TETRA TECH

Cambridge Eastern Access

STRATEGIC OUTLINE BUSINESS CASE

Part 1: STRATEGIC CASE

GREATER CAMBRIDGE PARTNERSHIP

26 April 2021

Document Control

Document:	Strategic Outline Business Case
Project:	Cambridge Eastern Access
Client:	Greater Cambridge Partnership
Job Number:	A081175-146
File Origin:	

Revision:	Final	
Date:		
Prepared by: Ben King	Checked by: Ben Green	Approved By: Alistair Gregory
Description of revision:		

Revision:		
Date:		
Prepared by:	Checked by:	Approved By:
Description of revision:		

Revision:		
Date:		
Prepared by:	Checked by:	Approved By:
Description of revision:		

Contents

PART 0 | EXECUTIVE SUMMARY

Overview

i. This document forms the Strategic Outline Business Case (SOBC) for the Cambridge Eastern Access (CEA) scheme. It contains five distinct parts which respectively comprise the Strategic, Economic, Commercial, Financial and Management Cases, in line with the Department for Transport's (DfT) requirements for transport business cases[1].

The Cambridge Eastern Access Scheme

ii. The Cambridge Eastern Access scheme seeks to enhance sustainable transport provision in the east of the city. In the short term it will address congestion issues on Newmarket Road by reducing journey times for public transport and making walking and cycling more attractive options, whilst in the longer term, the scheme will look to increase the capacity and connectivity of sustainable transport, opening up locations for growth and reducing reliance on the car.

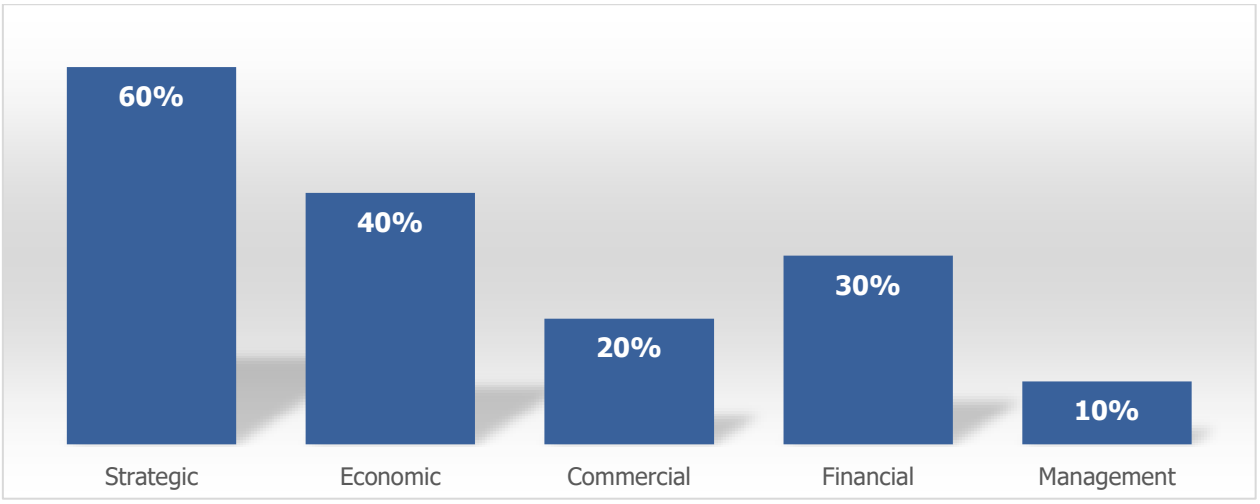
iii. The interventions which comprise the Eastern Access scheme include measures for all modes of travel, particularly bus passengers, together with pedestrians and cyclists. It will provide real travel choice, attractive alternatives to the car and reduce the dominance of traffic on local communities. It will embrace new technologies and enhance the already popular Park and Ride service along Newmarket Road.

iv. The scheme is estimated to represent public sector investment of some £50 million in the transport network and is anticipated to be delivered in two phases, the first of which will mostly be in place by 2025 and the second complete by 2030. Its role in the wider vision for the transport network across the city is highlighted in the plan overleaf.

Requirements of the Strategic Outline Business Case

v. The SOBC is the first of three stages in the Business Case development process, preceding the production of an Outline Business Case and finally a Full Business Case. As such, it is not expected to provide all the details of every aspect of the proposals and their delivery. The required level of detail for the five cases is illustrated below.

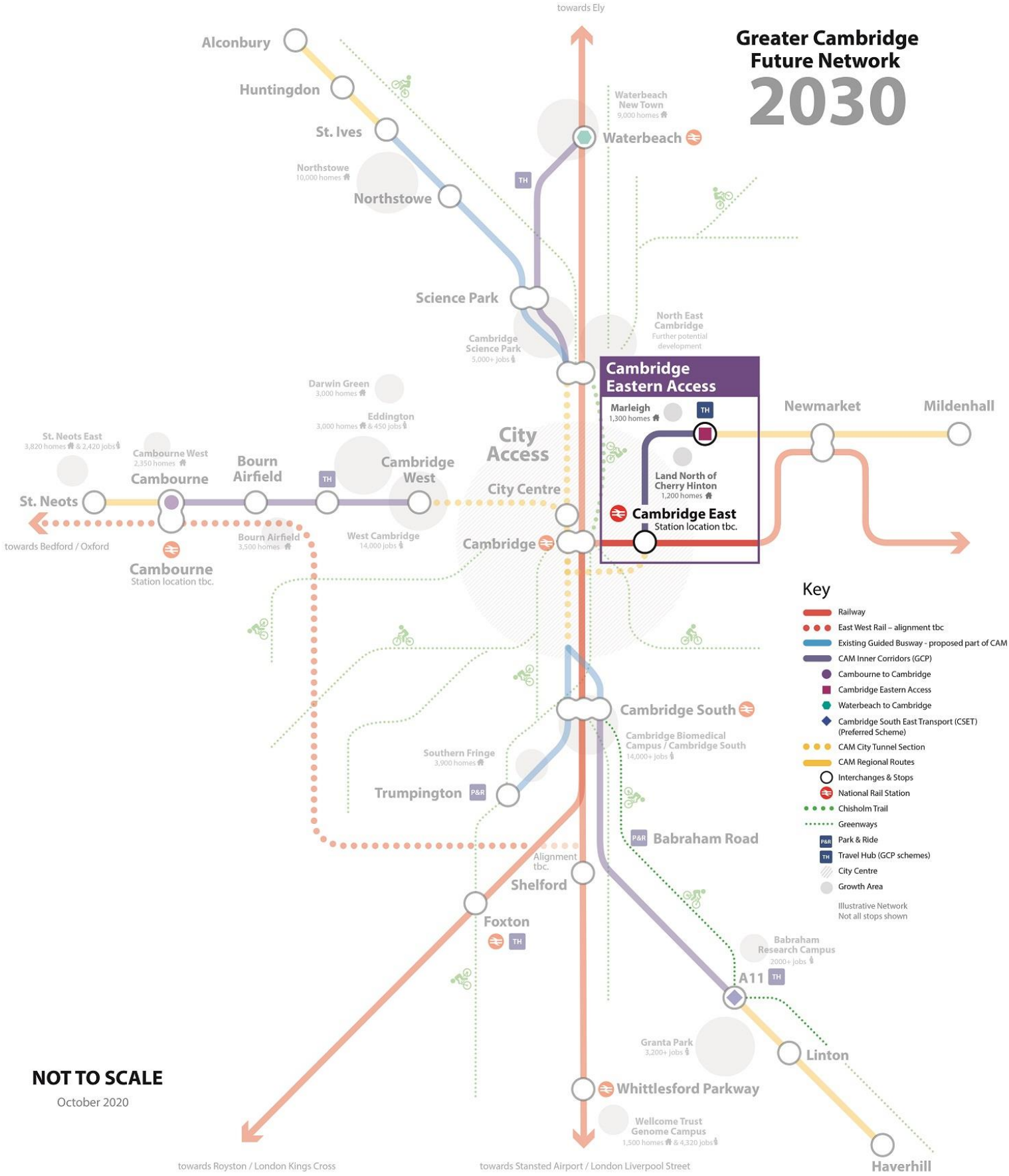
Required Level of Detail for a Strategic Outline Business Case



Source: Guide to Developing the Project Business Case; HM Treasury, 2018

- **The Strategic Case:** The Strategic Case highlights the need for intervention and the case for change. It provides the policy context within which the scheme or schemes are coming forward, the nature of existing provision and the gaps in the offer which need addressing. It also highlights current and future travel patterns and the performance of the network, together with the proposals which will shape the demand to travel in the years to come.

[1] https://www.gov.uk/government/publications/transport-business-case



NOT TO SCALE

October 2020

The perceptions of stakeholders and the general public also form an integral part of the strategic case, to demonstrate that there is a support for the scheme. The case concludes with a series of objectives and priorities for the east of the city and details the packages of intervention through which they may be addressed.

- **The Economic Case:** The Economic Case details the economic benefits of the scheme options, determining if investment in the network would provide value for money based upon it's impacts on a broad range of factors, each of which are monetised, in line with the need to fulfil the Treasury's requirements for appraisal. The basis to the Economic Case are the outputs derived from the Cambridge Paramics Model.

- **The Financial Case:** The Financial Case outlines financial profile of the recommended scheme options and an overview of how the scheme will be funded, through public and private sector sources.

- **The Commercial Case:** The Commercial Case provides evidence on the commercial viability of the proposals and the procurement strategy that is used to engage the market. It presents evidence on risk allocation and transfer, contract timescales and implementation timescale as well as details of the capability and skills of the team delivering the project.

- **The Management Case:** The Management Case assesses whether a proposal is deliverable. It tests the project planning, governance structure, risk management, communications and stakeholder management, benefits realisation, and assurance.

External Factors

vi. Both 2020 and 2021 have been disrupted by the Covid-19 pandemic, with uncertainty remaining as to the implications of the departure of the UK from the EU. These significant externalities are recognised, and will be studied further as the scheme progresses, but in the context of this SOBC it is considered premature to seek to assess what the implications might be in the medium to longer term.

vii. There are recognised risks that the UK economy may experience ongoing recession, that public transport patronage may be hit by reluctance to mix socially and increased remote working. Conversely an increase in interest in leisure activity may lead to long term growth in cycle demand.

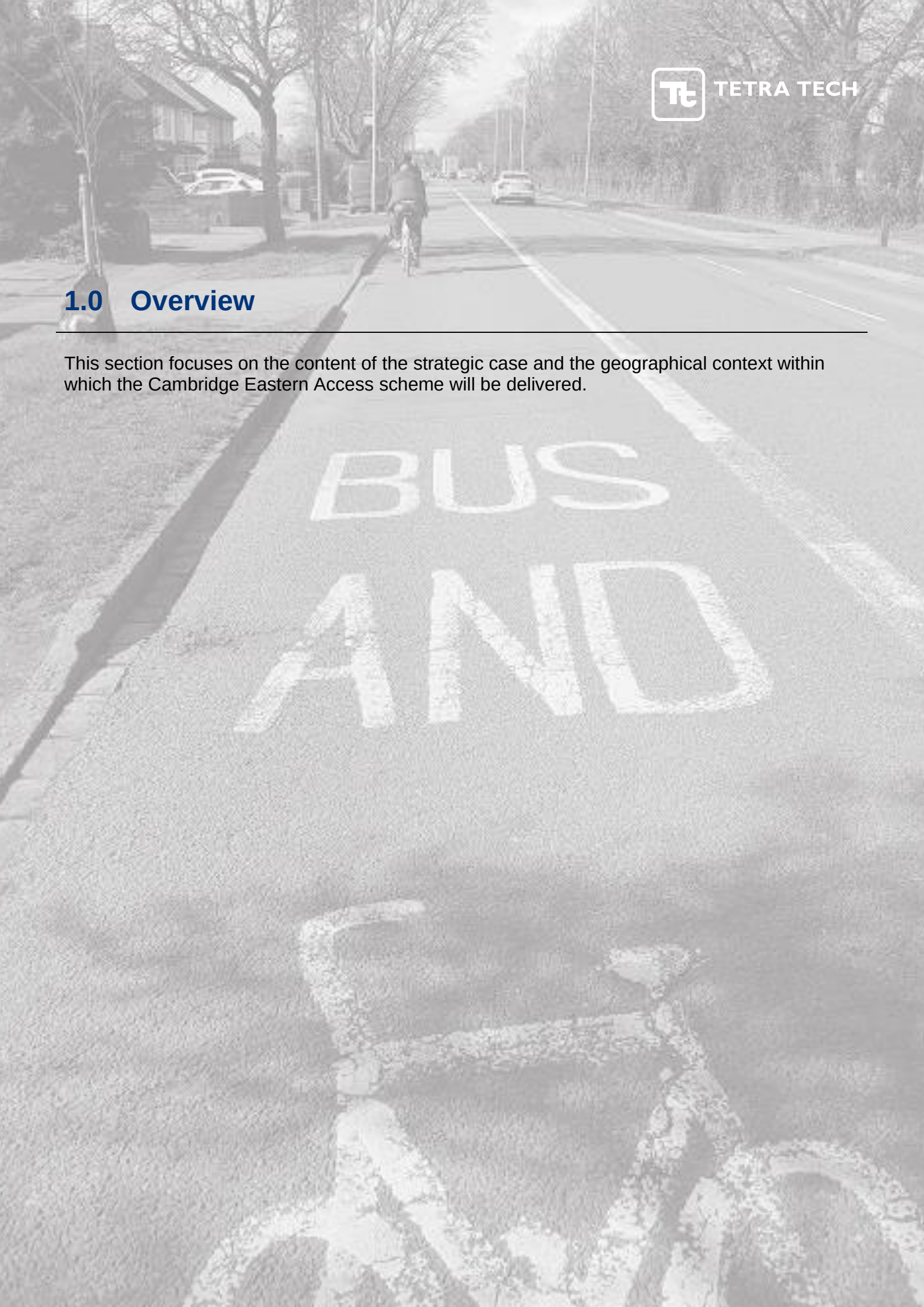
viii. Moreover, in Cambridge, the economy is relatively strong, and dependant on sectors such as education, healthcare and leisure which are likely to return to historic behaviour patterns. At this point in time these matters remain supposition and it is expected that any future Outline Business Case will be informed both by behavioural trends emerging during 2021 and by further risk assessment and scenario tests.

More Information

ix. If more information is required, please contact the Greater Cambridge Partnership, via:

Telephone: 01223 699906
Email: contactus@greatercambridge.org.uk

PART 1 | STRATEGIC CASE



1.0 Overview

This section focuses on the content of the strategic case and the geographical context within which the Cambridge Eastern Access scheme will be delivered.

1.1 Requirements of the Strategic Case

1.1.1 The purpose of the strategic case is to demonstrate the need for change and how future interventions provides strategic fit with broader objectives social, economic and environmental objectives.

1.1.2 Demonstrating that the scheme provides synergy and holistic fit with other projects and programmes within the strategic portfolio requires an up-to-date organisational business strategy that references all relevant local, regional and national policies and targets.

1.1.3 Making a robust case for change requires a clear understanding of the rationale, drivers and objectives for the spending proposal, which must be made SMART – Specific, Measurable, Achievable, Relevant and Time constrained – for the purposes of post-evaluation.

1.1.4 Key to making a compelling case for intervention is a clear understanding of the existing arrangements: the Business As Usual (BAU), business needs (related problems and opportunities), potential scope (the required organisational capabilities) and the potential benefits, risks, constraints and dependencies associated with the proposal.

1.1.5 The challenges are:

- To explain how further intervention and spend on key 'inputs' will deliver 'outputs' that improve the organisation's capability to deliver better outcomes and benefits to stakeholders and customers, while recognising the associated risks.
- To ensure the organisation's proposals focus on business needs that have been well researched and are supported by service demand and capacity planning.
- To ensure schemes are planned and delivered as part of an approved organisational strategy that has a well defined portfolio of related programmes and projects.

1.1.6 This Strategic Case forms the first of the five cases which together comprise the Strategic Outline Business Case for the Cambridge Eastern Access project.

1.2 Structure of the Strategic Case

1.2.1 The DfT's guidance document, '*The Transport Business Case: Strategic Case'*, outlines the areas to be covered as part of the Strategic Case. At this Strategic Outline Business Case Stage, the following are required to be demonstrated:

- Chapter 2 | Project Definition & Context
  Details the short, medium and long term strategic need for intervention and the options which comprise the Cambridge Eastern Access scheme.

- Chapter 3 | Policy Context
  Highlights the relevant national, regional and local policy context and historic studies which support the delivery of the scheme, and the ability of the Cambridge Eastern Access project to contribute towards wider economic, environmental and social priorities.

- Chapter 4 | Infrastructure & Service Provision
  Details infrastructure and services in place which connect Newmarket Road to the wider transport network considering all modes of travel. The section also establishes the local context and constraints.

- Chapter 5 | Travel Patterns & Practice
  Highlights the way in which the Newmarket Road corridor is currently used, detailing the volume of movement, origins and destinations of trips, modal choice, safety and journey times.

- Chapter 6 | Planning & Transport Proposals
  Establishes the land use and transport proposals in the pipeline which may influence the future operation of the Newmarket Road corridor in terms of the level of demand and the extent of travel choice available to future users.

- Chapter 7 | Perceptions of Stakeholders
  Provides a review of the feedback received from stakeholders and the general public as part of the scheme development process.

- Chapter 8 | Socio-Economic Context
  Overview of socio-economic trends in Cambridge, Greater Cambridge and Cambridgeshire. Primarily it identifies challenges and opportunities regarding population growth and employment levels.

- Chapter 9 | Air Quality & The Environment
  High-level overview of the environmental issues in the east of the city and across Cambridge in general which should be sought to be alleviated through investment in network improvements.

- Chapter 10 | Objectives & Priorities
  The overarching objectives and specific priorities through which to help target investment in transport improvements within the east of the city, together with the core principles upon which the packaging of the scheme options has been based.

- Chapter 11 | Option Generation
  Details the process through which scheme options were identified, assessed, shortlisted, phased and packaged as alternative interventions to meet the overarching objectives of the study. It sets out the long list of alternatives considered, the criteria upon which their potential contribution towards meeting the needs of the corridor and their ease of delivery was determined, and the combination of measures which constituted alternative packages for appraised in the transport model.

- Chapter 12 | Model Outputs & Recommended Packages
  Recommends the packages to be taken forward following the outputs of the modelling assessment of the various options.

1.3 Geographical Scope

1.3.1 This SOBC focuses on the introduction of transport improvements in the area covering the Newmarket Road corridor and the surrounding links in the east of Cambridge, from Mill Road and Coldham's Lane in the south to the A14 and Ditton Lane in the north, and from the Quy Interchange (A14 J35) in the east to the Elizabeth Way roundabout in the west.

1.3.2 The area is subject to high volumes of traffic and is the location for significant growth proposals which could see the expansion of the city to the east with the redevelopment of the airport site. In the longer term it is anticipated that the Cambridgeshire Autonomous Metro will serve the area via a route extending to Mildenhall.

1.3.3 The corridor forms the main gateway into the city from the east, and whilst it accommodates many east-west movements into and out of the city centre, it also forms an important leg for strategic trips between the north and south of the city, particularly for those wishing to access employment opportunities within the science park to the north and at the Biomedical Campus to the south.

1.3.4 The mix of land uses along Newmarket Road ensures that it remains busy throughout the day and Abbey Stadium, home of Cambridge United Football Club, represents a significant trip generator and destination on match days throughout the football season. A map of the study area is provided in Figure 1.2.

