:00-15:00	12	18	30	163
15:00-16:00	7	26	33	144
16:00-17:00	10	39	49	115
17:00-18:00	9	77	86	47
18:00-19:00	5	31	36	21

Table 4: Surveyed Arrivals and Departures (Cars) and Parking Accumulation

4.11 Travel Plan and Existing Travel Mode Share

4.11.1 The University has operated a full Travel Plan for Begbroke Science Park since 2004. Reviews of the Travel Plan have been undertaken in July 2011, January 2015 and June 2016. The 2016 Travel Plan Update is included as Appendix 3.

4.11.2 The results of travel surveys of staff and students based at Begbroke Science Park are summarised in Table 5.

4.11.3 The 2006, 2008, 2009, 2010, 2011 and 2015 modal share data is derived from surveys sent only to staff, students and employees of businesses based at Begbroke Science Park, shown as shaded in Table 5.

Mode	2006	2007	2008	2009	2010	2011	2012	2015
Car driver	76%	71%	72%	77%	58%	60%	50%	57%
University Minibus	8%	10%	16%	15%	28%	26%	29%	30%
Car passenger	2%	2%	2%	1%	2%	2%	1%	1%
Public bus	3%	7%	0%	0%	1%	1%	4%	1%
Bicycle	7%	5%	9%	6%	10%	10%	14%	7%
Motorbike	2%	2%	1%	0%	0%	0%	1%	0%
Walk	2%	3%	1%	1%	1%	1%	1%	4%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Table 5: Staff and Student Modal Share at Begbroke Science Park

4.11.4 Modal share for 2007 and 2012 has been derived from travel surveys sent to all University staff and students only; as such they do not include employees of non-University businesses based at the Begbroke Science Park.

4.11.5 University wide travel surveys of staff and students were also undertaken in 2014 and 2017 but there were only 10 and 7 responses respectively from people based at Begbroke Science Park. Given the low sample sizes no meaningful comparisons can be made from these surveys.

4.11.6 The following targets for future mode share were set in the 2016 Travel Plan Update:

- To reduce the percentage 'car driver' modal share to 54% by 2019 and to 51% by 2021;

- To increase the percentage cycle modal share to 10% by 2019 and to 15% by 2021; and
- To increase the percentage car share to 3% by 2019 and to 5% by 2021.

4.11.7 The University is currently arranging for a travel survey of staff, students and employees of businesses based at Begbroke Science Park to be undertaken, the results of which will be reported to Cherwell District Council and Oxfordshire County Council. Survey results are expected to be available by the end of May 2018.

5 Development Proposals

5.1 Proposed Development

5.1.1 The proposed development will retain the existing buildings on site (circa 14,200m^2) and provide up to 12,500m^2 of additional B1a/b/c floorspace and ancillary D1 floorspace.

5.1.2 The University is seeking to renew the time-expired 2015 outline permission (15/00309/OUT) development at Begbroke Science Park, but with a slightly higher development density, and the proposed development is intended to be broadly in accordance with the principles established for the previous outline application.

5.1.3 The application boundary for the proposed development scheme is the same as that for the 2015 outline application and the proposed areas for development are broadly the same, as shown on development framework plan included as Appendix 4.

5.1.4 The total floorspace following the development would be up to a maximum of 26,700m^2 on site.

5.1.5 With the 2015 outline application, the level of B1(a) uses was restricted to 20% and the same restriction will be applied to this application, as this is consistent with existing and proposed use and activities.

5.2 Parking Provision

5.2.1 Car parking on site associated with the 2015 outline application for the previous development was limited to 260 spaces (via the Travel Plan) to serve the 21,236m^2 of floorspace at a standard 1 space per 81.7m^2. This standard was lower than the level permitted for the interim development, which was 160 spaces to serve 12,148m^2 of development at 1 space per 76m^2 of floorspace.

5.2.2 The maximum demand surveyed on site in March 2018 was, as indicated above, some 201 cars, at a ratio of 1 space per 71m^2.

5.2.3 Considering the predicted parking demand on site following the proposed development, on the basis of a straightforward pro-rata uplift (26,700/14,200) of the recorded peak parking accumulation (201 cars) the future predicted peak parking accumulation on site is predicted to be 378 cars.

5.2.4 Allowing an additional 5% to cater for circulation and fluctuations in parking demand, this would result in 396 general spaces being provided on site. It is therefore proposed that up to 400 general parking spaces would be provided at Begbroke Science Park following the proposed development.

5.2.5 In addition to general parking, disabled parking would be provided at the standard set out in the Department of Transport's traffic advisory leaflet TAL 5/95 for car parks greater than 200 spaces of 6 spaces plus 2% overall capacity. This equates to a total of 14 disabled spaces. Therefore, the maximum total proposed number of parking spaces would be 414, a standard of 1 space per 65.4m^2.

5.2.6 Parking standards for Cherwell are set out in the adopted 1996 Local Plan and relate to parking maximums. Cherwell District Council has advised that these standards are used as the starting point for negotiations on parking. The site is in a Type 2 location and the maximum standards for B1 employment is 1 space per 30m^2.

5.2.7 The proposed parking provision at a standard of 1 space per 65.4m^2 is higher than that approved for the 2015 outline application but is significantly lower than that allowed by Cherwell maximum parking standards.

5.2.8 The development framework plan envisages that the two existing unmade parking areas adjacent to the main entrance and in the north-east corner of the site would be developed as part of the proposed outline application.

5.2.9 Car parking will therefore need to be redistributed across the site and consideration will need to be given to options such as decked, basement and under croft parking alongside surface level parking at the detailed planning stage (i.e. submission and approval of reserved matters).

5.2.10 In terms of cycle parking provision, a total of 73 parking spaces are currently provided on site, at a standard of 1 space per 194.5m$^{2.}$ Recent spot checks of the number of cycles parked on site recorded a maximum occupancy of 36 spaces (49%) or 1 space per 12.5 persons on site (an 8% mode share).

5.2.11 The 2016 Travel Plan Update set a target to increase cycling modal share to 15% (from the 2015 level of 7%), which would increase cycle parking demand on site to 1 space per 6.7 persons on site.

5.2.12 It is proposed to provide cycle parking on the basis of 1 space per 5 persons on site, which is the same standard as applied by Oxford City Council to developments in the city of Oxford, which is considered an appropriate level at Begbroke to encourage cycling. This would mean a maximum total of 170 cycle parking spaces (850/5) being provided on site, equating to a standard of 1 space per 157m^2.

5.2.13 The proposed level of car and cycle parking are based on existing transport conditions.

5.2.14 The Cherwell Local Plan Part 1 Review identifies significant development on land surrounding the Science Park under the title “Land East of the A44”. The proposed allocation, and that at Yarnton on the west side of the A44, would provide some 2,450 dwellings within easy walking distance of the site, which would include University controlled accommodation. This would be likely to significantly increase the walk mode share.

5.2.15 The proposed allocation, if realised, will result in a step change in public transport, cycling and walking infrastructure, most notably improved links with Kidlington, Parkway Station, central Oxford and potentially the Eastern Arc. The proposed allocation also reserves land for a Rail Halt at Begbroke, which could see it forming part of an Oxford metro system.

5.2.16 Such improvements will significantly enhance the accessibility of the Begbroke Science Park, and as result, the car modal share would reduce, and the mode share of public transport, cycling and walking increase. As such, the modal share by sustainable modes of travel is likely to increase as result of improved public transport and pedestrian/cycle infrastructure which will come forward as part of these development proposals, if they are found sound following Examination, which is likely to take place later this year (2018).

5.2.17 In these circumstances, a lower car parking ratio is likely to be appropriate in the future if these proposals are adopted. At this stage, however, they are not approved and have a number of stages to complete before being adopted.

5.2.18 In the meantime however, and until such time as the service becomes commercially viable, the University will continue to operate and subsidise its successful minibus service, to supplement access by other non-car modes of travel and so minimise car use and parking demand.

5.3 Proposed Access Arrangements

5.3.1 The proposed development would be served via the existing signal junction with the A44 Woodstock Road, which was designed to be able to accommodate the level of development consented in the 2015 outline application and was predicted to operate with a significant degree of spare capacity.

5.3.2 The internal access roads will be largely unaltered by the proposed development although some minor improvement works may be provided. This would be considered as part of any reserved matters application(s).

6 Predicted Change in Travel Demand

6.1 Predicted Vehicle Trips

6.1.1 The proposed outline application is for an additional 12,500m^2 floorspace of B1 and ancillary D1 uses to be provided at the site. This would bring the total floorspace on site to a maximum of 26,700m^2.

6.1.2 Table 6 provides a summary of the predicted trips associated with the proposed development of 12,500m^2 floorspace and Table 7 provides a summary the total predicted Begbroke Science Park Trips following the proposed development.

Period	Surveyed Trips			Trip Rate per 100m^2 GFA		
	Arrival	Depart	Two-Way	Arrival	Depart	Two-Way
AM Peak	0.634	0.085	0.718	79	11	89
PM Peak	0.070	0.549	0.620	9	68	77

Table 6: Begbroke Science Park Trip Rates and Predicted Trips Based on 12,500m^2

Period	AM Peak			PM Peak		
	Arrival	Depart	Two-Way	Arrival	Depart	Two-Way
Existing 14,200m^2	90	12	102	10	78	88
Proposed 12,500m^2	79	10	89	9	68	77
Total 26,700m^2	169	22	191	19	146	165

Table 7: Total Begbroke Science Park Trips

6.1.3 It has been assumed that the additional development trips associated with the proposed development of 12,500m^2 floorspace will distribute onto the highway network in similar distribution as that of existing Begbroke Science Park traffic and the resulting predicted development flows are shown on Figures 7 and 8 for the AM and PM peaks respectively.

6.1.4 Table 8 below sets out vehicle trips which reflect the current Travel Plan targets, which aim to reduce car driver trips by 10.5% by 2021, that is from the existing level of 57% to 51%.

Period	AM Peak			PM Peak		
	Arrival	Depart	Two-Way	Arrival	Depart	Two-Way
Existing 14,200m^2	81	11	92	9	70	79
Proposed 12,500m^2	71	9	80	8	61	69
Total 26,700m^2	152	20	172	17	131	148

Table 8: Total Begbroke Science Park Trips Based on Travel Plan Targets to 2021

6.2 Non-Car Mode Trips

6.2.1 At present, between 400 and 450 people (staff, students and employees) are typically based at the Begbroke Science Park on any one day. On a pro-rata basis (12,500/14,200) an additional 350 to 400 people could be based at the Science Park.

6.2.2 Table 9 provides a prediction of the additional number of daily trips (two-way) by non-car modes of travel for the proposed development based on the 2015 travel survey mode share and the mode share targets set for 2021 in the Travel Plan.

Mode	2015 Mode Share	Daily Two-Way Trips	2021 Target Mode Share	Daily Two-Way Trips
University Minibus	30%	210-240	30%	210-240
Car passenger	1%	7-8	5%	35-40
Public bus	1%	7-8	1%	7-8
Bicycle	7%	49-56	15%	105-120
Walk	4%	28-32	4%	28-32

Table 9: Predicted Non-Car Mode Trips (12,500m^2)

7 Transport Implications – Vehicle Trips

7.1 Introduction

7.1.1 This section of the report examines the implications of the predicted change in vehicular travel demand as a result of the development proposals.

7.1.2 The vehicle trips predicted for Begbroke Science Park following the proposed development are firstly compared with the approved vehicle trips predicted for the 2015 outline application.

7.1.3 The adopted design years and assessment flows are then detailed and the comparative change in traffic flows on the highway network are quantified. Junction capacity assessments are then undertaken as appropriate.

7.1.4 The implications of potential improvements to the local highway network are then considered and finally consideration of the implications of construction traffic on the local highway network is then undertaken.

7.2 Comparison with Outline Application 15/00309/OUT (Lapsed)

7.2.1 The Transport Assessment submitted in support of the planning application for the Begbroke Hill access road (reference: 11/00069/FULL) indicated that trip predictions had been agreed with Cherwell District Council and Oxfordshire County Council in 2008. Trip predictions were based on a simple pro-rata of surveyed 2006 flows, with a reduction factor applied to account for the proposed sustainable transport measures.

7.2.2 Table 10 provides a comparison of the previously consented Begbroke Science Park trips and the proposed development trips.

Period	AM Peak			PM Peak		
	Arrival	Depart	Two-Way	Arrival	Depart	Two-Way
Approved Development Trips	144	29	173	3	120	123
Proposed Development Trips	169	22	191	19	146	165
Change	+25	-7	+18	+16	+26	+42

Table 10: Comparison of Previously Consented and Proposed Development Trips

7.2.3 As can be seen in the proposed development trips these are only slightly higher than those predicted, tested and accepted in relation the 2015 outline application (15/00309/OUT) by 18 and 42 two-way trips in the AM and PM peaks respectively. The predicted slight increase in traffic flows compared to that consented for the 2015 outline application would have an imperceptible impact on the operation of the local highway network.

7.2.4 The access road transport assessment demonstrated that the site access junction would operate within capacity even using higher sensitivity test trip predictions of 253 two-way trips and 199 two-way trips in the AM and PM peaks respectively.

7.3 Design Year and Assessment Flows

7.3.1 The expected year of opening of the proposed development is 2020 and the adopted assessment years are the year of opening and 5 years hence. The Department for Transport TEMPRO computer program has been used to predict local traffic growth factors for the area Cherwell 019, as summarised below:

- 2017 – 2020 AM Peak - 1.0623
- 2017 – 2020 PM Peak - 1.0600
- 2017 – 2025 AM Peak - 1.1608
- 2017 – 2025 PM Peak - 1.1581

7.3.2 The above traffic growth rates have been applied to the 2017 background flows (Figures 5 and 6) to produce: 2020 background flows as shown on Figures 9 and 10 for the AM and PM peaks respectively; and 2025 background flows as shown on Figures 11 and 12.

7.3.3 The existing Begbroke Science Park trips (Figures 3 and 4) have then been added to the 2020 and 2025 background flows to produce 2020 and 2025 Base assessment flows, as shown on Figures 13 to 16. Predicted development flows (Figures 7 and 8) have been added to the 2020 and 2025 Base assessment flows to produce 2020 and 2025 With Development assessment flows.

7.4 Predicted Changes in Traffic Flows

7.4.1 Table 11 provides a summary of the predicted change in junction inflows between the 2020 Base and 2020 With Development assessments scenarios, when the percentage impact would be at its highest.

Junction	AM Peak			PM Peak		
	2020 Base	2020 With Development	Change (%)	2020 Base	2020 With Development	Change (%)
Site Access	2233	2323	4%	2554	2631	3%
A44/Spring Hill Road Rbt	2265	2297	1%	2580	2602	1%
A44/Langford Lane	2870	2902	1%	3048	3070	1%
A44/A4095 Bladon Rbt	3140	3169	1%	3348	3368	1%
A44/Sandy Lane Rbt	2593	2651	2%	2869	2924	2%
A44/Cassington Road Rbt	2603	2661	2%	3039	3095	2%
A44/A4260 Loop Farm Rbt	3121	3176	2%	3859	3912	1%

Table 11: Predicted Change in Junction Inflows in 2020 (With and Without Development)

7.4.2 It can be seen that beyond the site access junction the percentage change in traffic flows at individual junctions is only between 1% and 2%. This level of flow change would be imperceptible on the operation of these junctions.

7.4.3 It is also worth reiterating that, compared with the traffic levels tested for the lapsed outline application, the impact of the proposed development would be negligible.

7.4.4 In view of the level of impact of the proposed development, it is only proposed to undertake capacity assessments for the site access junction, where the percentage impact is at its highest.

7.5 Junction Assessments

7.5.1 The A44/Begbroke Hill site access junction has been assessed using the LINSIG computer program. All LINSIG assessment output for the site access is included as Appendix 5.

7.5.2 To validate the junction model the operation of the junction has firstly been assessed using the 2017 survey flows as summarised in Table 12.

7.5.3 The results predicted for the existing operation of the junction correspond to the observed operation of the junction in both the AM and PM peak periods, validating the LINSIG model of the junction.

7.5.4 The validated LINSIG model has then been used to assess the future operation of the junction for the 2025 Base and With Development assessment scenarios, the results of which are summarised in Table 13 and Table 14.

Movement	AM Peak (Cycle Time 90s)			PM Peak (Cycle Time 90s)		
	Deg of Sat	Q	Delay (s/PCU)	Deg of Sat	Q	Delay (s/PCU)
A44 (N) Left Ahead	37.4%	5.1	8.1	38.6%	5.4	8.3
A44 (N) Ahead	39.5%	6.1	8.1	40.9%	6.3	8.3
Begbroke Hill Right Left	4.3%	0.2	43.6	33.3%	1.5	49.8
A44 (S) Ahead	64.2%	10.8	6.5	40.4%	4.8	4.3
A44 (S) Ahead Right	38.0%	1.7	55.4	40.6%	4.8	4.8

Table 12: LINSIG Results – Site Access Junction – 2017 Surveyed Flows

Movement	AM Peak (Cycle Time 90s)			PM Peak (Cycle Time 90s)		
	Deg of Sat	Q	Delay (s/PCU)	Deg of Sat	Q	Delay (s/PCU)
A44 (N) Left Ahead	43.4%	6.3	8.7	45.0%	6.7	8.9
A44 (N) Ahead	45.5%	7.4	8.7	47.1%	7.9	8.9
Begbroke Hill Right Left	4.3%	0.2	43.6	33.3%	1.5	49.8
A44 (S) Ahead	38.2%	4.3	4.2	46.7%	6.0	4.7
A44 (S) Ahead Right	40.0%	4.2	7.5	47.0%	6.0	5.1

Table 13: LINSIG Results – Site Access Junction – 2025 Base Flows

Movement	AM Peak (Cycle Time 90s)			PM Peak (Cycle Time 90s)		
	Deg of Sat	Q	Delay (s/PCU)	Deg of Sat	Q	Delay (s/PCU)
A44 (N) Left Ahead	45.1%	6.8	9.4	47.4%	7.4	10.6
A44 (N) Ahead	47.1%	7.9	9.4	49.5%	8.6	10.6
Begbroke Hill Right Left	8.0%	0.3	43.8	45.8%	2.8	46.7
A44 (S) Ahead	74.7%	15.6	8.5	48.8%	7.1	5.9
A44 (S) Ahead Right	63.5%	3.5	66.5	49.4%	7.0	6.7

Table 14: LINSIG Results – Site Access Junction – 2025 With Development Flows

7.5.5 It can be seen from the tables above that the site access junction is predicted to operate with a significant degree of spare capacity in 2025 even with the addition of development traffic flows. Comparing the results for the 2025 Base and With Developments it can be seen that the addition of development traffic would not have significant impact on the operation of the junction in either the AM or PM peak periods.

7.6 Potential Future Improvements to the Highway Network

7.6.1 A number of strategic improvements to the transport network are proposed, or under consideration which are likely to affect its operation.

7.6.2 Specific schemes and projects are included in the Infrastructure Delivery Plan in Appendix 8 of the Local Plan. Extracts from the Council's Infrastructure Delivery Plan Update dated December 2017 Kidlington and Rural Areas Projects are included as Appendix 1 of this report.

7.6.3 The London Oxford Airport project (reference no. 1) in the transport & movement category of the IDP Update for Kidlington and Rural Areas is prioritised as being critical and its main aim is to support the growth of employment clusters such as the one formed by the London Oxford Airport and Langford Lane Industrial Estate. In terms of delivery it is stated that it will be progressed through the Local Plan Part 2 in liaison with the Airport operator and existing businesses at the airport and on Langford Lane.

7.6.4 Other projects to improve the level of public transport, improvements to facilities for cyclists and pedestrians, road network improvements such as vehicle active signage, measures to address speeding and to ensure correct routing on strategic network are prioritised as being necessary. In terms of delivery these projects are typically stated to be progressed further through the Local Plan Part 2 and the Kidlington Masterplan.

Loop Farm Link

7.6.5 The County Council has provided guidance in relation to the Loop Farm A40-A44 Link Road, and has indicated that it is undertaking further planning and modelling of the link road to take account of West Oxfordshire and Cherwell DCs Local Plan work.

7.6.6 The link road currently does not have its full allocation of funding and also does not yet have planning permission. All of this could make delivery by 2020 challenging. OCC therefore advise that a sensitivity test is undertaken with and without the link road.

7.6.7 The modelling work undertaken by WS Atkins on behalf of Oxfordshire County Council and Cherwell District Council for use in relation to the evaluation of transport impacts of the Local Plan Part 1 Partial Review included a sensitivity test (Scenario 5) which was the same as model Scenario 3 but with the Loop Farm A40-A44 Link removed. This assessment was included in Appendix 7 of the Transport Assessment prepared by ITP on behalf of Cherwell District Council in relation to the Cherwell Local Plan (Part 1) Partial Review for Oxford's Unmet Housing Need.

7.6.8 Comparing the results of Scenario 5 with Scenario 3 shows the effects of the Loop Farm Link on the operation of this part of the transport network.

7.6.9 The WS Atkins report includes diagrams showing flow changes for each scenario compared with the Do Minimum assessment. These have been replicated in Appendix 6 to this report for the network immediate to Begbroke for Scenarios 3 and 5, and for the AM and PM peak.

7.6.10 Considering firstly the AM peak, it can be seen that, in the main, flow changes on the A44 are very similar. It is notable that traffic flow increases eastbound on the A40 are higher without the link through to the Wolvercote Roundabout. There is a greater decrease in flow on the Eynsham Road/Yarnton Road/Cassington Road route without the link.

7.6.11 In the PM peak, without the link, the flow increase on the A40 into Oxford is less, but equally the reduction in flow on the Eynsham Road/Yarnton Road/Cassington Road is also less, suggesting that without the link, more traffic travelling towards Oxford routes via Eynsham Road/Yarnton Road/Cassington Road. Other than this traffic flow changes are broadly consistent.

7.6.12 In terms of the implications for the proposed development of Begbroke Science Park, which would come ahead of the allocations being considered in the Examination of the Cherwell Local Plan (Part 1) Partial Review for Oxford's Unmet Housing Need, it is concluded that the construction of the A44-A40 link road would have a relatively neutral effect on the operation of the A44 to the north of the Loop Farm roundabout.

7.6.13 The link would, if provided, improve connectivity with the A40 west from Begbroke via the main road network, reducing the need for traffic to route by way of the Pear Tree Roundabout/Wolvercote Roundabout, Cassington, or indeed via Bladon.

Eynsham P&R

7.6.14 The Eynsham P&R site does not yet have planning permission and therefore is not permitted development. The planning application for the P&R is proposed to be submitted later this year. Subject to planning the P&R will open in 2020/21.

7.6.15 The effect of the Eynsham P&R on the A44 is likely to be neutral to beneficial, as it will remove car trips into Oxford on the A40 from the highway network, and as such would be likely to reduce the extent to which drivers chose alternative routes into Oxford.

7.7 Construction Traffic

7.7.1 In terms of construction traffic, flows associated with construction will be less than that those associated with the proposed development, though the proportion of HGVs will be higher generally but only for a limited period of time.

7.7.2 The majority of construction traffic movements will be generated from construction workers' cars and vans, having a largely incidental impact on the surrounding highway network at peak times. A number of daily HGV movements will be generated but these are likely to occur outside the peak hours.

7.7.3 The control of movement of construction traffic to and from the site will form part of the Construction Traffic Management Plan (CTMP), which will be agreed with the Planning and Highway Authorities for each development brought forward. This will be addressed in detail at the reserved matters stage for each specific proposal.

7.7.4 The CTMP will include the following information:

i. The routing of construction traffic and delivery vehicles will be detailed, including means of access into the site. This will be via the existing main vehicular access to the development site.

ii. Times for construction traffic and delivery vehicles will be detailed, including any restrictions on delivery hours.

iii. Details of and approval of any traffic management needed during construction.

iv. Details of appropriate signing, to accord with the necessary standards/requirements, for pedestrians during construction works, including any footpath diversions.

v. The erection and maintenance of security hoarding / scaffolding if required.

vi. A regime to inspect and maintain all signing and barriers.

vii. Contact details of the Project Manager and Site Supervisor responsible for on-site works will be provided.

viii. The use of appropriately trained, qualified and certificated banksmen for guiding vehicles/unloading.

ix. Details of any travel initiatives for construction workers.

x. Details of where site related vehicles (worker transport etc.) will park in the vicinity and whether workers will be transported from elsewhere.

xi. The Science Park will need to be kept informed of significant deliveries and liaised with through the project.

xii. Times for construction traffic and delivery vehicles will be detailed, including any restrictions on delivery hours.

7.7.5 The above sets out the measures envisaged during the construction period at this stage. These will be set out in in the CTMP, which will be developed further with the contractor, when appointed, in agreement with the District and County Councils.

8 Transport Implications – Sustainable Modes of Travel

8.1 Introduction

8.1.1 This section of report will consider the transport implications of the proposed development in terms of travel by sustainable modes and will also outline potential improvements which are proposed or being considered in the vicinity of the site.

8.2 Implications of Change in Travel Demand

8.2.1 As set out in section 4.11 of this report the University of Oxford has operated a full Travel Plan for Begbroke Science Park since 2004, which has been very successful reducing the percentage of commuting trips to the site made by car, from 76% in 2006 to 57% in 2015 (see Table 5 on page 20).

8.2.2 The modal share change that has been achieved is significant when set in context to the general modal share for travel to work in this area (see below).

8.2.3 Data from 2011 Census records, obtained from the National Statistics Office, has been obtained for the workday population for the Super Output Area Middle Layer of Cherwell 019 (workday population) which covers the development site, as summarised in Table 15.

Travel Mode	Modal Share
Train	1%
Bus, minibus or coach	5%
Taxi	0%
Motorcycle, scooter or moped	1%
Driving a car or van	81%
Passenger in a car or van	4%
Bicycle	4%
On foot	5%

Table 15: Travel to Work – Cherwell 019 Middle Output Layer

8.2.4 It can be seen from Table 15 that the 'car driver' modal share for people working in the local area around Begbroke Science Park, including the employment areas in Langford Lane, is 81%. As can be seen from Table 5 (page 20), Begbroke Science Park itself has a lower car driver mode share of 57% in 2015. This is primarily as result of Begbroke Science Park's introduction of the mini-bus service between the science park and Oxford city centre, and the on-going operational costs of operating this service. Equally it can be seen from Table 5 that the cycle mode share at 7% for the Science Park is notably higher than the 4% from the census data, this being an area the University is targeting for further improvement.

8.2.5 The proposed development is predicted to lead to an increase of 60 people cycling to the site, 20 people car-sharing, 16 walking and 4 people travelling by public transport. The largest predicted increase in travel by sustainable modes is predicted to be via the very successful and sustainable mini-bus service operated by Begbroke Science Park, which is therefore within its control to increase capacity as and when required.

8.2.6 It should be appreciated that the access road to the site has been designed to accommodate improved access by public transport, with an area provided for a bus stop and bus turning. During discussions with local bus operators it has previously been indicated that the current quantum of development is not sufficient to justify the diversion of existing services but that this could be reconsidered as the Science Park grows, and as evidence of demand from the University's minibus service increases to a point whereby a commercial operation becomes realistic.

8.2.7 It is proposed to provide cycle parking on the basis of 1 space per 5 persons on site, which is the same standard that the University provides for staff within Oxford. A

total of 170 cycle parking spaces (850/5) will be provided on site following the proposed development, a standard of 1 space per 157m^2, an increase of 97 cycle parking spaces (or 49 stands).

8.2.8 The provision of showers, changing facilities and lockers would be accommodated within the proposed new buildings on site, in a similar manner to the facilities provided with previous development projects at the site such as the CIE building and extension.

8.2.9 The Cherwell Local Plan Partial Review identifies significant development on land surrounding the Science Park under the title "Land East of the A44" and modal share by sustainable modes of travel is likely to increase significantly as result of improved public transport and pedestrian/cycle infrastructure which will come forward as part of these development proposals, if found sound, adopted and realised.

8.3 Potential Future Improvements to Sustainable Transport Infrastructure

8.3.1 Key sustainable transport infrastructure improvements proposed to accommodate the planned growth under the existing Cherwell Local Plan, and which may impact on the Begbroke Science Park, are summarised below:

Route/Junction	Investment Rationale	Timescale
Oxford Airport Park & Ride New Site	New Park & Ride site to convert Oxford-bound vehicle trips to bus trips from north of A34/A40.	2016-21
Rapid Transit Line 1 (A44/A4095 -Oxford City)	Upgrade existing bus corridor to add capacity and route priority.	2016-25
Rapid Transit Line 3 (A44/A4095/Eynsham – Lodge Hill/Sandford)	Directly connect North Oxford P&Rs, residential and employment growth areas to Eastern Arc	2016-31
Oxford Woodstock Rd Cycle Super Route	Improve quality and safety of cycle route to Northern Gateway.	2015-25
Kidlington-Oxford Eastern Arc (Employment Locations)	Direct bus from Kidlington to jobs to the East of Oxford	2020-25
Oxford B4495 Cycle Super Routes	Improve quality and safety of cycle routes around Eastern Arc	2015-30

Table 16: Key Transport Proposals

8.3.2 These measures all have the potential to benefit Begbroke Science Park in terms of improving access by non-car modes of travel.

9 Summary and Conclusions

9.1 Summary

9.1.1 This report has considered the transport implications of development proposals at the Begbroke Science Park on behalf of the University of Oxford who own and run the Science Park.

9.1.2 Key points of the report are summarised as follows:

i. Outline applications relating to an interim and a long-term phase of development at Begbroke Science Park were consented in 2001. The interim phase of the development has been fully implemented. The long-term phase of the development allowed around a further 21,000m^2 and this outline consent has now lapsed after being partly implemented. It remains a material consideration.

ii. The University is seeking to renew the time-expired 2015 outline permission for development at Begbroke Science Park, but with a slightly higher development density, and the proposed development is intended to be broadly in accordance with the principles established for the previous outline permission.

iii. The proposed development will retain the existing buildings on site (circa 14,200m^2) and provide up to 12,500m^2 of additional B1a/b/c floorspace and ancillary D1 floorspace. The floorspace on site following the development would be up to 26,700m^2.

iv. The proposed development would be served via the existing signal junction of the access to the Science Park with the A44 Woodstock Road, which was designed to be able to accommodate the level of development consented in the 2015 outline application and was predicted to operate with a significant degree of spare capacity. The internal access roads will be largely unaltered by the proposed development although some minor improvement works may be provided.

v. It is proposed that following the proposed development that parking on site (as a whole) would be increased to a maximum of 414 spaces (including 14 disabled spaces) at a ratio of 1 space per 65.4m^2, less than half the maximum standard for this type of development.

vi. Up to 170 cycle parking spaces would be provided to serve the site as a whole, at a standard of 1 space per 5 persons. This is in line with the University's aim to increase the cycling mode share from 7% to 15% by 2021.

vii. The proposed level of car and cycle parking are based on existing transport conditions; however, it is likely that modal share by sustainable modes of travel will increase as a result of improved public transport and pedestrian/cycle infrastructure which are likely to come forward with development in this area of Cherwell.

viii. The predicted development trips by car are only slightly higher, just 18 and 42 two-way trips in the AM and PM peaks respectively, than those consented for the 2015 outline application, which were considered to be acceptable by the Local Highway Authority (LHA).

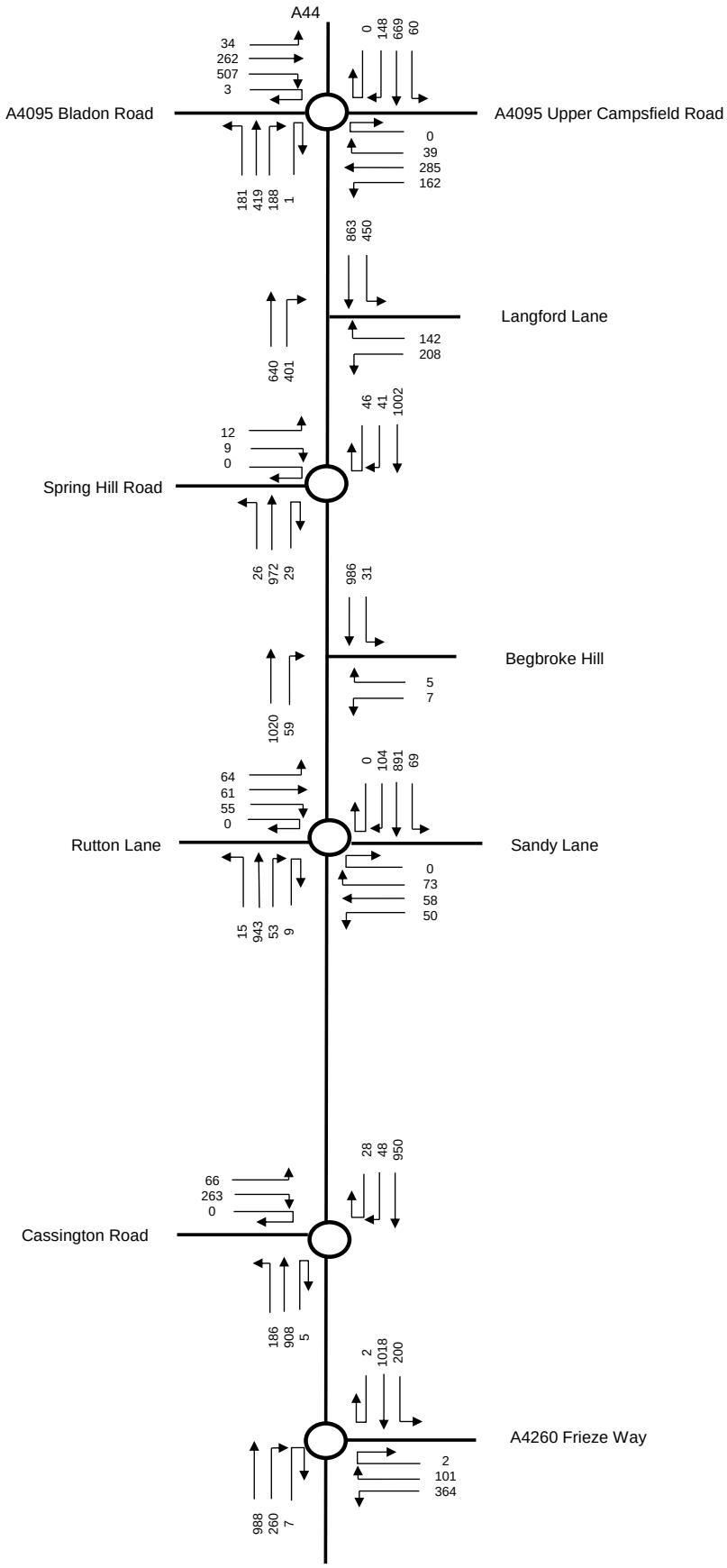
ix. Beyond the site access junction, the percentage change in traffic flows at individual junctions is only between 1% and 2% and this level of flow change would be imperceptible on the operation of these junctions.

x. It has been demonstrated that the site access junction is capable of operating with a significant degree of spare capacity in 2025 even with the addition of proposed development traffic flows.

