



Strategic Economic Narrative & Economic Impacts Report

Outline Business Case - Appendix J

17 January 2020

Mott MacDonald
22 Station Road
Cambridge CB1 2JD
United Kingdom

T +44 (0)1223 463500
F +44 (0)1223 461007
mottmac.com

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Executive summary

Cambridge Phenomenon - driving UK growth

Supporting Cambridge's rapid economic growth, particularly within the life sciences cluster which competes internationally, is vital for the UK economy. Cambridge is one of the UK's fastest growing and most productive cities where economic success, a high quality of life and place are all inextricably linked. The thriving hi-tech and biotech industry, which has developed since the 1960s and is known as the "Cambridge Phenomenon", accounts for 23.9% of employment¹.

The city embodies the key foundations of the national Industrial Strategy² for the UK to become the world's most innovative economy. Cambridge helps the UK to compete globally, attracting high value jobs and net economic growth through internationally mobile employees in knowledge-based industries. The innovation has been able to thrive due to the deep and collaborative links between the University of Cambridge, business and research organisations. The cluster also interacts with the innovation economy that spans the Cambridge-Milton Keynes-Oxford arc, which are the UK's most productive cities.

"The UK Government should adopt a 'Cambridge or overseas' mentality towards knowledge-intensive (KI) business in this area, recognising that in an era of international connectivity and footloose labour, many high-value companies will need to relocate abroad if this area no longer meets their needs. Ensuring that Cambridge continues to deliver for KI businesses should be considered a nationally strategic priority."

Cambridge & Peterborough Independent Economic Review (CPIER), Final Report, September 2018

Over the long term, the Cambridgeshire and Peterborough Independent Economic Review (CPIER)³ clearly sets out that baseline growth projections, which inform local planning, have underestimated growth and by 2051 there could be as many as 450,000 additional jobs across the sub-region⁴. Past and current growth targets have not predicted the level of growth experienced and planning and transport policy needs to be actively planning for further growth.

¹ Based on high tech manufacturing and service related activities within the high-tech and biotech industries. Definition, using Standard Industrial Classification (SIC) codes, encompasses manufacture of pharmaceuticals, computer, electrical & optical equipment, electrical equipment and other specialist manufacturing (air & space craft and medical and dental instruments) and telecoms, computer related activities and relevant professional services (i.e. excludes financial and legal services and real estate). A full definition is included in Appendix A. Data from Business Register Employment Survey (BRES), Office of National Statistics (ONS), 2017 and relates to Greater Cambridge (Cambridge and South Cambridgeshire).

² Industrial Strategy: Building a Britain fit for the future, HM Government, November 2017

³ Cambridgeshire and Peterborough Independent Economic Review (CPIER) Final Report, Cambridge and Peterborough Independent Economic Commission, September 2018

⁴ CPIER growth projections based on central projection, with employment for Cambridgeshire and Peterborough increasing from 480,000 jobs in 2018 to 930,000 jobs in 2051.

Addressing the growth constraints

The Greater Cambridge City Deal (GCCD), signed in 2014, is a deal with Central Government to enable a new wave of innovation-led growth through investment in infrastructure, housing and skills to address existing shortages and high road traffic congestion levels.

High house prices in Greater Cambridge are driven by the city's economic success and the high wage high skill economy (demand driven), as well as constraints on housing supply due to the city's tightly defined local authority boundaries and greenbelt. As a result, Cambridge has experienced some of the fastest housing price growth in England and Wales over the last decade⁵.

Today, these priorities are becoming ever more pressing given the lack of housing supply and associated affordability issues. House prices in Cambridge are amongst the highest in the UK – almost two thirds more than the national average and over 10 times average workplace wages.

"If employment grows at the rates envisaged by the local plans, by 2031 there will be 32% more in-commuters in 2031 than in 2011. However, if employment growth continues at recent high rates, this could be as much as 82%."

Cambridge & Peterborough Independent Economic Review (CPIER), Interim Report, May 2018

Transport infrastructure is a fundamental enabler of supporting the additional housing and jobs growth required to support the wider growth ambition of Greater Cambridge and its partners. Both current and emerging transport policies set out in Cambridgeshire⁶ and the CPCA's non-statutory Spatial Framework⁷, firmly establish the role of high-quality public transport corridors in providing the required transport capacity to connect residents to opportunities in a sustainable manner. Without these corridors growth in housing (and labour) supply cannot be accommodated and existing residents would see increasingly constrained accessibility as road traffic congestion constrained connectivity. These would both stifle the economic growth potential of the area.

Greater Cambridge's spatial ambitions

Spatially, economic growth within the CPCA area over the short-medium term, as set out in the Combined Authority's plans and local authority Local Plans, focuses on 22 strategic growth sites, which collectively provide over 74,000 new homes for the Combined Authority area. This includes Cambourne West and Bourn Airfield, which will accommodate a high level of Greater Cambridge's economic growth.

In turn, the continued growth of Cambridge's innovation economy will be driven by the huge levels of growth planned at the fringe locations - Cambridge Biomedical Campus, Cambridge Northern Fringe East including Cambridge Science Park, West Cambridge and North West Cambridge – as well as the city centre and the new settlements. Ensuring transport connectivity and accessibility for both existing and new workers to these key employment sites will be critical given the scale of growth envisaged.

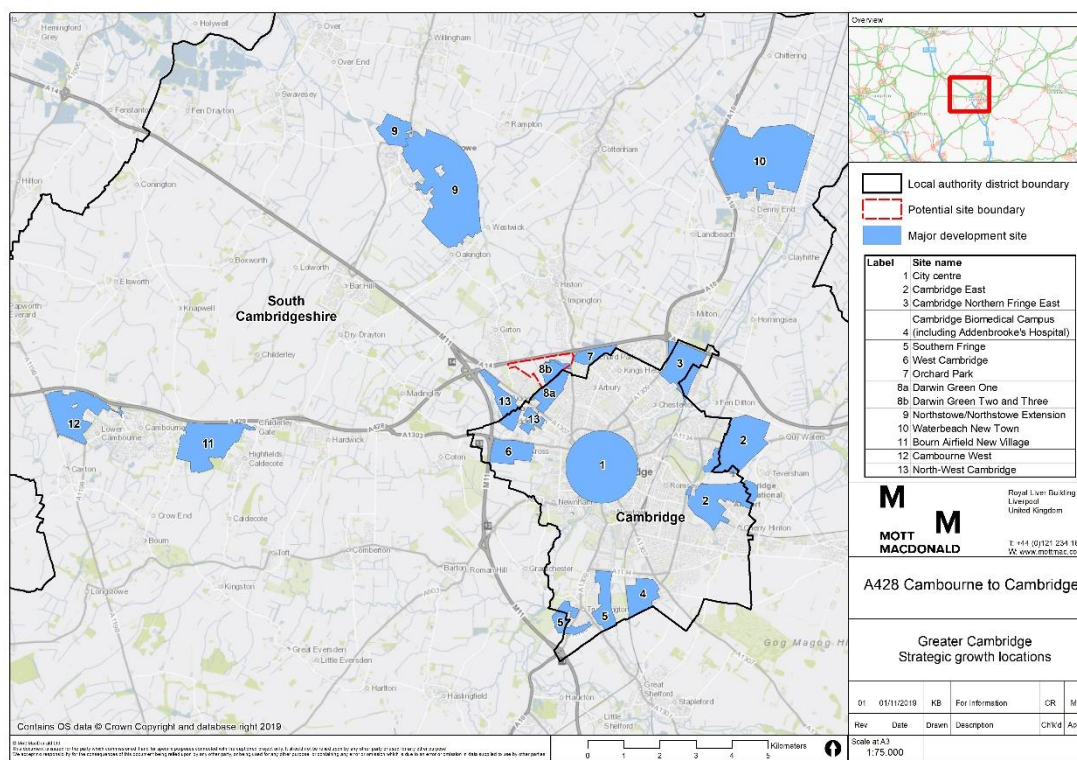
⁵ Using mean house prices, House Price Statistics for Small Areas (HPSSAs) dataset 14, ONS.

⁶ For example, Draft Cambridgeshire and Peterborough Local Transport Plan, Steer for Cambridgeshire and Peterborough Combined Authority, May 2019; Cambridgeshire Local Transport Plan 2011-2031, Policies and Strategy, Cambridgeshire County Council, July 2015 and Cambridgeshire Local Transport Plan 2011-2031, Long Term Transport Strategy, Cambridgeshire County Council, July 2015

⁷ Cambridgeshire and Peterborough Strategy Spatial Framework (Non-Statutory): Towards a sustainable growth strategy to 2050, Phase 1, 2018

Collectively, and based on current plans only, there are around 11,700 additional housing units planned and development is estimated to support at least 13,400 additional jobs on those sites along the Cambourne to Cambridge corridor. The new settlements Cambourne West and Bourn Airfield account for around 50% of the 11,700 new houses planned.

Greater Cambridge – strategic growth locations



Source: Mott MacDonald

Given the scale of growth and housing pressures in particular, the adoption of the Local Plans for Cambridge and South Cambridgeshire in 2018 included the policy to undertake an early review before the end of 2019. A joint Local Plan for Greater Cambridge is being developed to ensure that planning and transport policy can actively plan for growth and address the city's housing needs.

Cambourne to Cambridge Better Public Transport Project

The C2C project is along one of the key seven radial corridors that connect Cambridge to its surrounding towns and villages in South Cambridgeshire – the Cambridge to Cambourne and St Neots corridor to the west. Fundamentally the scheme aims to support new housing and development to accommodate Cambridge's growing population and workforce while enhancing connectivity for existing residents.

The C2C project evolved in response to existing issues of congestion on the local road network and the need to provide additional public transport capacity and improved levels of connectivity between the growing settlements to the west of Cambridge and key employment locations, including the city centre, the Biomedical Campus and the science park. In particular, the project aims to facilitate the increased demand for transport into Cambridge as a result of the planned

growth in housing along the A428/A1303 route and the forecast growth in employment within Cambridge.

The C2C project also forms the first phase of CPCA's plans for Cambridge Autonomous Metro (CAM). CAM⁸ will be an expansive metro network which seamlessly connects central Cambridge, its current and future rail stations, major employment sites on the city's fringe and key 'satellite' growth areas in Cambridge and across the wider sub-region. The proposals are heavily reliant on the success of other schemes in and around Cambridge, including C2C. The scale of the CAM project reflects Cambridge's need for transformational improvements in the city's infrastructure and connectivity to its wider hinterland.

The scheme will also form part of the last mile / first mile strategy into and out Cambridge as part of proposals for a Cambridge to Oxford expressway.

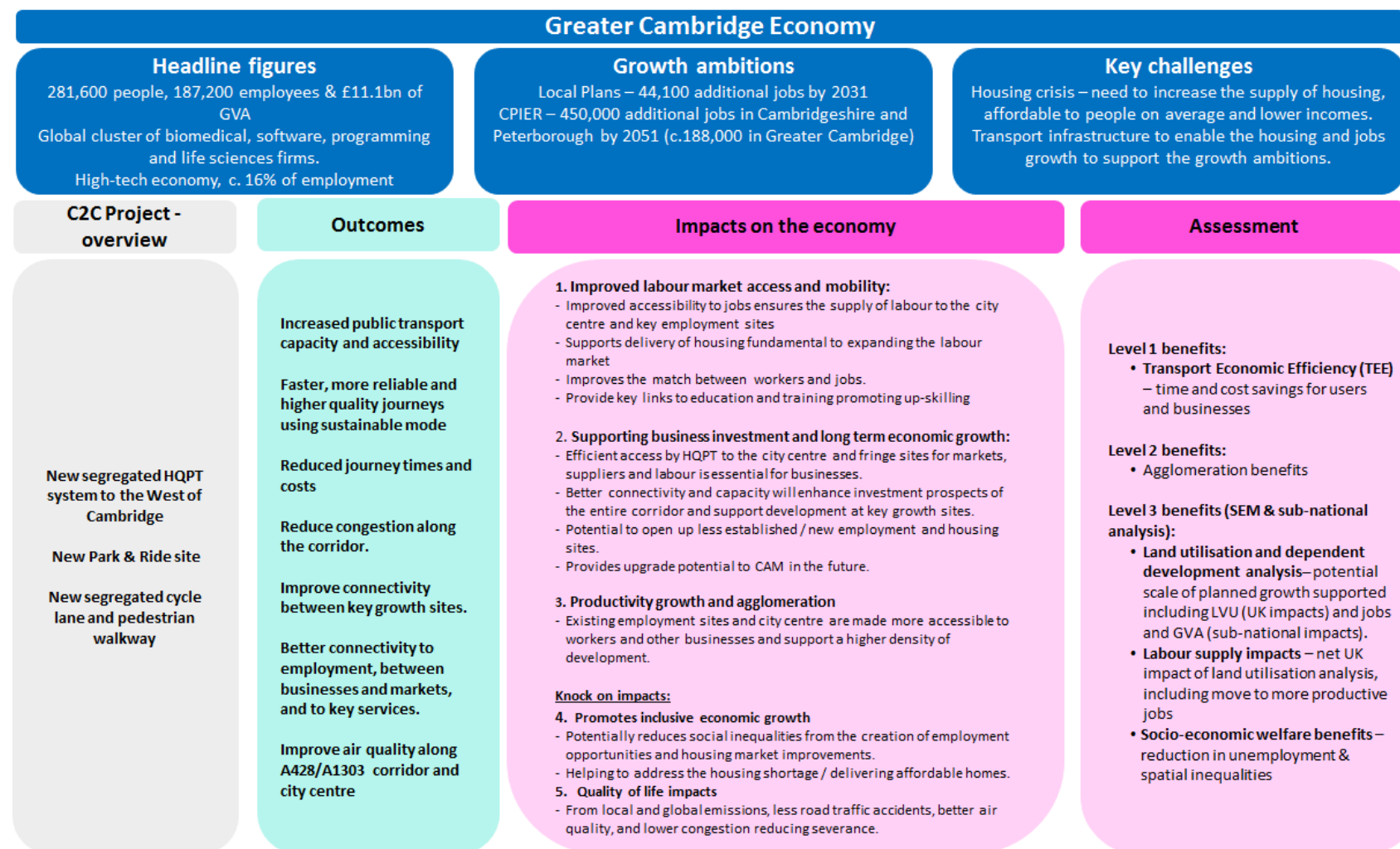
How will C2C support the economy?

Fundamentally, the C2C project will support economic growth by providing faster and reliable journey times that will improve connectivity and accessibility and thereby link housing and employment growth areas more closely. Providing the 'first phase' of CAM the scheme will become part of a wider network that seamlessly connects the fringe growth areas to the West with central Cambridge and other key growth areas. This offers the potential for significant new housing development along the corridor given it will have high public transport accessibility to key employment areas in Greater Cambridge, and where the developments themselves can be developed to a higher-density and more sustainable manner.

The key channels via which the C2C project influences the Greater Cambridge economy are identified below. The 'logic' demonstrates how the C2C project is perceived to support the Greater Cambridge economy via the services delivered and resulting transport outcomes, the economic impacts derived from these outcomes and the Wider Economic Impacts (WEIs), which can be quantified where possible.

⁸ As set out in the SOBC: Cambridgeshire Autonomous Metro Strategic Outline Business Case, Final Draft Report, Steer, February 2019.

C2C project – key economic linkages and impacts



Source: Mott MacDonald.

How are these impacts captured in transport appraisal?

Business case making, as set out by government, focuses on the principle of welfare economics and the net gain to the national economy. In recent years this standard approach has been augmented with recommendations over how to capture the additional benefits that can arise from transport improvements being transmitted into the wider economy, i.e. beyond those businesses and passengers that are directly affected by the transport change.

The Economic Case for the C2C project includes cost-benefit analysis based on the direct impacts of the scheme to both users and non-users (from changes in travel costs and times), changes in the externalities associated with car use (e.g. emissions and accidents), and changes in operating costs and revenue to the public and private sector.

However, given the C2C project is about safeguarding growth by ensuring sufficient transport capacity it is critical that the business case, whilst adhering to standard transport guidance, looks more widely from an economic development perspective at how the scheme supports economic growth in Greater Cambridge from the local perspective while maintaining an understanding of how this translates this into impacts at the UK level. These have been the governing principles of the approach adopted here.

Delivering significant economic benefits

For Greater Cambridge, the gross direct employment and associated GVA impacts have been estimated based on assessing the linkages between the C2C project and the sites along the corridor. Overall the gross economic impacts are anticipated to be within the range of 975 jobs, 5,850 housing units and £102.8m of GVA per annum⁹ (once all sites are fully built out). This is a very significant economic impact given the level of development planned and over a 30 year time period¹⁰ from 2019 the Present Value Benefits (PVB), in 2019 prices, would be in the range of £1.1bn.

C2C Project – Economic impacts (summary)

	PVB, 2019 values and 2019 prices, £m	PVB, 2010 values and 2010 prices, £m	Clarifications
Greater Cambridge	£1,075.9	£676.1	<ul style="list-style-type: none"> • 30 year time horizon • Relates to gross GVA impacts.
UK	£458.0	£287.8	<ul style="list-style-type: none"> • 30 year time horizon • Relates to net LVU impact.

Source: Mott MacDonald.

The UK impacts have been assessed based on the LVU impacts of the dependent development, which is in accordance with the latest government guidance across all departments. The LVU impacts relate to the increase in land values along the corridor due to the land's conversion into more productive uses. Using this approach, the overall net LVU impact of the C2C project is estimated to be £458.0m (in 2019 values and 2019 prices), assuming a 30 year time period from 2019.

⁹ Assuming again a GVA per worker figure of £61,800 in 2019 prices which is assumed to grow in line with GDP growth from the Annual Parameters (average GDP per person), TAG Data Book, Department for Transport.

¹⁰ A 30-year time horizon has been used with an average duration of GVA benefits of 13 years. Although commercial buildings would last longer than 30 years the new businesses locating within them (linked to the C2C project) are likely to move on sooner than this and therefore this time horizon is a reasonable assumption. An average discount rate of 3.5% has been used in line with HM Treasury Guidelines.

This UK level impact is assessed to be relatively conservative given a number of sensitivity tests around displacement and the level of dependency (to the sites). Furthermore, the study has included (and in line with the previous 2016 study) analysis of the degree to which the sub-national impacts (measured in terms of GVA) can be considered net additional at a UK level. This results in a higher UK impact and demonstrates that the LVU assessment is conservative in comparison.

Glossary

Table 1: Glossary terms

Abbreviation	Definition
BAU	Business As Usual
BCR	Benefit:Cost Ratio
C2C	Cambridge to Cambourne
CAM	Cambridgeshire Autonomous Metro
CBA	Cost Benefit Analysis
CCC	Cambridgeshire County Council
CPCA	Cambridgeshire and Peterborough Combined Authority
CPIER	Cambridgeshire and Peterborough Independent Economic Review
DfT	Department for Transport
FBC	Full Business Case
GC	Generalised Cost
GCCD	Greater Cambridge City Deal
GCP	Greater Cambridge Partnership
GDP	Gross Domestic Product
GEA	Gross External Area
GVA	Gross Value Added
HQPT	High Quality Public Transport
IMD	Index of Multiple Deprivation
LQ	Location Quotient
LVU	Land Value Uplift
MHCLG	Ministry of Housing, Communities and Local Government
NIC	National Infrastructure Commission
OBC	Outline Business Case
ONS	Office of National Statistics
P&R	Park & Ride
SEM	Supplementary Economic Modelling
SPD	Supplementary Planning Document
TAG	Transport Appraisal Guidance (often referred to as WebTAG)
TOD	Transit Orientated Development
VfM	Value for Money
WEIs	Wider Economic Impacts

Source: Mott MacDonald

1 Introduction

1.1 Aim of this report

Mott MacDonald was appointed by the Greater Cambridge Partnership (GCP) to prepare the Outline Business Case (OBC) for the Cambourne to Cambridge Better Public Transport (C2C) project. This report, as part of the OBC process, provides the strategic economic narrative of how the scheme supports economic growth within Greater Cambridge, informing both the Strategic and Economic Cases of the OBC. This includes an assessment of Level 3 Wider Economic Impacts (WEIs) for the preferred option (described below), which directly informs the Value for Money (VfM) assessment of the scheme. Level 3 impacts include land use changes which the scheme is expected to stimulate and/or Supplementary Economic Modelling (SEM) to better understand scheme impacts. Both of these are included in this narrative.

This assessment builds on the strategic economic appraisal of the scheme in 2016¹¹ which examined the relationship between the transport infrastructure and Greater Cambridge's growth ambitions and objectives. The focus of the previous study was understanding which scheme option, inclusive of online (low segregation from general traffic), hybrid (medium) and off-line (high) solutions, best supported Greater Cambridge's growth ambitions. The work concluded that the off-line solution best supported long term investment and growth and this analysis subsequently fed into the optioneering work carried out on the C2C project.

This report focuses on assessing the WEIs of the preferred option, however, the analysis undertaken as part of the 2016 work, that compared the preferred segregated off-line with the low cost online solution, is also summarised for context (presented in Appendix C).

1.2 The scheme

The C2C project evolved in response to existing issues of congestion on the local highway network and the need to provide additional capacity and improve levels of connectivity between the growing settlements to the west of Cambridge and key employment locations, including the city centre, the Biomedical Campus and the science park. In particular, the project aims to facilitate the growing demand for transport into Cambridge as a result of the planned growth in housing along the A428/A1303 route and the forecast growth in employment within Cambridge.

The C2C project has been described by the Greater Cambridge Partnership as the 'first phase' of the CPCA's wider transformational plans for a Cambridgeshire Autonomous Metro (CAM)¹². The vision for CAM is for an expansive metro network which seamlessly connects central Cambridge, its current and future rail stations, major employment sites on the city's fringe and key 'satellite' growth areas in Cambridge and across the wider region. Plans for CAM gained significant traction over the last 18 months and an SOBC for the scheme was published in March 2019.

Complementing the wider CAM project, the three key aims of the C2C project are:

1. To achieve improved accessibility to support the economic growth of Greater Cambridge.
2. Deliver a sustainable transport network/system that connects areas between Cambourne and Cambridge along the A428/A1303.

¹¹ Strategic Economic Appraisal of A428-A1303 Bus Scheme: Wider Economic Benefits, Cambridgeshire County Council, August 2016

¹² Cambridgeshire Autonomous Metro Strategic Outline Business Case, Steer, Final Draft Report 2019

3. Contribute to enhanced quality of life by relieving congestion and improving air quality within the surrounding areas along the A428/A1303 and within Cambridge city centre.

The proposed scheme consists of three core elements:

- A **new segregated public transport route**, with junction priority measures between Cambourne and Cambridge where required, that bypasses general traffic congestion;
- A **new Park & Ride** site off the A428/A1303 to supplement the existing Madingley Road Park & Ride, and;
- **New high-quality cycling and walking facilities** along as much of the route as is feasible.

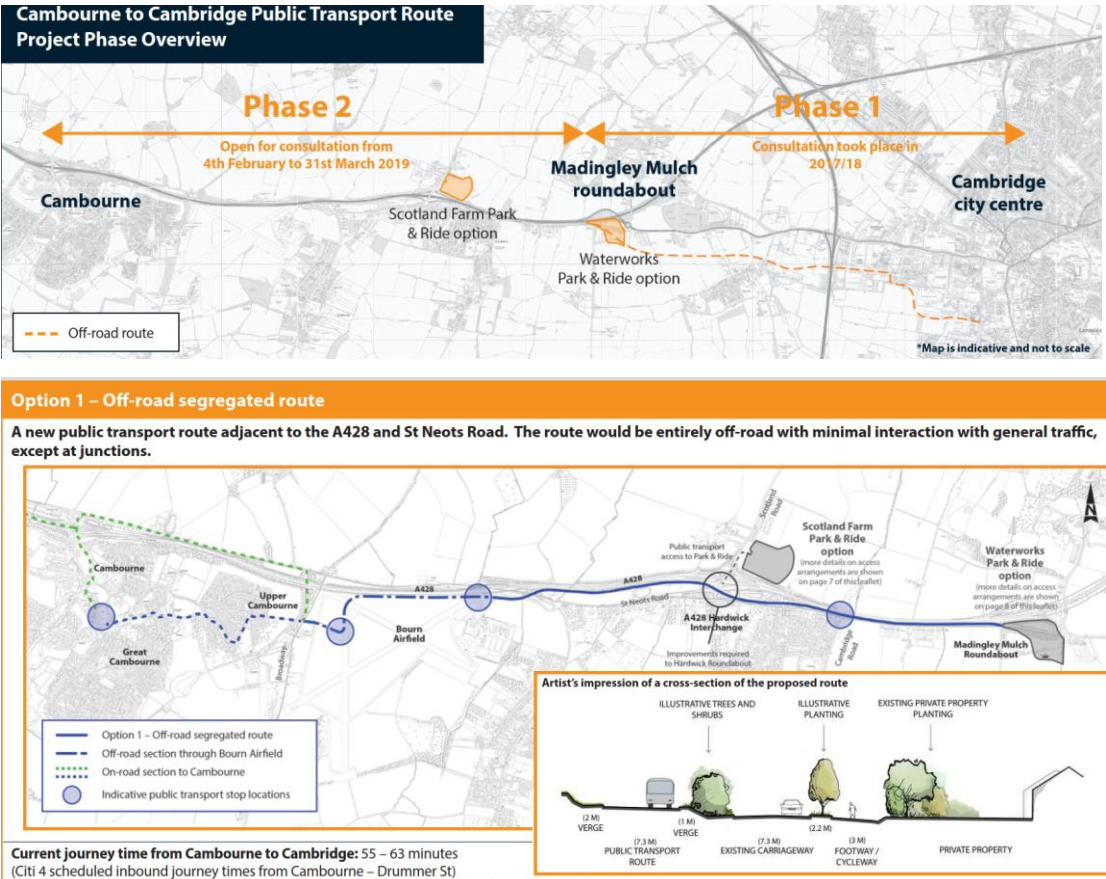
As the C2C project covers a wide area, the planning of the project has been split into two phases, with a new Park & Ride (P&R) facility being developed in parallel.

The Phase 1 route will run from the Madingley Mulch roundabout into Cambridge, connecting into the existing bus network on Grange Road. Phase 2 will link the route further west, out to Cambourne, through the proposed development at Bourn Airfield. Phase 1 and 2 together would provide the complete end-to-end High Quality Public Transport (HQPT) scheme between Cambourne and Cambridge and it is envisaged that both phases and the P&R site will be delivered in parallel.

Potentially, a future Phase 3 would complement the Highways England proposals for A428 Black Cat to Caxton Gibbett improvements by providing upgraded public transport connectivity to St Neots. Whilst this has been discussed in the context of the wider CAM network, it does not form a part of the proposals contained in this OBC.

The preferred option presented within the OBC that this report supports, which has been informed by consultation and optioneering work for the scheme, is therefore the off-road solution as presented below.

Figure 1: C2C Public Transport Route – preferred option



Source: Mott MacDonald

As stated above, this study also includes the comparison of the WEIs between the preferred off-road option and an on-road solution. The on-road option tested is the “optimised” on-road solution for Option 1 in Phase 1¹³ and Option 2 for Phase 2. This is discussed further in Appendix B.

Dependent upon the scheme achieving OBC approval later this year (2019) and Full Business Case (FBC) and statutory approvals in 2021, the current timeline for the C2C project sees construction due to commence in Q2 2022, with the aim of becoming operational in Q4 2024.

1.3 Methodology – overview

1.3.1 Transport guidance and Wider Economic Impacts (WEIs)

The HM Treasury (HMT) Green Book¹⁴ provides central government guidance on how to appraise and evaluate public policies, projects and programmes (the Five Case Model), which is based on the principles of welfare economics. The Department for Transport (DfT) Transport Appraisal Guidance (TAG) is the department’s internal guidance on business case making, which the OBC for this scheme is consistent with.

The Economic Case for the scheme includes Cost-Benefit Analysis (CBA) of user and non-user impacts (from changes in travel costs and times, including decongestion), changes in the externalities associated with car use (e.g. emissions and accidents), and changes in operating costs and revenue to the public and private sector. These, under an assumption of no changes in land use, are all termed Level 1 impacts. When set against a scheme’s projected capital and operating expenditure, these result in an overall Benefit-Cost Ratio (BCR). User impacts are typically the principal effect of a transport improvement and form the core of an economic appraisal but there is wide agreement that they fail to capture the full impact of major projects. Through consumer surplus theory, they are assumed to act as a proxy for conventional economic impacts, e.g. changes in welfare or GDP, or, at a local/regional level, Gross Value Added (GVA) and the associated jobs gains and productivity uplifts:

- Businesses gain productivity benefits through lowered costs, improved quality of inputs, or increases in market catchments; and
- Commuters can benefit by using the time saving to enter the labour market, work more, access a new job (which can all have GDP/GVA impacts), or could use the time for leisure (or ‘other’) uses (welfare impact).