TETRA TECH

Figure 1.1: Study Area

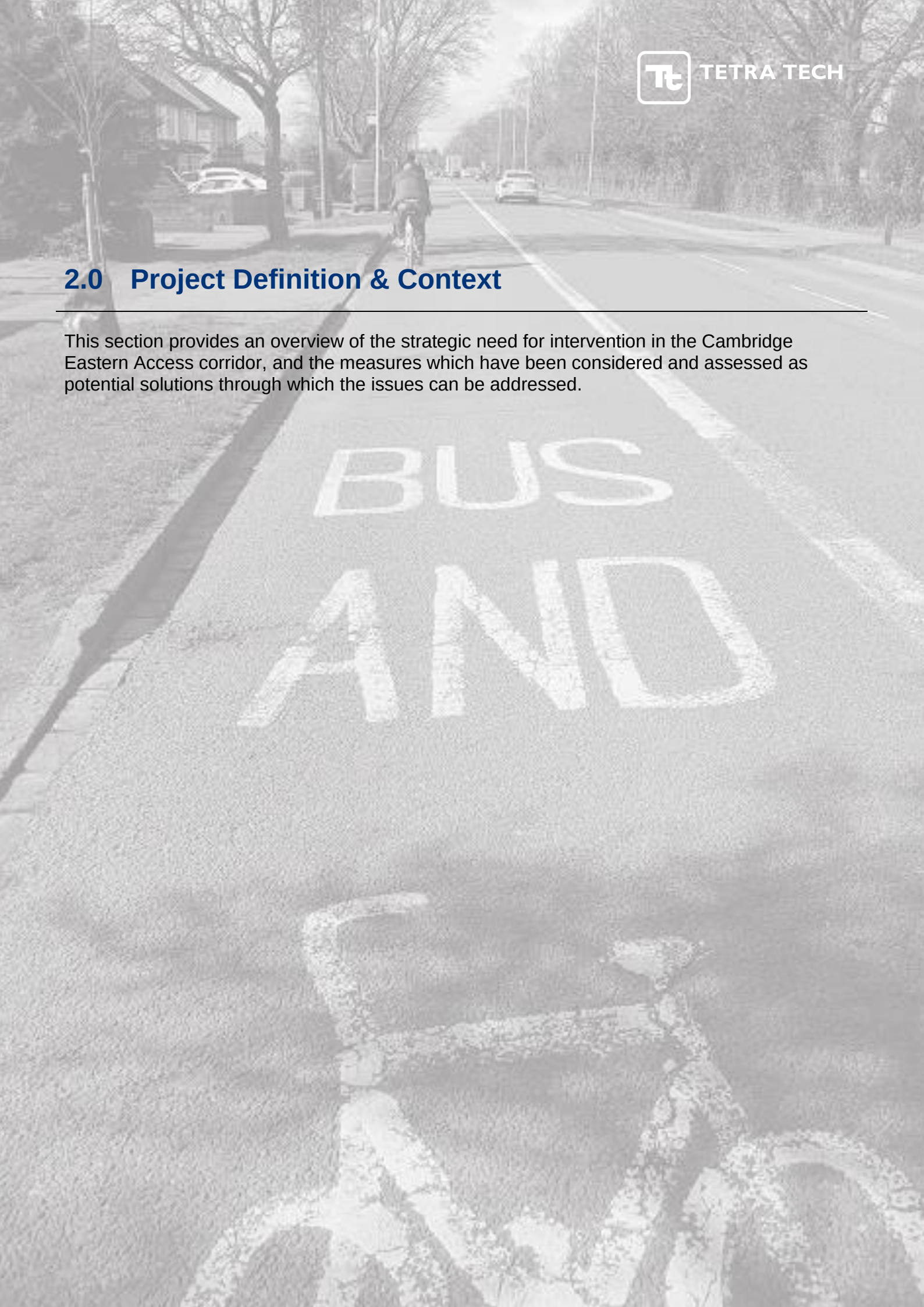
DATE: 14.09.20 SCALE: 1:17,500 @ A3

DRAWN BY / REVIEWED BY: BR / BK

PROJECT NO:	DRAWING NO:	REVISION:
A081175-146	056	-

WYG
Quay West at MediaCityUK, Trafford Wharf Road,
Trafford Park, Manchester, M17 1HH
Tel: 0161 872 3223
www.**wyg**.com

1. DO NOT SCALE FROM THIS DRAWING.
2. THIS DRAWING IS TO BE CHECKED WITH ALL OTHER RELEVANT DRAWINGS.
3. ANY DISCREPANCIES CHECK WITH WYG, IF IN DOUBT ASK.
4. DRAWING TO BE USED FOR PURPOSES OF THE ISSUE AND NOTED ON PLAN.



2.0 Project Definition & Context

This section provides an overview of the strategic need for intervention in the Cambridge Eastern Access corridor, and the measures which have been considered and assessed as potential solutions through which the issues can be addressed.

2.1 Overview of Strategic Need

2.1.1 There is short term need to address the inadequacies of the transport offer into Cambridge from the east. Reliance on the car results in delays and congestion for commuters and has significant adverse impacts on local communities and the environment. In the longer term, there is a need to provide the capacity and connectivity through which to facilitate housing and economic growth within the east of the city and beyond.

2.1.2 These drivers for change and the timescales within which they manifest themselves require a phased approach in the nature of the interventions through which they will be addressed, as illustrated in Figure 2.1 and discussed in more detail below.

Figure 2.1.: Summary of Strategic Need

Short Term

2.1.3 The A1303/A1134 (Newmarket Road) provides a key radial route through the east of Cambridge between the A14 at junction 35 (Quy Interchange) and the Elizabeth Way roundabout, serving several key employment locations, Cambridge Airport, local communities and out of town retail parks. It is a busy route throughout the day serving not just commuters, but shoppers and visitors to the city from Cambridge and beyond.

2.1.4 The corridor also accommodates both east-west movements into the city centre and north-south orbital movements across the city via Ditton Lane and Barnwell Road, creating a complex pattern of use. This makes for a busy artery which is heavily trafficked throughout the day.

2.1.5 Consequently, journey times for general traffic and buses are impacted by delays and congestion in several locations. Local residents also suffer as a result of the impact on air quality and noise of vehicles – the most heavily populated section of the corridor is also the point at which the carriageway is at its narrowest, bringing vehicles close to residential properties.

2.1.6 The dominance of general traffic is compounded by the lack of attractive alternatives. Whilst buses operate at a regular frequency, including Park and Ride provision, they are often delayed due to a lack of comprehensive (and effective) priority measures along the corridor.

2.1.7 Provision for cyclists is also inconsistent and fails to provide a continuous route segregated from general traffic along Newmarket Road. The public realm is of poor quality in places, with a lack of crossing points for pedestrians, particularly on desire lines, an issue encapsulated in the Elizabeth Way roundabout where pedestrians have to negotiate a series of underpasses in order to reach the city centre.

2.1.8 During the Covid-19 pandemic, an experimental Traffic Regulation Order (eTRO) placed a Bus Gate on the parallel Mill Road, and a further eTRO is being considered in the form of a Modal Filter on Coldham's Lane. If these are adopted as permanent measures they will improve cycle access to the city for the east but are likely to compound the impact of traffic on Newmarket Road.

2.1.9 It is anticipated that, despite changes in travel behaviours during 2020/21 as a result of the Covid-19 pandemic, changes in travel choice are required, together with a shift away from the private car and the detrimental impacts the dominance of traffic has on the quality of life on both residents along the corridor and other road users.

Medium to Long Term

2.1.10 Cambridge is one of the fastest growing cities in Europe. A booming economy and rapidly growing population have forced growth out of central Cambridge into the periphery, placing increasing pressure on the city's radial routes. The Joint Local Plan for Cambridge and South Cambridgeshire estimates that more than 44,000 additional jobs will have been created in the area by 2031, whilst 33,500 new homes are expected to be delivered within the east of the city over the next 10 years.

2.1.11 The rate at which residential and commercial development is anticipated to be delivered across east Cambridge will place significant pressure on a transport system on which demand is already exceeding capacity during busy periods.

2.1.12 If action is not taken to future proof the transport network, peak period journey times are expected to increase by as much as 90% by 2026, primarily as a result of increased demand and a transport network which lacks the flexibility and capacity to respond appropriately.

2.1.13 Cambridge and South Cambridgeshire import a larger proportion of labour than is exported. The significant number of job opportunities and sector-specific requirements of the dominant science and engineering industry necessitate that employers must attract labour from outside of the immediate area. Reliance on external labour results in high commuter demand on the transport network, particularly during peak hours.

2.1.14 In the medium to longer term it is therefore necessary to provide the capacity for growth, primarily with regards to sustainable transport, together with improvements in connectivity which will open up development opportunities and along current and future residents to access employment opportunities and other services.

2.2 Detail of Scheme Options – Phase A (Short Term) Packages

2.2.1 A package of measures has been identified through which to rebalance road user priorities on Newmarket Road in the next five years. Through a combination of technology to control the flow of traffic, the reconfiguration of junctions to make them safer and more direct for pedestrians and cyclists, and the relocation of the Park and Ride site to the east of Airport Way, the measures will enhance the sustainable transport offer along the corridor.

2.2.2 Continuous, dedicated and segregated cycle lanes, and major works to overhaul the Elizabeth Way and Barnwell Road roundabouts, will reduce the dominance of traffic and create safe and attractive access into the city, fitting for Cambridge, and reflecting the city's commitment to sustainable growth.

2.2.3 Where additional highway capacity is provided to the east of Airport Way, it will be used to hold queuing traffic outside of the built-up area. This will enable the smoother flow of buses downstream into the city from the new transport interchange on the edge of the city.

2.2.4 This package of measures, referred to herein as the A2-Hybrid package, emerged from a comprehensive optioneering and assessment process using the Cambridge Paramics Model, and following many iterations and sensitivity tests, providing confidence that the measures the package contains represents the most effective short term investment possible along Newmarket Road.

2.3 Detail of Scheme Options – Phase B (Medium Term) Packages

2.3.1 In the medium term (considered to be before 2030, subject to the redevelopment of the Cambridge Airport site), a second series of interventions are proposed to build upon those schemes earmarked to come forward along Newmarket Road in the short term. The package is based upon the provision of a high-quality public transport corridor into the city through the Cambridge Airport site, and via Coldham's Lane and Mill Road.

2.3.2 The provision of a continuous busway from the new Park and Ride facility, to the east of Airport Way, through the current airport site to Coldham's Lane would provide a fast and unhindered link to the edge of the urban area. From here buses would utilise Coldham's Lane and Brooks Road to connect into Mill Road, a destination in its own right, and travel inbound to the city centre.

2.3.3 This new corridor would open up the airport site for possible redevelopment, and with the busway being located to the east of the current runway, could be delivered whilst the airport is still operational. The package is future proofed in that in the longer term it could form part of the eastern arm of the Cambridgeshire Autonomous Metro.

2.3.4 A bus gate on Mill Road (subsequently delivered as a trial in advance of option testing) would reduce the volume of general traffic on Mill Road freeing up capacity for bus service provision whilst complementary cycle infrastructure improvements would also help in increasing the connectivity of the airport site by sustainable modes.

2.3.5 This package of measures is referred to herein as Package B1.

2.4 Detail of Scheme Options – Phase C (Long Term) Package

2.4.1 Assessment of the issues and opportunities in the corridor has highlighted the longer-term potential for investment in the rail network to accommodate travel demand in the corridor. Whilst not part of this business case, a series of measures has been identified which completes the picture in terms of the scope for improvements to the transport network to the east of the city.

2.4.2 Long term rail investment would provide a step change in rail capacity to the east of the city. This would require the double tracking of the line between Cambridge and Newmarket, coupled with the provision of new stations to serve potential growth locations within the airport site and in the Six Mile Bottom area (the latter of which could also operate as a Parkway Station given its proximity to the A11 and A14).

2.4.3 Such a package would provide potential benefits above and beyond the Eastern Access Scheme. The enhancements would seek to reflect the wider aspirations of the East-West Rail Consortium to improve the capacity and connectivity of rail service between the Haven ports, Ipswich, Cambridge and beyond, but would also need to work at a local level in terms of traversing Coldham's Common and addressing level crossing issues in Cherry Hinton.

2.5 Business Strategy

The City Deal Objectives

2.5.1 Since 2010, the government has pursued a policy of devolving increasing levels of powers and funding away from central Government and down to local/regional areas, with City Deals playing a key part of the devolution process. City Deals are a means for central government and local partners to agree key investment programmes and outcomes, especially around promotion of local economic growth and development.

2.5.2 The Greater Cambridge City Deal was signed between Government and local representatives in 2014. The Greater Cambridge Partnership (GCP) was formed following the deal made with Government and is the local delivery body, responsible for overseeing the delivery of the City Deal and the promotion of local economic growth and development. GCP aims to:

- Deliver up to £1 billion of investment, providing vital improvements to infrastructure, supporting and accelerating the creation of 44,000 new jobs and 33,500 new homes to Greater Cambridge by 2031; and
- Enable a new wave of innovation-led growth in the Greater Cambridge area by investing in infrastructure, housing and skills, thereby addressing housing shortages and transport congestion bottlenecks that will facilitate its continued growth and a continuation of the "*Cambridge Phenomenon*"[3].

2.5.3 This investment fund offers funding towards proposed infrastructure in the region to help achieve these aims. To ensure infrastructure investment aligns with this, the Greater Cambridge City Deal Assurance Framework has established key strategic objectives against which projects will be prioritised, these are:

- To nurture the conditions necessary to enable the potential of Greater Cambridge to create and retain the international high-tech businesses of the future which bring investment into the UK.
- To better target investment 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.
- To markedly improve connectivity and networks between clusters and labour markets so that the right conditions are in place to drive further growth.
- To attract and retain more skilled people 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 of Cambridge spin-outs.

2.5.4 In this context, the SOBC will be assessed by the GCP Executive Board to ascertain the extent to which any transport investment meets the strategic objectives of the City Deal, including:

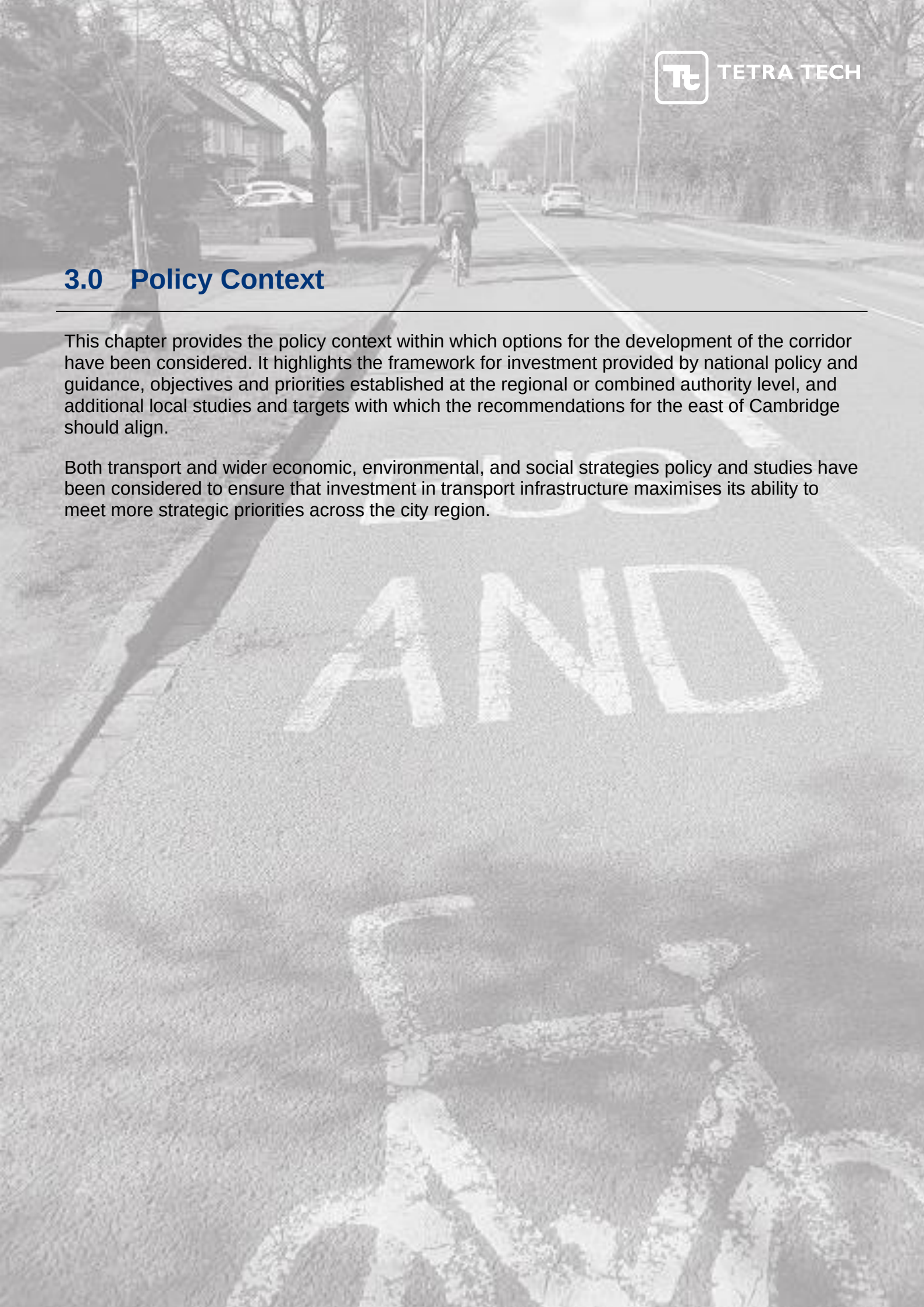
- How well the scheme supports business investment and confidence?
- How well the scheme represents targeted investment where business needs it?
- How well the scheme links effectively into the key growth sites?
- How well the scheme supports transport infrastructure and quality of life?

2.6 Summary

2.6.1 Improving the capacity and connectivity of sustainable transport access into Cambridge from the east, together with the provision of real travel choice through which to reduce reliance on the car will improve the quality of life for existing communities and facilitate the growth of the city to realise its potential as an economic powerhouse.

2.6.2 Within this, there is the need for short, medium and long term investment through which to address current issues blighting local communities and capitalise upon opportunities presented by the demand for housing and business investment in the city.

2.6.3 The process through which the recommended packages and interventions have been identified is detailed within this strategic case.



3.0 Policy Context

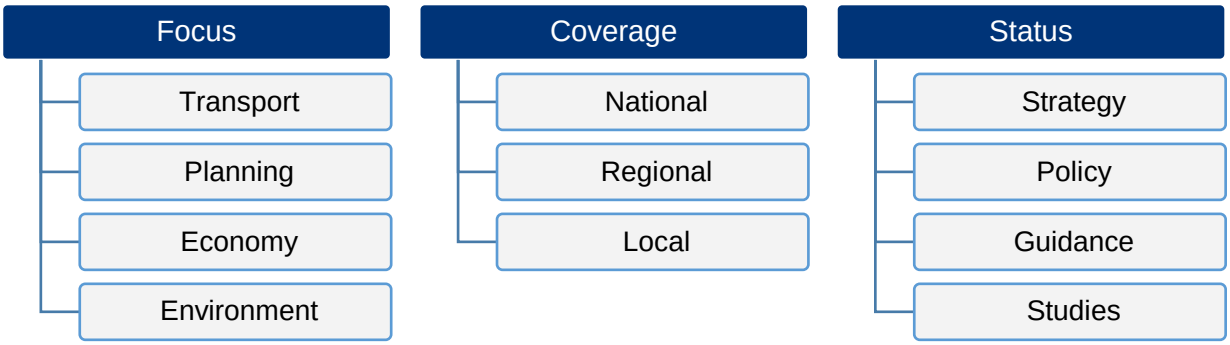
This chapter provides the policy context within which options for the development of the corridor have been considered. It highlights the framework for investment provided by national policy and guidance, objectives and priorities established at the regional or combined authority level, and additional local studies and targets with which the recommendations for the east of Cambridge should align.

Both transport and wider economic, environmental, and social strategies policy and studies have been considered to ensure that investment in transport infrastructure maximises its ability to meet more strategic priorities across the city region.

3.1 Overview

3.1.1 The development of the Cambridge Eastern Access options and packages has been shaped and informed by a series of policies, strategies and studies in place at national, regional and local levels, covering not just transport provision but also planning, economic growth and the wider place making agenda. Figure 3.1 seeks to summarise this context for investment in the network.

Figure 3.1: Cambridge Eastern Access Policy Context



3.2 National Policy and Strategy

National Planning Policy Framework (NPPF) – March 2012 and National Planning Practice Guidance 2014

3.2.1 The National Planning Policy Framework (NPPF) sets out the UK Government planning policies for England. This document sets out requirements of the planning system and how policy should be adhered to and delivered in local plan development and planning decisions.

3.2.2 The NPPF promotes sustainable development and addresses the importance of developing sustainable transport solutions to support sustainable development. It advocates:

- A transport system needs to be balanced in favour of sustainable transport modes, giving people a real choice about how they travel.
- Transport solutions which support reductions in greenhouse gas emissions and reduce congestion.
- Developing strategies for the provision of viable infrastructure necessary to support sustainable development, including transport investment necessary to support strategies for the growth of ports, airports or other major generators of travel demand in their areas.

3.2.3 The NPPF states that all developments that generate significant amounts of movement should take account of:

- Prioritising opportunities for encouraging the use of sustainable transport modes depending on the nature and location of the site, to reduce the need for major transport infrastructure.
- Safe and sustainable access can be achieved for all users.
- Improvements which can be undertaken within the transport network that cost effectively limit the significant impacts of the development. Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe.

Implications for Cambridge Eastern Access

The Eastern Access Project will help to further sustainable development and align with the key principles of the NPPF by:

- Promoting the use of sustainable modes of transport by the provision of improved public transport infrastructure.
- Encouraging the use of non-car modes and low emission vehicles to minimise air quality effects of car travel.
- Creating a safer environment for pedestrians and cyclists on the highway network.

Transport Investment Strategy

3.2.4 The Transport Investment Strategy (TIS) was developed in 2017 and supports the Government's *Building Our Industrial Strategy.* Maintaining and upgrading transport infrastructure is seen as a core component of achieving the objectives of the Industrial Strategy. The TIS sets out four objectives:

- Create a more reliable, less congested, and better-connected transport network.
- Build a stronger, more balanced economy by enhancing productivity and responding to local priorities.
- Enhance our global competitiveness by making Britain a more attractive place to trade and invest.
- Support the creation of new housing.

Implications for Cambridge Eastern Access

CEA will help to achieve the objectives of the TIS by:

- Providing alternative modal options to private vehicle travel, minimising the potential for increased congestion along the Newmarket Road corridor which is associated with further development in the east of the city.
- Improving linkages between key employment centres, the retail parks, the airport and further afield to the medical campuses thus serving to enhance the international competitiveness of the area.
- Supporting the creation of new houses by providing more capacity and connectivity in the transport network.
- Enabling people to access new employment opportunities, increasing the size of the labour market for employers, further enhancing the international competitiveness of the area.

3.3 Regional Policy and Strategy

England's Economic Heartland – Transport Strategy[2]

3.3.1 In the summer of 2020, England's Economic Heartland Sub-National Transport Body set out a new approach to connectivity which will enable the region's transport system to support a green recovery from COVID-19 and sustainable growth in subsequent years, while reaching net zero carbon emissions no later than 2050[3]. In March 2021 a Final Strategy "Connecting People, Transforming Journeys" was published.

