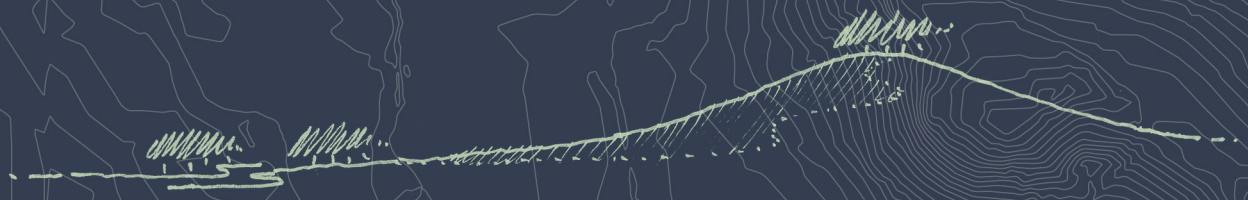


CAMBRIDGE SOUTH

Transport Strategy

Jesus College Cambridge

St John's College University of Cambridge

Cambridgeshire County Council

Vectos

April 2021

Contents

1 Introduction

Overview

1.1 The expansion of the Cambridge Biomedical Campus (CBC) is a unique opportunity.

1.2 It is unique because it has all the ingredients necessary to provide globally and locally significant growth whilst reducing carbon emissions and improving healthy living.

1.3 It can do this because it has the following converging attributes:

- A move away from the largely single employment hub at CBC, widening the variety of commercial and research facilities which will interact at the local level, reducing the need to travel.
- Providing homes that support employment at CBC, substantially increasing the opportunity for local working and local living, changing previously car dominated travel patterns to more sustainable modes.
- Creating a well-balanced community, supported by a Community Concierge team as part of the wider estate management, that maximises the benefits of the interacting facilities and homes. This includes localising the major reasons for travel, adding education and leisure, and providing for 'virtual accessibility' including local work hubs, Mobility Hubs and 'online plus deliveries' accessibility.
- Investing in a primary movement network based on active travel, creating permeable and connected neighbourhoods.
- The existing wider area has excellent active travel and shared travel facilities, including the Trumpington Park and Ride, Hub, Babraham Road Park and Ride, the Busway (incorporating active travel), the Hills Road cycle route, the Melbourn Greenway and the Genome National Cycle Route.
- A substantial investment is underway in longer distance active travel routes and shared travel facilities, including Cambridge South station, the Cambridge South East Transport corridor and Travel Hub, the South West Travel Hub, and East West Rail.
- The opportunity to rationalise the existing CBC operation, and also the committed expansion, by removing the need to implement planned car parking within the campus, reallocating some parking to the dedicated CBC smart Travel Hubs, upgrading cycle facilities and reallocating road space.
- The opportunity to rationalise deliveries from the strategic road network into a Micro Consolidation Centre for onward delivery to homes and businesses throughout Cambridge South by clean and less intimidating vehicles.

1.4 In 2021 the CBC Vision 2050 was prepared which sets out a clear vision for the growth and success of CBC over the next 30 years. The Cambridge South proposal responds to that vision and the understood need to support further growth opportunities for CBC.

1.5 The CBC Vision 2050 is:

1.6 "Cambridge Biomedical Campus will be globally leading and locally rooted, the preferred destination for Life Sciences, where research, commercialisation and real-world application come together to create life-saving innovation in a vibrant local community."

1.7 To achieve this vision, it is important to understand CBC as a maturing neighbourhood with an aspiration of achieving its potential as a world class science hub and becoming an established district. The aspiration will require growth beyond the existing site boundaries.

1.8 This report outlines the vision for the future mobility for Cambridge South to match the sustainability objectives of the CBC Vision 2050. This vision responds to the massively changing attitudes towards mobility and how technology, investment and local living are changing the face of accessibility, travel and transport.

1.9 The land being promoted through the Local Plan comprises land within a study area immediately south of CBC, within which two development zones have been identified: 'the East development zone immediately south east of CBC and the West development zone west of Cambridge Road. Together, the zones offer the opportunity to respond to the growing needs of CBC in a mixed-use sustainable development.

1.10 The proposed development zones are shown in Figure 1.1.

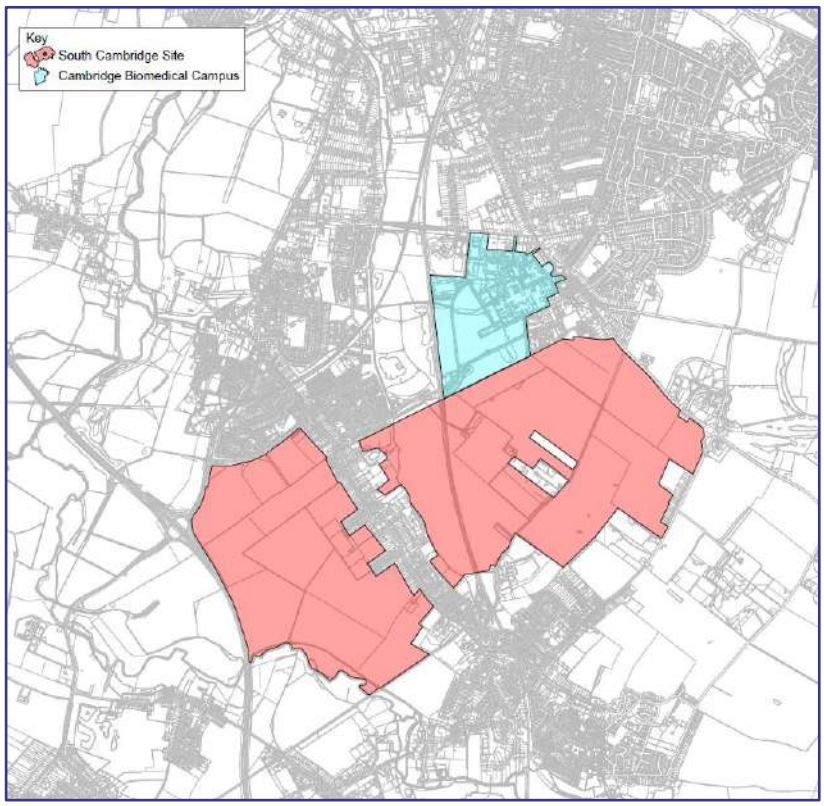


Figure 1.1 – Location of Cambridge South

1.11 This Mobility Vision and Strategy forms part of a submission by the landowners of the study area to the Great Cambridge Local Plan.

Development proposals summary

1.12 The proposals for Cambridge South that are set out at this time are not definitive but respond to the identified need for the expansion of the Biomedical Campus. Those precise needs may evolve over time but a draft central proposal has been developed on behalf of the landowners, in consultation with CBC. Further detail will be developed in due course as the Masterplan for the site evolves and as discussions with the local planning authority, the local community and other stakeholders take place.

1.13 This Vision summarises how balanced land use and innovation, placemaking and mobility can work at Cambridge South to realise these ambitions. It is aspirational but deliverable.

1.14 The key land uses that are being proposed are:

- Research and Development uses to expand and reinforce CBC's status as a global leader in Life Sciences;
- Clinical uses to expand the scale and range of hospital services;
- Up to 5,000 homes of which 40% will be affordable, and many of which will be tied directly to employment at CBC. The homes will be planned and marketed to meet the needs of CBC, including Addenbrookes, the Royal Papworth Hospital and the growing hospital cluster;
- New primary and secondary schools, noting that travel to education is the major reason for travel in the UK at present; and
- Open space, recreational, hotel and leisure facilities. Travel for leisure is the next most significant reason for travel in the UK today, and local facilities including enhanced access to the countryside as well as sports facilities and catering facilities can be provided to significantly reduce the need to travel and at the same time respond to CBC's vision to promote healthy living.

1.15 The wide mix of development proposed will foster a community based on local living, social interaction and non-car travel by providing homes and a range of day-to-day leisure, supporting and recreational facilities which are currently missing from the campus.

1.16 Cambridge South provides the opportunity for existing employees and visitors to use and choose more sustainable and space efficient travel.

Report Structure

1.17 The remainder of this report is structured as follow:

- Section 2 – Sets out the key approach and challenges of local authorities in respect of mobility;
- Section 3 – outlines the mobility opportunities in the South Cambridge area;
- Section 4 – outlines the current context of CBC including staff numbers, baseline mode splits and mobility options
- Section 5 – outlines the Masterplan and the key mobility principles. Proposed access and linkages are identified;
- Section 6 – Considers the effect of the development upon the Trip Budget with reference to trip forecasts and modelling; and,
- Section 7 – summarises and outlines the next key steps.

2 In a city context

2.1 Cambridge is part of the Oxford-Cambridge Arc, which the National Infrastructure Commission (NIC) has identified as an area with particular economic potential.

2.2 The identification of the Oxford-Cambridge Arc region as a growth opportunity of national significance by the Government has resulted in its intention to adopt an Oxford-Cambridge Arc Spatial Framework by the end of 2022 to stimulate and guide investment. Early reports associated with the framework identify the need for investment in connectivity and accessibility to housing. Without this, longer journeys to work and may result. Cambridge South can contribute positively within this framework.

2.3 The Cambridgeshire and Peterborough Independent Economic Review (CPIER) Final Report (2018) sets out a series of recommendations that '*reflects the goal of doubling the size of the Combined Authority economy.'* The report concludes that *'improvements in infrastructure, and further development, must start in and around Cambridge'*.

2.4 The importance of transport is identified in the report where Recommendation 7 identifies that such measures 'should include the use of better digital technology to enable more efficient use of current transport resources.'

2.5 The CPIER report highlights the issues associated with employment growth being dislocated from housing and housing growth. It reports that unless transport infrastructure and housing is provided, the success of Cambridge may be constrained.

2.6 A new Local Plan is being developed jointly between Cambridge City Council and South Cambridgeshire District Council. The emerging Local Plan identifies 'Big Themes' on which it is to be based including climate change (with a commitment to net zero); biodiversity & greenspace; wellbeing & inequality; and 'great places'.

2.7 The proposals for Cambridge South offer the ability to be successful against these Local Plan themes through the creation of a sustainable mix of uses and effective Masterplanning to optimise the advantages of its highly accessible location.

2.8 The key to this is enabling sustainable local living through the creation of a new 20-minute neighbourhood incorporating new homes, employment and leisure facilities.

2.9 Providing a full range of facilities for a living and working community will dramatically enhance the operation of the Campus and reduce the need to travel. This would internalise trips and make active travel by foot, cycle or other Micromobility solutions the obvious choice.

2.10 Alongside Cambridgeshire County Council, the Greater Cambridge Partnership (GCP) has established a City Access project which aims to enhance public transport and cycling and walking routes to cut congestion and improve air quality. To achieve this, it is stated that there is a need to reduce the number of cars on the road and create space for more sustainable transport that offers a real alternative to the car.

2.11 GCP recognise that '*employment will bring new jobs and opportunities for future generations – but growing congestion threatens Cambridge's future'*[1].

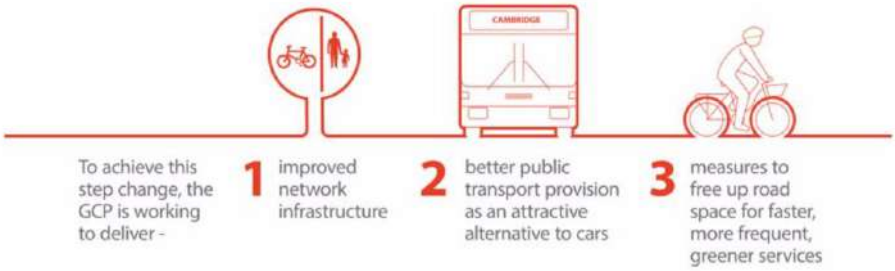
Figure 2.1 – Challenge for City Access Project

2.12 The key challenges highlighted are:

- *'How to reduce congestion to run faster, more frequent and reliable services: traffic needs to reduce by up to 15% on 2011 levels (that's up to 24% on today's levels).*
- *How to pay for improved public transport, cycling and walking networks over the longer term, which requires investment of around £20m per year.*
- *How to improve air quality as we expand the public transport network. In Greater Cambridge, 106 deaths per year are attributed to poor air quality'*. (GCP website)

[1] GCP Choices for Better Journeys (2019)

2.13 It is therefore clear that the future approach to mobility to and within Cambridge requires a step change away from reliance on the use of the car and on infrastructure improvements to increase traffic capacity. The first challenge highlights a need to reduce car use to levels below those which occurred almost 10 years ago.



3 In a South Cambridge context

3.1 Cambridge is the centre of significant investment, research and demonstration in innovative mobility solutions, Southern Cambridge is a particular focus with a range of committed strategic measures at varying stages of progress.

3.2 Cambridge South offers a unique opportunity for development. The aspirations of CBC, the local growth in active travel and mass transit systems, the motorway, the particularly advanced and advancing attitudes to mobility in this local community and the location, make this one of the best places for urban growth.

3.3 The provision of new homes and jobs at Cambridge South, alongside the creation of a truly sustainable place that provides day to day facilities locally and promotes active, healthy and clean travel opportunities can contribute positively towards Cambridge's net zero carbon aspirations.

3.4 There are mobility opportunities already present within the locality of CBC and Cambridge South which can support the proposals for expansion of CBC. In addition, several schemes are already coming forward with improvements to the local area from a mobility perspective.

Cambridge South East Transport (CSET)

3.5 The Cambridge South East Transport (CSET) project is a priority for the GCP, creating a vital link to ease congestion, offer sustainable travel choices, connect communities and support growth. In the longer term, it would form part of the Cambridgeshire Autonomous Metro, providing high-quality, frequent and reliable public transport across the city region.

3.6 The CSET project itself aims to provide better public transport, walking and cycling options for those who travel in the A1307 and A1301 corridors, improving journey times and linking communities and employment sites in the area south east of Cambridge.

3.7 The CSET project is split into two phases, of which Phase 2 is of more relevance to the site by providing Busway facilities that run through the East development zone of Cambridge South, combined with remote park and ride facilities enabling sustainable travel movements.

3.8 Phase 2 of the scheme involves a new public transport route from the A11 via Sawston and Shelford to CBC. Alongside this new public transport route will be a new active travel corridor for walkers, cyclists and horse riders, similar to the one along the existing guided busways.

3.9 The proposals also include a new travel hub near the A11/A1307 junction. This travel hub would be in addition to the existing Babraham Road Park & Ride.

3.10 A map showing the preferred route for the new public transport scheme between CBC and a new travel hub near the A11 is shown in Figure 3.1. The route runs via Great Shelford, Stapleford and Sawston before reaching the travel hub between Babraham and the A11.

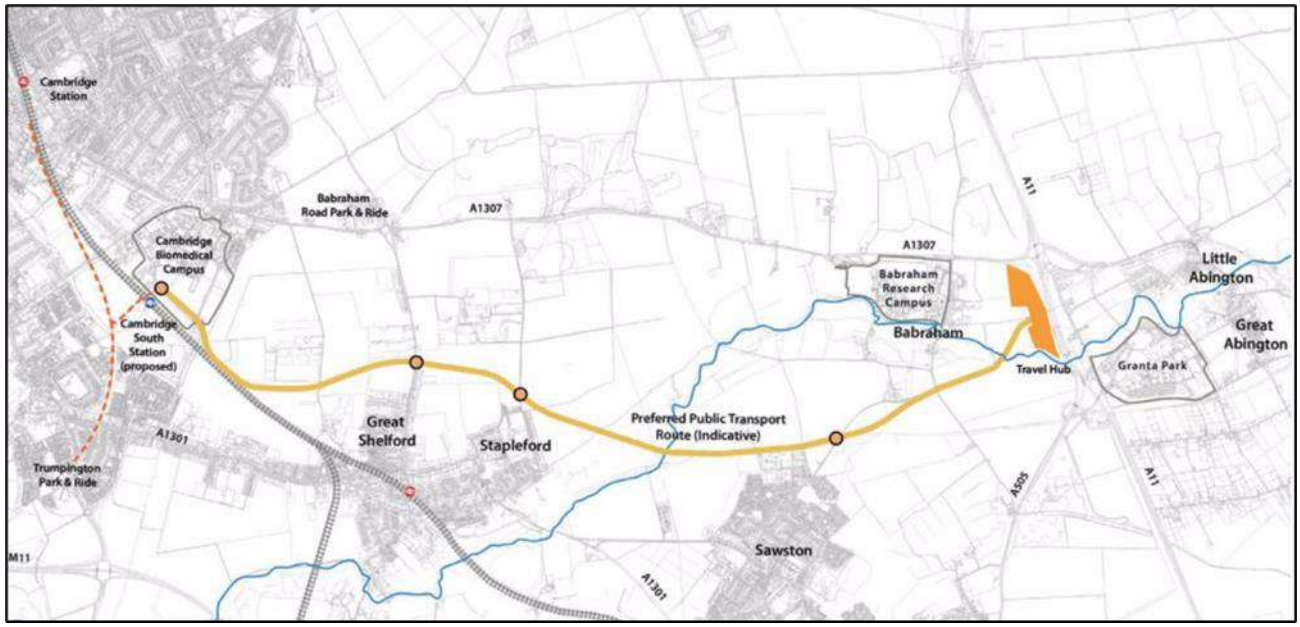


Figure 3.1 – CSET Preferred Route (Phase 2)
(Source: https://www.greatercambridge.org.uk/transport/transport-projects/cambridgesoutheast)
(Source: https://www.greatercambridge.org.uk/transport/transport-projects/cambridgesoutheast)

3.11 The route, with connections to Babraham, the Babraham Research Campus and Granta Park, would be a dedicated route restricted from general traffic, only interacting with other traffic at junctions. Junctions between existing roads and the new public transport route would be controlled by traffic lights.

3.12 At CBC, the route would run on prioritised public transport lanes on Francis Crick Avenue, connecting to the existing Busway and enabling services to continue to the station and Cambridge city centre via the Busway.

3.13 The Strategic Business Case for CSET states that 'Due to the relatively scarce supply of such a workforce, the catchment area can extend a considerable distance from the campus. Consequently, reliable and efficient transport provision is required so that both the workforce and visitors to the campus are able to access it by sustainable means and support it in achieving its full economic potential'.

3.14 In addition to connecting the Travel Hub site with the Cambridge Biomedical Campus and Cambridge City Centre, the CSET Phase 2 scheme has been designed to provide an enhanced public transport service to wider locations e.g. Haverhill and Linton, whilst providing improved public transport connectivity for intermediate locations on the CSET public transport route, with dedicated stops at Sawston, Stapleford and Great Shelford.

3.15 The forecasts states that around 450 peak hour trips may be attracted to CSET. Whilst the proportion of those trips that may be associated with CBC is not defined, some use by CBC staff and visitors will be apparent.

Cambridge South Railway Station

3.16 Cambridge South railway station is a planned railway station located in Cambridge adjacent to Addenbrooke's Hospital and CBC. The station will be on the Cambridge line and West Anglia Main Line. It is planned to open in 2025.

3.17 Funding for Cambridge South station was announced in the budget of 11 March 2020. On 22 June 2020, Network Rail revealed that its preferred location for the station was at a site adjacent to CBC and the Cambridgeshire Guided Busway crossing.

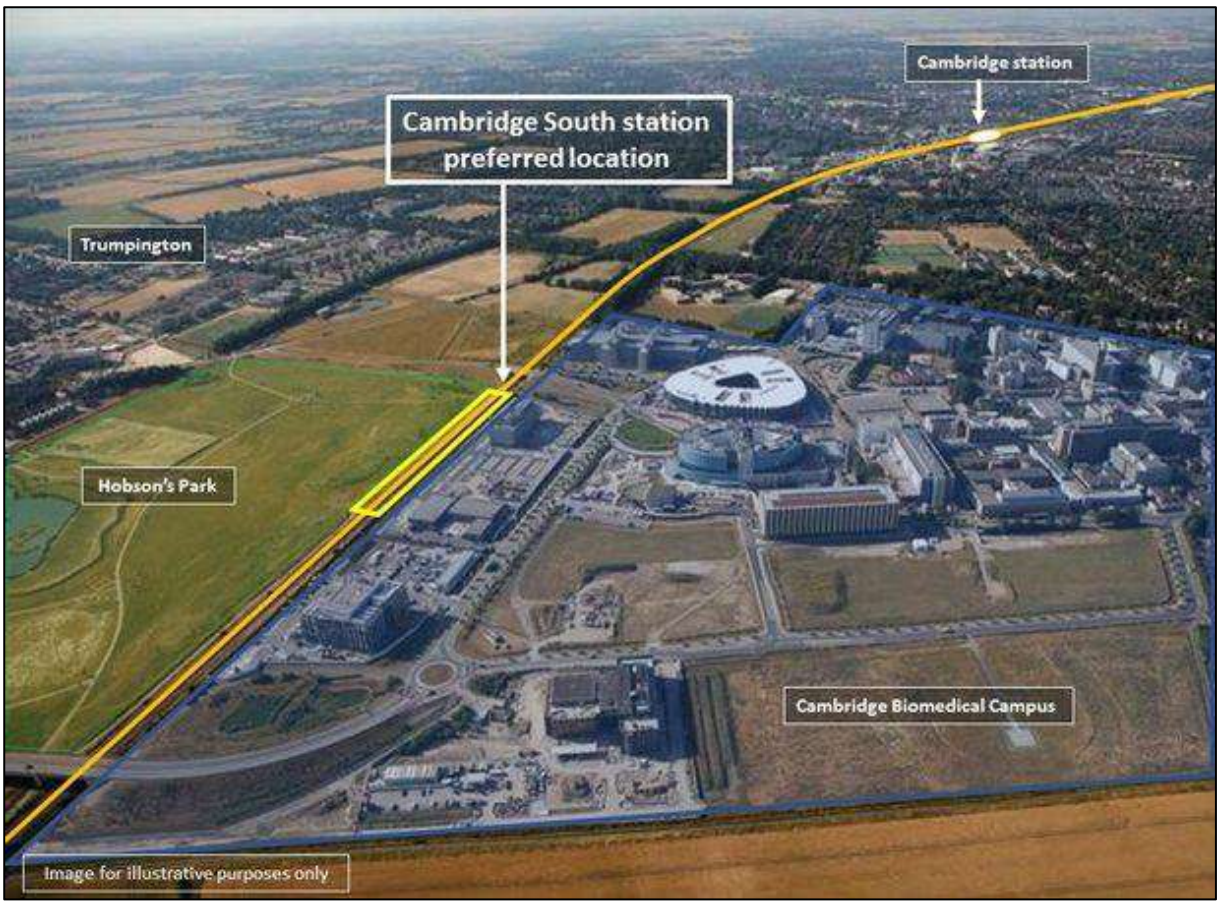


Figure 3.2 – South Cambridge railway station (Source: https://www.cambridge-news.co.uk/news/cambridge-news/location-new-cambridge-south-railway-18468492)

3.18 The Cambridge Biomedical Campus Transport Needs Review report confirms that the new station offers considerable potential to achieve a mode shift for workers at the Campus.

3.19 The ability for Cambridge South to provide links to Cambridge South Station are identified in this report with active and shared travel route connecting the west side of the station with Addenbrooke's Road and the wider site beyond.

Cambridge South West Travel Hub

3.20 The Cambridge South West Travel Hub Project is a component of the West of Cambridge transport package, which includes development options for new park and ride facilities that form an extension of the Trumpington Busway, Electric Vehicle charging points and cycle parking form part of the proposals to create a new Travel Hub for journeys approaching Cambridge from the South-West. The creation of new Travel Hub locations, and the enhancement or upgrade of existing facilities. It will be located at Junction 11 of the M11.

3.21 Junction 11 of the M11 is a key entry point into Cambridge. With significant growth in housing and employment in the area, upgrading the transport infrastructure in this area and enabling transitions to sustainable modes of travel is vital to reduce congestion and improve access into the city.

3.22 The economic case for the Hub is primarily dependent on the growth at CBC with CBC/Addenbrooke's passengers representing over 70% of the total passengers on the CSWTH services, removing these trips that would otherwise have been made on the road network.

3.23 **Figure 3.3** demonstrates the layout of the Cambridge South West Travel Hub, located directly to the southwest of the proposed West development zone. Park and ride facilities are proposed which will be connected to the city as an extension of the Trumpington Busway. Where 48% of vehicle trips approaching CBC are from the south-west, there is significant potential for the Travel Hub to improve access to CBC and Cambridge South. The Travel Hub will facilitate movement to CBC and is also immediately accessible to Cambridge South and through to wider CBC destinations, providing opportunity for last mile shared and active travel.