Both these sets of impact contain welfare and GDP/GVA components, and the Level 1 impacts do not seek, and cannot readily, separate one from the other given the complexity of choices which individuals will make in response to a given intervention.

Since the mid-2000s, this analysis has been augmented within TAG¹⁵ with recommendations for the assessment of direct WEIs, as set out in TAG units A.2.1-A.2.4 (& TAG unit M5.3), published in May 2018. This guidance seeks to capture the net additional impacts (at the UK level) that can arise as the impact of the transport improvements are transmitted into the wider economy, beyond those businesses and passengers that are directly affected by the transport change.

¹³ Cambourne to Cambridge Better Public Transport Project, Interim Report, November 2018, as set out in Figure 5.

¹⁴ The Green Book: Central Government Guidance on Appraisal and Evaluation, HM Treasury, 2018

¹⁵ Available at: <https://www.gov.uk/guidance/transport-analysis-guidance-webtag> [Accessed: 02/02/18].

The most prominent study by three eminent academics¹⁶, which examined the economic impacts of transport investment and informed DfT's latest guidance on WEIs, identifies three 'levels' of impact:

- User impact effects (Level 1): direct effects and comprise the savings in time, vehicle operating costs and other elements of 'generalised travel cost' associated with better transport, plus monetised externalities to society and the environment. These are also termed 'established' economic impacts of transport investment (as they have long been the mainstay of economic appraisal), and user impacts are a recognised proxy for other forms of economic benefit through consumer surplus theory.
- Productivity effects (Level 2): productivity gains accruing to firms and workers, including those that are not themselves necessarily users of the transport improvement. These arise because of the economic benefits of scale and economic density, both of which are known to lead to higher productivity. These are also termed 'evolving' economic impacts and are initially (for Level 2) considered in terms of fixed land use scenarios, i.e. no interaction between transport supply and land use patterns.
- Investment and employment effects (Level 3): the potential for transport to alter patterns of private sector investment and employment, and thereby land use. This is a complex area of debate given transport links are but one factor shaping the location decisions for firm's investment. The concepts of additionality, displacement and the social value of investment are important here. These effects are also 'indicative' monetised impacts and can involve dynamic land use scenarios (in response to changes in transport supply).

The C2C project is primarily about supporting the continued growth of Greater Cambridge by providing new transport infrastructure that will provide effective links to development sites, supporting housing and employment growth. It will also provide the first stage of CAM which will build on this by connecting central Cambridge, its current and future rail stations, to all the major employment sites on the city's fringe, the new settlements and other key growth areas across the wider region. Fundamentally, given the overall aim of these proposals are to enable growth by ensuring sufficient transport capacity, it is critical that the business case, whilst adhering to DfT's WebTAG Unit A2.1 guidance, looks more widely from a local economic development perspective at how the scheme supports economic growth in Greater Cambridge and how these translate into net impacts at the UK level.

This report therefore sets out this narrative and how land use changes supported via the C2C project support the spatial growth planned for Greater Cambridge. Using this narrative, the report then looks from a DfT TAG perspective to consider the Level 3 impacts emerging from the scheme by considering induced investment (TAG Unit A2.2) and TAG Unit M5.3 on Supplementary Economic Modelling (SEM).

A key consideration in order to set out the Level 3 impacts that can feed into the OBC Economic Case and Value for Money (VfM) assessment will be understanding the difference between net impacts at the sub-regional, level, i.e. Greater Cambridge, and national level, which relies on assessing the level of displacement of economic activity between Greater Cambridge and the UK.

Within the economic case the outputs of the SEM within this report will be used to inform both:

- an 'Indicative BCR' incorporating Level 1, 2 and 3 impacts that are net additional at a national level; and

¹⁶ Transport investment and economic performance: implications for project appraisal, Anthony J. Venables, James Laird and Henry Overman, 2014

- a '*BCR sensitivity test*' that will examine the total WEIs arising from explicit land use changes at a Greater Cambridge level (sub-national). This will take into consideration the GVA impacts at a sub-national level, rather than just the national Level 3 impacts used in the '*Indicative BCR*'.

Further details on the methodology and underlying assumptions for this report and the calculation of Level 3 impacts is set out in Section 4 and Appendix B.

1.4 Report structure

The remainder of this report is structured as follows:

- **Section 2: Strategic Economic Context** – Examines the current economic performance of Cambridge and explores what is driving the city's success and the documented 'Cambridge Phenomenon'. This is supplemented by examination of strategic economic policy and economic growth forecasts to understand Cambridge's future outlook and aspirations, and what this means for the C2C project.
- **Section 3: Spatial Development Plans** – Reviews spatial development plans along the Cambourne to Cambridge corridor, and more widely the major developments within Greater Cambridge and the surrounding area. This sets out the overall growth planned at a site level and the linkages and degree of dependency between the development plans and the C2C project.
- **Section 4: Economic Impact Assessment** - Sets out the logic and methodology for assessing the scheme's economic impact in terms of land use and value, jobs growth and GVA impacts. This covers both the sub-regional economic impacts for Greater Cambridge and the appraisal of the WEIs of the scheme, in line with TAG guidance.
- **Section 5: Conclusions** – Summarises the findings in the preceding chapters and the anticipated economic impact of the scheme.
- **Appendix A:** Context – additional information
- **Appendix B:** Methodology – further details and key assumptions
- **Appendix C:** Strategic economic appraisal of options

2 Strategic economic context

This section provides the evidence regarding Cambridge's status as one of the most successful and growing economies in the UK and the scale of growth anticipated within the sub-region over the next 20 years and beyond. Infrastructure investment will be critical if Greater Cambridge and the wider area is to continue this growth trajectory. The analysis also directly informs the displacement scenarios used to assess the net additional impact at a UK level (covered in Section 4).

2.1 The Greater Cambridge economy and the 'Cambridge Phenomenon'

Greater Cambridge¹⁷ has grown into a highly successful city region where economic success, high quality of life and quality of place are inextricably linked. The thriving hi-tech and biotech industry, which has developed since the 1960s and is known as the "Cambridge Phenomenon", accounts for 23.9% of employment¹⁸.

Cambridge is one of the UK's fastest-growing and most productive cities and will continue to be a key hotspot for regional and national job creation. Between 2009-2017 total jobs growth in Greater Cambridge was 21.4% (in absolute terms) compared to 13.8% regionally and 11.7% nationally¹⁹. Over 2016-17 Cambridge ranked third highest out of all of the UK's cities for net private sector jobs growth (5.7%), with a net increase of 3,500 private sector jobs²⁰.

The city embodies the key foundations of the National Industrial Strategy²¹ for the UK to become the world's most innovative economy. Cambridge helps the UK to compete globally, attracting high value jobs and net economic growth through internationally mobile employees in knowledge-based industries.

The University of Cambridge, which is amongst the world's top universities, attracts global talent, fosters innovation and encourages business spin-outs. Cambridge has been at the forefront of the development of disruptive technologies, ranging from drug modelling, DNA sequencing and alternative fuels to network computing, inkjet printing, low power semiconductors, speech recognition software and telecommunications.

Today, the Cambridge sub-region is home to world-leading life sciences research centres such as the Medical Research Council Laboratory for Molecular Biology, the Babraham Institute for immunology research, and the Wellcome Trust Sanger Institute for genomic research. This year the new Papworth Hospital opened at the Biomedical Campus, uniting this internationally-recognised heart and lung treatment institution with other world-leading healthcare organisations.

¹⁷ Defined here to include Cambridge and South Cambridgeshire local authorities, in line with the Greater Cambridge Partnership (GCP).

¹⁸ Based on high tech manufacturing and service related activities within the high-tech and biotech industries. Definition, using Standard Industrial Classification (SIC) codes, encompasses manufacture of pharmaceuticals, computer, electrical & optical equipment, electrical equipment and other specialist manufacturing (air & space craft and medical and dental instruments) and telecoms, computer related activities and relevant professional services (i.e. excludes financial and legal services and real estate) and. A full definition is included in Appendix A. Data from Business Register Employment Survey (BRES), Office of National Statistics (ONS), 2017 and relates to Greater Cambridge (Cambridge and South Cambridgeshire).

¹⁹ Refers to employees using BRES, ONS, 2009-17 and relates to Cambridge district.

²⁰ Cities Outlook 2019, Centre for Cities, 2019

²¹ Industrial Strategy: Building a Britain fit for the future, HM Government, November 2017

In addition to the huge growth within the Biomedical Campus, the University of Cambridge also has huge expansion plans along the Cambourne to Cambridge corridor, including at North West Cambridge and West Cambridge, whilst Cambridge Science Park is one of Europe's largest centres for commercial research and development.

This entrepreneurial environment and concentration of people focused on science and engineering is attracting international businesses to invest in the area. Cambridge has transformed from a city characterised by a high rate of start-ups to a city which major companies class worthy of housing headquarters. More than 25 of the world's largest corporations have established operations in Cambridge, including Amazon, Apple, HP, Illumina, Microsoft, Sanofi, Siemens and Qualcomm. AstraZeneca has chosen Cambridge for its global research headquarters for 2,000 staff.

Understanding Cambridge's success

The Greater Cambridge City Deal²² attributes Greater Cambridge's economic success largely due to:

- A world class university that draws talent from across the globe, fostering innovation and encouraging new businesses;
- The area's scale and connectedness allows clusters of overlapping networks to develop and facilitates a culture of co-operation and cross-fertilisation between entrepreneurs and academics; and
- Retaining a strong heritage and sense of place, thereby competing with other world cities as a good place for business leaders and their families to live, not just a good place to do business.

Examination of key performance indicators, as shown in Table 2 below, clearly demonstrates that the Greater Cambridge economy, when compared to the UK and a range of other benchmark locations that are growing rapidly and fuelling national growth (Oxford, London and Manchester), is:

- Highly productive with productivity levels (measured by GVA per worker²³) exceeding the UK national average by £5,700, driven by a very high proportion of employment within knowledge intensive sectors, at 23.9% compared to 9.8% nationally. This reflects the importance of the knowledge and innovation economy, particularly the life sciences cluster, which is vital to the UK's life sciences sector at large (see the box below on Astra Zeneca).
- This economic success and productivity is underpinned by the very high level of skills of the workforce. Cambridge has very high levels of its population educated to degree level or above (NVQ4+) at 58.1% compared to 38.4% nationally. Furthermore, this does not just represent recent graduates (within the age cohort 16-24) from the University but is also embedded within the workforce aged over 24.

²² City Deal, Greater Cambridge City Deal Document, 2014

²³ Productivity tends to be measured by output per employee. At a sub-national level by ONS this is based on Gross Value Added (GVA) per productivity job. Overall when estimating using ONS data (note that GVA per worker is not available below NUTS3 area, in this case Cambridgeshire) the level for Greater Cambridge is largely in line with the national figure as productivity level for Cambridge are comparatively low. Given the structure of the Cambridge economy it is highly likely that GVA per worker is in fact higher and underestimated. The ONS data does not exist to interrogate this further and it is suspected that whilst education and health are clearly part of the life sciences cluster there are probably ancillary services which dampen down the overall figure. This working assumption is also further confirmed by workplace wages (given GVA is essentially wages plus profit) which are substantially higher than the UK levels and demonstrate the highly productive jobs that are present within the economy. Given this the figures presented for Cambridge, South Cambridgeshire and Greater Cambridge, are based on the East of England Forecasting Model (EEFM) 2013 figures adjusted for inflation.

- Greater Cambridge is home to a high proportion of highly skilled non-UK born migrants. 21.7% of Greater Cambridge's residents were born outside of the UK, compared to 15.7% nationally. Of its non-UK born population, 57% are qualified to degree level or above, which is significantly higher than the national average and exceeding the proportion seen in Manchester, Oxford and London.
- Cambridge's economic success is putting pressure on its housing market. Like Oxford and London, Greater Cambridge experiences high house prices with an average house price of £503,182 in Cambridge and £407,156 in South Cambridgeshire in 2018, against a national average of just £295,284. Nationally, this places house prices in Cambridge in the 1st decile and South Cambridgeshire in the 2nd decile, when ranked against all local authorities across England.
- Demonstrating its high levels of innovation, and as cited in the Centre for Cities' Cities Outlook 2019, Cambridge had the highest number of patents published per resident in 2017²⁴ at 270 per 100,000 population compared to 113 in Coventry and only 94 in Oxford (the closest contenders).

Table 2: Performance indicators

Indicator	Cambridge	South Cams	Greater Cambridge	London	Oxford	Manchester	UK
Headline statistics							
Population, 2017	124,900	156,700	281,600	8,825,000	154,600	545,500	66,040,200
Employment, 2017	103,000	84,000	187,000	5,134,000	118,000	386,000	29,550,000 ¹
GVA, £million, 2017	£5,900	£5,200	£11,100	£431,200	£6,800	£19,700	£1,819,800
Population density (persons per hectare), 2017	30.7	1.7	3.0	56.1	33.9	47.2	2.7
Productivity and innovation							
GVA per worker, £, 2017 ¹	£52,700*	£69,400*	£60,000*	£77,125	£52,400	£48,200	£54,300
GVA per head, £, 2017	£47,200	£33,300	£39,500	£48,900	£44,000	£36,100	£27,600
Wages - workplace, mean	£39,600	£41,700	-	£50,300	£36,800	£34,800	£35,400
% employed in knowledge intensive sectors ³ , 2017	17.3%	32.1%	23.9%	13.0%	8.8%	9.8%	9.8%
Patent applications per 100,000 of population, 2017	270	n/a	n/a	22	94	10	9
Skills							
% population aged 16-64 qualified to NVQ4+, 2017	58.1%	55.1%	56.6%	51.8%	63.0%	39.9%	38.4%
% population aged 16-24 qualified to NVQ4+, 2017	46.6%	19.5%	35.5%	26.6%	31.7%	22.4%	18.7%
% population aged 25-64 qualified to NVQ4+, 2017	61.3%	61.1%	61.2%	56.5%	67.4%	44.6%	42.5%
% of population non-UK born	32.2%	12.4%	21.7%	42.8%	31.7%	28.2%	15.7% ⁴
% of population non-UK born with skills NVQ4+	57.2%	56.7%	57.0%	38.6%	51.0%	32.4%	34.8% ⁴
Quality of life and living environment							
Mean house price paid, £, Year ending Sep 2018	£503,200	£407,200	n/a	£606,500	£504,300	£200,500	£295,300 ⁴
Wages - resident, mean	£40,200	£44,000	-	£47,000	£37,200	£29,300	£35,400

Source: Population Estimates, Annual Population Survey, Annual Survey of Hours and Earnings, Business Register and Employment Survey (BRES), Census 2011, Regional gross value added (balanced) local authorities by

²⁴ Cities Outlook 2019, Centre for Cities, 2019

NUTS1 region 2017, Nominal regional gross value added (balanced) per head and income components 2017, Sub regional productivity: labour productivity indices by UK NUTS2 and NUTS3 subregions, Mean house prices for administrative geographies (existing dwellings): House Price Statistics for Small Areas (HPSSA) dataset 14, all ONS. Patent data from Centre for Cities Data Tool, available at <https://www.centreforcities.org/data-tool/#graph=map&city=show-all>, PATSTAT; Intellectual Property Office. NVQ4+ refers to those educated to degree level or equivalent.

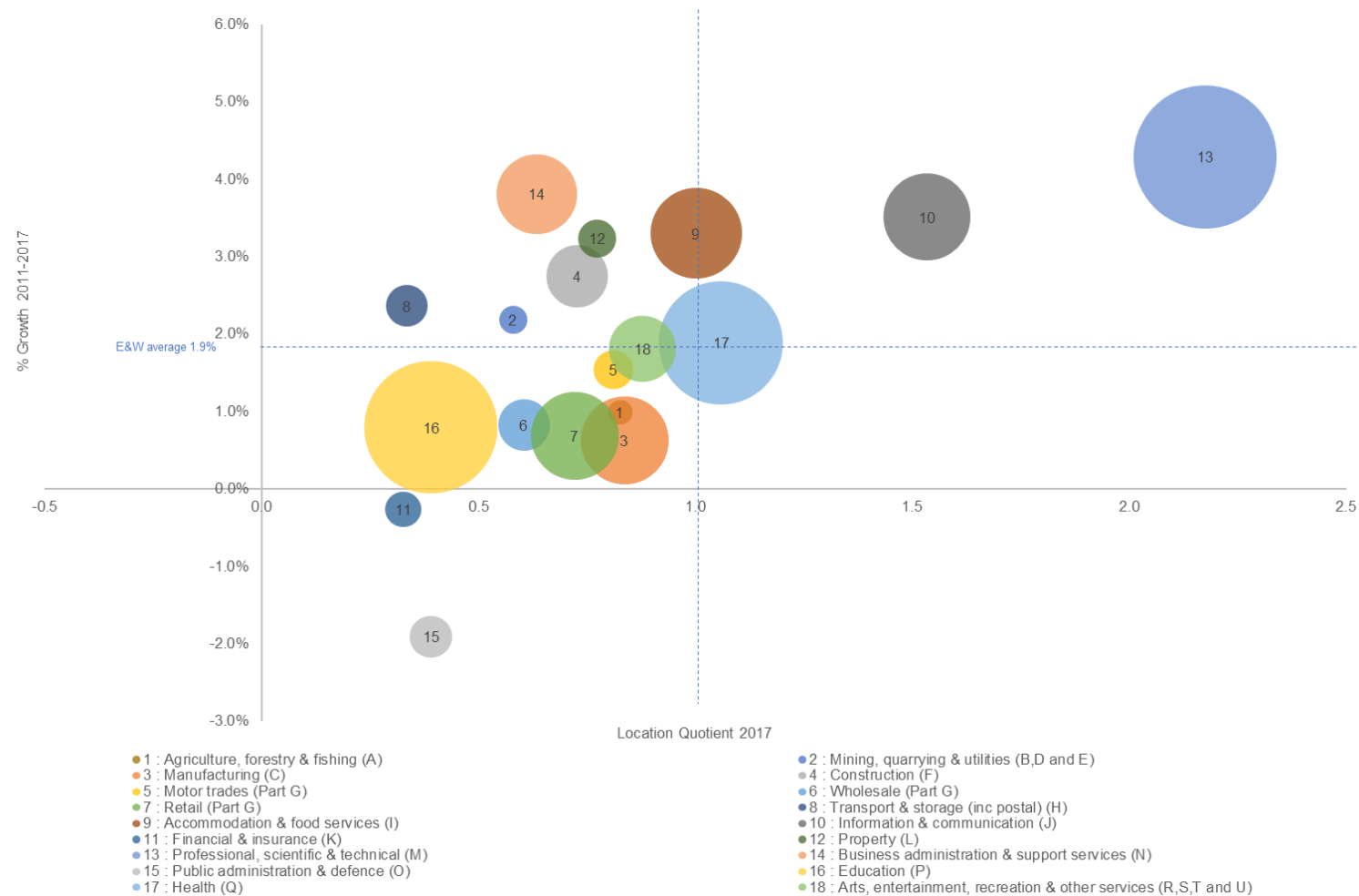
- ¹ Data not available for UK. Data shown is for Great Britain. * Cambridge figures taken from East of England Forecasting Model (EEFM 2017, accessible at <https://cambridgeshireinsight.org.uk/eeefm/>).
- ² GVA per worker figures for London, Manchester and UK from dataset 'Sub regional productivity: labour productivity indices by UK NUTS2 and NUTS3 subregions', ONS Regional and Sub regional Productivity February 2019 release. GVA per worker figures for Cambridge, South Cambridgeshire and Oxford estimated based on scaling employee jobs data (from BRES) and Self-employment jobs (from the APS).
- ³ See definition in Appendix A.
- ⁴ Data for England only.
- n/a Data not available.

Chart 1 explores the performance of the Cambridge economy in further detail by summarising the structure and relative strength of the Greater Cambridge economy by comparing:

- **Nationally growing sectors**, by examining average annual employee growth between 2010 and 2017 on the vertical axis for England & Wales (with the national economy average across all sectors being 2.0% per annum.)
- **Degree of specialism**, by examining Location Quotients (LQs) by industry on the horizontal axis. The LQ is the ratio of the share of an industry in total employment in Greater Cambridge compared to the corresponding national share and thereby an LQ above 1 represents a degree of specialism or over-representation compared to the national economy.
- **Absolute sector size** by total employees represented in circle size.

Chart 1: Greater Cambridge - employees by sector, growth and specialism (compared to England & Wales)

Circle size represents total employment size. LQ is the employment concentration in relation to England and Wales (E&W) averages. The growth rate refers to the average annual growth rate for England and Wales over 2011-17 (the economy average was 1.9%).



Source: BRES, ONS, 2010-17

The following trends can be observed:

- Greater Cambridge's economy is structured towards high growth sectors, including health, professional, scientific & technical services and information and communication services, which are growing rapidly nationally and represent significant specialisms with LQs approaching or exceeding 2. The health sector is growing rapidly at a local level (albeit more modestly nationally), which is reflective of the world-leading research centres mentioned above located in the area.
- Other sectors growing at a national level are under-represented in Greater Cambridge yet still employ a sizeable proportion of the population including business administration & support services and accommodation & food services. These sectors are key to supporting both university activities and wider business activities within knowledge intensive sectors and therefore play an important role in the Greater Cambridge economy.
- Positively, there are no industries over-represented but declining at a national rate (bottom right quadrant) demonstrating the competitive nature of the economy in high value sectors.

Cambridge: driving growth in life sciences²⁵

The UK's largest life sciences cluster – spanning London, Cambridge and Oxford – is one of the most important clusters in the UK and an integral part of the life sciences sector as a whole, providing over £8.4bn per annum for the economy (measured by GVA) and more than 24,000 high skilled jobs. Cambridge is a particularly important location, supporting a specialised workforce of more than 15,500 and contributing around £2.9bn annually to the UK economy.

Dr Benjamin Hall, Royal Society University Research Fellow and AstraZeneca partner said: *"Right now Cambridge is a growth engine for UK life sciences. Within the city there's an incredible range of work taking place, stretching from fundamental research to medtech and pharma. Its natural collaborative atmosphere - facilitated by deep links between the university, business and research organisations - makes it an exciting place to be doing life sciences research. Supporting the future growth of this world-class cluster will be vital to the success of the UK's life sciences sector at large".*

The Cambridge cluster is growing and has an opportunity for further expansion in the future. This is expected to be driven largely by growth in the number of scientific and research collaborations, and by the growth of new business spin-outs and joint ventures set up between large businesses and academics, and research institutes as well as SME partners.

If the cluster can grow unimpeded, it could generate an additional £1 billion per annum and provide an extra 6,000 jobs by 2032. Growth of the Cambridge cluster is important in helping the UK life sciences sector compete with established clusters in the United States – in particular with Boston and San Francisco – as well as emerging clusters in Europe and in Asia.

However, the research undertaken demonstrates that not only national constraints could hold back growth, including for example R&D funding, but also local constraints. The principal consideration being transport infrastructure and the challenges presented by a limited housing supply. Over the 2017-2032 period, the cumulative amount of net economic output that is expected to be lost, assuming that none of the possible constraints to growth at both local and national levels are taken into account, could be worth just over £7.9 billion (using 2017 prices).

²⁵ Recent research by AstraZeneca²⁵ has sought to quantify the economic impact of the Cambridge life sciences cluster. Source: Cambridge: driving growth in life sciences: Exploring the value of knowledge-clusters on the UK economy and life sciences sector, AstraZeneca and Development Economics, 2017.

2.2 Growth ambitions

2.2.1 Cambridgeshire and Peterborough Combined Authority (CPCA) - Devolution Deal²⁶

Cambridge's role as a world-leading city in science and technology and its contribution to the UK economy was explicitly documented in the Cambridgeshire and Peterborough Devolution Deal. Published in March 2017, the devolution deal awarded Cambridgeshire and Peterborough increased power and accountability over transport, planning and skills development, and funds to support economic and housing growth²⁷. Today, the CPCA works together on strategic issues, such as housing, transport and infrastructure, which span council borders and the entire Cambridgeshire and Peterborough area²⁸.

The Devolution Deal aims to enable significant economic growth, building on Cambridgeshire and Peterborough economic success to date, increasing economic output by nearly 100% over 25 years with GVA increasing from £22 billion to more than £40 billion. To support this, the CPCA received control of a £600 million investment fund over 30 years. The Deal also aims to accelerate the delivery of 72,000 new homes by 2031 with £170 million investment, £70 million of which is ring-fenced for Cambridge over a period of five years to meet its housing needs.

2.2.2 Greater Cambridge Partnership – delivering the City Deal

In addition to the Combined Authority Devolution Deal, the Greater Cambridge City Deal²⁹, signed in June 2014 (three years prior to the Devolution Deal) is the largest of the UK's City Deal programmes. The City Deal aims to enable the continued growth of the Cambridge Phenomenon through a new wave of innovation-led growth with investment in new homes, infrastructure and skills. The City Deal has brought together Cambridge City Council, South Cambridgeshire District Council, Cambridgeshire County Council, and the University of Cambridge to form the Greater Cambridge Partnership – the local delivery body for the City Deal.

The City Deal aims to accelerate the delivery of the 33,500 new homes allocated in Local Plans (see below) and support the creation of over 44,000 new jobs in the city region.

As part of the assurance framework Greater Cambridge authorities will prioritise projects that deliver against the following four strategic objectives of the GCCD (which can be thought of as the ultimate outcomes of the GCCD):

- **Create and retain investment** to nurture the conditions necessary to enable the potential of Greater Cambridge to create and retain the international high-tech businesses of the future.
- **Targeted business investment** supporting the Cambridge Cluster to the needs of the Greater Cambridge economy by ensuring those decisions are informed by the needs of businesses and other key stakeholders such as the universities.

²⁶ Cambridgeshire and Peterborough Combined Authority Devolution Deal, Ministry of Housing, Communities & Local Government and Department for Business, Energy & Industrial Strategy, March 2017

²⁷ Cambridgeshire and Peterborough Combined Authority Devolution Deal, Ministry of Housing, Communities & Local Government and Department for Business, Energy & Industrial Strategy, March 2017. The Cambridgeshire and Peterborough deal was one of six devolution deals awarded in the UK which, following elections in May 2017, saw the creation of a new combined authority each with a new directly elected mayor. These elections saw a shift in power, budgets and responsibilities passed from Central Government to the new elected mayors and their combined authorities.

²⁸ The CPCA comprises eight founding partners: Cambridge City Council, Cambridgeshire County Council, East Cambridgeshire District Council, Fenland District Council, Huntingdonshire District Council, Peterborough City Council and South Cambridgeshire District Council.

²⁹ Greater Cambridge City Deal, Deputy Prime Minister's Office, June 2014

- **Improve connectivity and networks** between clusters and labour markets so that the right conditions are in place to drive further growth.
- **Attract and retain skills** by investing in transport and housing whilst maintaining a good quality of life, in turn allowing a long-term increase in jobs emerging from the internationally competitive clusters and more university spin-outs.

Like the Combined Authority Devolution Deal, these strategic objectives demonstrate the City Deal's shared aim to support sustainable economic growth through investment in people and skills, housing, and improved transport connectivity.

2.2.3 Local Plan – growth targets

At a more local level, housing and employment growth targets for Greater Cambridge are presented in the Cambridge City Council and South Cambridgeshire District Council Local Plans, both adopted in 2018. The growth targets, summarised in Table 3, cover the 20-year planning period 2011-2031, and together establish a total growth target of 44,100 jobs and 33,500 new homes across Greater Cambridge. It is anticipated, however, that these figures will be updated over the coming year. Both councils are committed to preparing a joint Local Plan for Greater Cambridge with an early review of the existing Local Plans commencing before the end of 2019 and a Local Plan submission to the Secretary of State for examination anticipated by the end of Summer 2022. This is reflective of a move toward Greater Cambridge adopting a joint approach to spatial planning and assessment of its housing needs.

Table 3: Local Plan housing and employment growth

	New homes (2011-2031)	Jobs growth (2011-2031)
Cambridge	14,000	22,100
South Cambridgeshire	19,500	22,000
Greater Cambridge	33,500	44,100

Source: Cambridge Local Plan, Cambridge City Council, October 2018. South Cambridgeshire Local Plan, South Cambridgeshire District Council, Adopted September 2018.