3.3.2 The Transport Strategy includes measures to:

- Harness the region's expertise in clean technologies to deliver a greener transport system
- Use investment in East West Rail and mass transit systems such as the Cambridgeshire Autonomous Metro and Milton Keynes MRT as a catalyst for transforming public transport across the Heartland
- Champion digital technologies to make transport smarter
- Improve local and rural connectivity

3.3.3 Support the freight sector while reducing its environmental impact. The strategy includes an investment pipeline of the strategic transport infrastructure required for the region to meet its ambitions. And it contains details of connectivity studies which will be taken forward by EEH working with its partners, through which future investment requirements will be identified.

Implications for Cambridge Eastern Access

Cambridge Eastern Access will help to achieve the objectives of the Strategy by providing the sustainable transport capacity and connectivity to facilitate growth, utilising technology to maximise the efficiency of movement on the network and prioritise low carbon travel and through improving integration and interchange opportunities with East-West Rail and the Cambridgeshire Autonomous Metro.

[2] https://www.englandseconomicheartland.com/transport/our-strategy/

[3] http://www.englandseconomicheartland.com/Pages/transport-strategyconsult.aspx

The Cambridgeshire and Peterborough Local Transport Plan

3.3.4 The first Cambridgeshire and Peterborough Local Transport Plan (LTP) was published in June 2019. The Plan is in two parts – the first sets out the vision, goals, objectives and policies for the area, whilst the second forms a delivery plan for the implementation of schemes up to 2035.

3.3.5 The vision of the LTP is to deliver a world class transport network that supports sustainable growth and opportunity for all, with three supporting goals focus on the economy, society and the environment. A series of ten objectives sit under these with a further 101 policies establishing the approach to investment in transport in the coming years.

3.3.6 References are included relating to the desire to connect all new and existing communities sustainably and take advantage of the agglomeration benefits to businesses as a result of the life science clusters for example, whilst the needs of rural communities are also drawn out and reflected in the range of policies identified. The need to improve inter-urban bus services, combined with local rail services, at the centre of an integrated rural public transport network is highlighted.

3.3.7 A significant component of the LTP is the CAM Sub Strategy, which describes the policy framework for the CAM, to ensure that individual components of the CAM metro network are fully compliant with a consistent and coherent overall vision for the network.

Implications for Cambridge Eastern Access

CEA will help to achieve the objectives of the LTP. It will help to facilitate economic growth, create safer and more attractive communities, provide real transport choice through which to reduce reliance on the car and the impact of travel on the environment. The LTP itself provides a source of funding for measures which may supplement the 'big ticket' items of the Eastern Access scheme and aligning areas of investment will ensure that travel into the city from the east is managed holistically.

Cambridgeshire and Peterborough Independent Economic Review

3.3.8 In September 2018, a report was published on behalf of the Cambridgeshire and Peterborough Combined Authority (CPCA) which detailed the economic performance of the area and the strategic priorities through which the future success of the area could be maximised[4].

3.3.9 In terms of investment in transport, new infrastructure is expected to contribute towards improving access to employment, the creation of healthy and prosperous communities, and a high-quality sustainable environment. It states that the focus should be on providing low-cost technology which can prepare the ground for longer term solutions, to meet the short- and medium-term needs and risks which may undermine the continued growth of the economy.

Implications for Cambridge Eastern Access

Research undertaken in the development of the CPIER identified transport as a key constraint to economic growth. It is suggested that investment in transport improvements could be economically beneficial for the Combined Authority. Of particular urgency is connectivity improvements to economic hubs, which could unlock land for development and encourage further growth.

The Cambridge Eastern Access scheme will open up the east of the city for job creation and economic growth, in particular the site currently occupied by Cambridge Airport. It also seeks to improve orbital links through the east of the city, thereby improving access to jobs at the science park to the north and those to the south at Cambridge Biomedical Campus.

[4] https://www.cpier.org.uk/

Climate Change

3.3.10 Following the declaration of a national climate emergency, Cambridgeshire County Council[5], Cambridge City Council[6] and South Cambridgeshire District Council[7] have each declared local climate emergencies and published individual climate change strategies. In addition, the Cambridgeshire and Peterborough Independent Commission on Climate has recently published emerging recommendations[8], which will be considered by the Combined Authority and will potentially inform future strategic documents.

Implications for Cambridge Eastern Access

The GCP's programme aims to support a reduction in carbon emissions by increasing uptake of public transport and active travel, decreasing car use and supporting the decarbonisation of public transport. Projects are shaped to support these objectives.

3.4 Local Planning Policy

3.4.1 Local planning policy, including the location and scale of housing and employment provision, is set out in each authorities respective Local Plans. These form the basis of a plan-led planning system and provide the basis upon which future demand and supporting infrastructure can be identified and delivered. However, at the time of writing there remains uncertainty as to the future of the planning system with a proposed move away from Local Plans to a zonal planning approach, designed to streamline the planning process.

Cambridge Local Plan (2018)

3.4.2 The Cambridge Local Plan was adopted in October 2018 and covers the period between 2018 and 2031. It identifies the need for 14,000 additional homes and 22,100 jobs. A series of "Areas of Major Change (AOMC)" were identified within the city including Cambridge East, comprising much of the site covered in the Cambridge East Area Action Plan. It contains three parcels of potential development Land north of Newmarket Road, Land north of Coldham's Lane and Land north of Cherry Hinton.

3.4.3 Parcels 1 and 2 comprise safeguarded land for longer term development beyond 2031 when the land is anticipated to become available (it is currently occupied by Marshall's Airport), and Parcel 3 would comprise a total of 1,200 dwellings (780 within the city boundary and 420 with South Cambridgeshire). A spine road is proposed to be constructed between Coldham's lane and Cherry Hinton Road to facilitate this growth.

South Cambridgeshire Local Plan (2018)

3.4.4 The South Cambridgeshire Local Plan[9] contains proposals for the creation of 22,000 new jobs and provision of 19,500 new homes in South Cambridgeshire in the period between 2011 and 2031. It was submitted to the Government for examination in March 2014 and was subsequently subject to consultation on the Main Modifications which closed in February 2018. The Inspectors report was received on 29 August 2018 and the Plan was adopted by the Council on 27 September 2018.

3.4.5 Transport is addressed in "Chapter 10 – Promoting and Delivering Sustainable Transport and Infrastructure". It highlights the need for transport provision to be balanced in favour of sustainable modes, to give people a real choice as to how they travel.

[5] https://www.cambridgeshire.gov.uk/residents/climate-change-energy-and-environment/climate-change-and-environment-strategy

[6] https://www.cambridge.gov.uk/climate-change-strategy

[7] https://www.scambs.gov.uk/nature-and-climate-change/zero-carbon-strategy-and-action-plan/

[8] http://cambridgeshirepeterborough-ca-gov-uk-6985942.hs-sites.com/cpicc-initial-report

[9] https://www.scambs.gov.uk/localplan2018

Emerging New Joint Greater Cambridge Local Plan

3.4.6 Following the adoption of both the Cambridge and South Cambridgeshire Local Plans, both authorities commenced a review and the production of a new joint Greater Cambridge Local Plan spanning both local authority areas. The rationale behind this was to plan and allocate sites more effectively over the region.

3.4.7 At the time of publication, the Plan is currently at the 'Call for Sites' stage during which all sites which landowners are keen to see included within the Local Plan are submitted to the authorities. A significant proposal has been submitted as part of this process for land currently owned by the Marshall Aerospace and Defence Group, comprising the existing Cambridge Airport site.

3.4.8 As this is at the start of the process, a process which can take up to three years, there remains some uncertainty in terms of the sites which may come forward in the east of Cambridge and beyond which may influence future demand on the corridor.

Implications for Cambridge Eastern Access

CEA will provide the capacity and connectivity to help facilitate the sites earmarked for development in the Local Plan. The sites which emerge through the process of producing the Joint Local Plan will have implications for the content of the recommended package of interventions provided.

3.5 Historic Plans and Studies

Cambridge East Area Action Plan (2008)

3.5.1 In February 2008, an Area Action Plan was produced for the east of Cambridge setting out plans for the delivery of 12,000 dwellings with employment, services, facilities and infrastructure, that would create 4,000 to 5,000 new jobs. The AAP suggested that high density housing would be appropriate for the location as part of creating a new community with low levels of car dependency.

3.5.2 The AAP detailed proposals to relocate the Newmarket Road Park and Ride site to a new site south of Newmarket Road and east of Airport Way, in the vicinity of a proposed country park. The relocated site could offer dual purpose to provide parking provision for both the P&R site and the country park. Highways improvements at the Quy interchange were deemed to be necessary to facilitate the growth of Cambridge East, whilst essential sustainable transport provision should include:

- Newmarket Road to city centre connection.
- Northern link to the Science Park, Northern Fringe and existing guided busway.
- Southern link to Addenbrooke's Hospital.
- An additional guided bus link into the city centre.
- New shared use cycle bridge over the River Cam in the vicinity of the existing railway bridge.

Eastern Gate Development Framework Supplementary Planning Document (2011)

3.5.3 The Eastern Gate SPD was adopted by the City Council in October 2011 to articulate a clear vision for the future of the Eastern Gate area, establish a development framework to coordinate redevelopment and guide decisions and to identify a series of key projects, to attract and guide investment. Existing issues highlighted in the SPD focused upon:

- Streetscape dominated by vehicle movements.
- Area hostile towards pedestrian and cycle movements.
- Newmarket Road causes severance to communities.
- Lack of direct, surface level crossing located on desire lines.
- Ineffective bus lanes are used by taxis and other vehicles to avoid congestion.

3.5.4 To help address these concerns a Movement and Circulation Strategy was identified which suggested the following interventions:

- Create safe and inclusive streets.
- Permeable and integrated structure.
- Remodelling of hostile junctions.
- Improved cycle and pedestrian routes.
- Breaking down barriers to movement.
- Responding to natural desire lines.
- Improved lighting.
- Re-establish historic links and reconnect streets.
- Improve gateway and entry points.
- Promote two-way streets.
- Improvements at the Queen Elizabeth Way Roundabout.

Implications for Cambridge Eastern Access

Cambridge Eastern Access will seek to address many of the issues identified in these historic studies which remain concerns today. The packages of intervention draw on many of the interventions initially highlighted within these studies.

3.6 Related Transport Studies

3.6.1 It is imperative that a joined-up approach is taken in the consideration of future public transport provision within the corridor. A series of studies have commenced, some of which are ongoing and some of which are ongoing, the findings of which will be reflected in the optioneering for the Newmarket Road corridor.

Future Bus Network Concept Study (2019)

3.6.2 In 2019, SYSTRA were commissioned to review the bus network serving the Cambridge City Region. The study identified existing constraints within which the network operates and devised three alternative structures for the provision of services, notably standardisation of the existing network and consideration of operating hours, enhancements of existing routes and provision of additional routes to form a 'core' bus network and enhancement of the rural bus network.

3.6.3 The study detailed a core network of services, including several which would operate into the city from the east, both along Newmarket Road and a proposed segregated route, as illustrated in Figure XX. It has been assumed within the Study that the segregated bus corridor, connecting the parcels of land included within the Local Plan associated with Cambridge East development, will form part of Phase 1 of the CAM.

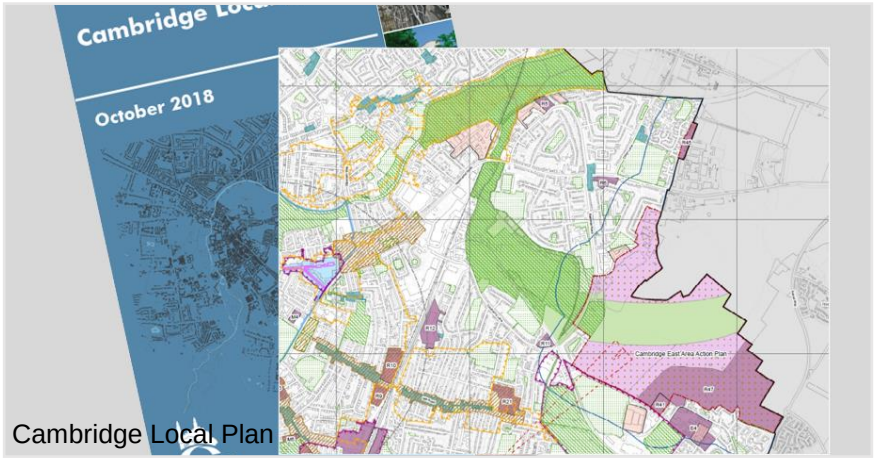
3.6.4 Proposed changes also include the provision of a new service operating between Newmarket Road Park and Ride and the south of the city via Cherry Hinton, which would reduce journey times to the Cambridge Biomedical Campus to 8 minutes and 18 minutes respectively.

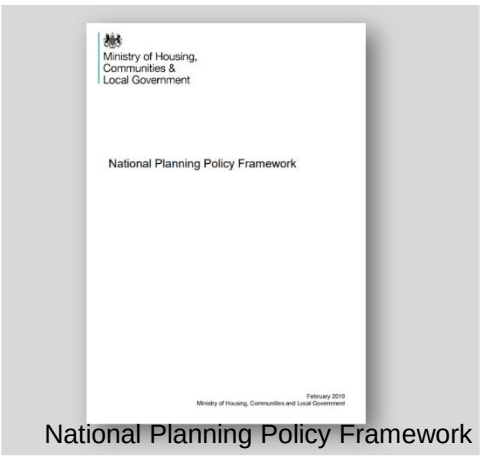
3.6.5 Greater access to the Science Park to the north of the city would be achieved by facilitating interchange in the city centre between the X11 service and the Milton Keynes / Trumpington Park and Ride services, and the X11 would also be run as a regular daytime service and replace the existing 11 service, which would itself become a rural connector terminating at the Newmarket Park and Ride site.

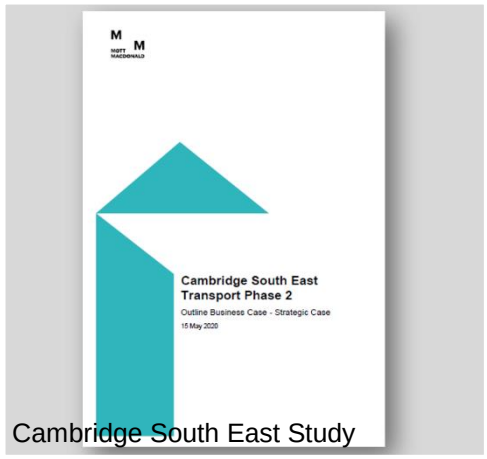
Implications for Cambridge Eastern Access

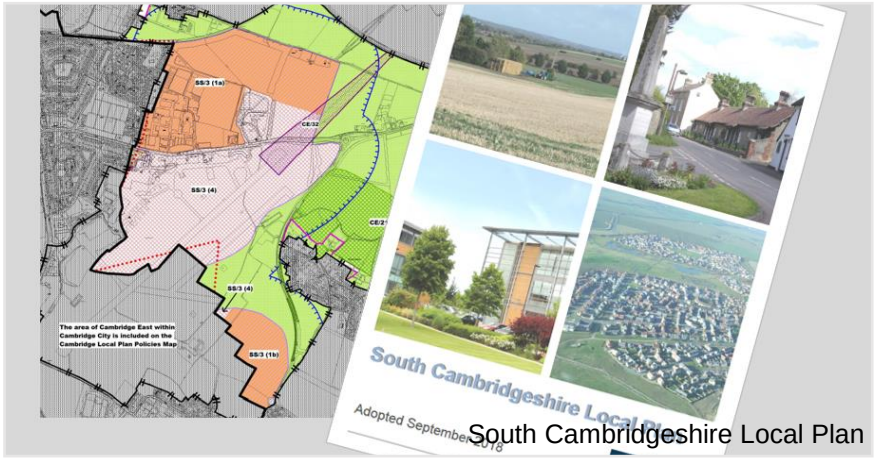
CEA will help to deliver improvements to the eastern section of the core network identified by SYSTRA. It will provide a level of bus priority commensurate with that available on other parts of the core network and see significant journey time savings for bus travel.

Figure 3.2: Policy and Strategy Documents









Cambridge South East Transport (CSET) Study (2015)

3.6.6 In 2015, the GCP commissioned the production of the CSET with the aim of identifying and delivering fast and reliable public transport links, serviced by a new Park & Ride site, together with high-quality cycling and walking routes, for people travelling between Cambridge and the settlements to the south east of the city.

3.6.7 Proposed improvements contained in Phase 1 of the study comprised a number of relatively low-cost measures to provide additional capacity and faster, more reliable and sustainable public transport options for journeys between Cambridge City and the fast-growing area to the south east.

3.6.8 A recommended option has been identified for potential longer-term public transport improvements have also been identified and comprise Phase 2 of the project. This consists of a new segregated Mass Rapid Transit route from the A11 via Sawston, Stapleford and Great Shelford to the Cambridge Biomedical Campus with a new travel hub near the A11/A505 junction. It would most likely form part of the Cambridgeshire Autonomous Metro being proposed by the Combined Authority.

Cambourne to Cambridge (C2C) Study

3.6.9 The C2C Public Transport Route is a priority project for the GCP and forms a first phase of Cambridgeshire and Peterborough Combined Authority's plans for a Cambridgeshire Autonomous Metro (CAM)[10]. Parts of the current Cambourne to Cambridge road network, in particular the A1303/Madingley Road, suffer heavy traffic congestion at peak times. Without action, by 2031 car trips into the city are set to increase by up to 70%, with already lengthy journey times expected to double.

3.6.10 A new route, bypassing other road traffic, will provide a public transport alternative to avoid congestion and make quicker journeys, with provision for walking and cycling. The dedicated route will create reliable transport links, running regular, 'turn up and go' services operating to high service standards. Proposals also include a new Park & Ride site, with a site at Scotland Farm being the recommended option. At the time of publication of this SOBC the Study was on hold pending an Independent Audit of its underlying Assumptions and Constraints.

Cambridge to Waterbeach Transport Study

3.6.11 In 2019, Atkins were commissioned to undertake a study of public transport connectivity between Waterbeach and Cambridge Science Park in the north east of the city. Waterbeach is the proposed site of a new town of around 10,000 new dwellings and interventions are required to provide realistic travel choice and ease existing pressures on the A10.

3.6.12 The current Waterbeach Station is set to be relocated (subject to funding) on the Cambridge to Ely line and the study, which is due to publish an SOBC in parallel with this SOBC, will consider what further investment is required in the local area.

Implications for Cambridge Eastern Access

CEA will benefit from the Waterbeach study through the identification of attractive alternatives to the car for communities to the north of the city and as such the alleviation of delays and congestion on the A14 at Junction 33. To avoid these queues some traffic from the north re-routes along Ditton Lane resulting in queues at the junction with Newmarket Road. Addressing the issue at the source will enable better management of flows on Newmarket Road itself.

Cambridgeshire Corridor Study

3.6.13 In February 2019, Network Rail produced a study looking into the infrastructure requirements in Cambridgeshire over the next 25 years. Significant growth in rail patronage is anticipated in Cambridge in particular over the period and as such the study identifies the need for an additional two platforms at Cambridge Station by 2033 and the double tracking of the Newmarket to Cambridge Line by 2043. These improvements are in addition to the provision of a new station at Cambridge South to serve the growing Biomedical campus.

[10] https://www.greatercambridge.org.uk/transport/transport-projects/cambourne-to-cambridge

Implications for Cambridge Eastern Access

Infrastructure improvements which would permit the increase in services between Newmarket and Cambridge would increase capacity on the line and potentially provide a more attractive alternative to the car for many commuters and visitors into the city from the east. In turn this could reduce the pressure on Newmarket Road through a modal shift from car to rail.

East-West Rail Eastern Section: Prospectus for Growth

3.6.14 In January 2019, the East West Rail Consortium issued their Prospect for Growth associated with the development of the eastern section of the East-West Rail scheme[11]. It makes the case for reducing journey times and increasing capacity for rail journeys between Cambridge, Norwich and Ipswich together with enhancing the movement of freight to the Haven ports and the subsequent economic benefits it would entail.

3.6.15 In summer 2020, consultants Steer were subsequently appointed to lead on the development of the Business Case for the enhancements of the eastern section.

Implications for Cambridge Eastern Access

Whilst improving rail linkages into Cambridge from the eastern suburbs and surrounding towns could have positive benefits as part of the Cambridge Eastern Access project, the line is the focus of significant and strategically important regional proposals. As such any works or changes to the line associated with the Eastern Access Study should be cognisant of the wider context and demands on the functioning of the line in the long term.

Cambridgeshire Autonomous Metro

3.6.16 The Cambridgeshire and Peterborough Combined Authority (CPCA) vision for the Cambridgeshire Autonomous Metro (CAM) is for an expansive metro-style network that seamlessly connects regional settlements, major city fringe employment sites and key satellite growth areas across the region with key railway stations and Cambridge city centre, helping to nurture and sustain long-term regional economic growth. CAM is currently expected to use a technologically advanced, sustainable, highly flexible trackless electric vehicle.

3.6.17 The CAM network will comprise both tunnelled and surface elements and the CPCA intends that it will be delivered over the next decade. The City Tunnel Section, which is the subject of this consultation, will include new underground tunnels and stations under the city of Cambridge, with planned major interchange hubs at the city centre and at Cambridge railway station.