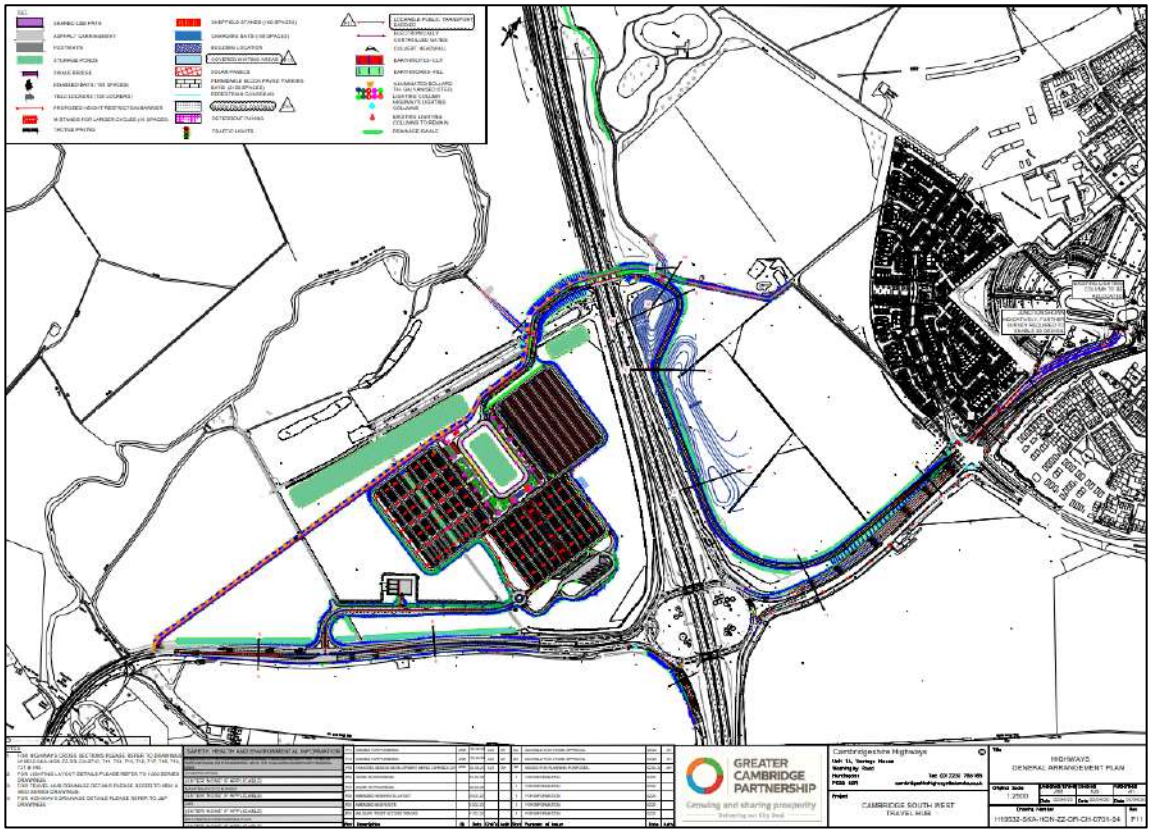


Figure 3.3 – Cambridge South West Travel Hub

3.24 The South West Travel Hub has been estimated to be 70% utilised by CBC staff (SW Travel Hub Business Case). This would mean it would reduce CBC existing and committed peak demand by about 700 vehicles penetrating along Addenbrookes Road and into the Campus.

East-West Rail

3.25 East-West Rail is a major railway project that aims to deliver connections for communities between Oxford and Cambridge through upgrading and providing new railway infrastructure. The Bedford to Cambridge section will follow a completely new route. The preferred route option for East West Rail between Bedford and Cambridge was announced in January 2020 by the Secretary of State for Transport.

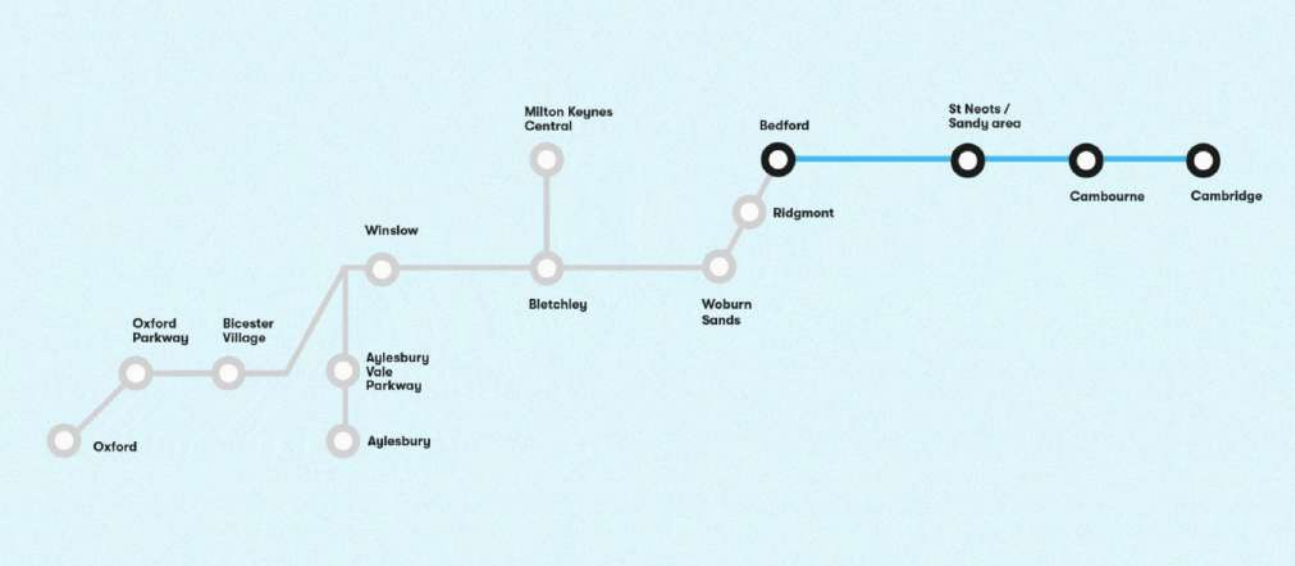


Figure 3.4 – East-West Rail Stations and connections

3.26 East-West Rail will link existing stations in Bedford and Cambridge with communities in Cambourne and the area north of Sandy and south of St Neots. The promoters suggest that this will provide fast and affordable connections between existing stations and communities in wider locations.

3.27 Whilst the Cambridge South station proposal is a separate project being led by Network Rail, it is expected that some East West Rail services will stop at Cambridge South station.

3.28 Accordingly, future employees at CBC and visitors will be provided with an additional sustainable form of travel, connecting to a wider catchment area.

3.29 The preferred route option has been identified which will run to the south of Cambridge providing direct connections into Cambridge South Station.

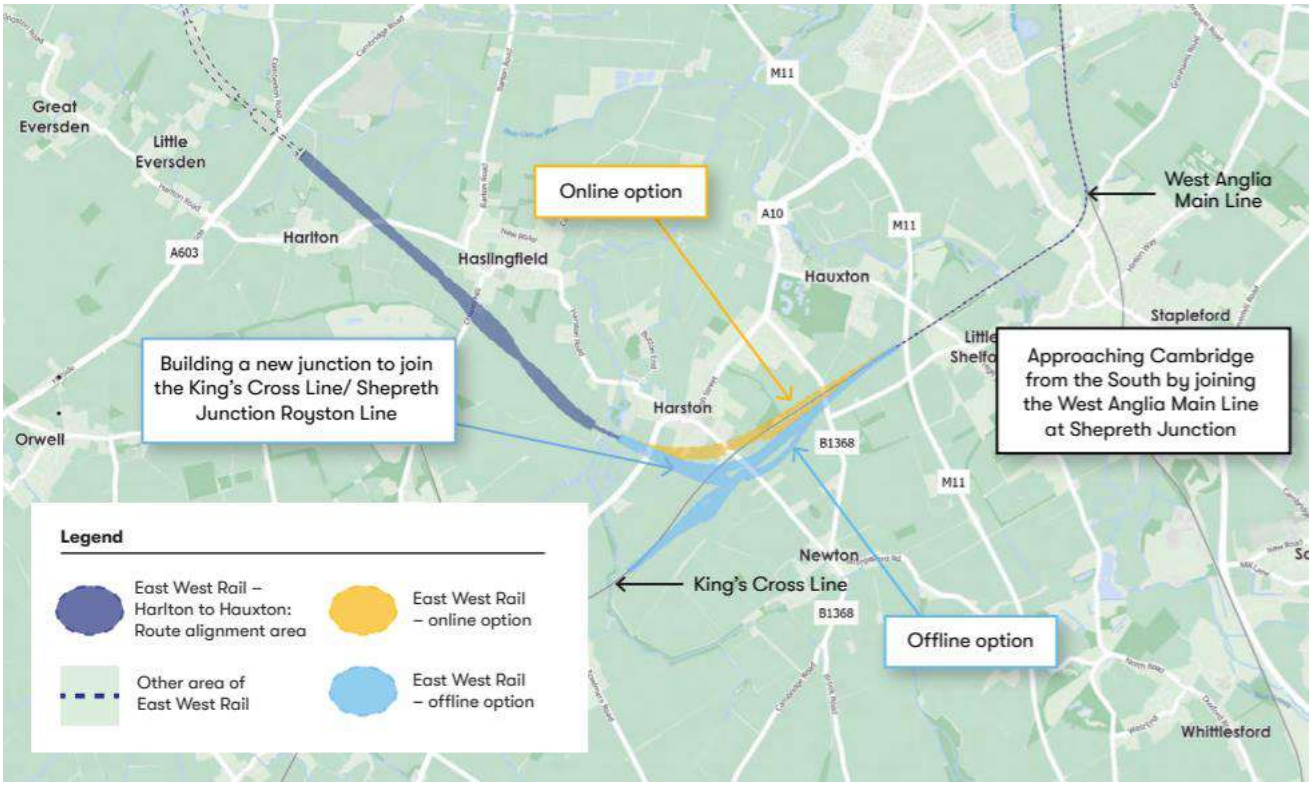


Figure 3.5 – Proposed East-West Route and connection to King's Cross Line

3.30 The proposed route on the approach to Cambridge is subject to consultation which will run through to June 2021. The proposed route would connect with the King's Cross Line south of Harston approaching from the west between Harlton and Haslingfield.

3.31 East-West Rail will connect Oxford, Milton Keynes and Bedford to Cambridge via Sandy/St Neots and Cambourne where new stations will be provided. Once in place, East-West Rail will provide connections to South Cambridge from communities such as Cambourne and Bedford which are direct and convenient.

Cambridgeshire Autonomous Metro

3.32 The Cambridgeshire Autonomous Metro is a Cambridgeshire and Peterborough Combined Authority initiative that would essentially see the extension of, and upgrade of Cambridge Busway connected through a series of tunnels through the centre of Cambridge. Advanced autonomous vehicles would provide flexible services using sustainable electric power sources.

3.33 The emerging CAM network is presented below:

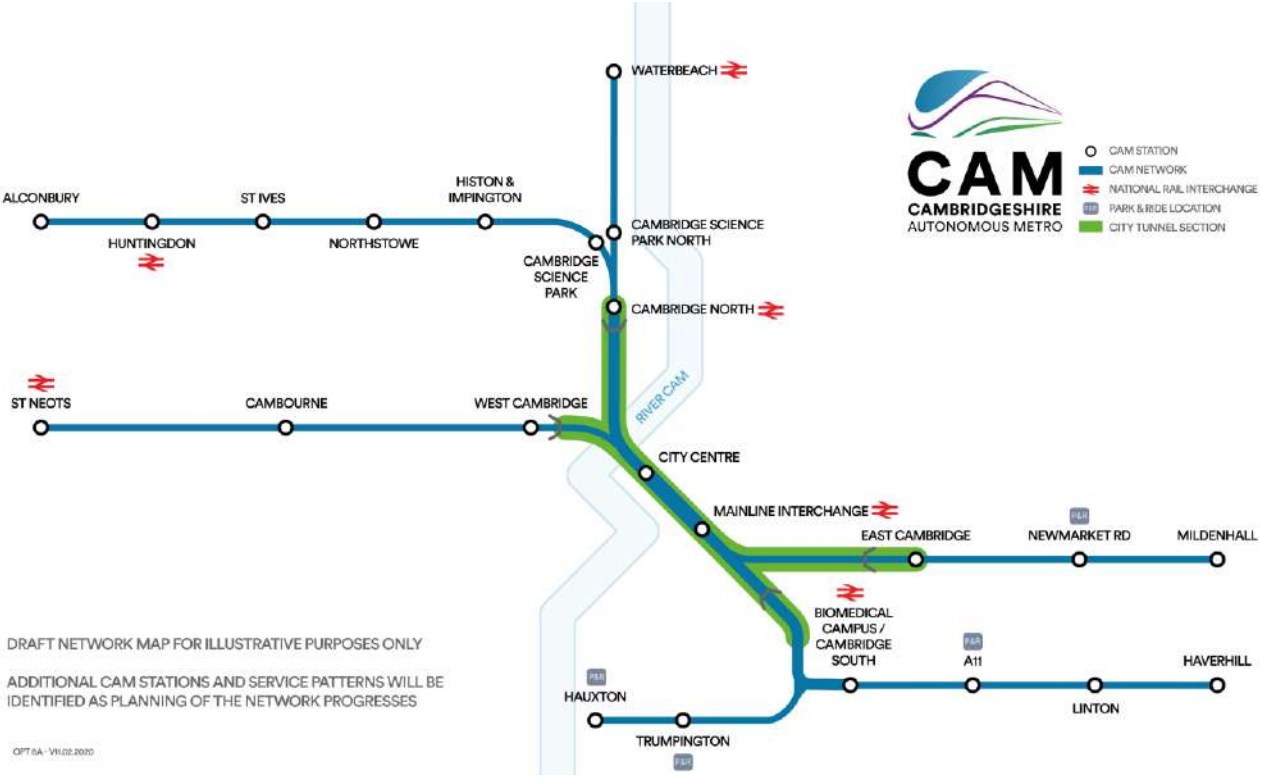


Figure 3.6 – Emerging CAM network

3.34 The location of CBC as a major destination for future CAM services is clear. It is directly connected to the Haverhill line and has easy connects to the Trumpington line and through to the city centre and beyond.

3.35 The greater frequency of the CAM services, combined with direct seamless connection to the wider routes to the north west and east will ensure that travel to CBC and Cambridge South is possible from multiple directions.

3.36 The Business Case for CAM is still being developed. Whilst the CAM cannot be considered committed or certain at this stage, its delivery would further improve mobility across and through Cambridge and enhance connections to CBC and Cambridge South, particularly from those locations to the north (Waterbeach) and west Northstowe and St Ives) where direct transport links are currently not available.

4 In a CBC context

4.1 Cambridge's economy has grown rapidly, fuelled by the development of our knowledge-intensive specialisms. Life Sciences is pre-eminent among these, and over 30,000 people work in Life Sciences across the public and private sectors.

4.2 CBC is at the heart of Cambridge Life Sciences and is the only place in Cambridge—or indeed the UK or Europe—that delivers both clinical/research on-site collaboration opportunities and true bench-to-bedside potential. It is home to a number of organisations including: Cambridge University Hospitals NHS Foundation Trust, Royal Papworth Hospital, NHS Foundation Trust, Astra Zeneca's headquarters, Abcam, Cancer Research UK, the university's medical school, and the UK government's Medical Research Council.

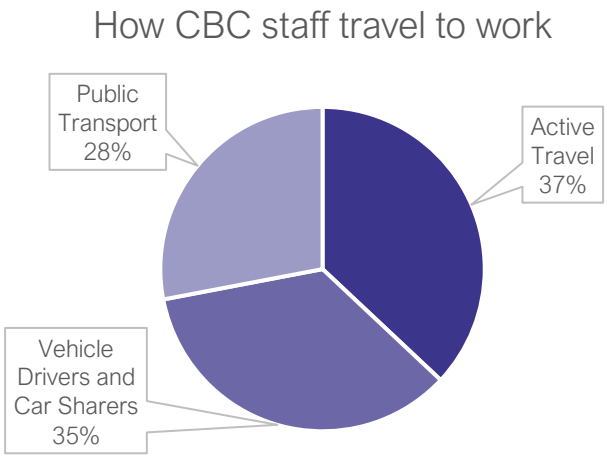
4.3 CBC is a major destination and generator of travel demand, with around 20,000 staff currently working on-site and 14,500 visitors to the site each day.

Existing Mode Shares

4.4 A Transport Needs Review for CBC was published by Atkins in October 2018. This demonstrated that patient mode share is heavily biased towards single or multiple occupancy car (86% in total).

4.5 Staff mode share was shown to be relatively evenly split between cycle, single occupancy car and bus trips, with walking trips making up a lower percentage.

4.6 Cycling was shown to account for 33% of staff travel, with bus use constituting 28% of travel. This also includes Park and Ride use. The implication is that that there is a willingness to use public transport where it is available 35% of staff currently use the car, which is likely to mostly represent those travelling from outside of Cambridge or those who have shift patterns that run into the night.



4.7 In terms of visitor mode share, this was derived within the report from CBC Interview Surveys conducted in October 2017. In this survey, visitors included those that accompany patients, those that accompany staff and those that are visiting the shops within the site. Car had the highest mode share with 49%, with bus at 15%, cycling at 13% and walking at 11%. Train and Park and Ride made up the remaining numbers.

4.8 CBC has a range of transport links that cater for all modes, although demand for some modes is exceeding supply, particularly existing cycle and car parking levels and some directions are less well served.

4.9 Census and RSI data found that CBC staff are predominantly located within the south of Cambridge, Haverhill, surrounding south eastern Cambridgeshire villages, Cambourne, Royston and Fulbourn. Travel to work data shows that the south is the main corridor by which commuters' access CBC, with 88% of commuters travelling from the south east or south west (via Babraham Road and Hauxton Road and Addenbrooke's Road).

4.10 RSI data showed that patients tend to originate from a significantly wider area, in locations such as Ely and Saffron Walden, but local access is consolidated and dominated by people travelling via the southern access routes. The main purposes for travel to CBC were work (42%), other business (including medical appointments) (39%), or personal business (10%).

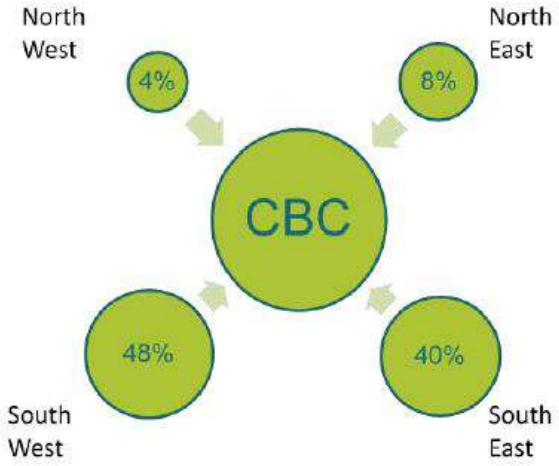


Figure 4.1 – Direction of travel for staff arriving at CBC by car

4.11 The provision of new parking facilities within Cambridge South and connections to Travel Hubs can intercept many of these vehicle movements, reducing congestion around CBC and freeing space by reducing the need for car parking.

4.12 Alongside CBC specific bus services and parking that is directly associated with CBC, the facilities would provide an alternative to the publicly accessible park and ride and travel hub facilities alongside additional capacity. Over time, however, as travel connections improve further the intention will be to further reduce car parking levels and encourage increasing mobility by other modes.

4.13 Walking levels are reasonably low accessing the site, with a mode share of 3% for staff and 1% for patients. On-site observations found that, although not all junctions have pedestrian priority, most do and footways are often of an adequate width and level. The constraint, therefore, is the absence of homes and of facilities related to the Campus within walking distance.

4.14 Cycling catchments show that most of Cambridge is within an 8.5km (circa 35 minute cycle) catchment of CBC, with 33% of staff cycling to work and a lower mode share of 4% for patients. The local cycling network provides reasonable links to wider infrastructure. While overall accident numbers are low, accident data showed that 52% of local accidents involve at least one cyclist, which may be due to large numbers travelling along Hills Road, Trumpington Road and Long Road during peak times.

4.15 With a high mode share of 28% staff and 9% patients, there is a propensity to travel by public transport to the Campus, which could be increased further if service improvements and increased reliability were brought forward. The bus services around CBC cover the site with nine stops within a 1,000m (approximately 10 minute) walking catchment from the CBC centre, including the Addenbrooke's hospital bus station and the busway.

4.16 Bus services that visit CBC are generally cater well for the main concentrations of staff home locations. However, services to the east, north east and west of Cambridge currently provide limited access. The locations of the bus stops within CBC mean that staff and patients may have to traverse the site to get to their destination as the bus service do not always stop centrally or conveniently.

Cycle parking and car parking

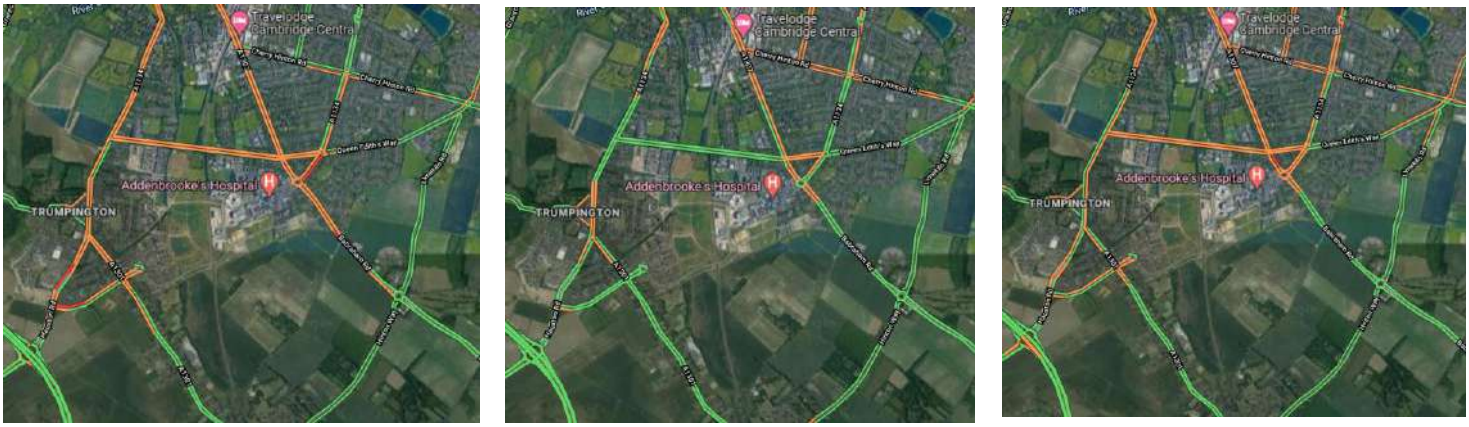
4.17 CBC also assesses the current performance of cycle parking on-site. Out of 19 sites, 11 sites had more cycles parked than spaces provided. In total, there were 3,151 cycles parked in 2,973 spaces. This deficit is due to the unofficial parking on-site and it was observed that cycles were parked on barriers, rails and trees, therefore demonstrating that parking is over-capacity. With CBC set to grow with additional consented floorspace, this problem needs to be addressed.

4.18 Both car and cycling parking facilities do not meet demand. CUH estimates that an additional 1,106 individuals park their cars on-street outside of CBC and walk. The current level of car parking supply within CBC is 4,950 spaces. Data received from CBC showed that 15 of the 38 car parks are operating over capacity, with the entire site having an occupancy level of 87.5%.

4.19 With new developments, the demand for car parking will increase (unless alternative modes are provided) and committed developments include proposals for additional car parking. Cambridge South can provide alternative car parking for CBC, connected to the wider site through shared and active travel corridors which will relieve car parking pressure and congestion around the Campus.

4.20 The provision of new homes and support facilities close to the Campus will reduce the need to travel significant distances, particularly by car. Enhanced public transport services and the implementation of a site wide mobility strategy will assist a shift away from the use of the car, enabling car parking numbers to be reduced over time, although the particular need for hospital parking will continue.

Local traffic conditions



8am Weekday with some congestion *12pm Weekday* *5pm Weekday with some congestion around CBC*

Figure 4.2 – Traffic and congestion close to CBC

4.21 The local highway network is currently operating in free flow conditions for most of the day and night, but close to capacity during an hour in the morning and an hour in the evening which coincides with the traditional pre Covid general commuter times. This is indicated in Figure 4.2, which is derived from Google observed effect data.

4.22 A major benefit of developing homes at CBC, and prioritising them for CBC staff, is much greater 'internalisation' of travel to work movement than exists at present, with substantial comparative reductions in carbon emissions from surface transport. The range of education, leisure and community facilities complements this by ensuring that new residents adopt the principles of a 20-minute settlement, and in the main stay local for day-to-day activities, with consequent benefits to carbon reduction, as well as to mental and physical health.

4.23 Combined with measures such as consolidated car parking on the West and East sites, Cambridge South will contribute positively to reducing movements and congestion in the area.

Looking forward

4.24 CBC's occupiers have considered what role CBC should play in the coming decades to support Cambridge, the UK and Life Sciences globally; the outcome of that review is Vision 2050.

4.25 CBC's Vision 2050 recognises that the significant pressures of previous development in Cambridge have created transport and housing issues that must be addressed head on. CBC's further Life Sciences development must offer healthy, diverse, and sustainable living conditions to attract and retain talent.

4.26 The proposal for Cambridge South is prepared by the four landowners adjacent to CBC – St John's College, Jesus College, the private family trust and Cambridge County Council. It responds to the need to translate the Vision 2050 into practical development.

5 Masterplan and mobility

5.1 The proposals for Cambridge South are not fixed but the principles are clear. The emerging Masterplan provides for the components that respond to the CBC Vision for 2050 and which bring a particularly helpful diversity of uses.

5.2 This is the best place for growth because of the unique way that it can bring together the elements that make up a carbon reducing, healthy living, globally significant community. These are summarised in Chapter 1.