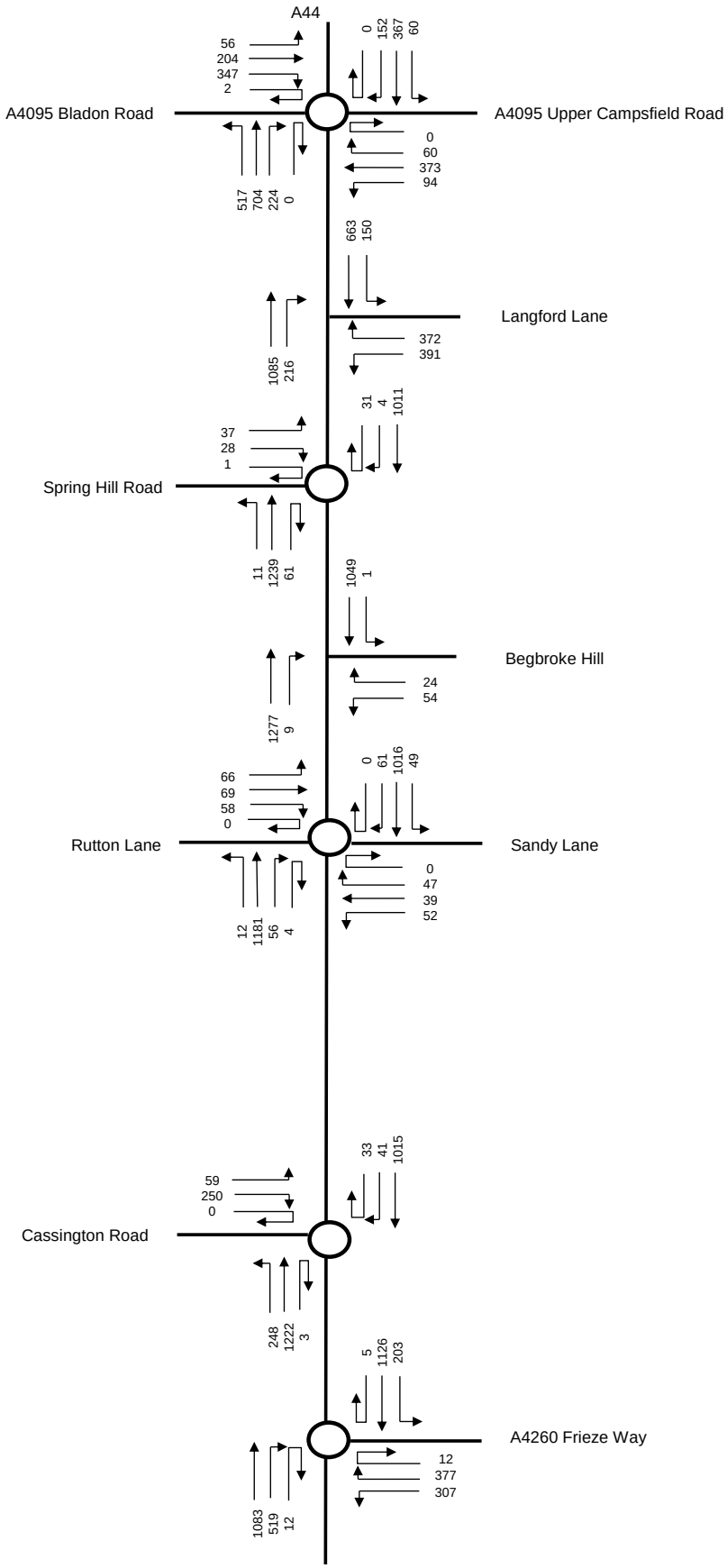
xi. The University has operated a full Travel Plan for Begbroke Science Park since 2004, which has been very successful in reducing the percentage of commuting trips to the site made by car, from 76% in 2006 to 57% in 2015. Primarily as a result of its investment in the mini-bus service between the science park and Oxford city centre, and its focus on promoting cycling as a mode of travel.

xii. The University will continue to operate and update the Travel Plan, and all new developments at Begbroke will be subject to it.

Figures

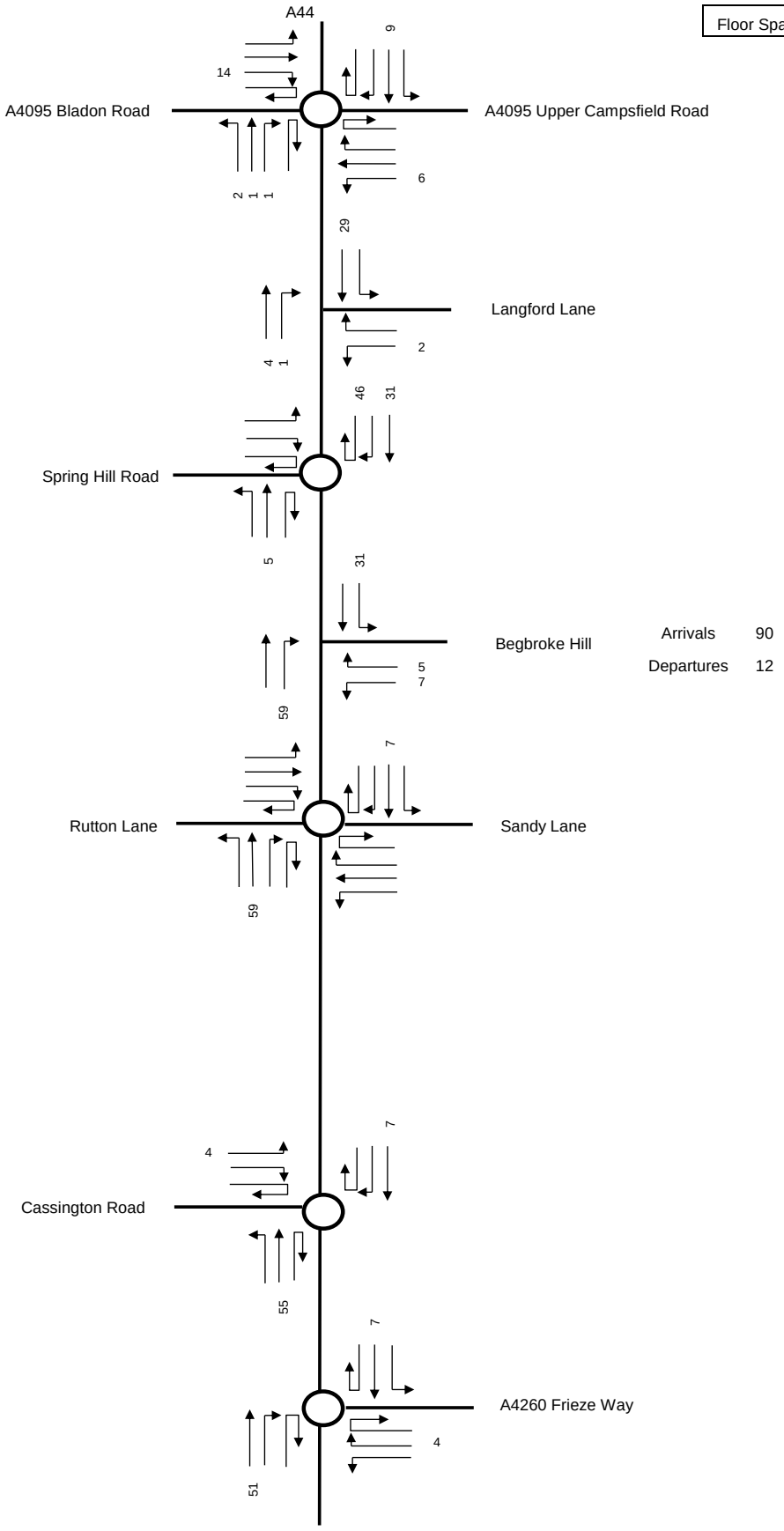


IMA TRANSPORT PLANNING	Scale@size; N.T.S.	Date; Feb-18	Job No; IMA-18-032	Project; Begbroke Science Park	
	Drawn by; AB	Client; University of Oxford		2017 Survey (PCU) - AM Peak (08:00-09:00)	Figure 1



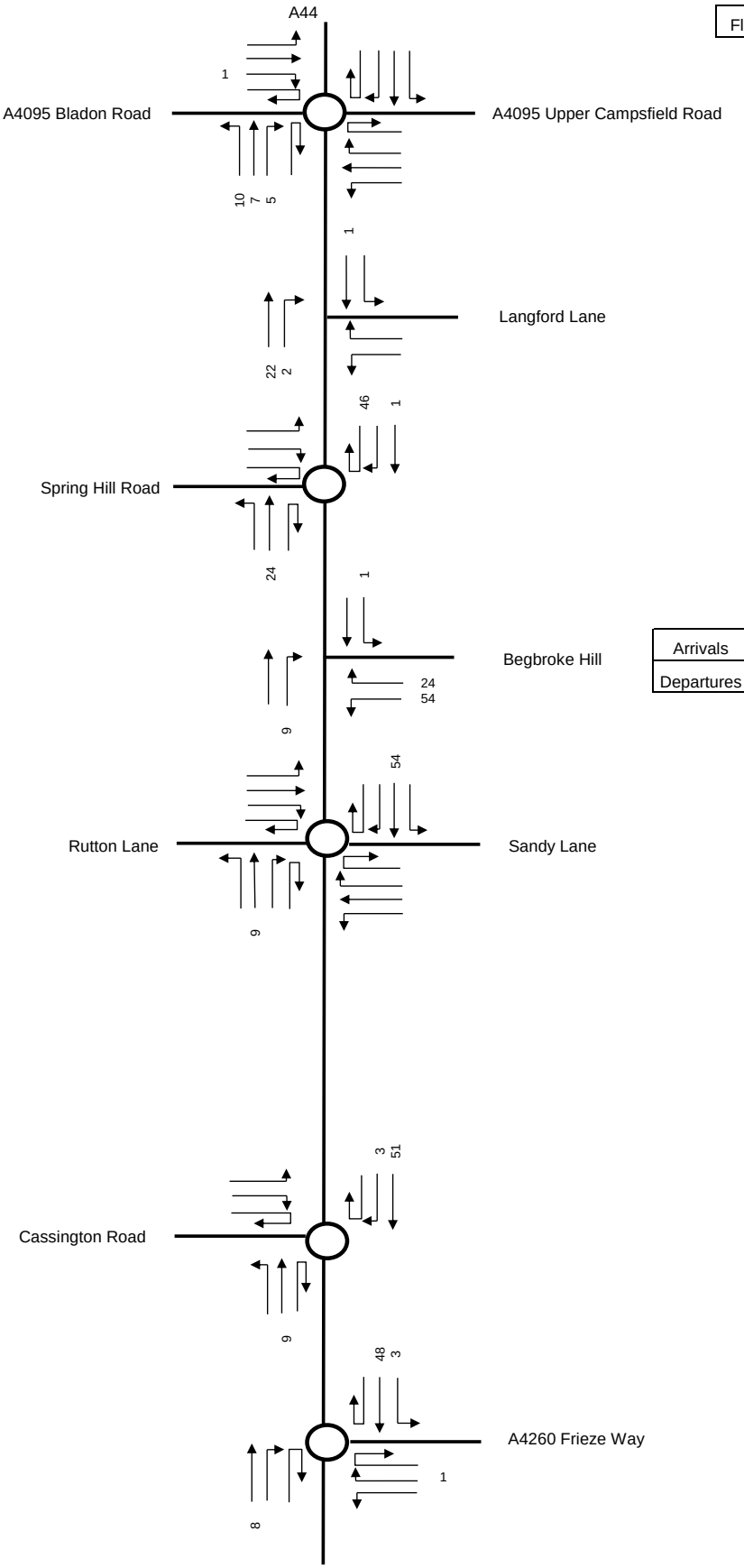
IMA TRANSPORT PLANNING	Scale@size; N.T.S.	Date; Feb-18	Job No; IMA-18-032	Project; Begbroke Science Park	
	Drawn by; AB	Client; University of Oxford		2017 Survey (PCU) - PM Peak (17:00-18:00)	Figure 2

Floor Space (m2)	14200



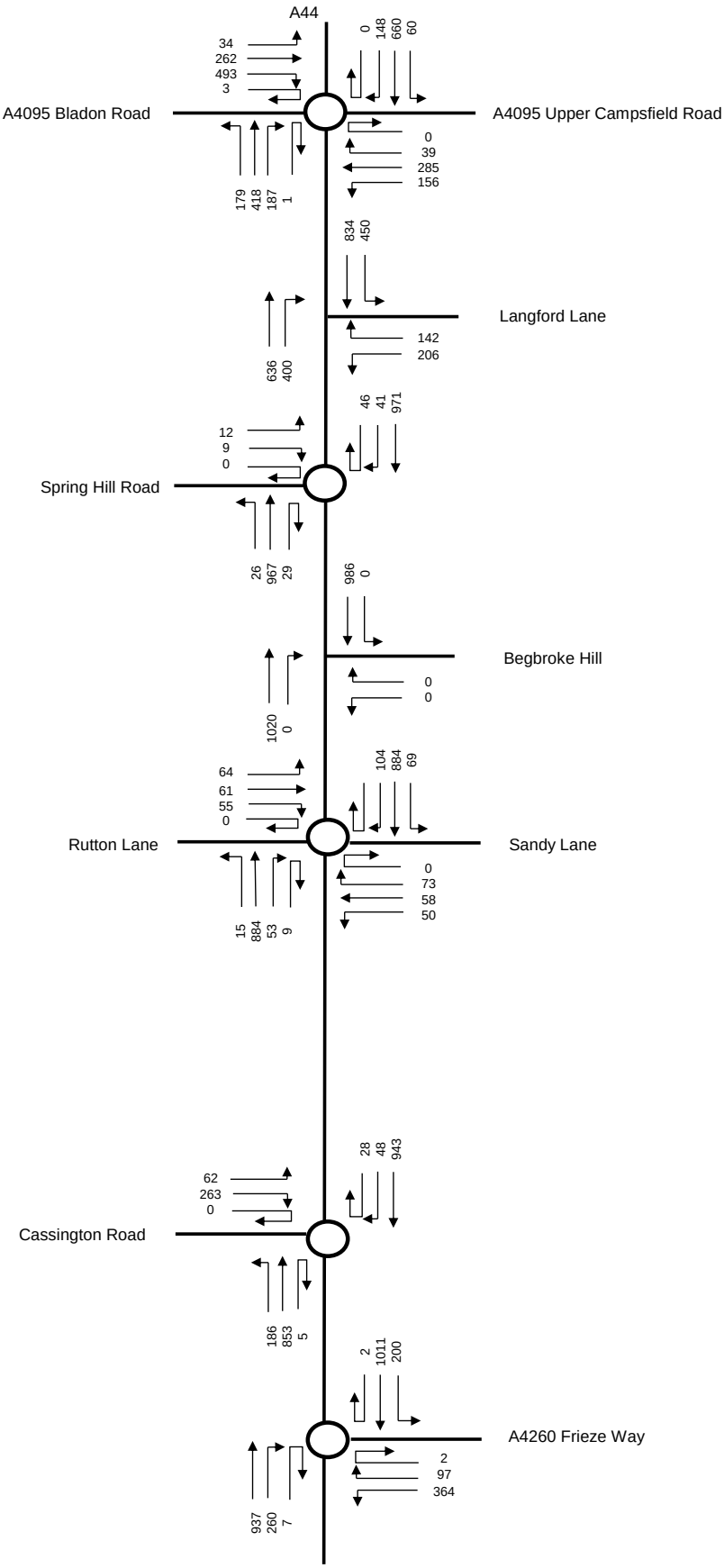
TRANSPORT PLANNING	Scale@size; N.T.S.	Date; Feb-18	Job No; IMA-18-032	Project; Begbroke Science Park	
	Drawn by; AB	Client; University of Oxford		Existing Begbroke Trips (14,200m2 GFA) - AM Peak	Figure 3

Floor Space (m2)	14200

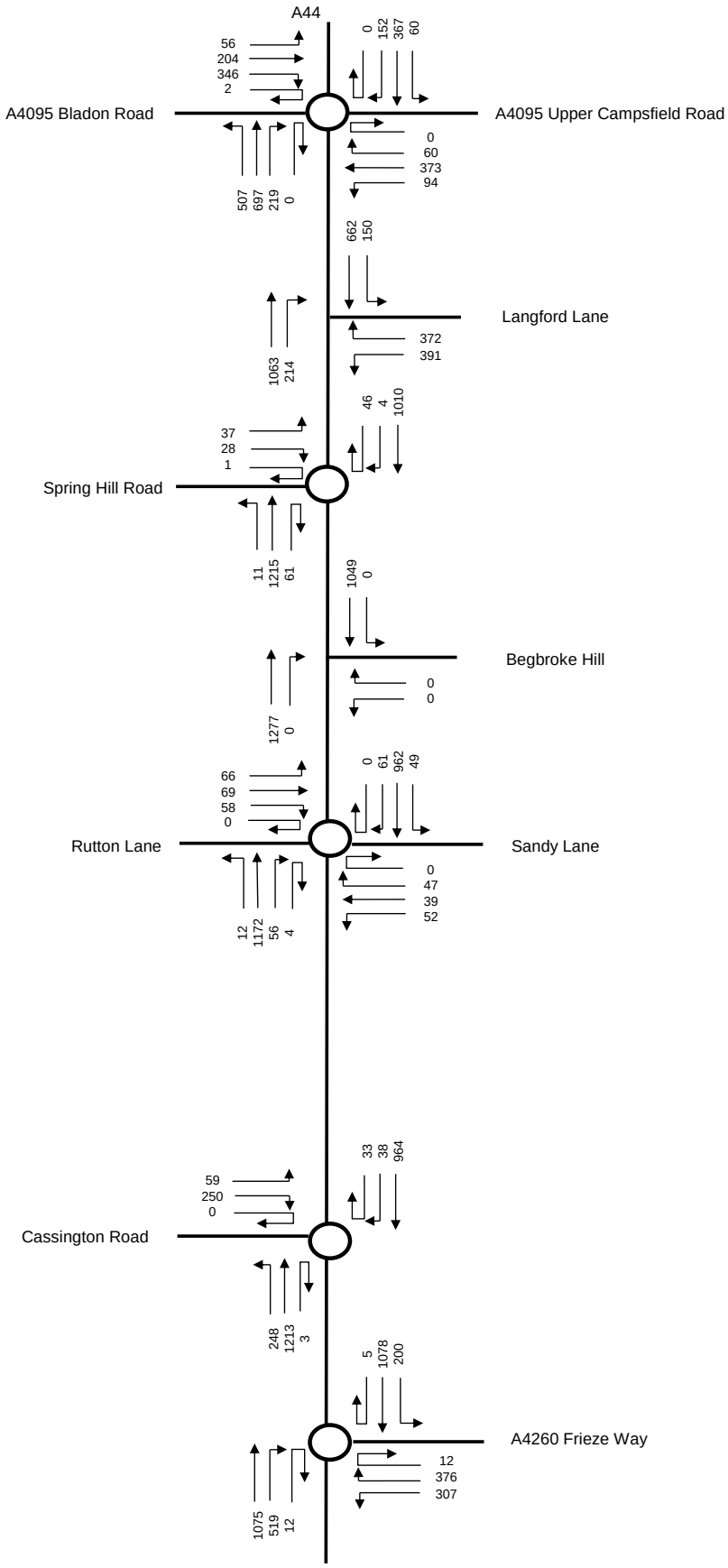


Arrivals	10
Departures	78

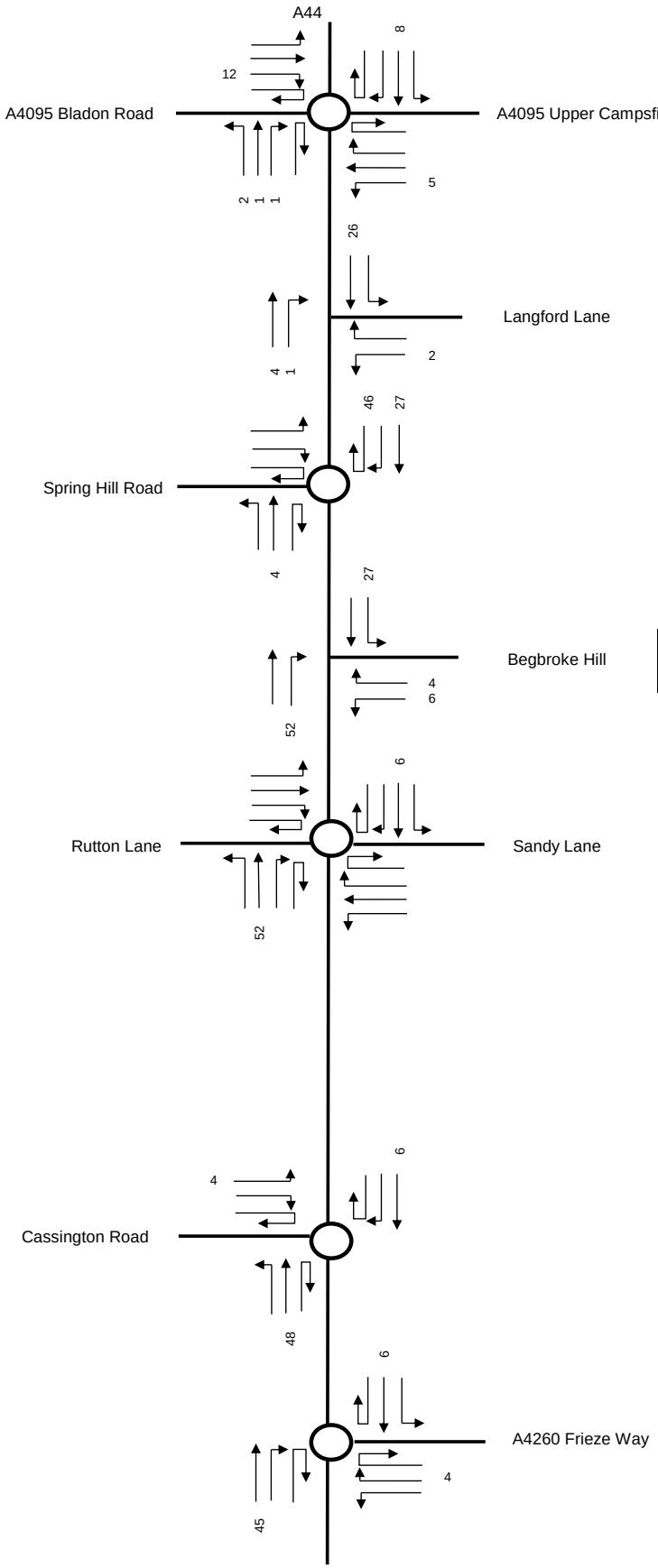
TRANSPORT PLANNING	Scale@size; N.T.S.	Date; Feb-18	Job No; IMA-18-032	Project; Begbroke Science Park	
	Drawn by; AB	Client; University of Oxford		Exisitng Begbroke Trips (14,200m2 GFA) - PM Peak	Figure 4



IMA TRANSPORT PLANNING	Scale@size; N.T.S.	Date; Feb-18	Job No; IMA-18-032	Project; Begbroke Science Park	
	Drawn by; AB	Client; University of Oxford		2017 Background Flows - AM Peak	Figure 5



IMA TRANSPORT PLANNING	Scale@size; N.T.S.	Date; Feb-18	Job No; IMA-18-032	Project; Begbroke Science Park	
	Drawn by; AB	Client; University of Oxford		2017 Background Flows - PM Peak	Figure 6

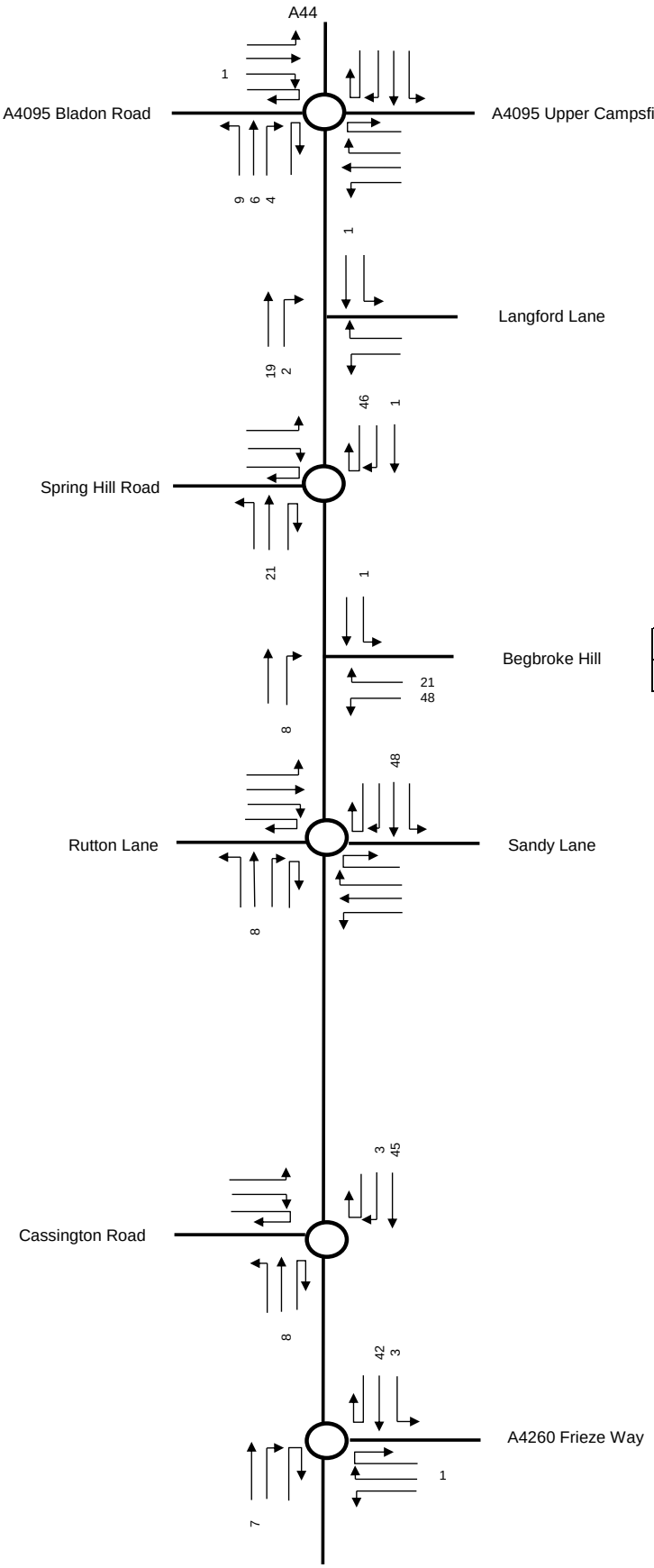


Floor Space (m2)	12500

Arrivals	79
Departures	11

IMA TRANSPORT PLANNING	Scale@size; N.T.S.	Date; Feb-18	Job No; IMA-18-032	Project; Begbroke Science Park
	Drawn by; AB	Client; University of Oxford	Development Flows (12,500m2 GFA) - AM Peak	Figure 7

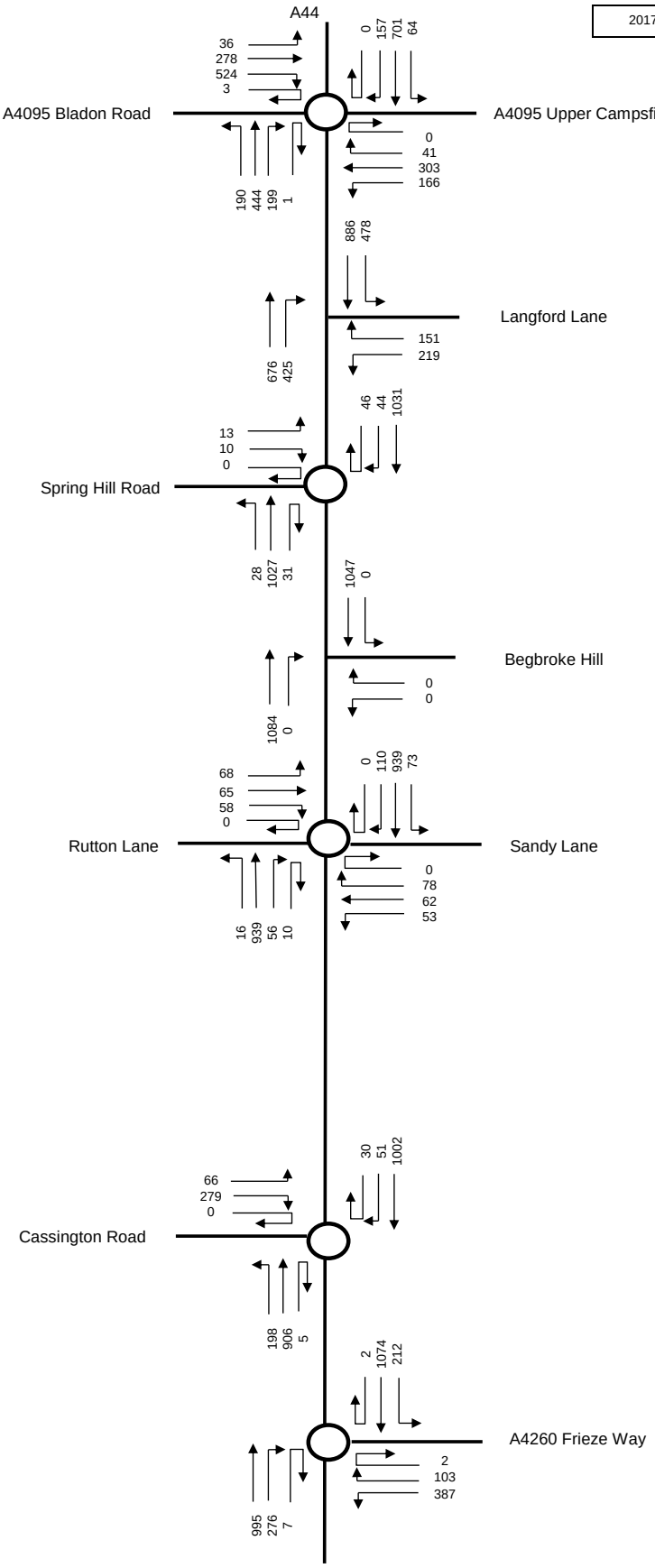
Floor Space (m2)	12500



Arrivals	9
Departures	69

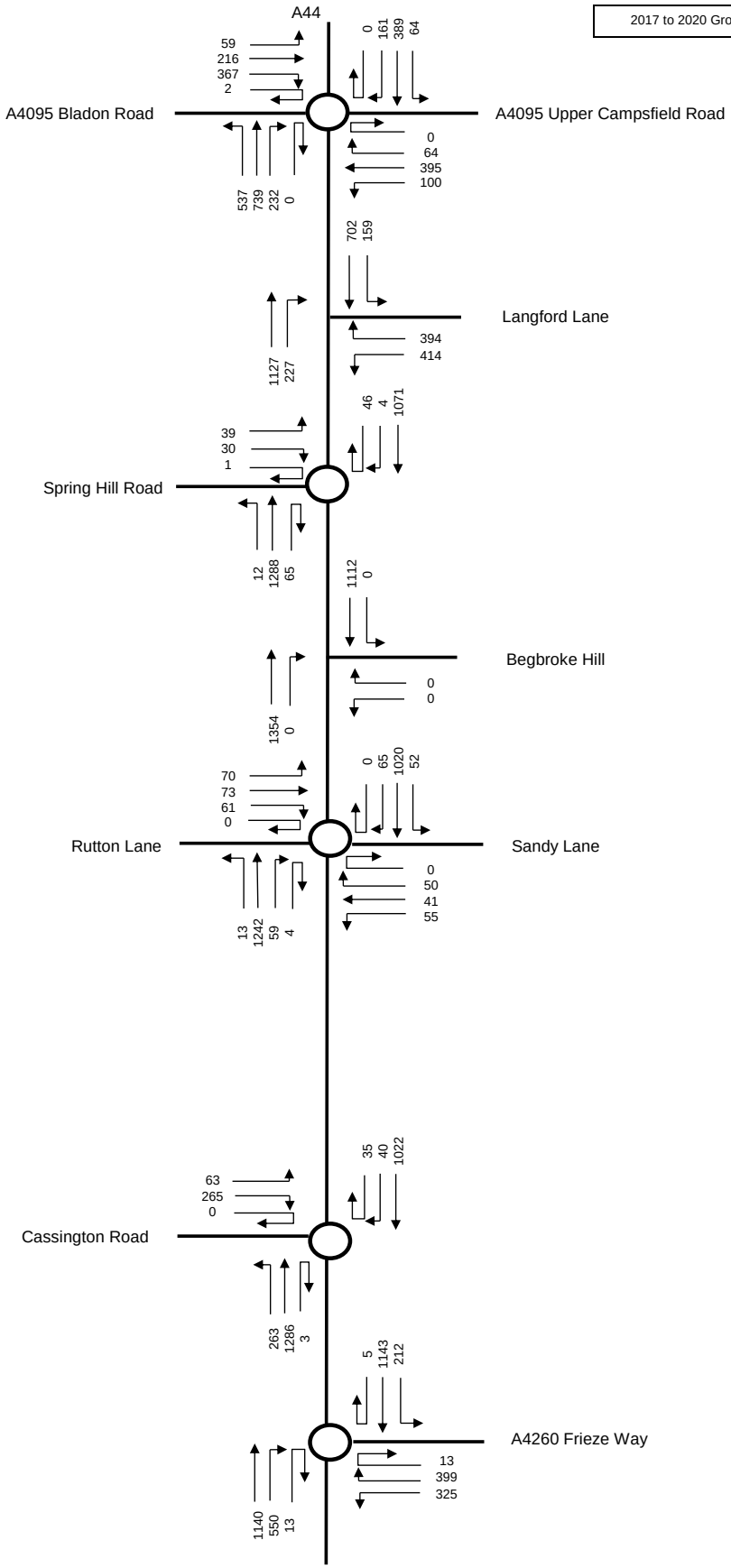
TRANSPORT PLANNING	Scale@size; N.T.S.	Date; Feb-18	Job No; IMA-18-032	Project; Begbroke Science Park	
	Drawn by; AB	Client; University of Oxford		Development Flows (12,500m2 GFA) - PM Peak	Figure 8