2.2.4 CPIER – long term growth potential³⁰

Published in 2018, the Cambridgeshire and Peterborough Independent Economic Review (CPIER)³¹ has developed an evidence base on the economic performance and growth potential of Cambridgeshire and Peterborough, which has included consideration of a range of different growth scenarios beyond those set out in the Local Plans. Undertaken by an independent economic commission, the purpose of the review was to create a single strategic position to help Cambridgeshire and Peterborough 'consider the case for greater fiscal devolution and powers to unlock the delivery of major infrastructure, including showing how the area delivers benefits to the rest of UK'³².

The CPIER 2018 Final Report³³ is clear that not only has historical growth been underplayed but future growth could be much higher than the levels set out above. As summarised in section 2.2.1, a central element of the Devolution Deal for the CPCA was the commitment to doubling the area's economic output (GVA) over the following 25 years (from £22bn to over £40bn) in

³⁰ This entire section refers and summarises the CPIER report as relevant to this study.

³¹ Cambridgeshire and Peterborough Independent Economic Review (CPIER) Final Report, Cambridge and Peterborough Independent Economic Commission, September 2018

³² See <https://www.cpier.org.uk/about-us/cpier/> [Accessed 10 May 2019]

³³ Cambridgeshire and Peterborough Independent Economic Review (CPIER) Final Report, Cambridge and Peterborough Independent Economic Commission, September 2018

return for new powers. Achieving this level of growth will depend largely on the economy of Greater Cambridge.

The CPIER report has examined what the future for the CPCA economy could be – termed the Cambridgeshire and Peterborough Futures. The work sets out a ‘base case’ which is what is expected to happen given current development in Cambridgeshire and Peterborough, taking account of proposals in local plans, produced by councils, and the build out of the remainder of the planned new settlements. In this way the 44,100 jobs reported above can be viewed as the relevant ‘base case’ for Greater Cambridge.

The commission sets out four scenarios for the future of the area to inform recommendations about how development will be carried out and what infrastructure is likely to be needed to position the area well in the future. This includes examining the options for densification, fringe growth, dispersal, transport corridors and deeper digital transformations.

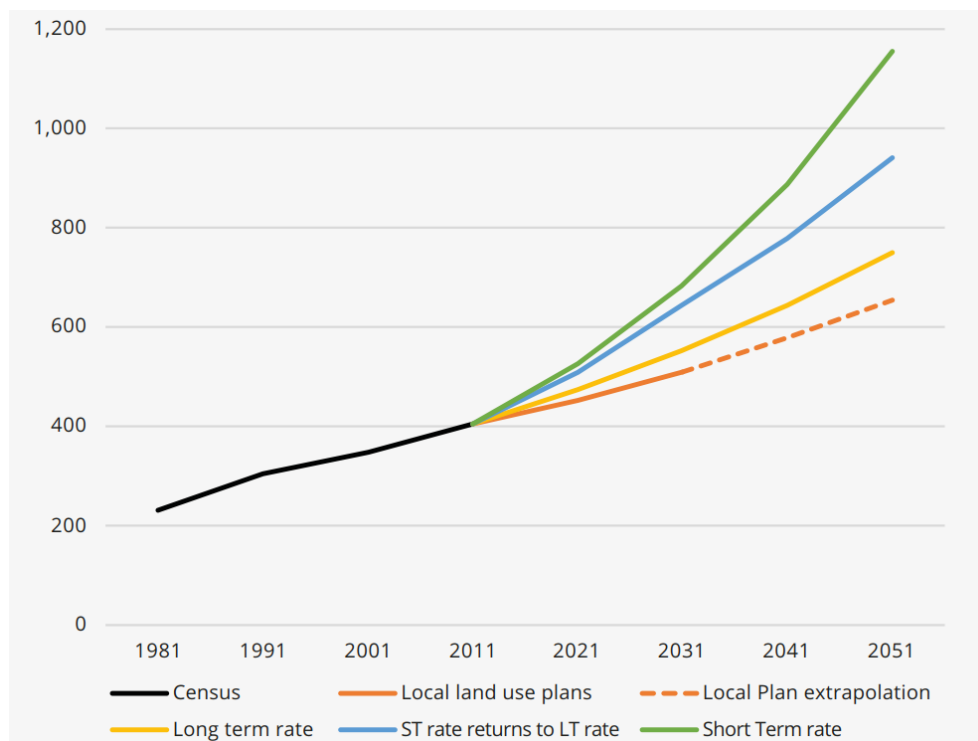
The modelling carried out is driven by employment growth and as this grows so does the demand for housing and the pressure on the transport system. The model has been run by the CPIER for four scenarios:

1. **Local land use plans** – capturing the assumptions around the employment targets underpinning the Local Plans. This can be considered a Business-as-Usual (BAU) scenario.
2. **Employment Growth** – Longer term rate. Based on a continuation of the 1981-2016 trend of employment growth (no weight given to recent high-levels of employment growth).
3. **Employment Growth** – Shorter term rate. Based on a continuation of the 2010-2015 employment growth trends according to recent CPIER data.
4. **Employment Growth** – shorter (ST) rate returning to longer term (LT) rate. Based on continuation of recent higher growth rates but then a gradual return to long term ONS growth rates. This projection is the commission’s central projection of the four model runs.

The findings in relation to these scenarios are shown in Chart 2, taken directly from the CPIER report. Clearly, growth according to the employment projections from historical performance demonstrate that the growth within the Local Plans are very low and at the lower bound of the projections. Discrete figures for Greater Cambridge are not available, but this analysis indicates that the 44,100 jobs target within the Local Plans is perhaps inherently pessimistic and planning and transport policy needs to be actively planning for further growth. The ‘central projection’ of employment growth in the CPIER report (which continues at the shorter-term rate then returning to the longer term rate) sets out a future where employment increases to 900,000 by 2051 (blue line in Chart 2); this significantly exceeds a future projection based solely extrapolating on local plan ambitions (orange line in Chart 2) but is lower than the projection that assumes the recent high levels of employment growth continue throughout the period (green line in Chart 2).

Overall, the difference between the BAU scenario based on Local Plan extrapolation compared with the central projection is over 250,000 jobs by 2051, at the Combined Authority level.

Chart 2: Employment projections for Cambridgeshire and Peterborough – '000s of people



Source: Dr Ying Jin, Department of Architecture, University of Cambridge, extracted from Cambridgeshire and Peterborough Independent Economic Review (CPIER) Final Report, Cambridge and Peterborough Independent Economic Commission, September 2018

Understanding the future growth potential of Cambridge and South Cambridgeshire is important not just for the sub-region itself, but also due to its potential impacts nationally for the UK, i.e. the net additionality provided by future economic growth in Cambridge once displacement between locations has been accounted for.

Recognising that for some knowledge-intensive sectors Cambridge is the only viable cluster in the UK, the CPIER³⁴ highlights the net additionality impact of the area to the UK's economic output and its national importance. The CPIER report included results from a qualitative survey which demonstrated that if a knowledge intensive company is forced to move away from the sphere of clustering activity, of those respondents who said they would likely or certainly move activity outside of the area, 44% responded that they would move abroad, compared to just 25% who would stay in the UK. The CPIER recommends a 'Cambridge or overseas' approach:

"The UK Government should adopt a 'Cambridge or overseas' mentality towards knowledge-intensive (KI) business in this area, recognising that in an era of international connectivity and footloose labour, many high-value companies will need to relocate abroad if this area no longer meets their needs. Ensuring that Cambridge continues to deliver for KI businesses should be considered a nationally strategic priority."

Cambridge & Peterborough Independent Economic Review (CPIER), Final Report, September 2018

³⁴ Cambridge & Peterborough Independent Economic Review (CPIER), Final Report, September 2018

2.2.5 Cambridgeshire and Peterborough Local Industrial Strategy

The Local Industrial Strategy³⁵ sets out an evidence-based plan to support industry across the area in ensuring Cambridgeshire and Peterborough can enhance its position as a global leader in knowledge and innovation, particularly within life sciences, information and communication, creative and digital industries, clean tech, high-value engineering and agri-business. The foundation for the Local Industrial Strategy is the CPIER which set out a series of key recommendations that have been further reiterated and developed.

The three priorities for the Local Industrial Strategy include:

- Improving the long-term capacity for growth in Greater Cambridge by supporting the foundations of productivity. This will reduce the risk of any stalling in the long-term high growth rates that have been evidenced in the area over the last several decades. The focus will be on investing heavily in housing; supporting supply chain development; delivering transformational transport and infrastructure; whilst leveraging the strengths and better connecting the Cambridge cluster.
- Increase sustainability and broaden the base of local economic growth. This will be done by identifying opportunities for high growth companies to accelerate growth where there is greater absorptive capacity, addressing the current bottlenecks to growth in Greater Cambridge.
- Expand and build upon the clusters and networks that have enabled Cambridge to become a global leader in innovative growth. The strategy sets out how business leaders, sectors, and places will join together to build an economy-wide business support ecosystem. This ecosystem will promote business growth; greater productivity; innovation commercialisation; greater global market access; and more effective skills development.

In terms of infrastructure, it was noted that the views of businesses surveyed and engaged in the development of place and sector strategies is that poor infrastructure is hampering growth and is set to increase as a problem over the next decade. Sustaining and de-risking the area's full potential for economic growth relies on transforming the transport, housing and infrastructure capacity in Greater Cambridge and improving the transport system for market towns. The report notes the importance of establishing in-principle the viability of CAM, which could support sustainable growth in and beyond Cambridge City.

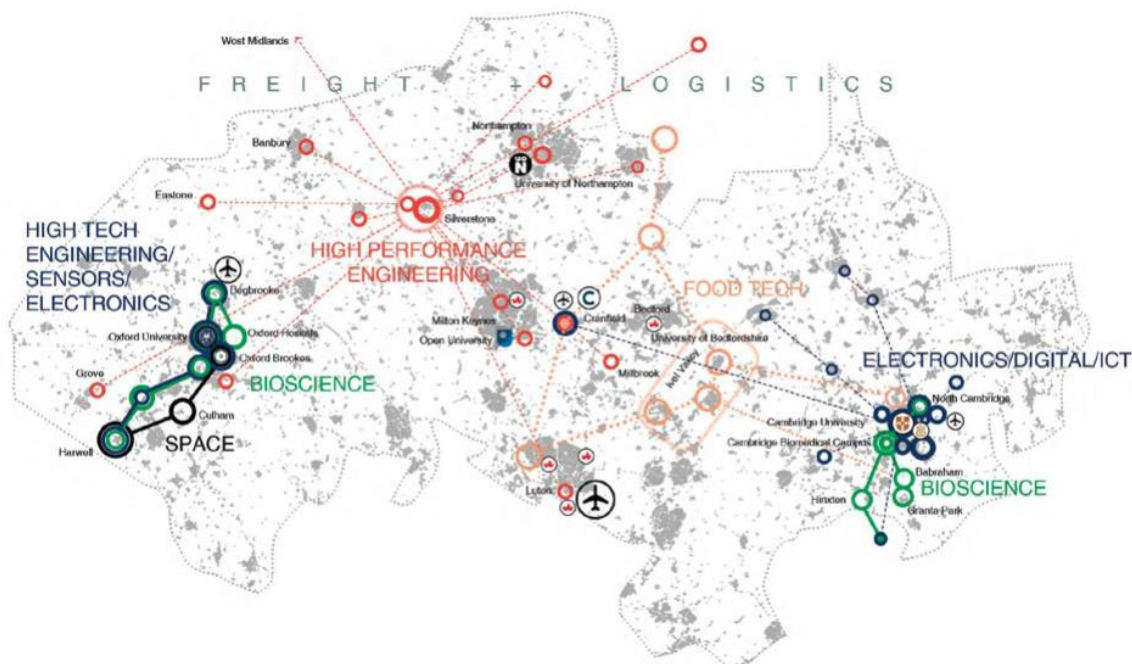
2.2.6 The Cambridge-Milton Keynes-Oxford Arc

Cambridge's contribution to the national economy also comes to the fore in proposals for improving infrastructure and connectivity across the Cambridge-Milton Keynes-Oxford Arc, the aims of which are to maximise the potential of the arc as a connected, knowledge-intensive cluster that competes on a global stage³⁶. For Cambridge, these proposals cite the city's strengths in electronics, digital tech and bioscience (Figure 2).

³⁵ Cambridgeshire and Peterborough Local Industrial Strategy, HM Government, July 2019

³⁶ 'Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Arc', National Infrastructure Commission, November 2017

Figure 2: Major business clusters in the Cambridge-Milton Keynes-Oxford arc



Source: 5th Studio based on analysis from SQW, cited in 'Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Arc', National Infrastructure Commission, November 2017

The National Infrastructure Commission's (NIC) report 'Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Arc' outlines the role of Cambridge, Milton Keynes and Oxford as amongst the UK's most productive cities, however highlights that these are currently diverse and disjointed economies, with the arc comprising a polycentric housing area and labour market. The NIC argues that a joined-up plan for jobs, homes and infrastructure is required to help achieve the arc's economic potential.

"The success of the Cambridge-Milton Keynes-Oxford arc should be a national priority. The arc competes with locations across the globe, attracting talent and bringing investment into the UK. Its towns and cities are amongst the most economically productive outside London and make a vital contribution, both to national income and to national tax revenues.

If the UK is to succeed in the global economy, it must invest in the success of the arc. This matters, not just for those who live and work in the arc, but for all parts of the UK."

'Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Arc', National Infrastructure Commission, November 2017, page 20

Significantly, the NIC argues that without action there is a real risk that a chronic undersupply of homes could limit growth, access to labour and the future prosperity of the arc. The report's central finding is that rates of house building must double in order for the arc to fully achieve its economic potential. The report also makes recommendations around new strategic infrastructure that will help bridge the gap between towns and cities in the arc, focusing in particular on a new East West Rail and the Oxford-Cambridge Expressway. This is of particular

relevance for the C2C project as the St Neots and Cambourne - Cambridge corridor is part of the proposed alignment for the Oxford-Cambridge Expressway³⁷ (see section 2.3.2).

2.2.7 London-Stansted-Cambridge Corridor

The London-Stansted-Cambridge-Corridor (also known as the UK's Innovation Corridor) connects Peterborough and Cambridge to London, via the research centres of Hertfordshire and Essex, and the international airport at Stansted³⁸. The Corridor shares a set of fast growing and highly productive industries supported by a global centre for business and financial services, which are underpinned by a shared housing market, labour market and infrastructure system. This area has the potential to generate 400,000 new jobs, half of which would be in technological jobs, by 2036³⁹. This Corridor plays a significant role in the growth of the Life Sciences sector across the wider region

The London Stansted Cambridge Consortium (LSCC) was formed in June 2013 as a strategic partnership of public and private organisations and has a 20 year ambition to ensure the corridor becomes a competitive global tech and life sciences region. This includes priorities to ensure new powers and financial vehicles, provide place-making for tech and life sciences, build talent and ensuring everyone can benefit, ensuring London Stanstead Airport acts as a dynamic driver of growth, and deepening the partnership with London.

2.3 Constraints to growth

Whilst Cambridge's success brings benefits for the national economy, businesses based in and around the city, and the people that choose to live and work there, it also brings with it challenges and constraints to further growth. As evidenced in Section 2.2.4 above, for example, housing supply and house price affordability is a key challenge for Cambridge which is well-documented in both local and national literature. Transport connectivity and high levels of congestion also pose a threat to further growth. The key challenges surrounding housing and transport, and how the proposed C2C project aims to help address these constraints to growth, are described in more detail below.

2.3.1 Housing

Whilst Cambridge is seen as good place to do business and a good place for business leaders and their families to live⁴⁰, one of the challenges associated with these high levels of growth is focused on housing. Housing in and around the city has become less affordable as demand outstrips supply. House prices in Cambridge are also amongst the highest in the UK, with a mean price paid of over £500,000 in the year to September 2018⁴¹, which is more than two thirds more than the national average⁴² of £295,284. Both Cambridge and South Cambridgeshire have experienced significant growth post-recession and the house price gap continues to widen when compared to surrounding districts and national averages.

³⁷ Greater Cambridge CaMKOx Firsts/last Mile Strategy, GCP, September 2017

³⁸ Encompassing 15 local authority areas of London Boroughs of Enfield, Hackney, Haringley, Islington, Redbridge and Waltham Forest, Cambridge City and South Cambridgeshire, Peterborough City, Broxbourne, East Herts, Stevenage, Epping Forest, Harlow and Uttlesford.

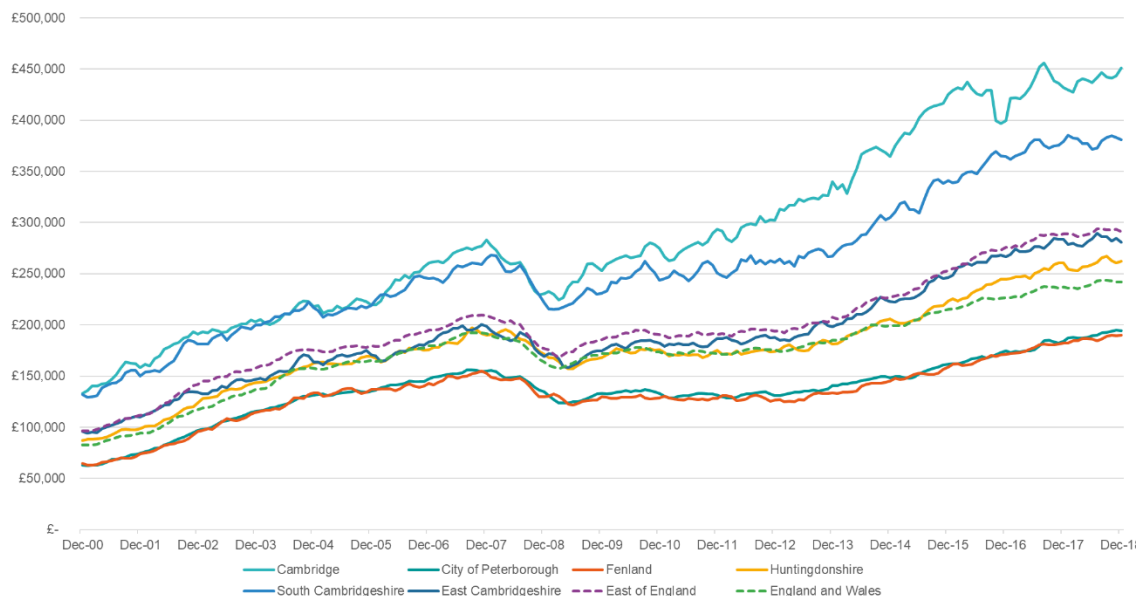
³⁹ Findings and Recommendations of the London Stansted Cambridge Corridor Growth Commission, The Next Global Knowledge Region: Setting the Ambitions and Delivering the Vision, London Stansted Cambridge Corridor (LSCC) Growth Commission, July 2016.

⁴⁰ City Deal, Greater Cambridge City Deal Document, 2014

⁴¹ Mean house prices for administrative geographies (existing dwellings): HPSSA dataset 14, ONS, 2019.

⁴² For England and Wales.

Chart 3: Average house prices, 2000-2018



Source: Average price of all property types, UK House Price Index, December 2000-December 2018.

As such, house prices are over 10 times average workplace wages, and house purchase in Cambridge itself is increasingly unattainable for first time buyers despite the strong employment opportunities. When compared to other UK cities, Cambridge experienced the third highest housing affordability ratio in 2018⁴³. This is driving the demand for housing outside Cambridge in locations such as Cambourne and St Neots, and consequentially traffic growth on the A428/A1303 route (see Section 2.3.2 below for a wider discussion of traffic and transport issues and their potential impact on Cambridge's growth). The housing pressures are likely to be acutely felt in the attraction and retention of highly skilled and qualified graduates at the onset of their careers, where the wages to house prices will be higher.

High prices in Greater Cambridge are driven by the city's economic success and high wage high skill economy (demand driven) as well as constraints on housing supply due to the city's tightly defined local authority boundaries and greenbelt. As a result, Cambridge has experienced some of the fastest housing price growth in England and Wales over the last decade.

Coupled with the city's high employment growth, as Cambridge's high house prices drive the demand for housing beyond the city's boundaries this in turn impacts on transport infrastructure and levels of community. The CPIER interim report⁴⁴ outlined the potential impact of increasing employment numbers on commuting:

⁴³ Cities Outlook 2019, Centre for Cities, 2019

⁴⁴ Cambridge & Peterborough Independent Economic Review (CPIER), Interim Report, May 2018

“If employment grows at the rates envisaged by the local plans, by 2031 there will be 32% more in-commuters in 2031 than in 2011. However, if employment growth continues at recent high rates, this could be as much as 82%.”

Cambridge & Peterborough Independent Economic Review (CPIER), Interim Report, May 2018

The CPIER highlights a risk to Cambridge’s future growth whereby if house prices and rents increase in some areas, and heavier commuting leads to extra delays, the wages demanded by workers to compensate for these difficulties would increase in such areas⁴⁵. The work done by CPIER suggests that this would be particularly acute in Greater Cambridge and that the area would be unable to maintain its present growth given current infrastructure and housing plans, and that growth will tail off as house prices, office rents and congestion make the area too costly a place to live and do business⁴⁶.

Importantly, CPIER recognises that the Local Plans are very proactive in planning for growth and that the constraints on growth are really the result of such unusually high levels of local growth. This will also put a strain on the CPCA’s target of nearly doubling GVA since Greater Cambridge, as the largest economy, could start to falter in the foreseeable future. This reinforces how important investing in the infrastructure of Greater Cambridge, as the main economic driver, of the CPCA area is.

Greater Cambridge is already responding to challenges regarding its housing supply. Cambridge recorded the highest growth in its housing stock out of all UK cities, with a 2.3% increase in housing stock between 2016-17; Cambridge now has 10% more houses than it did five years previously⁴⁷.

2.3.2 Transport

It is not just in its housing supply and affordability, however, that Cambridge is facing challenges which threaten to undermine further growth. As demonstrated above, for example, through reference to work done by the CPIER, housing supply and affordability can in turn influence use of and requirement for transport infrastructure.

Transport infrastructure is a fundamental enabler of supporting the additional housing and jobs required to support the wider growth ambition of Greater Cambridge and its partners. Both current and emerging transport policies set out in Cambridgeshire⁴⁸ and the CPCA’s non-statutory Spatial Framework⁴⁹, firmly establish the role of high-quality public transport corridors in providing the required sustainable transport capacity and connectivity to support growth. By comparison, additional growth in the use of the private car is highly unlikely to support the same growth as:

- Little existing capacity exists on the current network, and any additional capacity would promote the de-clustering of the economy. Such de-clustering would manifest itself through

⁴⁵ Cambridge & Peterborough Independent Economic Review (CPIER), Interim Report, May 2018

⁴⁶ Cambridge & Peterborough Independent Economic Review (CPIER), Final Report, September 2018

⁴⁷ Cities Outlook 2019, Centre for Cities, 2019

⁴⁸ For example Draft Cambridgeshire and Peterborough Local Transport Plan, Steer for Cambridgeshire and Peterborough Combined Authority, May 2019; Cambridgeshire Local Transport Plan 2011-2031, Policies and Strategy, Cambridgeshire County Council, July 2015 and Cambridgeshire Local Transport Plan 2011-2031, Long Term Transport Strategy, Cambridgeshire County Council, July 2015

⁴⁹ Cambridgeshire and Peterborough Strategy Spatial Framework (Non-Statutory): Towards a sustainable growth strategy to 2050, Phase 1, 2018

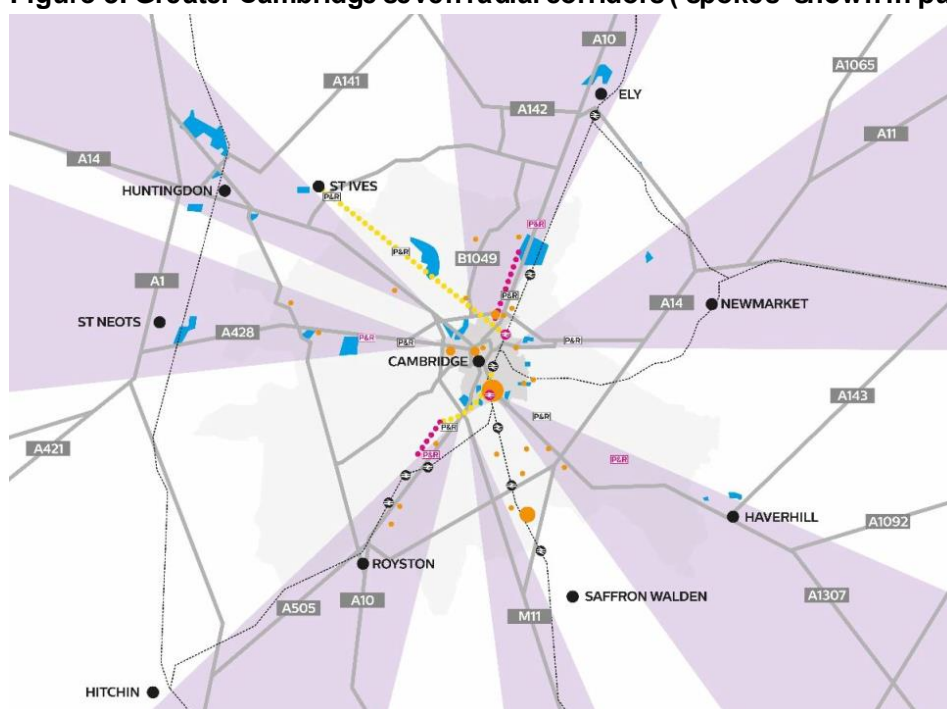
both lower densities reducing spatial proximity of businesses and workers, including the need for parking provision, but also through increased congestion reducing connectivity; and

- It will lead to adverse impacts on residents and workers quality of life through significant disbenefits on the townscape, landscape, natural environment (including local air quality and global greenhouse gas emissions), and society through increased severance effects.

Rather than enabling growth, however, aspects of Greater Cambridge's existing transport infrastructure are currently acting as a barrier to the future growth of the city. Whilst Cambridge is well-served by connections to the strategic highway network and bus and rail services, many of its roads suffer from high levels of congestion, particularly at peak times. Cambridge's city centre streets, many of which are narrow and/or pedestrianised, and the historical buildings which line them, contribute to this challenge. It is not just the city centre though which suffers from high levels of congestion. Cambridgeshire's third Local Transport Plan (2011-2031) highlighted the challenge of congestion along the main corridors into Cambridge and on the inner radial routes, which it argued is already having a detrimental effect on businesses in the area⁵⁰. The importance of addressing the first/last mile problem along the main corridors into and out of Cambridge to supporting the city's economic growth should not be underestimated.

Routes into Cambridge have been mapped into seven radial corridors which connect Cambridge to its surrounding towns and villages in South Cambridgeshire⁵¹. The Greater Cambridge Partnership describes Cambridge's orientation 'like a hub and spoke network'⁵², with the city of Cambridge as the hub and the seven corridors as the spokes (Figure 3). The proposed C2C project falls within the Cambridge to Cambourne and St Neots corridor to the west, which follows the A428 up to the A1.

Figure 3: Greater Cambridge seven radial corridors ('spokes' shown in purple)



Source: GCP, Greater Cambridge CaMKOx Firsts/last Mile Strategy, September 2017

⁵⁰ Cambridgeshire Local Transport Plan 2011-2031, Policies and Strategy, Cambridgeshire County Council, July 2015

⁵¹ Cambridgeshire County Council, Transport Strategy for Cambridge and South Cambridgeshire, March 2014

⁵² GCP, Greater Cambridge CaMKOx Firsts/last Mile Strategy, September 2017

The C2C project is one of several multi-modal interventions along the Cambridge to Cambourne and St Neots corridor, or which impact on the corridor, that are currently being progressed with the aim of improving transport infrastructure and, in turn, supporting economic growth. The C2C project is identified in the draft Cambridgeshire and Peterborough Local Transport Plan⁵³, which describes how the scheme will not only help to reduce current levels of traffic congestion but also how it supports regional objectives for new housing and development to accommodate Cambridge's growing population and workforce.