5.3 The mobility masterplan elements that complement and make the most of these include:

- A primary movement network within the community that is the active travel network. Movement around the sites will be predominantly by active travel or micro mobility
- A large proportion of homes provided directly for the benefit of staff at CBC, enabling them to work and live locally. These are nurses, doctors, R&D staff, creating a vibrant, knowledge-based community, adding to the global attraction and strength of CBC.
- New private parking will be minimal or zero.
- Excellent connections to the primary cycle network to and within Cambridge. This includes the Busway, the Genome Route on National Cycle Route 11, Hills Road, the Melbourn Greenway, routes along Addenbrooke's Road through Great Shelford, and the future CSET. The site itself provides the opportunity for greater permeability across South Cambridge .
- Excellent connections to local public transport such as existing park and ride and busway connections provided at the Trumpington and Babraham facilities, and those proposed through the proposals for the South West Travel Hub and CSET initiative.
- National public transport connections will be delivered through Cambridge South Railway Station connecting destinations on the West Anglian Main Line, services to London via Thameslink and Kings Lynn, Norwich and Ipswich.
- The design and facilitation of modern shared travel including demand responsive bus services, shuttle connections between travel hubs which may incorporate automated pods.
- The intercept of car travel from the strategic road network. Most of the staff movement to the existing CBC from the Cambridge direction is already by sustainable travel. Of the car borne movement, most arrives from the M11 junction 11 or from the A1307 and the A11. There is the most unusual opportunity to intercept these car trips through up to six Travel Hubs. Two of these exist now (there are plans to expand the site at Babraham), another two are planned by GCP, and a further two smart and CBC specific hubs are proposed as part of this scheme, to both intercept cars, and replace parking that can be removed from the existing CBC, and from the already committed expansion of CBC.
- The intercept of goods from the strategic road network for onward delivery via by more efficient 'last mile' techniques

5.4 The Masterplan (Figure 5.1) takes advantage of the two key attributes: size and location.

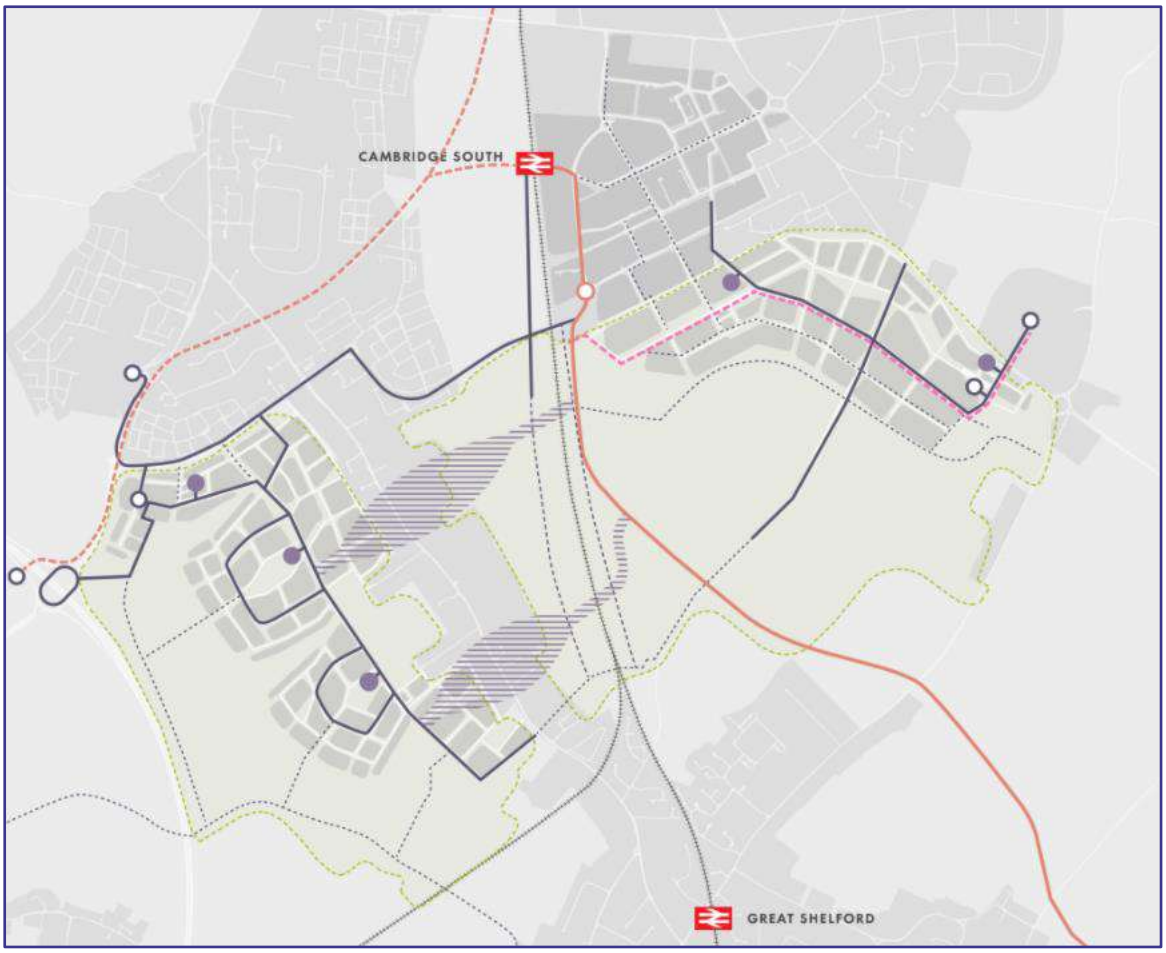


Figure 5.1 – Cambridge South Masterplan

5.5 This provides:

- Employment floorspace comprising 405,057sqm GEA of clinical, research, commercial R&D, education, supporting office and logistics spaces
- Provision of 5,000 homes
- Hotel and conference facilities
- Retail and leisure uses
- Pre-school, Primary school and Secondary schools to meet the requirements of new residents
- Healthcare, sports, leisure and recreation and community facilities

5.6 There is a need for, and benefit from, both East and West development zones working as one. Together they provide:

- Sufficient scale to deliver the 5,000 homes to provide for the existing and proposed interlinked healthcare, research and commercial entities. The intention is that many homes would be occupied by those who work at the Campus, thereby transforming the nature and quality of their journey to work;
- Connectivity across and between all major modes of transport and facilities, embracing and connecting with CSET, The Western Travel Hubs, the Eastern Travel Hubs, the Busway;
- Direct segregated active travel corridors within the development but also reaching out to connect with the southern villages and Trumpington; and
- The intercept of goods deliveries direct from the M11 by a micro consolidation centre on the West development zone.

Mobility Hubs and Community Concierge

Figure 5.3 – Concept Primary Mobility Hub

5.7 Car free, or low car, neighbourhoods, where the primary network is the active travel network lend themselves to a network of Mobility Hubs either Primary, Secondary or Tertiary. The masterplan proposes a network of linked hubs.

5.8 Primary Mobility Hubs will be located in local centres and close to shared travel nodes. They will include members of the Community Concierge team (as part of the estates management team).

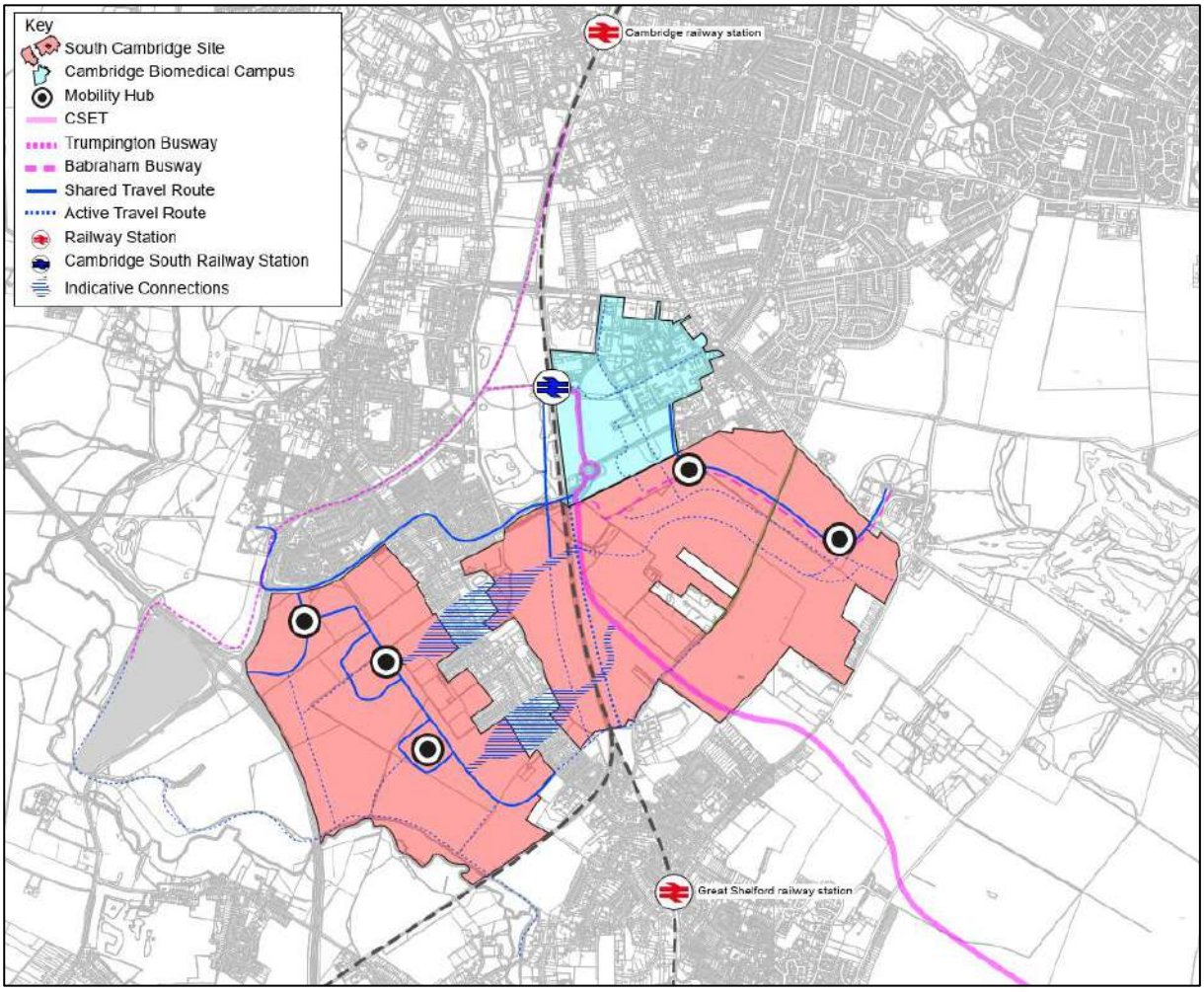


Figure 5.4 – Location of Primary mobility hubs at Cambridge South

5.9 The Hubs and the Community Concierge team will provide;

- Hire bikes, cargo bikes (trials planned by GCP), e-bikes, scooters, which are currently being trialled in the area by the Combined Authority and other forms of micro mobility;
- Pick up and drop off for parcels, encouraging online 'travel' and delivery, whilst providing a focus for community interaction amongst those dropping in to pick up their parcels;
- Administering the 'last mile of travel' techniques for those that want their parcel delivered to their door, including by cargo bike and ground drone such as those already in place in Milton Keynes and Northampton;
- Providing space and tools for 'fix your own bike';
- Serving coffee and cakes;
- Administering care share and car pooling schemes;
- Administering school and other travel planning;

— Administering the Third Places Workhubs that allow people to work remotely from home and place of work; and

— Other community functions.

5.10 Mobility Hub are being planned for a range of emerging development proposals that Vectos are actively working on. Examples include the Garden Town at Gilston Garden Town in Hertfordshire and Dunton Hills Garden Village in Essex. In addition, Cambridge Science Park has implemented an initial Mobility Hub which incorporates cycle maintenance facilities near to their Bradfield Centre Co-working facility. Over time the offer will be expanded to form part of the wider offer within the park.

5.11 As part of the Transforming Cities Fund (TCF) grant Plymouth city Council are planning to install up to 50 multi-modal mobility hubs. These will consist of 300 electric vehicle charging points, 400 e-bikes, car club, 0.5 megawatts of solar carports and a smart booking system. Local residents, employees, businesses and visitors will be able to plan their journeys to use public and shared transportation.

5.12 A Community Concierge service has been established by Vectos at Milton Park in Oxfordshire, one of Europe's largest multi-use business parks with circa 250 companies. In 2016, a Behaviour Change Advisor was appointed to work with the companies and individuals to implement a range of behaviour change initiatives, with the objective of reducing Single Occupancy Vehicles by 2%. By 2018, the SOV rate had reduced from 69% to 63%, while the mode shares for bus, car sharing and cycling had all increased.

5.13 Secondary and Tertiary Hubs are planned. These would be unstaffed, with varying facilities and at more frequent intervals.

Figure 5.5– Concept Secondary Mobility Hub

Car Parking and Car Sharing

5.14 With the unique characteristics of the site there is very little need for private car ownership, and much reduced need from the norm for private car accessibility, particularly to individual units within the expansion area.

5.15 The existing CBC does have a substantial proportion of car parking, some 4,950 spaces, and not enough cycle parking, only 2,973 spaces. Furthermore, the committed development at CBC comes with a further and substantial proportion of car parking, some 1,400 spaces.

5.16 The committed development pre-date the emerging proposals for CSET, Cambridge South Station and the SW Travel Hub. Alongside the measures proposed for Cambridge South there is opportunity to review the proposals for the committed schemes where parking may not need to be implemented.

5.17 The expansion scheme represents an opportunity to rationalise what happens at the existing CBC and what is provided with the committed developments. It will be necessary to maintain sufficient private vehicle parking for high priority uses, such as for instance patients drop off and pick up, restricting easy parking for staff, and reallocating parking from within the campus to peripheral parking barns, with provision for onwards travel by foot, cycle, shared or personalised transport. In time, as mobility habits mature, the provision of parking in the barns can be further reduced.

5.18 The approach brings mobility and carbon benefits, but it also frees up the masterplan to enable car free streets and to ensure that central space is not unnecessarily given over to extensive parking. There will be no large surface car parks.

5.19 Initial parking standards could be as low as an average 0.1 - 0.2 spaces per dwelling, with the majority of spaces pooled and provided peripherally. The detail is still to be considered, but these are likely to be decked car parks, close to Primary Mobility Hubs, managed by the Community Concierge team.

5.20 Car ownership does not necessarily equate to car usage. A balance across Cambridge South will be achieved. The blended average across the site will result in significant areas for numbers of car free development. New approaches to mobility are creating the confidence that households do not need to own a car.

5.21 Both Zip car and Enterprise are already present in Cambridge providing car club services. Studies have demonstrated that each shared car replaces between eight and eleven private cars. Car clubs are becoming more prominent in towns and cities across the UK, and car club spaces can be located strategically at key destinations, major employment sites, mobility hubs, and town and city centres. The membership of car clubs is increasing, reflecting people's changing attitudes towards Mobility.

5.22 App-based carpooling is now taking off, and lifts can be booked on demand, reflecting modern lifestyles, removing the requirement to plan journeys well in advance to participate in an effective carpooling system. Vectos played a leading role in the SocialCar project, an EU funded research and innovation project, which aimed to establish carpooling as a more accessible transport mode. The project developed and demonstrated a new mobile phone application, in ten European cities, which allows users to find carpooling options in real-time and to connect with public transport services.

5.23 Liftshare is an online car sharing scheme. It was introduced to Johnson Matthey in Royston, a site with over 2,000 employees, where there was significant strain on parking infrastructure. Prior to the scheme there were a reported 980 single-occupancy vehicle trips. After the scheme, 106 employees were sharing their commute, removing 64 single-occupancy vehicle trips from the site. This reflects a reduction of 6.5%.

5.24 Faxi is a scheme currently in operation across the UK which aims to incentivise employees to share a ride with co-workers. Faxi is based around a map showing users journeys, regular destination and other community members. Icons represent other users, and the app allows users to click on the icons to see journey requirements and use the built-in messaging system to arrange a journey. The app calculates a fair contribution towards costs, and passengers simply pay drivers directly from the app.

Park and Ride and Travel Hubs

5.25 Figure 5.6 shows the four existing, committed and applied for travel hubs, available to all members of the public. Two of these are on the A10 close to Junction 11 of the M11, one is at Babraham Road, and the other is at the A11 at one end of the committed CSET, which itself runs through the site.

5.26 The proposal is to supplement these with two further Travel Hubs, one within the East development zone and the other within the West development zone. These can be for CBC specific use, linked to the Primary Mobility Hubs and managed by the Community Concierge team.

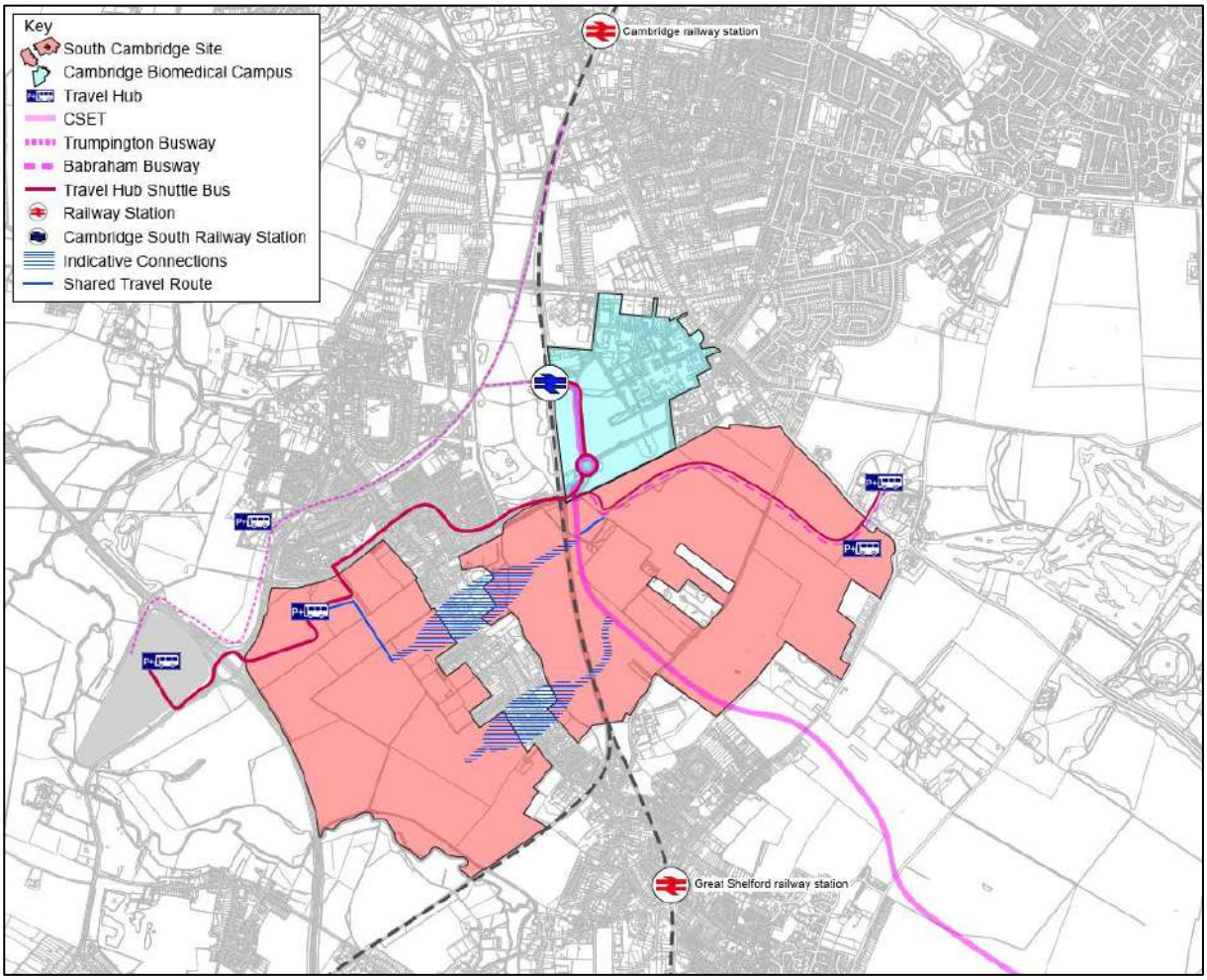


Figure 5.6 – On and off-site Travel Hub connections

5.27 The masterplan proposes a new busway from the Babraham Road Travel Hub through the site.

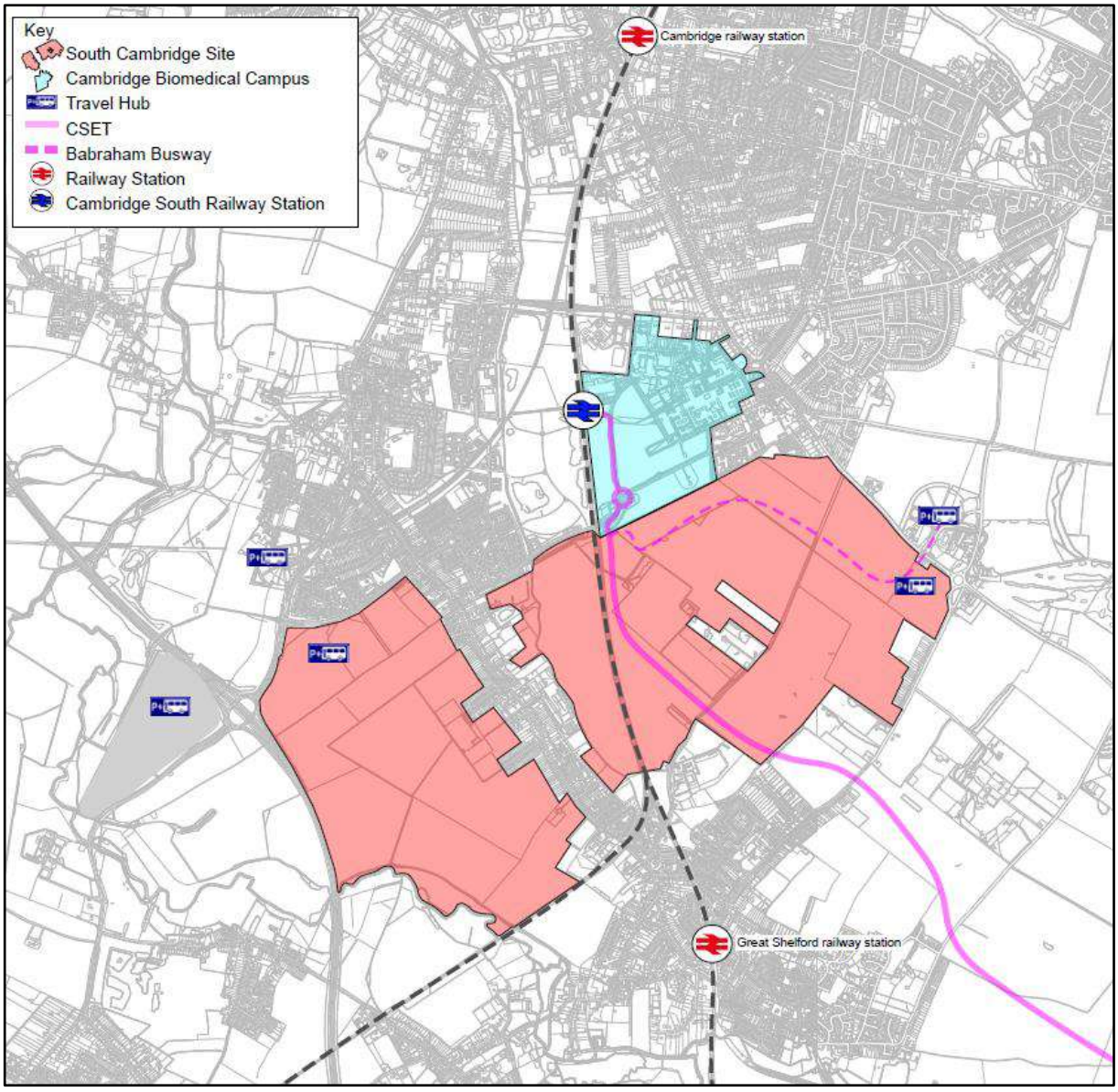


Figure 5.7 – Babraham Busway link

5.28 The provision of a seamless, traffic-free link from the Babraham Park and ride site with Cambridge South has the ability to maximise the attractiveness of the Travel Hub and reduce car trips into CBC and beyond. Ensuring that bus (or future CAM services) are protected from traffic is a key advantage that makes such services efficient and preferable to the use of the car.

5.29 Movements from the west can utilise the existing Travel Hub at Trumpington and the proposed South West Travel Hub. The busway provides a direct route through to CBC, local shuttle services, specific to CBC will provide connections between hubs, through the expansion land and CBC.

Micro Consolidation Centre

5.30 Micro consolidation centres work well when the area which they serve is largely managed by a single entity, as here. Micro consolidation centres are places where goods are delivered to, for onward delivery by more sustainable and less intrusive methods.

5.31 The masterplan includes such a centre close to the M11 junction 11 within the West development zone, and with direct access proposed from the motorway junction.