2017 to 2020 Growth Factor	1.0623



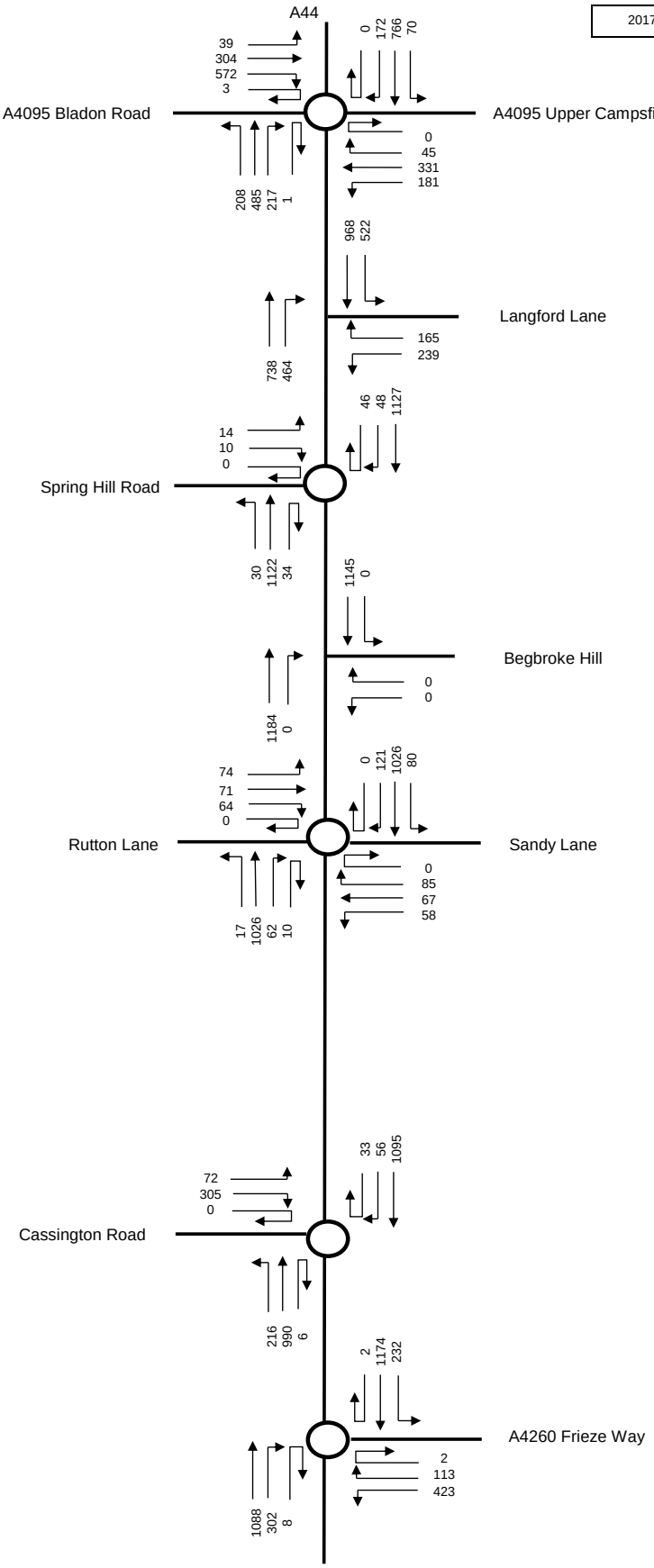
IMA TRANSPORT PLANNING	Scale@size; N.T.S.	Date; Feb-18	Job No; IMA-18-032	Project; Begbroke Science Park
	Drawn by; AB	Client; University of Oxford	2017 Background Flows plus Growth to 2020 - AM Peak	Figure 9

2017 to 2020 Growth Factor	1.0600



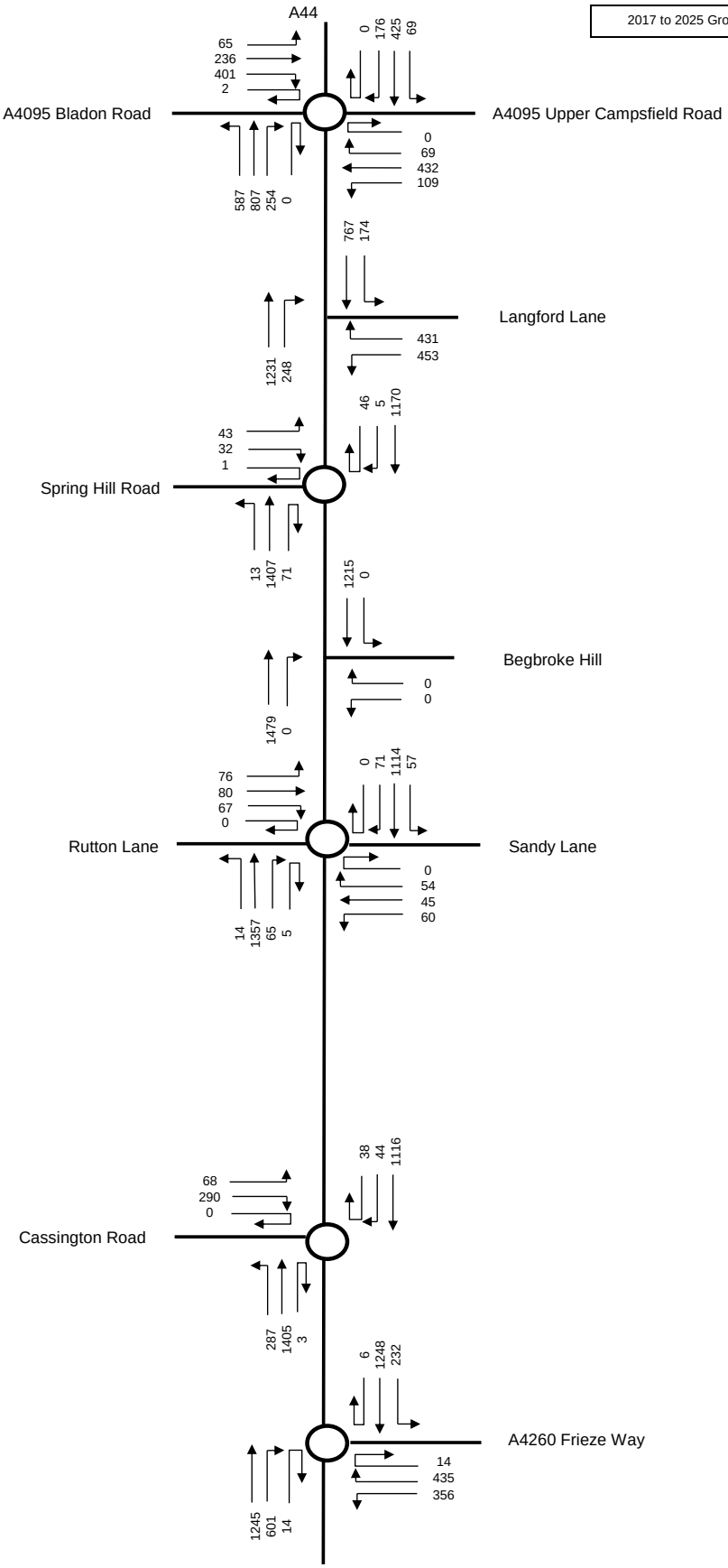
TRANSPORT PLANNING	Scale@size; N.T.S.	Date; Feb-18	Job No; IMA-18-032	Project; Begbroke Science Park
	Drawn by; AB	Client; University of Oxford	2017 Background Flows plus Growth to 2020 - PM Peak	Figure 10

2017 to 2025 Growth Factor	1.1608

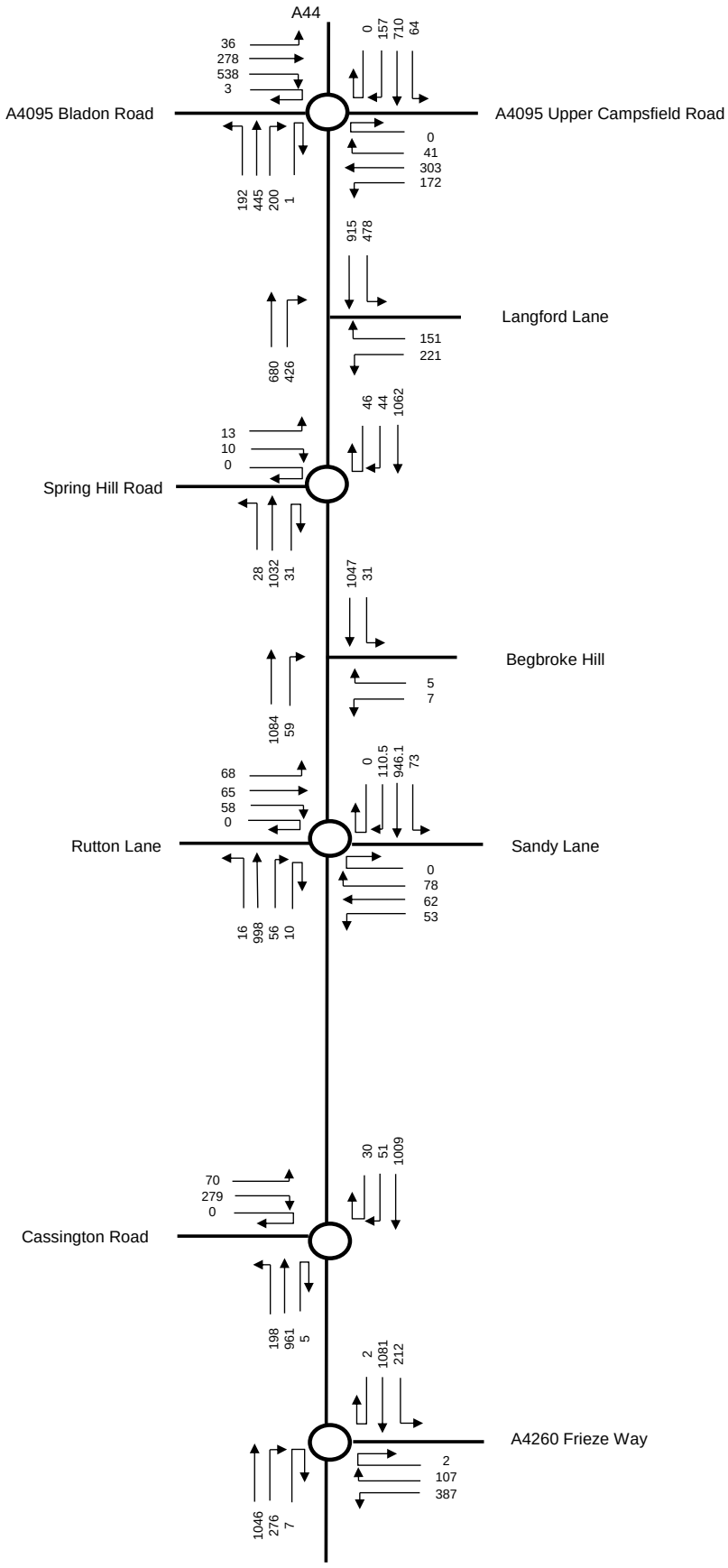


TRANSPORT PLANNING	Scale@size; N.T.S.	Date; Feb-18	Job No; IMA-18-032	Project; Begbroke Science Park
	Drawn by; AB	Client; University of Oxford	2017 Background Flows plus Growth to 2025 - AM Peak	Figure 11

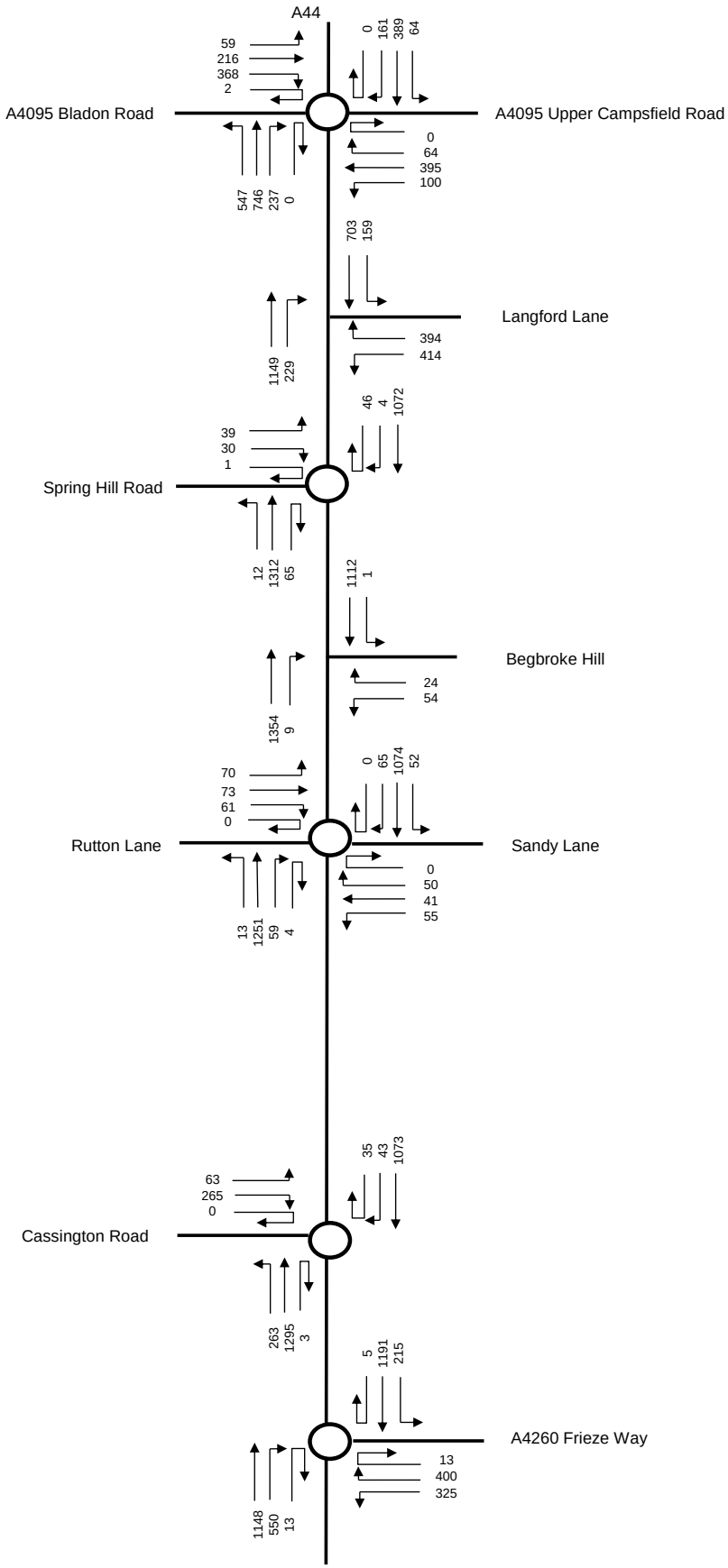
2017 to 2025 Growth Factor	1.1581



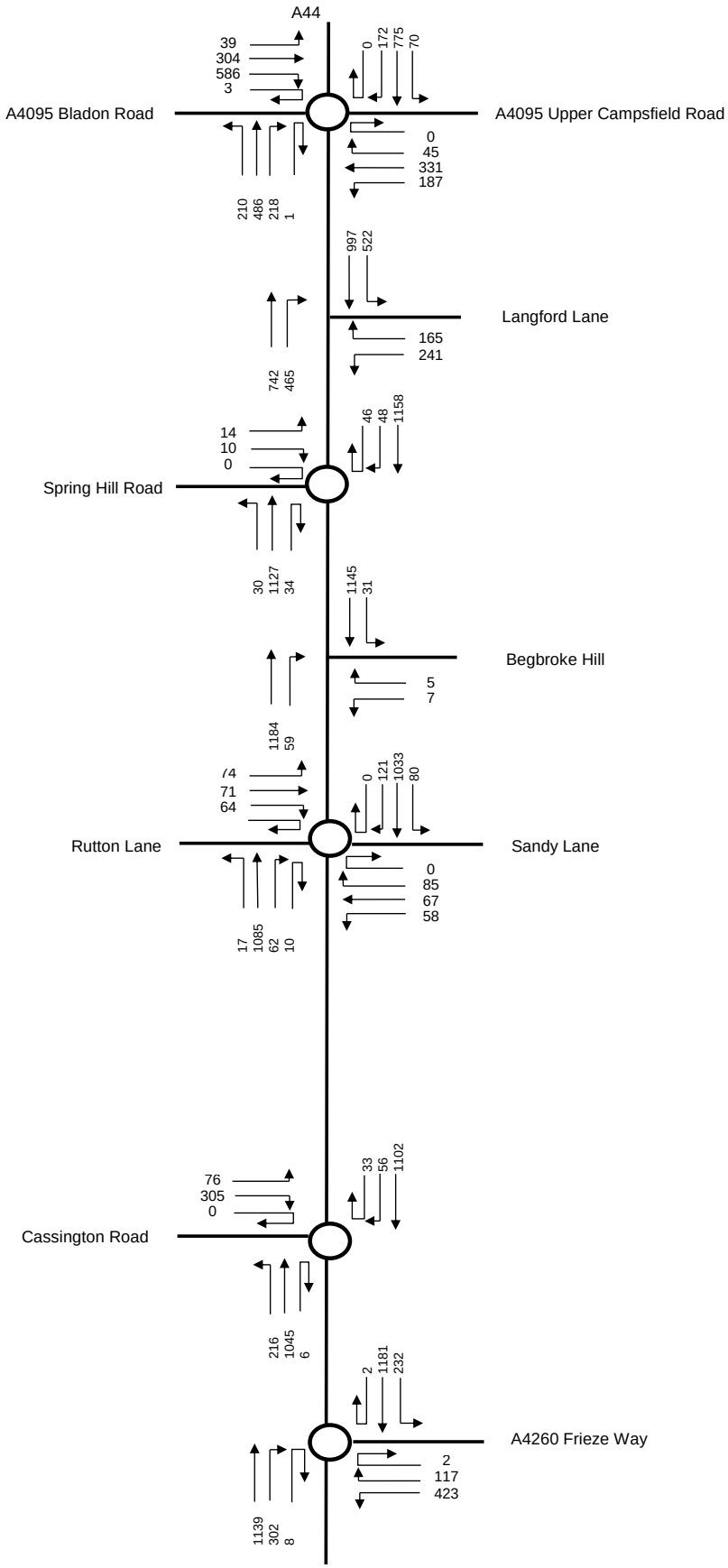
	Scale@size;	Date;	Job No;	Project;	
TRANSPORT PLANNING	N.T.S.	Feb-18	IMA-18-032	Begbroke Science Park	
	Drawn by; AB	Client; University of Oxford		2017 Background Flows plus Growth to 2025 - PM Peak	Figure 12



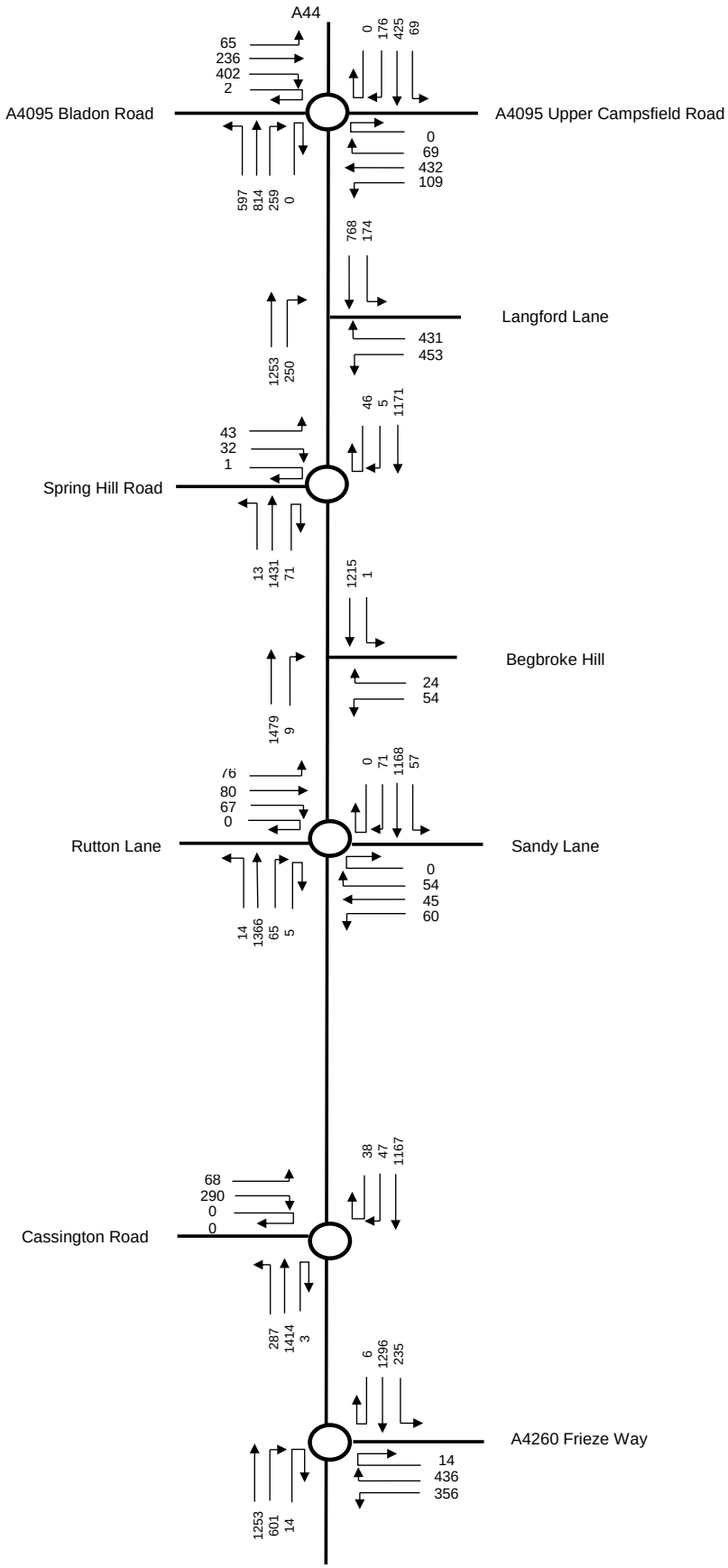
IMA TRANSPORT PLANNING	Scale@size; N.T.S.	Date; Feb-18	Job No; IMA-18-032	Project; Begbroke Science Park	
	Drawn by; AB	Client; University of Oxford		2020 Base Flows - AM Peak	Figure 13



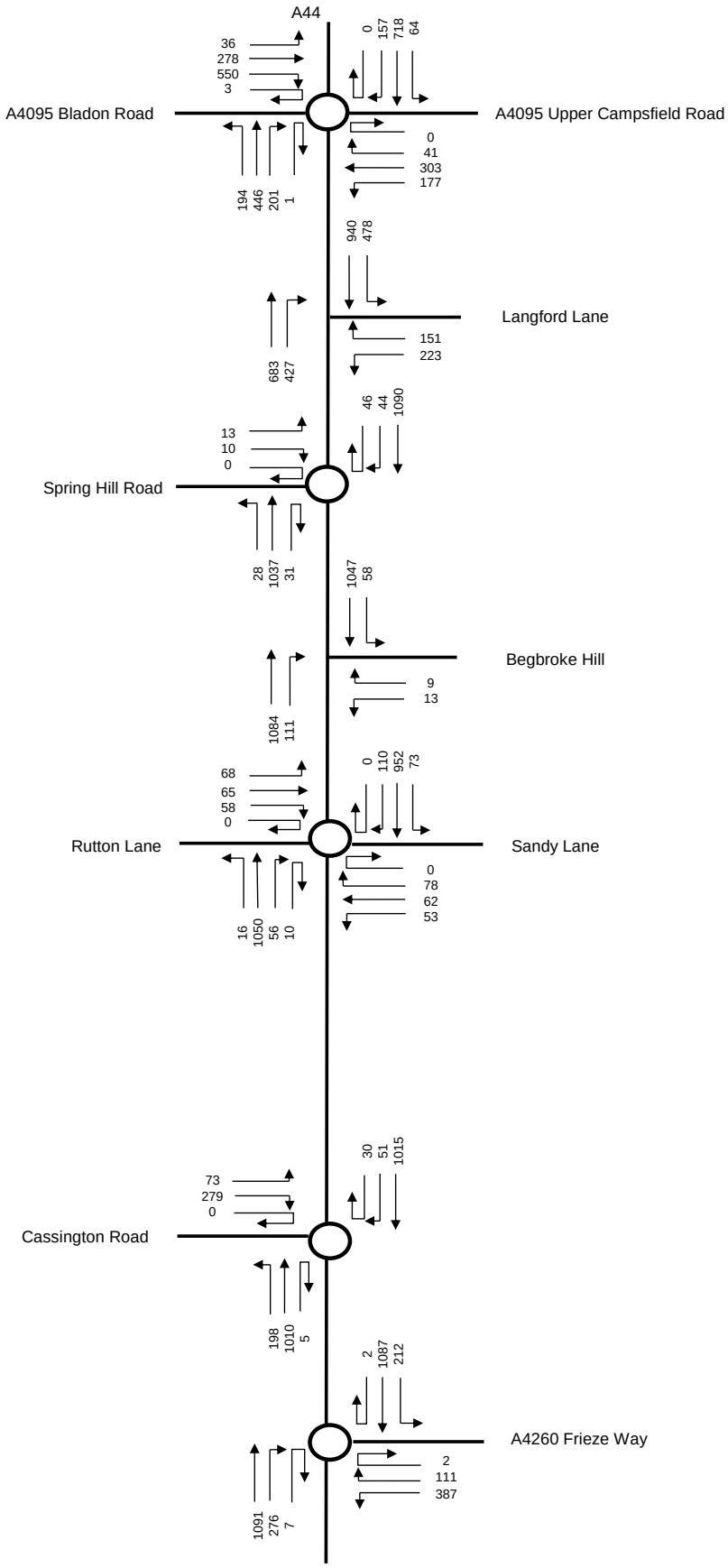
TRANSPORT PLANNING	Scale@size; N.T.S.	Date; Feb-18	Job No; IMA-18-032	Project; Begbroke Science Park
	Drawn by; AB	Client; University of Oxford	2020 Base Flows - PM Peak	Figure 14



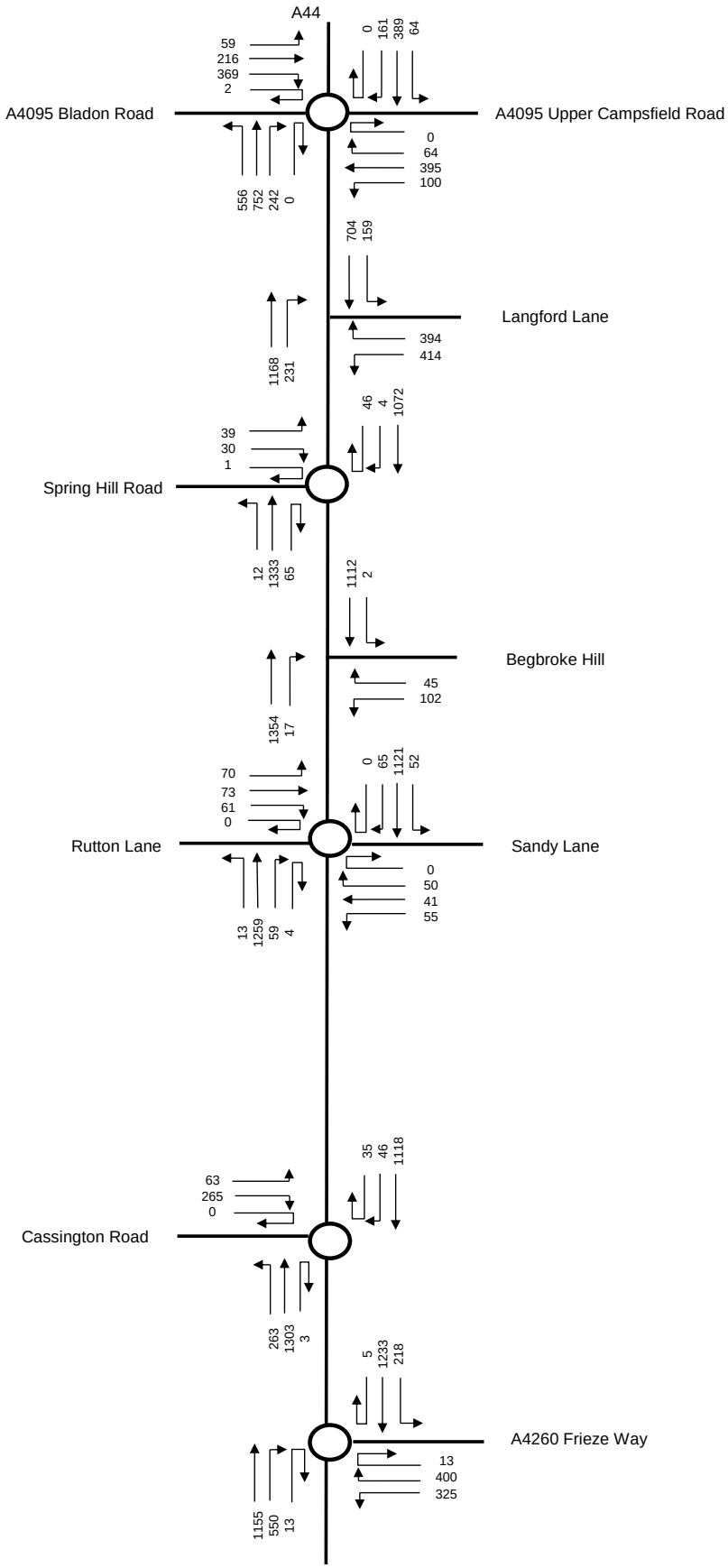
TRANSPORT PLANNING	Scale@size; N.T.S.	Date; Feb-18	Job No; IMA-18-032	Project; Begbroke Science Park	
	Drawn by; AB	Client; University of Oxford		2025 Base Flows - AM Peak	Figure 15



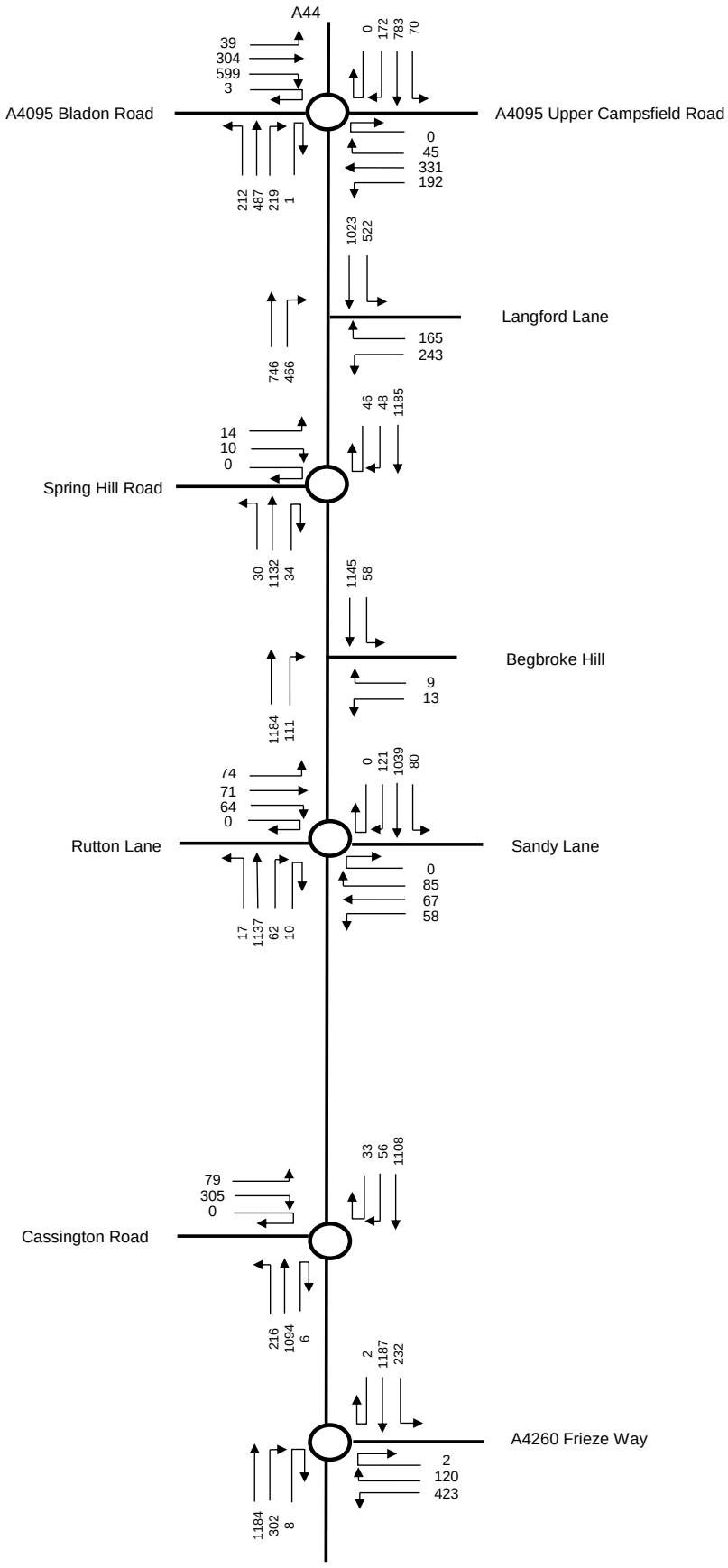
IMA TRANSPORT PLANNING	Scale@size; N.T.S.	Date; Feb-18	Job No; IMA-18-032	Project; Begbroke Science Park	
	Drawn by; AB	Client; University of Oxford		2025 Base Flows - PM Peak	Figure 16