"Along the A428/A1303 corridor, the Cambourne to Cambridge scheme being led by the Greater Cambridge Partnership will deliver a segregated public transport corridor from Cambourne, and future housing sites at Cambourne West and Bourn Airfield, to West Cambridge and other key employment sites and destinations. Similarly to Waterbeach, this will form a first phase of the CAM network, operated by high-quality electric vehicles, and will include a new Park & Ride site at Scotland Farm or Madingley Mulch. It will help to attract those who currently drive to public transport, and hence contribute towards reducing the impacts of traffic on local communities."

Draft Cambridgeshire and Peterborough Local Transport Plan, Steer for Cambridgeshire and Peterborough Combined Authority, May 2019

More details regarding the key housing and employment development sites along the Cambridge to Cambourne and St Neots / A428/A1303 corridor, and analysis of how and to what extent the C2C project will support the development of these sites, is provided in Sections 3 and 4 of this report.

Looking beyond the C2C project, to demonstrate the breadth and scale of transport investment currently underway or planned in and around Cambridge, Figure 4, taken from the draft Cambridgeshire and Peterborough Local Transport Plan, shows the key transport projects along the Cambridge to Cambourne and St Neots corridor and across Greater Cambridge more widely. The key schemes which complement and/or are dependent on the C2C project are introduced in more detail below.

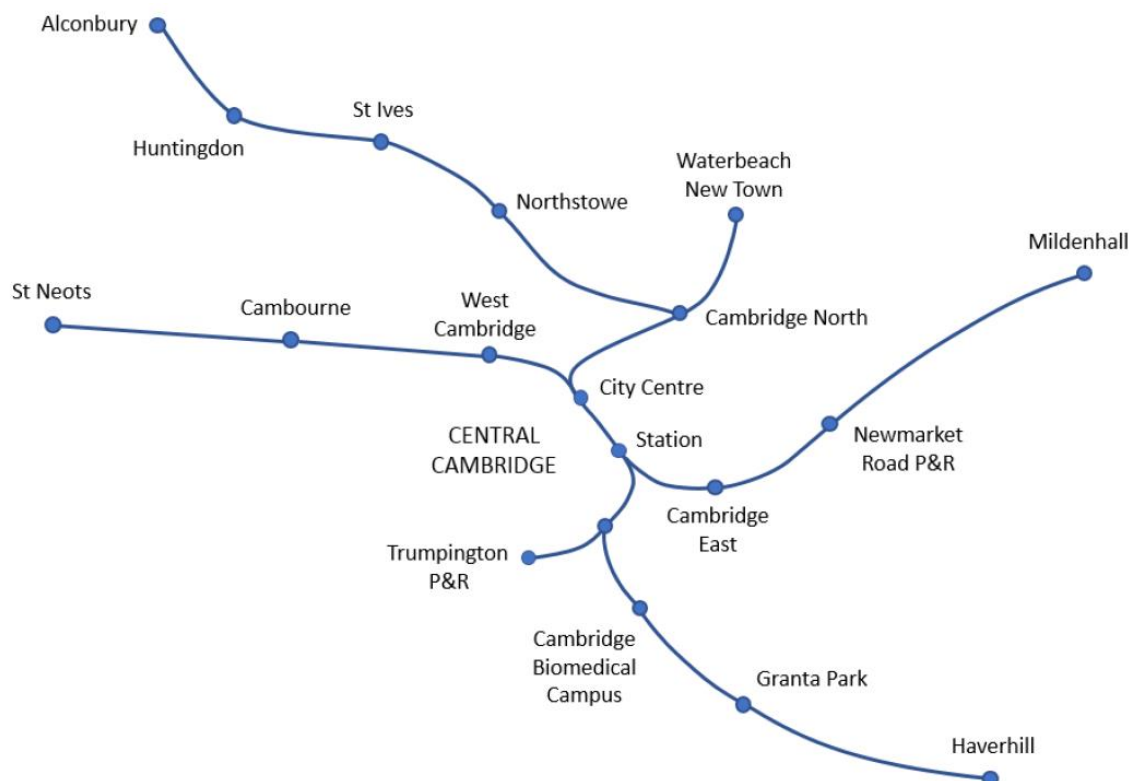
⁵³ Draft Cambridgeshire and Peterborough Local Transport Plan, Steer for Cambridgeshire and Peterborough Combined Authority, May 2019

The Cambridge Area Metro (CAM)

Proposals for CAM are heavily reliant on the success of other schemes in and around Cambridge, some of which are already in place and others planned, which form the ‘building blocks’ of the CAM network⁵⁵. The C2C project, the focus of this report, forms the ‘first phase’⁵⁶ of CPCA’s plans for CAM. The proposed network map for CAM is shown in Figure 5.

⁵⁶ <https://www.greatercambridge.org.uk/transport/transport-projects/cambourne-to-cambridge/> [Accessed 17 May 2019]

Figure 5: CAM Network Map



Source: Cambridgeshire Autonomous Metro Strategic Outline Business Case, Final Draft Report, Steer, February 2019

The scale of the CAM project reflects Cambridge's need for transformational improvements in the city's infrastructure and connectivity to the wider region. The CAM SOBC states: 'CAM has been designed to support the shared CPCA and GCP priorities and outcomes around economic growth, accelerating housing delivery, promoting equity and encouraging sustainable growth and development. These outcomes have directly informed the development of four overarching CAM scheme objectives.'⁵⁷ To demonstrate the alignment and interdependence of the CAM and C2C projects, Table 4 outlines their respective objectives.

⁵⁷ Cambridgeshire Autonomous Metro Strategic Outline Business Case, Final Draft Report, Steer, February 2019

Table 4: Alignment of C2C and CAM scheme objectives

C2C project Objectives	CAM Scheme Objectives
<p>To achieve improved accessibility to support the economic growth of Greater Cambridge</p> <ul style="list-style-type: none"> Support the delivery of new housing and job creation through the provision of High Quality Public Transport (HQPT) that serves current and future housing sites along the A428/A1303, including Cambourne and Bourn, and employment sites within and around Cambridge city centre. Provide additional capacity during the peak periods to meet forecasted growth in demand along the A428/A1303. Does not impede existing road traffic, resulting in a growth in delays for highway trips along the A428/A1303. Improve connectivity on part of the Oxford-Cambridge Arc. <p>To deliver a sustainable transport network/system that connects areas between Cambourne and Cambridge along the A428 / A1303.</p> <ul style="list-style-type: none"> Improve connectivity into Cambridge using sustainable modes of transport such as walking, cycling, and HQPT. HQPT that offers peak journey times that are equal to or less than the equivalent journey by car. HQPT frequency during the peak periods of six Public Transport Vehicles or more an hour. End to end journey time reliability better than the car alternative journeys. HQPT offering improved waiting and in-vehicle environments that are comparable to Cambridge's existing Guided Busway <p>Contribute to enhanced quality of life by relieving congestion and improving air quality within the surrounding areas along the A428 / A1303 and within Cambridge city centre.</p> <ul style="list-style-type: none"> Improve the attractiveness of sustainable modes of travel as an alternative to using cars, leading to an increase in their mode share. Supports Cambridge in achieving continued economic growth whilst retaining the high quality of life and place associated with the city. Introducing improvements which enhance levels of safety for cyclists and pedestrians and promote a healthier life style 	<p>Promote economic growth and opportunity</p> <ul style="list-style-type: none"> Improve transport connectivity Improve journey time reliability Promote agglomeration Support new employment by enhancing access to and attractiveness of key designated employment areas Increase labour market catchment <p>Support the acceleration of housing delivery</p> <ul style="list-style-type: none"> Direct high-quality public transport access to key housing sites (existing designations) Serve and support areas for sustainable housing development Provide overall transport capacity to enable and accommodate future growth <p>Promote Equity</p> <ul style="list-style-type: none"> Promote better connecting other towns with C&P to Cambridge Improved opportunities for deprived residents <p>Promote sustainable growth and development</p> <ul style="list-style-type: none"> Improve air quality Promote low carbon economy Support environmental sustainability

Source: Cambridgeshire Autonomous Metro Strategic Outline Business Case, Final Draft Report, Steer, February 2019

The scheme-specific objectives for CAM listed in Table 4 sit alongside the CPCA Mayor's key transport measures for CAM outlined in the Mayor's Interim Transport Strategy⁵⁸:

- Delivering high quality, high frequency, reliable services, making it the mode of choice and taking away a reliance on cars;
- Delivering maximum connectivity, network coverage, and reliable journey times;
- Forming part of a more active and sustainable travel choice which encourages walking and cycling at the start and end of journeys;

⁵⁸ As set out in Cambridgeshire Autonomous Metro Strategic Outline Business Case, Final Draft Report, Steer, February 2019

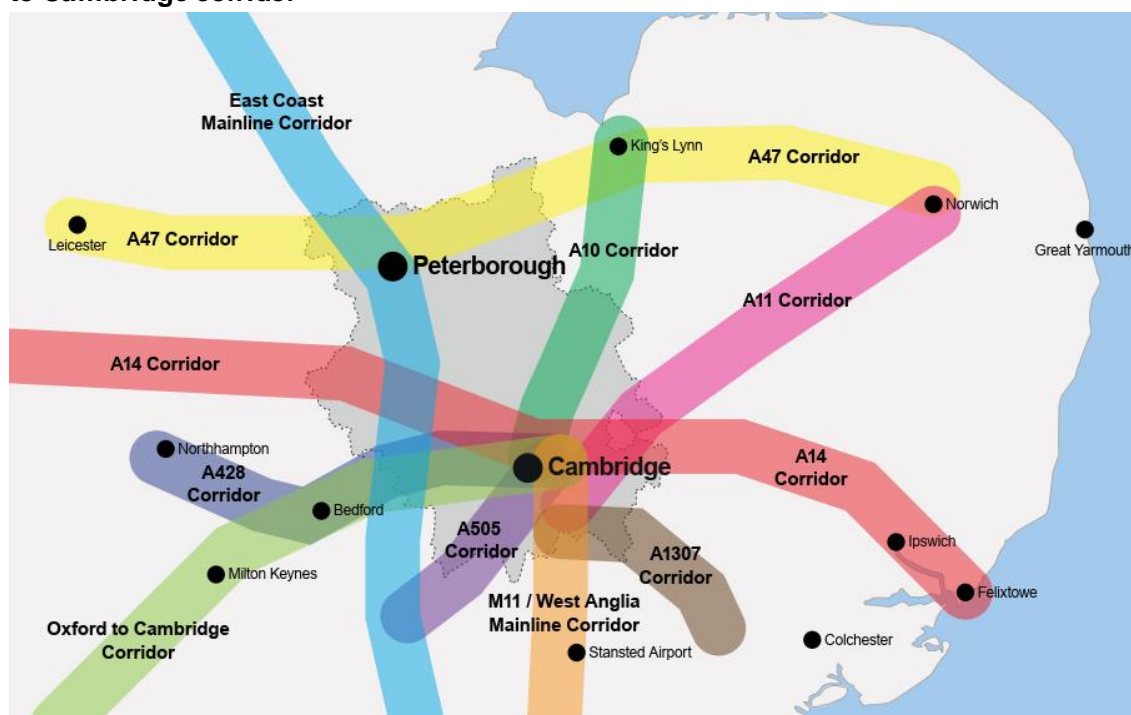
- Providing sufficient capacity for growth and supporting transit-led development;
- Flexibly adapting to future needs; and,
- Using emerging technologies, including connected and autonomous vehicles.⁵⁹

Oxford-Cambridge Expressway

Part of the NIC's proposals for new east-west infrastructure to enable new settlements across the Cambridge-Milton Keynes-Oxford arc, proposals for an Oxford-Cambridge Expressway have gained traction over the last 18 months. The Strategic Outline Business Case for part of the Oxford-Cambridge Expressway between the M1 and the M40 was published by the DfT in September 2018⁶⁰. The preferred route for the new Oxford-Cambridge Expressway sits alongside proposed East West Rail⁶¹, which together will provide the arc with a 'multi-modal transport spine'⁶² better connecting existing communities and enabling the development and growth of new ones.

Figure 6, taken from the CPCA Spatial Framework, shows the Oxford to Cambridge corridor and indicates (at a high level) the route of the multi-modal transport spine which will comprise it. The lines marking the green 'Oxford to Cambridge corridor' and the purple 'A428 corridor' demonstrate the geographical overlap of proposals for an Oxford-Cambridge Expressway and the C2C project.

Figure 6: Map of strategic transport corridors within the CPCA area, including the Oxford to Cambridge corridor



Source: Cambridgeshire and Peterborough Strategy Spatial Framework (Non-Statutory): Towards a sustainable growth strategy to 2050, Phase 1, 2018

⁵⁹ CPCA Mayor's Interim Transport Strategy, cited by Cambridgeshire Autonomous Metro Strategic Outline Business Case, Final Draft Report, Steer, February 2019

⁶⁰ Oxford to Cambridge expressway strategic study: strategic outline business case, Department for Transport, September 2018

⁶¹ Oxford to Cambridge Expressway – The preferred corridor, Highways England, 2018

⁶² 'Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Arc', National Infrastructure Commission, November 2017

The C2C project will contribute to the first-mile / last-mile strategies for the Cambridge-Milton Keynes-Oxford arc, helping to integrate the Oxford-Cambridge Expressway and other transport infrastructure enhancements, when they are constructed, along the arc into Cambridge's local network. These other enhancements include, for example, the A428 Black Cat to Caxton Gibbet (east-west) scheme, which will complete the dualling of the A428 to create a continuous dual carriageway standard route from Cambridge to Milton Keynes⁶³. The A428 Black Cat to Caxton Gibbet scheme thereby forms a key part of the Oxford to Cambridge Expressway⁶⁴.

2.4 Synopsis

- The Greater Cambridge economy is highly successful and outperforms national averages and other leading UK cities across a range of key socio-economic indicators. Its economic success is underpinned by the very high level of skills of the workforce, which include a high proportion of highly skilled non-UK born migrants. The city's success is also reflected in its high levels of innovation. Cambridge had the highest number of patents published per resident in 2017⁶⁵ at 270 per 100,000 population compared to 113 in Coventry and only 94 in Oxford (the closest contenders). There is a substantial evidence base which supports the position that growth in Greater Cambridge has a high degree of net additionality at the UK level, i.e. it would be lost overseas if it cannot be accommodated.
- Greater Cambridge's economy is structured towards knowledge-intensive high growth sectors, including health, professional, scientific & technical services and information and communication services. The health sector is growing rapidly at a local level, which reflects the city's world-leading research centres.
- Greater Cambridge has been growing rapidly and will continue to do so in the future. At a sub-regional level, the Cambridgeshire and Peterborough Combined Authority Devolution Deal aims to enable significant economic growth, increasing economic output by nearly 100% over 25 years with GVA increasing from £22 billion to more than £40 billion. The Deal also aims to accelerate the delivery of 72,000 new homes by 2031 with £170 million investment, £70 million of which is ring-fenced for Cambridge over a period of five years to meet its housing needs.
- Work by the CPIER outlines how historical growth in Cambridgeshire and Peterborough has likely been underplayed and that future growth could be much higher than the levels set out in Local Plans. Economic projections are by no means certain but there is growing evidence that the Cambridge and South Cambridgeshire Local Plan targets of 44,100 extra jobs by 2031 is pessimistic and that much higher growth is likely.
- The 'central projection' of employment growth in the CPIER report sets out a future where employment increases to 900,000 by 2051 across the CPCA area. This equates to a difference of over 250,000 more jobs by 2051, at the Combined Authority level, compared to a BAU scenario based on Local Plan extrapolation. To achieve this potential the CPIER is unequivocal that Greater Cambridge will be unable to do so without investment in infrastructure and housing, which will otherwise act as a bottleneck on growth.
- Already Cambridge's economic success is putting pressure on its housing market. Like Oxford and London, Greater Cambridge experiences high house prices with an average house price of £503,182 in Cambridge and £407,156 in South Cambridgeshire in 2018, against a national average of just £295,284. Cambridge's transport infrastructure is also

⁶³ Oxford to Cambridge expressway strategic study: strategic outline business case, Department for Transport, September 2018

⁶⁴ Oxford to Cambridge expressway strategic study: strategic outline business case, Department for Transport, September 2018

⁶⁵ Cities Outlook 2019, Centre for Cities, 2019

under pressure, with high levels of congestion in the city centre and on key corridors into and out of the city.

- The C2C project forms the first 'building block' of the wider transformational CAM project, which aims to seamlessly connect Cambridge city centre, Cambridge's rail stations and key growth areas and employment hubs in the wider Cambridgeshire area. The scheme also forms part of the last mile/first mile strategy into and out of Cambridge as part of proposals for a Cambridge to Oxford expressway.

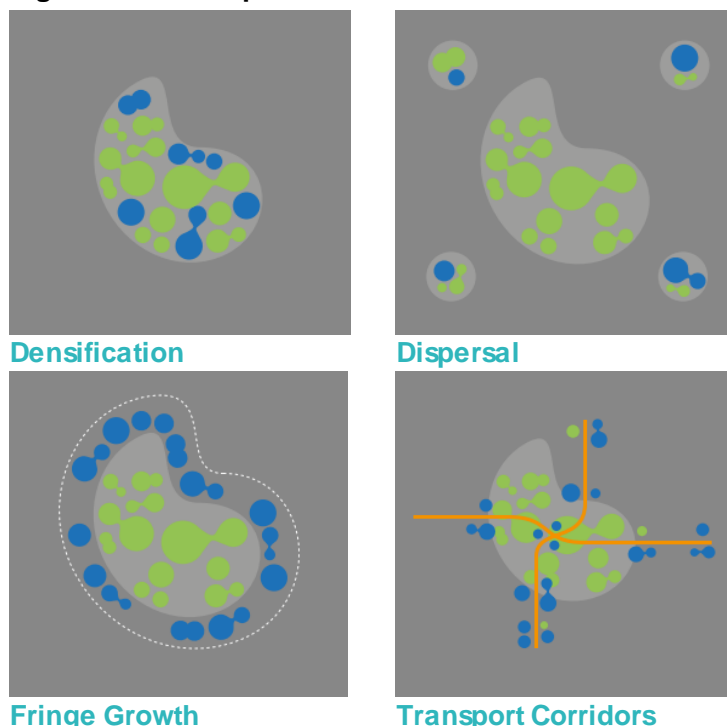
3 Spatial development plans

This section provides an overview of the major development plans within Greater Cambridge and the surrounding area, as well a detailed review of the sites along the Cambourne to Cambridge corridor. This informs the land utilisation analysis in Section 4. The analysis has been informed by discussions with planners at both South Cambridgeshire District Council (SCDC) and Cambridge City Council (CCC).

3.1 Cambridgeshire and Peterborough - strategic spatial framework

To support the required level of future growth in Cambridgeshire and Peterborough (see section 2.2.4), the CPIER recommended that the CPCA should adopt a 'blended spatial strategy' which provides flexibility to ensure development meets the needs of residents, business and the environment⁶⁶. In the Final Report, the CPIER set out four possible scenarios for development along with their respective advantages and disadvantages. The four possible scenarios are: densification, dispersal, fringe growth and transport corridors (Figure 7). The CPIER conclude that a dispersal strategy, whereby homes and businesses are relocated away from city centres is unlikely to be successful, but the three other options - densification, fringe growth, and transport corridors - all have potential benefits. In recommending a blended spatial strategy, the CPIER pose that these three strategies should be pursued to an extent, though none should be taken to its extreme.

Figure 7: CPIER Spatial Scenarios



Source: Cambridgeshire and Peterborough Independent Economic Review (CPIER) Final Report, Cambridge and Peterborough Independent Economic Commission, September 2018

⁶⁶ Cambridgeshire and Peterborough Independent Economic Review (CPIER) Final Report, Cambridge and Peterborough Independent Economic Commission, September 2018

The CPCA has developed a non-statutory Strategic Spatial Framework for Cambridgeshire and Peterborough, which is divided into two phases. Phase 1 of the Framework, adopted in March 2018, defines the Authority's immediate priorities for sustainable growth to support the delivery of 100,000 new homes and over 90,000 jobs as set out in existing Combined Authority plans and Local Plans⁶⁷. Phase 2 of the Framework, which is yet to be published, will take a longer-term view, setting out a growth strategy beyond the current Local Plan periods to 2031/36 and toward 2050.

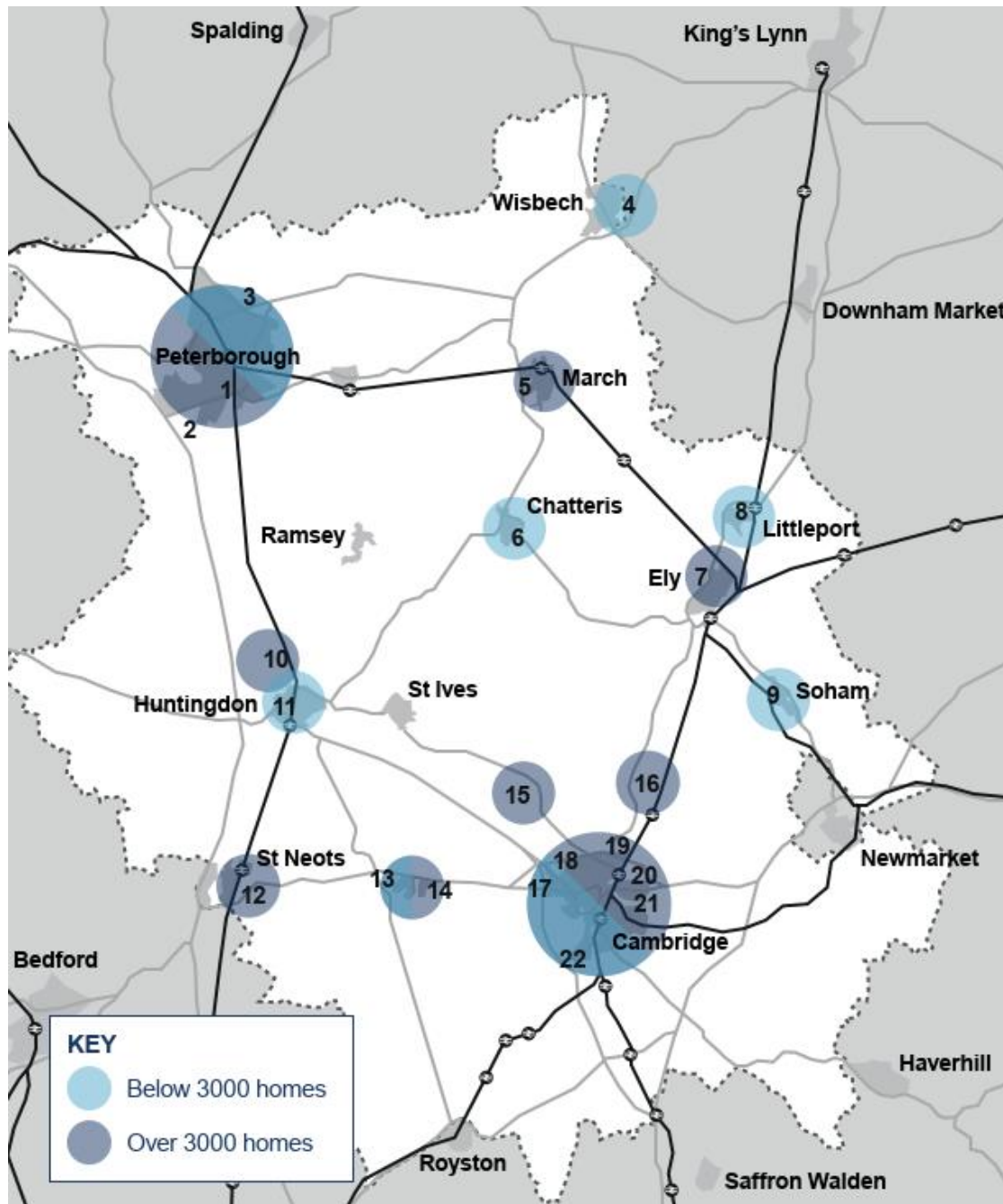
The non-statutory Strategic Spatial Framework identifies 22 'strategic growth sites' which together will provide over 74,000 new homes for the CPCA area. This is a significant portion of the overall housing target for the CPCA, which highlights their important role in meeting the area's growth needs. Of particular relevance to this scheme, sites at Cambourne West and Bourn Airfield New Village, allocated in South Cambridgeshire's adopted Local Plan⁶⁸, are both identified as strategic growth sites for the entire CPCA area (see Site IDs 13 and 14 on Figure 8). Other key sites include West Cambridge (see Site ID 17 on Figure 8) and North West Cambridge (Site ID 18 on Figure 8) which are both fringe sites on the West along the Cambourne to Cambridge corridor. Continuing westwards along the Cambourne to Cambridge corridor, St Neots East, allocated in Huntingdonshire's draft Local Plan 2036⁶⁹, is also identified as a strategic growth site (see Site ID 12 on Figure 8) and also forms part of area covered by the Oxford to Cambridge Expressway.

⁶⁷ Cambridgeshire and Peterborough Strategy Spatial Framework (Non-Statutory): Towards a sustainable growth strategy to 2050, Phase 1, 2018

⁶⁸ South Cambridgeshire Local Plan, South Cambridgeshire District Council, Adopted September 2018

⁶⁹ Huntingdonshire's Local Plan to 2036, Huntingdonshire District Council, Adopted May 2019

Figure 8: Cambridgeshire and Peterborough Strategic Spatial Framework - strategic sites



Source: Cambridgeshire and Peterborough Strategy Spatial Framework (Non-Statutory): Towards a sustainable growth strategy to 2050, Phase 1, 2018

3.2 Greater Cambridge - strategic growth locations

The Local Plans for Cambridge and South Cambridgeshire were adopted in 2018. Both plans included the policy⁷⁰ to undertake an early review of the Local Plans to commence before the

⁷⁰ Policy 9 within the Cambridge Local Plan, Cambridge City Council, October 2018 and Policy S/13 within the South Cambridgeshire Local Plan, South Cambridgeshire District Council, September 2018.

end of 2019 and with submission of a joint Greater Cambridge Local Plan to the Secretary of State for examination anticipated by the end of Summer 2022. This will include an updated assessment of housing needs and the progress being made towards implementing the spatial strategy for Greater Cambridge, in particular the new settlements at north of Waterbeach and Bourn Airfield. This will also follow the non-statutory spatial plan being developed for the wider area by CPCA (as outlined above).

The following review, as set out in Table 5 and Figure 9, of the existing spatial strategy is based on the current Local Plans and the employment and residential targets within the plans (as set out in Table 3 in Section 2) which informed the GCCD targets of creating 44,000 new jobs and 33,500 new homes by 2031.

Table 5: Strategic growth locations within Greater Cambridge

Map ID	Strategic growth location	Local authority	Objectives/proposed development
Cambridge Urban Area			
1	City Centre	Cambridge City Council	<p>Cambridge City Centre will be the primary focus for developments attracting a large number of people and for meeting retail, leisure, cultural and other needs appropriate to its role as a multi-functional regional centre. The city centre boundary is shown on the Policies Map. Any new development or redevelopment should:</p> <ul style="list-style-type: none"> • add to the vitality and viability of the city centre; • achieve a suitable mix of uses; • preserve or enhance heritage assets and their setting, open spaces and the River Cam; • be of the highest quality design and deliver a high-quality public realm; and promote sustainable modes of transport.
East of Cambridge			
2	Cambridge East	Cambridge City Council and South Cambridge District Council	<p>In reviewing the future options it has been concluded that it is appropriate that the site allocated in the AAP remains out of the Green Belt. There is an opportunity during the plan period to deliver residential development on parts of Cambridge East whilst the airport remains on the site.</p> <p>Land at Cambridge East is allocated for development through several sites:</p> <ul style="list-style-type: none"> • Land north of Newmarket Road. • Land north of Coldham's Lane for residential use. Land north of Cherry Hinton for approximately 1,200 dwellings across both South Cambridgeshire and Cambridge City councils.
3	Cambridge Northern Fringe East	Cambridge City Council and South Cambridge District Council	<ul style="list-style-type: none"> • Cambridge Northern Fringe East (CNFE) is within both local authority boundaries and contains one of the last remaining substantial brownfield sites within the City and is a genuine opportunity to create a sustainable new City District, supporting future growth needs. The overall vision for the area is <i>"a socially and economically inclusive, thriving and low-carbon place for innovative living and working; inherently walkable where everything is on your doorstep"</i>⁷¹. • The Local Plans have allocated CNFE for regeneration and the Cambridge Science Park for employment intensification. It has been proposed that the AAP being developed will cover both areas, which will collectively be known as North East Cambridge. The Housing Infrastructure Fund (HIF) bid for the funding to relocate the Water Recycling Centre was successful and although the quantity of housing and employment uses will be determined by the AAP, the HIF references up to 7,600 new homes. • The existing local plans placed no reliance on the development in this area in accommodating the current growth needs of Greater Cambridge (given the Water Recycling Centre is proposed to be relocated). The strategic development planned for through the NEC AAP will feed into the wider joint Greater Cambridge Local Plan. The draft NEC AAP will be published for further public consultation in Spring 2020.
7	Orchard Park	South Cambridge District Council	<ul style="list-style-type: none"> • Significant housing site which is now almost complete with around 990 dwelling completed between 2006 and 2018⁷².