3.6.18 Four regional routes will connect St Neots, Alconbury, Mildenhall and Haverhill with the city of Cambridge and, through the central tunnelled section, with each other. The development of the CAM is documented in a Sub-Strategy of the LTP as discussed above. More recently additional extensions to Peterborough and Chatteris have been suggested but work on a new Programme Business Case which will help to confirm the extent of the network has not yet commenced.

Implications for Cambridge Eastern Access

The arm of the CAM from Cambridge city centre to Mildenhall is intended to run through East Cambridge and the Marshall site. As such the public transport route envisaged in Phase B of CEA would form a part of the CAM. It is currently assumed that a portal toward the south-west of the Marshall site would provide access to the CAM tunnels.
The progress of CEA is not dependent on delivery of the CAM, and will ensure downstream compatibility. As details of the CAM become clearer, the detailed design of CEA may be refined to optimise the potential interface.

[11] https://www.eastwestrail.org.uk/wp-content/uploads/2019/02/29-Jan-2019-East-West-Rail-Eastern-Section-Rail-Prospectus-3.pdf

3.7 Other Relevant Plans and Studies

East Barnwell Regeneration Study

3.7.1 Cambridge City Council is seeking to bring forward additional housing as part of the regeneration of East Barnwell. The study is seeking to develop a holistic place-based approach with the aim that housing growth will be achieved along with a community facility and other local improvements for those who live in this part of the City. The initial outline potential for East Barnwell has been identified as:

- The provision of up to 400 new homes.
- Community facilities and infrastructure to assist in the delivery and successful integration of the 1,300 new homes coming forward as part of the Marleigh development.
- Job creation resulting from the above.
- Up to £30m in capital receipts for partner organisations.

Implications for Cambridge Eastern Access

Newmarket Road severs East Barnwell whilst the volume and dominance of traffic does little to enhance the area in terms of noise or air quality. Measures to curb the dominance of general traffic could therefore improve the quality of life for local residents and support its regeneration. Similarly, improved travel choice and connectivity with the rest of the city will increase life chances in terms of access to employment and other facilities.

North East Cambridge Area Action Plan

3.7.2 Proposals are emerging for the creation of a new community in the north east of Cambridge over the next 20 years. The site immediately south of the A14 will see the current Cambridge Waste Water Treatment Plant relocated to free up some 182ha for new housing and employment provision. An Area Action Plan has been produced by the Greater Cambridge Shared Planning Service and consultation on its content concluded in October 2020[12].

Implications for Cambridge Eastern Access

Significant growth in the north east of the city has the potential to generate further demand in the Eastern Access area, particularly along Newmarket Road. It may also further increase the demand for radial trips around the city which don't start, travel through, or finish in the city centre.

One possible location for the Wastewater Treatment Plant is to the north of Fen Ditton. If that site is selected, then that may have an impact both during construction and operation.

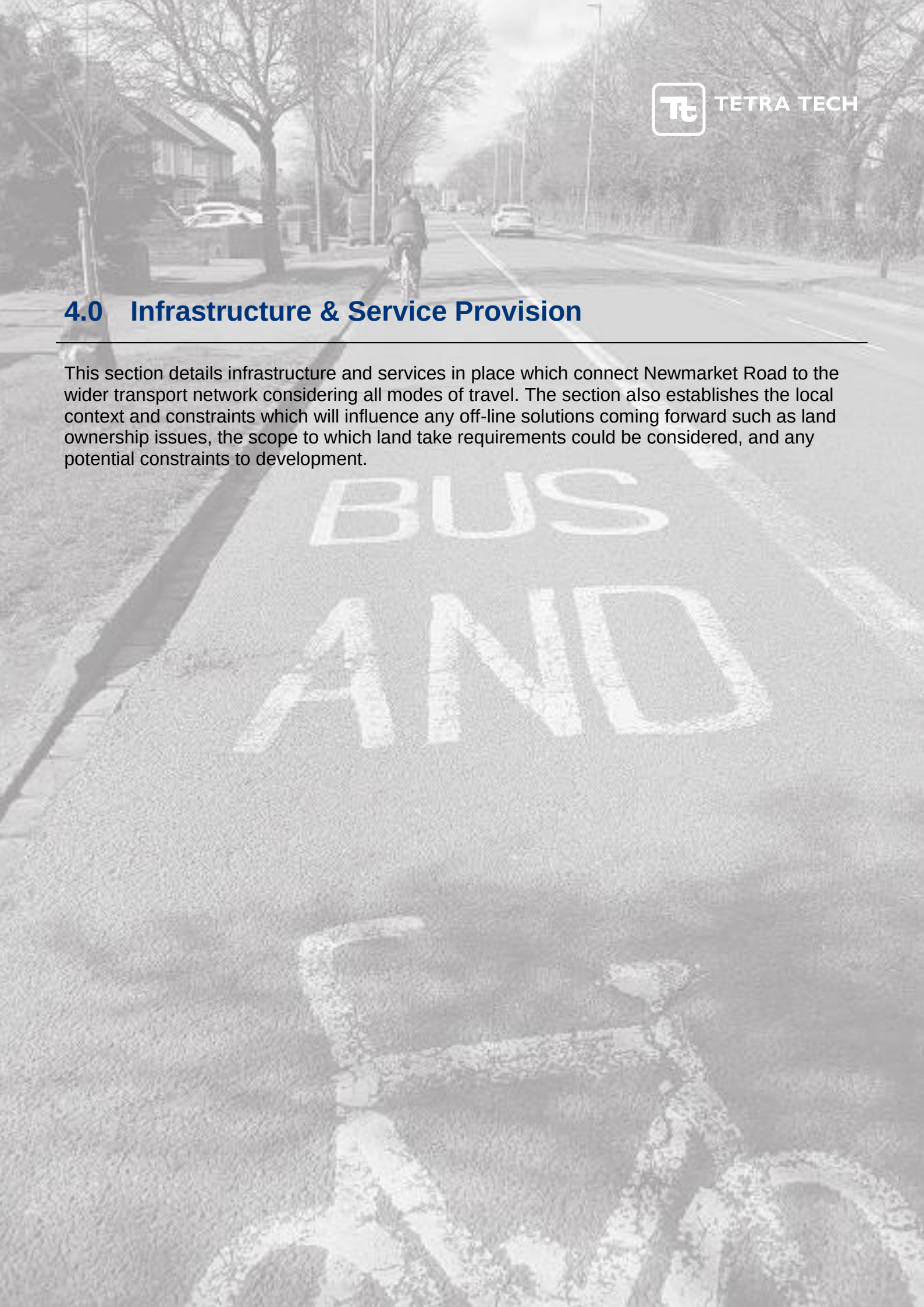
3.8 Summary

3.8.1 Planning and transport strategy from the national level through to the local level focuses on the need to ensure future development is sustainable and that the transport offer operates effectively and efficiently and offers real travel choice, with public transport and active travel the most attractive options for all journey purposes. Whilst policy evolves and the specifics as to how it may be delivered may change, these principles will continue to be the heart of transport planning in the future.

3.8.2 It is also clear from the housing and economic policy in place, that the wider Cambridge area will be subject to continued development pressures, and that the transport network will have to adapt to ensure that the capacity and connectivity is in place to facilitate these aspirations.

3.8.3 In doing so, provision should ensure that local communities benefit from growth and the supporting infrastructure and that the adverse impacts of additional trips on the network, for communities such as Barnwell, are mitigated.

[12] https://www.greatercambridgeplanning.org/emerging-plans-and-guidance/north-east-cambridge-area-action-plan/



4.0 Infrastructure & Service Provision

This section details infrastructure and services in place which connect Newmarket Road to the wider transport network considering all modes of travel. The section also establishes the local context and constraints which will influence any off-line solutions coming forward such as land ownership issues, the scope to which land take requirements could be considered, and any potential constraints to development.

4.1 Overview

4.1.1 Newmarket Road (forming part of both the A1303 and A1134) provides the main access into Cambridge from the east. It is predominantly urban in nature and links the Quy Interchange on the A14 in the east, with Elizabeth Way roundabout in the west.

4.1.2 The characteristics of the road change throughout its 5.5km length, both in terms of the capacity it provides and in terms of land uses it serves, including Cambridge Retail Park, Cambridge United Football Club, residential areas and employment provision both to the north and south of the corridor around the airport.

4.1.3 Images which capture the changing characteristic of Newmarket Road along its length are provided in Figure 4.1.

4.2 The Newmarket Road Corridor

4.2.1 From east to west, the A1303 Newmarket Road is formed of a dual carriageway from the A14 for 0.3km before the lanes merge into a single carriageway, through rural countryside for around 1.5km until it meets the un-signalised roundabout junction with Airport Way. This section of single carriageway road was once dual carriageway until Airport Way was moved eastwards to its current location.

4.2.2 From here a third lane is provided in the centre of the carriageway, which runs for around 0.6km immediately to the north of Cambridge Airport, providing dedicated access to the Newmarket Road Park and Ride site. A new junction to the west of the BP garage serves the developing Marleigh residential site.

4.2.3 At this point the road becomes more urban in nature. An inbound bus lane, 0.3km in length, is provided from the junction for the Park and Ride access. A signalised junction providing access into the car dealerships to the north provides priority for buses as the bus lane merges with general traffic.

4.2.4 The two-lane single carriageway travels for 0.25km with a short section of on-road cycle lane and a wide grass verge up until the access to Marshall's. At this point the verge narrows (to a point at which it would not be possible to widen the carriageway) for 0.2km before another bus lane commences immediately to the east of the junction with Meadowlands Road.

4.2.5 The bus lane runs for 0.3km and terminates at the signalised junction with the B1047 (Ditton Lane) at which point Newmarket Road becomes a dual carriageway for 0.2km on its approach to the priority roundabout junction with Wadloes Road in Barnwell.

4.2.6 At this point Newmarket Road becomes the A1134 and feels increasingly residential in nature, with an on-road cycle lane as far as the bridge over Coldham's Brook and the trainline (some 0.7km in length), where it merges with another section of bus lane. It should also be noted that a new subway adjacent to the bridge is to be constructed as part of the Chisholm Trail works.

4.2.7 The carriageway splits as the bridge spans the tracks and brook, before it reaches a signalised junction for access to B&Q. This crossroads arrangement allows for south-west to north-east U-turns for access to Swanns Road which leads to the Mercers Row Industrial Estate.

4.2.8 The bus lane continues to the east of the junction and is clearly enforced with bus lane cameras, through another signalised junction for access to the Cambridge Retail Park. It then meets a third signalised junction providing a second access into the Cambridge Retail Park before it reaches a 4-arm signalised staggered junction between Coldham's Lane and River Lane at which point it merges with general traffic.

4.2.9 In total however, the length of bus lanes stretches for 0.75km. It should also be noted that a third access is provided into the Cambridge Retail Park from Coldham's Lane via a 4-arm priority roundabout located circa 200m to the south east of the Newmarket Road junction. The road then becomes a dual carriageway for around 0.4km up until the roundabout junction with Elizabeth Way / East Road (the A603).

Figure 4.1: Changing Characteristics of Newmarket Road

Source: Google Maps

4.2.10 Heading from west to east, the A1134 Newmarket Road comprises a dual carriageway for some 0.35km, up until its junction with River Lane. From here a bus lane commences, passing through three signalised junctions, until after 0.65km, it gives way to an on-road cycle lane as the road splits and the bridge traverses the trainline.

4.2.11 The single carriageway road with cycle lane, bordered by housing on its northern side, stretches for 0.9km until it reaches the non-signalised roundabout junction with Wadloes Road. At this point Newmarket Road becomes the A1303 and the cycle lane continues (although there is no provision for cyclists on the roundabout itself), but is sandwiched between two lanes of traffic for 0.2km, with one dedicated to left turning vehicles, seeking to access the B1047 (Ditton Lane).

4.2.12 Eastbound from Ditton Lane, the cycle lane leaves the carriageway and becomes a shared use path as the road passes Cambridge Cemetery and the large car dealership to the north of Newmarket Road. Beyond the signalised junction for the Ford dealership the character of the route remains the same, through several junctions, including that for the Newmarket Road Park and Ride site, totalling some 1.4km in length.

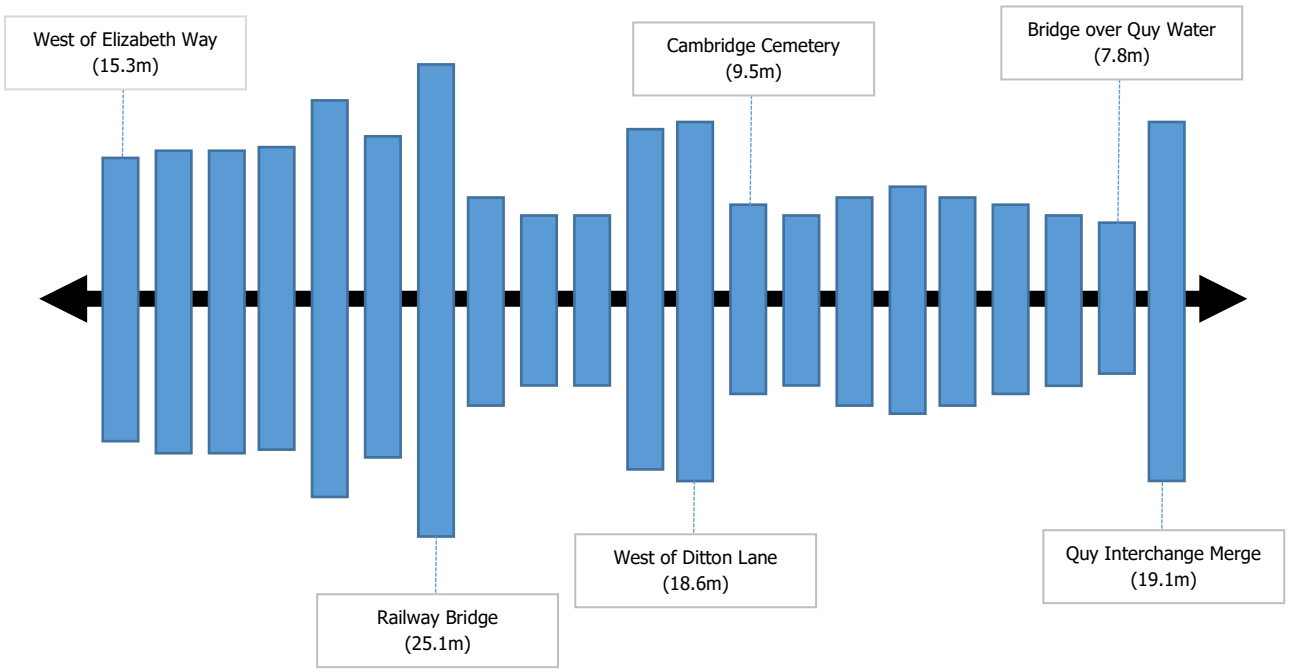
4.2.13 To the east of the Park and Ride, the shared use path is segregated from the carriageway by a grass verge, allowing it to bypass the roundabout junction with Airport Way, and continue unhindered until it reaches a path which provides access under the A14, a distance of 1.7km.

4.2.14 Beyond this point the road is formed of a single carriageway for 0.3km before it becomes a dual carriageway for 0.25km, on its approach to Quy Interchange on the A14.

Carriageway Width

4.2.15 A distinguishing feature of Newmarket Road is the variable width of the carriageway, in part reflecting the move from the urban to rural context within which it is set. The widest point is formed by the bridge over the railway (although it should be noted that this section is formed of two separate bridges catering for unidirectional traffic over each bridge section), and the narrowest is the bridge over Quy Water, close to the junction with the A14. Figure 4.2 provides a conceptual illustration of the stark changes in carriageway width over the 5.5km corridor.

Figure 4.2: Conceptual Changes in Carriageway Width along Newmarket Road (not to scale)



4.3 Junctions

4.3.1 There are several junctions along Newmarket Road which have a significant impact upon its operation, and as such are drawn out below in some detail. Images of several of these key interchanges are provided in Figure 4.3.

Elizabeth Way Roundabout

4.3.2 The Elizabeth Way roundabout is a fully signalised, at-grade roundabout and is located on the Cambridge inner ring road, providing a major highway interchange for traffic travelling in, out and through the city of Cambridge. The roundabout has an ICD of circa 70m, providing 2-3 circulating lanes for use by traffic. A subway is provided beneath the central island for use by pedestrians and cyclists and, despite providing segregated access, is a poor environment for non-motorised users. The roundabout currently dominates the urban environment, providing limited amenity value as a key gateway into the central areas of Cambridge.

4.3.3 The Northern approach to the junction comprises the Queen Elizabeth bridge, the bridge was constructed in the 1970s and provides vehicular, pedestrian and cycle access over the River Cam. The link forms part of the A1134 corridor as well as part of the Cambridge Ring Road. Two lanes are provided for vehicular traffic with a footway / cycleway link running parallel to the main carriageway. It is the only vehicular access crossing over the river serving the east of Cambridge, the next available river crossing eastwards of the Queen Elizabeth bridge is along the A14 west of junction 34.

4.3.4 The Eastern approach comprises another section of the A1134 corridor, namely Newmarket Road. Newmarket Road also provides two lanes for general traffic, with guard railing preventing any pedestrian-cycle movements across the central reserve. The A1134 section of Newmarket Road also serves as part of the Cambridge Ring Road, connecting to Barnwell Road to the east with the latter providing access to the south of Cambridge along the A1134 corridor.

4.3.5 The Southern approach is East Road and forms part of the A603 corridor. East Road is a strategic link that provides access to several high-profile destinations such as The Grafton Centre, Anglia Ruskin University and Cambridge Crown Court. Three lanes for vehicular traffic entering the roundabout are provided within the carriageway, with footways provided on both sides.

4.3.6 The Western approach is also named Newmarket Road but does not form part of the A1134 corridor. A long flare on the approach provides two lanes for general traffic. There is no central reserve provided along this arm of the junction and a Toucan crossing is located approximately 100m to the west.

Coldham's Lane / River Lane

4.3.7 The Coldham's Lane / River Lane junction is a signalised staggered intersection located approximately 320m east of the Elizabeth Way roundabout. Between these junctions, provisions are made for two lanes of bi-directional vehicular traffic, a narrow central reserve discourages any form of crossing for pedestrians and cyclists, which is guard railed up until the Toucan crossing located at Abbey Street. A pair of bus stops are provided adjacent to the Toucan, but no laybys are provided. The stops contain shelters with limited seating and timetable information. The overall carriageway width along this section of the Newmarket Road corridor varies between 15m – 16.5m.

4.3.8 At Coldham's Lane itself, the carriageway widens slightly to allow for three lanes of bi-directional traffic to queue at the eastbound and westbound stop lines along Newmarket Road. Dedicated right and left turn lanes provide vehicular access into Coldham's Lane from the Newmarket Road western and eastern approaches respectively.

4.3.9 Coldham's Lane runs in a north south direction connecting Newmarket Road with Cherry Hinton in the south east of Cambridge. The link forms an important connection between the south east and central Cambridge zones. To the immediate south, Coldham's Lane provides access to the two major retail sites via a 4-arm priority roundabout along the eastern corridor, namely the Cambridge Retail Park and the Beehive Centre.

4.3.10 At its junction with Coldham's Lane, Newmarket Road provides segregated right and left turn lanes with the latter comprising a priority give-way arrangement whilst the former is signalised. River Lane however is a minor road providing vehicular access into the Riverside residential area.

4.3.11 On the eastern arm of the junction, dedicated bus / cycle lanes are provided, effectively narrowing the carriageway space to a single lane for general traffic in either direction. The approach contains a signalised bus gate circa 50m east of River Lane which gives priority to bus and cycle movements using vehicle detection systems.

Cheddars Lane

4.3.12 The Cheddars Lane junction forms a 4-arm signalised crossroads intersection with Newmarket Road and forms the primary access to the Cambridge Retail Park, located approximately 340m east of Coldham's Lane. A secondary access is provided into the Cambridge Retail Park by another signalised junction halfway between the two and caters for two lanes of traffic along Newmarket Road, one of which is a bus lane that terminates upon approach to the access. Along this section of the corridor, the carriageway continues to occupy a 16.5m width.

4.3.13 At its junction with Cheddars Lane, the Newmarket Road approaches provide three lanes for traffic in each direction, with a puffin crossing provided on the western arm with a central refuge area. Like the Retail Park Access, Cheddars Lane also provides access to a large Tesco unit. Both Cheddars Lane and the Retail Park Access have two lanes dedicated to general traffic on the approach. All approaches cater for cyclists by providing advanced cycle stop lines.

Stanley Road

4.3.14 170m east of Cheddars Lane is Stanley Lane, a quiet residential road that provides alternative access to River Lane into the Riverside area. Directly opposite is an access that serves a B&Q store, that is situated directly next to, but segregated from, the Cambridge Retail Park. Newmarket Road widens significantly at this point to over 20m, in order to provide sizable refuge islands for pedestrians and cyclist negotiating the 4-arm signalised crossroads junction.

4.3.15 A Toucan crossing is provided on the western arm, with informal crossing provision provided on the eastern arm, both approaches contain advanced cycle stop lines, and capacity to stack vehicles in three lanes. Dedicated bus lanes are provided upstream and downstream to both approaches of the junction, whereby Newmarket Road funnels traffic into a single lane.