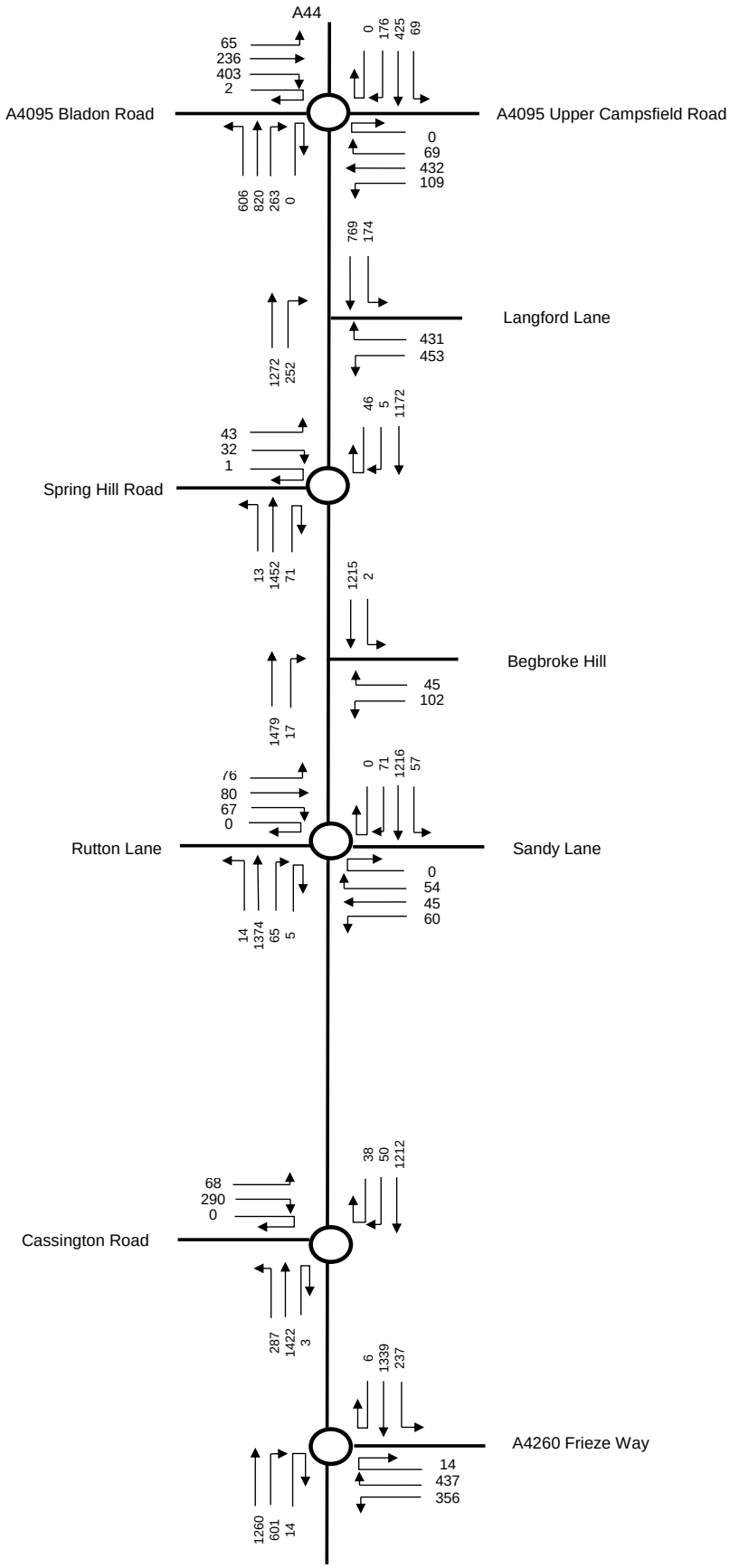
IMA TRANSPORT PLANNING	Scale@size; N.T.S.	Date; Feb-18	Job No; IMA-18-032	Project; Begbroke Science Park	
	Drawn by; AB	Client; University of Oxford		2020 With Development Flows - AM Peak	Figure 17



IMA TRANSPORT PLANNING	Scale@size; N.T.S.	Date; Feb-18	Job No; IMA-18-032	Project; Begbroke Science Park	
	Drawn by; AB	Client; University of Oxford		2020 With Development Flows - PM Peak	Figure 18

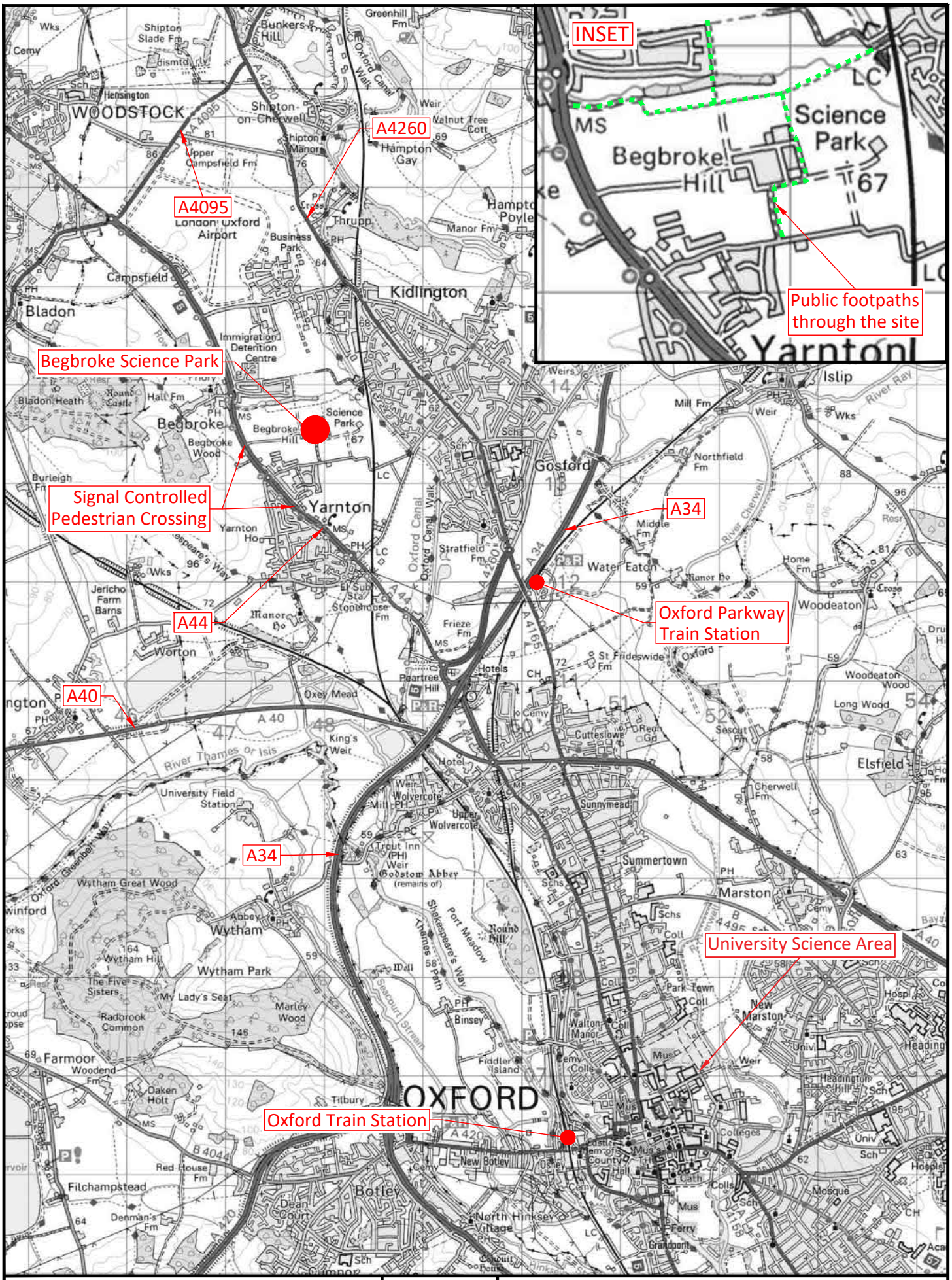


IMA TRANSPORT PLANNING	Scale@size; N.T.S.	Date; Feb-18	Job No; IMA-18-032	Project; Begbroke Science Park	
	Drawn by; AB	Client; University of Oxford		2025 With Development Flows - AM Peak	Figure 19



IMA TRANSPORT PLANNING	Scale@size; N.T.S.	Date; Feb-18	Job No; IMA-18-032	Project; Begbroke Science Park	
	Drawn by; AB	Client; University of Oxford		2025 With Development Flows - PM Peak	Figure 20

Plans



I M A TRANSPORT PLANNING 11 KINGSMEAD SQUARE BATH BA1 2AB t: 01225 444 011 f: 01225 444 055 www.ima-tp.com	SCALE: (A4) 1:50,000	PROJECT: Begbroke Science Park		
	DATE: May - 2018	TITLE Site Location		
	CAD FILE: Layout_v1-1.dwg	PROJECT No: IMA-18-032	DRAWING No: PLAN 1	REV: -

Cycle parking adjacent to CIE building temporarily unavailable due to construction work. A total of 30 spaces will be provided on completion of CIE extension.

Conference Parking Area (unmade)

Key:

- Existing Building
- Cycle Parking
- Showers
- OXONBIKE Hire (electric cycles)
- Minibus Stop

Unmade Parking Area

Main access via Begbroke Hill

CIE Building

CIE Extension

30 Spaces

Chemical Store

APL

Department of Materials

10 Spaces

OGC

IAT

14 Spaces

10 Spaces

2 Spaces

Unit 5 & 6

Sub Station

Christian Building

Walled Garden

Farm House

Car parking temporarily unavailable due to construction work.

7 Spaces (one space reserved for departmental bicycle)

Visitor car park

Pedestrian/cycle access from Sandy Lane

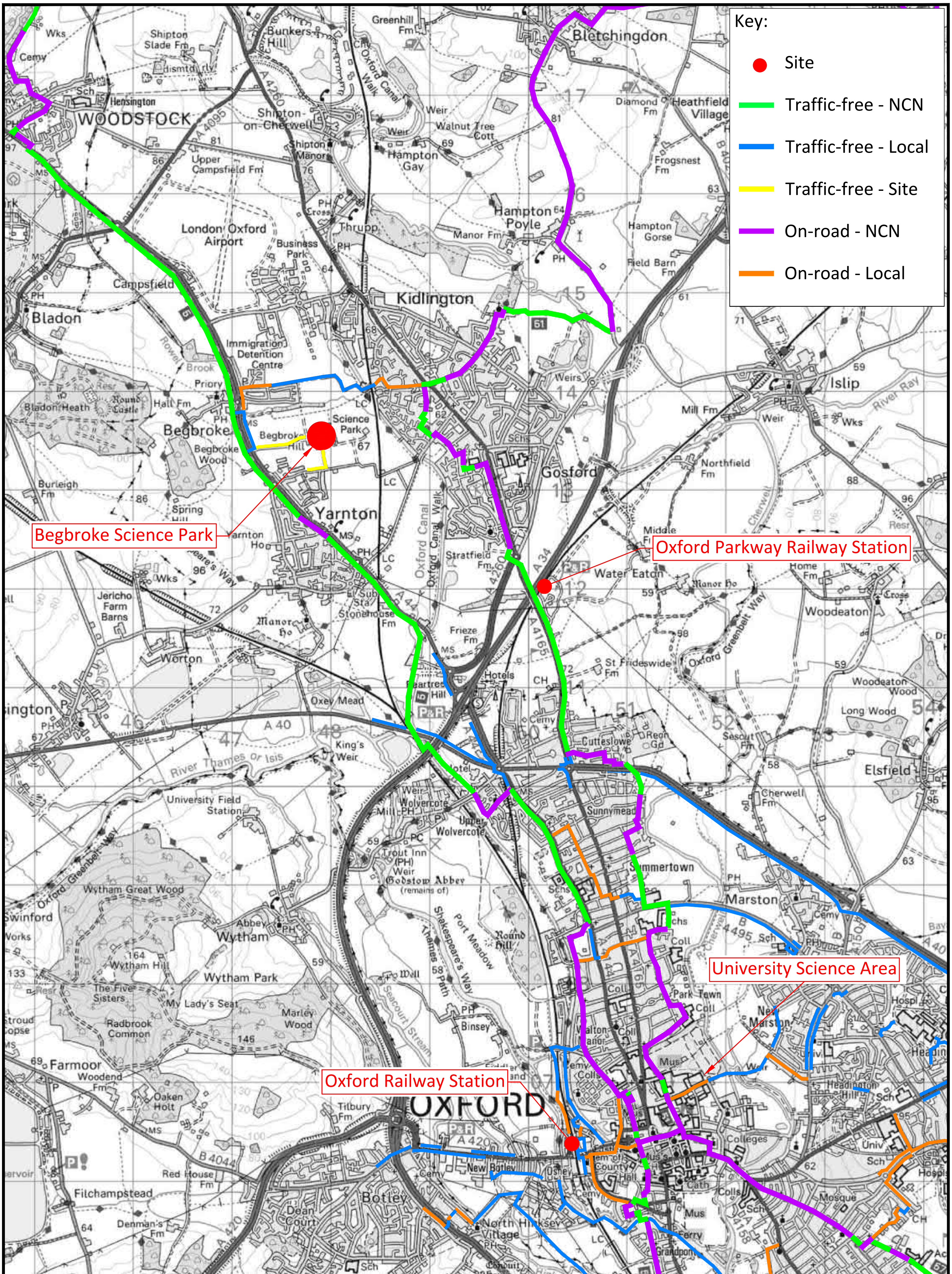
I M A TRANSPORT PLANNING
11 KINGSMEAD SQUARE
BATH BA1 2AB
t: 01225 444 011
www.ima-tp.com

CLIENT: Unviersity of Oxford

PROJECT: Begbroke Science Park

TITLE: Existing Site Layout

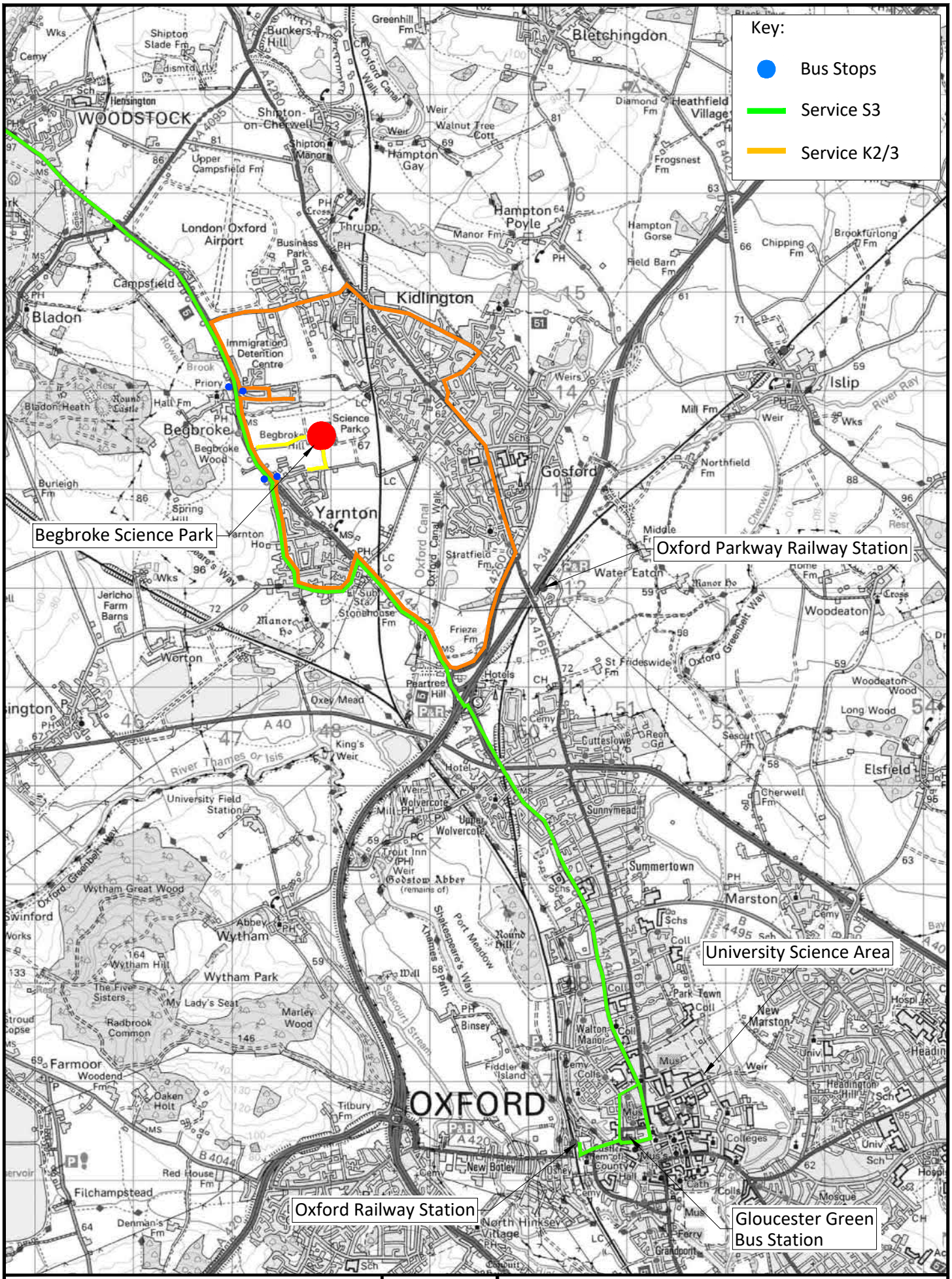
SCALE: (A3)	CHECKED:	APPROVED:
1:1000	IMA	IMA
CAD FILE:	DESIGN/DRAWN:	DATE:
Layout_v2-0.dwg	SN	Feb - 2018
PROJECT No:	DRAWING No:	REV:
IMA-18-032	PLAN 2	-



I M A TRANSPORT PLANNING

11 KINGSMEAD SQUARE
BATH BA1 2AB
t: 01225 444 011
f: 01225 444 055
www.ima-tp.com

SCALE: (A4) 1:50,000	PROJECT: Begbroke Science Park	
DATE: Feb - 2018	TITLE Cycle Network	
CAD FILE: Layout_v1-1.dwg	PROJECT No: IMA-18-032	DRAWING No: PLAN 3 / REV: -



I M A TRANSPORT PLANNING 11 KINGSMEAD SQUARE BATH BA1 2AB t: 01225 444 011 f: 01225 444 055 www.ima-tp.com	SCALE: (A4) 1:50,000	PROJECT: Begbroke Science Park Travel Plan	
	DATE: Feb - 2018	TITLE Existing Bus Services	
	CAD FILE: Layout_v1-1.dwg	PROJECT No: IMA-18-032	DRAWING No: PLAN 4 / REV:

Appendix 1

No. Complete Pipeline	Kidlington and Rural Areas Projects	Main aim	Priority Critical Necessary Desirable	Update
Transport & movement				
(3a) Comp.	Oxford Parkway - New station at Water Eaton as part of the East West Rail Phase 1 (Evergreen 3 project) The station is served every 30 minutes by trains running in both directions between Oxford and London Marylebone	Supporting economic growth and new homes with better access to the national rail network.	Desirable	Completed
(3b) Comp.	Improved Park & Ride and highway to support the new stations	Supporting economic growth and new homes with better access to the national rail network.	Desirable	Completed
(4a) Comp.	Integration of bus and rail transport: Extending the existing Oxford Plus bus zone to include Water Eaton station	Ensuring delivery of high quality public transport. Integration of rail and bus transport	Desirable	Completed
(4b) Comp.	Integration of bus and rail transport: Bus link to the rail network (probably via Water Eaton station)	Ensuring delivery of high quality public transport. Integration of rail and bus transport	Necessary	Completed
(4c) Comp.	Direct bus services from Kidlington and/or Water Eaton to serve Oxford's Eastern Arc	Ensuring delivery of high quality public transport. Integration of rail and bus transport	Necessary	Completed. 700 Service runs from Kidlington to Oxford Parkway, JR and Churchill Hospital
Education				
(17a) Comp.	Heyford Park Free School - Providing 500 secondary and sixth form school places	Expand the schools and colleges provision to match the needs of residents and businesses. Provide opportunities for local people to improve the quality of their life: Skills, training and education.	Critical	Completed
19 NEW	Permanent expansion to 1 FE: Launton CE Primary School, Launton		Critical	New Classroom accommodation expected for 2018.
20 NEW	Expansion of Chesterton CE (VA) Primary School, Chesterton		Critical	Feasibility assessment under preparation, expansion planned for 2018
21 NEW	Expansion of Christopher Rawlins CE (VA) Primary School, Adderbury		Critical	Expanding to 1.5 FE from September 2017
24 NEW	Expansion of Warriner School, Bloxham		Critical	Expansion to 1FE in 2017 and an additional FE from 2019.
Utilities				
32b NEW	Waste Management Capacity Building new or enhancing existing Household Waste Recycling Centre (HWRC) sites to deal with increased demand	Ensure waste and recycle facilities grow at the same rate as communities needs	Necessary	Further project specific information to be added as project development progresses
Flood risk				
EA considering projects for future capital works at the time of this update.				
Emergency and rescue services				
No updates				
Health				
35 NEW	Exploring the relocation of Gosford Hill Medical Practice to a new practice at Exeter Hall and work in alliance with the KEYS practice	Ensure health infrastructure grows at the same rate as communities	Necessary	
36 NEW	Exploring additional primary care facilities	Ensure health infrastructure grows at the same rate as communities	Necessary	
Community Infrastructure				
Comp.	Chesterton Community Hall - Provision of a new community hall	Ensure social infrastructure grows at the same rate as communities and there are opportunities for culture and leisure	Necessary	Completed in 2016
Comp.	Retained sports hall at Former RAF Upper Heyford for educational and community use.		Necessary	Completed
37b NEW	Extension to The Windmill Centre, Deddington	Ensure social infrastructure grows at the same rate as communities and there are opportunities for culture and leisure	Necessary	Short term
37c NEW	Improvements to Ellen Hinde Hall, Bloxham	Ensure social infrastructure grows at the same rate as communities and there are opportunities for culture and leisure	Necessary	Short term

No.	KIDLINGTON AND RURAL AREAS Projects	Main aim	Priority Critical Necessary Desirable	Phasing St 2015-2020 Mt 2020 -2025 Lt 2025 - 2031	Costs (where known)	Funding (where known)	Main Delivery Partners	Policy links (LP, LTP policies)	LP site policy	Source	Delivery status
Transport & movement											
1	London Oxford Airport	Supporting economic growth of employment clusters such as the one formed by the Oxford London Airport and Langford Lane Industrial estate.	Critical	TBC	TBC	TBC	DfT Airport Operator OCC CDC Private sector developers	Local Plan: Improved Transport and Connections (SLE 4)	Kidlington 1: Accommodating High Value Employment Needs (1A.Langford Lane / London Oxford Airport)	Local Plan	To be progressed through the Local Plan Part 2, liaison with Airport operator and existing business at the airport and Langford Lane.
2	High Speed 2 Proposed route to run through Cherwell's Fringford Ward.	High Speed rail connecting UK's major cities. Dedicated line for high speed train which is also intended to free up capacity on the existing rail network.	N/A	Long Term	TBC	TBC	HS2 Ltd (DfT)	Local Plan: High Speed Rail 2 - London to Birmingham (SLE 5)	N/A	Local Plan National Infrastructure Plan, Dec. 2013.	Discussions on-going with County Highways with regards to construction routes and mitigation.
3	Improving the level of public transport to and from London Oxford Airport	Ensuring delivery of high quality public transport.	Necessary	Short term	c. £400K	TBC	OCC Bus operators Airport operator	Local Plan: Improved Transport and Connections (SLE 4)	Kidlington 1: Accommodating High Value Employment Needs (1A.Langford Lane / London Oxford Airport)	LTP	To be progressed further through the Local Plan Part 2 and Kidlington Framework Masterplan
4	Implementation of a bus lane on Bicester Road (C43) using additional land rather than just existing highway	Ensuring delivery of high quality public transport.	Necessary	TBC	TBC	TBC	OCC Bus operators	Local Plan: Improved Transport and Connections (SLE 4)	Kidlington Non strategic sites to be identified in the Local Plan Part 2	LTP	Implementation options being investigated.
5a	Accessing Oxford - Northern Approaches - Northern Gateway Site Link Road	Identified in LTP4 as part of the Oxford Transport Strategy. Delivery expected to be monitored as part of that area strategy and LTP4.									
5b	Potential road link between A40 and A44 (Part of the above) (A40-A44 Strategic Link Road)										
6a	Road network improvements: Remedial road safety measures such as installing Vehicle Active Signage; build outs or lining/surface measures to address speeding	To improve highways safety	Necessary	TBC	TBC	TBC	OCC Private sector developers	Local Plan: Improved Transport and Connections (SLE 4) and Mitigating and Adapting to Climate change (ESD1) in support of strategic growth in Kidlington	Kidlington Non strategic sites to be identified in the Local Plan Part 2 Neighbourhood Plans	LTP	To be progressed further through the Local Plan Part 2 and Kidlington Framework Masterplan
6b	Road network improvements: Remove clutter and ensure the routing is correct on the strategic road network particularly from the A44, A40 and A34 of signage to Kidlington	To improve highways safety	Necessary	TBC	TBC	TBC	OCC Private sector developers	Local Plan: Improved Transport and Connections (SLE 4) and Mitigating and Adapting to Climate change (ESD1) in support of strategic growth in Kidlington	Kidlington Non strategic sites to be identified in Local Plan Part 2	LTP	To be progressed further through the Local Plan Part 2 and Kidlington Framework Masterplan
7	Joining up the riding network across the wider area using public rights of way so that routes for commuting and recreation are improved;	Improving cycling and walking routes Provide sustainable movement routes for pedestrians and cyclists	Desirable	TBC	TBC	TBC	OCC Parish Council Private sector developers		Kidlington Non strategic sites to be identified in Local Plan Part 2	LTP	To be progressed further through the Local Plan Part 2 and Kidlington Framework Masterplan

No.	KIDLINGTON AND RURAL AREAS Projects	Main aim	Priority Critical Necessary Desirable	Phasing St 2015-2020 Mt 2020 -2025 Lt 2025 - 2031	Costs (where known)	Funding (where known)	Main Delivery Partners	Policy links (LP, LTP policies)	LP site policy	Source	Delivery status
8	Linking Kidlington to the proposed railway station at Water Eaton to promote the opportunity for cycling and walking	Improving cycling and walking routes Provide sustainable movement routes for pedestrians and cyclists	Necessary	TBC	TBC	TBC	OCC Parish Council Private sector developers	Local Plan: Improved Transport and Connections (SLE 4) and Mitigating and Adapting to Climate change (ESD1) in support of strategic growth in Kidlington	Kidlington 1: Accommodating High Value Employment Needs (Langford Lane and Begbroke Science Park) Non strategic sites to be identified in the Local Plan Part 2 DPD, Neighbourhood Plans	LTP	Implementation options being investigated.
9	Improving cycling and walking links to the Langford Lane area and shopping facilities in the centre of Kidlington.	Improving cycling and walking Provide sustainable movement routes for pedestrians and cyclists	Necessary	TBC	TBC	Secured	OCC Airport operator Private sector developers	Local Plan: Improved Transport and Connections (SLE 4) and Mitigating and Adapting to Climate change (ESD1) in support of strategic growth in Kidlington	Kidlington 1: Accommodating High Value Employment Needs (Langford Lane and Begbroke Science Park)	LTP	Implementation options being investigated. Cycle improvements to Langford Lane secured through Oxford Technology Part development
10	Improvements of footways: widening, resurfacing, dropped kerbs and new or improved crossing points, which will contribute to greater containment and thus support their vitality and economic success, including the business parks and London Oxford Airport.	Improving cycling and walking Provide sustainable movement routes for pedestrians and cyclists	Necessary	TBC	TBC	TBC	OCC Airport operator Private sector developers	Local Plan: Improved Transport and Connections (SLE 4) and Mitigating and Adapting to Climate change (ESD1) in support of strategic growth in Kidlington	Kidlington 1: Accommodating High Value Employment Needs (Langford Lane and Begbroke Science Park) Policy Kidlington 2: Strengthening Kidlington Village Centre	LTP	To be progressed further through the Local Plan Part 2 and Kidlington Framework Masterplan
11	Pedestrianisation of part of the High Street, wider footways and pedestrian crossings.	Improving public realm	Necessary	TBC	TBC	TBC	OCC CDC Parish Council Private sector developers	Local Plan: Improved Transport and Connections (SLE 4) and Mitigating and Adapting to Climate change (ESD1) in support of strategic growth in Kidlington	Kidlington 2: Strengthening Kidlington Village Centre	LTP	To be progressed further through the Local Plan Part 2 and Kidlington Framework Masterplan
12	Improvements to facilities for cyclists and pedestrians at key destinations and employment sites including London Oxford Airport and the proposed rail station at Water Eaton.	Necessary	Necessary	TBC	TBC	TBC	OCC CDC Airport operator Private sector developers	Local Plan: Improved Transport and Connections (SLE 4) and Mitigating and Adapting to Climate change (ESD1) in support of strategic growth in Kidlington	Kidlington/Water Eaton Kidlington 1: Accommodating High Value Employment Needs (Langford Lane and Begbroke Science Park) Policy Kidlington 2: Strengthening Kidlington Village Centre	LTP	To be progressed further through the Local Plan Part 2 and Kidlington Framework Masterplan
13	Local and Area Bus Services - Former RAF Upper Heyford	New or Improved Bus Services with connections to other transport nodes Improved accessibility Provide sustainable travel options	Necessary	Short to Long Term	TBC in addition to approved scheme	Developer Contributions in addition to approved scheme	OCC Private sector developers	Local Plan: Improved Transport and Connections (SLE 4) and Mitigating and Adapting to Climate change (ESD1) in support of strategic growth Local Transport Plan: LTP4 Policy BIC2	Policy Villages 5	CDC/OCC	To be secured through implementation of policy Villages 5 in liaison with the Highways Authority
14	Improvements to the Public Rights of Way Network including re-opening of historic routes (including the Portway)- Former RAF Upper Heyford	Improvements to the network in addition to measures secured as part of the approved scheme	Necessary	Short to Long Term	TBC in addition to approved scheme	Developer Contributions in addition to approved scheme	OCC Private sector developers	Local Plan: Improved Transport and Connections (SLE 4) and Mitigating and Adapting to Climate change (ESD1) in support of strategic growth	Policy Villages 5	CDC/OCC	To be secured through implementation of policy Villages 5. Transport mitigation package to be determined through master planning of Former RAF Upper Heyford and developer funded. Assessment commenced.