⁷¹ North East Cambridge Area Action Plan, Issues and Options 2019 Consultation, Cambridge City Council and South Cambridgeshire District Council, March 2019

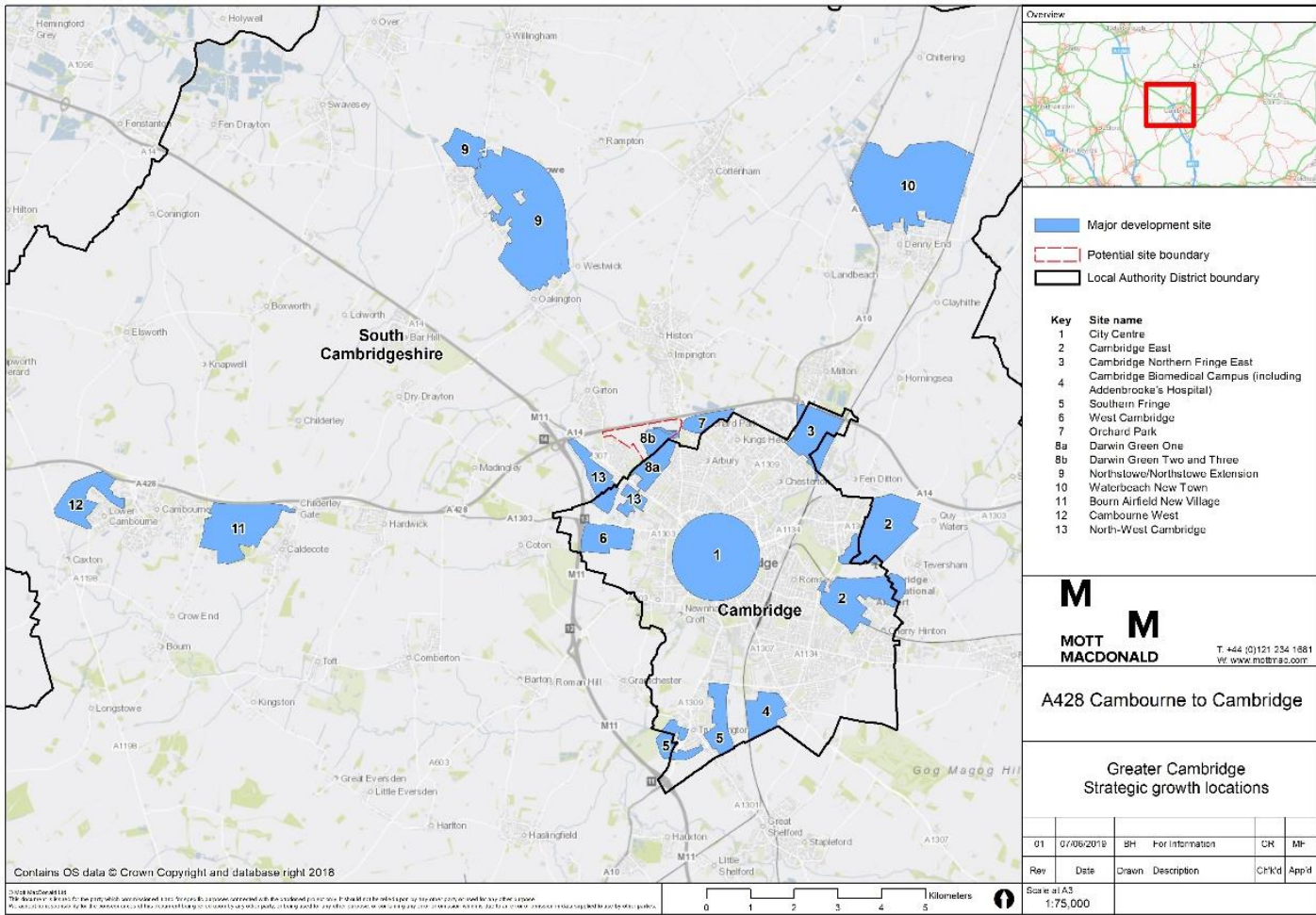
⁷² According to the latest AMR published by South Cambridge District Council in January 2019.

Map ID	Strategic growth location	Local authority	Objectives/proposed development
8A	Darwin Green One	Cambridge City Council and South Cambridge District Council	<ul style="list-style-type: none"> Darwin Green One has outline planning permission to deliver a high quality inclusive new neighbourhood on the edge of the city with around 1,700 new homes planned and complementary uses.
8B	Darwin Green Two and Three	South Cambridge District Council	<ul style="list-style-type: none"> In January 2010, South Cambridgeshire District Council identified land within South Cambridgeshire and adjoining Darwin Green One for residential development. The aim is to provide a sustainable, housing-led, urban extension which ensures separation from the villages of Girton, Histon and Impington. There is potential for Darwin Green Two and Three land to provide in the region of 1,000 homes.
Cambridge Southern Fringe			
4	Cambridge Biomedical Campus (including Addenbrooke's Hospital)	Cambridge City Council	<ul style="list-style-type: none"> The Cambridge Biomedical Campus is an international centre of excellence for patient care, biomedical research and healthcare education. As set out in Policy E/2 the South Cambridgeshire Local Plan supports the extension of the campus for biomedical and biotechnology research and development within class B1(b) and related education and sui-generis medical research institutes. It is now undergoing major expansion that includes the co-location of companies alongside the existing healthcare professionals and research scientists and will drive growth to 2031 and beyond. By 2031 the area is expected to see 26,000 workers accessing the campus, with 25,100 patients and visitors also needing access.
5	Southern Fringe	Cambridge City Council and South Cambridge District Council	<ul style="list-style-type: none"> The vision for the Southern Fringe is to create attractive, well-integrated, accessible and sustainable new neighbourhoods for Cambridge. It was informed by the Cambridge Southern Fringe Area Development Framework (ADF) and will provide approximately 3,300 new homes within the city boundary. It is partly in south Cambridgeshire, and covered by the Cambridge Southern Fringe Area Action Plan.
North West Cambridge			
6	West Cambridge	Cambridge City Council	<ul style="list-style-type: none"> The West Cambridge site covering 66.5 hectares, as set out in Policy 19 of the Cambridge Local Plan, is allocated for uses related to the University of Cambridge, namely D1 education uses and commercial research and development. Development has begun in accordance with the approved planning permission and is supported by an agreed masterplan and development guidelines. Further details are considered below.
13	North West Cambridge	Cambridge City Council and South Cambridge District Council	<ul style="list-style-type: none"> The North West Cambridge development serves to meet the housing demand for students and staff at the University of Cambridge by delivering 1,500 homes for University and College key workers, 1500 homes for sale and accommodation for 2000 post-graduate students. The site will also accommodate 100,000m² of research facilities (including 40,000m² for research institutes and private research facilities linked to the University), and a wide range of community facilities. Further details are considered below.
New Settlements			
9	Northstowe / Northstowe Extension	South Cambridge District Council	<ul style="list-style-type: none"> The new town of Northstowe will provide 10,000 new homes originally planned in the Northstowe Area Action Plan with an area of reserved land to the west of the town. This reserved land is identified as being the Northstowe Extension which has been allocated to provide flexibility for the phasing and

Map ID	Strategic growth location	Local authority	Objectives/proposed development
			delivery of the town over the local plan period but will not increase the total number of housing delivered by 2031.
10	Waterbeach New Town	South Cambridge District Council	<ul style="list-style-type: none"> Waterbeach new town is allocated to provide approximately 8,000 to 9,000 dwellings and associated uses is proposed on the former Waterbeach Barracks and land to the east and north.
11	Bourn Airfield New Village	South Cambridge District Council	<ul style="list-style-type: none"> Land south of the A428 based on Bourn Airfield is allocated for the development of a new village of approximately 3,500 dwellings. Further details are considered below.
12	Cambourne West	South Cambridge District Council	<ul style="list-style-type: none"> Cambourne West is allocated within the Local Plan as a new sustainable village and following the Local Plan an outline planning permission was submitted for 2,350 homes on a larger site Cambourne West site (147 ha). Further details are outlined below.
Huntingdonshire Strategic Expansion Location			
n/a	St Neots East	Huntingdonshire District Council	<ul style="list-style-type: none"> Major mixed use development to the east of St Neots comprising approximately 3,800 homes, 22ha of employment land and other complementary uses. St Neots is strategically positioned along the Cambridge-Milton Keynes- Oxford development corridor and seen as community that can benefit from better connections and opportunities.

Source: Cambridge Local Plan (0218), Huntingdonshire's Local Plan to 2036 (2019), South Cambridgeshire Local Plan (2018)

Figure 9: Greater Cambridge strategic growth locations



Source: Mott MacDonald

Overall, there is substantial housing and employment development planned across Greater Cambridge, identified for areas in a way which will promote and support economic growth in sustainable and accessible locations. The preferred sequential approach, both in Cambridge and South Cambridgeshire, to new development can be described as:

1. being within the existing urban area of Cambridge;
2. being within the defined fringe sites on the edge of Cambridge;
3. within the small-scale Green Belt sites proposed to be released from the inner Green Belt boundary;
4. within existing and newly identified settlement locations at Cambourne, Northstowe, Bourn Airfield and Waterbeach; and lastly,
5. in identified villages.

3.3 Key developments along Cambourne to Cambridge corridor

Although the C2C project will support the spatial plans of Greater Cambridge as a whole, given the scale of jobs and housing that are likely to be accommodated within the city centre, the fringe sites and the new settlements, the following provides further details on those developments most closely linked to the route. These include Cambourne West and Bourn Airfield, West Cambridge and North West Cambridge, which are detailed in terms of the overall growth planned and timescales.

3.3.1 Cambourne West

Built on former agricultural land, Cambourne was originally conceived in the early 1990s and outlining planning permission was granted in 1994, with construction commencing in 1998. The urban design of Cambourne was broadly based on the principle of three interlinked villages (Great Cambourne, Lower Cambourne and Upper Cambourne), separated by landscaped corridors, but each with access to common infrastructure at Cambourne's core.

The Cambourne West development is referred to as a fourth linked village to Cambourne, following the existing three villages of Great Cambourne, Lower Cambourne and Upper Cambourne.

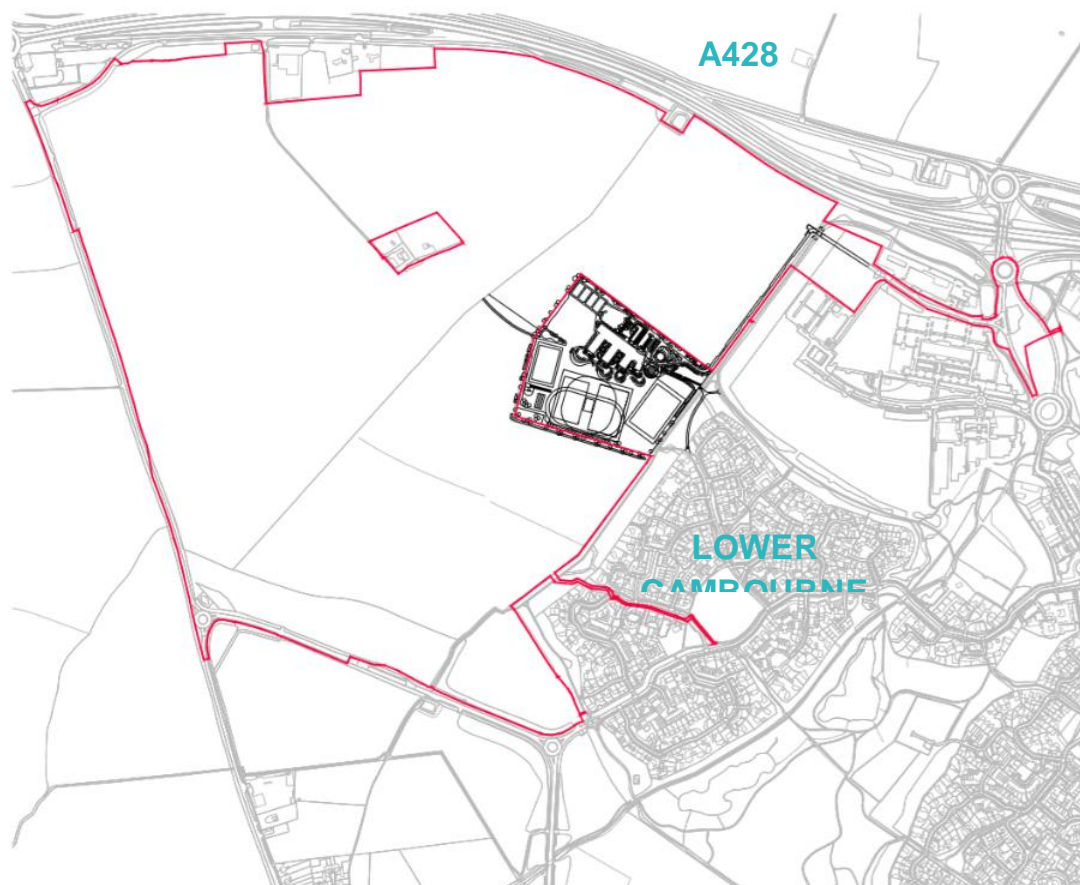
In terms of the current status regarding the Local Plan and planning applications:

- Cambourne West is allocated within the Local Plan as a new sustainable village that will accommodate approximately 1,200 dwellings by 2031. Part of the land allocated for residential development on the site encroaches on land previously reserved for employment use on Cambourne Business Park. Therefore, the Local Plan allows for an equivalent quantity of employment land to that lost on the Business Park (8.1 hectares in June 2013) to be delivered in the northern part of the Cambourne West site rather than its current location.
- Following the Local Plan an outline planning permission was submitted for 2,350 homes on a larger Cambourne West site (147 ha), which subsumes the original 1,200 from the Local Plan. This outline application for Cambourne West was approved by the Council's planning committee on 11th January 2017⁷³. This approval responded to housing land supply issues.

⁷³ The full planning application, reference S/2901/14/OL can be found at the following link: <http://plan.scambs.gov.uk/swift/q/apas/run/WPHAPPDETAILDisplayUri?theApnID=S/2903/14/OL&theTabNo=3> [Accessed 02/07/2019].

Figure 10 presents the latest site boundary of the Cambourne West site as per the approved outline planning application⁷⁴.

Figure 10: Cambourne West site boundary



Source: Site Boundary map submitted as part of the Outline Planning Application (S/2903/14/OL) for Cambourne West, 24/09/2014

- To support the additional population created through the delivery of the 2,350 new dwellings at Cambourne West the approved outline application also makes provision for the necessary supporting infrastructure. This supporting infrastructure includes two primary schools and one secondary school, a network of pedestrian and cycle routes and various community and leisure facilities.
- In addition to the proposed residential development and associated infrastructure included within the Cambourne West application there is also provision for up to 1.04ha of land for retail uses and up to 6.25ha of land for office/light industrial uses.
- The Section 106 agreement for Cambourne West includes funding for the C2C project of “the sum of £8.7m to be used to fund improvements for highway infrastructure so as to improve links by bus between Cambourne and the City Centre of Cambridge”⁷⁵.
- This application does not include the remaining land on the Cambourne Business Park, which is anticipated to come forward for development independently of the Cambourne West

⁷⁴ Ibid.

⁷⁵ Section 106 Agreement dated 29 December 2017 – Full Document, Schedule 4: C Highway and Transport Matters, Section 2, p. 45, Planning Application reference (S/2903/14/OL)

planning application. The promoters are proposing a mixed use development, incorporating around 240 new dwellings as well as 4,400m² of B1 land use. Part of this site is also included within the Cambridge Compass Enterprise Zone.

- In addition, Building 4010 within Cambourne Business Park has planning permission for 4,978 m² B1 land use.

3.3.2 Bourn Airfield

Bourn Airfield is allocated in the adopted Local Plan for the development of a new village of approximately 3,500 homes and is a long term development opportunity, which will take place over the plan period, and beyond.

“Bourn Airfield will be a distinct new South Cambridgeshire village acknowledging its historic past but with its own contemporary identity. A diverse, yet integrated community, with a range of facilities and services to complement, not compete with, existing local provision. Well connected to the wider area by high quality public transport and providing employment and homes to support the Greater Cambridge economy.”

Vision for the new village, Bourn Airfield New Village: A Spatial Framework & Infrastructure Delivery Plan, Supplementary Planning Document, Greater Cambridge Share Planning, Consultation Draft, June 2019.

In terms of the current status regarding the Local Plan and planning applications:

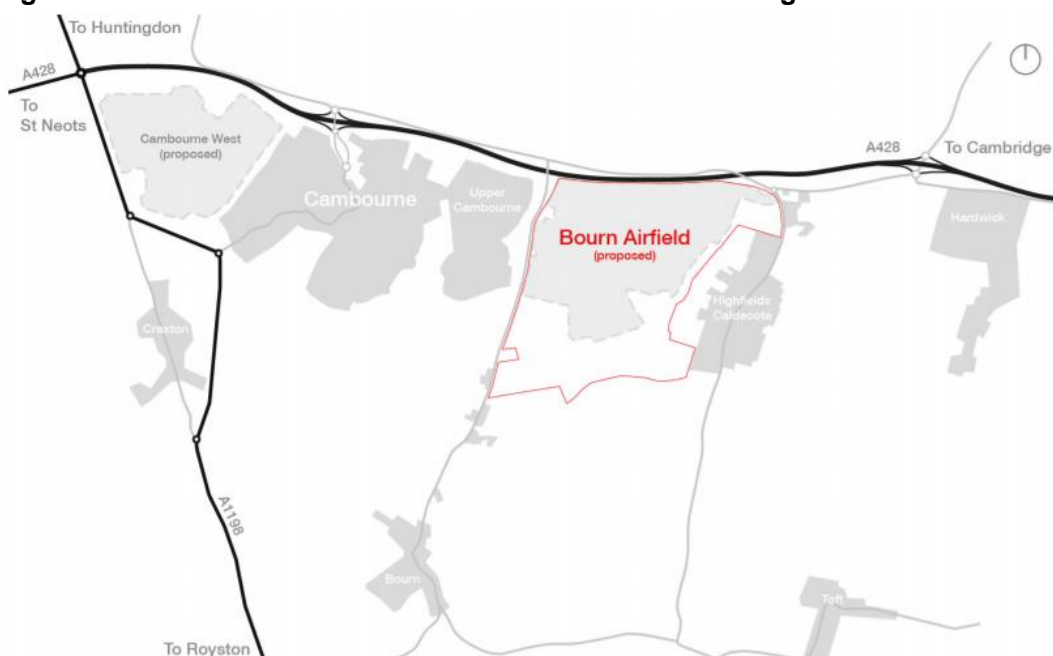
- A Supplementary Planning Document (SPD) has been drafted for Bourn Airfield, currently out for consultation, to guide the implementation of the new village⁷⁶.
- A key strategic objective within the SPD for Bourn Airfield is that it must be a well-connected place that facilitates sustainable movement within the site and to/from surrounding villages, shaped around a network of traffic-free active travel routes, integrated public transport, and delivering excellent connections along the A428 corridor to Cambridge and St. Neots via a high-quality public transport route (the C2C project).
- The C2C project is due to have two stops in Bourn Airfield, providing future residents with the opportunity to use alternatives than car to travel to Cambridge city and in the longer term, St. Neots. The SPD states that⁷⁷:
 - The new village should provide a protected route for the proposed scheme through the site, with two stops located in convenient locations for use.
 - A street network which allows other bus routes to efficiently serve the site, potentially utilising the C2C alignment to provide direct access between the village and Upper Cambourne.
 - Local facilities and higher-density development clustered around public transport and village centre and neighbourhood hub, to encourage and facilitate greater patronage.
- The SPD also clearly states that the developer will make a contribution towards the C2C project within Fig. 55: Infrastructure Delivery Plan and will provide the section within their site⁷⁸. A contribution towards the scheme will be negotiated through a Section 106 agreement.

⁷⁶ Bourn Airfield New Village: A Spatial Framework & Infrastructure Delivery Plan, Supplementary Planning Document, Greater Cambridge Share Planning, Consultation Draft, June 2019.

⁷⁷ Ibid, p. 36 and p.

⁷⁸ Ibid, p. 74, Fig 55.

Figure 11: Location of Bourn Airfield in relation to surrounding settlements



Source: Bourn Airfield New Village: A Spatial Framework & Infrastructure Delivery Plan, Supplementary Planning Document, Greater Cambridge Share Planning, Consultation Draft, June 2019

- An outline planning application was submitted in September 2018⁷⁹ proposing that the site will accommodate a new mixed-use village comprising approximately 3,500 dwellings in addition to other land uses including employment, retail, hotel, leisure, education, community facilities and open space including parks, ecological areas and woodlands. This includes up to (in Gross External Area (GEA)):
 - 1,500m² of employment uses comprising offices, research and development and light industry only (Class uses B1a, b and c uses).
 - 4,000m² of retail uses (Classes A1/A2/A3/A4/A5 uses).
 - 5,000m² of hotel and accommodation (Class C1 use).
 - 2,000m² of health and fitness, gym and other cultural and recreational uses (class D2).
 - 2,250m² of community uses (Class D1 use).
 - 2 primary schools and 1 secondary school.
- Not all the site will be developed within the plan period (up to 2031) and large parts of it will remain undeveloped and green after the settlement is complete to provide a substantial green setting for the settlement.
- The housing trajectory contained within the South Cambridgeshire District Council Annual Monitoring Report, December 2017, suggests that c.1,360 homes will be provided by 2031 and therefore c.2,150 homes beyond the plan period.
- The 9 ha former Gestamp factory site (formerly ThyssenKrupp) adjoins the new village site and a planning application has been submitted for up to 24,620m² of GEA commercial floorspace (B1c light industry and B8 warehouse) to be built in two phases⁸⁰. This

⁷⁹ Planning application (S/3440/18/OL) submitted by Countryside Properties, September 2018.

⁸⁰ Planning application (S/1021/19/OL) submitted by Diageo Pension Trust Ltd, March 2019.

supersedes an earlier planning permission submitted in December 2013⁸¹. The development includes pedestrian footpath and cycleway along an internal access road to connect and ensure integration with the new village.

3.3.3 West Cambridge

The West Cambridge site is allocated in the Cambridge Local Plan adopted in October 2018 for uses related to the University of Cambridge. Development has begun in accordance with an approved planning permission and supported by an agreed masterplan and development guidelines.

Development at West Cambridge has been on-going since the 1960s and planning permission was granted in 1999 for the current framework for the site. A review of the site through a masterplanning process is currently underway which aims to create a high quality, well connected research environment that will support the University's and City's globally competitive position, whilst also creating opportunities to support the Cambridge Cluster with the commercialisation of knowledge through entrepreneurship and collaboration with industry.

The overall site, which covers 66.5 hectares is seeking outline planning permission⁸² for up to 383,300m² of development comprising of up to:

- 370,000m² of academic floorspace (Class D1 space) and commercial/research institute floorspace (Class B1b and sui generis research uses), of which not more than 170,000m² will be commercial floorspace (Class B1b).
- 2,500m² nursery floorspace (Class D1).
- 1000m² of retail/food and drink floorspace (Classes A1-A5).
- 4,100m² and not less than 3,000m² for assembly and leisure floorspace (Class D2).
- 5,700m² of sui generis uses, including Energy Centre and Data Centre.

This outline planning permission also seeks to deliver associated infrastructure including roads (including adaptations to highway junctions on Madingley Road), pedestrian, cycle and vehicle routes, parking, drainage, open spaces, landscaping and earthworks; and demolition of existing buildings and breaking up of hardstanding.

The Section 106 negotiations are still ongoing and the current assumption is that between £9m and £16m will be secured from the University of Cambridge West Cambridge development as a contribution towards the C2C project⁸³.

Figure 12 and Figure 13 show the current position of West Cambridge in comparison to the site once all anticipated development is completed.

⁸¹ Planning application (S/1020/13). Note this information has been provided by SCDC.

⁸² Planning application (16/1134/OUT), received 16/06/2016.

⁸³ Further information can be found within the Financial Case.

Figure 12: West Cambridge – Current position



Source: West Cambridge Outline Planning Application (June 2016)

Figure 13: West Cambridge – anticipated full development



Source: West Cambridge Outline Planning Application (June 2016)

3.3.4 North West Cambridge

The 150-hectare North West Cambridge development was granted outline planning consent⁸⁴ in 2013 for 1,500 homes for University and College key workers, 1,500 homes for sale, accommodation for 2,000 post-graduate students, 100,000m² of research facilities (including 40,000m² for research institutes and private research facilities linked to the University), and a wide range of community facilities.

Figure 14: North West Cambridge Masterplan



Source: <http://www.nwcambridge.co.uk/building-north-west/outline-planning-consent>

⁸⁴ Planning application reference S/1886/11, submitted in September 2011 and granted in February 2013.

Phase 1 consisting of the construction of 700 homes for qualifying university and college staff, 325 post-graduate student rooms and 450 market homes, and a 3-form entry primary school, community centre, nursery, hotel, retail units, green space and required roads and transport infrastructure, has been completed. Discussions for Phase 2 are now underway with the commencement for planning the infrastructure for the second phase.

3.4 Business consultation findings

A review of consultation responses received from local businesses and employers regarding the C2C scheme (including that provided by the University of Cambridge), supported by a more informal (but targeted) discussion with a select key employer and business representative in Cambridge, has provided important context for understanding the role of scheme in supporting travel to work journeys and business investment in Cambridge.

Key findings include:

- Congestion and housing affordability are identified as key issues which can and do impact staff recruitment.
- With significant numbers of staff who work in Cambridge living outside of the city and commuting in, including from the west of Cambridge, the A428/A1303 Maddingley Road corridor is a key route from travel to work journeys into the city. The University of Cambridge has identified, for example, that around 50% of its 11,500 staff commute to the city from outlying areas, of which approximately 20% travel along the A428/Maddingley Road corridor⁸⁵.
- It is perceived that the corridor suffers badly from congestion and it is acknowledged that people living along the corridor have limited public or sustainable transport options available to them at present.
- Investment in transport infrastructure, such as the C2C scheme, will support the existing and future investments being made by Cambridge employers.

3.4.1 Economic growth supported – housing and jobs

Based on a review of all relevant planning documents and applications, particularly supporting socio-economic chapters, the overall level of growth supported by these developments is summarised below, in Table 6. This refers to the total number of residential units planned up to 2031 and post 2031 as well as the total level of gross jobs⁸⁶ across business uses that will be created on site once these developments are fully complete. By business uses this means jobs created within B1 and D1 uses only, i.e. office and academic jobs, and excludes retail and ancillary uses, given these are not strategically planned for and drive economic growth. It also looks at major sites only and does not take account of any windfall development along the corridor.

Overall based on current plans, both those within the current Local Plan or well established through planning applications or known to be emerging, there is around 11,700 of additional housing units planned and development is estimated to support 13,400 additional jobs along the Cambourne to Cambridge corridor. These jobs assuming an average GVA per worker figure of £61,800 per worker⁸⁷ would generate approximately £827.5m of GVA per annum. This is a very significant level of development with around 50% of all housing planned (c. 6,000 houses) at the

⁸⁵ University of Cambridge, Cambourne to Cambridge Consultation: response from the University of Cambridge, January 2018

⁸⁶ Apart from West Cambridge where a high level of the academic jobs created on site will be displacement from those located elsewhere in the University campus once consolidated on the new development (estimated at 65% in the planning application).

⁸⁷ As referenced in Table 2: Performance Indicators and converted to 2019 figures using Consumer Price Index (CPI), ONS.

new settlements of Bourn Airfield and Cambourne West, which will both be directly linked to Cambridge city centre and other key employment locations via the C2C project.