Leper Chapel

4.3.16 The Leper Chapel is a grade I listed building dating back to the 11th century, where lepers could come and worship in a space that was segregated from the rest of the population. It is located adjacent to the railway line, circa 270m east of Stanley Road, where a bridge on Newmarket Road provides vehicular access over the line. The bridge divides the inbound and outbound flow of traffic along Newmarket Road by forming two distinct sections of carriageway, totalling a width of 25m at differing levels. It is here that a U-turn facility for traffic is provided and where the westbound bus lane originates.

Ditton Fields

4.3.17 Ditton Fields is a minor residential road that serves part of the Barnwell Estate near to the Abbey Stadium and approximately 320m east of the Leper Chapel. It is here that the Newmarket Road carriage becomes most constrained despite it not being at its narrowest point along the corridor. This section of Newmarket Road is characterised by tightly packed development frontages, narrow verges and cycle lanes, with an overall carriageway width of 9.0m. A puffin crossing for pedestrian access is provided to the immediate west of Ditton Fields.

Barnwell Roundabout

4.3.18 580m further east of Ditton Fields lies the Barnwell Roundabout, known also as the McDonald's Roundabout. As far as the highway network is concerned, the junction forms the focal point of the Barnwell residential estate.

4.3.19 The roundabout has 4 arms and is priority controlled. The Newmarket Road eastern approach contains two lanes, with the other three approaches providing for one lane of traffic with flared entries, so that vehicles can queue in two lines for a short distance. The Newmarket Road western approach is not characteristic of a typical flare, with a carriageway width of around 18m-20m, a bus stop is provided with no layby feature, cutting into the left turn flare and not only blocking traffic but also the dedicated cycle lane, whilst an additional dedicated cycle lane divides the traffic lanes to cater for cyclist movements through the roundabout.

4.3.20 The Southern arm of the roundabout, comprising Barnwell Road, provides the continuation of the A1134 corridor and runs north south to meet Coldham's Lane at a significant roundabout towards the south west corner of the Marshall's Airport site. This road is a key link between the eastern corridor and major destinations to the south of the city centre. To the east, Newmarket road continues to form the A1303 corridor.

4.3.21 The northern arm of the roundabout comprises Wadloes Road, a wide single carriageway that serves the northern area of the Barnwell estate. The Stagecoach Citi 3 service also uses Wadloes Road to connect residents to Cambridge city centre. The carriageway standard of Wadloes Road appears overengineered given its local nature, this is because the road was planned to be of more strategic importance by providing a bridge over the River Cam at Ditton Meadows to complete the Cambridge Ring Road.

4.3.22 However, due to objection, the link over the River Cam was never completed. With the only link over the river in the east of Cambridge at the Queen Elizabeth bridge, the River Cam produces an unwanted severing effect in the highway network in the east of the city. This puts additional pressure on key links and junctions elsewhere in the network.

4.3.23 This junction is a notorious safety blackspot for cyclists, with 19 recorded collisions with vehicles on the roundabout over the last five years. Problems are exacerbated through traffic demand for MacDonald's, this can sometimes cause queues to block back onto the roundabout, leading to congestion and delays. The presence of formal crossing facilities close to the junction is limited, except for a Toucan crossing provided on the eastern approach with a narrow refuge island in the centre of the carriageway.

Ditton Lane

4.3.24 A small section of link, less than 200m in length, along Newmarket Road connects the Barnwell Roundabout to Ditton Lane. The link is characterised by heavy traffic flow since it caters for east west movements along the Newmarket Road corridor as well north south movements between the A14 and key destinations to the south of Cambridge via Ditton Lane and the A1134 corridor.

4.3.25 Ditton Lane itself provides a secondary route into Cambridge city from the A14, where junction 34 is provided north of Fen Ditton comprising west facing slips only. A14 J34 was constructed during the 1970s era in response to a lack of vehicular access from the Strategic Road Network (then A45) to Marshall's Airport. Closure of this junction has been investigated more recently. There was particular support for this from Fen Ditton in the 2005 A14 Public Consultation.

4.3.26 Ditton Lane is a single lane, single carriageway distributor road that is not designed for high volumes of traffic, and it meets Newmarket Road at a signalised junction with no formal provision for cyclists or pedestrians. Even with a flared approach, traffic regularly blocks back through Fen Ditton to the A14 from this junction and therefore encompasses one of the most challenging pinch points along the Cambridge eastern corridor.

4.3.27 To the west of Ditton Lane, Newmarket road is characterised by dual carriageway with a central refuge. But for the Toucan crossing at the Barnwell Roundabout, this appears very inaccessible and uninviting for cyclists and pedestrians. Two lanes of traffic are provided for in both directions, with the eastbound lane allocation being cut into two sections by a dedicated cycle lane.

4.3.28 To the east, Newmarket Road is comprised of single carriageway in the order of 9.5m width. A dedicated bus and cycle lane is provided on-carriageway between Ditton Lane and the Cambridge Cemetery boundary. The approach to the junctions itself provides a flared entry for general traffic as well as a bus gate complete with a detection system.

Marshall's Airport

4.3.29 The Marshall's Airport site currently occupies a large expanse of land within the eastern corridor that stretches from Meadowlands Road to Airport Way. The access into the airport buildings is governed by a simple priority T-junction circa 750m east of the Barnwell Roundabout. An additional signalised access to other Marshall's buildings is provided another 280m to the east.

4.3.30 Other minor junction are present along Newmarket Road that serve as emergency gates into the airport site. It should be noted that these junctions would not necessarily be required should Marshall's successfully relocate the airport site elsewhere.

4.3.31 Here, Newmarket Road widens to provide a bus gate through the westbound approach, with a further two lanes provided for general traffic, of which one is a dedicated right turn into the site. A single lane for all road users is provided in the reverse direction, with an advanced cycle stop line. At its narrowest point along this segment of corridor, Newmarket Road provides a carriageway width of circa 9m.

Newmarket Park and Ride

4.3.32 The Newmarket Park and Ride site is located directly opposite Marshall's Airport, circa 630m east of the access that serves the airport buildings. The Park and Ride junction is signal controlled and provides a segregated right turn access into the site from the east. The dedicated park and ride allocated traffic lane runs for approximately 600m until its origin point at the Airport Way roundabout.

4.3.33 A single ahead lane for all other traffic is provided at the westbound approach to the junction, whilst the eastbound approach also provides a single lane for all traffic whether travelling ahead or turning left into the park and ride site. It is adjacent to this approach that an advanced cycle stop line is provided along with a puffin crossing complete with refuge island. The carriageway width of Newmarket in the vicinity of this junction is approximately 11.5m

Airport Way

4.3.34 In the absence of a strategic ring road connection, Airport Way forms a significant link to connect the east of Cambridge with the southern areas of Cherry Hinton and Queen Edith's before other links provide access to the Cambridge Biomedical Campus and Addenbrookes Hospital. Airport Way gets its name from the Marshall's Airport site, of which Airport Way forms the eastern boundary.

4.3.35 Airport Way forms a 3-arm priority roundabout with Newmarket Road circa 600m east of the Park and Ride site. Although all approaches to the junction are single lane, the entries provide flares that allows traffic to queue in twos for a short length. The Newmarket road mainline carriageway is in the region of 10m wide at this location.

High Ditch Road

4.3.36 Some 750m east of Airport Way, Newmarket Road forms a priority junction with High Ditch Road, a ghost island right turn is provided from the westbound mainline. At this point, Newmarket Road has a carriageway width of around 8.5m on each approach, although this widens out at the junction to accommodate the ghost island. High Ditch Road runs almost perfectly straight in a north west direction, providing a lightly trafficked route through to Fen Ditton. It forms a 4-arm crossroads junction with Ditton Lane in the centre of the village.

Quy Water

4.3.37 At a point 430m east of High Ditch Road, a bridge along Newmarket Road is provided over Quy Water. It is here that the carriageway is narrowest with a width of around 7.8m. The shared footway / cycleway that runs parallel on the northern edge of Newmarket Road continues over the bridge before terminating 50m to the east. From here, the route travels offline to the north, with a tunnel provided under the A14 mainline to provide segregated walking and cycling access to Stow cum Quy, located to the north of Quy interchange.

Quy Interchange

4.3.38 Quy interchange is the local name given to A14 J35 and comprises a grade-separated, priority controlled, 4-arm roundabout.

4.3.39 The A14 forms part of the strategic road network managed by Highways England and has been subject to £1.5 billion of investments recently, with regards to the Cambridge to Huntingdon scheme, as well as significant widening work at numerous locations in the Cambridge area.

4.3.40 At Quy, the A14 provides two lanes for two-way traffic in each direction, with both slip roads providing type A diverges that further diverge to provide two lanes on approach to the give way lines. The east facing slip provides a dedicated left turn lane that bypasses the roundabout circulatory carriageway, allowing for free-flowing traffic to travel from the A14 westbound to Newmarket Road.

4.3.41 Quy Interchange marks the endpoint of the eastern access corridor into Cambridge. The Southern approach, Newmarket Road, forms the start of this corridor, although it should be noted that the A1303 corridor continues east towards Newmarket itself, providing access to Bottisham. At Quy, Newmarket Road consists of two-lane dual carriageway.

4.3.42 To the south of the roundabout, the link takes a sharp bend to the west, with a corner radius of around 75m, the road is substandard for a derestricted dual carriageway link subject to the national speed limit. Beyond the bend, the road becomes single carriageway with the highway narrowing to single lane provision. Inbound traffic at this point needs to negotiate a merge in order to continue in single file, creating a major pinch point in the network, with traffic regularly blocking back through the Quy interchange and onto the A14 mainline.

4.4 The Wider Network

4.4.1 The characteristics of the wider highway network have a significant impact upon the operation of Newmarket Road itself. Key links in the wider network are summarised below.

Strategic Road Network

4.4.2 The A14 and M11 provide high capacity routes which form bypasses to the north and west of Cambridge. Although the A11 provides connectivity, the city lacks a similar high capacity orbital route to the south and east, which brings many strategic trips onto Newmarket Road and other local connections.

Figure 4.3: Key Junctions on Newmarket Road


Advance stop line for cyclists at B&Q junction


Poor provision for pedestrians at Coldham's Lane junction


Ditton Lane junction


Elizabeth Way Roundabout


Guard railings at Barnwell Road roundabout

Local Road Network

4.4.3 There are several other key links in the local road network which have a significant role to play in the movement of people through the area, and these are summarised below:

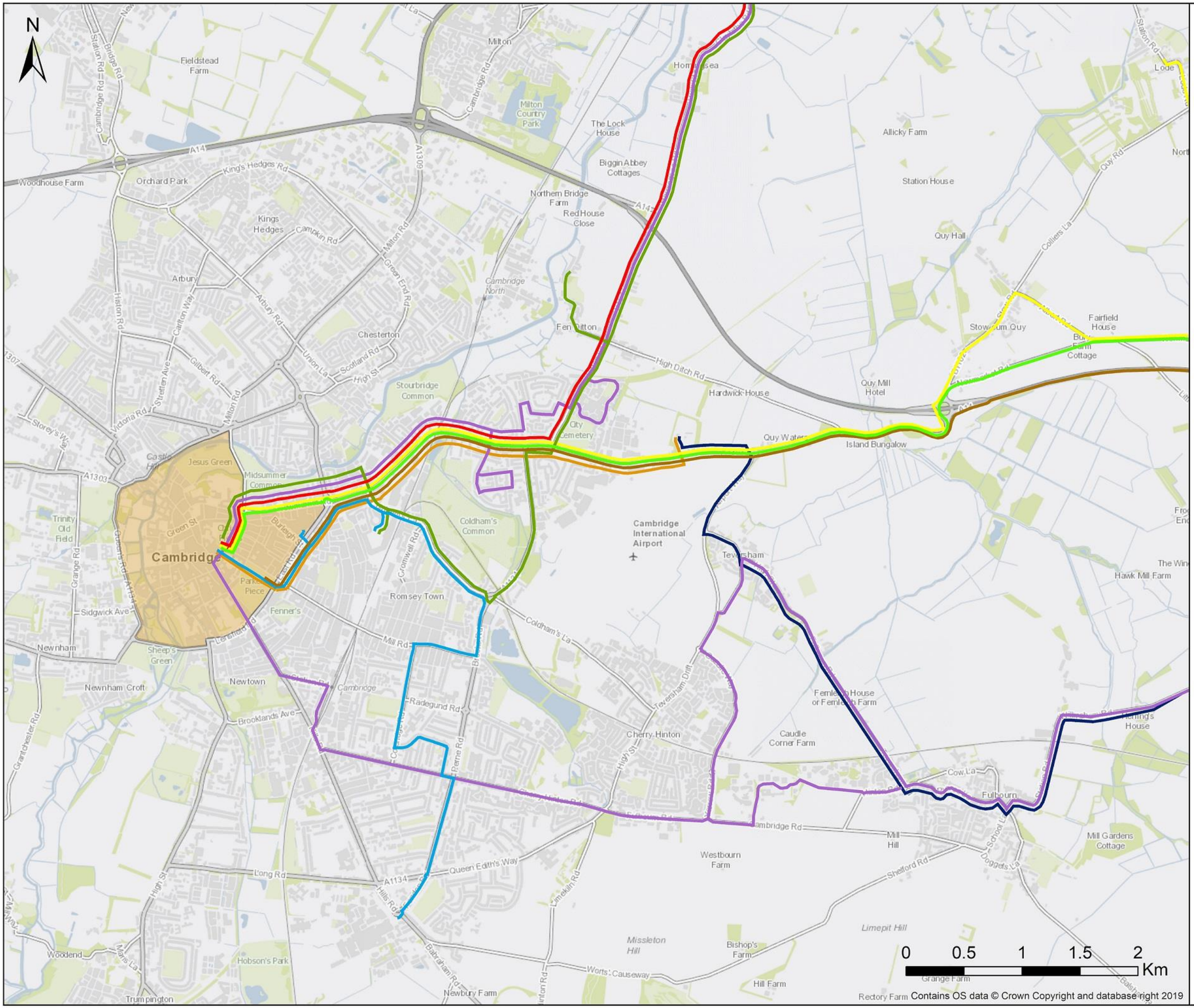
- **Elizabeth Way & East Road:** Together, Elizabeth Way and East Road provide a two-lane dual carriageway in each direction from the junction with Newmarket Road. It forms an actual and perceived barrier to movement for pedestrians and cyclists in the east of the city, with a series of subways providing access from one side to the other.
- **Airport Way:** Airport Way links Newmarket Road with Cherry Hinton in the south. It runs along the eastern boundary of the airport, with open countryside to the east, before it becomes High Street within Cherry Hinton itself. Despite being a local road, it provides a strategic function linking Newmarket Road to the south of the city in parallel to Barnwell Road.
- **Mill Road:** Mill Road forms the heart of a vibrant community providing local access into the city centre to the west for residents in the surrounding area, connecting to the A1134 Brooks Road in the east. It comprises a tight single carriageway lined with shops, restaurants and other services. The road bridges the railway, but capacity is limited and there is little in the way of on-street parking. The Road is currently restricted by an experimental TRO which is under review.
- **Coldham's Lane:** Coldham's Lane provides the main link between the city centre, Cambridge Retail Park and Cherry Hinton. The single carriageway road traverses the city from Newmarket Road in the north-west, past the southern end of the runway of Cambridge Airport, before reaching Cherry Hinton in the south-east. The nature of the route changes as it serves the busy retail parks and hotels close to Newmarket Road, before passing through the residential areas in and around Romsey and Cherry Hinton.
- **Barnwell Road (A1134):** Barnwell Road provides a north-south connection from the junction with Newmarket Road in the north, to Coldham's Lane, and on to Addenbrookes Hospital in the south of the city. It forms the eastern element of the ring road although, in reality, some of this function is provided by Airport Way.
- **Ditton Lane (B1047):** The B1047 Ditton Lane provides access from Newmarket Road to Fen Ditton to the north, together with Horningsea and Waterbeach on the other side of the A14. The single carriageway road is partly urban and partly rural and offers an alternative to the heavily congested A10 for residents in these areas. It enables north-south access onto and off the A14 at junction 34 from the east of Cambridge, although only west facing slip roads are provided.

4.5 Bus Services

4.5.1 There are several bus services which operate along Newmarket Road, the majority of which are run by Stagecoach. These include the Citi 3 and dedicated Newmarket Road Park and Ride service which both operate every 10 minutes during peak periods (see Table 4.1).

4.5.2 Together with other, less frequent services, sections of the corridor are served by buses every four minutes, representing excellent provision for both residents, employees along the corridor and those using the Park and Ride.

4.5.3 A weakness in current provision is the lack of orbital services operating via Newmarket Road. For those wishing to travel to the north or south of the east, there is a need to interchange between services in the city centre. A route was previously in place serving both the north and south of the city via Newmarket Road, but was withdrawn after nine months due to a lack of patronage. The routing of services currently in place is shown in Figure 4.4.



REV	DESCRIPTION	BY	CHK	APP	DATE

Client:
Greater Cambridge Partnership

TETRA TECH

Project:
Cambridge Eastern Access

Figure 4.4: Bus Service Network

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date	
NTS	BG	21.11.19	BK	21.11.19	BK	21.11.19	
Project No.	Office	Type	Drawing No.				Revision
A081175-146	35	18	004				-

Table 4.1: Bus Service Provision along Newmarket Road

Service	Operator	Route	Frequency (Buses per hour)				
			AM	IP	PM	Sat	Sun
P&R	Stagecoach	Park and Ride	6	6	6	6	4
Citi 3	Stagecoach	Fulborn - Cambridge	6	4	6	3	2
9B	Stagecoach	Cambridge - Chatteris	-	-	1	-	-
11	Stagecoach	Bury St Edmonds - Cambridge	1	1	1	1	-
X11	Stagecoach	Bury St Edmonds - Cambridge	1	-	1	2 Services	-
12	Stagecoach	Ely - Cambridge	1	1	1	1	-
18	A2B	Newmarket P&R - Newmarket	-	2 Services	-	-	-
19	Stagecoach	Cambridge - Landbeach	-	1 Service	-	-	-
114	Big Green Bus	Addenbrooke's - Cambridge	-	-	-	4 Services	-
Total Bus Service Provision along the Newmarket Road Corridor			15	12	16	11	6

Source: Stagecoach

4.6 Bus Infrastructure

4.6.1 Bus service provision along Newmarket Road is supported by the following infrastructure in place on the corridor. It is the responsibility of the Combined Authority and Cambridge County Council, as the Transport and Highways Authority's respectively, to manage and maintain the facilities in place.

Bus Priority

4.6.2 Bus priority measures are in place to cater for both inbound and outbound movements. In terms of inbound provision, six separate sections of bus lane cover around 1.0 km of the 5.8 km corridor between Quy Interchange on the A14 and Elizabeth Way roundabout on the edge of the city centre. This is accompanied by priority signals at the North Works access and the B1047 Ditton Lane junction, with and enforcement cameras to ensure that the measures in place are adhered to by general traffic.

4.6.3 In terms of outbound movements, three sections of bus lane adjacent to the Cambridge Retail park cover around 400m of the corridor and these are illustrated in Figure 4.5. Despite these bus priority measures being in place, several issues are apparent:

- The provision is fragmented which undermines the ability of buses to maximise a journey time advantage.
- The road surfacing is poorly maintained, and the lack of demarcation may contribute towards general traffic encroaching into the bus lanes.
- The priority signals require buses to be travelling above a certain speed before they are activated. However, the actual speed of buses along the corridor is often slower than the activation speed required to trigger a stage change at the traffic signals. The existing bus priority infrastructure along Newmarket Road is therefore highly ineffective. Many buses subsequently choose to join the lane of general traffic.

Waiting Facilities

4.6.4 Waiting facilities in place along the corridor comprise a mix of shelters and stops. Many are equipped with seating, lighting, raised kerbs and real time information, but the quality of provision is inconsistent and there is no standard branding or style. An image of a typical shelter on the corridor is provided in Figure 4.5.

Figure 4.5: Bus Infrastructure on Newmarket Road

Park and Ride

4.6.5 The Newmarket Road Park and Ride provides 873 car parking spaces, together with a travel centre, toilet facilities and helpdesk to answer any general enquires. Access to the site itself benefits from the provision of a dedicated lane for general traffic, enabling vehicles to bypass queuing traffic on the approach to the junction with the Park and Ride. This stretches for 0.6km from the junction with Airport Way. The site is operational seven days a week, with services operating every 10 minutes between 7am (inbound) and 8.45pm (outbound).

4.7 Rail

4.7.1 Cambridge Station is located around 1.5km to the south of the Elizabeth Way roundabout at the junction with Newmarket Road, and provides services to destinations across the country including London and Birmingham. A selection of the services provided are included in Table 4.2.

4.7.2 Greater Anglia are the main train operating company serving the station, running an hourly service between Cambridge and Newmarket to providing an alternative to traffic travelling into the city from Newmarket Road. The journey takes around 25 minutes compared to between 30-60 minutes by car in the AM peak.

Table 4.2: Rail Service Provision from Cambridge Station

Train Operating Company	Route	Frequency (Services per hour)				
		AM	IP	PM	Sat	Sun
Greater Anglia	Cambridge - Ipswich (via Newmarket)	2	1	1	1	1
Greater Anglia	Norwich - Cambridge / Stansted Airport	5	6	6	6	5
Greater Anglia	Cambridge North – London Liverpool Street	2	2	2	2	2
Greater Anglia	King's Lynn - London Liverpool Street (Peak Only)	2	-	1	-	-
Great Northern	King's Lynn / Ely – London Kings Cross	7	2	5	2	1
Great Northern	Cambridge – London Kings Cross	5	4	5	3	3
Thameslink	Cambridge - Brighton	2	2	2	1	1
Cross Country	Birmingham New Street – Stansted Airport	2	1	1	1	1

Source: National Rail Enquiries

4.7.3 In the north of the study area, the former Cambridge to Mildenhall Line was closed in 1965. Its former alignment is still visible and forms the northern edge of the built-up area of Barnwell[13]. There are no plans for the line to be reopened and it has partly been redeveloped as a cycle path.