Appendix 2

Reference (Police)	Date	Time	Light	Surface	Severity	Vehicle	Location	Description
160249215	09/01/2016	00:14	Dark	Dry	Serious	Car	A44 - A4095 - Langford Lane Link	Car1 lost control and skidded off carriageway to the nearside through fence and overturned - driver sustained serious injury
P0400815	08/04/2015	16:05	Light	Dry	Slight	Car x2	A44 - Cassington Raod - Frieze Way Link	Car hit rear of stationary Car2 waiting to turn right to entrance to Stonehouse Farm
P0690316	03/07/2016	07:08	Light	Wet/Damp	Slight	Car x4	A44 - Cassington Raod - Frieze Way Link	Car hit rear if Car2 who hit rear of Car3 who in turn hit rear of car4 travelling stationary queuing traffic
P1170215	13/2/2015	16:48	Light	Wet/Damp	Slight	Car x3	A44 - Cassington Raod - Frieze Way Link	Car2 hit rear of car3 slowing to turn right to field entrance - car1 in turn hit rear of car car2
P1570912	18/9/2012	07:45	Light	Dry	Slight	Cars x2	A44 - Cassington Raod - Frieze Way Link	Car1 travelling SE on A44 hit rear of Car2 travelling SE ahead of C1 waiting in queueing traffic
P2320416	23/4/2013	12:26	Light	Dry	Slight	Car x2, M/C	A44 - Cassington Raod - Frieze Way Link	MC1 hit rear of stationary Car2 also travelling ahead behind car3 which had stopped due to emergency police - rider mc1 hit rear of car3
P2560112	27/1/2012	16:40	Light	Wet/Damp	Slight	Cars	A44 - Cassington Raod - Frieze Way Link	Car1 travelling S in Wet Conditions on A44 hit rear of C2 who in turn hit rear of C3 travelling S ahead of C1 waiting for vehicle to turn right at Knightsbridge junction
P1870613	22//6/2013	18:14	Light	Dry	Slight	Cars x2	A44 - Langford Lane - Spring Hill Road Link	car1 hit rear of car2 travelling slow to turn left into private drive - view of c2 had been masked by a vehicle ahead which had then pulled to overtake car2
P0220614	06/03/2014	10:55	Light	Dry	Slight	GDS1, Car	A44 - Langford Lane - Spring Hill Road Link	3.5t vehicle hit rear of car2 after car2 slowed down for traffic
160353025	30/11/2016	14:24	Light	Dry	Slight	HGV, Car	A44 - Sandy Lane - Cassington Road Link	HGV hit car2 after slowing for unknown reason
P1130912	13/9/2012	23:16	Dark	Dry	Serious	7.5t	A44 - Sandy Lane - Cassington Road Link	HGV1 travelling SE on A44 when teenage pedestrian crossed from one side into path of HGV1 and hit occurred - Pedestrian sustained serious head injury
P0960712	07/06/2012	14:51	Light	Wet/Damp	Serious	Cars x2	A44 - Sandy Lane - Cassington Road Link	Car1 travelling south rounding bend on A44 crossed to one side and hit Car2 travelling N on A44 and Car1 skidded off carriageway to one side and came to rest in ditch - passenger in C1 seriously injured
P1110712	07/06/2012	13:49	Light	Dry	Slight	Car, M/C	A44 - Sandy Lane - Cassington Road Link	MC1 travelling NW on A44 braked on seeing Car2 ahead slowing - rider lost control and fell
P1731215	12/12/2015	06:37	Dark	Wet/Damp	Slight	LGV	A44 - Sandy Lane - Cassington Road Link	LGV1 lost control while travelling and skidded to other side exited carriageway and hit tree rebounded onto carriageway and overturned
P2840116	25/1/2016	08:15	Light	Wet/Damp	Slight	Car x2	A44 - Sandy Lane - Cassington Road Link	Car1 turning left onto A44 hit rear of stationary Car2 waiting at red light
170114399	29/3/2017	08:47	Light	Wet/Damp	Slight	Car, P/C	A44 - Sandy Lane - Cassington Road Link	information not given
160312559	27/10/2016	18:27	Dark	Dry	Slight	Car x2	A44/A4095 Junction	Car overtaking line of traffic moved to turn left at roundabout but hit car2 causing to spin
P0610912	09/08/2012	17:23	Light	Dry	Slight	Cars x2	A44/A4095 Junction	LGV1 travelling NW exiting A44 Bladon Roundabout to travel on A44 Oxford Rd hit rear of Car2 travelling ahead of LGV1 slowing due to queueing traffic ahead
P0390516	05/04/2016	07:35	Light	Dry	Slight	Car x2	A44/A4095 Junction	car1 hit rear of stationary car2 waiting to enter roundabout
P0620516	05/05/2016	08:28	Light	Dry	Slight	Car x3	A44/A4095 Junction	Car1 hit rear if car2 who in turn hit rear of car3 in queuing traffic approach to roundabout
P2830314	18/3/2014	12:08	Light	Dry	Slight	Car	A44/A4095 Junction	Car1 lost control and exited carriageway onto splitter island on approach Roundabout - Driver suffered medical episode
P3360712	31/7/2012	15:02	Light	Wet/Damp	Slight	M/C	A44/A4095 Junction	M/C entered lane 2 on approach to Roundabout but lost control and fell off his bike
P1760812	08/12/2012	11:45	Light	Dry	Serious	M/C	A44/A4095 Junction	M/C travelling NW on A44 braked for roundabout too late and lost control carried straight on and exited carriageway onto roundabout and rider fell sustaining serious injury
P2390714	14/7/2014	07:05	Light	Dry	Slight	Car, P/C	A44/A4095 Junction	PC2 pulled to other side to enter cycle way and got hit by car - Driver drove off
P3150515	15//5/2015	14:20	Light	Dry	Slight	Car x2	A44/A4095 Junction	Car1 hit rear of stationary Car2 waiting to enter the roundabout
160282039	20/9/2016	07:10	Light	Wet/Damp	Slight	Car, P/C	A44/A4095 Junction	Car waiting to enter roundabout moved off as hit PC
P2790615	23/6/2015	17:50	Light	Dry	Slight	Car, PC2	A44/A4095 Junction	Car1 entered roundabout but failed to give way to PC2 - rider fell off and sustained slight injury
160261512	24/8/2016	00:11	Dark	Dry	Serious	Car	A44/A4095 Junction	Car1 lost control when turning left to A4095 and crossed to other side and of A4095 and hit lamp column - inexperienced driver
P2941014	26/10/2014	19:00	Dark	Dry	Slight	Car, M/C	A44/A4095 Junction	Car1 entered roundabout but hit M/C - M/C rider fell off
P1010613	13//6/2013	11:10	Light	Dry	Slight	Car , P/C	A44/A4095 Junction	Car approaching roundabout hit a pedal cycle that crossed into path of car from cycle track
P2790413	21/4/2013	01:07	Dark	Dry	Serious	Car	A44/A4095 Junction	Car1 (intoxicated) travelling on A44 failed to Neg. roundabout and hit central island then lost control and continued and left carriageway
P1410112	17/1/2012	19:37	Dark	Wet/Damp	Slight	Car	A44/A4095 Junction	Car travelling NE in wet conditions on Upper Campsfield Rd, lost control exited carriageway to the inside & hit edge
P1400716	17/7/2016	18:32	Light	Dry	Slight	Car	A44/A4260 Frieze Way Junction	Car1 rounding bend lost control exited carriageway to nearside and hit tree - breath test positive
P2020512	18/5/2012	12:42	Light	Dry	Slight	Car	A44/A4260 Frieze Way Junction	Car1 travelling SW rounding right ahead bend on A4260 Frieze Way lost control and exited carriageway to the nearside and hit the barrier
P2390216	25/2/2016	11:07	Light	Dry	Serious	Car, P/C	A44/A4260 Frieze Way Junction	PC1 changed lanes but failed to give way to Car2 - rider fell off and sustained serious injury
P2951114	24/11/2014	11:45	Light	Wet/Damp	Slight	Car x2	A44/Begbroke Hill Junction	Car2 turned right and hit Car1 at Science Park entrance
P1111013	10/08/2013	16:42	Light	Dry	Serious	P/C	A44/Begbroke Hill Junction	PC1 hit rear of stationary Unknown vehicle on approach to signalled junction
P0240512	05/01/2012	08:15	Light	Wet/Damp	Slight	Cars x2	A44/Cassington Road Junction	Car1 travelling SE on A44 in Lane1 in Wet conditions hit rear of C2 travelling SE ahead waiting in Queue traffic on approach to Roundabout.
P1850912	19/9/2012	18:26	Light	Dry	Slight	Car , Ped	A44/Cassington Road Junction	Car1 travelling SE on A44 exiting roundabout to continue on A44 hit pedestrian crossing from splitter island
P3240116	28/1/2016	13:10	Light	Wet/Damp	Slight	Car x2	A44/Cassington Road Junction	Car1 travelling in Lane1 and Car2 in Lane2 exited roundabout, Car2 pulled to nearside and hit Car1
P0580112	01/10/2012	10:20	light	dry	Slight	M/C & C	A44/Langford Lane Junction	M/C Travelling SE failed to give way to C2 also travelling SE when changing lanes and hit occurred
P2420613	06/08/2013	13:26	Light	Dry	Slight	Cars x2	A44/Langford Lane Junction	Car1 hit rear of Car2 stopping as signals changed to red
P1230713	07/11/2013	14:05	Light	Dry	Slight	Car, M/C	A44/Langford Lane Junction	Car hit rear or MC1 travelling slow and stopping for red signal
P1060616	06/09/2016	09:36	Light	Dry	Slight	Car x2	A44/Langford Lane Junction	Car1 turned right through red lights hit car2 travelling through green and car2 overturned.
P1681014	14/10/2014	17:55	Light	Wet/Damp	Slight	Car x2	A44/Langford Lane Junction	Car1 hit rear of car2 slowing to approach left turn to Campsfield Road
P1490914	16/9/2014	15:03	Light	Dry	Slight	Car x2	A44/Langford Lane Junction	Car1 hit rear of Car2 through green light as Car2 was slowing to allow Ambulance to turn right
P2140813	23/8/2013	08:00	Light	Dry	Slight	Cars x2	A44/Langford Lane Junction	Car1 hit stationary Car2 waiting at red signal
P2960515	25/5/2015	13:57	Light	Dry	Slight	Car x2	A44/Langford Lane Junction	Car1 turned right against red signal hit car2 who travelled through green light
P3401114	28/11/2014	17:59	Dark	Dry	Slight	Car x2	A44/Langford Lane Junction	Car1 hit rear of Car2 slowing to stop as signals changed red
P1411015	10/07/2015	12:35	Light	Dry	Slight	Car x2	A44/Langford Lane Junction	Car1 travelled through red light and hit car2 turning right from A44
P2390713	20/7/2013	10:44	Light	Dry	Serious	Cars x2	A44/Langford Lane Junction	Car1 failed to see/stop for ped. red signal and hit car2 turning right
P3140312	26/3/2012	12:29	Light	Dry	Fatal	Car x2	A44/Langford Lane Junction	Car1 travelling SE on A44 Woodstock Rd. hit Car2 turning right from Langford Lane onto A44 - unclear which vehicle failed to comply with signals - passenger in Car1 sustained fatal injury
P0220514	05/02/2014	16:35	Light	Dry	Slight	Car x3	A44/Sandy Lane Junction	Car1 skidded and hit rear of Car2 who in turn hit rear Car3 in stationary traffic on approach to roundabout
P1040712	07/05/2012	15:05	Light	Dry	Slight	Car , Ped	A44/Sandy Lane Junction	Car1 travelling SW Rounding bend on Sandy Lane at Poppy Junction close passed too close to pedestrian travelling SW on footway and hit pedestrian with car mirror
P2411212	12/06/2012	17:40	Dark	Dry	Slight	Cars x3	A44/Sandy Lane Junction	Car1 travelling SE on A44 hit rear of Car2 who in turn hit the rear of Car3 travelling ahead of Car1 slowing on approach to roundabout
P1230915	09/02/2015	16:19	Light	Dry	Serious	MC1	A44/Sandy Lane Junction	MC1 rounding roundabout hit gravel on carriageway and lost control and skidded to other side leaving roundabout landing onto central barrier
P1340215	14/2/2015	07:35	Light	Wet/Damp	Slight	M/C	A44/Sandy Lane Junction	MC1 failed to see roundabout ahead due to foggy conditions and went onto central of Roundabout - Rider fell off
P2831215	26/12/2015	11:07	Light	Dry	Serious	Car, M/C	A44/Sandy Lane Junction	Car1 rounding roundabout in lane1 made a right turn without signalling and hit MC2 - Rider fell off and sustained serious injury
P1760615	06/11/2015	17:55	Light	Dry	Slight	P/C	A44/Spring Hill Junction	PC1 lost control/suffered medical episode on cycle track - rider fell off
160271322	09/01/2016	19:11	Dark	Dry	Slight	Car x2	A44/Spring Hill Junction	Car1 turned right through red lights to hit car2
P0721013	10/06/2013	10:30	Light	Dry	Slight	Car, M/C	A44/Spring Hill Junction	Car failed to give way to MC2 - MC2 swerved to avoid hit and left carriageway and hit nearside barrier
P0420813	08/10/2013	23:30	Dark	Dry	Fatal	M/C	A44/Spring Hill Junction	MC1 appears to have braked hard on approach then lost control skidded and went onto Roundabout hitting sign - Rider sustained fatal injury
P2540413	29/4/2013	05:27	Light	Dry	Serious	3.5t Van	A44/Spring Hill Junction	GDS1 travelling on A44 failed to negotiate Roundabout - went over roundabout island then continued off carriageway to nearside and hit bus shelter

Appendix 3

BEGBROKE SCIENCE PARK, OXFORD

Full Travel Plan – 2016 Update

June 2016

IMA-15-141

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PLANS

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1 Introduction

1.1 Background

1.1.1 Begbroke Science Park is wholly owned and managed by the University of Oxford. It provides a flexible supportive environment which encourages links between new high-tech science-based companies, their more established counterparts and the University.

1.1.2 The University has operated a full travel plan for Begbroke Science Park since 2004. Reviews of the travel plan have been undertaken in July 2011 and January 2015.

1.1.3 Outline applications relating to an interim phase and a long-term phase of development at Begbroke Science Park were consented in 2001. The interim phase of development has now been implemented and has brought the total floor area on site to around 12,000m^2 of laboratories and offices.

1.1.4 The long-term phase of the development will bring the total floor on site to around 21,000m^2 (application reference: 01/00662/OUT) and the first development associated with the long-term phase is currently being constructed on site (application reference 15/01105/REM).

1.1.5 An application for the variation of Condition 4 of the long-term phase of development (01/00662/OUT) was granted consent on 20th May 2015 (application reference 15/00309/OUT). Condition 4 stated that long-term phase of development should be carried out strictly in accordance 033/PM/LTP/LP114/01.

1.1.6 Condition 9 attached to the outline consent 15/00309/OUT is worded as follows:

> *Prior to occupation of the development, a Travel Plan shall be submitted to and approved in writing by the local planning authority. The Plan shall include details of the means of regulating the use of private cars at the development in favour of other modes of transport and the means of its implementation and methods of regular monitoring. There shall be no variation to the details agreed without the prior written approval of the local planning authority.*

1.1.7 This travel plan document updates the 2004 travel plan document, provides details of the progress made against the objectives and targets contained in the travel plan and provides updated targets for the future, based on existing travel trends.

1.1.8 This travel plan update covers the entire Begbroke Science Park site and will include the long-term development phase at the site. As such, this update of the travel plan will be submitted to the planning authority in order to demonstrate that Condition 9 has been discharged.

1.1.9 The University has appointed Ed Wigzell as its Travel Coordinator covering the whole of its operations. Contact details are as follows:

Ed Wigzell

Sustainable Travel Officer

University of Oxford
The Malthouse
Tidmarsh Lane
Oxford
OX1 1NQ

Email: edward.wigzell@admin.ox.ac.uk

1.2 Structure of Travel Plan

1.2.1 Since the preparation of the 2004 travel plan Oxfordshire County Council (OCC) has produced guidance for the preparation of travel plans 'Transport for New Developments; Transport Assessments and Travel Plans' (2014). This updated travel plan will be structured to follow the OCC guidance.

1.2.2 The structure of the travel plan is as follows:

1.2.3 Section 1 – Background Information

1.2.4 Section 2 – Existing Modal Share and Site Audit

1.2.5 Section 3 – Objectives and Targets

1.2.6 Section 4 – Measures

1.2.7 Section 5 – Management and Monitoring

2 Background

2.1 Site Location and Profile

2.1.1 The full address of the site is:

Begbroke Science Park,
Begbroke Hill,
Woodstock Road,
Begbroke,
Oxfordshire,
OX5 1PF

2.1.2 Begbroke Science Park is located approximately 10km to the north-west of Oxford. Plan 1 shows the location of Begbroke Science Park.

2.1.3 Access to Begbroke Science Park is from the A44 Woodstock Road via a new signal controlled junction, which was provided in association with the interim phase of development.

2.1.4 The former access to the site from Sandy Lane has been closed to general vehicular traffic since the opening of the new Begbroke Hill access road into the site but still provides access to the site for pedestrians and cyclists.

2.1.5 Following the completion of the interim phase of development at the site Begbroke Science Park currently provides approximately 12,000m^2 of laboratory and office space. The interim phase of development related to the building of the Centre of Innovation (CIE) and the Institute for Advanced Technology (IAT) buildings. Car parking on site for the interim phase of development was limited to 160 spaces.

2.1.6 The existing layout of the site following the interim phase of development is shown on Plan 2. The first consented reserved matters application (an extension of the CIE building) of the long-term phase of development, which is currently being constructed on site, is also shown on Plan 2. Therefore, the site has now entered long-term phase of development.

2.1.7 The long-term phase of development (01/00662/OUT) provides consent to bring the total floor area at Begbroke Science Park to approximately 21,000m^2. The first reserved matters application associated with the long-term phase of development was consented in June 2015 (application reference 15/01105/REM). Once completed this building will provide around 2250m^2 additional floor space, bring the total floor space on site to around 14,250m^2.

2.1.8 Car parking on site associated with the long-term phase of development is limited to 260 spaces.

2.1.9 There are around 30 companies and over 20 research groups currently at Begbroke Science Park. Companies at the Science Park are science and research based, some of them University spin-outs, and many have links with either Oxford University or other research based organisations. Researchers from the Mathematical, Physical & Life Sciences and Medical Sciences Divisions of Oxford University work in inter-disciplinary groups at the science park.

2.1.10 At present, between 350 and 450 people (staff, students and employees) are typically based at the Begbroke Science Park on any one day. It is anticipated that following the completion of the CIE extension that this will increase by around 100 people. The existing split between University staff/students and employees of companies based at the science park 50:50 ± 10 i.e. it oscillates in the range of 40:60 to 60:40 over time depending on individual research group and company makeup.

2.1.11 It is likely that following the completion of the CIE extension, which will provide new space for research based companies, this ratio will be more biased towards business use but will still vary over time.

2.1.12 Conferencing and meeting facilities are provided at the science park and currently there are five versatile rooms on site, which can cater for events and meetings of between 5 and 90 guests. The grounds of the science park offer the scope for larger events, with capacity for up to 200 guests through the use of marquees, although such large events are rare (typically less than per year). The University also runs a programme of Schools Events at the science park.

2.1.13 Parking for conferences and other events is controlled by Begbroke Science Park with all visitors to the site having to display a visitor's permit which is valid only for the day of the event.

2.1.14 The outline planning consent for the long-term development of the site includes a number of restrictions on regarding the type of development which can be provided at Begbroke Science Park.

2.1.15 Condition 6 attached to the outline consent for the long-term development phase (01/00662/OUT), is worded as follows:

> *No more than 20% of the approved floorspace shall be occupied by uses falling within Class B1(a) of the Schedule to the Town and Country Planning (Use Classes) (Amendment) (England) Order 2005.*

2.1.16 Condition attached to the outline consent for the long-term development phase (01/00662/OUT), is worded as follows:

> *Other than what is permitted by condition 6, the premises shall be used only for the purposes falling with class B1(b) and B1(c) and ancillary D1 uses as specified in the Schedule to the Town and Country Planning (Use Classes) (Amendment) (England) Order 2005 and for no other purpose.*

2.1.17 Condition 8 attached to the outline consent for the long-term development phase (01/00662/OUT), is worded as follows:

> *Further to condition 7, the premises shall only be occupied where consultation and liaison with staff of the University of Oxford or another research institution or company within Oxfordshire is an integral part of the research and development process, and shall not involve any manufacture other than the manufacture of prototypes.*

3 Site Audit and Existing Modal Share

3.1 Site Audit

3.1.1 The University's website provides information regarding sustainable travel to Begbroke Science Park, as can be seen from the link below:

http://www.begbroke.ox.ac.uk/home/contact-us/getting-here

Access on Foot

3.1.2 The main points of pedestrian access to Begbroke Science Park are from the A44, via Begbroke Hill, or from Sandy Lane. Public footpaths 124/8 and 420/3 run along the western side of Sandy Lane and the boundary of the site along a broadly south-north alignment. The public footpaths running through the site are shown in the inset on Plan 1.

3.1.3 To the north of the site footpath 124/8 (unmade) connects to public foot path 124/7 (unmade), which runs in a broad east-west alignment and provides a connection to Kidlington to the east.

3.1.4 A shared foot/cycleway runs along the northern side of Begbroke Hill access road into the site and signalised pedestrian crossing facilities are provided at the site access junction with the A44 Woodstock Road, across Begbroke Hill and the northern arm of the A44 Woodstock Road.

3.1.5 The access from Sandy Lane is closed to general vehicular traffic but can be used by pedestrians. Footways are provided on Sandy Lane to the west of the Begbroke Science Park access but to the east of the access there is no provision for pedestrians.

3.1.6 The residential areas of Yarnton, to the south of campus are within walking distance of the site.

3.1.7 The University of Oxford agreed, as part of a Section 106 Agreement dated August 2005, to provide a new signal controlled pedestrian crossing in the vicinity of the A44 roundabout with Sandy Lane. Oxfordshire County Council, on behalf of the University, has provided a new pedestrian crossing across the A44 in the vicinity of Gravel Pits Lane, as shown on Plan 1, and therefore the S106 obligation has been met.

Access by Bicycle

3.1.8 Cycle access to Begbroke Science Park is also from the A44 Woodstock Road, via Begbroke Hill, or from Sandy Lane. Plan 3 shows the existing cycle network in the vicinity of the site.

3.1.9 A shared foot/cycleway runs along the northern side of the Begbroke Hill access road into the site and signalised pedestrian crossing facilities are provided at the site access junction with the A44 Woodstock Road.

3.1.10 The access from Sandy Lane is closed to general vehicular traffic but can be used by cyclists. A short section of off-road shared foot/cycleway adjacent to Sandy Lane is provided along the southern boundary of the site. Sandy Lane is a relatively lightly trafficked road and is considered to be a suitable route for cyclists to use.

3.1.11 The shared cycleway along the western side of A44 Woodstock forms part of the long distance national cycle network (NCN) Route 5. At a local level this route provides a mainly traffic free cycle link to Oxford to the south, and Begbroke and Woodstock to the north.

3.1.12 To the east of the site national cycle network Route 51 runs through Kidlington and can be accessed from the site via Sandy Lane and Yarnton Road. At a local level Route 51 provides an alternative route to Oxford city centre and also to Headington to the south and to Bicester to the north.

3.1.13 Sandy Lane also provides access to the traffic free route into Oxford city centre running alongside the Oxford Canal. Whilst this route is not a signed cycle route it is a popular route with cyclists.

3.1.14 Begbroke Science Park is easily accessible by bicycle from Kidlington, Begbroke, Woodstock, Oxford and surrounding villages.

3.1.15 The existing cycle parking provision on site is shown on Plan 2. At present there are a total of 24 stands on site (7 butterfly style and 17 Sheffield style) providing 41 parking spaces on site, one space of which is used for the departmental bike. This number does not include the 10 Sheffield style cycle stands adjacent to the CIE building which are temporarily unavailable due to construction work, which provided 20 cycle parking spaces.

3.1.16 Following the completion of the CIE extension there will be an additional 5 Sheffield cycle stands on-site, providing 10 cycle parking spaces, bringing the total number of parking spaces provided on site to 71 spaces, with one space being used for the departmental bike. The departmental bike is available for use by staff and students via a

3.1.17 Following the installation of new showers as part of the interim development there are a total of 5 showers provided on site, as shown on Plan 2. Three shower cubicles will be provided within the CIE extension, currently under construction, which will bring the total number of showers on site to 8.

3.1.18 OXONBIKE is a self-service cycle hire scheme for getting around Oxford quickly and cheaply. Bicycles can be hired and returned at any OXONBIKE docking stations, located in and around Oxford. As part of the expansion of the OXONBIKE network, a new site has been installed at Begbroke Science Park, with 6 docking stations for electric bicycles, and is planned to be in full operation in May 2016.

3.1.19 Existing OXONBIKE sites are located at 11 locations within the city, a number of which are University of Oxford sites including the University Science Area, Old Road Campus, Warneford Hospital, Churchill Hospital, John Radcliffe Hospital and Nuffield Orthopaedic Centre.

3.1.20 Shortly the OXONBIKE bike sharing scheme will offer up to 80 bikes at 13 docking stations in the local area. Seven of the docking stations are equipped with electric docking points. Electric bikes can be locked into any existing pedal docks but should ideally be re-docked after use at an electric point in order to recharge:

- Science Area (e-bike enabled dock)
- Radcliffe Observatory Quarter (e-bike enabled dock)
- Begbroke Science Park (e-bike enabled dock)
- Old Road Campus (e-bike enabled dock)
- Gipsy Lane (e-bike enabled dock)
- JR Hospital (e-bike enabled dock)
- Churchill Hospital (e-bike enabled dock)
- Thornhill Park & Ride (e-bike enabled dock planned)
- Nuffield Orthopaedic Centre

- Warneford Hospital
- Littlemore Mental Health Centre
- London Road
- Redbridge Park & Ride

3.1.21 Link to OXONBIKE website:

https://www.oxonbikes.co.uk/

3.1.22 Electronic bicycles will also be available for use by staff and students at Begbroke Science Park from early summer 2016.

Access by Public Transport

3.1.23 The nearest bus stops to the Begbroke Science Park are situated on the A44 Woodstock Road in the vicinity of A44 roundabout with Sandy Lane. Access to these stops is via the Begbroke Hill access road into the site, around 930m or 12 minute walk from the site.

3.1.24 These stops currently serve the S3 Oxford-Chipping Norton/Charlbury bus route operated by Stagecoach and the K2/K3 Kidlington-Yarnton-Bebroke-Kidlington circular service operated by Go Ride CIC. The routes of these services are shown on Plan 4.

3.1.25 The S3 service calls at both Oxford Railway Station and at the Gloucester Green bus station in Oxford city centre, allowing for public transport connections to be easily made. A PlusBus ticket adds unlimited urban bus travel to a train ticket and Begbroke Science Park is situated within the Oxford PlusBus zone.

3.1.26 The S3 operates with a typical weekday daytime frequency of 20 minutes, with services available from early in the morning until late in the evening.

3.1.27 The K2/K3 service is a circular bus route serving Kidlington, Begbroke and Yarnton. The K2 service follows the bus route in an anti-clockwise direction and there are 8 services per day at typically hourly intervals. The K3 service runs in a clockwise direction but only operates 3 services at 30 minute intervals in the morning peak.

3.1.28 Up to date public transport information can be found on the TRAVELINE website. Link to TRAVELINE website:

http://www.traveline.info/

3.1.29 The University of Oxford agreed, as part of a Section 106 Agreement dated August 2005, to provide 2 (1 northbound and 1 southbound) 4 or 5 bay enclosed bus shelters and Sheffield type cycle parking facilities on the A44 Woodstock Road. These improved bus waiting facilities have been provided at the existing bus stops located to the north of the Sandy Lane roundabout, therefore the S106 obligation has been met.

3.1.30 Mainline and local rail services can be caught from Oxford Railway Station, with direct services to/from Didcot, Reading, London, Birmingham, Manchester and Leeds, as well as intermediate stations, being available. Connecting services from Didcot Parkway provide links to Swindon, Bath, Bristol and Cardiff from Oxford.

3.1.31 Oxford Railway Station is around 7.5km, as the crow flies, to the south of Begbroke Science Park. Oxford Parkway Railway station is closer to Begbroke Science Park, around 2.7km to the southeast of the site.

3.1.32 At present there is not a direct bus service between the site and Oxford Parkway Railway Station and currently this station only serves trains to/from London Marylebone, connections to Oxford Railway Station are made by bus.

3.1.33 Link to National Rail website:

http://www.nationalrail.co.uk/

University Minibus

3.1.34 Begbroke Science Park operates a private minibus service that is free of charge to all University members and visitors.

3.1.35 The minibus service operates between Oxford city centre (Broad Street) and Begbroke Science Park and calls at the Sherrington Road Science Area, Parks Road Materials Laboratory and Woodstock Road opposite St Edwards School (as a request stop). The Broad Street stops are around a 15 minute walk from Oxford Railway Station.

3.1.36 The University currently operates 30 services per day between 07:25 and 19:15, typically at 15 to 20 minute intervals. The minibus timetable and a minibus tracker service are available at Begbroke Science Park's website.

3.1.37 Link to Begbroke Science Park's minibus tracker:

http://www.begbroke.ox.ac.uk/minibus-tracker/

3.2 Existing Modal Share

3.2.1 The results of the 2006, 2007, 2008, 2009, 2010, 2011, 2012 and 2015 travel surveys of staff and students based at Begbroke Science Park are summarised in Table 1.

3.2.2 The 2006, 2008, 2009, 2010, 2011 and 2015 modal share data is derived from surveys sent only to staff, students and employees of businesses based at Begbroke Science Park, shown as shaded in Table 1.

Mode	2006	2007	2008	2009	2010	2011	2012	2015
Car driver	76%	71%	72%	77%	58%	60%	50%	57%
University Minibus	8%	10%	16%	15%	28%	26%	29%	30%
Car passenger	2%	2%	2%	1%	2%	2%	1%	1%
Public bus	3%	7%	0%	0%	1%	1%	4%	1%
Bicycle	7%	5%	9%	6%	10%	10%	14%	7%
Motorbike	2%	2%	1%	0%	0%	0%	1%	0%
Walk	2%	3%	1%	1%	1%	1%	1%	4%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Table 1: Staff and Student Modal Share at Begbroke Science Park

3.2.3 Modal share for 2007 and 2012 has been derived from travel surveys sent to all University staff and students only; as such they do not include employees of businesses based at Begbroke Science Park.

3.2.4 Response rates for 2006, 2007, 2008, 2009, 2010, 2011, 2012 and 2015 were 50%, 20%, 47%, 28%, 37%, 23%, 24% and 30% respectively.

3.2.5 University wide travel surveys of staff and students were also undertaken in 2014 but there were only 10 responses from people based at Begbroke Science Park. The modal share from these surveys was 50% car driver, 30% University minibus and 20% by bicycle; the modal share is very similar to the 2015 surveys but given the low sample size no meaningful comparisons can be made.

3.2.6 It can be seen from Table 1 that the general trend since the implementation of the travel plan in 2006 is a reduction in the modal share of car driver and corresponding increases in the University minibus and bicycle modal shares. The modal share of travel by other sustainable means has broadly stayed the same.

3.2.7 Between 2006 and 2015 the percentage modal share of 'car driver' has fallen from 76% to 57%, which represents a fall of 25%. There is a corresponding increase in the percentage modal share of the 'University Minibus', with all other categories of modal share remaining broadly similarly (although percentage cycle use increased from 7% in 2006 to 14% in 2012 but fell back to 7% in 2015).

3.2.8 It is noted that between has been derived from travel surveys sent to all University staff and students only that the car driver modal share has increased by 7 percentage points from 50% to 57% and time cycle use fell from 14% to 7% between the same periods. It should be appreciated that the 2012 survey data was derived from a university wide UoO survey and does not include employees of businesses based at the science park; as such the two surveys are not directly comparable. Modal share results can also be affected by the sample size of the survey, which for the 2012 and 2015 surveys were relatively low.

3.2.9 The seeming rise in car driver modal share and corresponding fall between the two latest surveys undertaken at the science park is not considered by the University to reflect an actual change in travel patterns at the science park but the results of future surveys will be monitored to confirm that this is case and if appropriate actions to reverse any negative trends will be undertaken as necessary.

3.3 Snapshot Surveys 2015

3.3.1 On-site parking demand, both vehicle and cycle, is monitored informally, and the patronage of the minibus is recorded and monitored. The number of cars and cycles parked on site were recorded for a two week period between 15th February 2016 and 4th March 2016.

3.3.2 The minimum, maximum and average recorded numbers of vehicles parked on site across the two weeks are summarised in Table 2.

	Parked on Site		Minibus Arrivals
	Car	Cycle	Before 10:00
Minimum	128	20	61
Maximum	155	25	76
Average	140	23	69

Table 2: Car and Cycle Parking and Minibus Use Feb/March 2016

3.3.3 The recorded levels of parking on-site and the number people arriving by minibus before 10:00 were relatively consistent throughout the fortnight period.

3.3.4 The maximum recorded number of cars parked on-site was 155 on a Tuesday and the maximum number of cycles parked was 25 on a Monday. The maximum number of people arriving by minibus before 10:00 of 76 also occurred on a Monday.

3.3.5 Access to the buildings on site is via a security fob and records for the two week period between 15th February 2016 and 4th March 2016 show that between 146 and 255 people per day had used their security fob before 10:00, this does not necessarily represent the maximum occupancy of the site on any one day. One company, with 48 employees, do not use the security fob system and so up to 300 people could potentially have accessed the site before 10:00 on any one survey day.

3.3.6 People arriving in groups, for example those travelling by the University minibus, could all be covered by one activation of a security fob and therefore the access records may underestimate the actual numbers on site before 10:00.

4 Objectives and Targets

4.1 Objectives

4.1.1 The University recognises that the use of non-sustainable modes of transport by its staff and students can have a large impact on the environment. The aim of this travel plan is to set out a forward-thinking strategy to reduce the impact. It will be delivered through short, medium and long term actions, and through consultation with staff and student groups, and other stakeholders where necessary.

4.1.2 The aims and objectives of the travel plan are, within the context of the University's overall operational needs, and local and national transport policies, to implement a series of measures which seek to encourage the use energy-efficient public and communal transport, bicycles and walking, and to discourage unnecessary use of the private motor transport both for commuting purposes and business travel during the day.

4.1.3 As discussed more detail in Section 5.1 of this report the University has commissioned a Transport Strategy to support the growth and development plans within the University's Estate Strategy, whilst also considering the existing transport needs of the University.

4.1.4 The Transport Strategy sets out overarching objectives to reduce car trips for commuting and business across the University's Functional Estate to reduce traffic congestion and reduce emissions of carbon and air pollutants and includes a wide range of policies, measures and staff travel benefits to enable and encourage the use of sustainable travel. The Begbroke Science Park travel plan is in accordance with the objectives of the University's Transport Strategy.

4.1.5 Where travel is needed, the University will encourage it to be made by non-car modes for students, staff and visitors, and reduce travel by private car wherever there is a reasonable alternative. Where there is no reasonable alternative, the University will seek to reduce car mileage through actively encouraging car sharing.

4.1.6 The emphasis will focus on encouraging staff, students and science park employees to meet their travel demands by sustainable modes. However the University will also look at measures to discourage the use of the car where appropriate, taking into account the practical issues facing those travelling to/from Begbroke Science Park and between its other sites, and the need for the science park to remain attractive and competitive.

4.2 Targets

4.2.1 The original targets set out in the 2004 travel plan, were:

- Reduce the number of single occupancy car trips by 10% in the interim phase and 20% in the long term phase of development; and
- Increase the percentage of staff cycle to and from the site to 10% in the interim phase and 15% in the long-term phase.

4.2.2 The interim development phase of the site has now been completed and was in operation at the time of the 2015 travel surveys. The first element of the long-term development phase of the site is currently being constructed.

4.2.3 Between 2006 and 2015 the percentage modal share of 'car driver' has fallen from 76% to 57%, which represents a comparative fall of 25%. This means that not only has the 'car driver' target for the interim development phase has been met but also that the long-term phase modal share target for the site has already been met, although

4.2.4 In 2015, the percentage of people cycling to and from Begbroke Science Park was 7%, which indicates that the target for the interim development is not currently being met. However, it should be noted that the modal share of cycling has previously been recorded at the interim phase of development target of 10% or above in the 2010, 2011, 2012 and 2014 travel surveys.

4.2.5 Begbroke Science Park situated in a relatively rural location and the significant change in modal share which has already been achieved by the travel plan should be set in context to the modal share for travel to work in this area.

4.2.6 Data from 2011 Census records, obtained from the National Statistics Office, has been obtained for the workday population for the Super Output Area Middle Layer of Cherwell 019 (workday population) which covers the development site, as summarised in Table 3.

4.2.7 It can be seen from Table 3 that the 'car driver' modal share for the local area around Begbroke Science Park is 81%.

Travel Mode	Modal Share
Train	1%
Bus, minibus or coach	5%
Taxi	0%
Motorcycle, scooter or moped	1%
Driving a car or van	81%
Passenger in a car or van	4%
Bicycle	4%
On foot	5%

Table 3: Travel to Work – Cherwell 019 Middle Output Layer

4.2.1 The reduction in 'car driver' percentage modal share already achieved at Begbroke Science Park is excellent, especially in the context of local travel patterns, however as the level of car usage reduces, so further reduction is harder to achieve.

4.2.2 Travel to the Science Park by minibus/public transport is 6 times higher than compared to local travel patterns and travelling by bicycle is nearly double. The proportion of people travelling to the Science Park as a car passenger however, is lower than the local travel patterns.

4.2.3 The change in ratio between University staff/students and employees of companies based at the Science Park following the completion of the CIE extension is also likely to have an effect on the scope for further reduction in 'car driver' percentage modal share. Students tend to be based the centre of Oxford and as such are well placed to take advantage of the good public transport and cycle links to the Science Park from the city centre.

4.2.4 University staff and company employees tend to be more dispersed across a wider area and as such may not have as many opportunities to travel by non-car modes to the Science Park.

4.2.5 In discussion with Cherwell District Council and Oxfordshire County Council, and based on its current success in reducing car driver trips. The University proposes to set the following targets:

- To reduce the percentage 'car driver' modal share to 54% by 2019 and to 51% by 2021;
- To increase the percentage cycle modal share to 10% by 2019 and to 15% by 2021; and
- To increase the percentage car share to 3% by 2019 and to 5% by 2021.

4.2.6 The modal share targets for reductions in the percentage 'car driver' represent a comparative fall of 5% by 2019 and 10% by 2021 from the 2015 baseline of 57% and as such are ambitious targets given the substantial reductions in car travel already made at the Science Park.