Table 6: Development planned along the C2C project – total growth (housing and employment)

	Housing, total dwellings	Housing, 2011-2031	Housing, post 2031	Employment	Main sources
New settlements					
Cambourne West	2,350	1,655	695	1,145	<ul style="list-style-type: none"> • Existing information - Cambourne West, Socio-economic chapter (Chapter 17), planning application reference S/2903/14/OL, December 2014. Note following the Decision Notice (Decision Notice, same reference number) the jobs figure was slightly increased to reflect the increase in B1 figure to 30,625m². • Refers to B1 job only. • Housing trajectory based on South Cambridgeshire Annual Monitoring Report, South Cambridgeshire District Council, December 2017.
Cambourne Business Park (remaining land)	240	0	240	333	<ul style="list-style-type: none"> • Estimate - based on 4,400m² of B1 land uses. • Based on applying same land use assumptions as used in Cambourne West assessment - GIA represents 90% of GEA and employment density of 12m² per FTE. • Refers to B1 job only. • Housing trajectory based on South Cambridgeshire Annual Monitoring Report, South Cambridgeshire District Council, December 2017.
Cambourne Building 4010	0	0		377	<ul style="list-style-type: none"> • Based on 4,978m² of B1 land uses. • Based on applying same land use assumptions as used in Cambourne West assessment - GIA represents 90% of GEA and employment density of 12m² per FTE. • Refers to B1 job only.
Bourn Airfield	3,500	1360	2140	63	<ul style="list-style-type: none"> • Existing information – Bourn Airfield: Economic Development Statement, Quod, August 2018, as part of planning application (ref:S/3440/18/OL). • Based on Table 5.2 – median estimate for B1 uses only. Retail and community jobs excluded. • Refers to B1 job only. • Housing trajectory based on South Cambridgeshire Annual Monitoring Report, South Cambridgeshire District Council, December 2017.
Bourn Airfield - former Gestamp factory	0	0	0	351	<ul style="list-style-type: none"> • Estimate - based on 24,620m² of GEA for high quality mid-tech units and traditional industry (split 50:50 between B1c and B8). • Converted to GIA by assuming GIA is 20% of GEA (as assumed for Bourn Airfield).

	Housing, total dwellings	Housing, 2011-2031	Housing, post 2031	Employment	Main sources
					<ul style="list-style-type: none"> Convert to jobs using employment density of 47m² and 77 m² per FTE for B1c and B8 respectively. Refers to B1 job only.
Fringe sites					
Darwin Green One	1,627	1627	0	0	<ul style="list-style-type: none"> Established housing site under development.
Darwin Green Two & Three	1,000	750	250	0	<ul style="list-style-type: none"> Land allocated as a part of the local plan. Housing trajectory based on South Cambridgeshire Annual Monitoring Report, South Cambridgeshire District Council, December 2017.
North West Cambridge	3,000	3,000		3,685	<ul style="list-style-type: none"> Existing information - North West Cambridge: Environmental Statement, Volume 1, Main Report, March 2012. Residential includes 1,500 for key workers, 1,500 for open market and 2,000 for postgraduates Jobs refer to laboratories, offices and workshop only (B1(b) and D1 uses only). Housing trajectory based on South Cambridgeshire Annual Monitoring Report, South Cambridgeshire District Council, December 2017.
West Cambridge				7,435	<ul style="list-style-type: none"> Existing information - West Cambridge Masterplan Environmental Impact Assessment - Environmental Statement, Volume 3 Appendices, Appendix 9.1: Employment calculations Employment totals include commercial and academic space only and takes account of significant consolidation of academic space (B1 and D1 uses only).
TOTAL	11,717	8,392	3,325	13,389	

Source: Mott MacDonald and as cited. In addition, the Employment Density Guide, HCA, 2015 used as a key reference document.

3.5 Synopsis

- The Strategic Spatial Framework for Cambridgeshire and Peterborough examining growth post 2031 is currently being finalised but is likely to be a 'blended spatial strategy' with growth (housing and jobs) being the result of densification, fringe growth and development along transport corridors. The immediate priorities for sustainable growth are to support the delivery of 100,000 new homes and over 90,000 jobs as set out within the existing Local Plans. Greater Cambridge accounts for around 33.5% and 49.0% of these targets respectively, with growth targets of 33,500 homes and 44,100 jobs by 2031 whilst the strategic sites identified will make a significant contribution towards achieving this level of growth (across Cambridgeshire and Peterborough).
- Both councils are committed to producing a joint Greater Cambridge Local Plan, with an early review of the current Cambridge and South Cambridgeshire Local Plans to begin before the end of 2019. This demonstrates that local planning policy needs to respond promptly to the levels of growth being experienced with the assessment of the objective housing need being a key component of the early review.
- Substantial levels of housing and employment development are planned across Greater Cambridge with a preferred sequential approach focused on the existing urban area of Cambridge, the defined fringe sites and the existing and newly identified settlement locations. In terms of the scheme, those directly relevant along the route include Cambourne West, Bourn Airfield, West Cambridge and North West Cambridge (Eddington), however, the scheme will ultimately link housing with other very significant fringe sites including the Biomedical Campus to the south and North East Cambridge to the North.
- Overall, based on a review of all relevant planning documents and applications, there is a substantial level of economic growth planned with approximately 8,400 dwellings and 13,300 jobs planned on those sites directly along the C2C corridor. These figures do not include the substantial levels of growth planned on the other major fringe sites and other strategic growth locations and also largely relate to growth planned up to 2031, i.e. do not consider future additional sites. Furthermore, a great deal of this growth, around 50% of the housing figure, is linked to the new settlements which will be directly linked to Cambridge city centre and other key employment locations via the C2C project.

4 Economic impact assessment

This section provides an assessment of the potential economic impacts of the scheme based on analysis of the levels of development along the Cambourne to Cambridge corridor that could be supported by the scheme. It also sets out the logic of how the scheme supports economic growth and how this has been measured, both at the Greater Cambridge and UK levels, to inform the OBC Economic Case and VfM assessments.

4.1 Framework for assessment

4.1.1 Introduction

The assessment of economic impacts has been based on a land use approach which examines how the C2C project supports the planned development along the corridor. Given the scheme is primarily concerned with supporting the city's future economic growth, by helping to address both transport and housing bottlenecks along the corridor, the key focus of this report is the economic impacts at a Greater Cambridge level. However, as the OBC is being produced in line with HM Treasury Green Book and DfT TAG principles, the likely Level 3 ('indicative') impacts at a net UK level are also assessed and inform the Economic Case and VfM assessment.

Displacement and Net UK Impacts

A key consideration in order to set out the Level 3 WEIs is producing a best understanding of the difference between the net impacts at the sub-national level, i.e. Greater Cambridge, and national level. This depends on assessing the level of likely displacement of economic activity between Greater Cambridge and the rest of the UK which the scheme will support. The UK impacts are primarily measured in terms of the Land Value Uplift (LVU) associated with dependent development (adjusted for displacement) while the sub-national impacts focus on the jobs and GVA generated. In addition to the LVU analysis, which is the new core output to inform the Economic Case and VfM assessment, the labour supply analysis within the 2016 report is also updated which examined the level of jobs and GVA that are likely to be net additional to the UK. This assessment is based on the evidence outlined within Section 2, particularly the evidence within the CPIER report. The labour supply analysis acts as a comparator, and validator, on the LVU as the two approaches seek to capture the same impacts.

4.1.2 How does the scheme support economic growth?

In order to assess the economic impacts and Level 3 WEIs of the scheme it is important, based on the evidence review and the scheme's anticipated transport outcomes, to set out the key mechanisms or channels via which they could be generated. Based on the evidence gathered, the logic map, shown in Figure 15 overleaf, explores how the C2C project is perceived to support the Greater Cambridge economy, based on linking together the following:

- The **Greater Cambridge economy** today in terms of current size, growth ambitions, and key challenges.
- The key elements of the **scheme proposals**.
- **Outcomes** related to what the C2C project will deliver which largely focus on providing increased public transport capacity and accessibility along the corridor, thereby improving connectivity between key growth sites.

- **Key impacts or channels** via which the C2C project impacts on the economy. These relate to the key impacts the scheme is likely to have on the Greater Cambridge economy and those the study is seeking to assess.
- **Assessment** relates to how these key impacts, where possible, can be monetarily quantified to provide an indication of the sub-national impacts (grouped under Level 3 impacts) and the potential WEIs of the C2C project that can inform the transport economic appraisal. The central component relates to the land utilisation and dependent development analysis.

Key impacts on the economy

Fundamentally, the C2C project will support economic growth by providing faster and more reliable journey times which will improve connectivity and accessibility. This will more closely link housing and employment growth areas. Perceived as the ‘first phase’ of CAM, the scheme will become part of a wider network that seamlessly connects the fringe growth areas to the west with central Cambridge and other key growth areas. Given it will have high public transport accessibility to key employment areas in Greater Cambridge, this offers the potential for significant new housing development along the corridor and the potential to develop to a higher-density and more sustainable manner (Transit Orientated Development (TOD)). The key channels via which the scheme will impact on the economy are:

- **Improving labour market access and mobility:** The scheme will ensure that major growth sites, via a congestion free high quality public transport corridor, are connected to one another, enabling an adequate supply of labour to both the city centre and other major fringe sites. The scheme will ensure that the housing and employment planned at the new settlements at Bourn Airfield and Cambourne West, North West Cambridge and Cambridge West are effectively linked both between each other and with Cambridge city centre. It will also ensure, via onward connections at key interchanges, better linkages to other key fringe growth locations, particularly Cambridge Biomedical Campus and North East Cambridge. Ultimately this benefits both the workforce, who can access more opportunities, and employers, who can access a wider labour market.

The scheme will also support the labour market by providing better connectivity and accessibility to education and training opportunities in Cambridge, which in the longer term will promote up-skilling and further productivity gains.

- **Supporting business investment and long term economic growth:** The scheme will ensure efficient public transport access from the west to the city centre and other fringe sites for markets, suppliers and labour, which is essential for businesses. Better connectivity and capacity along the route will enhance investment prospects for the entire corridor and in particular will support the development at the new settlements and West Cambridge. This is likely to result in accelerated development along the corridor at the key growth sites. Perceived as the first phase of CAM, the scheme will also provide certainty and confidence to investors that over the longer term Cambridge is addressing its key growth constraints, namely the lack of housing and inadequate transport accessibility and capacity. This is linked closely to how the scheme also enhances the quality of life (see below) ensuring that the positive impact of Cambridge as a place to live, invest and do business is upheld – important attributes that have played a crucial role in the city’s success to date.

The CPIER report and spatial overview and the commitment to producing a new Joint Local Plan (with the review starting in 2019) demonstrates the high levels of demand that exist and development that is planned for Greater Cambridge, which has both the demand and quantum of employment land to drive regional growth. The scheme ensures that higher capacity (including the potential CAM upgrade) can be accommodated in the future and therefore represents an investment in longer term economic growth.

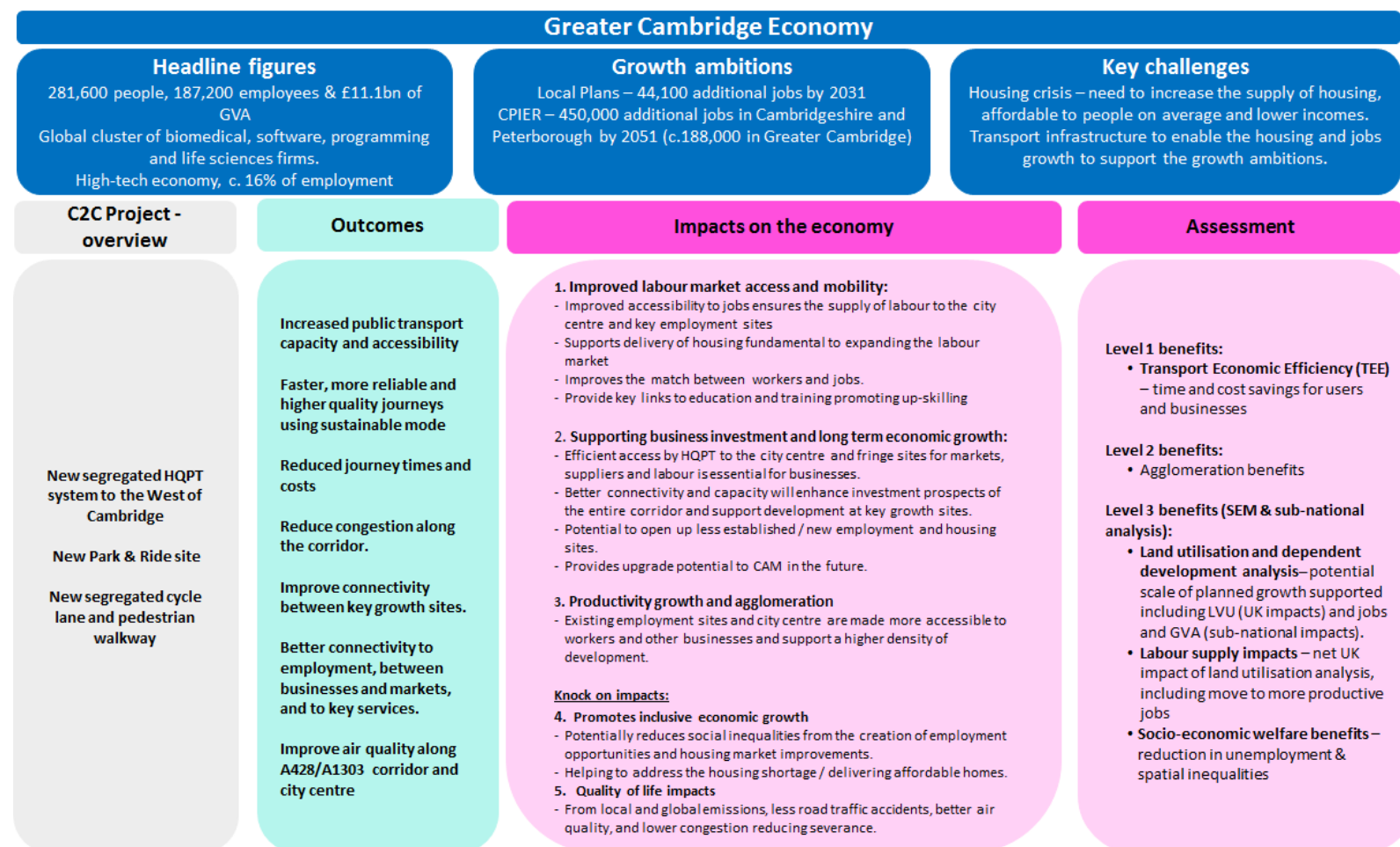
- **Supporting productivity growth through agglomeration:** The fringe sites and transport corridors for Cambridge will continue to become denser, both in terms of employees and businesses. The scheme, by providing high public transport accessibility to the city centre and other key employment sites for workers and other businesses, will support a higher density of development, i.e. spatial clustering. This densification process is well underway within Greater Cambridge, especially within the city centre (for example CB1, the new city quarter) and at Cambridge Science Park which is planning to intensify uses substantially. Promotion of densification through clustering (dynamic land uses) is proven to raise productivity through agglomeration economies. The second productivity impact is through the physical reduction in travel times and costs which the scheme will deliver, independent of the densification it supports⁸⁸.

These core channels of economic impact will also have a number of knock-on impacts via promoting economic growth particularly in relation to:

- **Supporting inclusive economic growth:** The scheme potentially reduces social inequalities from the creation of employment opportunities and housing market improvements, particularly in relation to improving housing market affordability and providing access for those do not have a car available.
- **Quality of life impacts:** The scheme will help to prevent increased road traffic, reducing negative externalities such as local and global emissions, road traffic accidents, general road traffic congestion, noise, and severance. The scheme via reducing congestion will also ensure that the quality of life in Cambridge is not compromised, which is important to both existing and potential investors. These impacts are captured within the standard Level 1 impacts from the core transport modelling.

⁸⁸ See TAG Unit A2-4 for further detail on productivity impacts through agglomeration economies:
<https://www.gov.uk/government/publications/webtag-tag-unit-a2-4-productivity-impacts-may-2018>

Figure 15: C2C project – key economic linkages and impacts



Source: Mott MacDonald. CPIER growth projections based on central projection, with employment for Cambridgeshire and Peterborough increasing from 480,000 jobs in 2018 to 930,000 jobs in 2051. The Greater Cambridge total is based on the proportion of total employment there compared to the CPCA area.

4.1.3 Core assessment

Building on these economic linkages the assessment of the economic impacts of the C2C project focuses on the following impacts, as shown in Table 7. This informs both the assessment of the sub-national economic impacts as well as the WEIs that inform the transport economic case. Note that the conventional (Level 1 and 2 as identified in the final column) transport user impacts are covered in the OBC's economic case.

Table 7: Key economic impacts to be quantified

Type of impact	Impact indicator (s)	Where in the business case?
<ul style="list-style-type: none"> Conventional transport user impacts 	<ul style="list-style-type: none"> Changes in quantifiable travel times and costs, including quality (societal welfare impacts, including employment). 	<ul style="list-style-type: none"> Economic case (Level 1 – 'established'). Covered in the OBC Economic Case.
<ul style="list-style-type: none"> Productivity 	<ul style="list-style-type: none"> GDP benefits from connectivity improvements between businesses and other businesses and workers through agglomeration economies. Move to more productive jobs (M2MPJ) – GDP changes from displaced UK activity 	<ul style="list-style-type: none"> Economic case (Level 2 – 'emerging') for agglomeration under static land uses, i.e. without dependent development. Covered in the OBC Economic Case. Economic case (Level 3 – 'non-traditional' using dynamic land use modelling, including M2MPJ impacts).
<ul style="list-style-type: none"> Dependent development 	<ul style="list-style-type: none"> Level of dependent development. Land Value Uplift (LVU) – Greater Cambridge and net national impacts Changes in total employment and economic activity - jobs created and associated GVA (sub-national impacts). Level of housing created. 	<ul style="list-style-type: none"> Sub-national impacts - Strategic Case – see also labour supply below. Economic case (Level 3 – 'non-traditional' using dynamic land use modelling). LVU cannot be included alongside the user impacts or WEIs in the Economic Case, e.g. agglomeration, from the dependent development.
<ul style="list-style-type: none"> Labour supply 	<ul style="list-style-type: none"> Changes in total employment and GDP welfare at net UK level. 	<ul style="list-style-type: none"> Sub-national impacts – Strategic Case – see dependent development above. Economic case (Level 2 – 'emerging') under static land use. Economic case (Level 3 SEM – 'non-traditional' using dynamic land use modelling) for dynamic land use and context-specific net additionality.
<ul style="list-style-type: none"> Socio-economic benefits from increased employment 	<ul style="list-style-type: none"> Reductions in unemployment (welfare benefit). Reduction in spatial inequalities (welfare benefit). 	<ul style="list-style-type: none"> Economic Case (Level 3 – 'non-traditional').

Source: Mott MacDonald

The strategic economic appraisal work, undertaken in 2016, also included the monetary quantification of option and non-use values. This relates to the welfare benefits relating to the value residents place on having access to opportunities due to the scheme (option values) and that they may place on a public transport service even if they never intend to use it (non-use values). As these values are no longer recommended for monetary quantification in the latest DfT TAG⁸⁹ they are not considered here.

⁸⁹ See the DfT Value for Money (VfM) framework: <https://www.gov.uk/government/publications/dft-value-for-money-framework>, Box 4.4, and TAG Unit A4-1: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/805253/tag-4.1-social-impact-appraisal.pdf, Section 7.

4.2 Key developments and scheme dependency

The core assessment of the sub-national economic impacts (jobs and GVA at a Greater Cambridge level) and national impacts (LVU impacts) of the C2C project are based on a land use approach, which examines the level of dependency between the scheme and developments. To reconcile the two, and thus account for displacement, we also consider the net additionality at the UK level of the Greater Cambridge jobs and GVA using the evidence base described in preceding sections. This detailed how the region is, to a significant extent, competing internationally for investment and economic activity.

The level of dependency of the scheme with the sites along the C2C is set out Table 8. This further builds on the analysis of the level of jobs and housing planned across the key sites along the corridor (as set out in Figure 9 in Section 3) and is based on the following:

- The evidence gathered, particularly through the Local Plans, other planning documents (Area Action Plans, planning applications), key consultation and consultation responses, that links the remaining development sites with the C2C project. Of particular importance is the level of developer contributions towards the scheme that have either been confirmed or are currently being negotiated. These are a recognition of the interdependency between enhancements to transport connectivity and land value/development potential.

Table 8: Development sites and evidence of linkages to C2C project

Development site	Key evidence including development status	Growth attribution and economic impacts quantified
New settlements		
Cambourne West	<ul style="list-style-type: none"> In 2017 the Council resolved to grant planning permission for a mixed use development including 2,350 homes at Cambourne West. This is above the 1,200 dwellings allocation within the Local Plan and permission was granted prior to the Local Plan being adopted in 2018. This was to ensure that the Council could demonstrate it had a sufficient deliverable sites to deliver five years' worth of housing supply against the Local Plan requirement, as required by the government through the National Planning Policy Framework (NPPF). Although there is no Grampian Condition that prevented the start of the development until infrastructure works began the Section 106 agreement negotiated contributions towards the C2C project. The Section 106 agreement for Cambourne West includes funding for the C2C project, termed the "City Deal Project and states that the developer will pay to Cambridgeshire County Council (CCC): <ul style="list-style-type: none"> "the sum of £8.7m to be used to fund improvements for highway infrastructure so as to improve links by bus between Cambourne and the City Centre of Cambridge" "the sum of £3.2m to be paid in two instalments of £1.6m, to be paid prior to the 250th and 450th dwelling occupation dates; and the sum of £5.5m to be paid before the 1500th dwelling occupation date."⁹⁰ Regarding transport infrastructure required for the development, the Local Plan specifies that development will provide for the additional travel demands generated and that coordination will be required with other developments on the A428 corridor to deliver the necessary improvements. In particular: <ul style="list-style-type: none"> "The development will need to address, but is not limited to, the following (subject to detailed strategy development and to the transport assessment of development proposals): <ul style="list-style-type: none"> Any measures necessary to ensure that a bus journey between Cambourne West and the junction of the A428 and the A1303 is direct and unaffected by any congestion suffered by general traffic; High quality segregated bus priority measures on the A1303 between its junction with the A428 and Queens Road, Cambridge; Direct, segregated high quality pedestrian and cycle links to west Cambridge, Papworth Everard, Caxton and Bourn;⁹¹ As set out in TAG Unit A2.2 a dependent development is a very particular case of induced investment with the following key features: (1) there is a clear intention to develop a specific 	<ul style="list-style-type: none"> Assumed the housing is 100% dependent given the policy position and statements with the Local Plan, the strong links with Section 106 agreement and knowledge of the transport implications without the scheme. In reality given the high levels of market demand it is likely that some housing will come forward before the C2C project is complete, however, the majority of housing is clearly dependent upon the scheme. However, in order to account for this the sensitivity testing looks at lowering the dependency to provide a level of assurance to the results. Clearly the scheme will support the employment uses planned but it is assumed the employment is 50% dependent given the C2C project is primarily concerned with bringing forward housing development. The C2C project is unlikely to unlock all the employment especially given Cambourne Business Park itself is not fully let. Economic impacts quantified include jobs, housing and Land Value Uplift (LVU) of the housing and commercial development.

⁹⁰ Section 106 Agreement dated 29 December 2017 – Full Document, Schedule 4: C Highway and Transport Matters, Section 2, p.45, Planning Application reference (S/2903/14/OL)

⁹¹ South Cambridgeshire Local Plan: Adopted, Policy SS/8: Cambourne West, p.80.

Development site	Key evidence including development status	Growth attribution and economic impacts quantified
	<p>site; and (2) the existing transport network cannot reasonably accommodate the additional traffic associated with the development⁹².</p> <ul style="list-style-type: none"> Decisions about dependency are judgement based given there is no precise definition of reasonable level of service. TAG Unit A2.2⁹³ guidance states: <p>However, if additional traffic can be accommodated by the network without significant increases in the costs of travel for existing users, then the network can be assumed to be providing a reasonable level of service.</p> <p>For example, if traffic flows on a road network remain within the 'flat' part of the speed/flow curve, the network should be assumed to be providing a reasonable level of service.</p> <p>Similarly, if there is no crowding on a public transport network, it should be assumed to be providing a reasonable level of service."</p> There are significant queues on the A1303 between the Madingley Mulch roundabout and Queens Road in Cambridge in the morning peak. This implies that the traffic flow on that part of the network is not within the flat part of the speed/flow curve and that additional traffic cannot be accommodated by the network without significant increases in the costs of travel for existing users. As a result, this implies that the Cambourne West development is dependent on the new transport scheme. 	
Cambourne – other development (remaining business park and Building 4010)	<ul style="list-style-type: none"> Business park already established 	<ul style="list-style-type: none"> Clearly, the C2C project will benefit the site but no attribution is made given this is already an established employment area.

⁹² TAG Unit 2.2: Induced Investment, Section 3, p. 8

⁹³ Ibid, p.9.

Development site	Key evidence including development status	Growth attribution and economic impacts quantified
Bourn Airfield	<ul style="list-style-type: none"> As outlined a draft SPD⁹⁴ has been prepared which is currently out for consultation and an outline planning application has been submitted for the largest part of the site. This confirms that the developer will make a contribution towards the C2C project to be negotiated through a Section 106 agreement. The South Cambridgeshire Local Plan specifies the creation of a comprehensive movement network as part of the policy on the strategic site at Bourn Airfield. The Local Plan states that⁹⁵: <p>"The new village will be founded on a comprehensive movement network for the whole village, that connects key locations including the village centre and schools to encourage the use of sustainable modes of travel and includes:</p> <p>a.) Significant Improvements in Public Transport, including:</p> <ul style="list-style-type: none"> Provision of a segregated bus link from Cambourne to Bourn Airfield new village across the Broadway, and on through the development to the junction of the St Neots Road with Highfields Road; "Any measures necessary to ensure that a bus journey between Caldecote / Highfields and the junction of the A428 and the A1303 is direct and unaffected by any congestion suffered by general traffic; "Provision of high quality bus priority measures or busway on or parallel to the A1303 between its junction with the A428 and Queens Road, Cambridge." This specifies that Cambourne West is fully dependent on the A428 Cambourne to Cambridge scheme. This view is reinforced by the guidance on dependent development in TAG Unit A2.2 as set out above under Cambourne West. 	<ul style="list-style-type: none"> Assumed housing is 100% dependent given the policy position and statements within the Local Plan, the strong links with the Section 106 agreement and the transport implications of not implementing the scheme (i.e. that it is dependent on the transport constraints being addressed). Assumed employment is 50% dependent as outlined above – primarily the C2C project will ensure that there is sufficient housing to support Greater Cambridge's planned growth. Economic impacts quantified include jobs, housing and Land Value Uplift (LVU) of the housing (excludes commercial development).
Bourn Airfield – other development (former Gestamp factory)	<ul style="list-style-type: none"> Established employment site and it is part of the Bourn Airfield development but will have a separate planning application to the housing application (outlined above). It is likely that some contribution towards the C2C project will be sought. 	<ul style="list-style-type: none"> Clearly the C2C project will benefit the site but no attribution is made given this is an established employment area.

⁹⁴ Bourn Airfield New Village: A Spatial Framework & Infrastructure Delivery Plan, Supplementary Planning Document, Greater Cambridge Share Planning, Consultation Draft, June 2019

⁹⁵ South Cambridgeshire Local Plan: Adopted, Policy SS/8: Cambourne West, p.80.