4.8 Cycling

4.8.1 There is extensive provision for cyclists along Newmarket Road and in the wider study area with both radial and orbital links providing direct access to many locations. Figure 4.6 illustrates the cycle network in the east of the city.

4.8.2 The quality of the provision is variable, however. Along Newmarket Road itself, the eastbound cycle lane is fragmented and does not commence until the junction with Garlic Row, in the form of a narrow, on-road cycle lane. This then splits two lanes of general traffic as it approaches the Barnwell (McDonald's) roundabout and junction with Ditton Lane.

[13] https://en.wikipedia.org/wiki/Cambridge_to_Mildenhall_railway

Contains Ordnance Survey data © Crown copyright and database right 2017.

REV	DESCRIPTION	BY	CHK	APP	DATE

Client:
Greater Cambridge Partnership

TETRA TECH

Project:
Cambridge Eastern Access

Figure 4.6: Cycle Network in the East of the City

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	BG	28.01.20	BK	28.01.20	BK	28.01.20

Project No.	Office	Type	Drawing No.	Revision
A081175-146	35	18	XXX	-

4.8.3 East of Ditton Lane, the cycle lane leaves the carriageway and becomes a shared use path as the road passes Cambridge Cemetery and the large car dealership to the north of Newmarket Road, before eventually turning north and heading under the A14.

4.8.4 For cyclists heading into the city, provision is also mixed with sections of bus lane open to cyclists, linked by dedicated on-road cycle lanes. Where cycle lanes are in place, the quality of the surfacing is often poorly demarcated and maintained. The dominance of the highway in the vicinity of the Queen Elizabeth Way roundabout also makes this section of Newmarket Road an unpleasant environment for cyclists.

4.9 Pedestrians

4.9.1 Continuous footpaths are provided along both sides of Newmarket Road within the urban area with signalised crossings and/or dropped kerbs in place at the junction with most of the main side roads where they meet the main carriageway. However, these footways are poorly maintained in places and are often narrow, making access difficult for wheelchair users and pushchairs.

4.9.2 The main barrier facing pedestrians is at Elizabeth Way, at which the only method of traversing the inter-section is via a series of subways underneath the roundabout. Provision for pedestrians and cyclists is illustrated in Figure 4.7. In addition, there is no provision for pedestrians at the busy Newmarket Road / Coldham's Lane junction.

4.9.3 In terms of the public realm, the quality is poor. Newmarket Road has a severing effect on the communities along its route, most obviously demonstrated in Barnwell, the pedestrian crossings off-set from the desire line at the junction with Barnwell Road only adding to the actual and perceived sense of severance within the heart of the community. The lack of street furniture, landscaping, or pedestrian orientated signage and lighting adds to an environment which in places feels hostile to pedestrians due to its dominance by traffic.

4.10 Summary

4.10.1 The Newmarket Road corridor and the surrounding area provides contrasting levels of infrastructure and service provision, together with opportunities and constraints to be considered in the development of options to enhance public transport capacity and connectivity.

4.10.2 The frequency of bus service provision and the quality and capacity of the Park and Ride facility is not matched by continuous, dedicated inbound and outbound bus lanes, whilst the comprehensiveness of the cycle network is undermined by inconsistencies in the quality of the offer.

4.10.3 The tight urban form through Barnwell provides a considerable constraint in the exploration of online public transport enhancements, although further to the east, the corridor runs through open countryside with more scope to accommodate a dedicated facility.

4.10.4 Offline options will also need to pay due diligence to prominent listed buildings, particularly the Leper Chapel, floodplains associated with the River Cam, and protected commons.

Figure 4.7: Examples of Pedestrian and Cycle Infrastructure Provision

5.0 Travel Patterns & Practice

This section highlights the way in which the Newmarket Road corridor is currently used, detailing the volume of movement, origins and destinations of trips, modal choice, safety and journey times. Understanding the scale of demand to travel along the corridor and the issues this generates will help inform and shape the nature of potential interventions and solutions.

This analysis has been informed by data sets from a variety of sources including the Cambridge Sub-Regional Model, Cambridge Paramics Model, bus operators, and local authority data sets.

This section of the study was largely completed before the onset of the Covid-19 pandemic and represents pre-Covid data. It is recognised that any subsequent Outline Business Case will need to consider the impacts of the pandemic.

5.1 Volume of Traffic

5.1.1 The Cambridge Sub-Regional Model (CSRM) provides information on the operation of Newmarket Road in terms of the movement of general traffic. Observed flows from the 2015 base year have been utilised herein to highlight the volume of traffic on the corridor and journey times, whilst congestion based upon volume over capacity and the origin and destination of trips has been derived from the model itself.

5.1.2 The volume of flow during the morning, inter-peak and evening peak periods is provided in Table 5.1. It highlights the respective flows at two cordons – an outer cordon close to the junction with the A14 and an inner cordon close to Elizabeth Way – within one-hour timeframes, heading both into and out of the city.

Table 5.1: **Observed Flows of General Traffic on Newmarket Road from 2015**

Time	Direction	Inner Cordon	Outer Cordon
AM peak	Inbound (westbound)	1,087	1,593
AM peak	Outbound (eastbound)	1,011	674
Inter-peak	Inbound (westbound)	1,024	693
Inter-peak	Outbound (eastbound)	1,153	701
PM peak	Inbound (westbound)	1,070	782
PM peak	Outbound (eastbound)	1,163	1,603

Source: Cambridge Sub-Regional Model

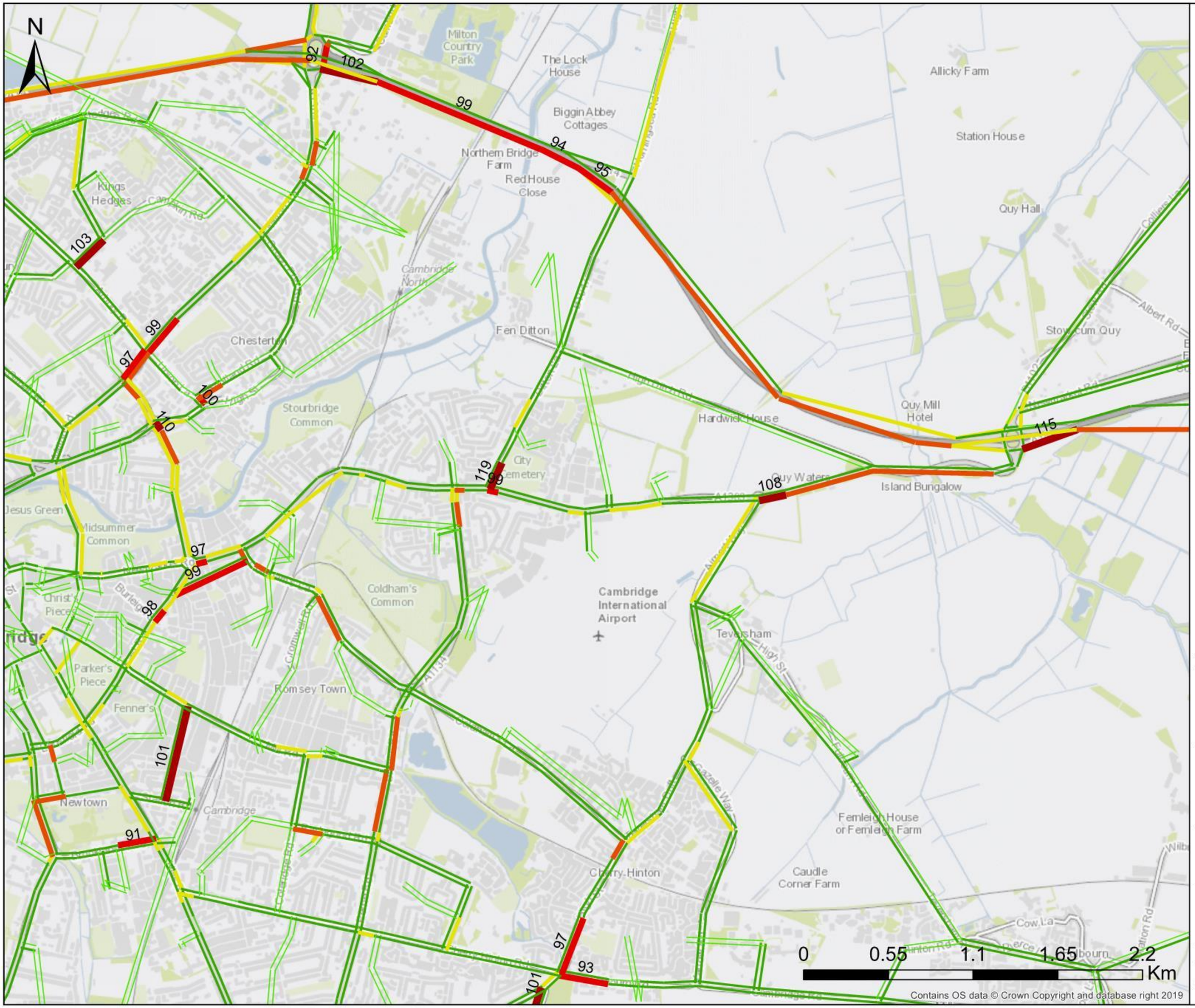
5.1.3 There are several observations which can be drawn from the data:

- Flows through the inner cordon are relatively consistent throughout the day, and between inbound and outbound movements. There does not appear to be any tidality.
- Flows through the outer cordon are more in line with what you would expect from a radial route into a city which much higher flows inbound in the morning peak and outbound in the evening peak.
- There is more traffic at the western end of the corridor, close to Elizabeth Way Roundabout, than at the eastern end, close to the Quy Interchange on the A14.

5.1.4 On its own the volume of traffic doesn't provide a great deal of insight into how the corridor operates in practice. However, when compared to the actual capacity of the road, areas of potential delay and congestion can be identified, and is reflected in terms of the respective level of 'stress'.

5.1.5 The ratio of volume to capacity along Newmarket Road and on the surrounding network is identified in the morning peak (Figure 5.1) and evening peak (Figure 5.2). It highlights how in the morning peak the main problems occur on the inbound approach to the Airport Way junction, and at the junction with Ditton Lane, with the same locations subject to the highest degree of stress in the evening peak.

5.1.6 Aside from these locations however, the corridor appears to operate at a reasonable level of stress.



Legend

AM Vehicle/Capacity Percentage

- 0 - 10
- 10 - 50
- 50 - 75
- 75 - 90
- 90 - 100
- 100 - 200

REV	DESCRIPTION	BY	CHK	APP	DATE

Client:
Greater Cambridge Partnership

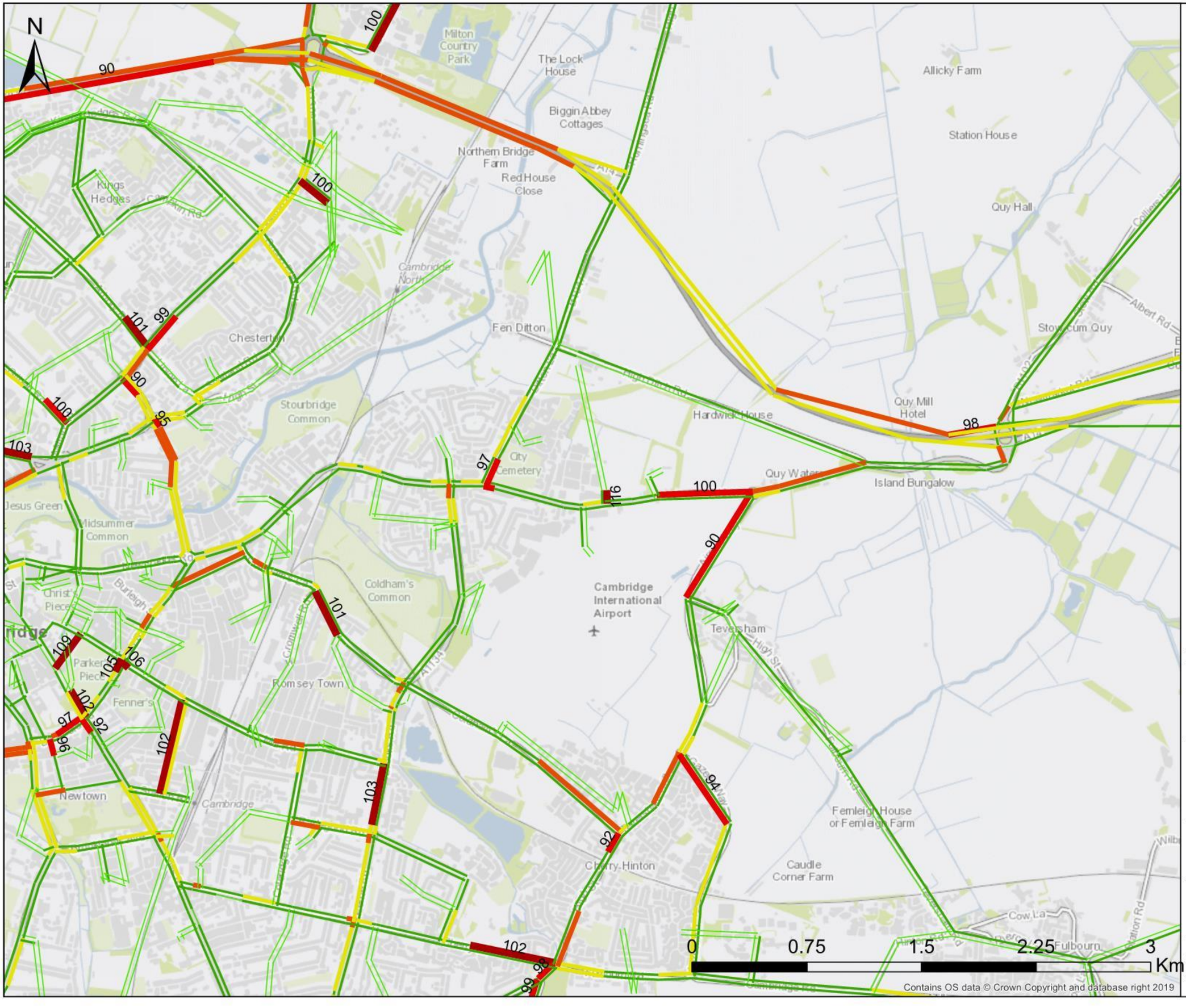
TETRA TECH

Project:
Cambridge Eastern Access

Figure 5.1: Volume over Capacity in the AM Peak Period

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	GD	30/01/20	LM	30/01/20	GD	30/01/20

Project No.	Office	Type	Drawing No.	Revision
A081175-146	35	18	020	-



Legend

PM Vehicle/Capacity Percentage

- 0 - 10
- 10 - 50
- 50 - 75
- 75 - 90
- 90 - 100
- 100 - 200

REV	DESCRIPTION	BY	CHK	APP	DATE

Client:
Greater Cambridge Partnership

TETRA TECH

Project:
Cambridge Eastern Access

Figure 5.2: Volume over Capacity in the PM Peak Period

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	GD	30/01/20	LM	30/01/20	GD	30/01/20

Project No.	Office	Type	Drawing No.	Revision
A081175-146	35	18	020	-

5.2 Journey Times

General Traffic

5.2.1 Journey times along Newmarket Road for general traffic between the Barnwell Road / Wadloes Road (McDonald's) roundabout and the junction with High Ditch Road were observed as part of the development and validation of the CSRM in 2015. Table 5.2 details the differences between journey times in both directions during morning and evening peaks, together with the inter-peak period.

Table 5.2: **Journey Times for General Traffic along Newmarket Road in 2015**

Time	Direction	Revalidated Journey Times
AM peak	Inbound (westbound)	15 mins 1 sec
AM peak	Outbound (eastbound)	10 mins 08 secs
Inter-peak	Inbound (westbound)	9 mins 18 secs
Inter-peak	Outbound (eastbound)	9 mins 38 secs
PM peak	Inbound (westbound)	10 mins 38 secs
PM peak	Outbound (eastbound)	13 mins 21 secs

Source: Cambridge Sub-Regional Model

5.2.2 The data indicates the extent of congestion in the morning and evening peak periods. Journey times for inbound flows increase by around 6 minutes compared to those experienced in inter-peak (free flow) conditions, whilst outbound flows in the evening peak are some 4 minutes longer.

Buses

5.2.3 Two of the main factors users often cite in terms of their requirements from public transport provision are the speed of the journeys and the reliability of the journey times[14]. Journey time data has been provided by Stagecoach which offers a detailed insight into where and when delays occur on the No.11 and No.12 services, between the city centre and Cambridge Airport, together with the Park and Ride service between the Newmarket Road site and the city centre.

5.2.4 Figure 5.3 and Figure 5.4 highlight journey times for inbound and outbound journeys respectively in the:

- Morning Peak (7am – 9am),
- Evening Peak (4pm – 6pm),
- Inter-Peak (9am – 4pm), and
- Off-Peak (6pm – 7am).

5.2.5 Analysis of the data shows several interesting findings:

- The most acute delays in journey time are on outbound bus services in the PM peak, with average journey times 7 minutes longer than those in off-peak conditions.
- Journey times are consistently slower in the PM peak than the AM peak for inbound and outbound travel.
- Inter-peak services are also slower than those in the AM peak.

5.2.6 The information provided by Stagecoach details the journey times between the city centre, the Grafton Centre and the Park & Ride. When this is disaggregated, it highlights a relative consistently in journey times between the city centre and Grafton Centre and more variability between the Grafton Centre and the Park & Ride.

[14] https://publications.parliament.uk/pa/cm201719/cmselect/cmtrans/1425/report-overview.html

Figure 5.3: Inbound Bus Journey Times (in minutes)

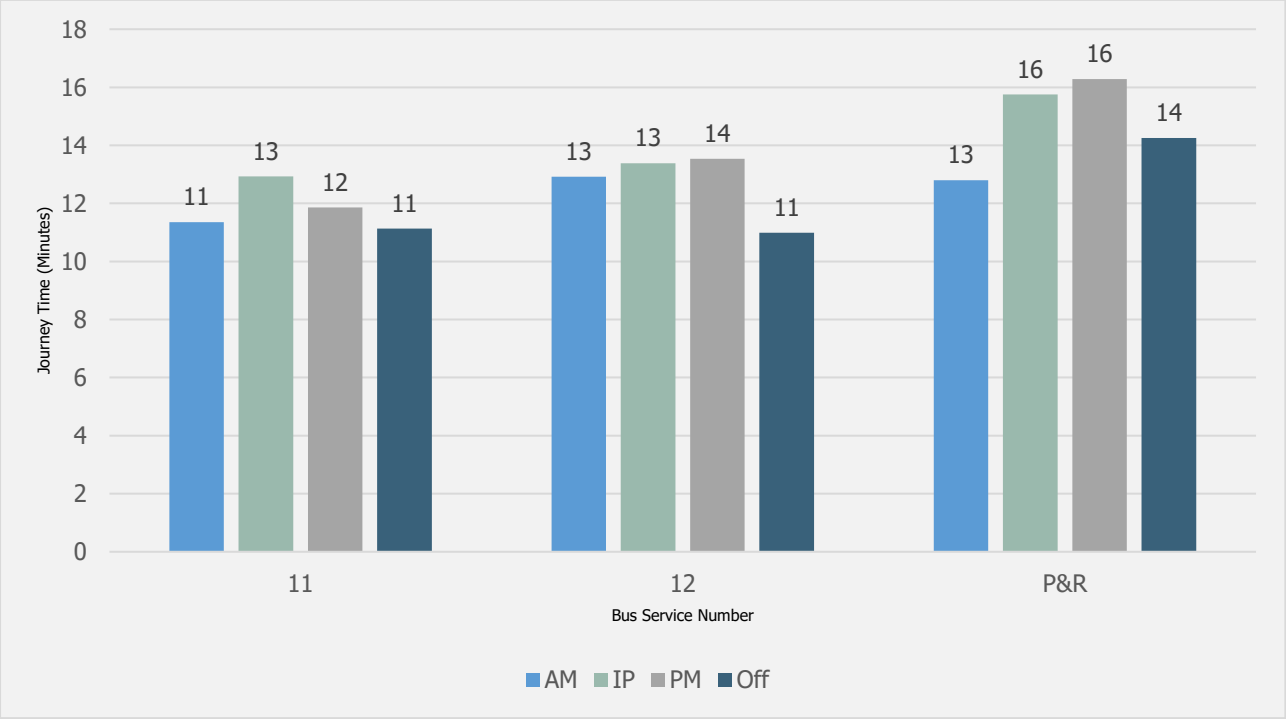
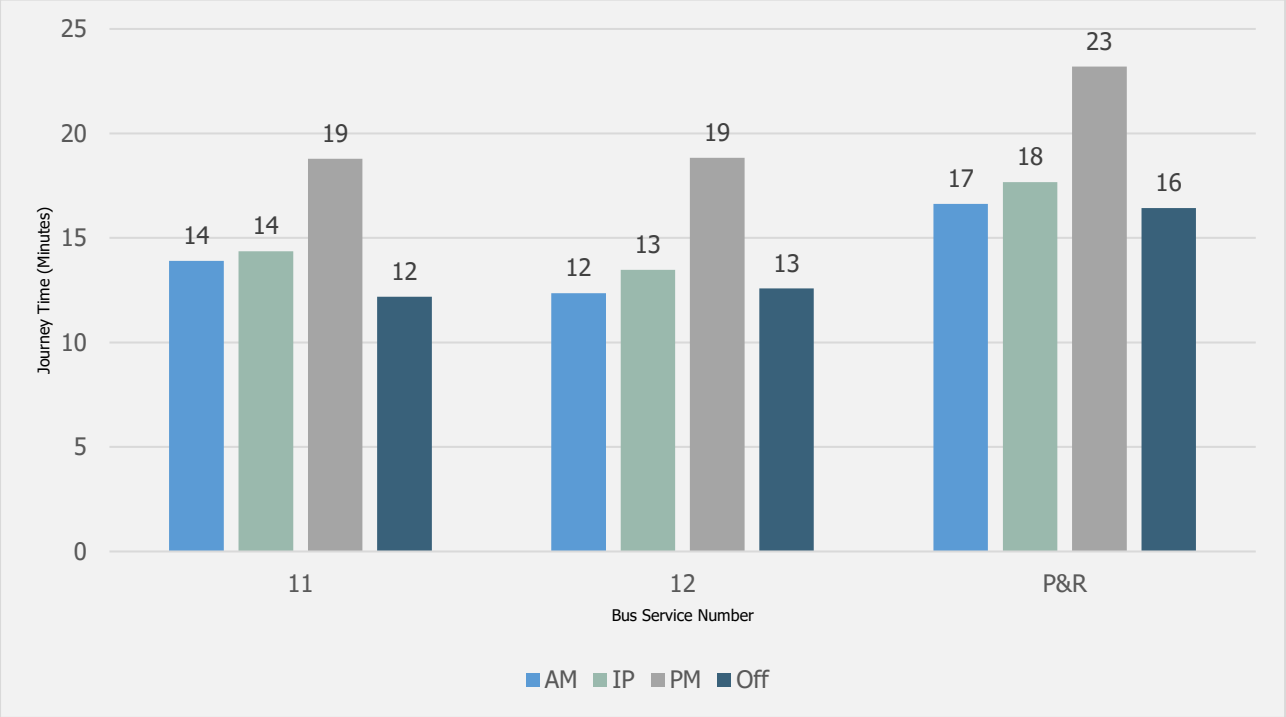


Figure 5.4: Outbound Bus Journey Times (in minutes)



Source: Stagecoach

5.3 Origin and Destination of Trips

5.3.1 A select link analysis of Newmarket Road in the Cambridge Model provides an understanding as to where corridor users start and finish their journeys. In Figure 5.5, only a relatively small proportion of the vehicles which enter the corridor at the Quy Interchange on the A14, travel the complete length of Newmarket Road to the Elizabeth Way roundabout.