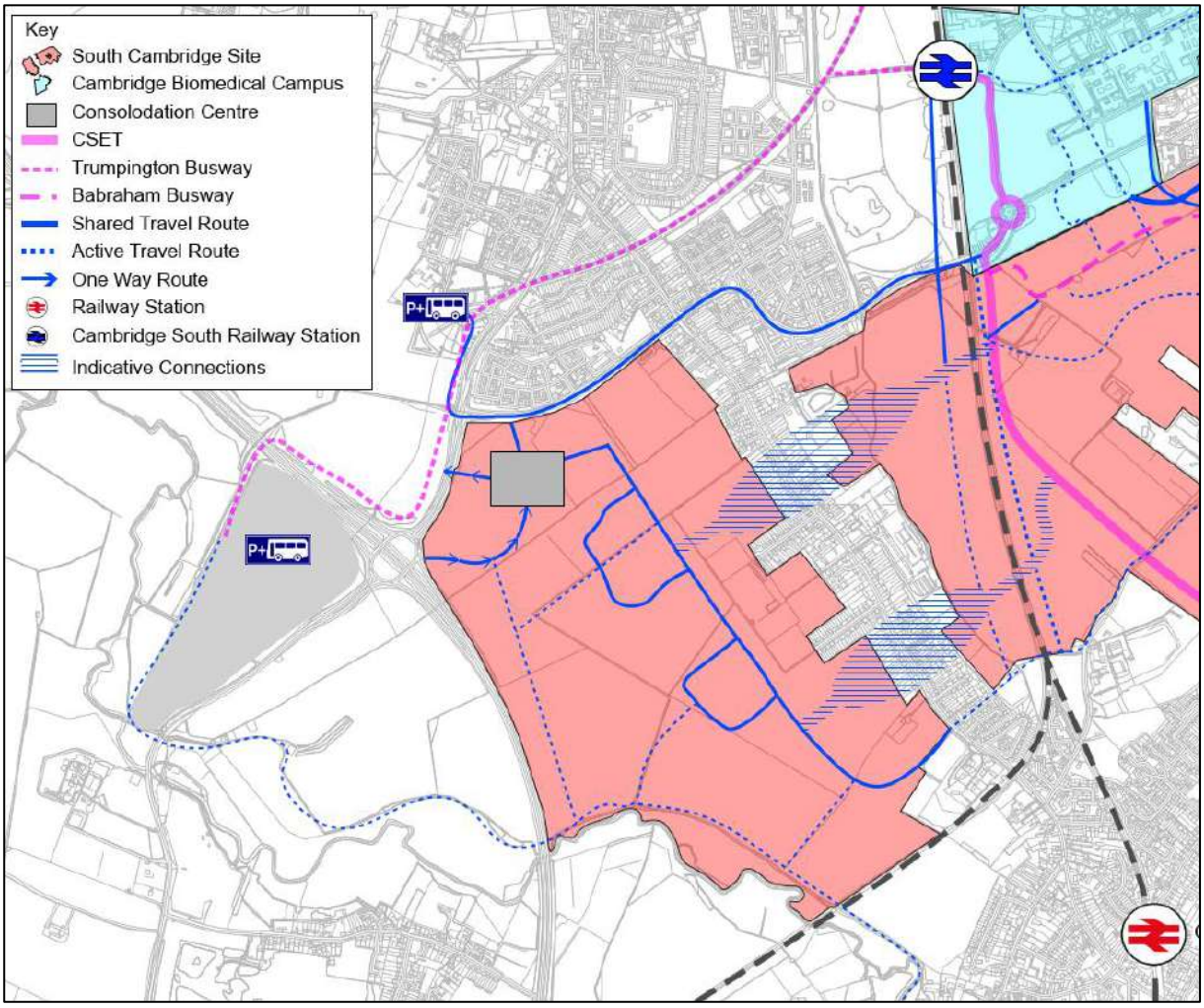


Figure 5.8– Location of Consolidation centre

5.32 The new homes will all be able to utilise the micro consolidation offer. New employment and commercial schemes that are implemented will also be able to utilise the facility. The potential will be investigated to extend the opportunity across CBC.

5.33 The key advantage would be the removal of vehicles required to pass through the Hauxton Road / Addenbrooke's Road junction and along Addenbrooke's Road through to CBC. The west development zone is the best place to intercept goods and private cars that are using the long distance strategic network (M11) and convert them into the efficient and urban scale movement networks.

5.34 By referencing the existing and forecast numbers of movements into CBC associated with heavy and light goods vehicles, there is opportunity to intercept around 50-100 goods vehicles through the micro consolidation centre.

5.35 To further reduce vehicle movements on Addenbrooke's Road, a simple junction arrangement to Hauxton Road is proposed, taking traffic directly into the western development zone. A two-stage arrangement will provide a high-capacity junction arrangement and one that would minimise vehicle movements on the local highway network.

5.36 The preliminary design of the junctions is provided in **Appendix A**.

Shared Travel

5.37 Shared travel includes buses and trains but is by no means restricted to these forms.

5.38 The proposal have the potential to build upon best practice described earlier in this section. A detailed mobility strategy ill be prepared but potential initiatives include:

- A semi-demand responsive network, such as Zeelo, to specific towns and villages at specific times to match staff clusters and travel and shift patterns;
- A shuttle network, connecting Travel Hubs and Mobility Hubs with CBC facilities, using the road network. These may be autonomous, such as Easymile EZ10, in due course;
- A 'personal pod' network for within CBC, that is capable of operating on the 'shared travel routes' with cyclists, or roads within the campus. These may be driven, or autonomous, such as UKAutodrive connected and autonomous pavement-based pods, in due course, and take passengers door to door;
- A substantial car sharing scheme, where the car is not owned by the individual and is available for hire; and
- Car pooling platforms, where the car is owned by the individual, and that individual shares rides with others, also benefitting from priority parking. This is particularly effective for permeating rural catchments.

5.39 Low occupancy buses are climate inefficient. Therefore, the idea with any shared travel network is to maximise occupancy, which in some cases means targeting demands, and being smart about the size and nature of the vehicles used.

5.40 Much of the Cambridge, and CBC, hinterland is rural in nature, with small towns and villages. Semi demand responsive services (buses or smaller vehicles) are capable of maximising occupancy by developing routes that pick up a string of towns and villages relative to the demand. These services are likely to be focussed on CBC staff and hospital visitors and at the times at which those staff want to, or need to, travel. They are pre booked on a smart phone or computer. Over time, the system learns the likely locations of demand and adjusts routes and sizes of vehicle accordingly.

5.41 Arriva Click is one example of a successful and growing demand responsive service in the UK. A current example of Arriva Click's success following Section 106 funding is at Lubbesthorpe near Leicester.

5.42 Arriva Click are serving a new residential / mixed use development in Leicester at New Lubbesthorpe. There are now some 300 houses built including a mix of social housing, flats and houses. In the six months that the Arriva Click service has operated, 5,000 journeys have been made to and from New Lubbesthorpe, including patronage from the adjacent communities.

5.43 In 2018 Innovate UK announced the award of £2.5 million to trial Connected Automated Vehicles (CAVs) at Milton Park, a large employment site near Didcot. The vehicles are expected to be operational within 12 months, and whilst initially operating within Milton Park, the intention is for vehicles to operate between Milton Park and Didcot Parkway rail station, providing improved choice for employees when making their daily travel decisions. Similar potential exists here at Cambridge South.

5.44 Whilst yet to be implemented, trials of Automated Vehicles (AVs) are planned for by GCP for the Trumpington Busway connecting the park and ride services to the railway station and CB1.

5.45 The Community Concierge team would administer these services and liaise with operators.

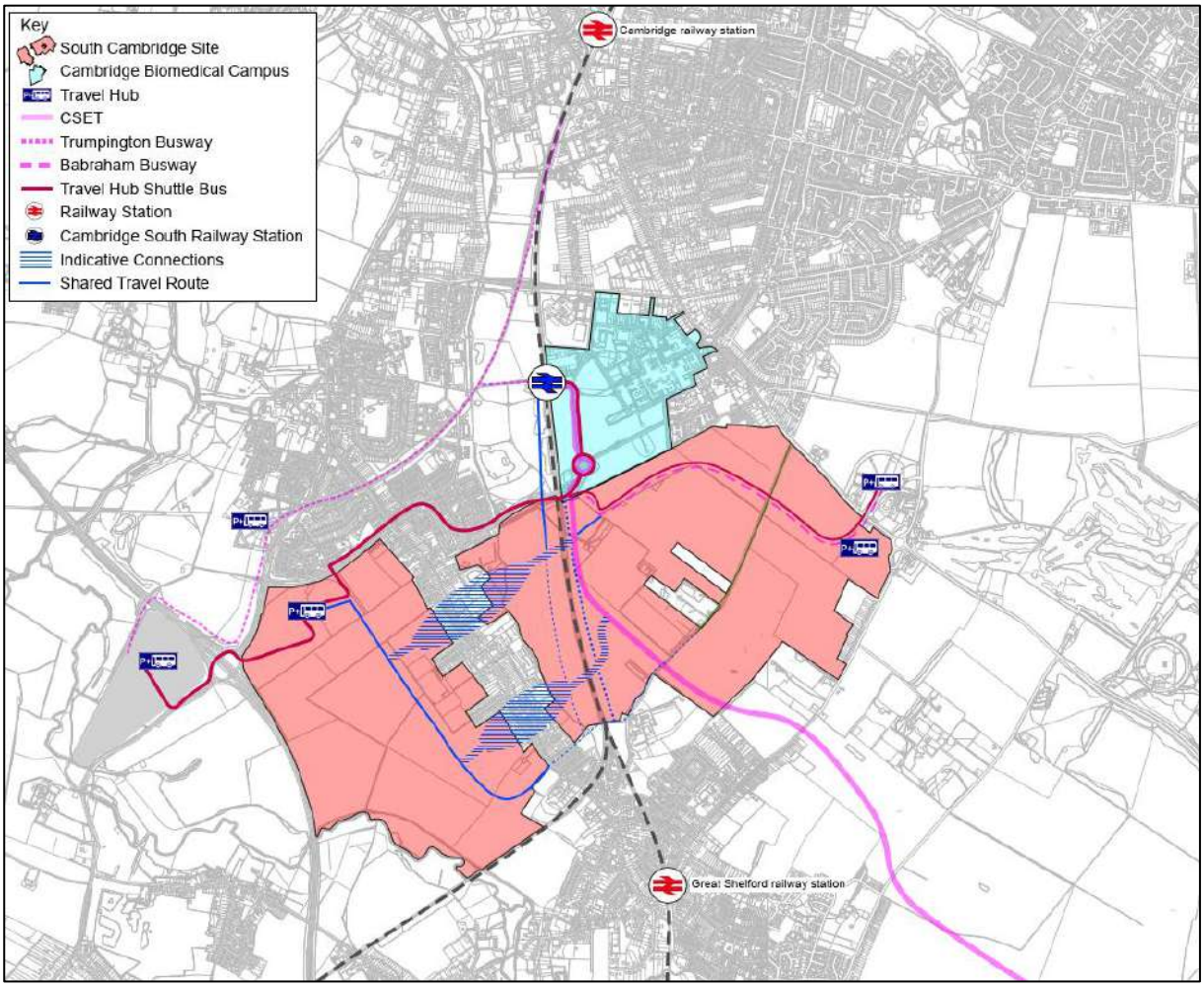


Figure 5.9 – Shared travel connections

Travel Data

5.46 The mobility strategy will implement a constant data collection exercise across staff, visitors, residents and travel modes at CBC to continually inform and enable refinement of accessibility and mobility. This is a major advantage of a single management of the campus.

The Masterplan movement network

5.47 Figure 5.10 shows an indicative network for high-capacity movement within, and across, the site.

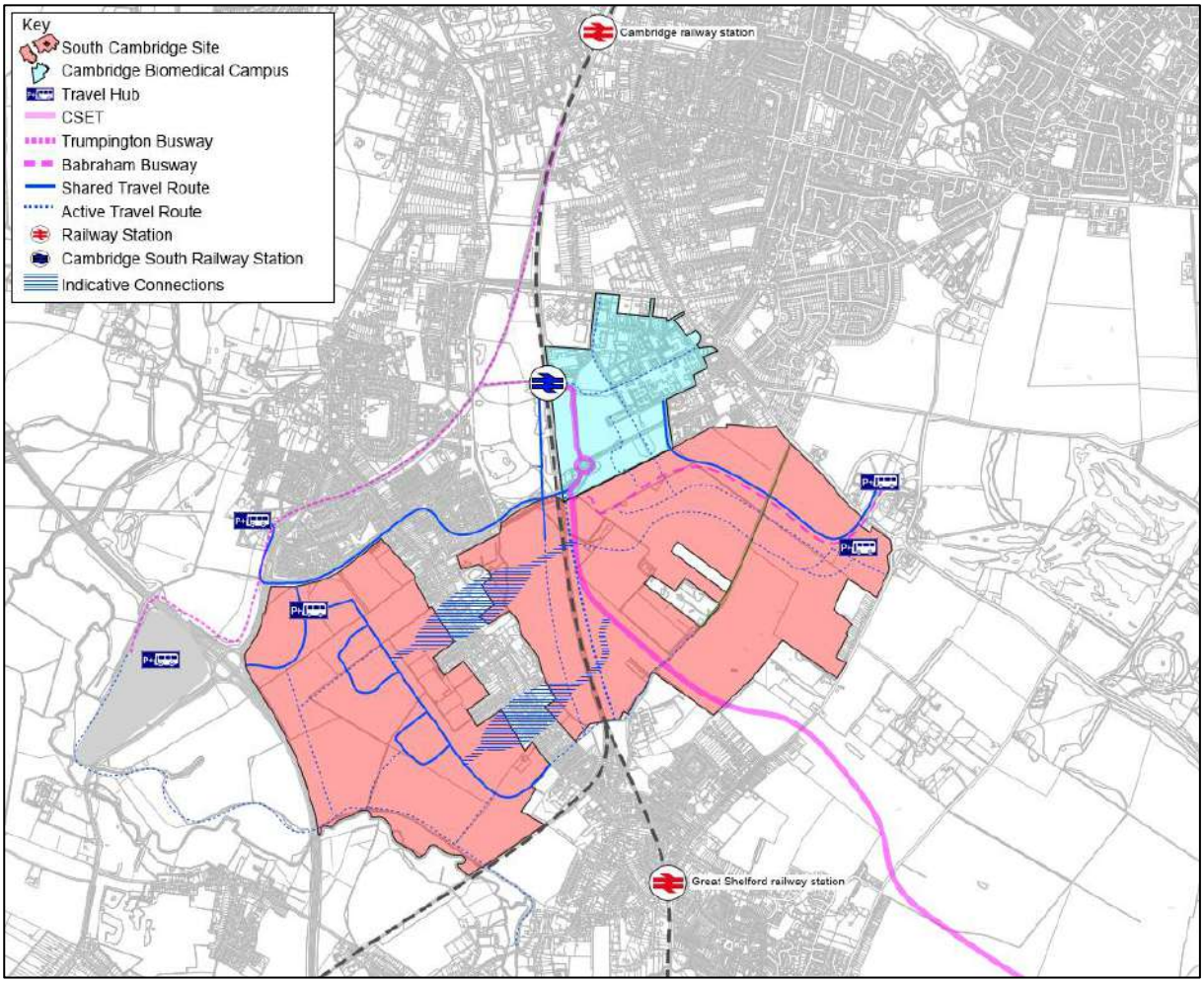


Figure 5.10 – Mobility across Cambridge South

5.48 The highest capacity networks are the walking and cycling networks that permeate the site, connecting West with East and the existing CBC. They can be up to nine times as space efficient as those that carry cars. They are also non intimidating and work well passing through the open spaces.

5.49 They form direct and easy routes within the site, connecting for instance the various sectors with the station, the travel hubs, the Mobility Hubs, the local centres, the commercial facilities, the leisure spaces and the neighbouring communities.

5.50 The cycle facilities are largely segregated from the pedestrian facilities due to differential speeds, except in some leisure and shared space circumstances. The potential exists to develop proposals for 'pavement pods', which are electric pods that carry two to four people, to share these routes.

Addenbrooke's Road

5.51 The measures proposed – including the decanting of car parking, the interception of trips, the increased emphasis on public and shared travel – will all enable car and delivery use of Addenbrooke's Road to substantially reduce, freeing up road space for its transformation.

5.52 Addenbrooke's Road provides a key link between the West and East Sites and CBC. The cycle and pedestrian facilities on Addenbrooke's Road are not continuous, and the vehicle route dominates. With the interception of much of the traffic at the Travel Hubs, an opportunity is created to alter the priorities. The proposal includes schemes for better and continuous cycle and pedestrian routes.

5.53 Addenbrookes Road is currently comprised of a duplication of cycle provision, neither of which are reflective of the high standards expected in a cycle city such as Cambridge. The off-road facility, separated from pedestrians by a painted white line, is punctuated by vehicle access points. The on carriageway mandatory cycle lane facilities are often sporadic and provide only a nod towards cycle priority.

5.54 It is proposed that these arrangements should be replaced by the highest quality cycle infrastructure that affords the level of prioritisation and convenience that is appropriate for this route. This includes full segregation of cyclists from pedestrians and vehicles and priority over vehicles at side road junctions. The provision will deliver infrastructure that meets the design guidance set out in Local Transport Note 1/20, a document that seeks to encourage the implementation of high-quality cycle infrastructure and the principles of which are being embraced by decision makers within the city.

5.55 An analysis of Addenbrooke's Road is presented in **Appendix B.**

Other connectivity

5.56 Granham's Road is currently vehicle dominated. This is not consistent with the climate and healthy living agenda, and there is no compelling reason for it to remain so. Therefore, we propose upgrading this route to a largely leisure and active travel route across the hill.

5.57 The potential for a new movement corridor that extends across Cambridge Road and the railway line will be explored, further connecting East and West. This could provide an active travel route or provide for pods connecting between areas within CBC and the wider Cambridge South area. The route may connect the facilities and the homes providing easy access from Travel Hubs and key cycling and public transport routes in the East with facilities in the West, and vice versa.

5.58 The intention is that this could extend across Cambridge Road and over the railway line, with a spur to the new Cambridge South Station, and is capable of carrying walkers, cyclists, Micromobility and electric automated or 'pavement pods'.

5.59 The existing footpath that connects the National Cycle Route 11 (Genome Route) to Bridge Close via the footbridge will be improved to accommodate cyclists. This provides a direct connection between the national cycle route in this location and southern section of the East development zone.

5.60 The proposal is to resurface this and incorporate low level or stud lighting, with the existing footbridge converted to become usable for cyclists. Works in this area associated with the Cambridge South Station delivery are planned and there would be opportunity to coordinate works.

Conclusion

5.61 This is a comprehensive plan for accessibility, mobility and transport. It is complementary to the values of CBC, and it enables the larger campus to exemplify sustainable transport and healthy lifestyles.

6 The Trip Budget

6.1 The CBC Expansion at Cambridge South is a unique opportunity to deliver new homes, leisure and recreational facilities, together with research and development uses to contribute to the Life Sciences offer for the city, in a way that contributes positively towards the climate agenda and health and wellbeing agenda. Growing CBC from an employment hub into a mixed innovation district offers the opportunity for transformational change.

6.2 This is entirely consistent with the Cambridge vision, and one of the best methods for achieving it.

6.3 In its simplest sense, the Cambridge vision is to meet the need for homes and jobs whilst reducing the need to drive a car and reducing the numbers of cars on the roads.

The Vehicle Trip Budget

6.4 To achieve this, the emerging approach of the planning authorities and CCC is to apply a Vehicle Trip Budget for defined larger development areas within Cambridge. The principle is straightforward. It is for new development to:

- Limit car trips, and the ability or incentive to drive a car
- Locate to take advantage of car reducing measures, such as railway stations, travel hubs, cycleways and other public transport systems
- Locate where new strategic transport measures have the ability to reduce background traffic
- Locate where there is the ability to rationalise existing development, including by reducing car parking, to reduce background or committed traffic levels
- Locate where there is the ability to reduce peak period traffic demand by limiting road capacity (Vision & Validate, not Predict & Provide)

6.5 Overall, it is to enable growth that does not rely upon increased road capacity. In areas that are congested for some parts of the day, the consequence is no net increase in traffic at these times.

6.6 Better still is the opportunity to reallocate road capacity in favour of the higher capacity, and climate efficient, active travel and shared travel, the consequence being less capacity for cars and hence less cars. This is based on the principle that traffic volumes are a function of the available roadspace.

6.7 Bringing this together, the best way to achieve this is to develop in such a place that maximum accessibility is gained locally, meaning that active travel is dominant, where a choice of sustainable travel options is also available for travel further afield, and which sustainably intercepts people who need to travel by single occupancy car.

6.8 This is that place.

Overview

6.9 A recent survey of Trumpington Meadows[2] has demonstrated how well planned land uses, arranged around a high quality transport network can significantly reduce the use of the car. Nobody was taken to school in a car. Of those that travelled to work, 66% worked in Cambridge, and of those over 60% cycled. Similar or better outcomes can be achieved at Cambridge South.

6.10 This section includes an initial assessment of traffic. It is informed by the existing travel characteristics, the masterplan, the forecasts arising from the new railway station and CSET, and the parking ratios. It employs the use of the Cambridge Paramics microsimulation model.

6.11 The unique location means that with good masterplanning and planned integration with the existing campus, there can be a net positive effect (reduction) in local area peak period cars, and hence a carbon reduction, compared with the current situation.

Approach

6.12 To set the benefits of this scheme in context the daily demand for external car travel if car travel was unconstrained has been compared with what it would be for a scheme of the same size but without the benefits of CBC, a railway station, the travel hubs, CSET, the associated limited parking, the tied residential homes and the other masterplan features that are made possible by this location.

6.13 The difference is that this scheme 'reduces' that demand by approximately 40%. The eventual 'internalisation' of residential based trip making is approximately 70%.

6.14 Accounting for all the masterplan designs that have been outlined in this report, the traffic demand estimate for the expansion land is an extra 850 vehicle movements in the local area during the peak hours.

6.15 The assessments associated with committed developments at CBC suggest that these may add an additional demand of about 1,450 vehicles during the peak hours. However, these forecasts are made without reference to the Cambridge South proposals and the local mitigation proposed, nor do those forecasts consider the strategic transport interventions that are planned. The forecasting method is detailed in **Appendix C**.

6.16 Strategic mobility measures for the area will help improve overall mobility choice.

6.17 Cambridge South Railway Station will remove about 990 vehicles each day from the existing and committed CBC demand (this is based on the station forecast report). The South West Travel Hub is

[2] Taken from planning application for sporting village at Trumpington.

estimated to be 70% utilised by CBC staff (SW Travel Hub Business Case). This would mean it would reduce CBC existing and committed peak demand by about 700 vehicles across the day.

6.18 In addition, there are other initiatives, including the new A11 Travel Hub at the southern end of the CSET and the extension of the Babraham Travel Hub.

6.19 Cambridge South will be the catalyst for mode shift for existing and committed development CBC staff. It will enable parking displacement from existing and committed CBC to new CBC specific Travel Hubs, and it will displace goods vehicles from the existing campus to the periphery of the site.

6.20 The proposed measures are assumed to include new shared travel systems (including targeted Zeelo style services to locations not currently well served by public transport), enhanced active travel corridors, a micro consolidation centre and behaviour change functions (such as Mobility Hubs).

6.21 By referencing the existing and forecast numbers of movements into CBC associated with heavy and light goods vehicles, there is opportunity to intercept around 50 to 100 goods vehicle movements during the peak hours through the micro consolidation centre.

6.22 In addition, the local Park & Ride sites 'intercept' up to 480 existing and committed vehicles during peak hours to and from CBC, displacing these from existing and committed parking facilities at the existing campus. The approach is to retain and provide ample parking close to facilities, including hospitals, for those that need it most, such as patients, visitors and those working anti-social hours, whilst displacing others.

6.23 The overall effect will be neutral or net positive in terms of vehicle movements in the area.

6.24 The high degree of non-car accessibility provides the opportunity to go further, and through the use of road capacity as a tool, to create a further reduction in peak movements, whilst retaining accessibility by all mode, including cars, for those that need it.

6.25 Therefore, it is reasonable to conclude that, working together with the Authorities, there is good opportunity to make good use of the current investment in infrastructure, accentuated by the site designs and facilities, to create growth in homes and jobs with a net reduction in local area peak car travel compared with existing.

6.26 There will be localised differences in the degree of change in traffic movement. The traffic effects associated with the strategy by time of day have been considered using the Cambridge Paramics model.

6.27 This is a Cambridge wide model. The Cambridge road network already operates at capacity for some times of the day, and in replicating this the model will not accommodate additional traffic at these times. At these times, increasing theoretical road capacity will increase traffic movement, whilst reducing theoretical road capacity will reduce traffic movements. This is consistent with the GCP approach to reducing traffic over time and identifies road capacity as one of the many tools for reducing carbon emissions.

6.28 The model enables these judgements to be made:

- Faced with the forecast changes in demand, where traffic is likely to increase and decrease on the network
- On that basis, how journey times change on specific routes
- Where queuing is likely to occur by time of day, and to what extent
- What proportion of traffic demand will be redistributed to other times or other modes by time of day, and what effect that has on journey times and queuing at other times of day

6.29 The modelling report is in **Appendix D**. To date, the model has been run for the pre Covid peak commuter hours in the morning and the evening. It will be run for longer periods in due course.

6.30 In no circumstances that we have tested does the model highlight any issues that affect safety. In particular, there is no indication that this scheme, or the approach, affects traffic on the mainline of the M11.

6.31 The interception of trips associated with Travel Hubs and the consolidation centre, together with the transfer of trips to other modes will have a positive effect on journey times along Addenbrooke's Road.