5 Measures and Actions

5.1 University Transport Strategy (2013-2018)

5.1.1 The University is expected to continue to grow, associated with a planned expansion of its physical estate. As the centre of Oxford becomes more constrained in terms of available capacity for development, areas of less central development have taken place, particularly at science parks which are located at Begbroke to the north and Harwell to the south.

5.1.2 The University commissioned a Transport Strategy to support the growth and development plans within the University's Estate Strategy, whilst also considering the existing transport needs of the University.

5.1.3 The University is committed to sustainable travel, to encouraging the use of efficient public and communal transport, bicycles and walking, and to reducing carbon dioxide emissions from work-related travel and University-owned vehicles. The University discourages unnecessary travel and the use of private motor transport both for travel to the University and travel for other work purposes during the day, with the aim of reducing traffic and parking in Oxford.

5.1.4 The stated objectives of the University's Transport Strategy are:

- reduce the numbers of car journeys on the network
- promote appropriate sustainable transport alternatives
- improve users' journey experience
- improve local air quality
- reduce the University's carbon footprint.

5.1.5 These strategic objectives were used to develop and prioritise a number of transport schemes to help deliver the University's Estate Strategy whilst also supporting the current activities of the University.

5.1.6 The Transport Strategy identifies the potential for a local Park & Ride to serve Begbroke Science Park. It is acknowledged in the strategy that future development of the Begbroke Science Park is expected to result in the need for an increased level of public transport connectivity between the University's city centre sites and the Science Park.

5.1.7 The increased demand for this route could open up further opportunities in terms of combining it with an edge-of-city centre parking location for staff living to the north of Oxford. An expanded shuttle bus service could then serve the dual role of providing both a park and ride facility for peak-hour journeys and an improved inter-site service between peak hours.

5.1.8 This potential scheme would build on the current links between Begbroke Science Park and the centre of Oxford and would help reduce the number of University staff travelling through the ring road into Oxford and help offset any future reductions in central area car parking, whilst also increasing the regularity of links between the Begbroke Science Park and the city centre.

5.2 University Wide Measures

5.2.1 The University has for some years implemented a series of University sustainable transport and measures, including:

- interest-free loans for purchasing public transport season tickets (bus, rail and park and ride);
- discounts of 10% 13-week and 52-week bus passes;

- membership of the Easit scheme offering 15% discounts on Great Western Railway rail travel and free bus taster tickets;
- a University-specific car share scheme (operated through Journeyshare), which includes priority access to peak car-parking permits and a guaranteed ride home for participants in the case of an emergency;
- security tagging for cycles;
- management of abandoned cycles;
- free adult cycle training;
- discounted OXONBIKE membership;
- personalised transport planning;
- transport-planning roadshows (with partners);
- interest-free loans (up to a value of £1,000) for cycle purchase and a range of discounts negotiated at local cycle suppliers;
- the operation of a mobile mechanic scheme for cyclists; and
- Cycle salvage and re-use scheme.

5.3 Begbroke Science Park Travel Plan Measures

5.3.1 Begbroke Science Park travel plan measures are summarised below.

Target/ Objective	Measure/Action	Timescale/Status
Promotion of travel plan.	Develop and maintain a site travel website.	Implemented as part of Interim Phase of development. On-going. http://www.begbroke.ox.ac.uk/home/contact-us/getting-here
	Provide a six monthly site travel newsletter and provide promotional material. Initiatives recently promoted include car share scheme, bicycle salary sacrifice scheme, new minibus service. Materials provided include cycle maps, minibus timetables.	Implemented since Interim Phase of development. On-going.
	Arrange at 6 monthly intervals meetings with occupant travel plan coordinators to discuss travel plan related issues.	Implemented since Interim Phase of development. On-going.
Promotion of travel to the site by foot and bicycle. To increase the percentage cycle modal share to10% by 2019 and to 15% by 2021	Provide showers, changing rooms, drying room/facilities and lockers on the following basis - 1 shower per 2,500m^2 up to 10,000m^2 and 1 shower per 4,000m^2 thereafter.	Implemented as part of Interim Phase of development and to be included within building specifications for any future development at the site.
	Install 1 secure, covered, lit and conveniently located cycle parking space per 6 staff of 'Sheffield' (upside-down U) type or similar.	Implemented as part of Interim Phase of development and to be included within building specifications for any future development at the site.
	Appoint site Cycling/Walking coordinators and provide help and advice to Cycling/Walking coordinators.	Implemented since Interim Phase of development. On-going.
	Install OXONBIKE self-serve cycle hire docking station on site, which will provide 6 electric bikes within an all-electric bike station capable of holding 8 bikes.	To be implemented in spring 2016.
	Link in with national events such as Bike Week.	On-going.

Target/ Objective	Measure/Action	Timescale/Status
Promotion of travel to the site by public transport.	Prepare and distribute an updated travel guide for the site to all occupants at 6 monthly intervals.	On-going. Paper and electronic public transport timetable information provided regularly.
	Provide a direct minibus link throughout the year between the site and the Science Area.	Implemented and on-going.
	Monitor usage of University minibus service and identify demand for additional services or expansion of existing route.	On-going. Minibus service directly operated and monitored by Begbroke Science Park.
	Explore opportunities with local bus operators of providing a direct bus access to Begbroke Science Park.	On-going - last meeting held in April 2016. Future development on the site may improve business case for operators to provide direct bus services to the site.
Discourage unnecessary private car use. To reduce the percentage 'car driver' modal share to 54% by 2019 and to 51% by 2021. To increase the percentage car share modal share to 3% by 2019 and to 5% by 2021.	Enforce car parking regulations whereby parking is only permitted in designated spaces to holders of site parking permits.	On-going. University Security Services issue car parking permits and provide enforcement. University staff currently have to pay £20 for an on-site parking permit.
	Limit the number of site parking permits issued as required.	On-going. University Security Services issue car parking permits and provide enforcement.
	Limit the number of cars parking on site to 260 at the long-term phase of development.	Overall limitation of parking numbers to be taken into consideration for any future development at the site.
	Promotion of University specific car-share scheme.	On-going. Journeyshare membership details has been made available to all site occupants and widely promoted.
	Prioritise parking permits for those without any option to travel by car.	On-going. The University prioritises parking permits for University staff. Companies are only allowed a restricted number of permits.
	Encourage staff to consider working from and teleconferencing rather than travelling to meetings where possible	Teleconferencing facilities are provided in the meeting rooms.

Table 4: Begbroke Science Park Travel Plan Measures

6 Travel Plan Management, Monitoring and Review

6.1 Travel Plan Management

6.1.1 Oxford University Estates Services will be responsible for the management of the travel plan, in cooperation with the Begbroke Directorate.

6.1.2 Oxford University Estates Services employs a Sustainable Travel Officer who is responsible for the existing University wide travel plan and who is also the nominated travel plan coordinator for Begbroke Science Park.

6.1.3 All correspondence relating to the Begbroke Science Park travel plan should be sent to the travel plan coordinator, contact details were given in section 1.1.

6.2 Monitoring and Review

6.2.1 The success of the travel plan will continue to be monitored, for a minimum of five years, by undertaking travel surveys at Begbroke Science Park. As the latest travel survey data is from 2015 the University will commit to undertaking travel surveys at Begbroke Science Park in 2017, 2019 and 2021.

6.2.2 The survey results will analysed and submitted to Cherwell District Council and Oxfordshire County Council within one month of the surveys being undertaken.

6.2.3 If targets are not met at the end of this period of monitoring the travel plan will be reviewed, new measures will be introduced and the monitoring period will be extended a further two cycles i.e. travel surveys will be undertaken in 2023 and 2025.

6.2.4 Once the travel plan has been approved, any changes, in particular the targets, will be made in agreement with the Travel Plan Team at Oxfordshire County Council.

Appendix 4

Rev	Description	Date

FOR PLANNING PURPOSES ONLY

Client:
University of Oxford

Land at Begbroke
Framework Plan

Scale@A1 :	Drawn:	Designed:	Approved:
1:500	ADW	DC	---

0m 20m

Drawing Number:	Revision:	Date:
UNO001/015	A	27.02.18

50 North Thirteenth Street, Central Milton Keynes, MK9 3BP
01908 666276 mail@davidlock.com **davidlock.com**

David Lock Associates
Town Planning and Urban Design

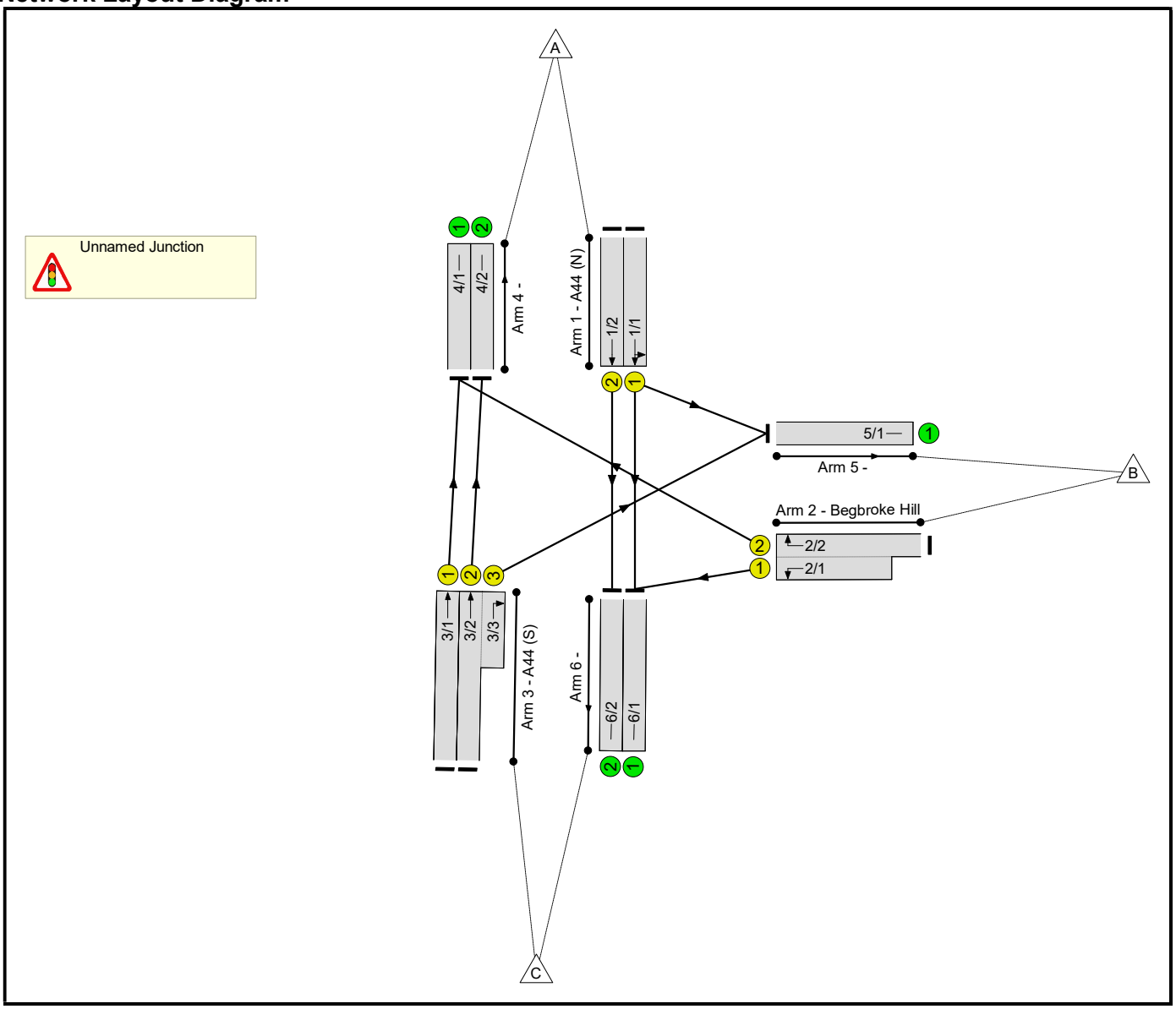
Appendix 5

Full Input Data And Results

User and Project Details

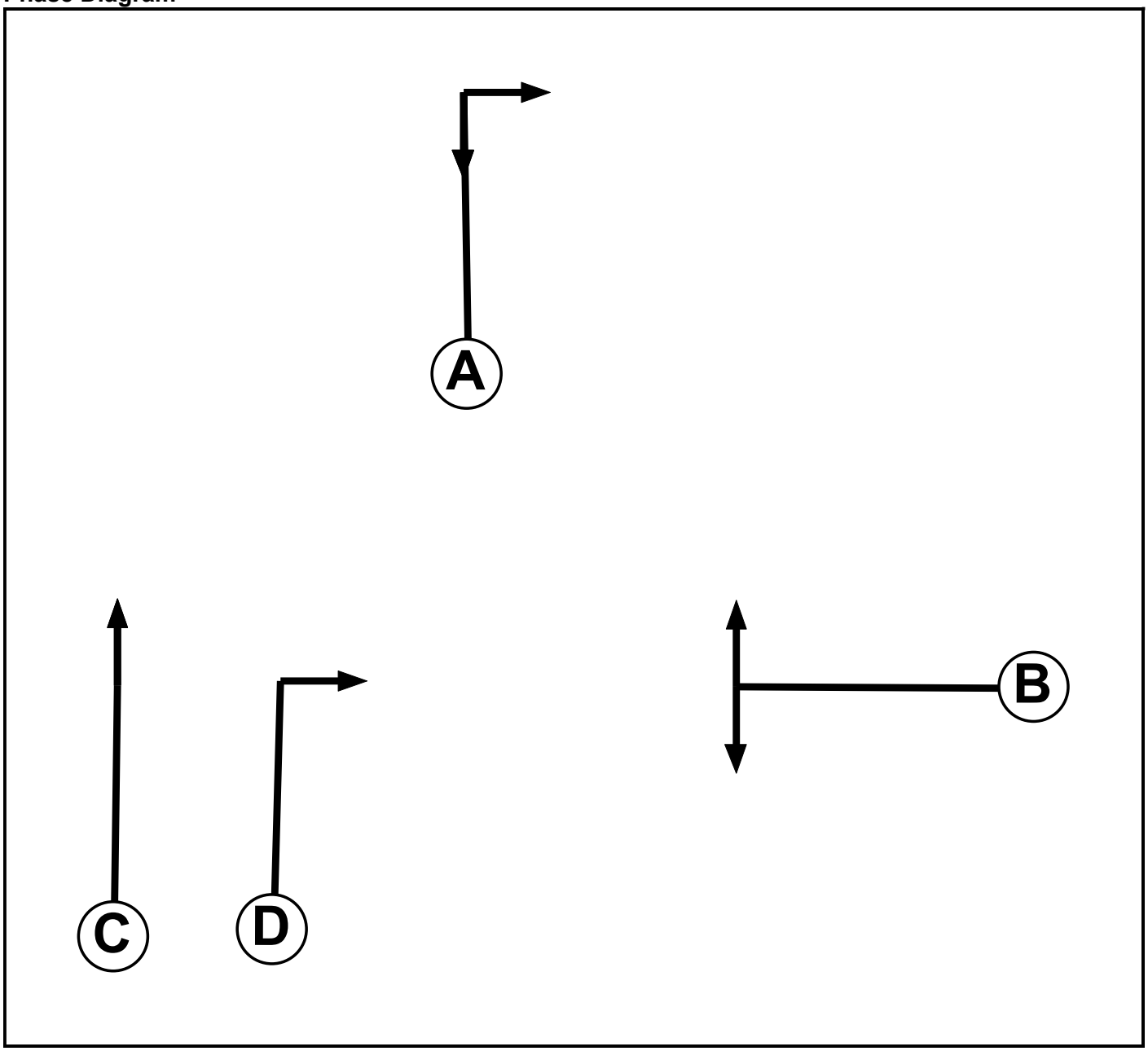
Project:	
Title:	
Location:	
Additional detail:	
File name:	A44-Begbroke Hill-Ex_04-2018.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		7	7
B	Traffic		7	7
C	Traffic		7	7
D	Traffic		7	7

Full Input Data And Results

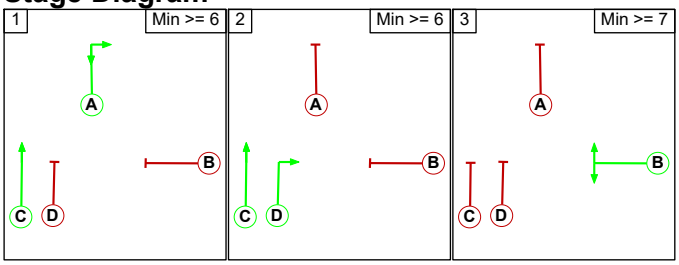
Phase Intergreens Matrix

	Starting Phase			
Terminating Phase	A	B	C	D
A		7	-	5
B	5		6	5
C	-	5		-
D	5	5	-	

Phases in Stage

Stage No.	Phases in Stage
1	A C
2	C D
3	B

Stage Diagram



Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Prohibited Stage Change

	To Stage		
From Stage	1	2	3
1		5	7
2	5		5
3	6	6	

Full Input Data And Results

Give-Way Lane Input Data

Junction: Unnamed Junction
There are no Opposed Lanes in this Junction

Full Input Data And Results

Lane Input Data

Junction: Unnamed Junction												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (A44 (N))	U	A	2	3	60.0	Geom	-	3.90	0.00	Y	Arm 5 Left	Inf
											Arm 6 Ahead	15.00
1/2 (A44 (N))	U	A	2	3	60.0	Geom	-	3.90	0.00	Y	Arm 6 Ahead	Inf
2/1 (Begbroke Hill)	U	B	2	3	8.2	Geom	-	3.90	0.00	Y	Arm 6 Left	15.00
2/2 (Begbroke Hill)	U	B	2	3	60.0	Geom	-	3.90	0.00	Y	Arm 4 Right	12.00
3/1 (A44 (S))	U	C	2	3	60.0	Geom	-	3.40	0.00	Y	Arm 4 Ahead	Inf
3/2 (A44 (S))	U	C	2	3	60.0	Geom	-	3.40	0.00	Y	Arm 4 Ahead	Inf
3/3 (A44 (S))	U	D	2	3	5.0	Geom	-	3.50	0.00	Y	Arm 5 Right	12.00
4/1	U		2	3	60.0	Inf	-	-	-	-	-	-
4/2	U		2	3	60.0	Inf	-	-	-	-	-	-
5/1	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1	U		2	3	60.0	Inf	-	-	-	-	-	-
6/2	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2017 Survey AM Peak'	08:00	09:00	01:00	
2: '2017 Survey PM Peak'	17:00	18:00	01:00	
3: '2025 Base - AM Peak '	08:00	09:00	01:00	
4: '2025 Base - PM Peak'	17:00	18:00	01:00	
5: '2025 With Development - AM Peak'	08:00	09:00	01:00	
6: '2025 With Development - PM Peak'	17:00	18:00	01:00	

Scenario 1: 'Scenario 1' (FG1: '2017 Survey AM Peak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	31	986	1017
	B	5	0	7	12
	C	1020	59	0	1079
	Tot.	1025	90	993	2108

Traffic Lane Flows

Lane	Scenario 1: Scenario 1
Junction: Unnamed Junction	
1/1	472
1/2	545
2/1 (short)	7
2/2 (with short)	12(In) 5(Out)
3/1	1018
3/2 (with short)	61(In) 2(Out)
3/3 (short)	59
4/1	1023
4/2	2
5/1	90
6/1	448
6/2	545

Full Input Data And Results

Lane Saturation Flows

Junction: Unnamed Junction								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (A44 (N))	3.90	0.00	Y	Arm 5 Left	Inf	6.6 %	1834	1834
				Arm 6 Ahead	15.00	93.4 %		
1/2 (A44 (N))	3.90	0.00	Y	Arm 6 Ahead	Inf	100.0 %	2005	2005
2/1 (Begbroke Hill)	3.90	0.00	Y	Arm 6 Left	15.00	100.0 %	1823	1823
2/2 (Begbroke Hill)	3.90	0.00	Y	Arm 4 Right	12.00	100.0 %	1782	1782
3/1 (A44 (S))	3.40	0.00	Y	Arm 4 Ahead	Inf	100.0 %	1955	1955
3/2 (A44 (S))	3.40	0.00	Y	Arm 4 Ahead	Inf	100.0 %	1955	1955
3/3 (A44 (S))	3.50	0.00	Y	Arm 5 Right	12.00	100.0 %	1747	1747
4/1	Infinite Saturation Flow						Inf	Inf
4/2	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
6/2	Infinite Saturation Flow						Inf	Inf

Scenario 2: 'Scenario 2' (FG2: '2017 Survey PM Peak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	1	1049	1050
	B	24	0	54	78
	C	1277	9	0	1286
	Tot.	1301	10	1103	2414

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 2: Scenario 2
Junction: Unnamed Junction	
1/1	485
1/2	565
2/1 (short)	54
2/2 (with short)	78(In) 24(Out)
3/1	640
3/2 (with short)	646(In) 637(Out)
3/3 (short)	9
4/1	664
4/2	637
5/1	10
6/1	538
6/2	565

Lane Saturation Flows

Junction: Unnamed Junction								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (A44 (N))	3.90	0.00	Y	Arm 5 Left	Inf	0.2 %	1823	1823
				Arm 6 Ahead	15.00	99.8 %		
1/2 (A44 (N))	3.90	0.00	Y	Arm 6 Ahead	Inf	100.0 %	2005	2005
2/1 (Begbroke Hill)	3.90	0.00	Y	Arm 6 Left	15.00	100.0 %	1823	1823
2/2 (Begbroke Hill)	3.90	0.00	Y	Arm 4 Right	12.00	100.0 %	1782	1782
3/1 (A44 (S))	3.40	0.00	Y	Arm 4 Ahead	Inf	100.0 %	1955	1955
3/2 (A44 (S))	3.40	0.00	Y	Arm 4 Ahead	Inf	100.0 %	1955	1955
3/3 (A44 (S))	3.50	0.00	Y	Arm 5 Right	12.00	100.0 %	1747	1747
4/1	Infinite Saturation Flow						Inf	Inf
4/2	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
6/2	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 3: 'Scenario 3' (FG3: '2025 Base - AM Peak ', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	31	1145	1176
	B	5	0	7	12
	C	1184	59	0	1243
	Tot.	1189	90	1152	2431

Traffic Lane Flows

Lane	Scenario 3: Scenario 3
Junction: Unnamed Junction	
1/1	548
1/2	628
2/1 (short)	7
2/2 (with short)	12(In) 5(Out)
3/1	605
3/2 (with short)	638(In) 579(Out)
3/3 (short)	59
4/1	610
4/2	579
5/1	90
6/1	524
6/2	628

Full Input Data And Results

Lane Saturation Flows

Junction: Unnamed Junction								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (A44 (N))	3.90	0.00	Y	Arm 5 Left	Inf	5.7 %	1832	1832
				Arm 6 Ahead	15.00	94.3 %		
1/2 (A44 (N))	3.90	0.00	Y	Arm 6 Ahead	Inf	100.0 %	2005	2005
2/1 (Begbroke Hill)	3.90	0.00	Y	Arm 6 Left	15.00	100.0 %	1823	1823
2/2 (Begbroke Hill)	3.90	0.00	Y	Arm 4 Right	12.00	100.0 %	1782	1782
3/1 (A44 (S))	3.40	0.00	Y	Arm 4 Ahead	Inf	100.0 %	1955	1955
3/2 (A44 (S))	3.40	0.00	Y	Arm 4 Ahead	Inf	100.0 %	1955	1955
3/3 (A44 (S))	3.50	0.00	Y	Arm 5 Right	12.00	100.0 %	1747	1747
4/1	Infinite Saturation Flow						Inf	Inf
4/2	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
6/2	Infinite Saturation Flow						Inf	Inf

Scenario 4: 'Scenario 4' (FG4: '2025 Base - PM Peak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	1	1215	1216
	B	24	0	54	78
	C	1479	9	0	1488
	Tot.	1503	10	1269	2782

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 4: Scenario 4
Junction: Unnamed Junction	
1/1	565
1/2	651
2/1 (short)	54
2/2 (with short)	78(In) 24(Out)
3/1	741
3/2 (with short)	747(In) 738(Out)
3/3 (short)	9
4/1	765
4/2	738
5/1	10
6/1	618
6/2	651

Lane Saturation Flows

Junction: Unnamed Junction								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (A44 (N))	3.90	0.00	Y	Arm 5 Left	Inf	0.2 %	1823	1823
				Arm 6 Ahead	15.00	99.8 %		
1/2 (A44 (N))	3.90	0.00	Y	Arm 6 Ahead	Inf	100.0 %	2005	2005
2/1 (Begbroke Hill)	3.90	0.00	Y	Arm 6 Left	15.00	100.0 %	1823	1823
2/2 (Begbroke Hill)	3.90	0.00	Y	Arm 4 Right	12.00	100.0 %	1782	1782
3/1 (A44 (S))	3.40	0.00	Y	Arm 4 Ahead	Inf	100.0 %	1955	1955
3/2 (A44 (S))	3.40	0.00	Y	Arm 4 Ahead	Inf	100.0 %	1955	1955
3/3 (A44 (S))	3.50	0.00	Y	Arm 5 Right	12.00	100.0 %	1747	1747
4/1	Infinite Saturation Flow						Inf	Inf
4/2	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
6/2	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 5: 'Scenario 5' (FG5: '2025 With Development - AM Peak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	58	1145	1203
	B	9	0	13	22
	C	1184	111	0	1295
	Tot.	1193	169	1158	2520

Traffic Lane Flows

Lane	Scenario 5: Scenario 5
Junction: Unnamed Junction	
1/1	563
1/2	640
2/1 (short)	13
2/2 (with short)	22(In) 9(Out)
3/1	1184
3/2 (with short)	111(In) 0(Out)
3/3 (short)	111
4/1	1193
4/2	0
5/1	169
6/1	518
6/2	640

Full Input Data And Results

Lane Saturation Flows

Junction: Unnamed Junction								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (A44 (N))	3.90	0.00	Y	Arm 5 Left	Inf	10.3 %	1840	1840
				Arm 6 Ahead	15.00	89.7 %		
1/2 (A44 (N))	3.90	0.00	Y	Arm 6 Ahead	Inf	100.0 %	2005	2005
2/1 (Begbroke Hill)	3.90	0.00	Y	Arm 6 Left	15.00	100.0 %	1823	1823
2/2 (Begbroke Hill)	3.90	0.00	Y	Arm 4 Right	12.00	100.0 %	1782	1782
3/1 (A44 (S))	3.40	0.00	Y	Arm 4 Ahead	Inf	100.0 %	1955	1955
3/2 (A44 (S))	3.40	0.00	Y	Arm 4 Ahead	Inf	0.0 %	1955	1955
3/3 (A44 (S))	3.50	0.00	Y	Arm 5 Right	12.00	100.0 %	1747	1747
4/1	Infinite Saturation Flow						Inf	Inf
4/2	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
6/2	Infinite Saturation Flow						Inf	Inf

Scenario 6: 'Scenario 6' (FG6: '2025 With Development - PM Peak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	2	1215	1217
	B	45	0	102	147
	C	1479	17	0	1496
	Tot.	1524	19	1317	2860

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 6: Scenario 6
Junction: Unnamed Junction	
1/1	567
1/2	650
2/1 (short)	102
2/2 (with short)	147(In) 45(Out)
3/1	742
3/2 (with short)	754(In) 737(Out)
3/3 (short)	17
4/1	787
4/2	737
5/1	19
6/1	667
6/2	650

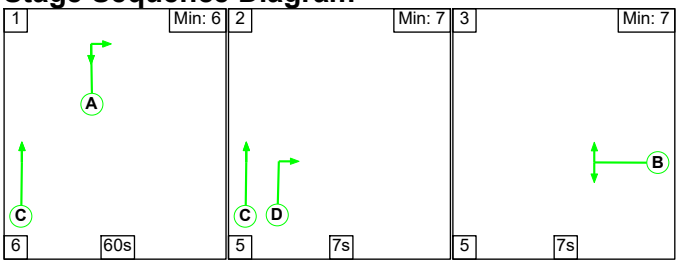
Lane Saturation Flows

Junction: Unnamed Junction								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (A44 (N))	3.90	0.00	Y	Arm 5 Left	Inf	0.4 %	1823	1823
				Arm 6 Ahead	15.00	99.6 %		
1/2 (A44 (N))	3.90	0.00	Y	Arm 6 Ahead	Inf	100.0 %	2005	2005
2/1 (Begbroke Hill)	3.90	0.00	Y	Arm 6 Left	15.00	100.0 %	1823	1823
2/2 (Begbroke Hill)	3.90	0.00	Y	Arm 4 Right	12.00	100.0 %	1782	1782
3/1 (A44 (S))	3.40	0.00	Y	Arm 4 Ahead	Inf	100.0 %	1955	1955
3/2 (A44 (S))	3.40	0.00	Y	Arm 4 Ahead	Inf	100.0 %	1955	1955
3/3 (A44 (S))	3.50	0.00	Y	Arm 5 Right	12.00	100.0 %	1747	1747
4/1	Infinite Saturation Flow						Inf	Inf
4/2	Infinite Saturation Flow						Inf	Inf
5/1	Infinite Saturation Flow						Inf	Inf
6/1	Infinite Saturation Flow						Inf	Inf
6/2	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 1: 'Scenario 1' (FG1: '2017 Survey AM Peak', Plan 1: 'Network Control Plan 1')

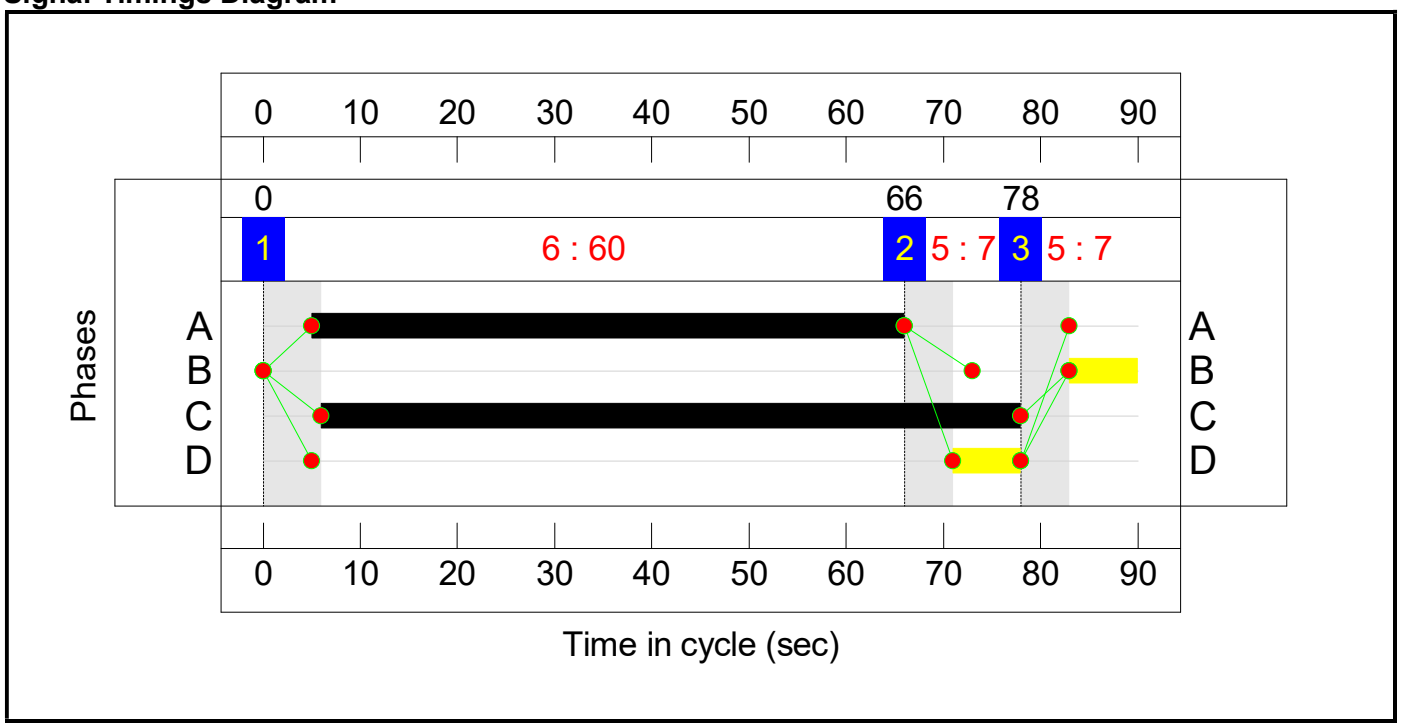
Stage Sequence Diagram



Stage Timings

Stage	1	2	3
Duration	60	7	7
Change Point	0	66	78

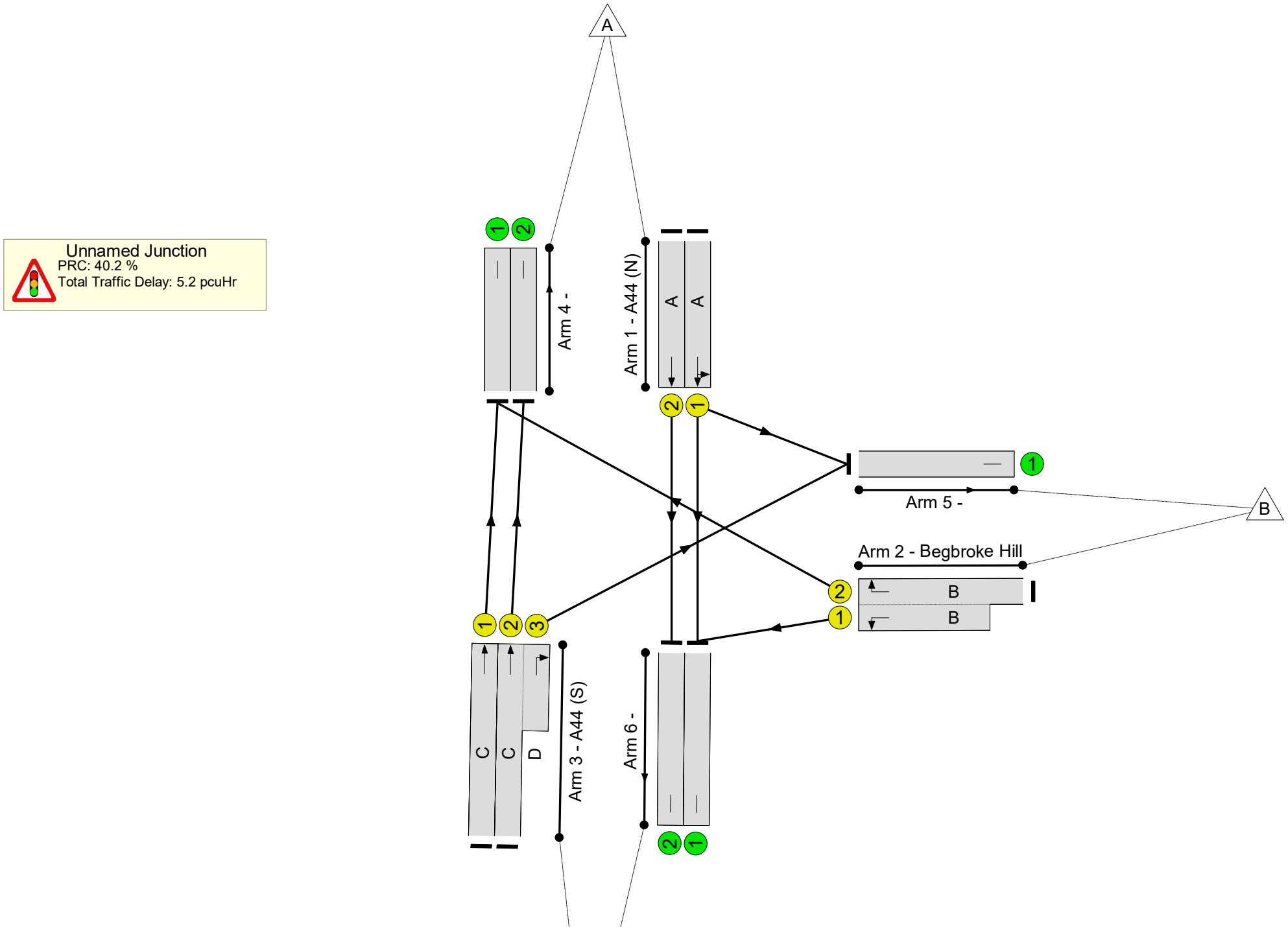
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Unnamed Junction
PRC: 40.2 %
Total Traffic Delay: 5.2 pcuHr