5.3.2 A large proportion of the vehicles head south down Airport Way, towards Addenbrookes Hospital and the other employment opportunities to the south of the city, whilst it appears that the Park and Ride site has some success in intercepting vehicles before they head into the city from the east.

5.3.3 In terms of trips heading away from the city centre in the evening peak, Coldham's Lane carries around the same number of vehicles as Newmarket Road from those joining the corridor from the inner ring road (see Figure 5.6). Both links provide access to the retail parks however, which appear to account for a high proportion of all trips entering Newmarket Road from Elizabeth Way.

5.3.4 In this respect it may reflect that the evening peak congestion delays are not merely as a result of commuter trips but are generated by trips associated with a variety of journey purposes.

5.4 Safety

5.4.1 A review of the number and severity of accidents on Newmarket Road between January 2014 and August 2019 has highlighted that there have been around 150 serious or slight casualties along the corridor. There are several locations in which casualties are most prevalent:

- Elizabeth Way roundabout,
- Barnwell Roundabout, and
- Quy Interchange on the A14.

5.4.2 There has also been a concentration of accidents associated with the junctions which provide access to the retail park, as illustrated in Figure 5.7.

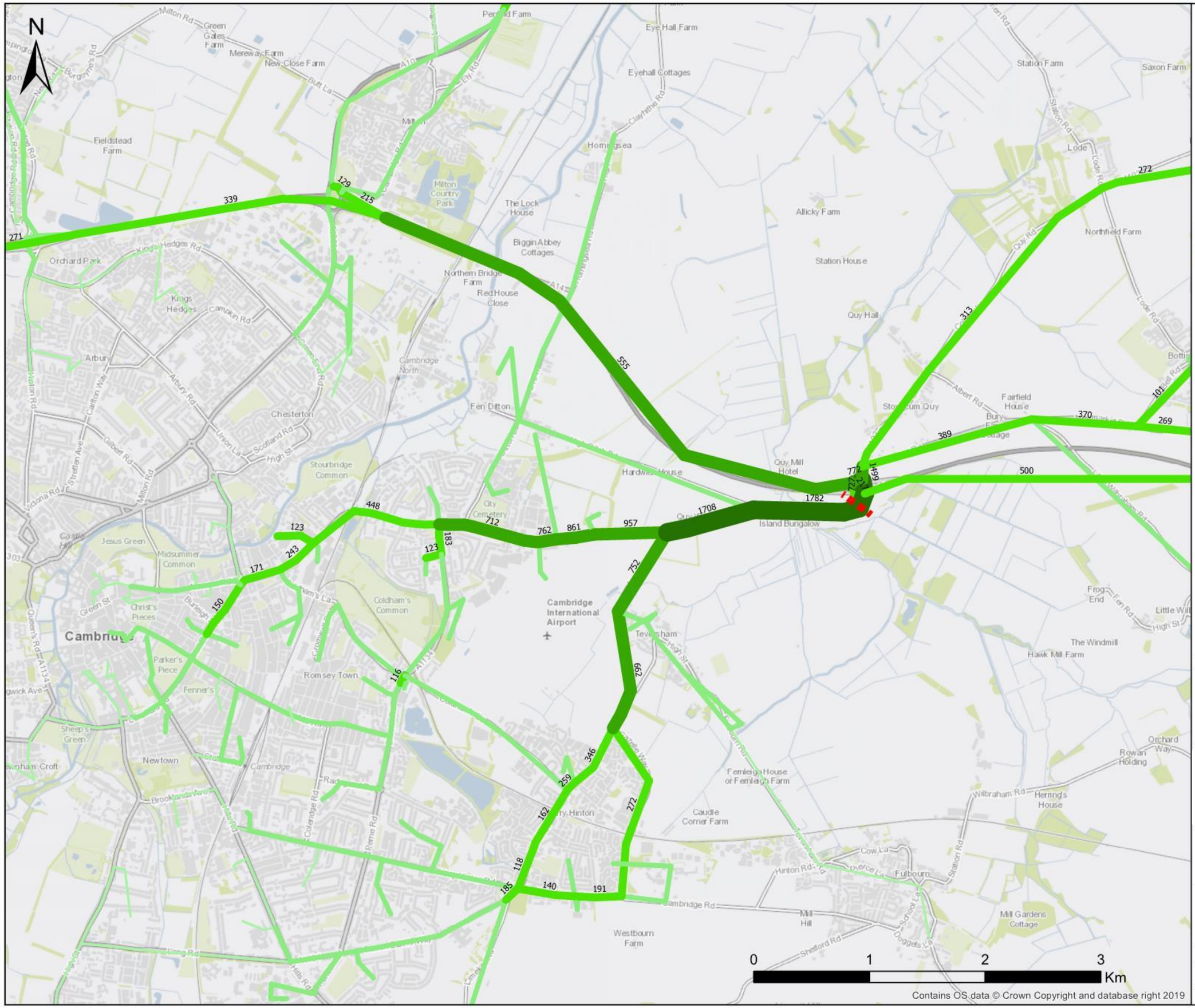
5.5 Patronage

5.5.1 Aggregated patronage data has been provided by Stagecoach relating to their services which operated along Newmarket Road for the period between 2015 and 2019. Table 5.4 highlights annual reductions in the number of passengers the operators carried over the period, with almost 200,000 fewer people travelling by bus on the corridor in 2019 compared to 2015, equating to a 20% reduction over the five years.

Table 5.4: Total Passenger Boardings on Newmarket Road

Year	Patronage	Annual Change	Overall % Change
2015	893,059	-	-
2016	863,316	-29,743	-3%
2017	776,115	-87,201	-13%
2018	723,059	-53,056	-19%
2019	711,424	-11,635	-20%

Source: Stagecoach



REV	DESCRIPTION	BY	CHK	APP	DATE

Client:
Greater Cambridge Partnership

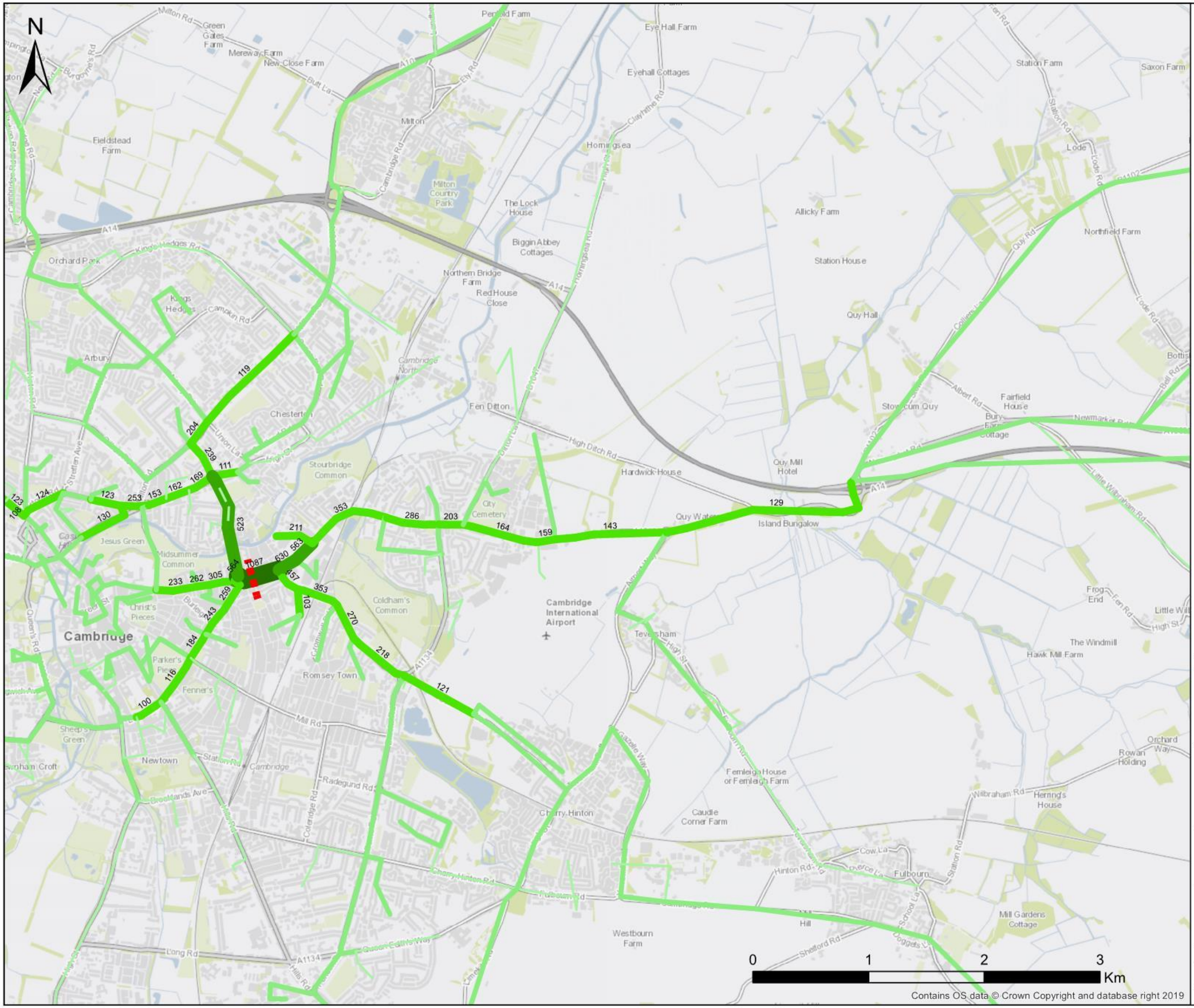
TETRA TECH

Project:
Cambridge Eastern Access

Figure 5.6: Origin & Destination of Westbound Flows on Newmarket Road in AM Peak

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	LM	04/02/20	GD	04/02/20	GD	04/02/20

Project No.	Office	Type	Drawing No.	Revision
A081175-146	35	18	019	-



PM Peak Select Link Analysis Traffic Flow (PCU)

- 0 - 1
- 2 - 10
- 11 - 100
- 101 - 500
- 501 - 1000
- 1001 - 2000
- Newmarket Road/ Elizabeth Way - Select Link Location

REV	DESCRIPTION	BY	CHK	APP	DATE

Client:
Greater Cambridge Partnership

TETRA TECH

Project:
Cambridge Eastern Access

Figure 5.7: Origin & Destination of Eastbound Flows on Newmarket Road in PM Peak

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	LM	04/02/20	GD	04/02/20	GD	04/02/20

Project No.	Office	Type	Drawing No.	Revision
A081175-146	35	18	019	-

Legend

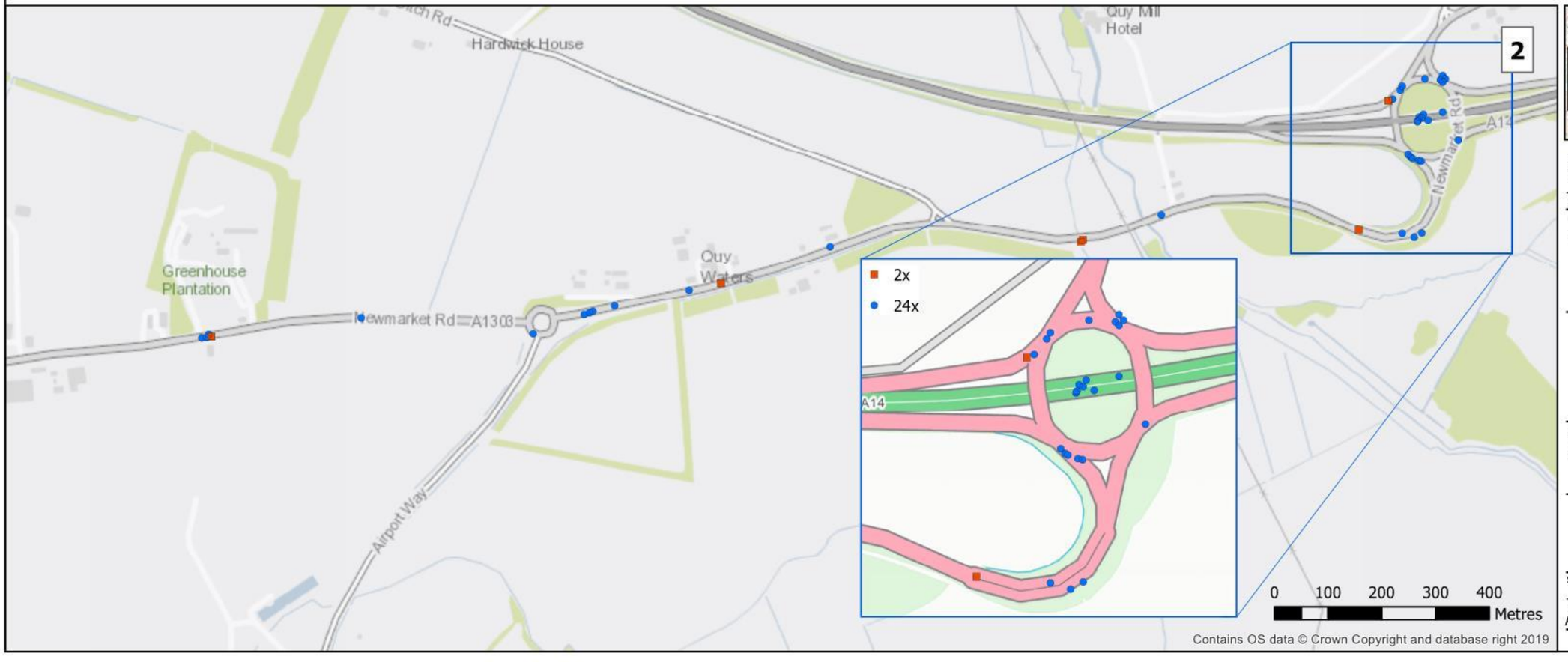
Collision Severity

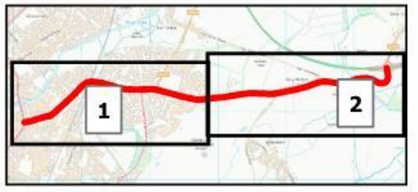
- Serious
- Slight

Number of Collisions:

	Fatal	Serious	Slight	Total
2014	0	5	24	29
2015	0	6	25	31
2016	0	5	26	31
2017	0	6	21	27
2018	0	2	15	17
2019*	0	6	10	16
Total	**0**	**30**	**121**	**151**

* 2019 includes January to August only.





REV	DESCRIPTION	BY	CHK	APP	DATE

Client:
Greater Cambridge Partnership

TETRA TECH

Project:
Cambridge Eastern Access

Figure 5.8: Collison Data (Jan 2014 to Aug 2019)

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	PJ	24/01/20	BK	24/01/20	BK	24/01/20

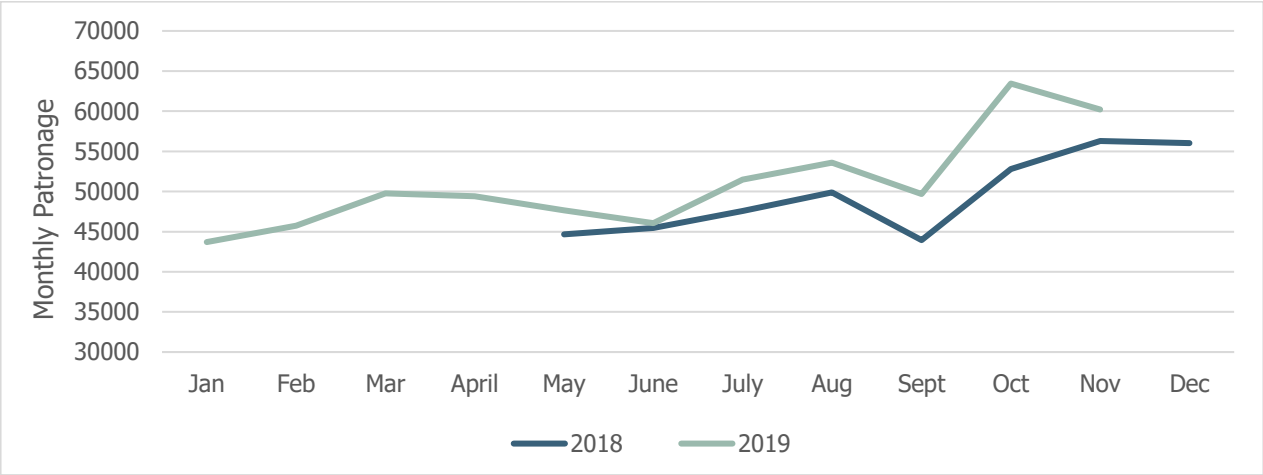
Project No.	Office	Type	Drawing No.	Revision
A081175-146	35	18	015	-

Newmarket Road Park and Ride

5.5.2 The popularity of the Newmarket Road Park and Ride is captured in data collected by Cambridgeshire County Council. The data focuses on the number of cars using the site and so it is not a direct reflection of patronage of the services as car occupancy is not reflected in the figures.

5.5.3 Notwithstanding this, Figure 5.9 highlights how the popularity of the site grew on a month by month basis between 2018 and 2019, peaking at over 63,000 vehicles using the site in October 2019, up from almost 53,000 in the same month in 2018.

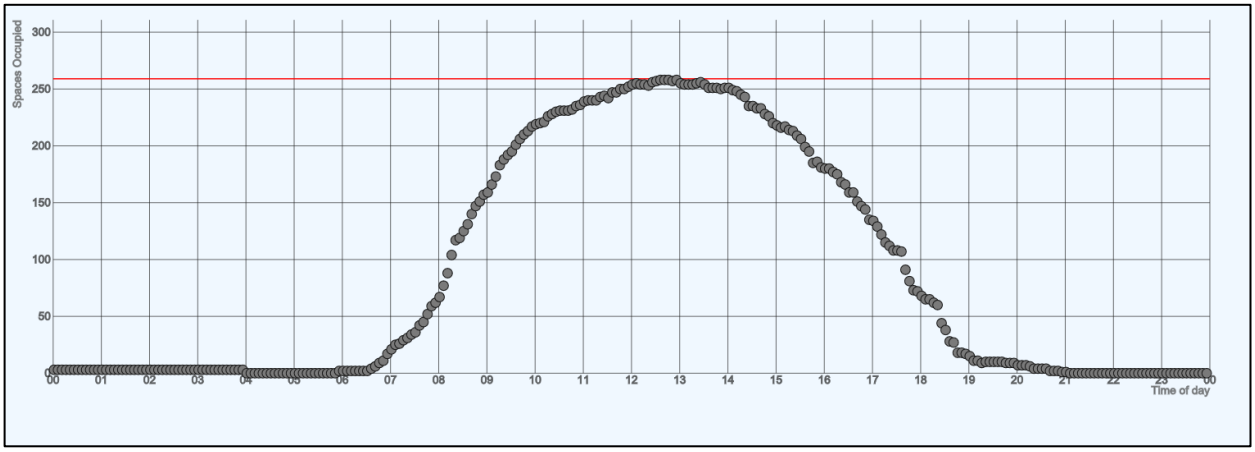
Figure 5.9: Patronage of Newmarket Road Park and Ride



Source: Cambridgeshire County Council

5.5.4 In terms of day to day operations, demand to use the Park and Ride is such that the car park reaches capacity at around midday on a typical weekday (see Figure 5.10). The timing of this peak indicates that it grows in popularity throughout the day, reflecting its use by not just commuters in the morning peak, but also shoppers and visitors later in the day.