6.32 From a trip budgeting point of view, this scheme is the best way to achieve growth with no material net change in traffic demand. It draws on the ability to rationalise the existing and committed development at CBC, to take maximum benefit from the outstanding public transport infrastructure in, and proposed for, the area, the synergies of growing CBC's commercial and ancillary businesses, tying homes to jobs, the movement strategy and healthy masterplanning.

6.33 It is consistent with the trip budgeting approach and one of the best ways of achieving growth whilst reducing carbon.

7 Key Findings and Next Steps

Key Findings

7.1 This transport and mobility report has set out the principles for a sustainable transport strategy for the expanded Cambridge Biomedical Campus, in the context of existing and emerging mobility infrastructure. It has provided a Transport Vision and Strategy to support the Local Plan submission for Cambridge South.

7.2 This vision responds to the massively changing trends in attitudes towards mobility and how technology, investment and also constraints are changing the face of accessibility, travel and transport.

7.3 The Cambridge South site being promoted through the Local Plan comprises land immediately south of CBC 'the East development zone and land to the west of Shelford Road 'the West development zone, which is inextricably linked with the existing CBC campus.

7.4 An internal movement and interaction framework has been developed which places active travel as the highest priority, and at the forefront of accessibility.

7.5 The major accessibility and mobility benefit of developing in this location is the opportunity to maximise local living and working, including accessibility to education and leisure, and uniquely, because of the location, the interaction between research, health facilities and business units, and maximising the number of staff that can walk to and from work. By changing the relationship between the homes and employment the proposals would maximise carbon reduction from surface transport and maximises mental and physical heath.

7.6 The site already benefits enormously from the surrounding sustainable infrastructure for travel further afield, and the attitudes of the local population towards travel. This is reinforced by the upcoming investments in sustainable infrastructure, including new Travel Hubs, the new Cambridge South station, the CSET corridor, and the new and improved active travel corridors.

7.7 Anchored on both sides by existing and emerging Park & Ride sites, or Travel Hubs, the expanded Campus is well positioned to utilise existing transport infrastructure. Key connections, including across the railway line and to the emerging South Cambridge station are proposed for active travel and shared travel.

7.8 Parking will be limited, prioritised and is to be carefully managed and limited to operational needs. Strategically located parking will enable vehicle movements to be intercepted from the strategic network at the earliest stage, enabling car free streets and freeing up central space for more productive use.

7.9 The principles of the vehicle trip budget approach can be met.

7.10 The area, including the expanded campus has been assessed using Cambridge County Council's citywide Paramics Microsimulation model. The work corroborates the expectation that this is an excellent location for growth, benefiting from major investments in sustainable travel infrastructure, and with no substantial requirement for potentially counterproductive highway infrastructure.

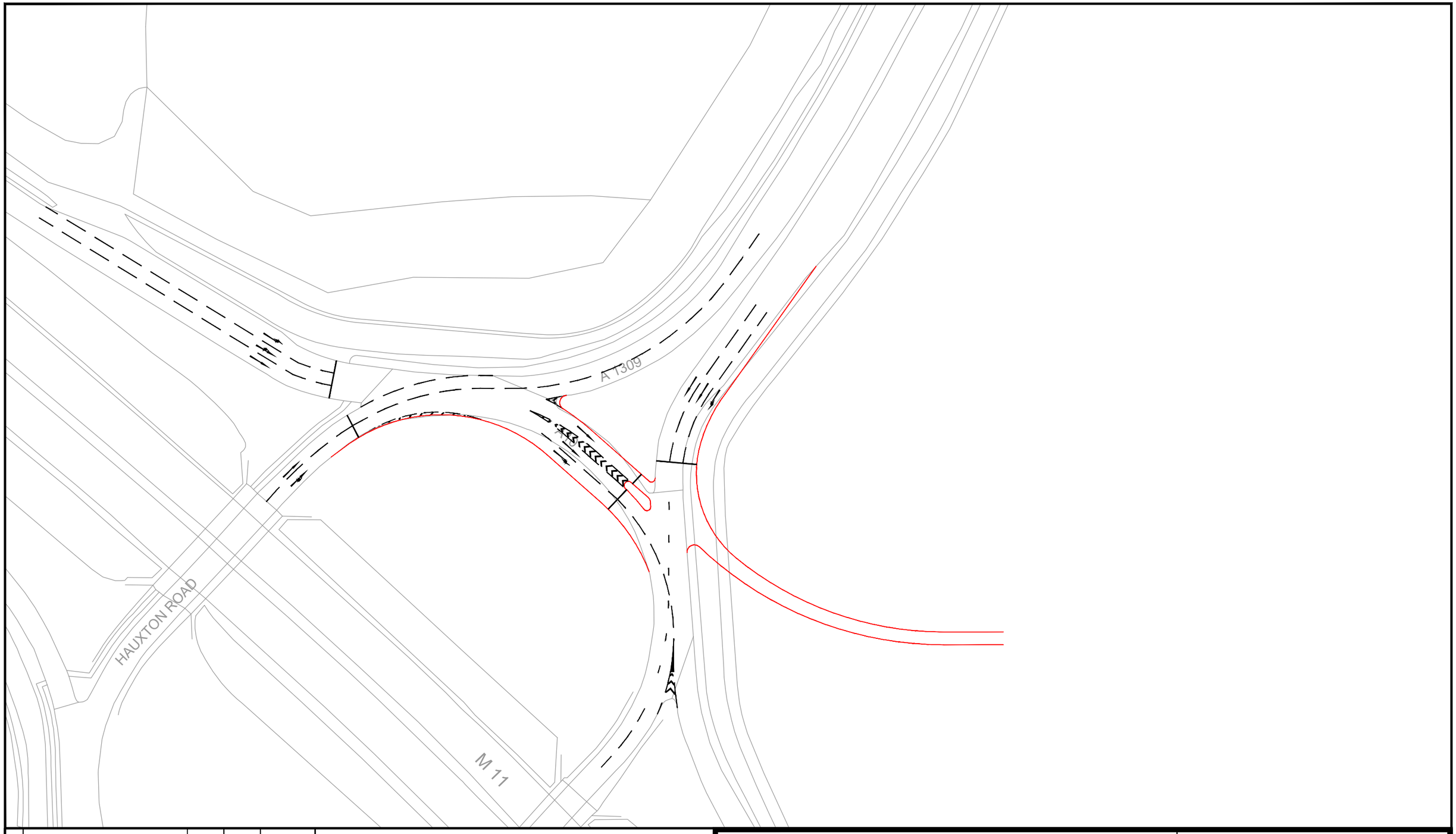
7.11 The model output quantifies the likely effects on traffic convenience, none of which are important or substantial in the planning policy context, and none of which challenge the overarching GCP aim to reduce traffic in Cambridge.

Next Steps

7.12 The work and the detailed analysis is ongoing. The accessibility and mobility strategy continues to be developed. The ongoing work includes:

- Collaborative working with CBC and with officers at CCC, GCP and local stakeholders to shape and hone the vision;
- More detailed analysis of the opportunities that exist in rationalising accessibility to the current CBC campus;
- An expansion of the CCC citywide PARAMICS model to incorporate neighbouring villages, together with a greater level of refinement of demand flows and analysis;
- More detailed investigation of the active travel corridors, including the internal networks, Addenbrookes Road, the Hauxton to Great Shelford link, and Granham's Road;
- Developing the Mobility Hub and community strategy;
- Developing the Micro Consolidation and smart Travel Hubs strategy;
- Quantifying likely effects and benefits in terms of accessibility, carbon and health.

Appendix A



REV.	DETAILS	DRAWN	CHECKED	DATE
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Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.
2. White lining is indicative only.

South Cambridge

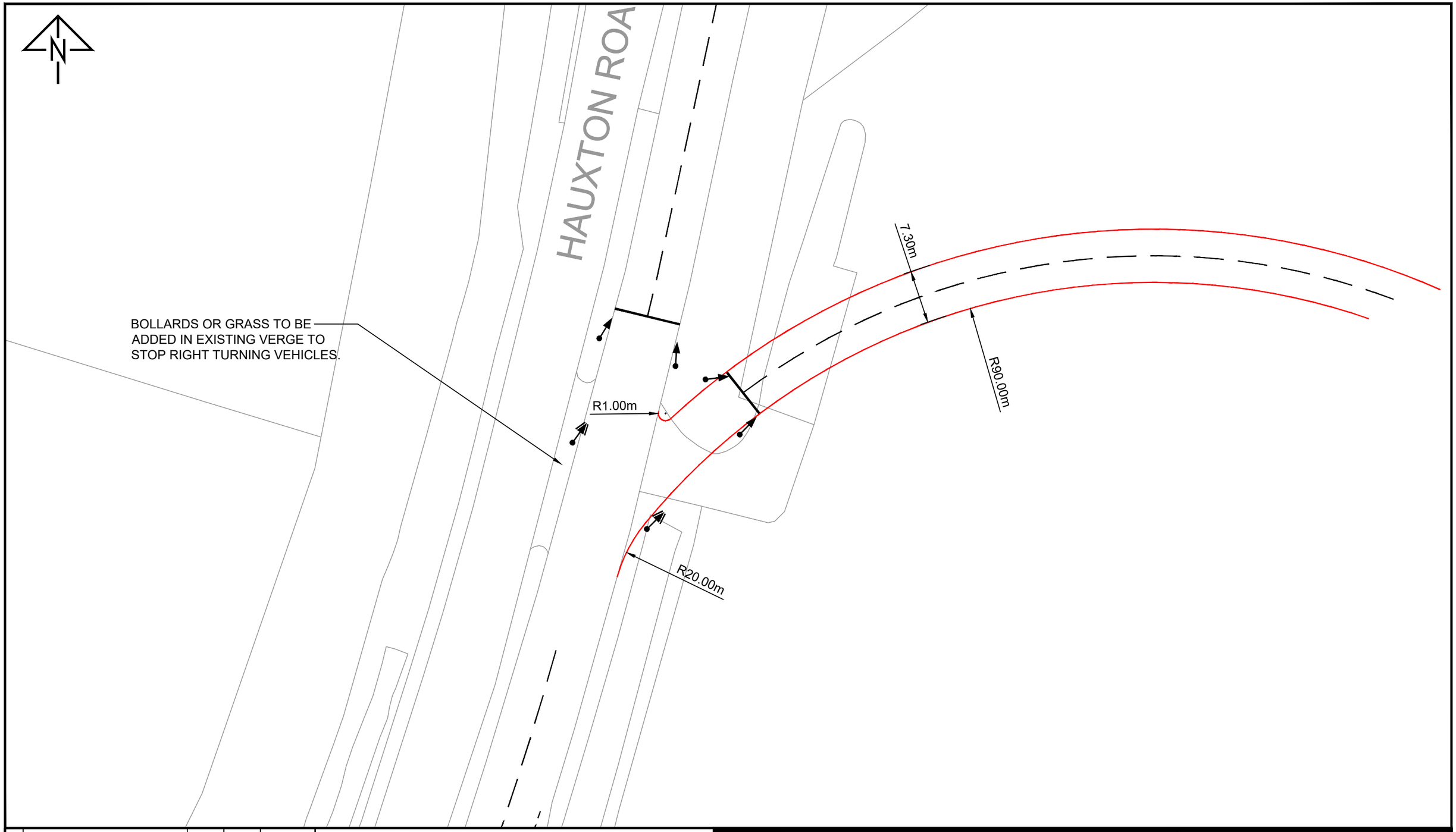
Proposed Improvements
Access Only
Single Lane Access

DRAWN:	CHECKED:	DATE:	SCALES:
KR	EW	18.03.21	1:1000 at A3

Land Improvements Holdings

vectos.
Ground Floor, Helmont House, Churchill Way, Cardiff CF10 2HE
t: 02920 720 860 e: enquiries@vectos.co.uk

DRAWING NUMBER:	REVISION:
215764_PD03	·



REV.	DETAILS	DRAWN	CHECKED	DATE
.	.	.	.	.

Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.
2. White lining is indicative only.

South Cambridge

Proposed Improvements
Signalised Junction
Left Only Egress

DRAWN:	CHECKED:	DATE:	SCALES:
KR	EW	18.03.21	1:500 at A3

Land Improvements Holdings

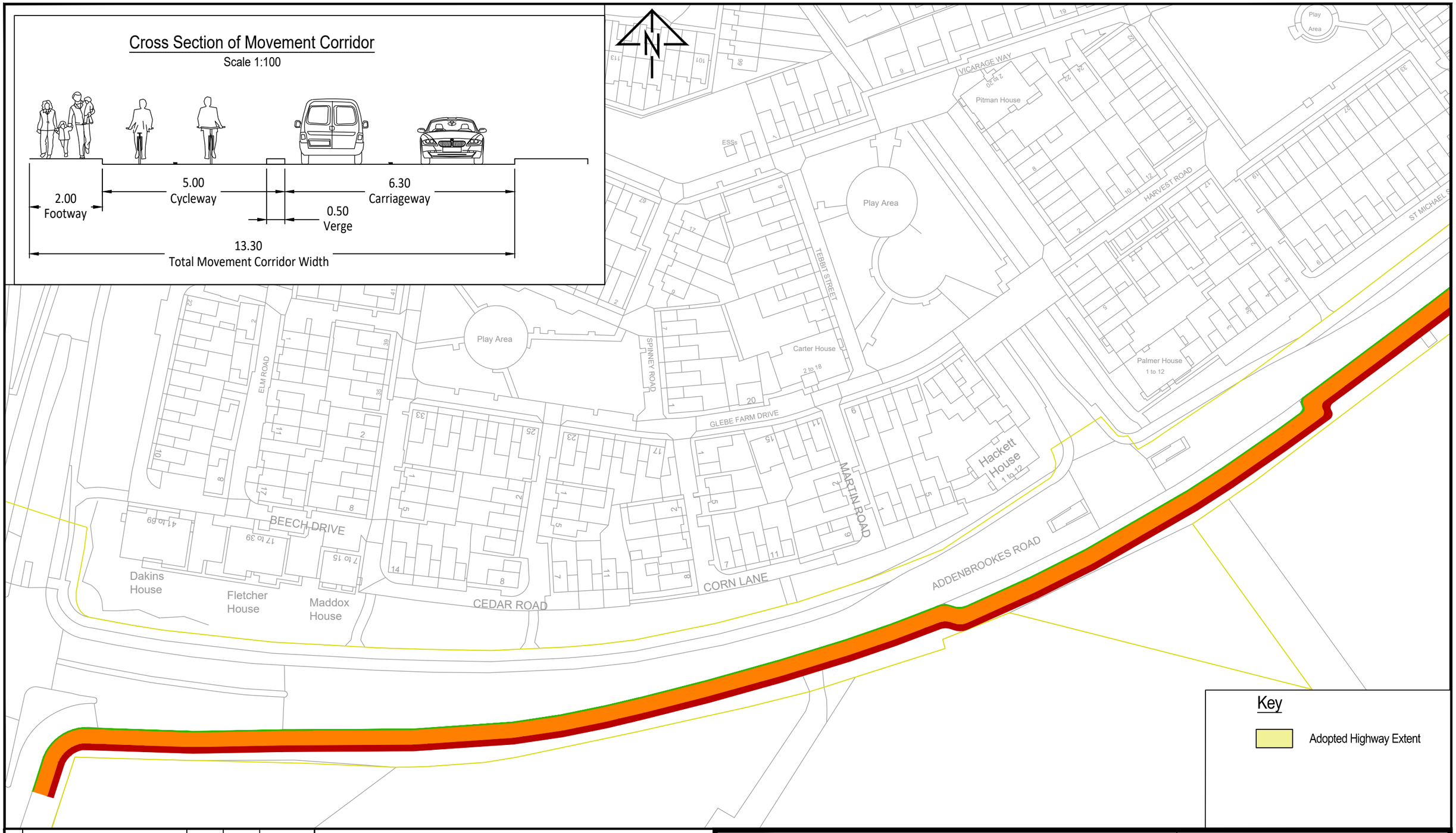
vectos.
Ground Floor, Helmont House, Churchill Way, Cardiff CF10 2HE
t: 02920 720 860 e: enquiries@vectos.co.uk

DRAWING NUMBER:	REVISION:
215764_PD04	·

Appendix B

Cross Section of Movement Corridor

Scale 1:100



Key

Adopted Highway Extent

REV.	DETAILS	DRAWN	CHECKED	DATE
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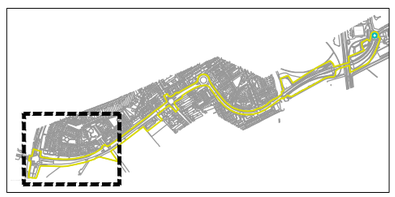
Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.
2. White lining is indicative only.



South Cambridge

Lands Improvement Holdings

Indicative Segregated Cycle Route
Section 1 of 5

vectos.
Ground Floor, Helmont House, Churchill Way, Cardiff CF10 2HE
t: 02920 720 860 e: enquiries@vectos.co.uk

DRAWN:	CHECKED:	DATE:	SCALES:	DRAWING NUMBER:	REVISION:
KR	EW	24.02.21	1:1250 at A3	215764_SK02a	·

Carriageway to be re-aligned to accommodate Segregated Cycle Route.

Potential Location for Segregated Crossing.

13.45m

12.94m

17.66m

17.5m

BISHOP'S ROAD

TRUMPINGTON PLACE

OVERHILL CLOSE

MERRYVALE

AUSTIN DRIVE

ST MICHAEL STREET

Play Area

Pumping Station

Allotment Gardens

Balancing Pond

Cosin House

Reed View

Posts

Path

El Sub Sta

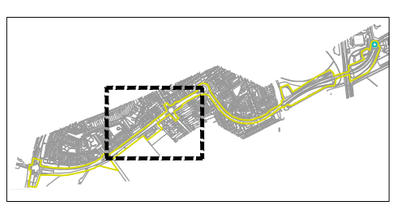
Key

Adopted Highway Extent

REV.	DETAILS	DRAWN	CHECKED	DATE
.	.	.	.	.

Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.
2. White lining is indicative only.



South Cambridge

Indicative Segregated Cycle Route
Section 2 of 5

DRAWN:	CHECKED:	DATE:	SCALES:
KR	EW	24.02.21	1:1250 at A3

Lands Improvement Holdings

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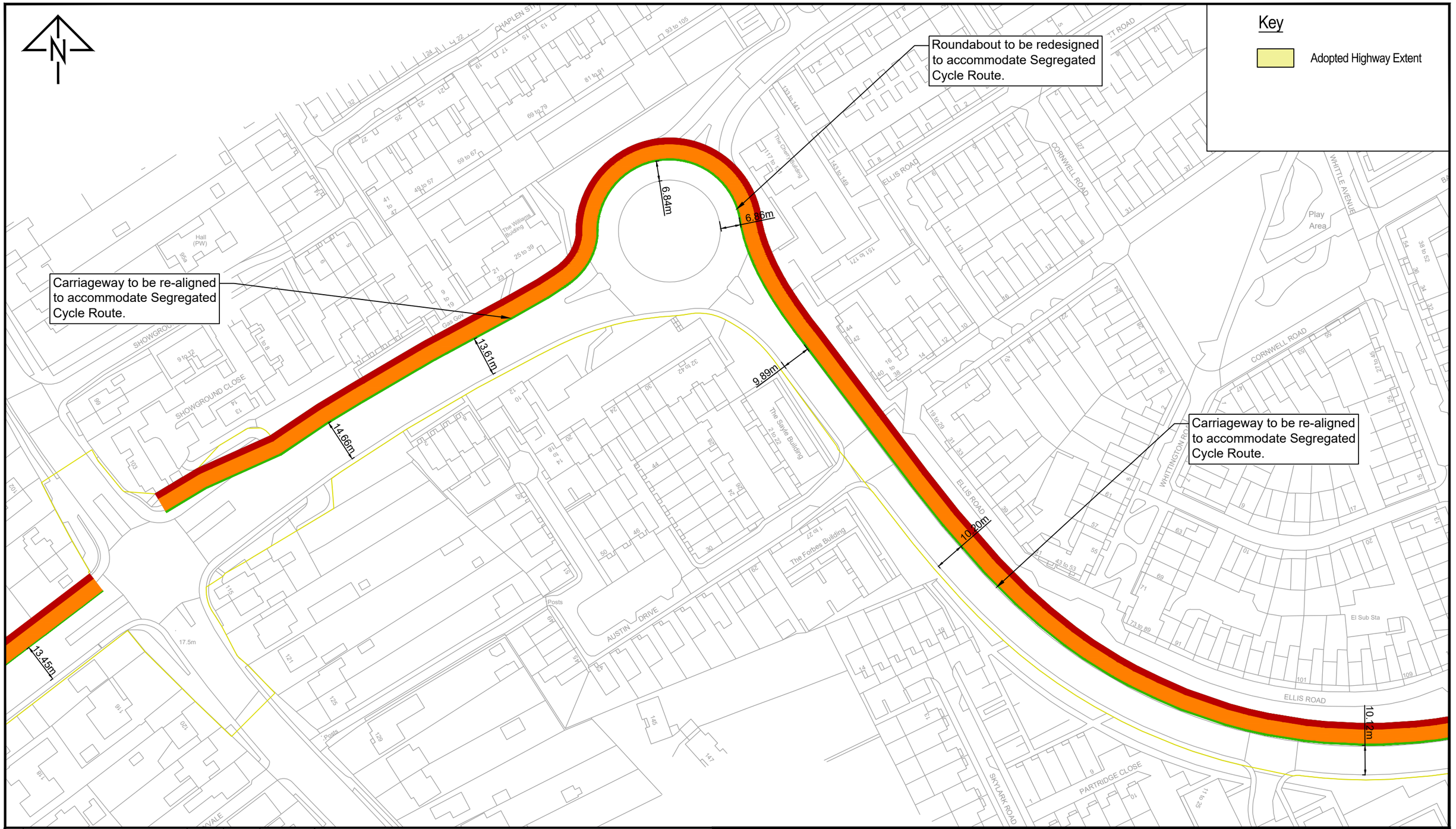
DRAWING NUMBER:	REVISION:
215764_SK02b	·



REV.	DETAILS	DRAWN	CHECKED	DATE
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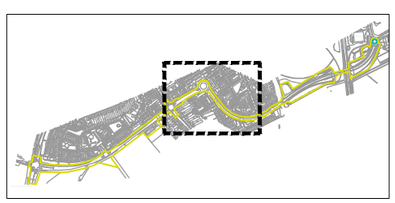
Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.
2. White lining is indicative only.



South Cambridge

Lands Improvement Holdings

Indicative Segregated Cycle Route
Section 3 of 5

vectos.

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t: 02920 720 860 e: enquiries@vectos.co.uk

DRAWN:	CHECKED:	DATE:	SCALES:	DRAWING NUMBER:	REVISION:
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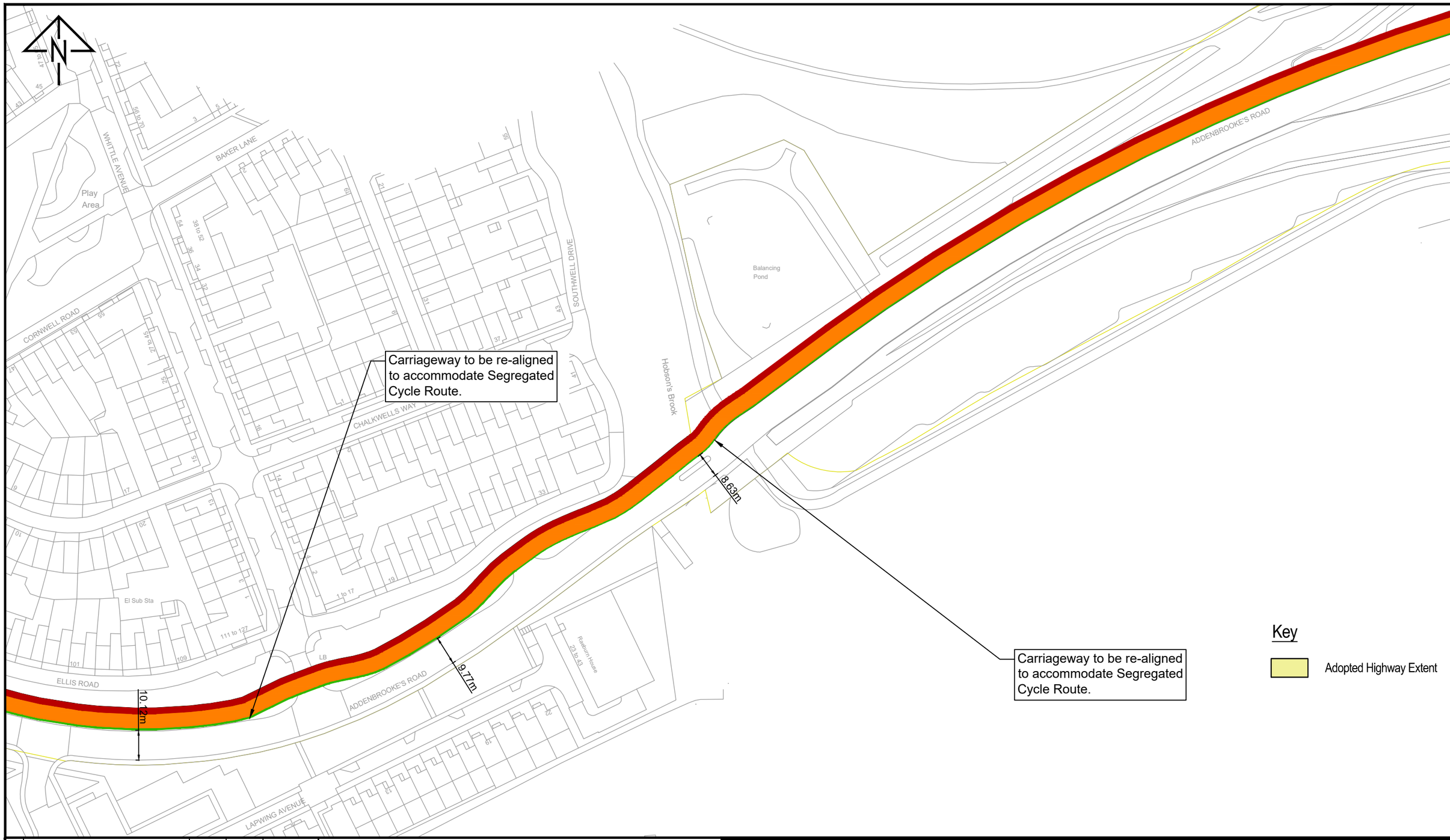

REV.	DETAILS	DRAWN	CHECKED	DATE
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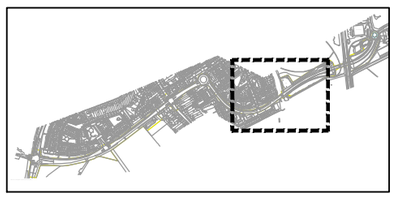
Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.
2. White lining is indicative only.