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	**N/A**	-	-		-	-	-	-	-	-	**64.2%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**64.2%**
1/1	A44 (N) Left Ahead	U	N/A	N/A	A		1	61	-	472	1834	1263	37.4%
1/2	A44 (N) Ahead	U	N/A	N/A	A		1	61	-	545	2005	1381	39.5%
2/2+2/1	Begbroke Hill Right Left	U	N/A	N/A	B		1	7	-	12	1782:1823	158+162	3.2 : 4.3%
3/1	A44 (S) Ahead	U	N/A	N/A	C		1	72	-	1018	1955	1586	64.2%
3/2+3/3	A44 (S) Ahead Right	U	N/A	N/A	C D		1	72:7	-	61	1955:1747	5+155	38.0 : 38.0%
4/1		U	N/A	N/A	-		-	-	-	1023	Inf	Inf	0.0%
4/2		U	N/A	N/A	-		-	-	-	2	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	90	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	448	Inf	Inf	0.0%
6/2		U	N/A	N/A	-		-	-	-	545	Inf	Inf	0.0%

Full Input Data And Results

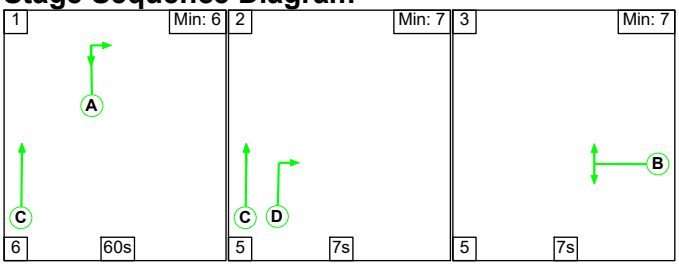
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**3.4**	**1.8**	**0.0**	**5.2**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**0**	**0**	**3.4**	**1.8**	**0.0**	**5.2**	**-**	**-**	**-**	**-**
1/1	472	472	-	-	-	0.8	0.3	-	1.1	8.1	4.9	0.3	5.1
1/2	545	545	-	-	-	0.9	0.3	-	1.2	8.1	5.8	0.3	6.1
2/2+2/1	12	12	-	-	-	0.1	0.0	-	0.1	43.6	0.2	0.0	0.2
3/1	1018	1018	-	-	-	0.9	0.9	-	1.8	6.5	9.9	0.9	10.8
3/2+3/3	61	61	-	-	-	0.6	0.3	-	0.9	55.4	1.4	0.3	1.7
4/1	1023	1023	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	2	2	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	90	90	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	448	448	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	545	545	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 40.2 Total Delay for Signalled Lanes (pcuHr): 5.23 Cycle Time (s): 90
PRC Over All Lanes (%): 40.2 Total Delay Over All Lanes(pcuHr): 5.23

Full Input Data And Results

Scenario 2: 'Scenario 2' (FG2: '2017 Survey PM Peak', Plan 1: 'Network Control Plan 1')

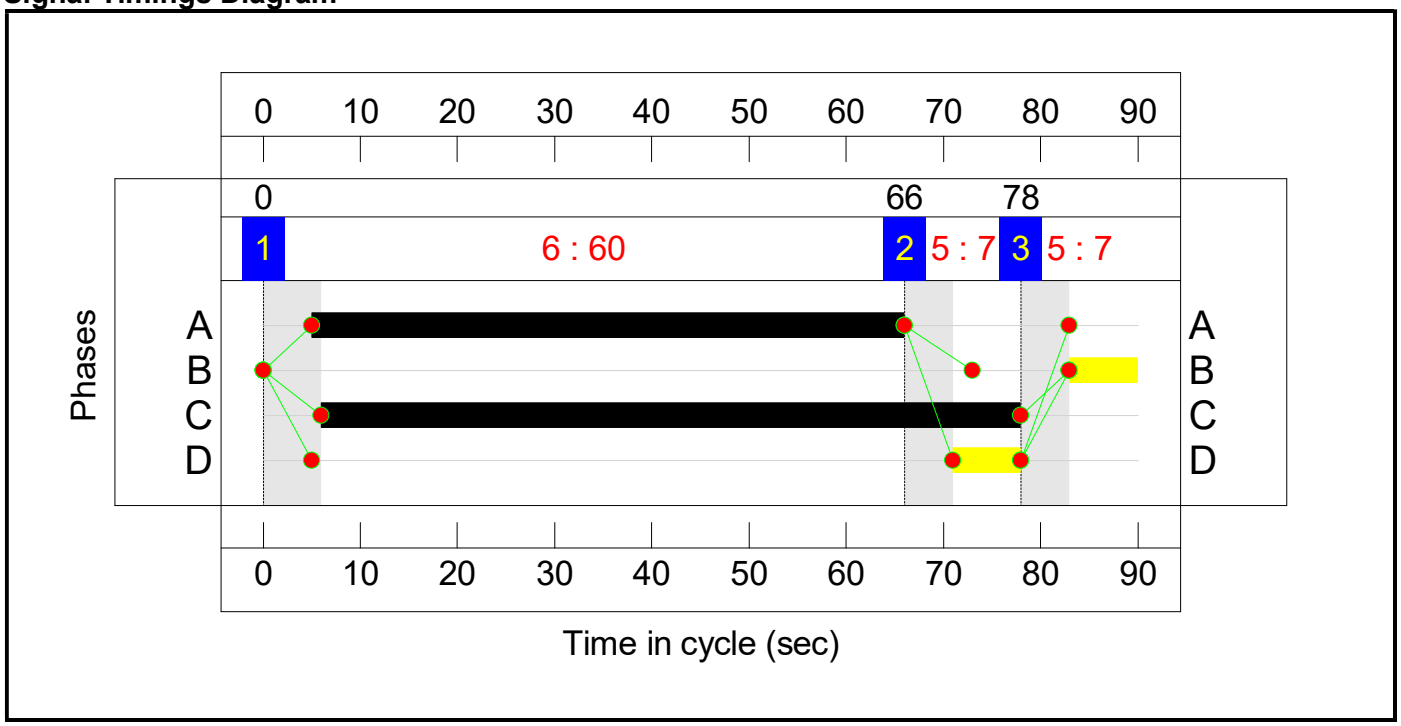
Stage Sequence Diagram



Stage Timings

Stage	1	2	3
Duration	60	7	7
Change Point	0	66	78

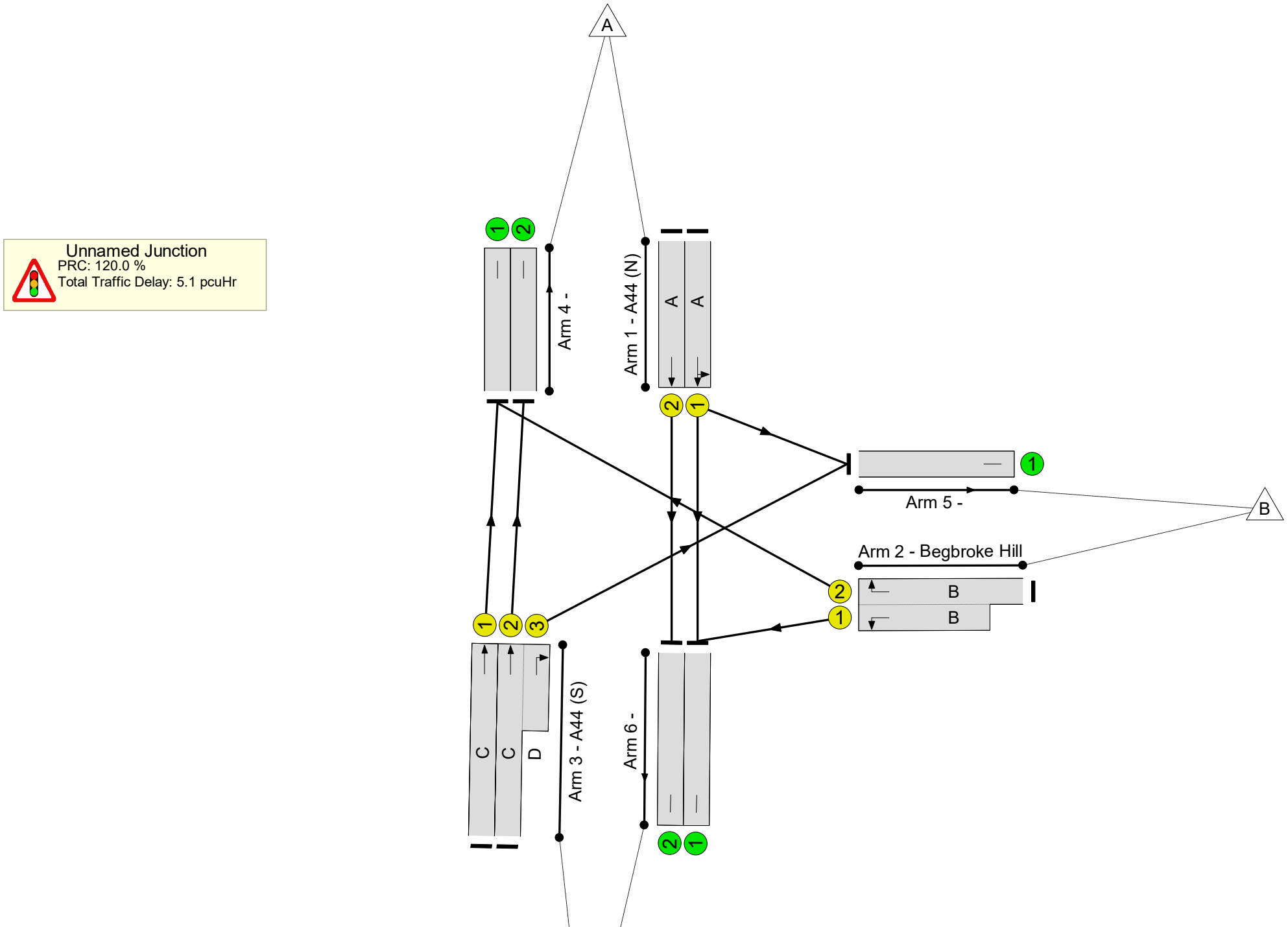
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Unnamed Junction
PRC: 120.0 %
Total Traffic Delay: 5.1 pcuHr



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	**N/A**	-	-		-	-	-	-	-	-	**40.9%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**40.9%**
1/1	A44 (N) Left Ahead	U	N/A	N/A	A		1	61	-	485	1823	1256	38.6%
1/2	A44 (N) Ahead	U	N/A	N/A	A		1	61	-	565	2005	1381	40.9%
2/2+2/1	Begbroke Hill Right Left	U	N/A	N/A	B		1	7	-	78	1782:1823	72+162	33.3 : 33.3%
3/1	A44 (S) Ahead	U	N/A	N/A	C		1	72	-	640	1955	1586	40.4%
3/2+3/3	A44 (S) Ahead Right	U	N/A	N/A	C D		1	72:7	-	646	1955:1747	1569+22	40.6 : 40.6%
4/1		U	N/A	N/A	-		-	-	-	664	Inf	Inf	0.0%
4/2		U	N/A	N/A	-		-	-	-	637	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	10	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	538	Inf	Inf	0.0%
6/2		U	N/A	N/A	-		-	-	-	565	Inf	Inf	0.0%

Full Input Data And Results

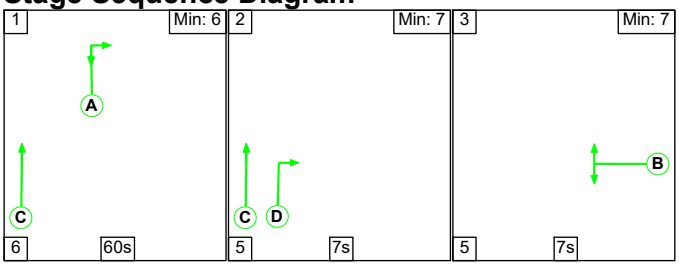
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**3.5**	**1.6**	**0.0**	**5.1**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**0**	**0**	**3.5**	**1.6**	**0.0**	**5.1**	**-**	**-**	**-**	**-**
1/1	485	485	-	-	-	0.8	0.3	-	1.1	8.3	5.1	0.3	5.4
1/2	565	565	-	-	-	1.0	0.3	-	1.3	8.3	6.0	0.3	6.3
2/2+2/1	78	78	-	-	-	0.8	0.2	-	1.1	49.8	1.3	0.2	1.5
3/1	640	640	-	-	-	0.4	0.3	-	0.8	4.3	4.4	0.3	4.8
3/2+3/3	646	646	-	-	-	0.5	0.3	-	0.9	4.8	4.4	0.3	4.8
4/1	664	664	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	637	637	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	10	10	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	538	538	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	565	565	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 120.0 Total Delay for Signalled Lanes (pcuHr): 5.11 Cycle Time (s): 90
PRC Over All Lanes (%): 120.0 Total Delay Over All Lanes(pcuHr): 5.11

Full Input Data And Results

Scenario 3: 'Scenario 3' (FG3: '2025 Base - AM Peak ', Plan 1: 'Network Control Plan 1')

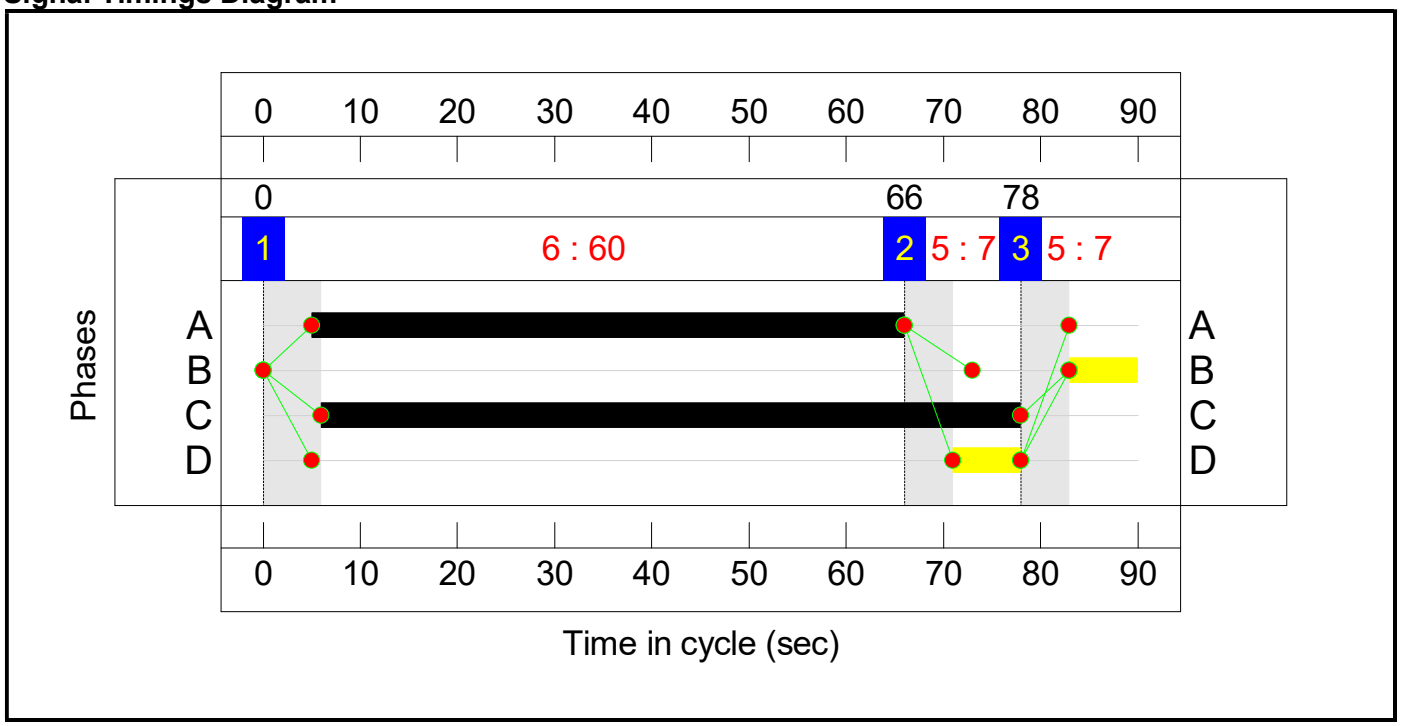
Stage Sequence Diagram



Stage Timings

Stage	1	2	3
Duration	60	7	7
Change Point	0	66	78

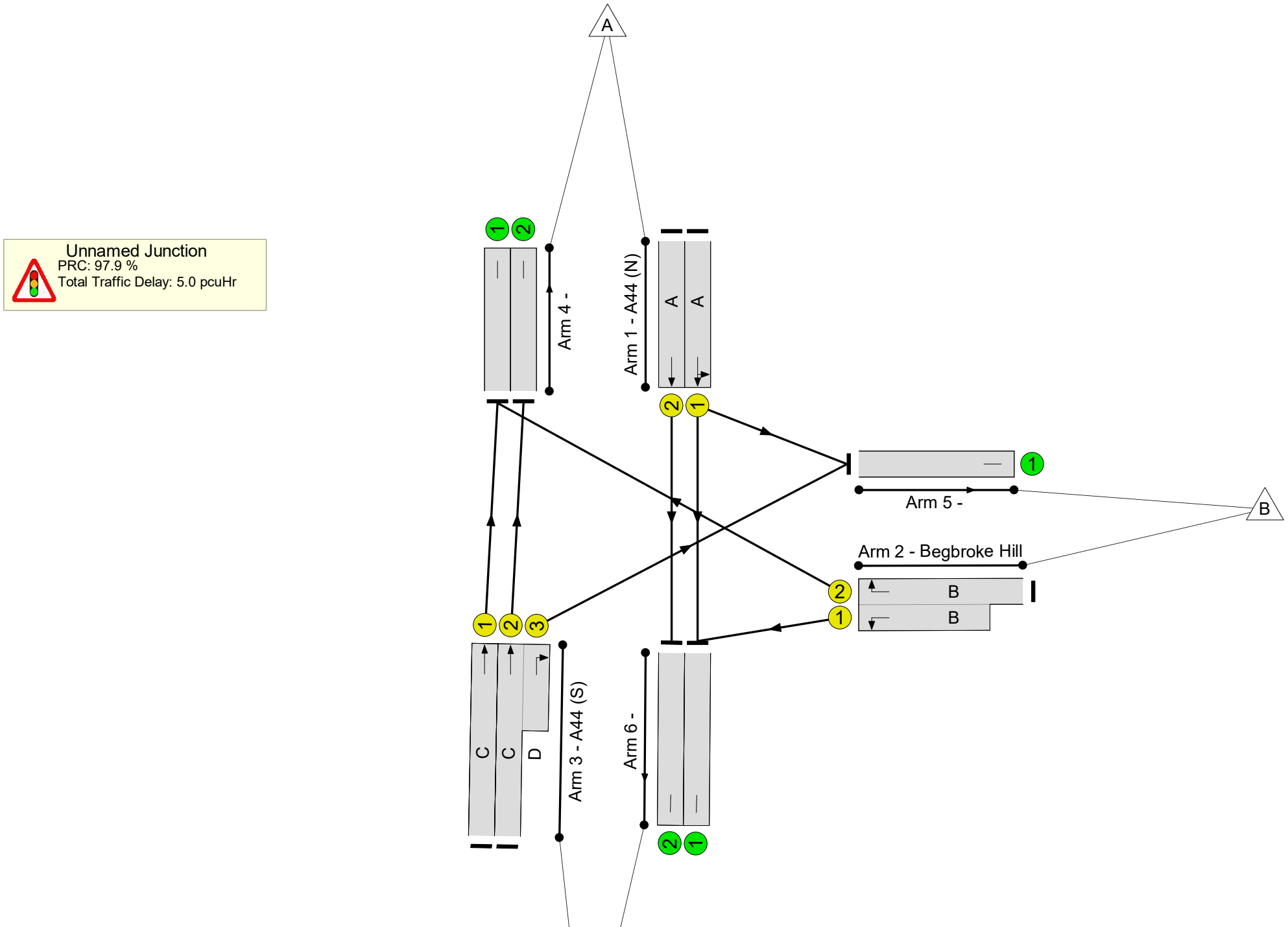
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Unnamed Junction
PRC: 97.9 %
Total Traffic Delay: 5.0 pcuHr



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	**N/A**	-	-		-	-	-	-	-	-	**45.5%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**45.5%**
1/1	A44 (N) Left Ahead	U	N/A	N/A	A		1	61	-	548	1832	1262	43.4%
1/2	A44 (N) Ahead	U	N/A	N/A	A		1	61	-	628	2005	1381	45.5%
2/2+2/1	Begbroke Hill Right Left	U	N/A	N/A	B		1	7	-	12	1782:1823	158+162	3.2 : 4.3%
3/1	A44 (S) Ahead	U	N/A	N/A	C		1	72	-	605	1955	1586	38.2%
3/2+3/3	A44 (S) Ahead Right	U	N/A	N/A	C D		1	72:7	-	638	1955:1747	1448+148	40.0 : 40.0%
4/1		U	N/A	N/A	-		-	-	-	610	Inf	Inf	0.0%
4/2		U	N/A	N/A	-		-	-	-	579	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	90	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	524	Inf	Inf	0.0%
6/2		U	N/A	N/A	-		-	-	-	628	Inf	Inf	0.0%

Full Input Data And Results

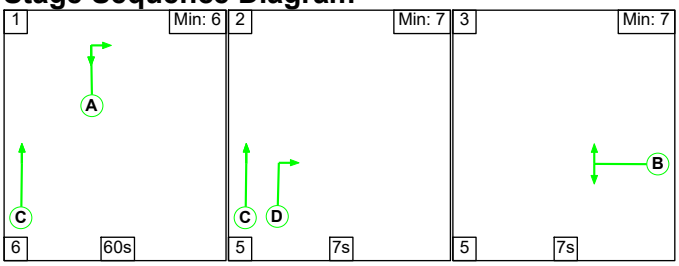
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**3.6**	**1.5**	**0.0**	**5.0**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**0**	**0**	**3.6**	**1.5**	**0.0**	**5.0**	**-**	**-**	**-**	**-**
1/1	548	548	-	-	-	0.9	0.4	-	1.3	8.7	5.9	0.4	6.3
1/2	628	628	-	-	-	1.1	0.4	-	1.5	8.7	7.0	0.4	7.4
2/2+2/1	12	12	-	-	-	0.1	0.0	-	0.1	43.6	0.2	0.0	0.2
3/1	605	605	-	-	-	0.4	0.3	-	0.7	4.2	4.0	0.3	4.3
3/2+3/3	638	638	-	-	-	1.0	0.3	-	1.3	7.5	3.9	0.3	4.2
4/1	610	610	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	579	579	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	90	90	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	524	524	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	628	628	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 97.9 Total Delay for Signalled Lanes (pcuHr): 5.03 Cycle Time (s): 90
PRC Over All Lanes (%): 97.9 Total Delay Over All Lanes(pcuHr): 5.03

Full Input Data And Results

Scenario 4: 'Scenario 4' (FG4: '2025 Base - PM Peak', Plan 1: 'Network Control Plan 1')

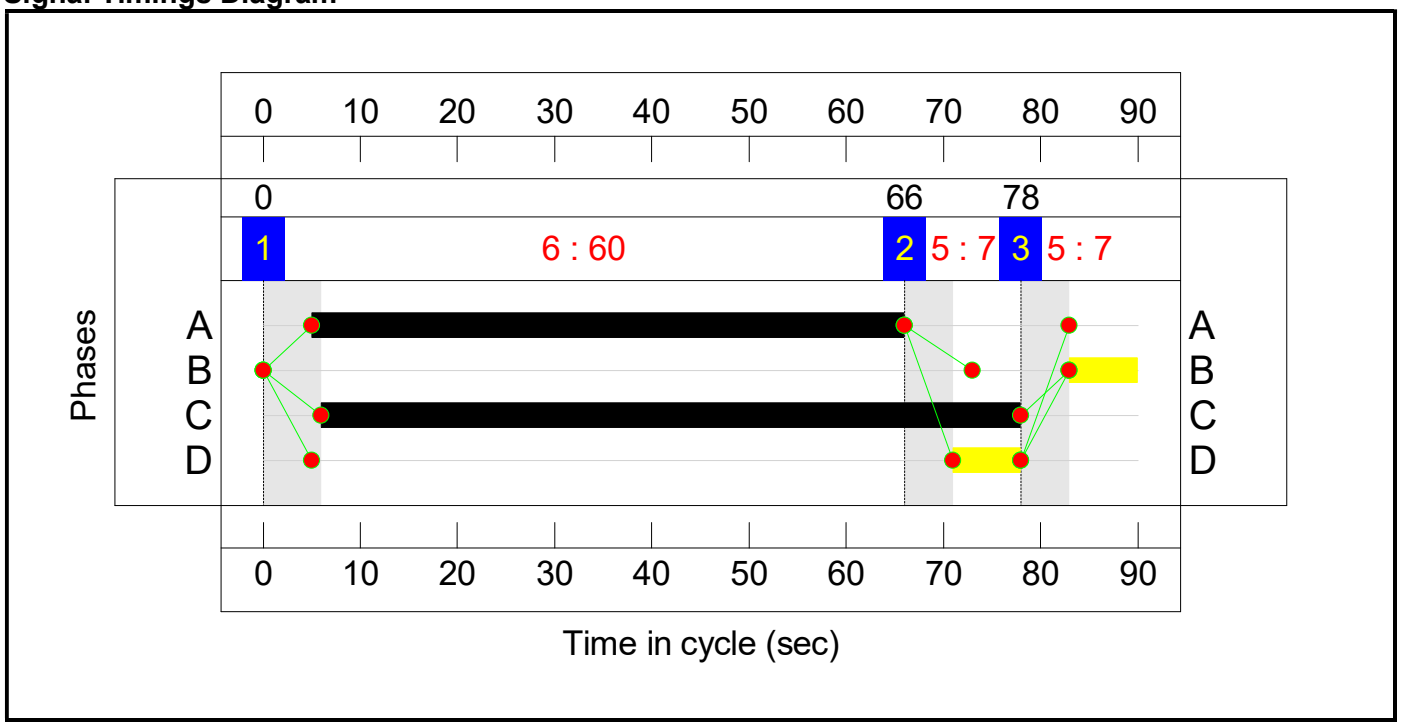
Stage Sequence Diagram



Stage Timings

Stage	1	2	3
Duration	60	7	7
Change Point	0	66	78

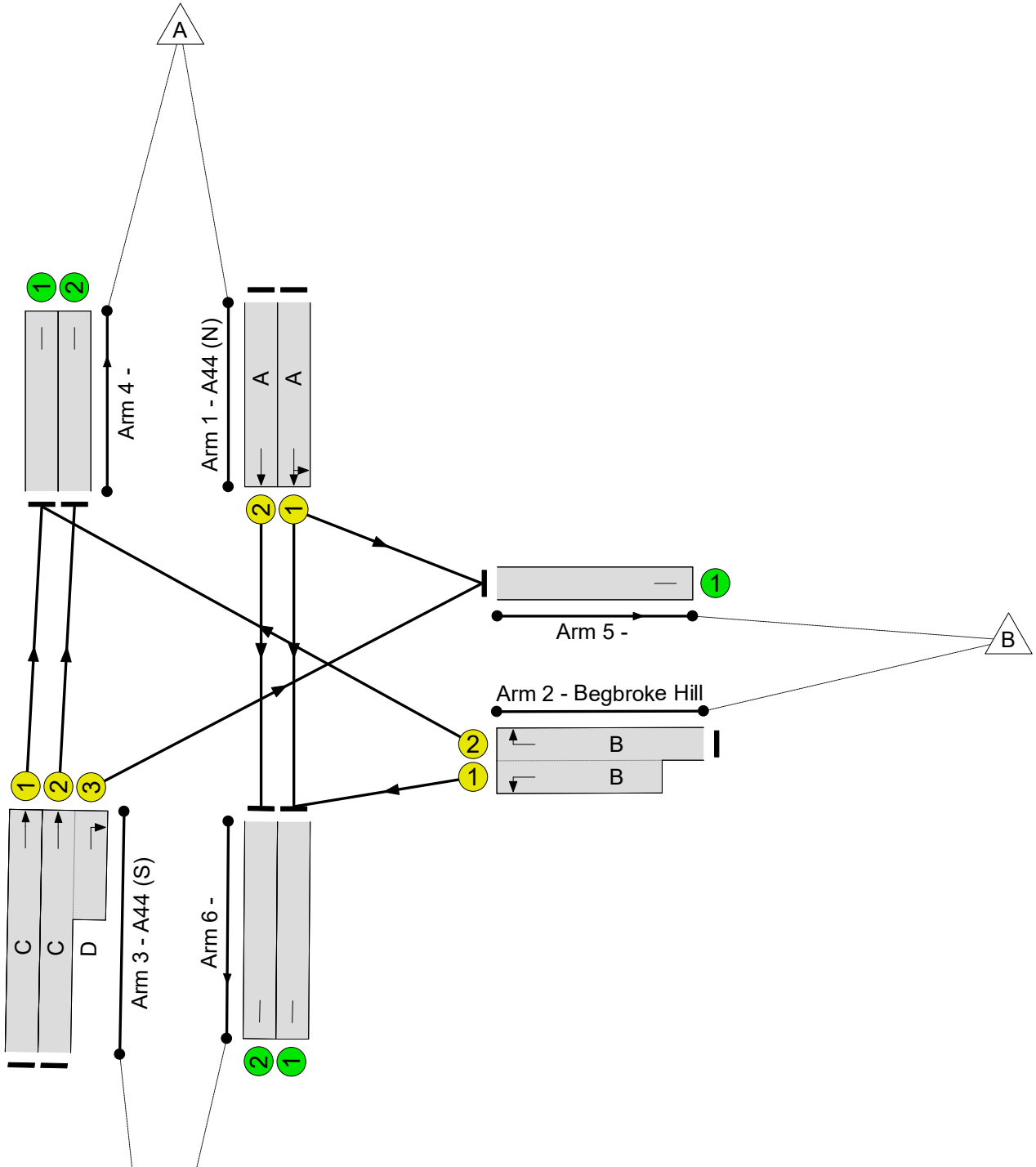
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Unnamed Junction
PRC: 91.0 %
Total Traffic Delay: 6.1 pcuHr



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	**N/A**	-	-		-	-	-	-	-	-	**47.1%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**47.1%**
1/1	A44 (N) Left Ahead	U	N/A	N/A	A		1	61	-	565	1823	1256	45.0%
1/2	A44 (N) Ahead	U	N/A	N/A	A		1	61	-	651	2005	1381	47.1%
2/2+2/1	Begbroke Hill Right Left	U	N/A	N/A	B		1	7	-	78	1782:1823	72+162	33.3 : 33.3%
3/1	A44 (S) Ahead	U	N/A	N/A	C		1	72	-	741	1955	1586	46.7%
3/2+3/3	A44 (S) Ahead Right	U	N/A	N/A	C D		1	72:7	-	747	1955:1747	1572+19	47.0 : 47.0%
4/1		U	N/A	N/A	-		-	-	-	765	Inf	Inf	0.0%
4/2		U	N/A	N/A	-		-	-	-	738	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	10	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	618	Inf	Inf	0.0%
6/2		U	N/A	N/A	-		-	-	-	651	Inf	Inf	0.0%

Full Input Data And Results

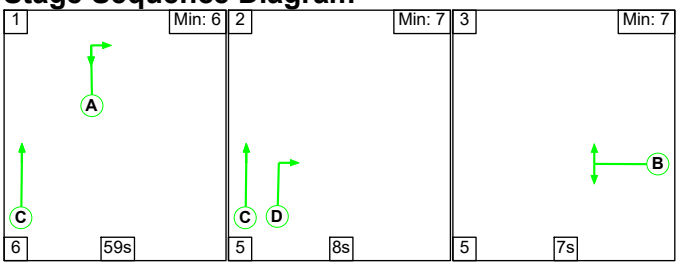
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**4.1**	**2.0**	**0.0**	**6.1**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**0**	**0**	**4.1**	**2.0**	**0.0**	**6.1**	**-**	**-**	**-**	**-**
1/1	565	565	-	-	-	1.0	0.4	-	1.4	8.9	6.3	0.4	6.7
1/2	651	651	-	-	-	1.2	0.4	-	1.6	8.9	7.4	0.4	7.9
2/2+2/1	78	78	-	-	-	0.8	0.2	-	1.1	49.8	1.3	0.2	1.5
3/1	741	741	-	-	-	0.5	0.4	-	1.0	4.7	5.6	0.4	6.0
3/2+3/3	747	747	-	-	-	0.6	0.4	-	1.1	5.1	5.5	0.4	6.0
4/1	765	765	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	738	738	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	10	10	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	618	618	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	651	651	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 91.0 Total Delay for Signalled Lanes (pcuHr): 6.13 Cycle Time (s): 90
PRC Over All Lanes (%): 91.0 Total Delay Over All Lanes(pcuHr): 6.13