Development site	Key evidence including development status	Growth attribution and economic impacts quantified
Fringe sites		
West Cambridge	<ul style="list-style-type: none"> Outline planning permission currently being sought. As stated in the Cambridge Local Plan⁹⁶ key to the success of the development will be an integrated and accessible sustainable public transport strategy to ensure that the development has an acceptable impact on the surrounding transport network. Whilst the Local Plan does not specifically mention the A428 as being essential to the development of West Cambridge it is clear that an enhanced public transport network serving the area is one of the requirements for development. Therefore, it has been assumed that the West Cambridge site is partly dependent on the C2C project. The development will link effectively with the housing growth along the A428-A1303 corridor (Bourne Airfield and Cambourne) which could serve the development. Development is focused on strengthening the Cambridge cluster in physical sciences and technology. This will rely strongly on linking effectively with the city and other key cluster sites (particularly those to the North). The West Cambridge development, through Section 106, will also make a contribution towards the scheme, yet to be determined. 	<ul style="list-style-type: none"> Overall assumed that some of the growth can be directly attributed from the West Cambridge site given the C2C project will improve access to the city centre and other cluster sites (via onward connections) and links to housing growth sites. However the West Cambridge site is fundamentally driven by the University's expansion plans and links with business to commercialise R&D – which is the key driver for attracting businesses to locate in the area. Overall a growth attribution of 5% of total employment is assumed and reflects that although a HQPT corridor will improve the site's connectivity the main drive for its development is University related and linked to demand. Note that no attribution for the housing and related LVU impacts are considered given there are less direct links within policy between the C2C project and the development.
North West Cambridge	<ul style="list-style-type: none"> Planning permission is granted with development well underway – Phase 1 completed and Phase 2 now started. AAP Policy NW11: Sustainable transport⁹⁷: "Development in North West Cambridge will be in the form of a mixed-use development which will allow the daily needs of occupants to be met within walking or cycling distance, thus minimising the need to travel beyond the development. Where travel is necessary, however, development will be planned to make this as sustainable as possible, particularly by: <ol style="list-style-type: none"> Maximising use of sustainable transport modes by the provision of safe and convenient routes and higher densities to encourage people to move about by foot, cycle and bus; Specifying appropriate standards for infrastructure provision within the development, including car and cycle parking; Providing sustainable transport infrastructure to link the development to key destinations in Cambridge and to the wider network." The C2C project will clearly support the development but does not directly serve the development and the scheme is largely driven by the University expansion plans. 	<ul style="list-style-type: none"> No attribution is made. Planning permission is already fully in place and the project is commencing. No options directly serve the development and the scheme is fundamentally driven by the University's expansion plans.

⁹⁶ Cambridge Local Plan 2018, Cambridge City Council, 2018, p.76

⁹⁷ North West Cambridge Area Action Plan, A joint Area Action Plan prepared by and adopted by Cambridge City Council and South Cambridgeshire District Council, October 2009

Development site	Key evidence including development status	Growth attribution and economic impacts quantified
Other fringe sites (Darwin Green Two & Three)	<ul style="list-style-type: none">• Darwin Green One established site.• Darwin Green Two & Three currently being submitted as housing location in next Local Plan.	<ul style="list-style-type: none">• No growth attribution is made

Source: Mott MacDonald

4.2.1 Transport dependency

The existing evidence makes it clear that the network would not be able to accommodate the additional traffic from the new settlements (Cambourne West and Bourn Airfield) without the transport scheme. This evidence is further outlined in the Strategic Case but it is worth noting the following:

- There are a number of pinch points including between the A428/A1303 junction and the M11 and some severely congested sections of the highway network, in particular along the A1303 from Maddingley Mulch Roundabout towards the city centre, resulting in unreliable journey times and long delays. There are also increasing difficulties in accessing the Maddingley Road Park & Ride site due to existing congestion on the adjacent highway network.
- There are significant queues on the A1303 between the Maddingley Mulch roundabout and Queens Road in Cambridge in the morning peak. This implies that the traffic flow on that part of the network is not within the flat part of the speed/flow curve⁹⁸ and that additional traffic cannot be accommodated by the network without significant increases in the costs of travel for existing users. As a result, this implies that the new settlements are dependent on the new transport scheme to provide additional capacity in the corridor.
- The model predicts that traffic flow levels on Maddingley Road will remain relatively unchanged in the AM Peak as the road is already at capacity and therefore unable to accommodate additional traffic, however this will cause more congestion on the wider corridor, particularly at the A1303 / M11 junction.
- Using the Cambridge Sub-Regional Model (CSRM), future traffic forecasts in the Cambridge area indicate a significant increase in demand for travel, which will exacerbate existing problems – particularly east of Maddingley Mulch roundabout along the A1303.

4.3 Sub-national economic impacts – jobs and GVA

For Greater Cambridge, based on the assessment of the linkages between the C2C project and the sites, the gross direct employment and GVA impacts have been calculated. These relate to the workplace jobs and associated GVA in Greater Cambridge that the C2C project is assessed to support. Specifically, these are the developments at Cambourne West, Bourn Airfield and West Cambridge. The results are presented at the gross level only to provide:

- An overall assessment of the likely scale of benefits that could accrue to Greater Cambridge. This does not take account of any displacement of economic activity from elsewhere within Greater Cambridge, leakage level (allowing for the fact that not all jobs would be filled by Greater Cambridge residents) or multiplier impacts (further economic activity associated with the additional economic activity). This is felt an unnecessary level of complication given the need to assess the net impact at the UK level. It is also very likely, given the high levels of demand and shortage of business space, that displacement at the local level would be very small.
- Clarity over the net UK impacts. This analysis, in line with HM Treasury Green Book guidance, focuses on the LVU impacts rather than an employment and GVA approach (further explained below in 4.4). The LVU impacts are then validated by evidence on how the Greater Cambridge economy contributes to UK net additionality by raising international competitiveness.

⁹⁸ Speed/flow curves capture the relationship between changes in demand (flows) and speed on links in the highway network. Links are roads and streets.

Results

At a Greater Cambridge level, the gross economic impacts of the scheme, are anticipated to be within the range of 975 jobs, 5,850 housing units and £88.0 of GVA per annum⁹⁹ (once all sites are fully built out). This includes 50% attribution of the Bourn Airfield and Cambourne West settlements and some attribution (5%) to the West Cambridge site.

This is a very significant economic impact given the level of development planned and over a 30 year time period¹⁰⁰ from 2019 the Present Value Benefits (PVB), in 2019 prices, would be in the range of £1.1bn. Net additionality at the UK level, accounting for displacement, is considered in Section 4.5.

Table 9: Gross direct impacts – Greater Cambridge

Gross direct impacts	
Jobs per annum	975
GVA, £m per annum (2019 prices)	£102.8 ¹⁰¹
PVB, 2019 values and 2019 prices, £m	£1,075.9
PVB, 2010 values and 2010 prices, £m	£676.1
Housing units	5,850

Source: Mott MacDonald

4.4 LVU assessment

At a UK level, and in order to adhere to the latest government guidance across all departments (see the discussion box below), the economic impacts of the dependent development along the corridor have been assessed based on their LVU impacts. The LVU impacts relate to the increase in land values along the corridor due to the land's conversion into more productive uses. Conservatively, the LVU assessment excludes the West Cambridge development, even though it will provide a contribution to the scheme through a Section 106 agreement, given it is judged less dependent and is already an established employment area. Furthermore, given the LVU appraisal guidelines the LVU impacts are likely to be relatively small even though the employment density of the area will increase considerably. The LVU analysis includes only the two housing developments, Cambourne West and Bourn Airfield, which are deemed 100% dependent upon the C2C project. The LVU of the commercial development is cautiously excluded given it is not anticipated to be wholly dependent upon the scheme

⁹⁹ Assuming again a GVA per worker figure of £61,800 in 2019 prices which is assumed to grow in line with GDP growth from the Annual Parameters (average GDP per person), TAG Data Book, Department for Transport.

¹⁰⁰ A 30-year time horizon has been used with an average duration of GVA benefits of 13 years. Although commercial buildings would last longer than 30 years the new businesses locating within them (linked to the C2C project) are likely to move on sooner than this and therefore this time horizon is a reasonable assumption. An average discount rate of 3.5% has been used in line with HM Treasury Guidelines.

¹⁰¹ Note this is the GVA per annum of all 975 jobs by 2050 and takes account of underlying productivity growth as captured in the TAG Data Book.

Land Value Uplift (LVU)

Within central government there has been a shift towards capturing Level 2 and 3 Wider Economic Impacts by calculating the LVU of an intervention, which is fully outlined in HM Treasury's Green Book and the DCLG Appraisal Guide. This is also the preferred approach within TAG Unit A.2.2 for measuring the benefits arising from a transport scheme unlocking development, which is closely aligned to the with the DCLG/Green Book guidance. This is a step change away from the traditional approach to capturing economic impacts, which was based on job creation and associated GVA impacts, with the default assumption now being that any jobs created by a development benefiting from government expenditure does not increase aggregate employment. Clearly, despite this from a local perspective and in the case here (as set out above) understanding the local jobs and GVA impacts for Greater Cambridge is still important.

The value of land is determined by factors such as market demand, use, location, nearby infrastructure and the cost of development for an alternative use. The change in value is defined as the value of the land in its new use (e.g. commercial or residential) minus the value of the land in its existing use.

Any increase in land value as a result of a change in its use reflects the economic benefits of conversion to a more productive use. The value to society of a development can therefore be derived from the land value. This estimate should then be adjusted for any change that would still occur without the proposed intervention, displacement of demand from other potential developments and wider effects of the resulting development, e.g. any change in amenity value, environmental or health outcomes.

Sources: The Green Book: Central Government Guidance on Appraisal and Evaluation, HM Treasury, 2018, TAG Unit A2.2: Appraisal of Induced Investment Effects, DfT, May 2018 and Appraisal Guide, The DCLG Appraisal Guide, December 2016.

The LVU has been assessed in line with the DCLG Appraisal Guide¹⁰² and TAG Unit A.2.2 and includes the following key assumptions (whilst Annex B, Table 14, provides a full list including by site):

- Estimating the amount of residential land in hectares for each site. This is not outlined explicitly in the planning applications, but average net densities are likely to be around 40 dwellings per hectare (dph)¹⁰³. For Bourn Airfield a reference was found that states that the site is likely to be able to accommodate housing on 40% of the 282 ha site¹⁰⁴. For Cambourne West conservatively a 40dph assumption is made to convert from dwellings to hectares.

¹⁰² The DCLG Appraisal Guide, Department for Communities and Local Government, December 2016. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/576427/161129_Appraisal_Guidance.pdf [Accessed: 18/06/2019]

¹⁰³ As stated in Policy H/8: Housing Density in the South Cambridgeshire Local Plan, South Cambridgeshire District Council, September 2018, p.145.

¹⁰⁴ Examination into the Soundness of the Cambridgeshire Local Plan, Matter SC6 – New Settlements, South Cambridgeshire District Council, February 2017, p.31

- The existing land values are that of agriculture use and in line with MHCLG's Land Value Estimates for Policy Appraisal¹⁰⁵, at £21,000 per ha (2017 prices) for Greater Cambridge and Peterborough¹⁰⁶.
- The new land values for the residential use are based on the same data source and geography and set at £5.3m per ha (in 2017 prices).
- Conservatively, the LUV analysis does not assume that these land values increase (above inflation) over time and holds them constant. The guidance assumes that they would actually increase by 5 per cent per year¹⁰⁷ in real terms.
- Calculating the external costs and benefits of the development based on applying:
 - An amenity disbenefit of £6,366 per ha per annum¹⁰⁸ (in 2016 prices) over the appraisal period from the change of use from agriculture. This is a conservative approach given it does not consider the potential positive impacts from the new settlements, which incorporate new areas of green space. This disbenefit is adjusted for displacement given any alternative development is also likely to have amenity disbenefits.
 - External health benefits from the additional rented affordable homes provided equivalent to £125 per affordable home per year¹⁰⁹. This is based, in the absence of more detailed data, on the assumption that at least 50% of affordable homes provided will be to rent. It is also an external benefit applied after displacement given this is not market led provision and therefore will not displace affordable home provision elsewhere. These benefits are included in line with the MHCLG Appraisal Guide.

Note the Transport External Costs (TEC) have been calculated and used to adjust the LUV figure within the Economic Case.

The LUV does not consider any additional public sector costs from these developments, for instance primary or secondary schools, given it is highly likely that these will be delivered as part of the Section 106 agreement.

4.4.1 Net LUV impacts

Sections 2 and 3 clearly set out how Cambridge is one of the UK's fastest-growing and most productive cities and integral to the UK's industrial strategy. The city helps the UK economy to compete on the international stage, attracting high calibre knowledge-based individuals to fill gaps and increase economic growth.

Understanding the extent to which the C2C impacts represent a relocation of investment from other locations is at the heart of transport appraisal, as changes at the local level may not represent corresponding national welfare or GDP impacts at the UK level.

However, given the uniqueness of Cambridge it is highly likely that the scheme through land use changes will induce supply side changes to the UK economy, namely through raising the supply of labour (employment). Cambridge competes internationally and to maintain its growth it must address the capacity constraints in its transport infrastructure. The C2C project ensures that

¹⁰⁵ Land Value Estimates for Policy Appraisal, MHCLG and Valuations Office Agency, May 2018 and accompanying workbook, Land Value Estimates. Available at: <https://www.gov.uk/government/publications/land-value-estimates-for-policy-appraisal-2017> [Accessed: 02/07/2019]

¹⁰⁶ Current land uses at Bourn Airfield are less clear given most of the Major Development Site includes land previously developed as a military airfield but is now mostly used for arable farming. Given this assuming agriculture use as the land value now is reasonable. For more information on former uses for the site see: Examination into the Soundness of the Cambridgeshire Local Plan, Matter SC6 – New Settlements, South Cambridgeshire District Council, February 2017.

¹⁰⁷ DCLG Appraisal Guide, p. 78

¹⁰⁸ DCLG Appraisal Guide. Based on amenity cost for Agriculture (Extensive), Figure 24, p.91

¹⁰⁹ DCLG Appraisal Guide, p. 90

transport is being integrated with economic development plans to enable the ongoing sustainable growth of one of the UK's most competitive locations.

For calculating the net LVU impacts, MHCLG guidance¹¹⁰, which TAG Unit A.2.1 recommends, provides a framework for assessing the additionality of development (both for residential and non-residential development).

Additionality refers to the extent to which an outcome is genuinely additional. The assessment of scheme dependency deals with deadweight – impacts which would have occurred anyway – and therefore the focus here is on the extent to which at a UK level economic activity is simply displaced from elsewhere. In this case how much of the residential and commercial development would arguably occur somewhere else in the UK if it did not occur along the C2C route.

Based on the following, it is anticipated that a high proportion of the LVU impacts can be argued to be additional and that displacement will be low:

- The very high levels of demand within the housing market in Cambridge where prices are within the 1st decile (Cambridge) and 2nd decile (South Cambridgeshire) of all UK house prices. Fundamentally, house prices are high because of the city's economic success, highly skilled / high wage economy and its quality of life offer that supports the clusters underpinning the Cambridge Phenomena. It is unlikely that this housing would simply be delivered elsewhere in the UK as it is aligned to developing a housing offer to supply a unique economy.
- Coupled with high demand, there is a very severe constraints on the housing supply. Although clearly an outcome of demand (i.e. housing struggles to keep pace with economic growth) this is also partially a result of the city's tightly defined local authority boundaries and greenbelt. The new settlements are critical to future housing supply and underpin the Local Plans approach to spatial development.
- A significant level of the housing planned at Bourn Airfield (40%) and Cambourne West (35%) is affordable housing which would not be provided by the market.

Based on these considerations the overall level of displacement for the LVU impacts has been set at 25% (which would be lost to the UK), and which, given the points above, and the uniqueness of Cambridge's economy is considered conservative. The housing planned within the Local Plans is responding to the very high levels of local demand and the need here is to increase supply of housing to support growth in a rapidly growing area rather than shifting demand from other parts of the UK.

Furthermore, based on housing business cases submitted to MHCLG and analysed by the study team, in other areas of very high demand, displacement has been judged to result in around 20-25% potentially being lost at the UK level.

4.4.2 Results

Once accounting for displacement, the overall PVB, assuming a 30 year time period¹¹¹ from 2019, of the net LVU impacts is £458.0m (in 2019 prices). This is the net economic impact of the C2C project for the UK given it accounts for displacement and adjusts for wider effects emerging from the development (namely the amenity disbenefit and health benefits).

¹¹⁰ As set out in the DCLG Appraisal Guide.

¹¹¹ As stated above.

Table 10: Land Value Uplift – results, PVB (2019 values and 2019 prices)

	Impacts, £m	Notes
Land value uplift - private benefit	£620.0	2019 values, 2019 prices (30 year time period)
Amenity disbenefit	-£11.1	2019 values, 2019 prices (30 year time period)
Displacement (25%)	-£152.2	2019 values, 2019 prices (30 year time period)
Health benefits (reducing homelessness)	£1.4	2019 values, 2019 prices (30 year time period)
Net economic impact	£458.0	2019 values, 2019 prices (30 year time period)
<i>Net economic impact</i>	<i>£287.8</i>	<i>2010 values, 2010 prices (60 year time period)</i>

Source: Mott MacDonald

The analysis demonstrates the significance of the scheme in unlocking land for residential development. The LVU impacts capture the economic benefit of converting the land into more productive uses that support growth in Greater Cambridge.

4.4.3 Sensitivity tests

The LVU impacts are subject to a number of assumptions with the main being the level of dependency between the two new settlements (effectively the level of deadweight) and the level of displacement (i.e. the level of housing development that would simply be displaced from elsewhere). The core assumptions are robust given the arguments above, particularly the policy position in relation to the scheme and the new settlements and that Cambridge is suffering from an acute shortage of housing.

However, it is still worth considering the implications if dependency was assumed lower or additionality lower (displacement higher). Table 11 (below) examines low and medium scenarios of dependency and additionality and then combines the two levels in a final set of tests. This equates to six tests in total alongside the core scenario.

Overall it is clear that in the extreme, with low dependency (50%) and high displacement (75%) that the impacts would erode substantially to £76.8m of PVB (over a 30 year time horizon, 2019 values and 2019 prices). However, this is highly unlikely, and a more moderate scenario would be one that assumes lower dependency (75%) given arguably some development could still occur before the scheme but that displacement is still low (25%) given the strong justifications for additionality. This would still result in PVB benefits of £343.5m and is likely to be underestimating the true benefit given the importance of the scheme to the new settlements.

Table 11: Sensitivity tests – net LVU impacts, PVB

	Low	Medium	Core	Notes
Dependency	50%	75%	100%	
UK - impacts	£229.0	£343.5	£458.0	30 year time horizon, 2019 discounted values and 2019 prices
UK - impacts	£143.9	£215.8	£287.8	60 year time horizon, 2010 discounted values and prices
Displacement	75%	50%	25%	
UK - impacts	£153.6	£305.8	£458.0	30 year time horizon, 2019 discounted values and 2019 prices
UK - impacts	£96.5	£192.2	£287.8	60 year time horizon, 2010 discounted values and prices
Dependency and displacement	As above	As above	As above	
UK - impacts	£76.8	£229.3	£458.0	30 year time horizon, 2019 discounted values and 2019 prices
UK - impacts	£48.3	£144.1	£287.8	60 year time horizon, 2010 discounted values and prices

Source: Mott MacDonald

4.5 Labour supply impacts – net additionality to the UK (validation test)

4.5.1 Jobs supported

As noted above, the LVU assessment is a step away from the approach used in the 2016 report which looked to capture economic impacts based on job creation and GVA impacts. This reflects the changes in national guidance for assessing WEIs but in this case capturing the benefits of the housing development is arguably more accurate given the C2C project is fundamentally about unlocking housing to support new jobs arising within Cambridge.

As further validation for the LVU, the previous analysis is updated based on assessing the degree to which the sub-national impacts can be considered net additional at a UK level. Since 2016 considerable evidence, as outlined in Section 2 and above, has been gathered from the CPIER with regards to the uniqueness of the Cambridge economy. As outlined in Section 2.2.4, qualitative research undertaken as part of CPIER highlighted the need to adopt a 'Cambridge or overseas' approach. As the Cambridge cluster is unique to the UK economy if a knowledge intensive company is forced to move away it is very likely to relocate to another cluster outside of the UK. In such a scenario the research uncovered that around 44% of those who would be likely or certain to move activity would move abroad, compared to just 25% who would stay in the UK.

Given this the validation test, examining the UK level labour supply effects assumes that 44% of the jobs supported by the C2C project can be considered net additional at a UK level. Based on this level of additionality, the same GVA per worker assumptions, and appraisal period as above, the overall discounted GDP^{112 and 113} benefits for the UK are as follows:

¹¹² Converting GVA to GDP for national accounting purposes.

¹¹³ These values are the full GDP effect for dependent development. When comparing with Economic Case analysis, it is necessary to consider the extent to which conventional Level 1 impacts interact with these figures. If such analysis includes dependent development, and associated Level 1 impacts, then this reflects the effect to consumers, and only the tax revenue proportion (30%) of the above figures would be quantified under the Level 2 UK labour supply impact.

- PVB of £563.4m over a 30 year appraisal period (2019 values and prices), which compares to the LVU assessment figure of £458.0m.
- PVB of £354.0m over a 30 year appraisal period (2010 values and prices), which compares to the LVU assessment of £287.8m.

These are higher values than the equivalent LVU assessment and also exclude the M2MPJ analysis below. This implies that the LVU assessment is conservative in comparison, which is partially because no real growth is assumed in land values compared to the underlying growth assumed for GVA per worker (from the TAG Databook) but also comes down to very different methodologies. Exclusion of the development at West Cambridge, which has 5% attribution, in this labour supply analysis would also make the two sets of values almost identical.

4.5.2 Move to more productive jobs

As part of the validation test it is also worth updating the previous analysis which looked at the benefits emerging from the move to more productive jobs. This examines the changes in GDP from the displaced employment within the UK. Given GVA/GDP per worker is higher in Greater Cambridge than the equivalent figure for the Eastern region (based on ONS data) there is an economic impact from these jobs re-locating, i.e. moving to a more productive area.

This economic impact is estimated to be:

- PVB of £126.8m over a 30 year appraisal period (2019 values and prices).
- PVB of £79.7m over a 30 year appraisal period (2010 values and prices).

At the UK level this is additional to the pure labour supply impact from net additional employment once internal displacement has been accounted for.

The previous analysis also considered socio-economic welfare impacts from providing opportunities in areas of high deprivation or high unemployment. These impacts were relatively small previously given the low deprivation levels in Greater Cambridge. At this stage it has not been possible to update these, but they are considered likely to be relatively small (especially in comparison to the impacts discussed previously).

4.5.3 Reconciling the results and comparison with the previous report

The core LVU assessment is compared to the updated labour supply analysis and the 2016 report in Table 12 (below). This demonstrates the following:

- The Greater Cambridge benefits are considerably lower using the LVU method, which although explained to some degree by the fact that GVA per worker grows in real terms for the labour supply impacts, is largely due to the different methods. The results may also reflect that local LVU for Greater Cambridge could be higher, but with greater displacement from other areas in the UK. The 2016 and 2019 results for the pure labour supply impacts are broadly comparable.
- The UK level economic impacts are higher than the 2016 report using both the LVU method and the labour supply analysis. For the updated labour supply impacts this is primarily due to assuming more jobs are net additional to the UK than previously (in light of the CPIER evidence). The LVU assessment is not directly comparable since it measures the value of housing, rather than the employment, but it is driven by assuming a high level of dependency between the housing and the C2C project and a low level of displacement (given the housing shortages). Despite this, the LVU assessment is lower than the estimated labour supply impact and appears a conservative assessment.

- This WEIs analysis is predicated on a proportion of the proposed development along the corridor being classified as dependent, i.e. it would not occur without the scheme. This dependent development can be assessed through Level 1 and 2 impact analysis using conventional transport modelling. In this case there would be double counting of impacts. However, if the modelling explicitly excludes dependent development and assumes only static land uses, then WEIs using SEM techniques are appropriate. In the case of labour supply impacts this is inclusive of all GDP impacts (as opposed to the tax revenue only in WEIs when conventional (Level 1) user impacts are included – these tax revenues are shown below).
- The change in central government guidance is clear that the LVU approach is now preferred to a GVA led approach. In the case of the C2C project the LVU approach is more likely to capture the core impacts given the primary focus of the new settlements is to provide a source of housing to meet the needs of Greater Cambridge rather than be self-contained employment centres.
- It is also worth noting that the UK LVU impacts do not count any impacts from the West Cambridge development given this development is more closely linked with the University's activities. However, clearly the C2C project will support this huge opportunity particularly in terms of supporting access to work along the A428 corridor. If these were included the LVU assessment would be even higher.

Table 12: Results comparison with previous report

	2016 report	This report – LVU assessment	This report – labour supply impacts (validation test)	Clarifications
Greater Cambridge – economic impacts (GVA and LVU)	£679.3	£383.4	£676.1	<ul style="list-style-type: none"> • 30 year time horizon • 2010 discounted values and 2010 prices, discounted to 2010. • Labour supply impact excludes M2MPJ impact as this is only applicable across a wider area than Greater Cambridge.
UK – economic impacts (GDP and LVU)	£198.1	£287.8	£433.7	<ul style="list-style-type: none"> • 30 year time horizon • 2010 discounted values and 2010 prices, discounted to 2010. • Labour supply also includes M2MPJ impacts. 2016 report also refers to these impacts only.
UK – economic impacts (tax revenue only)	£31.3	n/a	£130.1	<ul style="list-style-type: none"> • 30 year time horizon • 2010 discounted values and 2010 prices, discounted to 2010. • Labour supply also includes M2MPJ impacts. 2016 report also refers to these impacts only.

Source: Mott MacDonald

4.6 Synopsis

- The potential economic impacts of the scheme have been based on examining the levels of development and associated growth along the Cambourne to Cambridge corridor.

- Transport guidance in the area of WEIs is evolving and the approach has focused on examining the potential jobs and GVA supported at the developments as well as the LVU impacts. The former is examined for Greater Cambridge only, while the LVU impacts are assessed at a UK level, in line with national guidance, and form part of the Level 3 WEIs.
- The two new settlements at Cambourne West and Bourn Airfield are, in housing terms, judged to be fully dependent upon the C2C project given the clear policy position within the local plan and Section 103 commitments and ongoing negotiations. In reality, housing development is likely to come forward incrementally before the scheme but it is very clear the scheme is needed to facilitate sustainable development along the corridor. The employment dependency at new settlements is judged to be lower given it is largely in place to serve the developments and ensure they do not become dormitory towns whilst the employment site at Bourn Airfield is already established. Clearly, the C2C project will support all commercial development plans, especially those at West Cambridge, but the primary focus is to support housing development and support employment across Greater Cambridge's growth areas.
- Overall the C2C project is anticipated to support, at a gross level, in the range of 975 jobs per annum via supporting the commercial development planned along the corridor. This is a very significant economic impact and over a 30 year time period the present value of benefits amounts to over £1bn for the Greater Cambridge area (2019 values and prices, discounted to 2019).
- Within central government there has been a shift towards capturing the wider economic impacts from dependent development by calculating the LVU of an intervention, as set out in HM Treasury's Green Book and the DCLG Appraisal Guide. Any increase in land value as a result of a change in its use reflects the economic benefits of conversion to a more productive use. This is the recommended approach for capturing the benefits of dependent development. In the case of the C2C project it is also more appropriate given the fundamental aim of the scheme is to facilitate housing supply.
- The PVB of the LVU impact, which adjusts for displacement across the UK and wider effects emerging from the development, is £458.0m (in 2019 values and prices, discounted to 2019). Alternatively, this amounts to £287.8m (in 2010 values and prices, discounted to 2010). This is the central element of the Level 3 impacts.
- The sensitivity tests demonstrate that even if less dependency was assumed for the new settlements the PVB impact would be in the range of £230-£343m (2019 values and 2019 prices, discounted to 2019).
- The labour supply analysis from the previous 2016 report has been updated and demonstrates that the LVU assessment is if anything a conservative approach, given a GVA led approach yields a higher overall benefit.

5 Conclusions

5.1 Economic context

Supporting Cambridge's rapid economic growth, particularly within the life sciences cluster, is vital for the UK economy. Cambridge is one of the UK's fastest growing and most productive cities where economic success, a high quality of life and place are all inextricably linked.

Over the long term, the CPIER¹¹⁴ clearly sets out that baseline growth projections, which inform local planning, are too low and employment could increase by as many as 450,000 additional jobs by 2051 (of which around at least 188,000 are likely to be within Greater Cambridge¹¹⁵). Past and current growth targets have been too low and planning and transport policy needs to be actively planning for further growth.

The continued growth of Cambridge's innovation economy will be driven by the huge levels of growth planned at the fringe locations as well as the city centre and the new settlements. Ensuring transport connectivity and accessibility for workers to these key employment sites will be critical given the scale of growth envisaged.

Collectively, and based on current plans only, there is around 11,700 additional housing units planned and development is estimated to support at least 13,400 additional jobs on those sites along the Cambourne to Cambridge corridor, whilst Cambourne West and Bourn Airfield account for around 50% of all housing planned.

Given the scale of growth and housing pressures in particular, the adoption of the Local Plans for Cambridge and South Cambridgeshire in 2018 included the policy to review the local plan will starting in 2019. A joint Local Plan for Greater Cambridge is being developed to ensure that planning and transport policy can actively plan for growth and address the city's housing needs.