South Cambridge

Indicative Segregated Cycle Route
Section 4 of 5

DRAWN:	CHECKED:	DATE:	SCALES:
KR	EW	24.02.21	1:1250 at A3

Lands Improvement Holdings

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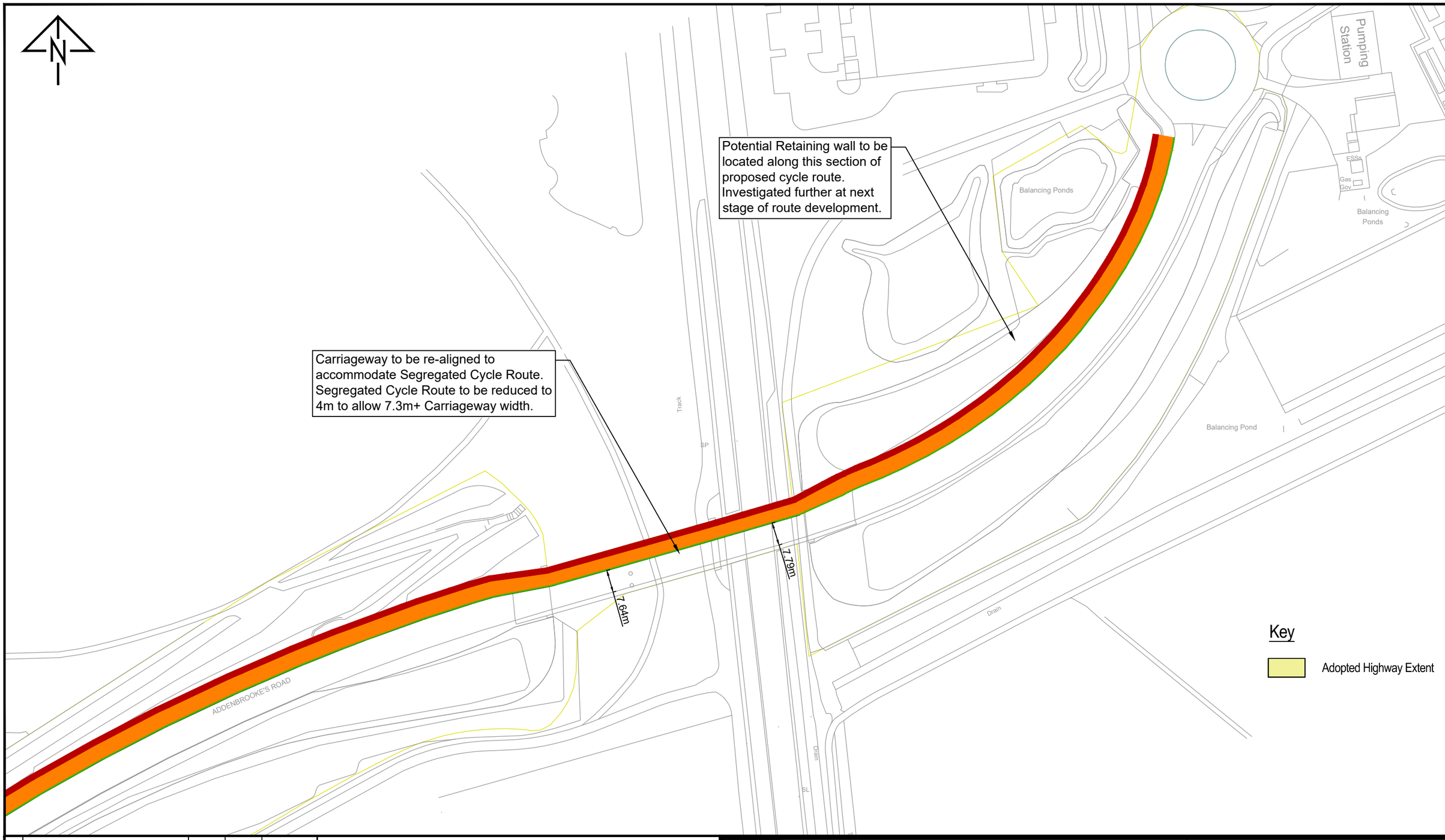
t: 02920 720 860 e: enquiries@vectos.co.uk

DRAWING NUMBER:	REVISION:
215764_SK02d	·



REV.	DETAILS	DRAWN	CHECKED	DATE
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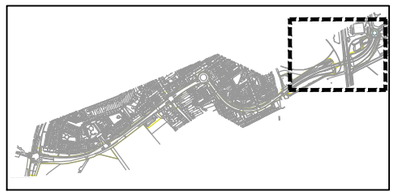
Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.
2. White lining is indicative only.



South Cambridge

Indicative Segregated Cycle Route
Section 5 of 5

Lands Improvement Holdings

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Ground Floor, Helmont House, Churchill Way, Cardiff CF10 2HE
t: 02920 720 860 e: enquiries@vectos.co.uk

DRAWN:	CHECKED:	DATE:	SCALES:	DRAWING NUMBER:	REVISION:
KR	EW	24.02.21	1:1250 at A3	215764_SK02e	·

Appendix C

Appendix C - Cambridge South
Trip Generation and Attraction Methodology Summary

205764/N05

Introduction

1. This note has been prepared by Vectos to set out the approach to trip generation and attraction for the Cambridge South development. It provides a summary of the approach taken and concludes with the anticipated vehicle trip generation for the peak periods.

Structure

2. The structure of this note is as follows:

- Approach;
- Existing CBC;
- Trip Generation;
- Summary.

Approach

3. The anticipated levels of movement generated by the expanded campus has been considered based on the emerging development quantums and the range of infrastructure both committed and forthcoming in the area.

4. The assessment has used available information related to travel patterns associated with the Cambridge Biomedical Campus (CBC) including travels surveys along with other sources of data covering movement patterns.

5. The emerging Cambridge South railway station will provide enhanced connectivity to the expanded Campus along with the existing CBC. The proximity of this station has been considered within the assessment and the increasing attractiveness for access, particularly in the context of wider rail enhancements including higher frequency of services and the opportunity for local connections to Cambridge (central) and Cambridge North within the city of Cambridge.

Existing CBC

6. Travel patterns associated with the CBC have been established using a range of existing data sources including the CBC Transport Needs Review (2019). The mode share for staff across the site and data available from Addenbrooke's Hospital has been used to establish how the CBC operates.

At this stage the number of staff travelling by each mode has been established, while peak period traffic data extracted from the Cambridge Paramics Model has been used to estimate approximate arrival and departure profiles. The number of staff to and from CBC has been summarised by mode in **Table 1**.

Table 1 – Existing CBC Staff Mode Share

Mode	Staff	
	%	No.
Cycle	36%	6,210
Motorcycle	1%	173
Car (single Occupancy)	27%	4,658
Car (Multiple Occupancy)	9%	1,553
Bus	22%	3,795
On Foot	5%	863
Total	**100%**	**17,250**

7. An estimate of the multimodal peak period arrivals and departures for CBC have been set out in **Table 2**. This includes the 17,250 existing staff and the 5,231 additional staff associated with committed CBC expansion, totalling 22,481. Note that it excludes visitors at this stage as there is limited data available which can be used to quantify arrival and departure from the site across the day.

8. **Table 2** is on the basis that arrivals and departures take place within the AM (07:00 – 10:00) and PM (16:00 – 19:00) peak periods.

Table 2 – Existing and Committed CBC Peak Period Movement Summary

Mode	%	0700 - 0759		0800 - 0859		0900 - 0959		1600 - 1659		1700 - 1759		1800 - 1859	
		Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep
Cycle	36%	1,696	801	2,192	789	1,992	623	615	1,974	742	2,031	633	2099
Motorcycle	1%	47	22	61	22	55	17	17	55	21	56	18	58
Car*	27%	1,272	601	1,644	592	1,494	467	461	1,481	556	1,523	474	1574
Shared car	9%	424	200	548	197	498	156	154	494	185	508	158	525
Bus	22%	1,036	489	1,340	482	1,218	381	376	1,206	453	1,241	387	1283
Walk	5%	304	111	304	110	277	87	85	274	103	282	88	292
Total	**100%**	**4,710**	**2,224**	**6,090**	**2,192**	**5,534**	**1,731**	**1,708**	**5,484**	**2,060**	**5,641**	**1,757**	**5,830**

*Details: *Car (single occupancy)*

9. The number of staff vehicle movements is estimated to be in the region of 6,060 in each 3 hour peak period with a proportion of these being car share.

Trip Generation

10. Trip generation has been undertaken based on the emerging development quantums:

    - Research & Development / Office - 405,000 sqm (circa 15,350 employees)
    - Homes / Dwellings - 5,000
    - Hotel and Conference -15,500 sqm
    - Education and Ancillary.

11. The approach to identifying trip generation is based on the following:

    - **Person Trip Rates** – the identification of Person Trip Rates for the relevant land uses through the TRICS database and appropriate site selection. This identifies the number of people who will be accessing each land use.
    - **National Travel Survey (NTS)** – using the NTS to quantify the likely breakdown of trip purposes throughout the peak periods including the demand for working and education movements.
    - **Internalisation** – quantifying the number of movements that will remain locally within CBC and the development site accounting for the Campus specific housing and the range of land uses proposed. A Campus Housing Methodology has been established which takes the average number of employees per household across Cambridge and calculates the level of commercial internalisation accounting for the linked campus housing and the new jobs being created on site.
    - **Mode Share** – utilising data sources such as 2011 Census, the CBC Transport Needs Review and travel survey to provide relevant mode share data. This has been adjusted to reflect emerging infrastructure such as Cambridge South railway station, Trumpington Travel Hub and Cambridge South East Transport (CSET).
    - **Demand Management System** – accounting for proposed management of on-site parking through parking restrictions, strategically located interception parking and dynamic parking management limit the opportunities for routine accessibility by private car.

12. These principles have been used to devise the predicted peak period (07:00 – 10:00 and 16:00 – 19:00) external vehicle movements generated by the expanded CBC which are shown in **Table 3**. In addition, the predicted increase in Park & Ride associated vehicle movements are provided in **Table 4**. Calculations for the Residential and commercial elements are provided in **Appendix A**.

Table 3 – Predicted Peak Period External Vehicle Movement Summary

Land Use	AM Peak Period						PM Peak Period					
	07:00-08:00		08:00-09:00		09:00-10:00		16:00-17:00		17:00-18:00		18:00-19:00	
	Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep
Residential	68	249	84	256	118	84	196	152	197	172	245	165
Commercial	264	5	491	10	435	21	35	306	10	461	10	280
Hotel	2	5	3	10	5	4	5	4	7	3	9	4
Total	**335**	**259**	**577**	**277**	**558**	**108**	**236**	**461**	**214**	**636**	**264**	**449**

Table 4 - Predicted Peak Period Expanded Campus Park & Ride Movement Summary

Park & Ride Location	AM Peak Period						PM Peak Period					
	0700-0800		0800-0900		0900-1000		1600-1700		1700-1800		1800-1900	
	Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep
Trumpington Travel Hub	152	3	282	6	250	12	20	176	6	265	6	161
Trumpington	51	1	94	2	83	4	7	59	2	88	2	54
Babraham Road	51	1	94	2	83	4	7	59	2	88	2	54
Total	**253**	**5**	**470**	**10**	**417**	**20**	**33**	**293**	**10**	**442**	**10**	**268**

13. The vehicle movements have been distributed to the network using 2011 Census and reflected in the Cambridge Paramics model.

Summary

14. This note has provided a summary of the anticipated trip generation associated with the Cambridge South development. The framework methodology has been set out alongside the peak period vehicle movements. These have been quantified in terms of movements to and from the site as well as additional movements to Park and Ride sites.

Appendix A

Trip Generation calculations

215764 - South Cambridge

Residential Trip Generation

No. of Dwellings	5,000
Home Working	30%

Home Working Factor: 1.1

Person Trip Rates (per **house**)

Period	Time	Arrivals	Departures	Total
AM Peak hour	07:00 - 08:00	0.106	0.511	0.617
	08:00 - 09:00	0.179	0.765	0.944
	09:00 - 10:00	0.187	*0.372*	*0.559*
PM Peak Hour	16:00 - 17:00	0.479	0.248	0.727
	17:00 - 18:00	0.552	0.25	0.802
	18:00 - 19:00	0.494	0.246	0.74

Details: based on TRICS Trip Rates (Mixed Private/Affordable Housing)

Person Trip Rates (per **flat**)

Period	Time	Arrivals	Departures	Total
AM Peak hour	07:00 - 08:00	0.053	0.257	0.31
	08:00 - 09:00	0.067	0.401	0.468
	09:00 - 10:00	0.097	0.19	0.287
PM Peak Hour	16:00 - 17:00	0.217	0.121	0.338
	17:00 - 18:00	0.261	0.13	0.391
	18:00 - 19:00	0.299	0.129	0.428

Details: based on TRICS Trip Rates (Private Flats)

Houses	3000

Total Person Movements (**Houses**)

Period	Time	Arrivals	Departures	Total
AM Peak hour	07:00 - 08:00	318	1533	1851
	08:00 - 09:00	537	2295	2832
	09:00 - 10:00	561	1116	1677
PM Peak Hour	16:00 - 17:00	1437	744	2181
	17:00 - 18:00	1656	750	2406
	18:00 - 19:00	1482	738	2220

Flats	2000

Total Person Movements (**Flats**)

Period	Time	Arrivals	Departures	Total
AM Peak hour	07:00 - 08:00	106	514	620
	08:00 - 09:00	134	802	936
	09:00 - 10:00	194	380	574
PM Peak Hour	16:00 - 17:00	434	242	676
	17:00 - 18:00	522	260	782
	18:00 - 19:00	598	258	856

Check
0

Total Person Movements (**Houses + Flats**)

Period	Time	Arrivals	Departures	Total
AM Peak hour	07:00 - 08:00	424	2047	2471
	08:00 - 09:00	671	3097	3768
	09:00 - 10:00	755	1496	2251
PM Peak Hour	16:00 - 17:00	1871	986	2857
	17:00 - 18:00	2178	1010	3188
	18:00 - 19:00	2080	996	3076

17,611

Accounting for Homeworking (plus 10% for those homeworking during the TRICS site surveys)

Period	Time	Arrivals	Departures	Total
AM Peak hour	07:00 - 08:00	466	2252	2718
	08:00 - 09:00	738	3407	4145
	09:00 - 10:00	831	1646	2476
PM Peak Hour	16:00 - 17:00	2058	1085	3143
	17:00 - 18:00	2396	1111	3507
	18:00 - 19:00	2288	1096	3384

19,372

Check
0

Person Movement - Internal Commuting trips from the **on-site residential** to **Commercial**

Period	Time	Arrivals	Departures	Total
AM Peak hour	07:00 - 08:00	13	661	674
	08:00 - 09:00	26	1227	1253
	09:00 - 10:00	52	1089	1141
PM Peak Hour	16:00 - 17:00	765	86	851
	17:00 - 18:00	1154	26	1180
	18:00 - 19:00	700	26	726

5,826

from commercial defined by the Campus Housing Methodology

Person Movement (**excluding Internal Commuting**)

Period	Time	Arrivals	Departures	Total
AM Peak hour	07:00 - 08:00	453	1590	2044
	08:00 - 09:00	712	2179	2891
	09:00 - 10:00	779	556	1335
PM Peak Hour	16:00 - 17:00	1293	998	2291
	17:00 - 18:00	1242	1085	2327
	18:00 - 19:00	1588	1070	2657

13,546

NTS Journey Purpose

NTS Table 502 (24 hours)

Start time	Commuting	Business	Education	Escort education	Shopping	Other work, other escort and personal business	Visiting friends / entertainment / sport	Holiday / Day trip / Other	All purposes
0000 - 0059	49%	3%	1%	0%	3%	11%	27%	5%	100%
0100 - 0159	51%	4%	0%	0%	1%	8%	32%	4%	100%
0200 - 0259	63%	3%	0%	0%	2%	7%	13%	10%	100%
0300 - 0359	62%	7%	2%	0%	2%	9%	8%	10%	100%
0400 - 0459	71%	8%	0%	0%	1%	8%	3%	9%	100%
0500 - 0559	75%	6%	0%	0%	1%	6%	3%	7%	100%
0600 - 0659	66%	7%	1%	0%	2%	9%	4%	10%	100%
0700 - 0759	**48%**	**6%**	**14%**	**5%**	**3%**	**14%**	**4%**	**6%**	**100%**
0800 - 0859	**20%**	**3%**	**29%**	**23%**	**4%**	**14%**	**3%**	**4%**	**100%**
0900 - 0959	**11%**	**5%**	**3%**	**7%**	**22%**	**26%**	**15%**	**12%**	**100%**
1000 - 1059	5%	4%	2%	0%	34%	24%	17%	14%	100%
1100 - 1159	5%	4%	2%	2%	35%	23%	18%	11%	100%
1200 - 1259	7%	4%	2%	2%	30%	25%	20%	9%	100%

Excluding Commuting & Business Total	Factor
47%	2.1
45%	2.2
34%	3.0
31%	3.3
22%	4.6
18%	5.5
27%	3.7
47%	2.1
77%	1.3
84%	1.2
91%	1.1
91%	1.1
89%	1.1

Excluding Commuter and Business, other purposes increased pro rata to reach 100%

Education	Escort education	Shopping	Other work, other escort and personal business	Visiting friends / entertainment / sport	Holiday / Day trip / Other	All purposes
1.1%	0.5%	6.4%	22.4%	57.9%	11.6%	100%
0.6%	0.5%	3.1%	17.5%	70.4%	7.9%	100%
0.0%	1.1%	7.0%	22.2%	39.0%	30.8%	100%
5.6%	1.0%	6.5%	29.8%	25.1%	31.9%	100%
1.3%	0.6%	2.6%	38.7%	14.2%	42.6%	100%
2.5%	0.7%	4.7%	32.6%	18.7%	40.8%	100%
5.3%	1.8%	8.2%	31.5%	16.4%	36.9%	100%
30.7%	11.8%	6.3%	29.8%	8.1%	13.3%	100%
37.0%	29.6%	5.4%	18.4%	4.5%	4.9%	100%
3.7%	8.1%	26.3%	30.6%	17.6%	13.7%	100%
1.8%	0.5%	37.5%	26.8%	18.3%	15.0%	100%
2.0%	1.7%	38.7%	25.6%	19.7%	12.3%	100%
2.6%	2.0%	34.3%	27.9%	22.7%	10.4%	100%

1300 - 1359	10%	5%	2%	1%	28%	24%	19%	10%	100%		85%	1.2		2.7%	1.2%	33.2%	28.2%	22.4%	12.3%	100%
1400 - 1459	10%	4%	4%	11%	25%	20%	17%	10%	100%		86%	1.2		4.2%	13.0%	28.6%	22.8%	19.9%	11.5%	100%
1500 - 1559	7%	2%	26%	21%	12%	14%	12%	6%	100%		91%	1.1		28.2%	23.6%	13.1%	15.4%	12.9%	6.7%	100%
1600 - 1659	**22%**	**4%**	**7%**	**4%**	**15%**	**20%**	**18%**	**10%**	**100%**		74%	1.4		9.1%	6.0%	20.3%	27.5%	24.2%	12.9%	100%
1700 - 1759	**32%**	**3%**	**3%**	**2%**	**12%**	**20%**	**20%**	**8%**	**100%**		64%	1.6		4.6%	3.4%	18.7%	31.0%	30.6%	11.7%	100%
1800 - 1859	**21%**	**3%**	**1%**	**1%**	**15%**	**18%**	**31%**	**11%**	**100%**		76%	1.3		1.7%	0.9%	19.6%	23.4%	40.5%	13.9%	100%
1900 - 1959	11%	2%	1%	0%	16%	18%	41%	11%	100%		87%	1.2		0.6%	0.3%	18.5%	20.3%	47.4%	12.9%	100%
2000 - 2059	13%	3%	1%	0%	14%	15%	43%	11%	100%		85%	1.2		0.8%	0.4%	16.5%	18.2%	51.0%	13.0%	100%
2100 - 2159	14%	3%	1%	0%	9%	15%	49%	9%	100%		83%	1.2		1.0%	0.2%	10.8%	18.2%	59.2%	10.7%	100%
2200 - 2259	22%	3%	0%	0%	5%	11%	50%	9%	100%		75%	1.3		0.6%	0.1%	6.3%	15.1%	66.2%	11.7%	100%
2300 - 2359	24%	2%	1%	0%	3%	11%	52%	6%	100%		73%	1.4		1.4%	0.2%	4.3%	15.2%	71.2%	7.7%	100%
All day	18%	4%	9%	8%	17%	19%	18%	9%	100%		78%	1.3		11.5%	9.6%	21.4%	23.9%	22.5%	11.2%	100%

NTS Table 502 - Journey Purpose (Peak Periods)

Start time	Commuting	Business	Education	Escort education	Shopping	Leisure	All purposes
0700 - 0759	48%	6%	14%	5%	3%	24%	100%
0800 - 0859	20%	3%	29%	23%	4%	22%	100%
0900 - 0959	11%	5%	3%	7%	22%	52%	100%
1600 - 1659	22%	4%	7%	4%	15%	48%	100%
1700 - 1759	32%	3%	3%	2%	12%	47%	100%
1800 - 1859	21%	3%	1%	1%	15%	59%	100%

Note: *Other work, other escort and personal business + Visiting friends / entertainment / sport + Holiday / Day trip / Other combined to make '**Leisure**'*

NTS Table 502 - Peak hours Movements

Start time	Direction	Commuting	Business	Education	Escort education	Shopping	Leisure	All purposes	Check
0700 - 0759	Arrive	217	25	65	25	13	108	453	0
	Depart	760	88	228	87	47	380	1590	0
0800 - 0859	Arrive	141	22	203	163	30	153	712	0
	Depart	431	67	623	498	92	469	2179	0
0900 - 0959	Arrive	85	38	24	53	172	406	779	0
	Depart	61	27	17	38	123	290	556	0
1600 - 1659	Arrive	284	53	87	58	194	618	1293	0
	Depart	219	41	67	44	150	477	998	0
1700 - 1759	Arrive	400	41	37	27	150	587	1242	0
	Depart	350	36	32	24	131	513	1085	0
1800 - 1859	Arrive	331	46	20	11	237	943	1588	0
	Depart	223	31	14	7	160	635	1070	0

13,546

Internal

AM Peak Period	Arrive	30%	30%	70%	90%	50%	70%
	Depart	30%	30%	70%	90%	50%	70%
PM Peak Period	Arrive	30%	30%	70%	90%	50%	70%
	Depart	30%	30%	70%	90%	50%	70%

Internal - Peak hours Movements

Start time	Direction	Commuting	Business	Education	Escort education	Shopping	Leisure	All purposes
0700 - 0759	Arrive	65	8	45	22	7	76	223
	Depart	228	26	159	79	24	266	782
0800 - 0859	Arrive	42	7	142	146	15	107	460
	Depart	129	20	436	448	46	328	1407
0900 - 0959	Arrive	26	11	17	48	86	284	472
	Depart	18	8	12	34	62	203	337
1600 - 1659	Arrive	85	16	61	52	97	433	743
	Depart	66	12	47	40	75	334	574
1700 - 1759	Arrive	120	12	26	24	75	411	668
	Depart	105	11	23	21	65	359	584
1800 - 1859	Arrive	99	14	14	10	118	660	915
	Depart	67	9	9	7	80	445	617

7783

External

External	Arrive	70%	70%	30%	10%	50%	30%
	Depart	70%	70%	30%	10%	50%	30%
PM Peak Period	Arrive	70%	70%	30%	10%	50%	30%
	Depart	70%	70%	30%	10%	50%	30%