Full Input Data And Results

Scenario 5: 'Scenario 5' (FG5: '2025 With Development - AM Peak', Plan 1: 'Network Control Plan 1')

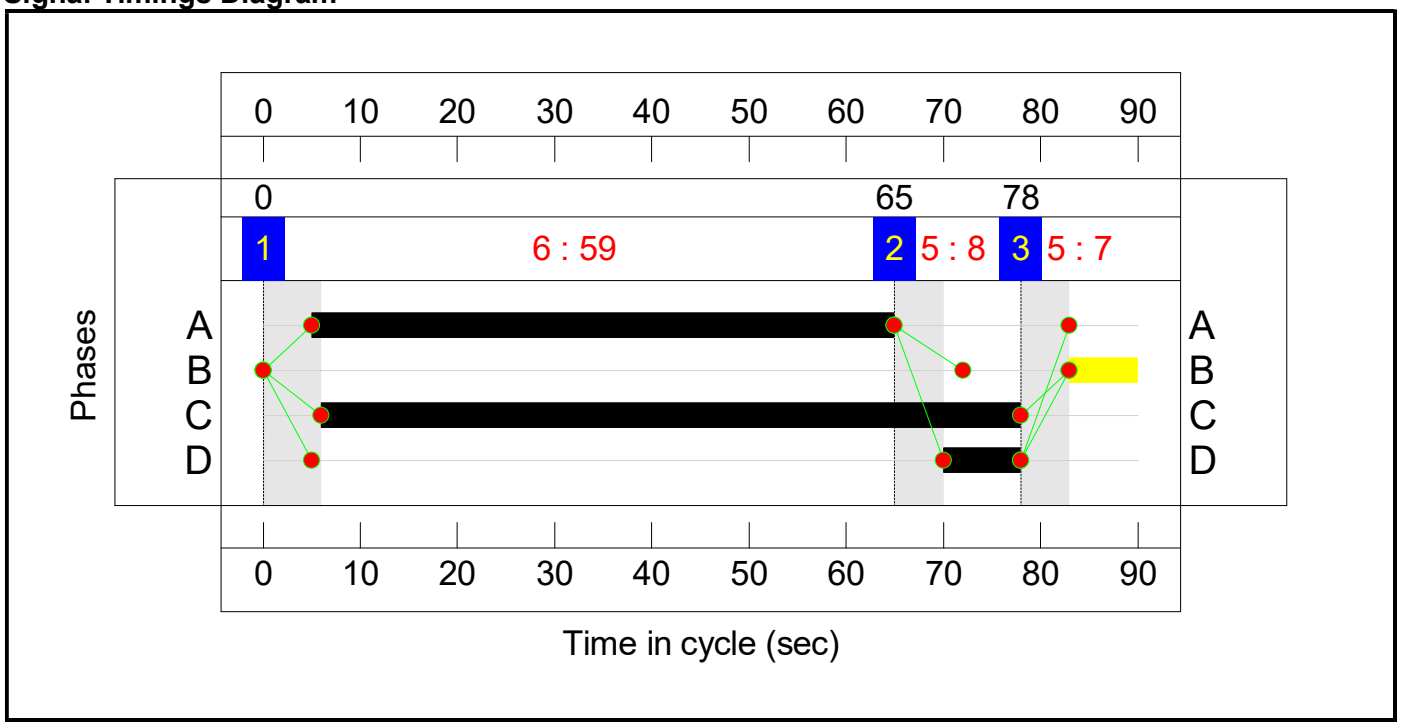
Stage Sequence Diagram



Stage Timings

Stage	1	2	3
Duration	59	8	7
Change Point	0	65	78

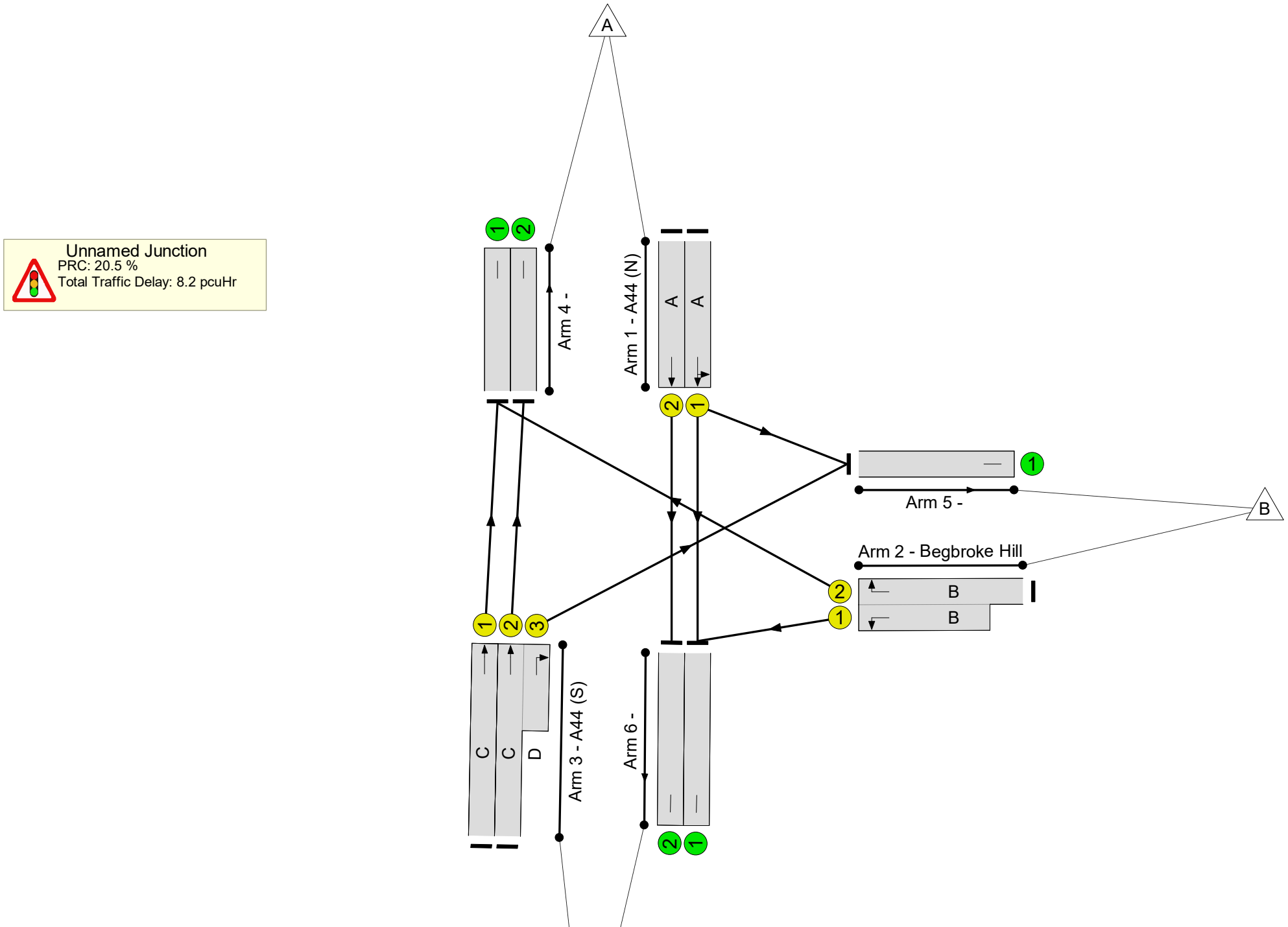
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Unnamed Junction
PRC: 20.5 %
Total Traffic Delay: 8.2 pcuHr



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	**N/A**	-	-		-	-	-	-	-	-	**74.7%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**74.7%**
1/1	A44 (N) Left Ahead	U	N/A	N/A	A		1	60	-	563	1840	1247	45.1%
1/2	A44 (N) Ahead	U	N/A	N/A	A		1	60	-	640	2005	1359	47.1%
2/2+2/1	Begbroke Hill Right Left	U	N/A	N/A	B		1	7	-	22	1782:1823	158+162	5.7 : 8.0%
3/1	A44 (S) Ahead	U	N/A	N/A	C		1	72	-	1184	1955	1586	74.7%
3/2+3/3	A44 (S) Ahead Right	U	N/A	N/A	C D		1	72:8	-	111	1955:1747	0+175	0.0 : 63.5%
4/1		U	N/A	N/A	-		-	-	-	1193	Inf	Inf	0.0%
4/2		U	N/A	N/A	-		-	-	-	0	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	169	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	518	Inf	Inf	0.0%
6/2		U	N/A	N/A	-		-	-	-	640	Inf	Inf	0.0%

Full Input Data And Results

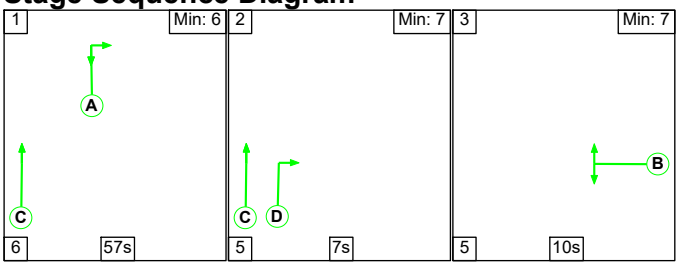
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**5.0**	**3.2**	**0.0**	**8.2**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**0**	**0**	**5.0**	**3.2**	**0.0**	**8.2**	**-**	**-**	**-**	**-**
1/1	563	563	-	-	-	1.1	0.4	-	1.5	9.4	6.4	0.4	6.8
1/2	640	640	-	-	-	1.2	0.4	-	1.7	9.4	7.5	0.4	7.9
2/2+2/1	22	22	-	-	-	0.2	0.0	-	0.3	43.8	0.3	0.0	0.3
3/1	1184	1184	-	-	-	1.3	1.5	-	2.8	8.5	14.1	1.5	15.6
3/2+3/3	111	111	-	-	-	1.2	0.8	-	2.0	66.5	2.7	0.8	3.5
4/1	1193	1193	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	169	169	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	518	518	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	640	640	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 20.5 Total Delay for Signalled Lanes (pcuHr): 8.25 Cycle Time (s): 90
PRC Over All Lanes (%): 20.5 Total Delay Over All Lanes(pcuHr): 8.25

Full Input Data And Results

Scenario 6: 'Scenario 6' (FG6: '2025 With Development - PM Peak', Plan 1: 'Network Control Plan 1')

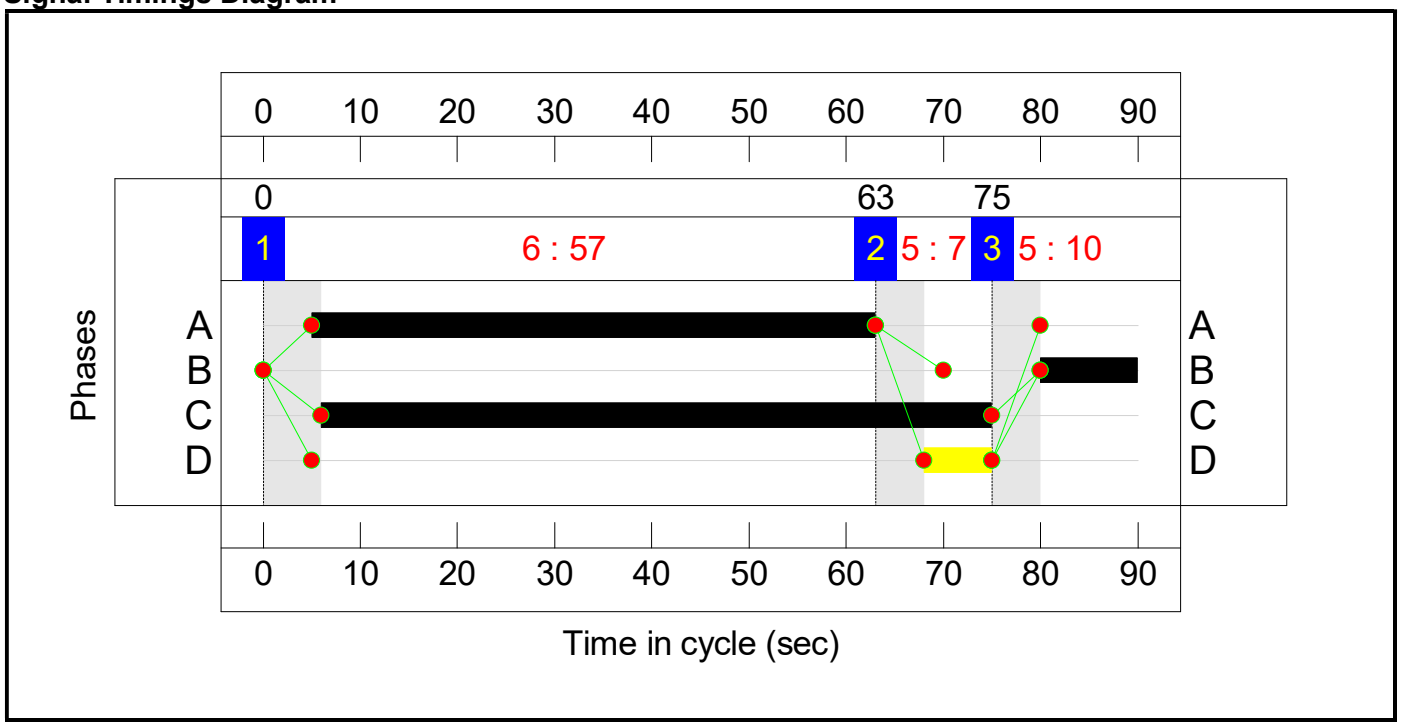
Stage Sequence Diagram



Stage Timings

Stage	1	2	3
Duration	57	7	10
Change Point	0	63	75

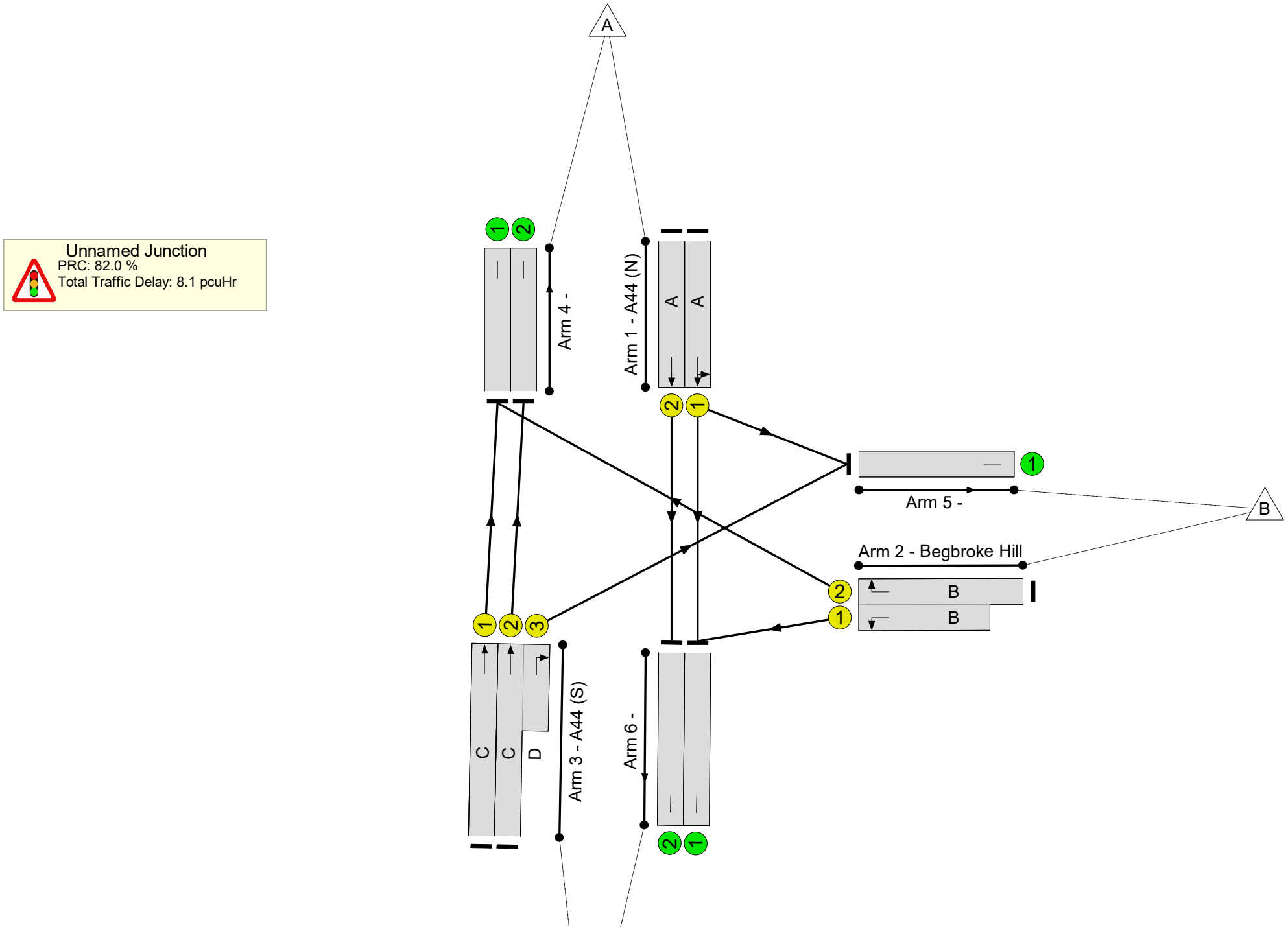
Signal Timings Diagram



Full Input Data And Results

Network Layout Diagram

Unnamed Junction
PRC: 82.0 %
Total Traffic Delay: 8.1 pcuHr



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	**N/A**	-	-		-	-	-	-	-	-	**49.5%**
Unnamed Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**49.5%**
1/1	A44 (N) Left Ahead	U	N/A	N/A	A		1	58	-	567	1823	1195	47.4%
1/2	A44 (N) Ahead	U	N/A	N/A	A		1	58	-	650	2005	1314	49.5%
2/2+2/1	Begbroke Hill Right Left	U	N/A	N/A	B		1	10	-	147	1782:1823	98+223	45.8 : 45.8%
3/1	A44 (S) Ahead	U	N/A	N/A	C		1	69	-	742	1955	1521	48.8%
3/2+3/3	A44 (S) Ahead Right	U	N/A	N/A	C D		1	69:7	-	754	1955:1747	1492+34	49.4 : 49.4%
4/1		U	N/A	N/A	-		-	-	-	787	Inf	Inf	0.0%
4/2		U	N/A	N/A	-		-	-	-	737	Inf	Inf	0.0%
5/1		U	N/A	N/A	-		-	-	-	19	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	667	Inf	Inf	0.0%
6/2		U	N/A	N/A	-		-	-	-	650	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**0**	**0**	**0**	**5.8**	**2.3**	**0.0**	**8.1**	**-**	**-**	**-**	**-**
Unnamed Junction	**-**	**-**	**0**	**0**	**0**	**5.8**	**2.3**	**0.0**	**8.1**	**-**	**-**	**-**	**-**
1/1	567	567	-	-	-	1.2	0.5	-	1.7	10.6	6.9	0.5	7.4
1/2	650	650	-	-	-	1.4	0.5	-	1.9	10.6	8.1	0.5	8.6
2/2+2/1	147	147	-	-	-	1.5	0.4	-	1.9	46.7	2.4	0.4	2.8
3/1	742	742	-	-	-	0.7	0.5	-	1.2	5.9	6.6	0.5	7.1
3/2+3/3	754	754	-	-	-	0.9	0.5	-	1.4	6.7	6.6	0.5	7.0
4/1	787	787	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	737	737	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	19	19	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	667	667	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	650	650	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 82.0 Total Delay for Signalled Lanes (pcuHr): 8.10 Cycle Time (s): 90
PRC Over All Lanes (%): 82.0 Total Delay Over All Lanes(pcuHr): 8.10

Appendix 6

AM Peak - Flow Changes Compared With Do Minimum – Transport Improvement Package 2 with Loop Farm Link

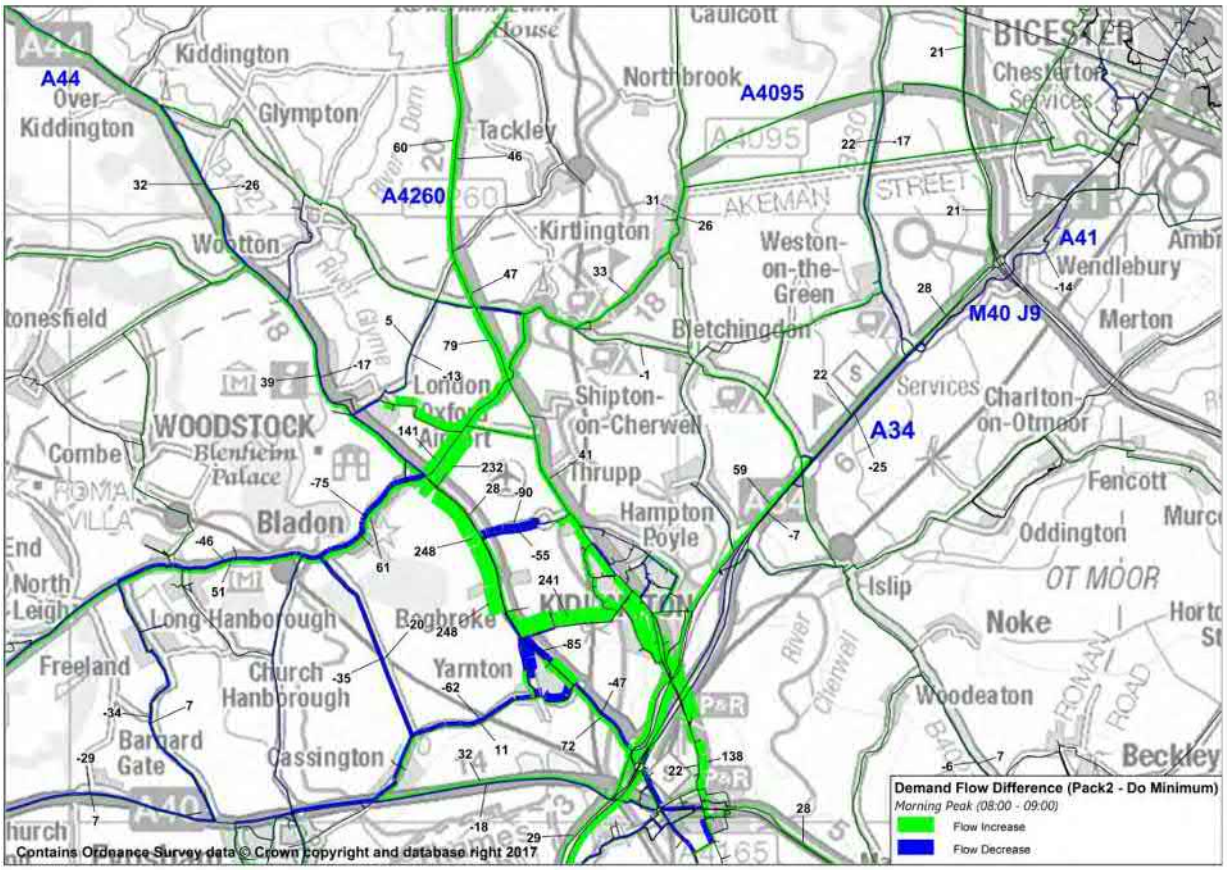


Figure 14 Transport Improvement Package 2 - Do Minimum Flow Difference Morning Peak

AM Peak - Flow Changes Compared With Do Minimum – Transport Improvement Package 2 without Loop Farm Link

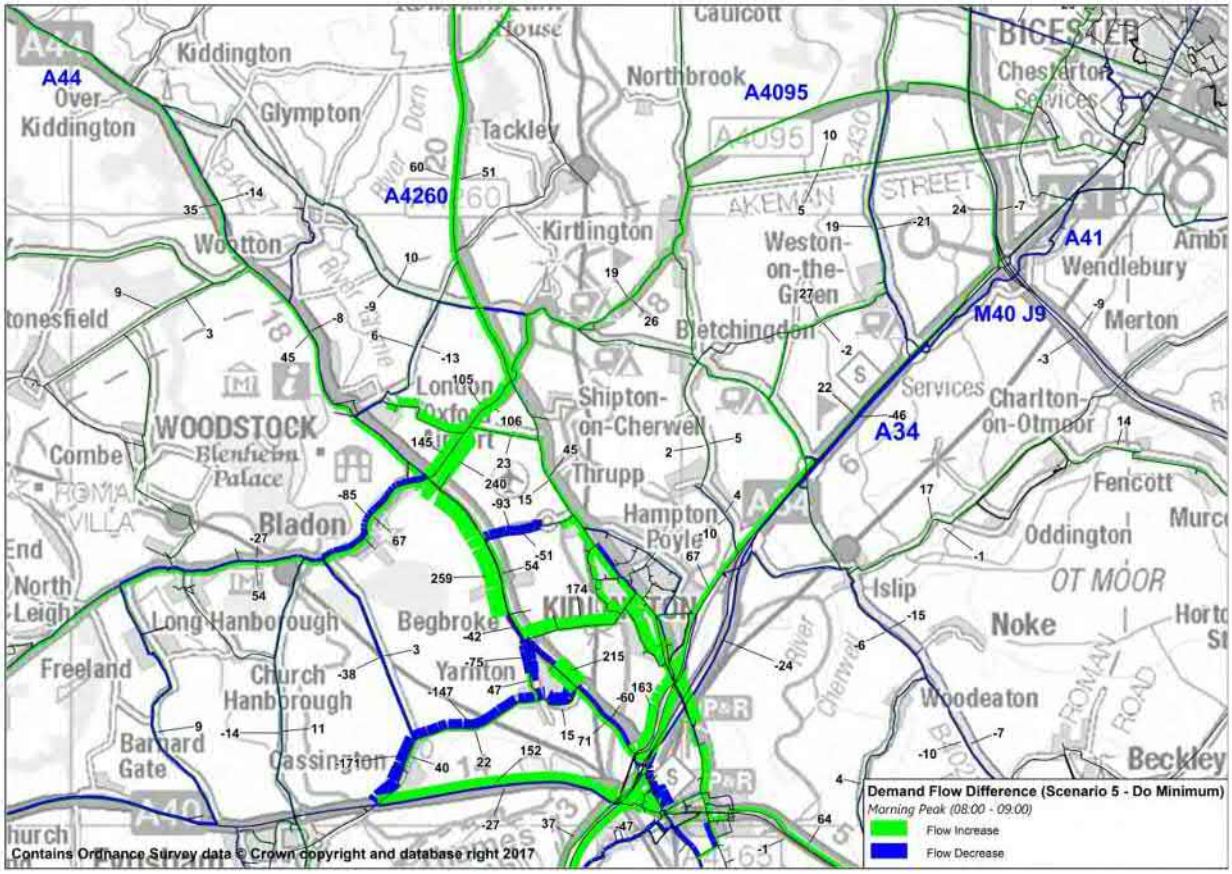


Figure 16 Scenario 5 - Do Minimum Flow Difference Morning Peak

PM Peak - Flow Changes Compared With Do Minimum – Transport Improvement Package 2 with Loop Farm Link

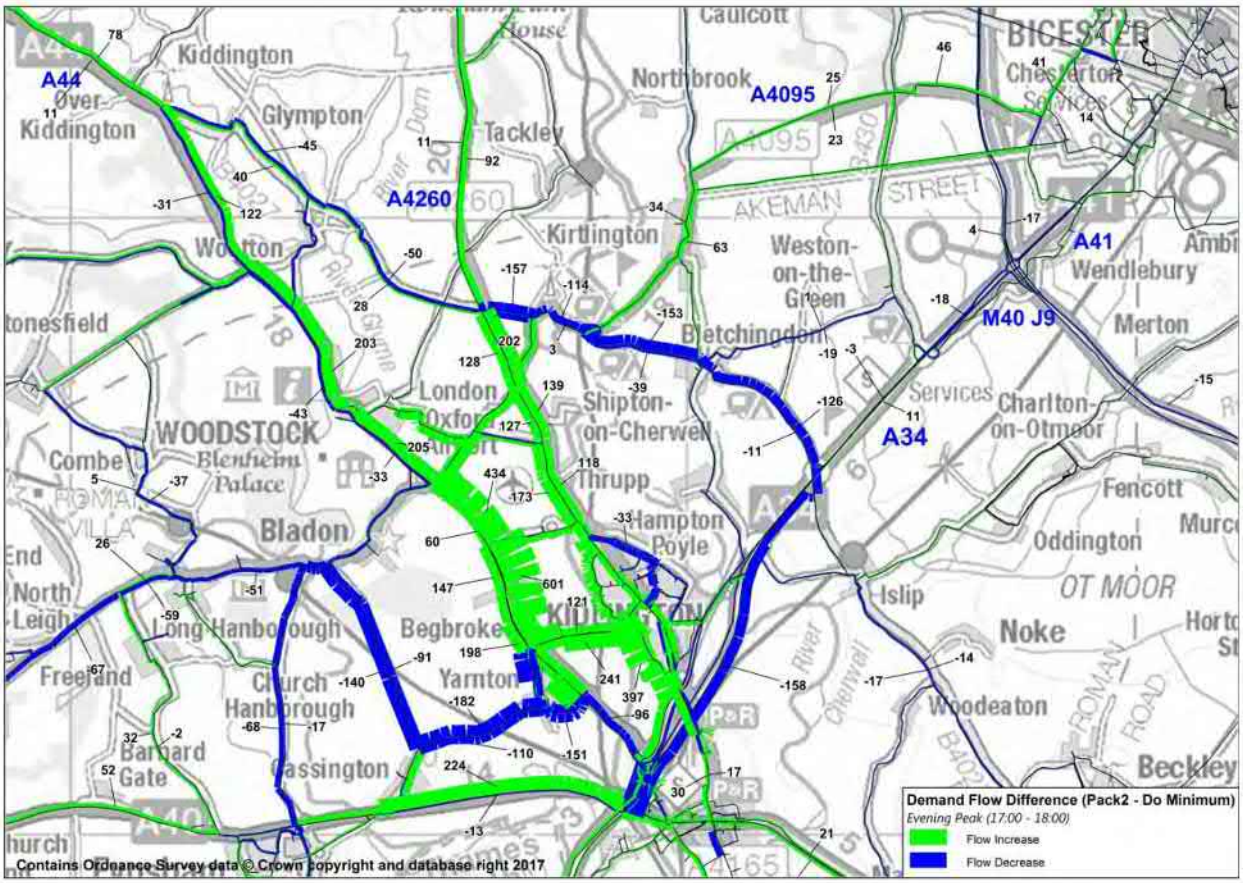


Figure 15 Transport Improvement Package 2 - Do Minimum Flow Difference Evening Peak

PM Peak - Flow Changes Compared With Do Minimum – Transport Improvement Package 2 without Loop Farm Link

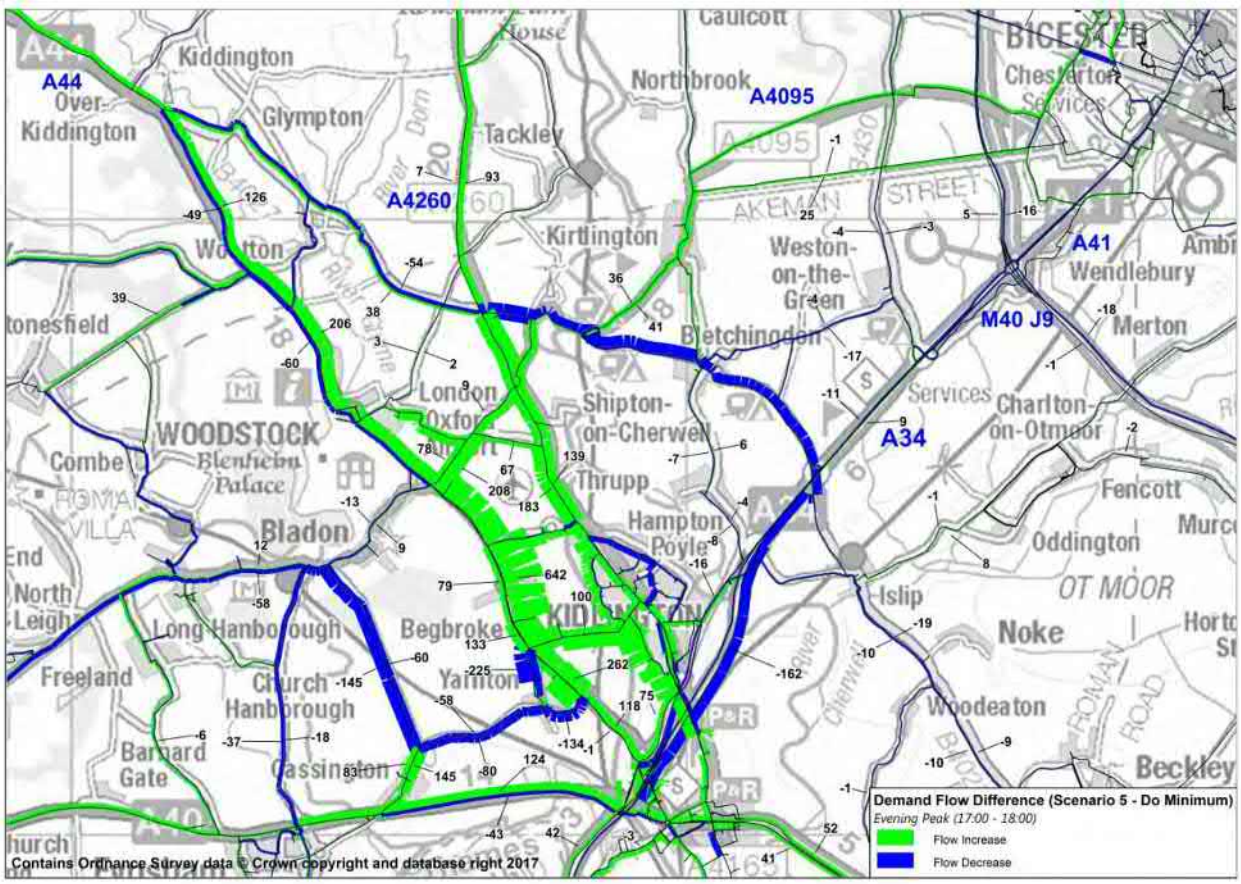


Figure 17 Scenario 5 - Do Minimum Flow Difference Evening Peak