5.2 The C2C project and supporting the economy

The C2C project aims to facilitate the growing demand for transport into Cambridge as a result of the planned growth in housing along the A428/A1303 route and the forecast growth of employment within Cambridge. Greater Cambridge planning policy is very clear that the project is needed to improve the connectivity between the growing settlements to the west of Cambridge, Cambourne West and Bourn Airfield, and key employment locations, including the city centre, Cambridge Biomedical Campus and Cambridge Northern Fringe East.

Fundamentally, the C2C project will support economic growth by providing faster and reliable journey times that will improve connectivity and accessibility and thereby link housing and employment growth areas more closely. Providing the 'first phase' of CAM the scheme will become part of a wider network that seamlessly connects the fringe growth areas to the West with central Cambridge and other key growth areas. This offers the potential for significant new housing development along the corridor given it will have high public transport accessibility to key employment areas in Greater Cambridge, and where the developments themselves can be developed to a higher-density and more sustainable manner.

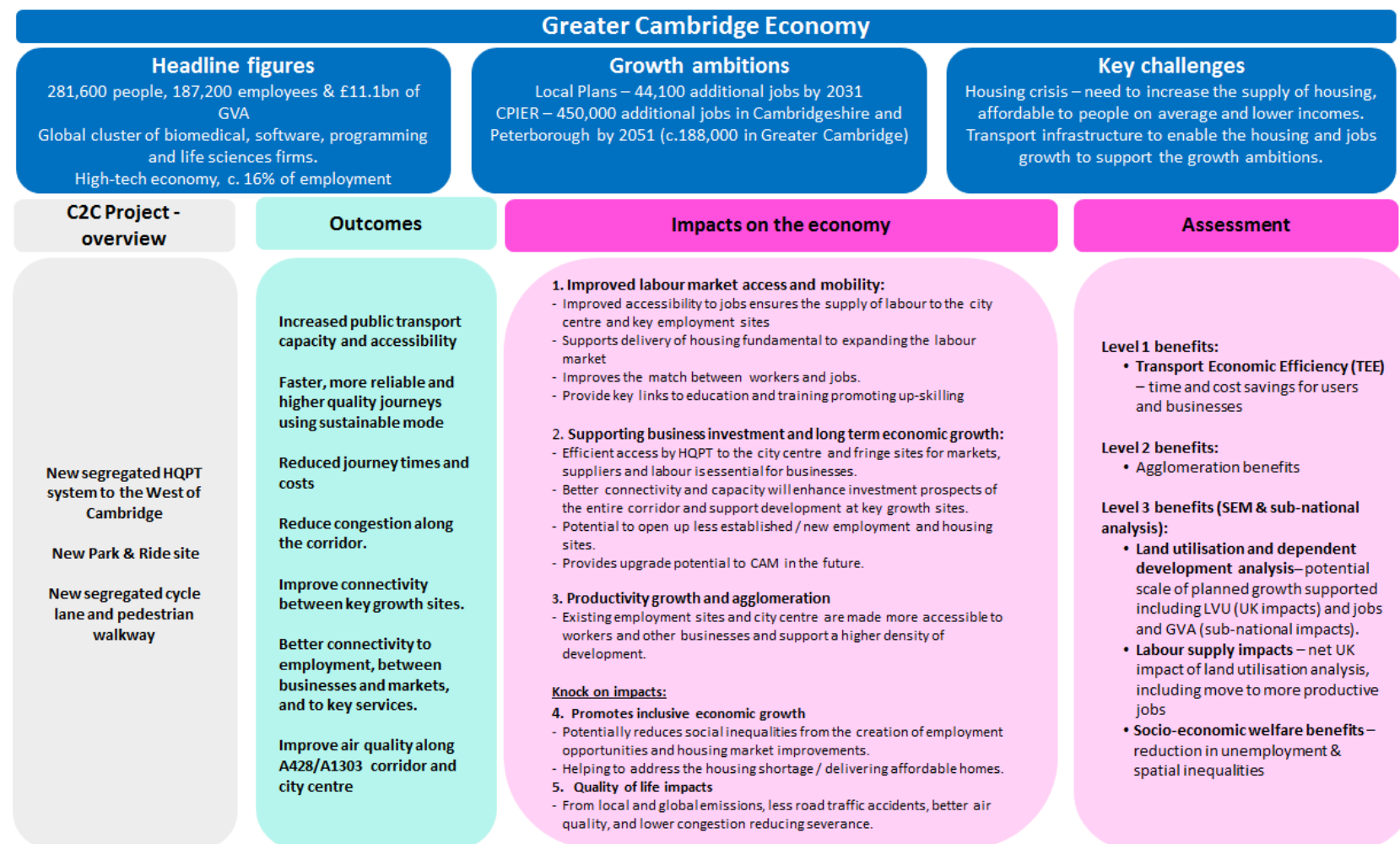
¹¹⁴ Cambridgeshire and Peterborough Independent Economic Review (CPIER) Final Report, Cambridge and Peterborough Independent Economic Commission, September 2018

¹¹⁵ CPIER growth projections based on central projection, with employment for Cambridgeshire and Peterborough increasing from 480,000 jobs in 2018 to 930,000 jobs in 2051. The Greater Cambridge total is based on the proportion of total employment there compared to the CPCA area.

The key channels via which the C2C project influences the Greater Cambridge economy are identified below. The 'logic' demonstrates how the C2C project is perceived to support the Greater Cambridge economy via the services delivered and resulting transport outcomes, the economic impacts derived from these outcomes and the Wider Economic Impacts (WEIs), which can be quantified where possible.

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Figure 16: C2C project – key economic linkages and impacts



Source: Mott MacDonald

5.3 Transport appraisal and WEIs

Business case making, as set out by government, focuses on the principle of welfare economics and the net gain to the national economy. In recent years this standard approach has been augmented with recommendations over how to capture the additional benefits that can arise from transport improvements being transmitted into the wider economy, i.e. beyond those businesses and passengers that are directly affected by the transport change.

The Economic Case for the C2C project includes cost-benefit analysis based on the direct impacts of the scheme in terms of user benefits (from changes in travel costs and times), changes in the externalities associated with car use (e.g. emissions and accidents), and changes in operating costs and revenue to the public and private sector.

However, given the C2C project is about safeguarding growth by ensuring sufficient transport capacity it is critical that the business case, whilst adhering to transport guidance, looks more widely from an economic development perspective at how the scheme supports economic growth in Greater Cambridge as well as impacts at the UK level. This has been the governing principles of the approach adopted here.

5.4 Potential impacts

The following table, Table 13, presents the overall results of the assessment. In summary:

- At a Greater Cambridge level the gross impacts are anticipated to be in the range of 975 jobs, via supporting the commercial development planned along the corridor. This is a very significant economic impact and the present value of benefits amounts to over £1bn (2019 value and 2019 prices, discounted to 2019).
- The LVU impacts of the scheme, which capture the economic benefits of supporting Greater Cambridge's housing supply, are anticipated to deliver a PVB in the range of £458.0m (in 2019 values and prices, discounted to 2019). Alternatively, in 2010 values and prices, this is equivalent to a PVB of £287.8m.
- The labour supply analysis which has been used to validate the LVU impacts is estimated to be higher at £433.7m (in 2010 values and prices, discounted to 2010), which assesses the degree to which the sub-national impacts (measured by jobs and GVA) can be considered net additional at a UK level. This is largely due to the different methodologies, i.e. a jobs and GVA versus LVU approach, but highlights that the LVU assessment is conservative in comparison.

Table 13: C2C Project – economic impacts, summary

	Greater Cambridge	UK	Clarifications
<i>2010 discounted values and prices, discounted to 2010</i>			
LVU impacts	£383.4	£287.8	• 30 year time horizon
Labour supply impacts (validation test)	£676.1 (GVA)	£433.7 (GDP)	• 2010 discounted values and 2010 prices, discounted to 2010. • Labour supply impacts includes M2MPJ impacts at the UK level.
<i>2019 discounted values and prices, discounted to 2019</i>			
LVU impacts	£610.2	£458.0	• 30 year time horizon
Labour supply impacts (validation test)	£1,076 (GVA)	£690.1 (GDP)	• 2019 discounted values and 2019 prices, discounted to 2019. • Labour supply impacts includes M2MPJ impacts at the UK level..

Source: Mott MacDonald

Appendices

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A. Cambridge Phenomenon – SIC Codes Definition

Definition of jobs encompassed by 'Cambridge Phenomenon' based on high tech manufacturing and service related activities within the high-tech and biotech industries. Definition, using Standard Industrial Classification (SIC) codes, encompasses:

- 211: Manufacture of basic pharmaceutical products
- 212: Manufacture of pharmaceutical preparations
- 261: Manufacture of electronic components and boards
- 262: Manufacture of computers and peripheral equipment
- 263: Manufacture of communication equipment
- 264: Manufacture of consumer electronics
- 265: Manufacture of instruments and appliances for measuring, testing and navigation; watches and clocks
- 266: Manufacture of irradiation, electromedical and electrotherapeutic equipment
- 267: Manufacture of optical instruments and photographic equipment
- 268: Manufacture of magnetic and optical media
- 271: Manufacture of electric motors, generators, transformers and electricity distribution and control apparatus
- 272: Manufacture of batteries and accumulators
- 273: Manufacture of wiring and wiring devices
- 274: Manufacture of electric lighting equipment
- 275: Manufacture of domestic appliances
- 279: Manufacture of other electrical equipment
- 303: Manufacture of air and spacecraft and related machinery
- 325: Manufacture of medical and dental instruments and supplies
- 582: Software publishing
- 611: Wired telecommunications activities
- 612: Wireless telecommunications activities
- 613: Satellite telecommunications activities
- 619: Other telecommunications activities
- 620: Computer programming, consultancy and related activities
- 631: Data processing, hosting and related activities; web portals
- 639: Other information service activities
- 701: Activities of head offices
- 702: Management consultancy activities
- 711: Architectural and engineering activities and related technical consultancy
- 712: Technical testing and analysis
- 721: Research and experimental development on natural sciences and engineering
- 722: Research and experimental development on social sciences and humanities
- 749: Other professional, scientific and technical activities n.e.c.

B. Methodology – further details and key assumptions

Table 14: Land value uplift assumptions

	Main assumption / source	Cambourne West	Bourn Airfield
Current land uses			
Agriculture	Although at Bourn Airfield some small scale aviation activities the vast majority of the site is agricultural. At Cambourne West the majority of the site is also agricultural uses.	100%	100%
Future land uses			
Residential development, ha	Based on assuming 40 dwellings per ha for Cambourne West and using existing evidence for Bourn Airfield.	Based on assuming 40 dwellings per ha for both sites (58.8ha)	112.8ha – based on assuming 40% of the site is used for residential development ¹¹⁶ .
Commercial development, sqm (NIA)	Based on latest planning applications.	30,625	1,250
Affordable housing	Bourn Airfield New Village: A Spatial Framework & Infrastructure Delivery Plan, Supplementary Planning Document, Greater Cambridge Share Planning, Consultation Draft, June 2019 and Cambourne West, Planning application reference S/2903/14/OL, December 2014	30%	40%
Trajectories (build out)			
Residential	South Cambridgeshire Annual Monitoring Report, South Cambridgeshire, December 2017	Post 2031 development assumed at same rate until completion	Post 2031 development assumed at same rate until completion
Commercial	Based on similar build out to the residential trajectories but complete by 2030.		
Data assumptions			
GVA per worker	£61,800	Greater Cambridge, EEFM model, updated to 2019 prices	
Residential land values, 2017 prices	£5,300,000	Land Value Estimates for Policy Appraisal, Valuation Office Agency (VOA) and MHCLG, May 2018 (South Cambridgeshire) (2017 prices)	
Agricultural land values, 2017 prices	£21,000	Land Value Estimates for Policy Appraisal, Valuation Office Agency (VOA) and MHCLG, May 2018 (Greater Cambridge and Greater Peterborough) (2017 prices)	
Commercial land value, £ per sqm (NIA)	£305	Refers to office out of town business park, Cambridge.	
Inflation adjustments	2017 and 2016 to 2019 prices	Consumer Price Index (CPI), ONS	
Externalities			
Amenity cost, £ pa ha	£6,366	DCLG Appraisal Guide. Based on amenity cost for Agriculture (Extensive), Figure 24, p.91	

¹¹⁶ Examination into the Soundness of the Cambridgeshire Local Plan, Matter SC6 – New Settlements, South Cambridgeshire District Council, February 2017. 4.4.1

	Main assumption / source	Cambourne West	Bourn Airfield
External health benefits from additional rented affordable housing, £ per additional affordable home	£125	DCLG Appraisal Guide, p. 90	
Additionality assessment			
Displacement	25%	Based on reasons outlined in Section 4.4.1	
Present Value Benefits			
2019 discounted values and 2019 prices	Costs discounted to 2019 using Green Book Discount Factors over a 30 year period.		
2010 discounted value and 2010 prices	Costs discounted to 2010 prices using Green Book Discount Factors over a 60 year period.		
Source: Mott MacDonald			

C. Options comparison

C.1 Introduction

Mott MacDonald was appointed by Cambridgeshire County Council (CCC) in Summer 2016 to provide a strategic economic appraisal of C2C project. This involved assessing the relationship between the transport infrastructure provision and the GCCD growth ambitions and objectives. The analysis, alongside the conventional transport appraisal being prepared in parallel (by Atkins Ltd at the time), was then used by CCC to inform the recommendation to the City Deal Board of a 'Preferred Option' for further consultation and full business case assessment.

The appraisal built upon the Level 1 impacts captured within the Economic Case assessment for each scheme by assessing the WEIs associated with supporting and bringing forward planned development along the A428-A1303 corridor.

The focus was on assessing the WEIs of three main variants – on highway measures (termed the low cost option), hybrid measures (termed the medium cost option) and a fully segregated option (termed the high cost option). The assessment was based on the following key tasks:

- Qualitative appraisal of the options for the scheme against the GCCD strategic objectives across a number of key channels via which the scheme is likely to influence economic growth given the identified transport benefits. This focused on:
 - Key transport benefits identified for each option and how they addressed congestion and capacity issues (assessed against connectivity, reliability, sustainable transport and quality). This, at a fine level of spatial detail, looked at journey times and costs between locations by mode of travel, journey purpose and time period under a Do Minimum (DM) scenario and three Do Something (DS) scenarios (on highway, hybrid and segregated options).
 - Using this, how the scheme supported GCCD strategic objectives against the key channels identified (business investment and growth, labour market mobility, positive image and perceptions and future development growth (post 2031))
- Attributing a level of growth from the development sites most likely to be impacted by the scheme and wider city centre development to the highest performing option (based on qualitative appraisal).
- Transport modelling to provide a set of multipliers by which to compare the options, which was based on:
 - Analysis of the perceived times and costs (Generalised Cost (GC) of travel) under each option from the transport modelling work by Atkins Ltd.
 - Capturing the impact on (public transport) users of the scheme, and for highways, capturing the decongestion benefits from mode shift.

The outcome of this analysis was that the segregated option was found to provide the greater stimulus via transport benefits and investment in long term capacity to support GCCD objectives.

C.2 This option comparison

Updating the 2016 study for all potential options is out of the scope and the C2C project has moved on substantially. Based on the findings of the 2016 study, only solutions which are segregated to the east of the M11 motorway are now being considered. Consequently, there is

no comparable wholly on-highway (online) option both west and east of the M11. Solutions only differ in their alignment west of the M11.

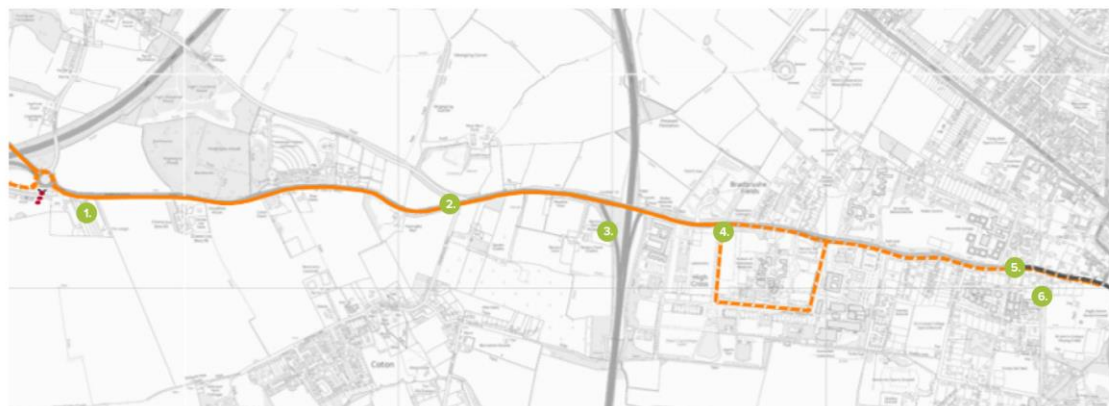
However, to reiterate the rationale for the preferred (segregated) option some additional analysis has been undertaken to update the 2016 findings for the on-highway and segregated options, including:

- Updating the qualitative assessment of the key transport benefits and how these differ between the segregated and on-highway options; and
- Using the modelling outputs which were available for the 2016 study in conjunction with the latest LVU analysis detailed in Section 4.4.

Options

The on-highway option that is assumed is the “optimised” solution for Option 1 in Phase 1¹¹⁷ and Option 2 for Phase 2, with an alignment shown in the figure below. As noted previously, there is no new assessment of the transport benefits for this on-highway solution as the latest transport modelling, given the stage of the project, assumes that all options are offline east of the M11 (Phase 1).

Figure 5: Optimised On-Road Option



Source: Mott MacDonald (© Crown Copyright. All Rights Reserved. OS License Number 100023205.2018)

The segregated (or offline) option discussed hereafter can be considered analogous to the scheme described in Section 1.2.

C.3 Qualitative assessment

The following updates the previous 2016 qualitative assessment by examining the key differences across the main transport benefits for both options and how this impacts on the economy, based mainly on those channels identified within the logic map (Figure 15).

¹¹⁷ Cambourne to Cambridge Better Public Transport Project, Interim Report, November 2018, as set out in Figure 5 from that report (above).

Table 15: Key transport benefits – qualitative assessment of on road and preferred option

Transport benefits and impacts	Preferred Option	On-road option
Connectivity and accessibility	<ul style="list-style-type: none"> Significant reductions in travel times and costs for residents of Cambourne and those accessing P&R sites. Greatest level of mode shift, which frees up highway capacity for use by others and /or reductions for existing users. Greatest increase in labour market accessibility, primarily focused on the city centre. Overall scheme demand, congestion savings and connectivity impacts are much higher which ensures journeys to work are efficient. 	<ul style="list-style-type: none"> Some reductions in travel times and costs for residents of Cambourne, Boum Airfield, Hardwick and those accessing P&R sites, but limited by online alignment. Low level of demand and therefore frees up much less highway capacity for use by others and/or reductions by existing users. Lower increase in labour market accessibility due to longer journey times to city centre.
Impact:	<ul style="list-style-type: none"> Improves labour market accessibility. The preferred route better ensures a supply of labour, via supporting demand from new housing, to the city centre and key employment sites. Supports business investment - efficient access by High Quality Public Transport (HQPT) to the city centre and fringe sites for markets, suppliers and labour is essential for businesses. Supports long term growth - better connectivity and capacity will enhance investment prospects of the entire corridor and support development at key growth sites. It also provides upgrade potential to CAM in the future to support the longer term economic growth ambitions. Fixed, segregated, infrastructure gives residents and businesses the confidence to make long-term decisions Fixed, segregated, infrastructure provides greater opportunities for Transit Orientated Development (TOD) and promotes clustering of activity around accessible nodes, with associated agglomeration gains. Existing employment sites and city centre are more accessible under the preferred option to workers and other businesses and support a higher density of development. Agglomeration impacts will be particularly relevant if the system is capable of being upgraded to CAM. 	
Reliability	<ul style="list-style-type: none"> Will promote much higher levels of reliability 	<ul style="list-style-type: none"> Promotes lowest level of reliability, with potential to be caught in highway congestion
Impacts	<ul style="list-style-type: none"> Supports all of the above with reliability often as important to workers and businesses as journey time savings. HQPT that is segregated with new fixed infrastructure will promote a positive impact of the transport network. 	
Sustainable transport (mode shift)	<ul style="list-style-type: none"> Greatest mode shift and will do the most to contribute to improved quality of life by reducing car-kms 	<ul style="list-style-type: none"> Lower mode shift and only make a limited contribution to improved quality of life
Impacts	<ul style="list-style-type: none"> Option with greatest mode shift will also be more effective at reducing CO₂ emissions, road traffic accidents, congestion reducing severance and at improving local air quality levels. Option that leads to highest mode shift will promote inclusive economic growth by potentially reducing spatial inequalities from housing market improvements and accessibility to jobs – job matches should be more efficient. 	
Quality	<ul style="list-style-type: none"> Segregated route will promote the highest levels of perceptions of quality, due to presence of fixed infrastructure for the entire length. 	<ul style="list-style-type: none"> On-road alignment will promote lowest levels of perceptions of quality, due to lack of fixed infrastructure.

Transport benefits and impacts	Preferred Option	On-road option
Impacts	<ul style="list-style-type: none"> ➤ HQPT that is segregated with new fixed infrastructure will promote a positive impact of the transport network. ➤ Preferred option provides the biggest increase in future capacity for further housing and development planned in the new settlements and fringe sites. ➤ Its segregated nature means it could more easily be upgraded to CAM in the future which will help future proof the corridor for any further unplanned development. 	

Source: Mott MacDonald

In summary this analysis reiterates that the preferred off-line solution has a much stronger impact given:

- **Strong connectivity and accessibility benefits:** Overall scheme demand, congestion savings and connectivity impacts are much higher which improves labour market efficiency and supports business investment. Fixed, segregated, infrastructure provides greater opportunities for Transit Orientated Development (TOD) and promotes clustering of activity around accessible nodes, with associated agglomeration gains.
- **Reliability benefits:** Reliability is critical for ensuring the above holds true as often it is as important to workers and businesses as journey time savings.
- **Sustainable transport (mode shift):** The offline option provides the greatest mode shift which will be more effective at reducing CO₂ emissions, road traffic accidents, congestion reducing severance and at improving local air quality levels. This also better promotes inclusive economic growth by potentially reducing spatial inequalities from housing market improvements and accessibility to jobs – job matches should be more efficient.
- **Quality:** HQPT that is segregated with new fixed infrastructure will promote a positive impact of the transport network. The offline option provides the biggest increase in future capacity for further housing and development planned in the new settlements and fringe sites. Its segregated nature means it could more easily be upgraded to CAM in the future which will help future proof the corridor for any further unplanned development.

C.4 Transport modelling outputs and analysis – 2016 results

The 2016 study examined the key transport benefits for the three options of scheme put forward at the time (on highway, hybrid and offline) in terms of how they addressed congestion and capacity issues (assessed against connectivity, reliability, sustainable transport and quality). At a fine level of spatial detail this analysis looked at journey times and costs between locations by mode of travel, journey purpose and time period.

To produce aggregate results the analysis demand weighted the Generalised Cost (GC) from all individual segments to show the relative reductions in GC for the three Do Something (DS) options compared to the Do Minimum (DM). The results of this analysis are shown below in Table 16.

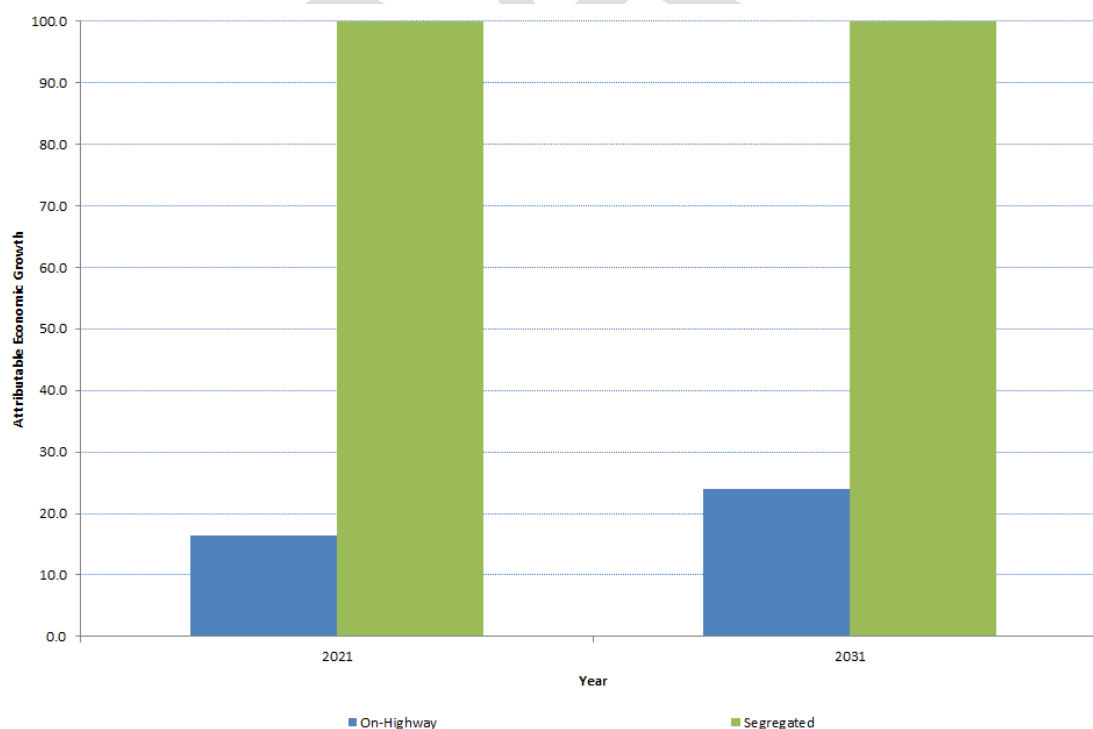
Table 16: Changes in travel times and costs by option

Option	2021	2031
Public Transport		
Do Minimum	100.00	100.00
Option 1 – On highway	98.07	99.45
Option 3 - Segregated	95.89	97.11
Highway		
Do Minimum	100.00	100.00
Option 1 – On highway	99.92	99.84
Option 3 - Segregated	99.84	99.70
TOTAL (Public Transport + Highway – demand weighted)		
Do Minimum	100.00	100.00
Option 1 – On highway	99.90	99.79
Option 3 - Segregated	99.20	99.11

Source: Mott MacDonald. Strategic Economic Appraisal of A428-A1303 Bus Scheme: Wider Economic Benefits, Cambridgeshire County Council, August 2016, p.36

The results showed the segregated option could, in 2021, support a 4.1% reduction in the total times and costs of public transport travel, and a corresponding 0.8% reduction in the total times and costs of travel across all modes relative to the Do Minimum (DM). This analysis provided a set of transport multipliers that set out the differences across the options and the scale of differences across these multipliers is set out below in Chart 4.

Chart 4: C2C Project – Attributable Economic Growth Index (2016 analysis)



Source: Mott MacDonald. Strategic Economic Appraisal of A428-A1303 Bus Scheme: Wider Economic Benefits, Cambridgeshire County Council, August 2016, p.36

The previous approach taken was then:

- Based on the qualitative assessment, the highest performing option was identified (this was the segregated option) and the economic growth, i.e. employment related development, as assessed at the time was then attributed to this option; and
- The WEIs for the on-highway, and a third 'Hybrid' option being considered in 2016, were then assessed based on their relative performance compared to the DM and best performing (i.e. the segregated) option.

C.5 On-highway versus segregated land value uplift estimate

As outlined above it has not been possible to update this analysis of the transport benefits for the on-highway option. However, applying the previous multipliers to the on-highway and segregated options results in the following LVU estimates:

Table 17: Land Value Uplift – results, PVB (2010 values and 2010 prices, 60 year time period)

	Impact, £m
Preferred Segregated Option	£287.8
On-Highway Solution	£62.1

Source: Mott MacDonald

This demonstrates that the on-highway solution, based on the previous transport analysis, is less likely to resolve the current transport issues on the route and accommodate the increased demand on the network. This will have a knock on impact on the scale of development that could be delivered meaning that an on-highway solution would deliver only £62.1m of LVU compared to £287.8m under the preferred, segregated, option.

It should be noted that this is a very high level assessment, based on the anticipated differences in transport impacts between the two options, and not a detailed appraisal of the options (like the 2016 study) and their likely impacts on the dependent development. To produce a complete update would require a comprehensive refresh of the proposals for a wholly on-highway option in order to bring it up to a comparable level of design detail and then reproduce the associated modelling outputs.