External - Peak hours Movements

Start time	Direction	Commuting	Business	Education	Escort education	Shopping	Leisure	All purposes
0700 - 0759	Arrive	152	18	19	2	7	33	230
	Depart	532	61	68	9	24	114	808
0800 - 0859	Arrive	99	15	61	16	15	46	252
	Depart	302	47	187	50	46	141	772
0900 - 0959	Arrive	60	27	7	5	86	122	307
	Depart	43	19	5	4	62	87	219
1600 - 1659	Arrive	199	37	26	6	97	185	550
	Depart	153	28	20	4	75	143	424
1700 - 1759	Arrive	280	29	11	3	75	176	574
	Depart	245	25	10	2	65	154	501
1800 - 1859	Arrive	232	32	6	1	118	283	672
	Depart	156	21	4	1	80	191	453

5763

Internalisation Summary

Type	No.	%
Internal Total	13609	70%
External Total	5763	30%
Total	**19372**	**100%**

Check	0

Commuting and Business Movements by Mode share (2011 Census - Adjusted)

Mode	Percentage	0700 - 0759		0800 - 0859		0900 - 0959		1600 - 1659		1700 - 1759		1800 - 1859		
		Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	
Underground, metro, light rail, tram	0%	1	2	0	1	0	0	1	1	1	1	1	1	
Train	12%	20	71	14	42	10	7	28	22	37	32	32	21	
Bus, minibus or coach	7%	12	42	8	25	6	4	17	13	22	19	19	13	
Taxi	0%	0	1	0	1	0	0	0	0	1	0	0	0	
Motorcycle, scooter or moped	1%	2	6	1	4	1	1	2	2	3	3	3	2	
Driving a car or van	**25%**	43	150	29	88	22	16	59	46	78	68	67	45	
Passenger in a car or van	3%	5	18	3	11	3	2	7	6	9	8	8	5	
Bicycle	27%	45	160	31	94	23	17	63	49	83	73	71	48	
On foot	24%	40	141	27	83	21	15	56	43	74	64	63	42	
Other method of travel to work	0%	1	2	0	1	0	0	1	1	1	1	1	1	
Total	**100%**	**169**	**593**	**114**	**349**	**86**	**62**	**236**	**182**	**309**	**270**	**264**	**178**	**2812**

Check	0

NTS Table 409a

Purpose	Walk	Bicycle	Car / van driver	Car / van passenger	Motorcycle	Other private transport	Bus in London	Other local bus	Non-local bus	London Underground	Surface rail	Taxi / minicab	Other public transport	All modes
Commuting	12%	4%	54%	7%	1%	0%	4%	5%	0%	5%	7%	1%	1%	**100%**
Business	8%	2%	65%	7%	0%	1%	3%	2%	0%	3%	7%	1%	0%	**100%**
Education / escort education	41%	1%	22%	23%	0%	2%	3%	6%	0%	0%	1%	1%	0%	**100%**
Shopping	25%	1%	46%	19%	0%	1%	2%	4%	0%	0%	1%	1%	0%	**100%**
Other escort	15%	0%	54%	28%	0%	0%	1%	1%	0%	0%	0%	0%	0%	**100%**
Personal business	23%	1%	43%	23%	0%	1%	2%	3%	0%	1%	1%	1%	0%	**100%**
Leisure[5]	16%	2%	38%	33%	0%	1%	2%	3%	0%	1%	2%	2%	0%	**100%**
Other including just walk	99%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**100%**
All purposes	26%	2%	40%	21%	0%	1%	2%	3%	0%	1%	2%	1%	0%	**100%**

Mode	Education / escort education	Shopping	Other escort	Personal business	Leisure	Other including just walk
Walk	41%	25%	15%	23%	16%	99%
Bicycle	1%	1%	0%	1%	2%	0%
Car / van driver	22%	46%	54%	43%	38%	1%
Car / van passenger	23%	19%	28%	23%	33%	0%
Motorcycle	0%	0%	0%	0%	0%	0%
Other private transport	2%	1%	0%	1%	1%	0%
Bus in London	3%	2%	1%	2%	2%	0%
Other local bus	6%	4%	1%	3%	3%	0%
Non-local bus	0%	0%	0%	0%	0%	0%
London Underground	0%	0%	0%	1%	1%	0%
Surface rail	1%	1%	0%	1%	2%	0%
Taxi / minicab	1%	1%	0%	1%	2%	0%
Other public transport	0%	0%	0%	0%	0%	0%
All modes	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Commuting	Business	All purposes
12%	8%	26%
4%	2%	2%
54%	65%	40%
7%	7%	21%
1%	0%	0%
0%	1%	1%
4%	3%	2%
5%	2%	3%
0%	0%	0%
5%	3%	1%
7%	7%	2%
1%	1%	1%
1%	0%	0%
100%	**100%**	**100%**

NTS Table 409a (Format adjusted for Cambridge)

Mode	Education / escort education	Shopping	Other escort	Personal business	Leisure	Other including just walk
Walk	41%	25%	15%	23%	16%	99%
Bicycle	1%	1%	0%	1%	2%	0%
Car / van driver	22%	46%	54%	43%	38%	1%
Car / van passenger	23%	19%	28%	23%	33%	0%
Motorcycle	0%	0%	0%	0%	0%	0%
Other private transport	2%	1%	0%	1%	1%	0%
Bus	*8%*	*6%*	*2%*	*5%*	*4%*	*0%*
Rail	2%	1%	0%	2%	3%	0%
Taxi / minicab	1%	1%	0%	1%	2%	0%
Other public transport	0%	0%	0%	0%	0%	0%
All modes	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Notes: London Underground combined with rail; London Bus and Coach combined with Bus

External **Education** Movements by Mode

Mode	Education / escort education	0700 - 0759		0800 - 0859		0900 - 0959		1600 - 1659		1700 - 1759		1800 - 1859	
		Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart
Walk	41%	9	32	32	97	5	4	13	10	6	5	3	2
Bicycle	1%	0	1	1	3	0	0	0	0	0	0	0	0
Car / van driver	22%	5	17	17	52	3	2	7	5	3	3	2	1
Car / van passenger	23%	5	18	18	55	3	2	7	6	3	3	2	1
Motorcycle	0%	0	0	0	0	0	0	0	0	0	0	0	0
Other private transport	2%	0	1	1	4	0	0	1	0	0	0	0	0
Bus	8%	2	6	6	20	1	1	3	2	1	1	1	0
Rail	2%	0	1	1	4	0	0	1	0	0	0	0	0
Taxi / minicab	1%	0	1	1	2	0	0	0	0	0	0	0	0
Other public transport	0%	0	0	0	0	0	0	0	0	0	0	0	0
	100%	**22**	**77**	**77**	**237**	**13**	**9**	**32**	**25**	**14**	**12**	**7**	**5**
External Education/education escort		22	77	77	237	13	9	32	25	14	12	7	5
check	0						435						94

External **Shopping** Movements by Mode

Mode	Shopping	0700 - 0759		0800 - 0859		0900 - 0959		1600 - 1659		1700 - 1759		1800 - 1859	
		Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart
Walk	25%	2	6	4	12	22	16	25	19	19	17	30	20
Bicycle	1%	0	0	0	1	1	1	1	1	1	1	1	1
Car / van driver	46%	3	11	7	21	40	28	45	34	34	30	55	37
Car / van passenger	19%	1	4	3	9	16	12	18	14	14	12	23	15
Motorcycle	0%	0	0	0	0	0	0	0	0	0	0	0	0
Other private transport	1%	0	0	0	0	0	0	1	0	0	0	1	0
Bus	6%	0	1	1	3	5	4	6	4	4	4	7	5
Rail	1%	0	0	0	0	1	1	1	1	1	1	1	1
Taxi / minicab	1%	0	0	0	0	1	1	1	1	1	1	1	1
Other public transport	0%	0	0	0	0	0	0	0	0	0	0	0	0
	100%	**7**	**24**	**15**	**46**	**86**	**62**	**97**	**75**	**75**	**65**	**118**	**80**
External Shopping		7	24	15	46	86	62	97	75	75	65	118	80

check	0

External **Leisure** Movements by Mode

Mode	Leisure	0700 - 0759		0800 - 0859		0900 - 0959		1600 - 1659		1700 - 1759		1800 - 1859	
		Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart
Walk	16%	5	19	7	23	20	14	30	23	29	25	46	31
Bicycle	2%	1	3	1	3	3	2	4	3	4	3	6	4
Car / van driver	38%	12	43	17	53	46	33	70	54	66	58	106	72
Car / van passenger	33%	11	38	15	46	40	29	61	47	58	51	93	63
Motorcycle	0%	0	0	0	0	0	0	0	0	0	0	1	0
Other private transport	1%	0	1	0	1	1	1	2	1	1	1	2	2
Bus	4%	1	5	2	6	5	4	8	6	8	7	12	8
Rail	3%	1	4	1	5	4	3	6	5	6	5	9	6
Taxi / minicab	2%	1	3	1	3	3	2	4	3	4	3	6	4
Other public transport	0%	0	0	0	0	0	0	0	0	0	0	1	1
	100%	**33**	**114**	**46**	**141**	**122**	**87**	**185**	**143**	**176**	**154**	**283**	**191**
Other work, other escort and personal business + Visiting friends / entertainment / sport + Holiday / Day trip / Other previously combined to make 'Leisure'		33	114	46	141	122	87	185	143	176	154	283	191

check	0

External Education, Shopping and Leisure (combined)

Mode	0700 - 0759		0800 - 0859		0900 - 0959		1600 - 1659		1700 - 1759		1800 - 1859	
	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart
Walk	16	56	43	132	47	34	68	52	53	47	79	53
Bicycle	1	4	2	7	4	3	6	4	5	4	8	5
Car / van driver	20	71	41	126	88	63	121	94	104	90	162	109
Car / van passenger	17	60	36	110	59	42	87	67	75	66	117	79
Motorcycle	0	0	0	0	0	0	1	0	0	0	1	1
Other private transport	1	2	2	6	2	1	3	2	2	2	3	2
Bus	4	13	9	28	11	8	16	12	13	11	20	13
Rail	1	5	3	9	5	3	7	6	7	6	10	7
Taxi / minicab	1	3	2	5	4	3	5	4	5	4	7	5
Other public transport	0	0	0	1	1	0	1	1	1	1	1	1
Total	**61**	**215**	**138**	**423**	**220**	**158**	**314**	**242**	**265**	**231**	**408**	**275**

2951

Check	0

External Vehicle Movements Summary

Journey Purpose	0700 - 0759		0800 - 0859		0900 - 0959		1600 - 1659		1700 - 1759		1800 - 1859	
	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart
Commuting & Business	47	166	32	98	24	17	66	51	86	75	74	50
Education	5	26	26	81	4	3	11	8	5	4	2	2
Shopping	3	11	7	22	41	29	46	35	35	31	56	38
Leisure	13	46	18	56	49	35	74	57	70	61	113	76
Total	**68**	**249**	**84**	**256**	**118**	**84**	**196**	**152**	**197**	**172**	**245**	**165**

vehicle Summary

Mode	0700 - 0759		0800 - 0859		0900 - 0959		1600 - 1659		1700 - 1759		1800 - 1859	
	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart
Vehicle Movements	68	249	84	256	118	84	196	152	197	172	245	165

Total	1985

215764 - South Cambridge

Research & Development - Commercial Space

Person Trip Rates (Per Employee)

Period	Time	Arrivals	Departures	Total
AM Peak hour	07:00 - 08:00	0.153	0.003	0.156
	08:00 - 09:00	0.284	0.006	0.29
	09:00 - 10:00	0.252	0.012	0.264
PM Peak Hour	16:00 - 17:00	0.02	0.177	0.197
	17:00 - 18:00	0.006	0.267	0.273
	18:00 - 19:00	0.006	0.162	0.168

Estimated no. of Employees	15,365

Person Movement

Period	Time	Arrivals	Departures	Total
AM Peak hour	07:00 - 08:00	2351	46	2397
	08:00 - 09:00	4364	92	4456
	09:00 - 10:00	3872	184	4056
PM Peak Hour	16:00 - 17:00	307	2720	3027
	17:00 - 18:00	92	4102	4195
	18:00 - 19:00	92	2489	2581

20,712 100%

Person Movement - Internal Commuting trips from **Residential** (On site)

Period	Time	Arrivals	Departures	Total
AM Peak hour	07:00 - 08:00	661	13	674
	08:00 - 09:00	1227	26	1253
	09:00 - 10:00	1089	52	1141
PM Peak Hour	16:00 - 17:00	86	765	851
	17:00 - 18:00	26	1154	1180
	18:00 - 19:00	26	700	726

Internal	28%

Based on **Campus Homes methodology**

5,826 28%

Person Movement - **Externa**l Movements

Period	Time	Arrivals	Departures	Total
AM Peak hour	07:00 - 08:00	1690	33	1723
	08:00 - 09:00	3136	66	3202
	09:00 - 10:00	2783	133	2915
PM Peak Hour	16:00 - 17:00	221	1955	2175
	17:00 - 18:00	66	2948	3015
	18:00 - 19:00	66	1789	1855

14886 72%

20,712 100%

Mode	Percentage	0700 - 0759		0800 - 0859		0900 - 0959		1600 - 1659		1700 - 1759		1800 - 1859	
		Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart
Cycle	32%	535	10	994	21	882	42	70	619	21	934	21	567
Motorcycle	1%	15	0	28	1	24	1	2	17	1	26	1	16
Single occupancy car	11%	182	4	339	7	301	14	24	211	7	318	7	193
Shared car	8%	134	3	248	5	220	10	17	155	5	234	5	142
Bus	19%	327	6	607	13	539	26	43	378	13	571	13	346
Walk	4%	74	1	138	3	122	6	10	86	3	130	3	79
Rail	10%	169	3	314	7	278	13	22	195	7	295	7	179
Park & Ride / CAM	15%	253	5	470	10	417	20	33	293	10	442	10	268
Total	100%	1690	33	3137	66	2784	133	221	1955	66	2950	66	1790
	Check	1	0	1	0	1	0	0	1	0	1	0	1

Mode	Percentage	0700 - 0759		0800 - 0859		0900 - 0959		1600 - 1659		1700 - 1759		1800 - 1859	
		Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart
Vehicle	16%	264	5	491	10	435	21	35	306	10	461	10	280

Mode	Percentage	0700 - 0759		0800 - 0859		0900 - 0959		1600 - 1659		1700 - 1759		1800 - 1859	
		Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart	Arrive	Depart
Park & Ride & CAM	15%	253	5	470	10	417	20	33	293	10	442	10	268

Appendix D

Cambridge South
Cambridge South Testing Overview

VM210403.Cambridge South

Introduction

1. Vectos Microsim (VM) has undertaken model testing using the Cambridge Microsimulation Model to assess the impact of the Cambridge South development proposals as part of the Cambridge Biomedical Campus (CBC) Expansion.

2. This note outlines the approach adopted in terms of testing methodology used to derived base and development model scenarios, before reporting on the associated network impacts predicted to occur in each scenario.

Objectives

3. The objectives of this assessment are outlined as follows:

- Develop a future year Base plus Committed Development model to ensure that the network capacitates for future year requirements.
- Review how trip patterns may change in the future and apply mode shift and active travel adjustments to account for this.
- Develop a scenario inclusive of Cambridge South proposals and assess the key network outputs against the Base plus Committed Development model outputs.

4. The following scenarios have been developed for this assessment:

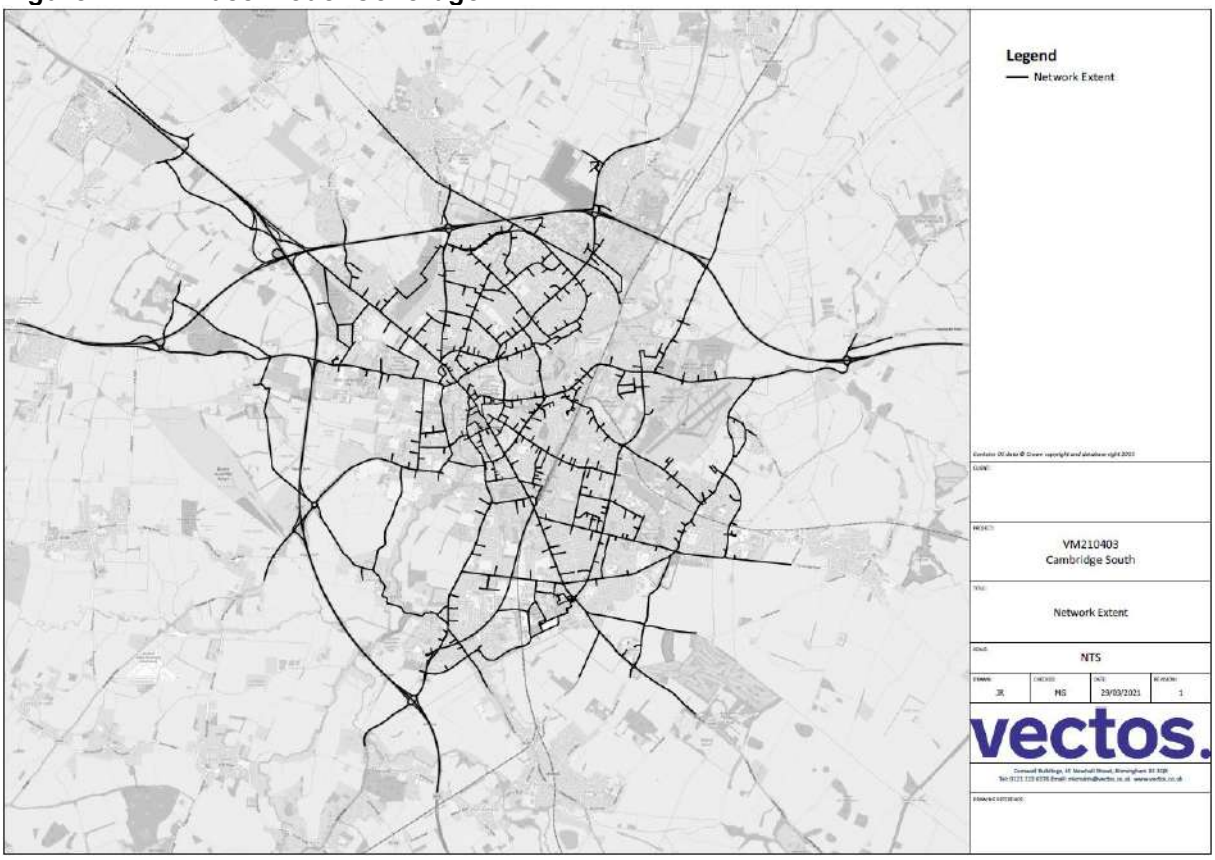
- Scenario 1 Base FYN + Committed Development
- Scenario 2 Base FYN + Committed Development + Cambridge South

Status of 2017 Base model

5. The base + com dev and development models detailed in this note have built upon the previously developed 2017 Base and 2031 Foundation Case models. As the highway network in Cambridge is already operating at capacity in the original Base model, any future year testing would need to account for this minimal spare capacity for additional future year demands to utilise. Therefore for the purposes of this round of testing both scenarios have been developed using the Future Year Network (FYN) as this is expected to account for baseline traffic and committed development scenarios.

6. The FYN Base network coverage is illustrated in the following figure.

Figure 1: FYN Base Model Coverage



7. The modelled hours remain consistent with the original model. The model has been developed to encompass the three-hour AM (07:00 to 10:00) and PM (16:00 to 19:00) time periods. Additionally, the base model also includes an average interpeak hour. For the purposes of this testing a focus on Peak Hour results has been adopted.

8. Vehicle release profiles are unadjusted from the originally developed model. Trip profiles are assigned to the development matrix to control the volume of trips travelling to/from the development on a 5-minute basis. A flat profile has been assumed for trips associated with committed developments and CBC proposals. A flat profile releases the hourly trip demands at equal intervals over the respective hour.

9. Several amendments to the original FYN have been made to reflect further refinement of on street conditions. Most notably a change to the lane usage at the Addenbrooke's Road / A1301 Signalised junction has been updated and the yellow box junction behaviour at the Hauxton Road / Anstey Way junction has been included.

Committed Developments.

10. The following committed developments have been included within the Base + Com Dev Scenario.

- Addenbrookes (28% left to develop)
- CBC Phase 2 (45k still to develop)
- Cambridge University
- Clay Farm

Mode Shift Assumptions

11. Following the development of the Base + Committed development model it was evident that the model was suffering from congestion across the network extent. Therefore, we have subsequently reviewed how trip patterns may change in the future on the basis of two key principles, reallocation to the P&R services to avoid traveling into the city from external regions and reallocation of short distance trips within the city centre via a switch to active modes. This strategy only looks at certain trip types and also applies adjustments which are limited by scope and trip nature.

12. Sectors have been defined in the model to control and adjust movements hierarchal to the model zones. Park and Ride (P&R) sectors are defined for exercise **Shift 1,** using the P&R locations identified to interact with the Cambridge South Network. Active Travel Sectors are defined for exercise **Shift 2** in which active modes trips are adjusted to align with short distance trips within the city centre. The P&R and Active Travel sectors are illustrated in **Figures 2** and **3**, respectively.

Figure 2: P&R Connectivity Catchment Area

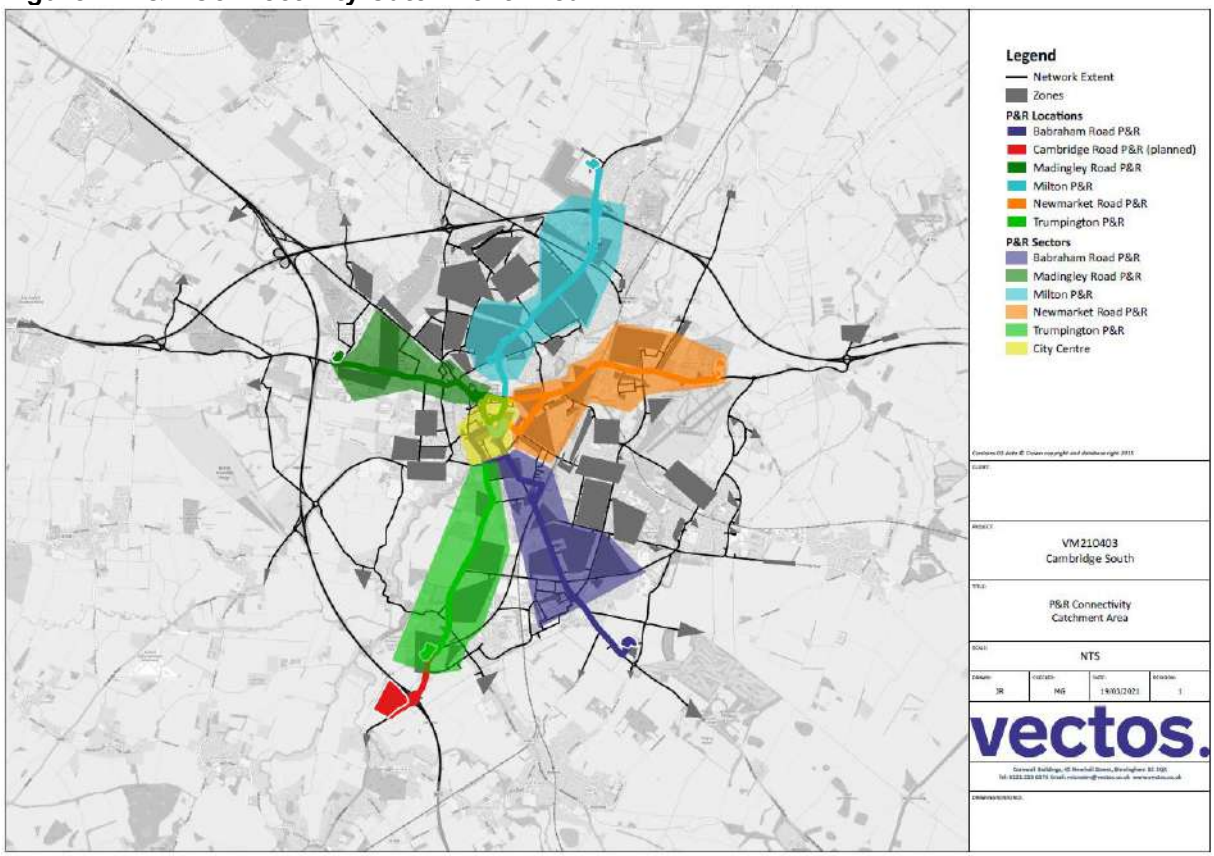
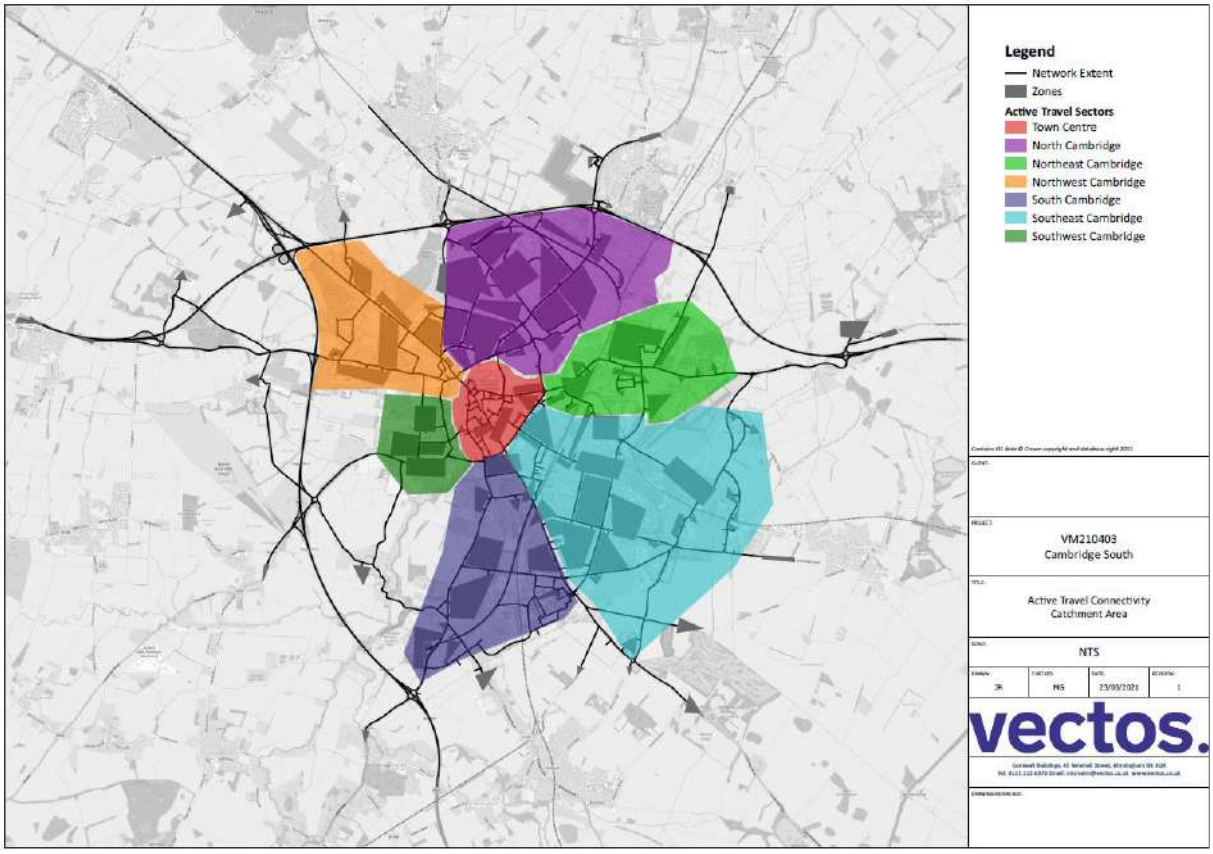


Figure 3: Active Travel Connectivity Catchment Area



13. The Mode **Shift 1** accounts for the trips interacting with the network from beyond the model extent, reducing the trips between external zones and internal zones within sectors. The external sector trips have been weighted according to likelihood of traffic diverting via P&R based on external zone catchment locations.

14. Mode **Shift 2** reduces the trips contained within the network. A 5% reduction has been applied for trips between zones within the Town Centre, and the Active Travel Sectors.

15. The Mode shift is applied to the model demands using a factor matrix calculated by the applied trip reduction in conjunction with the weighted inter-sector and intra-sector movements. These Mode Shift assumptions have been applied to the existing Base and Committed Development Matrices.

Development Inputs and Assumptions

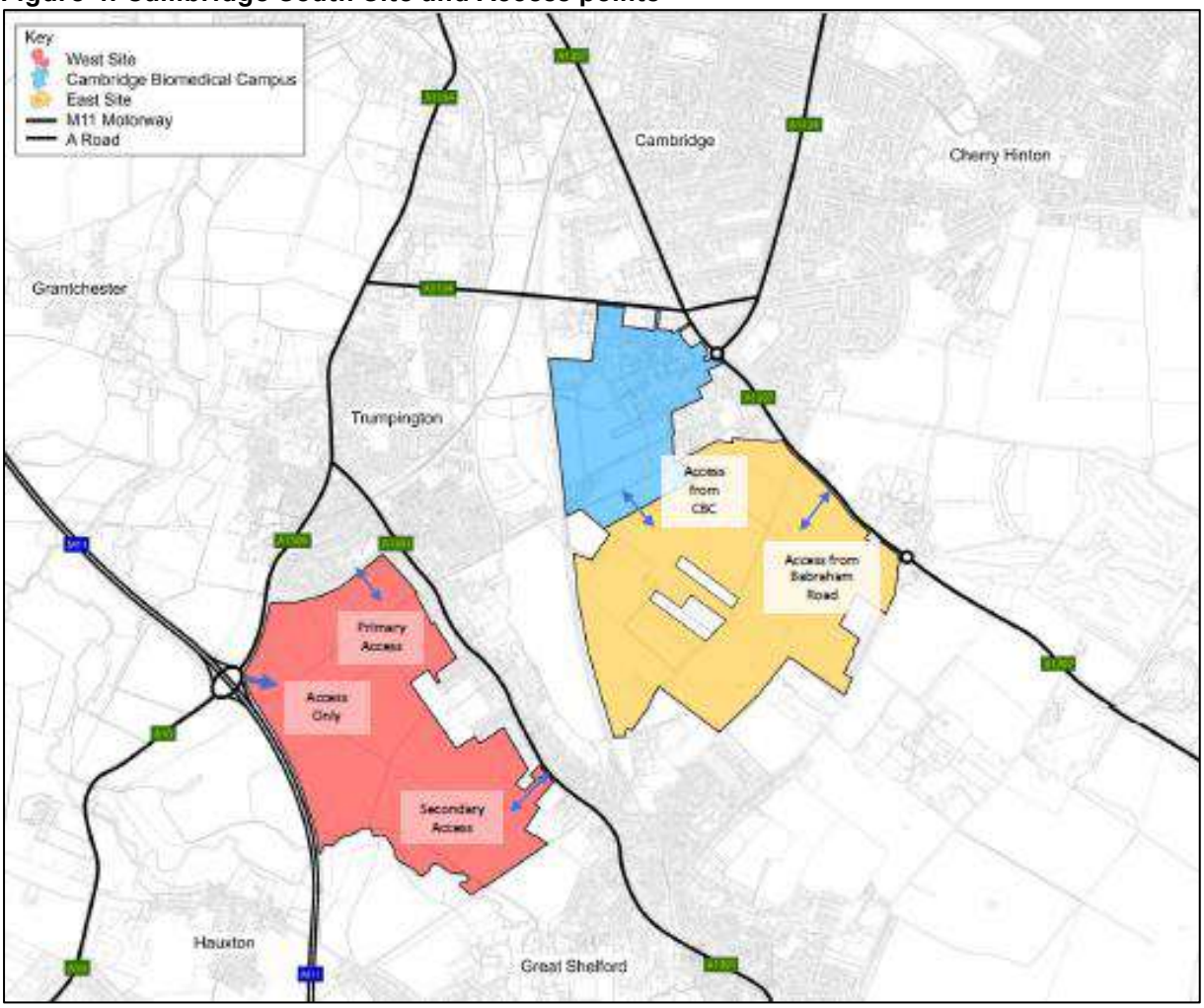
16. The Cambridge South proposals as part of the CBC expansion comprises land immediately south of CBC 'the East development area' and land to the west of Shelford Road 'the West development area'. The development offers the opportunity to respond to the growing needs of the CBC in a mixed-use sustainable development.

17. The proposals for Cambridge South are not fixed but the principles are clear. The emerging Masterplan provides for the components that respond to the CBC Vision for 2050. The development is set to provide:

- Employment floorspace comprising 405,057sqm of clinical, research, commercial R&D, education, supporting office and logistics spaces
- 5,000 homes
- Hotel and conference centre
- Retail and leisure
- Pre-school, Primary school and Secondary school provision
- Healthcare, sports, Leisure and recreation and community facilities

18. The development has been assigned two new zones in the model, Eastern (Zone 2001) and Western Sites (Zone 2000), the accesses to which are coded as simple priority junctions.

Figure 4: Cambridge South Site and Access points



Trip Generation

19. The development trip generation informs the total trips associated with the Cambridge South proposals. The trips are disaggregated by land-use of the areas to/from which trips interact with the development site.

20. Trip generation associated with the Cambridge South development proposals has been summarised within the following **Tables 2** and **3**, for AM and PM hours respectively. Additionally, development trips expected to use the park and ride facilities are also included within the model and are presented within **Table 4 and 5**.

Table 2: Cambridge South Trip Generation: AM Period

Land Use	AM Peak Period					
	0700-0800		0800-0900		0900-1000	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Residential	68	249	84	256	118	84
Research & Development / Office	264	5	491	10	435	21
Hotel	2	5	3	10	5	4
Total	**335**	**259**	**577**	**277**	**558**	**108**

Table 3: Cambridge South Trip Generation: PM Period

Land Use	PM Peak Period					
	1600-1700		1700-1800		1800-1900	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Residential	196	152	197	172	245	165
Research & Development / Office	35	306	10	461	10	280
Hotel	5	4	7	3	9	4
Total	**236**	**461**	**214**	**636**	**264**	**449**

Table 4: Cambridge South P&R Trip Generation: AM Period

P&R	AM Peak Period					
	0700-0800		0800-0900		0900-1000	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Trumpington Travel Hub	152	3	282	6	250	12
Trumpington	51	1	94	2	83	4
Babraham Road	51	1	94	2	83	4
Total	**253**	**5**	**470**	**10**	**417**	**20**

Table 3: Cambridge South P&R Trip Generation: PM Period

P&R	PM Peak Period					
	1600-1700		1700-1800		1800-1900	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Trumpington Travel Hub	20	176	6	265	6	161
Trumpington	7	59	2	88	2	54
Babraham Road	7	59	2	88	2	54
Total	**33**	**293**	**10**	**442**	**10**	**268**

Local Adjustments

21. The following local adjustments have also been applied within the development case model.

- CBC Base Traffic has been reduced by 4.5% to account for the new Railway station.
- 75% of CBC LGV and OGV of Base and Committed development trips have been relocated to the consolidation centre in the western site.
- Existing CBC Base and Committed development traffic has been reallocated to Trumpington Travel Hub and Babraham Road P&R sites.

Trip Distribution

22. The distribution of trips associated with the Cambridge South proposals has been informed by a combination of existing CBC travel Patterns and Census Travel to Work data. Cambridge 012 and Cambridge 013 Middle Super Output Layers (MSOA) were selected as the informant of distribution of trips to and from the western and eastern development areas, respectively.

Results Analysis

23. The following section details the results of the aforementioned scenarios. Each Scenario has been simulated for the following time periods:

- AM Peak Period (07:00 to 10:00)
- PM Peak Period (16:00 to 19:00)

Network Wide Statistics

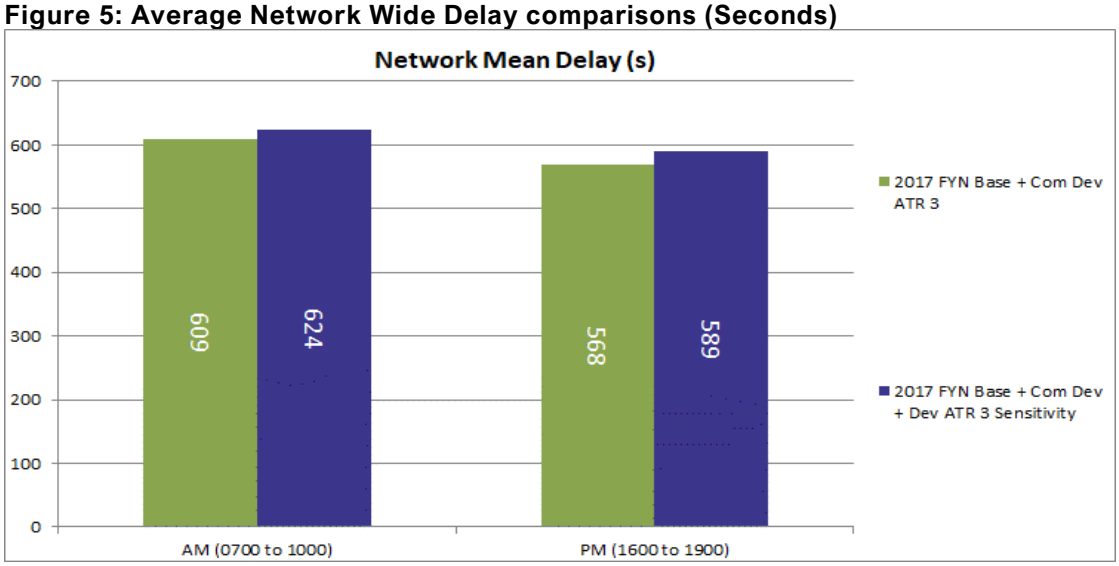
24. The performance of each scenario has been assess using a number of key performance measures, which are outlined as follows:

- Total Delay – The average journey time for all vehicles within the model network.
- Average Speed – That average speed of all vehicles that complete a trip within the model period.
- Completed Trips – That average total number of trips recorded as having been completed within the model period.
- Journey Times – The average time taken to travel along a predefined route through the model.

Average Journey Time

25. Analysis of the average journey times across the entire network (Seconds) within each of the modelled scenarios has been presented within the following figure:

Figure 5: Average Network Wide Delay comparisons (Seconds)



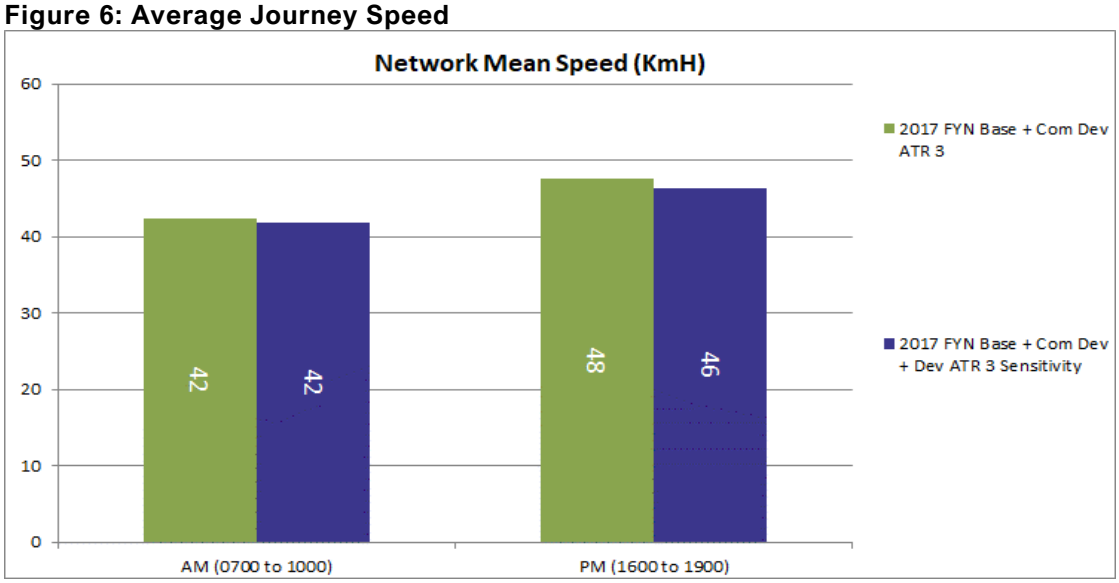
26. Analysis of the delay results presented in the figure above indicate that the introduction of the Development proposals alongside the Park and Ride, Active Travel and CBC reductions results in a slight increase, 15 seconds, in average delay when compared against both the Base + Committed

Development scenario with the AM period. Within the PM period there is an increase of 21 seconds change in network mean delay across the entire network.

Average Journey Speed

27. Analysis of the network wide average journey speeds (Km/H) within the modelled scenarios has been presented with the following figure;

Figure 6: Average Journey Speed

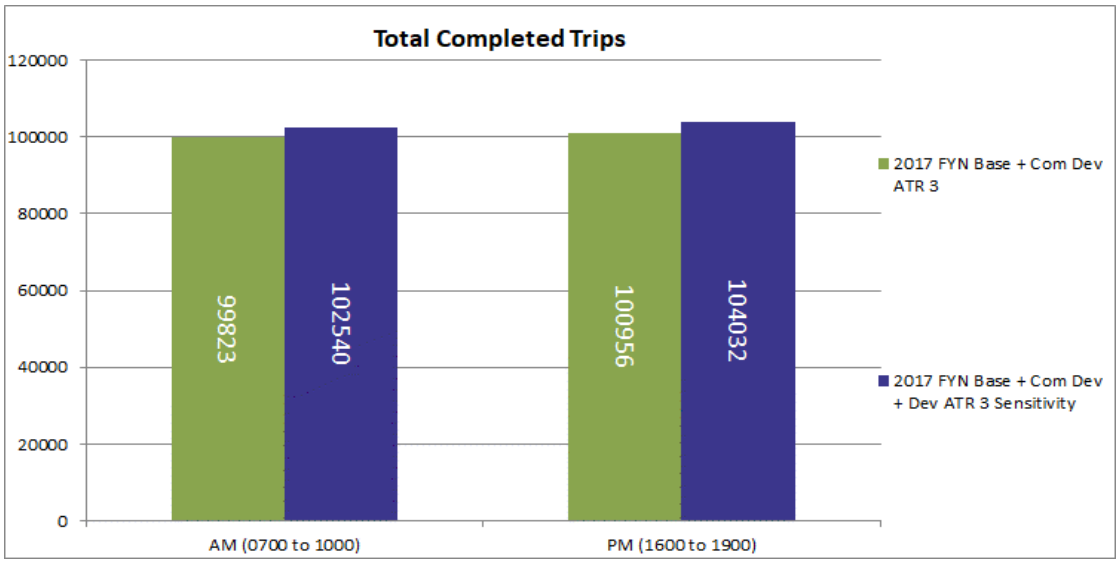


28. Analysis of the preceding figure shows that there is no notable change in the network wide average speeds as a result of the inclusion of the development proposals alongside the mode shift measures. In the PM period the speeds are shown to reduce by around 2 seconds to around 46 kph from 48.

Completed Trips

29. Analysis of the total number of completed trips within the modelled scenarios has been presented within the following figure:

Figure 7: Completed Trips

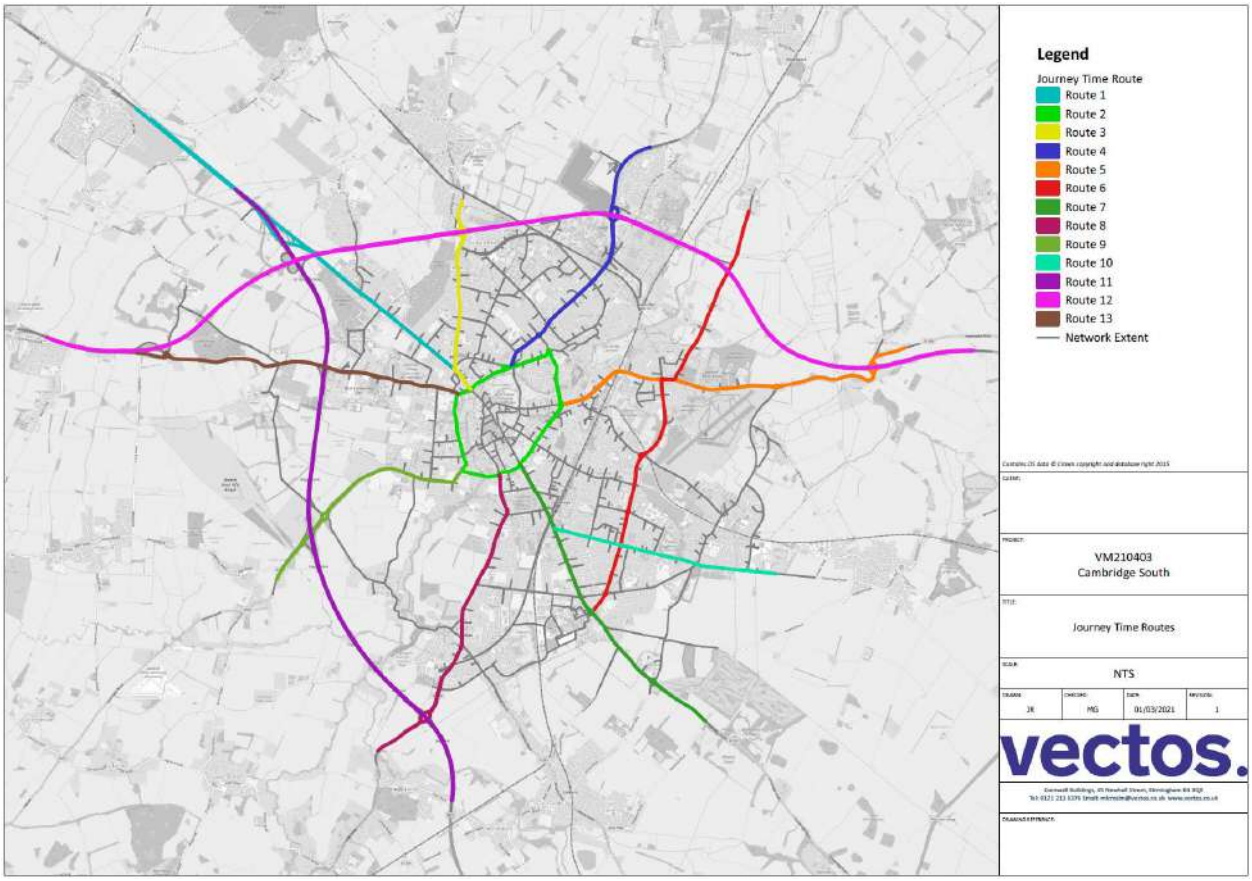


30. Analysis of the preceding figure demonstrates that there is a increase in the number of trips completing within the AM and PM modelled periods within the development scenario.

Journey Time Analysis

31. The following section of the note presents an analysis of the impact upon journey times of approaches to the Journey Time routes, which the model was originally validated against shown within the figure below.

Figure 8: Journey Time Routes



32. In addition an additional journey time route along the length of Addenbrooke's Road (Route 14) has been included as this route is a key consideration when assessing the impacts of the Cambridge South development proposals and has been the main focus of ensuring that impacts along this route are mitigated. The following table details the impacts on journey time routes in the AM and PM Peak Hours across the 14 routes.

Table 4: Journey Time Comparisons

Section	0800-0900			1700-1800		
	2017 FYN Base + Com Dev ATR 3	2017 FYN Base + Com Dev + Dev ATR 3 Sensitivity	Difference	2017 FYN Base + Com Dev ATR 3	2017 FYN Base + Com Dev + Dev ATR 3 Sensitivity	Difference
Route 1 NWB	411	405	-5	462	458	-4
Route 1 SEB	614	642	28	382	385	3
Route 2 Clockwise	945	990	45	962	990	28
Route 2 Anti-Clockwise	1082	1147	65	897	918	21
Route 3 NB	373	428	56	424	420	-4
Route 3 SB	876	1023	147	501	575	74
Route 4 NEB	766	729	-37	636	630	-5
Route 4 SWB	746	748	3	794	726	-68
Route 5 EB	580	579	-2	945	947	2
Route 5 WB	833	774	-59	583	587	4
Route 6 NB	897	889	-8	824	843	19
Route 6 SB	1410	1589	179	767	803	37
Route 7 NB	797	776	-22	682	710	28
Route 7 SB	660	670	11	627	680	54
Route 8 NB	763	715	-48	618	954	336
Route 8 SB	656	632	-23	895	859	-35
Route 9 EB	752	758	7	262	267	5
Route 9 WB	356	343	-13	349	351	2
Route 10 EB	522	494	-28	520	523	3
Route 10 WB	861	800	-61	489	511	22
Route 11 NB	392	401	9	396	431	35
Route 11 SB	403	401	-2	395	398	3
Route 12 EB	591	577	-14	578	579	1
Route 12 WB	1058	985	-73	587	589	3
Route 13 EB	1221	1232	11	483	484	1
Route 13 WB	494	502	8	499	506	7
Route 14 EB	253	243	-10	266	285	19
Route 14 WB	204	198	-6	665	275	-389

33. The key routes, that are within close proximity to the development proposals, are Route 7 Babraham Road, Route 8 A10/Hauxton Road and Route 14 Addenbrooke's Rd. The table above shows that travel times along Route 14 Addenbrooke's Rd remain consistent with the Base + Com Dev and the Base + Com Dev + Dev scenario. Within the PM Travel times in the WB direction are significantly reduced. This reduction is as a result of Existing CBC and Committed Development Traffic using the Trumpington Travel Hub and Babraham Road Park and Ride sites. There are no notable impacts on

travel times along Route 7 within the AM peak hour, however journey times are shown increase by a magnitude of less than 60 seconds within the PM Peak hour. Route 8 Journey times are shown to decrease within the AM peak hour again this reduction can largely be attributed to the shift in existing and committed development CBC traffic to the Trumpington Travel Hub. This reduction is also shown within the PM within the SB direction.

Conclusion

34. Vectos Microsim (VM) has undertaken model testing using the Cambridge Microsimulation Model to assess the impact of the Cambridge South development proposals as part of the Cambridge Biomedical Campus (CBC) Expansion.

35. The following scenarios have been developed:

- Scenario 1 Base FYN + Committed Development
- Scenario 2 Base FYN + Committed Development + Cambridge South

36. Following the development of the Base + Committed development model it was evident that the model was suffering from congestion across the network extent. Therefore we have subsequently reviewed how trip patterns may change in the future and applied mode shift assumptions to create a suitable Base + Committed development model to use as a reference to compare the development impacts against.

37. The development case model has been developed using the Trip Generation and distribution inputs detailed within this note alongside the further local adjustments to existing and committed development traffic adjustments at CBC. Results analysis has been provided using network statistics and impacts on Journey Time analysis. The model currently predicts that there are no adverse impacts on journey times along Addenbrooke's Road when accounting for the interventions outlined within this note.