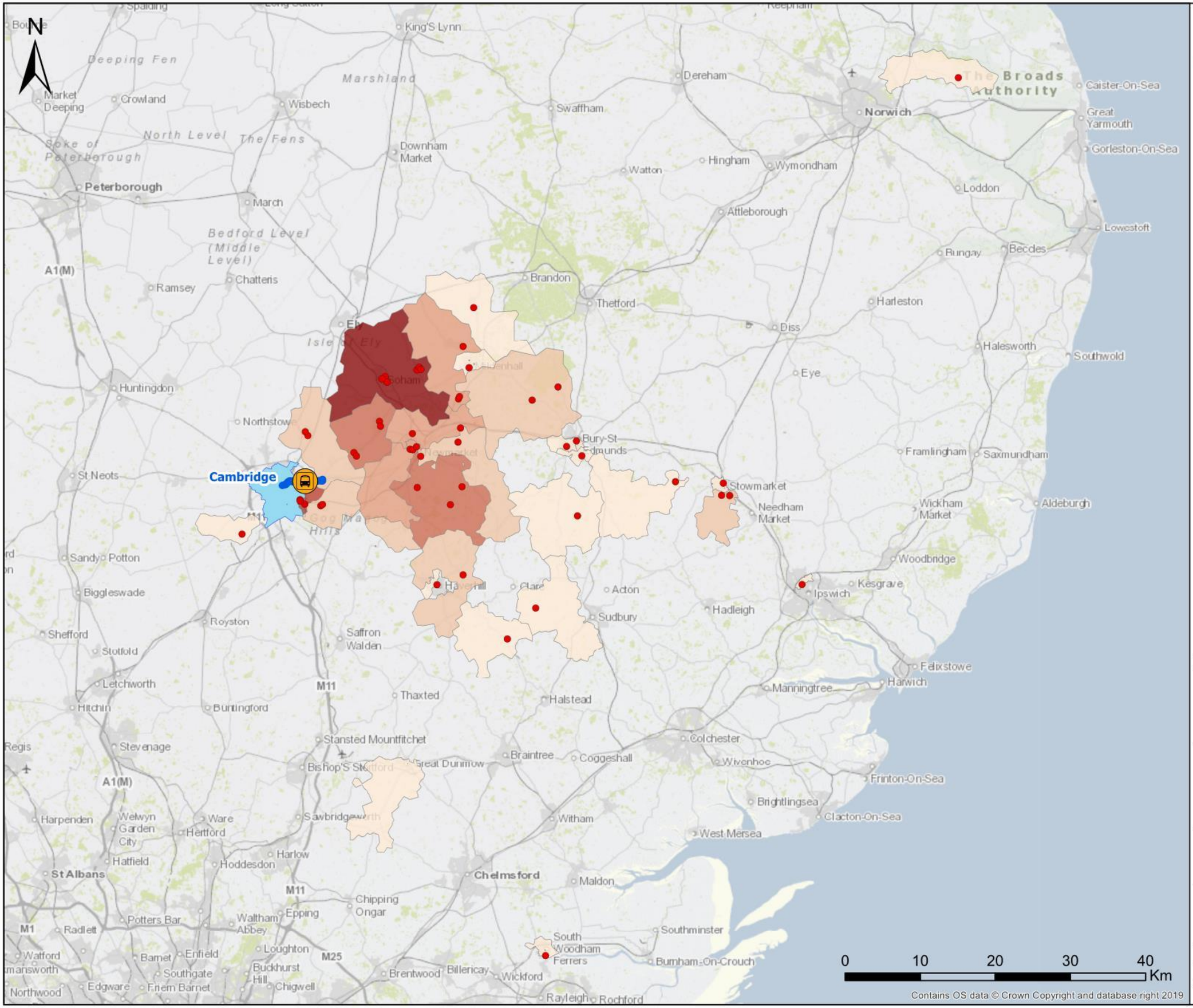
Figure 5.10: Park and Ride Demand on a Typical Weekday



Source: https://smartcambridge.org/parking/list/ (data for Tuesday 21 January 2020)

Park and Ride User Survey

5.5.5 Surveys were undertaken of the use of the Park and Ride in January 2020. Post code data collected, and highlighted in Figure 5.11, demonstrates the extent of the hinterland the site serves, stretching as far as Ipswich and Essex, as well as more local towns such as Soham, Bury St Edmunds, Newmarket and Haverhill.



Contains Ordnance Survey data © Crown copyright and database right 2020.

REV	DESCRIPTION	BY	CHK	APP	DATE

Client:
Greater Cambridge Partnership

TETRA TECH

Project:
Cambridge Eastern Access

Figure 5.11: Park & Ride Catchment

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	BG	21.11.19	BK	21.11.19	BK	21.11.19

Project No.	Office	Type	Drawing No.	Revision
A081175-146	35	18	021	-

5.6 Modal Split

5.6.1 Data is not available on the modal split of all trips along Newmarket Road. However, modal split has been calculated using Census 2011 Journey to Work data. The number of trips for each mode of transport for six Middle Super Output Areas (MSOAs) adjacent to the Eastern Corridor have been obtained from Nomis. These areas do not directly correspond to settlement boundaries, but can be summarised as followed:

- MSOA Cambridge 003: Chesterton.
- MSOA Cambridge 006: Barnwell and Riverside.
- MSOA Cambridge 008: Petersfield.
- MSOA Cambridge 009: Romsey.
- MSOA South Cambridgeshire 007: Milton, Horningsea, Fen Ditton and Stow Cum Quy.
- MSOA South Cambridgeshire 011: Teversham, Fulbourn, Little Wilbraham and Great Wilbraham.

5.6.2 Modal split data for these MSOAs have been summarised in Table 5.5 for bus, rail, walking, cycling and car.

Table 5.5: Modal Split along the Eastern Corridor

MSOA	Bus	Rail	Walk	Cycle	Car	Other
Cambridge 003	4.0%	2.2%	7.1%	22.2%	56.3%	8.2%
Cambridge 006	7.0%	2.6%	8.2%	21.8%	49.8%	10.6%
Cambridge 008	6.7%	8.1%	17.5%	25.3%	31.5%	10.8%
Cambridge 009	4.8%	5.9%	15.3%	27.7%	36.1%	10.2%
South Cambs 007	3.5%	1.6%	4.8%	14.0%	67.7%	8.3%
South Cambs 011	5.8%	2.1%	4.0%	10.5%	66.2%	11.4%
Cambridge Average	7.8%	4.8%	10.7%	24.3%	42.7%	9.7%
South Cambs Average	4.2%	2.4%	4.5%	9.3%	66.2%	13.5%
East Cambs Average	1.7%	4.3%	5.2%	2.8%	69.9%	16.2%

Source: 2011 Census Journey to Work Data

Commuting by Bus

5.6.3 Bus mode share is reasonably constant across the areas adjacent to the corridor. Mode share is highest in MSOA 006 which encompasses Newmarket Road from Queen Elizabeth Way to the Barnwell estate. Despite the proximity to the existing corridor, bus mode share falls below the Cambridge average for all areas. Bus mode share sharply decreases further with distance from the city boundary as evidenced, although it should be noted that usage of the Park and Ride service from eastern areas is unclear from the Census data.

Commuting by Rail

5.6.4 It should be noted that East Cambridgeshire has a reasonable rail modal share that is consistent with the Cambridge average. However, further east into Newmarket, rail share accounts for less than 1% of commuters for much of the town, despite the fact that it contains a rail station with services into Cambridge. When rail mode share in Newmarket is compared to that of Ely and Waterbeach it can be seen that Newmarket has a very poor mode share.

5.6.5 The existing single tracked line between Coldham's Lane Junction and Chippenham Junction is a big constraint with regards to service provision. Even with the mile-long passing loop at Dullingham, services from Newmarket to Cambridge are only able to be timetabled hourly which hinders capacity for the Ipswich to Cambridge service. The sharp bend in the track at Coldham's Common also reduces line speed to 10mph through this section of track, significantly increasing journey time. There are therefore huge opportunities to increase the mode share of rail along the Eastern corridor that should be considered in addition to this study. Options to better connect the Newmarket rail station to residents of the town should be explored in addition to any line, timetabling or fleet upgrades.

Commuting by Bicycle

5.6.6 There is a significant decrease in cycle mode share beyond the Cambridge City boundary, although cycle mode share is considerably higher for eastern areas adjacent to the corridor than the average cycle mode share across South and East Cambridgeshire authorities. The areas within Cambridge City adjacent to the Eastern Corridor are typical of Cambridge as a whole. The proposed Greenways and Chisholm Trail offer an excellent opportunity to encourage modal shift towards cycle use, especially for residents of Swaffham and Bottisham to the east, whereby currently less than 10% of residents cycle to work.

Commuting by Car

5.6.7 There is a notable increase in car modal share and significant decrease in cycle mode share beyond the Cambridge City boundary. With regards to those areas adjacent to the Eastern Corridor, car mode split is typical of South and East Cambridgeshire averages, however, many areas further to the east, including Suffolk, have far higher percent shares in car commuters.

5.7 Future Pressures & Demand

5.7.1 The Cambridge Eastern Access scheme is required to address not just the existing issues associated with the performance of the network, but also pre-empt changes in travel patterns and pressures. To this end, the operation of the network in a 2026 forecast year was assessed within the Cambridge Paramics Model to determine changes which will occur without intervention as a result of demographics, traffic growth and car ownership, and committed developments and transport proposals coming forward.

Volume of Traffic

5.7.2 Between 2017 and 2026 the overall volume of traffic on the network in the east of the city is expected to generally increase. The largest increases are anticipated to be on the section close to the Quy Interchange, and in the inter-peak period, with outbound flows increasing by over 20% and inbound flows by over 30%.

5.7.3 The morning peak will see more modest increases on Newmarket Road close to both Elizabeth Way and the Quy Interchange. In the evening peak however, the picture is less straightforward with a predicted reduction in flow through the inner cordon near Elizabeth Way and in terms of outbound flows in the evening peak at Quy Interchange.

5.7.4 This is at odds with the overall increases seen and is attributed to excessive queuing and delays in the model as opposed to any form of real reduction in traffic demand. Changes in the volume of flow in the peak and inter-peak periods are highlighted in Table 5.6.

Table 5.6: **Changes in the Flow of General Traffic on Newmarket Road between 2017 and 2026**

Time	Direction	Inner Cordon (East of Elizabeth Way)				Outer Cordon (West of Quy Interchange)			
		2017	2026	% Change	Actual Change	2017	2026	% Change	Actual Change
AM peak	Inbound (westbound)	1,144	1,157	1.2%	14	1,523	1,618	6.3%	95
AM peak	Outbound (eastbound)	1,118	1,176	5.2%	58	669	690	3.0%	20
Inter-peak	Inbound (westbound)	1,007	1,103	9.5%	96	593	804	35.6%	211
Inter-peak	Outbound (eastbound)	1,148	1,276	11.2%	129	771	952	23.4%	181
PM peak	Inbound (westbound)	1,131	1,039	-8.1%	-92	807	940	16.4%	133
PM peak	Outbound (eastbound)	1,262	1,190	-5.7%	-72	1,494	1,339	-10.4%	-155

Source: Cambridge Paramics Model

Journey Times

5.7.5 The changes in the volume of traffic will have an impact on the level of stress the network is subject to, and the typical journey times experienced by general traffic. Table 5.7 highlights the changes in journey time along Newmarket Road between the Elizabeth Way roundabout and the Quy Interchange.

5.7.6 The largest increases are anticipated to be for inbound traffic in the evening peak, with the journey times more than doubling to over 20 minutes, without intervention. Outbound journeys in the evening peak will also suffer with an increase of almost 5 minutes, as will inbound trips in the morning peak, increasing by over 3 minutes.

5.7.7 Inter-peak journey times will also rise, albeit to a lesser extent than in the peaks, despite being subject to the largest increase in volumes. This reflects the fact that the network is already saturated in the morning and evening peaks, and only a slight increase in traffic can have a major impact on overall journey times.

Table 5.7: **Changes in Journey Times for General Traffic on Newmarket Road between 2017 and 2026**

Time	Direction	Time (Minutes / Seconds)			
		2017	2026	% Change	Actual Change
AM peak	Inbound (westbound)	13:59	17:11	22.9%	03:12
AM peak	Outbound (eastbound)	09:25	10:14	8.7%	00:49
Inter-peak	Inbound (westbound)	08:21	08:48	5.4%	00:27
Inter-peak	Outbound (eastbound)	08:58	09:39	7.5%	00:40
PM peak	Inbound (westbound)	09:52	20:57	112.2%	11:05
PM peak	Outbound (eastbound)	12:24	17:11	38.7%	04:47

Source: Cambridge Paramics Model

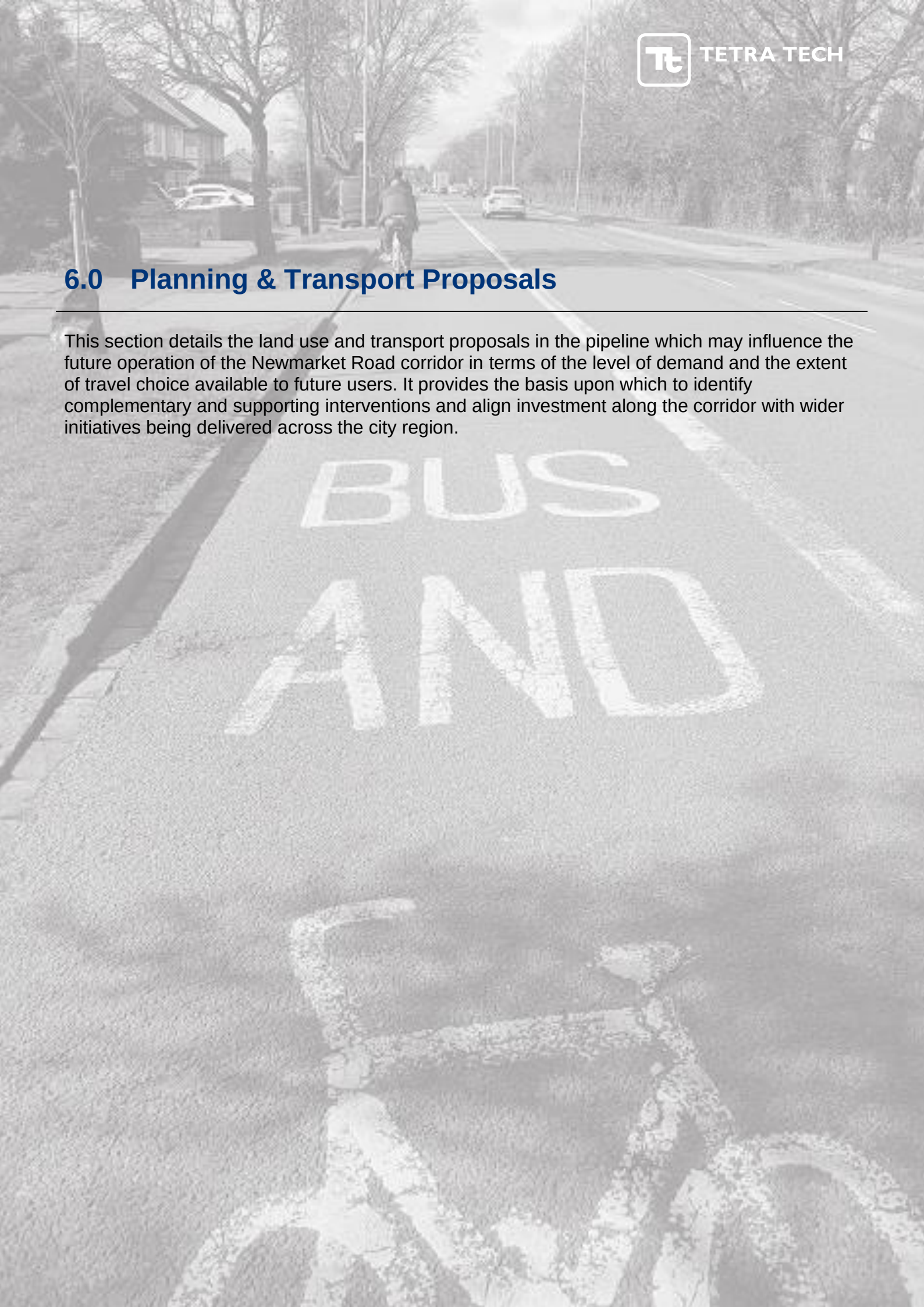
5.7.8 The increase in demand in the 2026 scenario partly reflects background growth in demand but also demonstrates the impacts of sites anticipated to be delivered in the intervening period, including allocations in the Local Plan with planning permission.

5.8 Summary

5.8.1 Newmarket Road and the wider transport network serves a complex web of travel patterns. With large employment provision to the north of the city and to the south, the city centre is not the only destination users of the corridor are seeking to access. This ensures that many trips only use a section of the road before connecting onto the wider network which makes the identification of future public transport improvements a more complex task.

5.8.2 Demand along the corridor is also high throughout the day. The role of Cambridge as a regional, national and international centre for education and healthcare generates a significant number of trips outside of the typical peak periods and from a wider catchment area.

5.8.3 It is clear however that improvements to public transport are needed. There is a high volume of traffic on the local network which manifests itself in the delays and congestion, particularly at peak times, and the lack of competitiveness of bus journey times also highlights how improvements are required to ensure that bus travel is an attractive alternative for many.



6.0 Planning & Transport Proposals

This section details the land use and transport proposals in the pipeline which may influence the future operation of the Newmarket Road corridor in terms of the level of demand and the extent of travel choice available to future users. It provides the basis upon which to identify complementary and supporting interventions and align investment along the corridor with wider initiatives being delivered across the city region.

6.1 Overview

6.1.1 There are a significant number of planning and transport proposals in the pipeline across Cambridge which have the potential to impact upon the operation of Newmarket Road and the wider transport network in the east of the east. Some form direct dependencies relating to the Eastern Access scheme. This section provides an overview of the future context within which improvements will be delivered.

6.2 Cambridgeshire Autonomous Metro

6.2.1 The Cambridgeshire Autonomous Metro (CAM) is intended to form a high-quality mass transit public transportation system for Cambridge and the wider city region. Planned to comprise a network of tunnels underneath the city centre, it is intended to provide fast, direct, frequent and high capacity public transport access into the heart of the city from surrounding towns.

6.2.2 The primary objectives of the CAM are to:

- Promote economic growth and opportunity
- Support the acceleration of housing delivery
- Promote equality
- Promote sustainable growth and development

6.2.3 The central section of the CAM will be underground and is being led by the Cambridgeshire and Peterborough Combined Authority (CPCA). The network will extend beyond the city along four routes at surface level with the development of these sections being led by the Greater Cambridge Partnership (GCP).

6.2.4 In total the network will be around 240km in length. The interface between the underground and surface level networks will through a series of tunnel portals. The exact locations of these are still to be determined.

6.2.5 The CAM will provide a limited stop services, predominantly catering for those travelling into the city from further afield. It will consist of underground sections which are guided (and ultimately fully autonomous), guided surface level sections of segregated busway (semi-autonomous), and regional links along standard carriageways upon which buses would be manually operated.

6.2.6 It is assumed that CAM would run a service frequency of 12 per hour (1 service every 5 minutes) on each corridor during AM and PM peak times, equating to 36 services per hour within the 'city core'. Services are anticipated to operate at half this frequency during the off-peak. Services would run for 18 hours per day (Mon -Sat) and 16 hours per day on Sunday.

6.2.7 The details outlined above may be refined, and the timeframe for the delivery of the CAM set out, in a Programme Business Case, work on which is due to start in April 2021.

6.3 Rail Proposals

6.3.1 There are several rail-based proposals in the pipeline, at various stages of the GRIP process – the framework used by Network Rail for the development of infrastructure projects. Some will have a direct impact on the operation of the Newmarket to Cambridge line, whilst others will see changes elsewhere on the network in and around the city.

New Stations

6.3.2 Network Rail are working on plans for the provision of a new Cambridge South Station[15]. Located next to the Biomedical Campus in the south of the city, the new station will be located on the Cambridge to London line and serve a growing healthcare and employment hub.

[15] https://www.networkrail.co.uk/running-the-railway/our-routes/anglia/cambridge-south-station/

6.3.3 A preferred location for the station has been identified adjacent to the guided busway. Network Rail intends to apply for a Transport and Works Act Order to the Secretary of State for Transport in 2021, and subject to gaining consent, work could start on the station in 2023 with it opening in 2025.

6.3.4 Elsewhere, new railway stations at Cherry Hinton and Fulbourn have also been listed within Cambridgeshire County Council's Transport Investment Plan although it is still to be determined whether such schemes will be progressed in the future.

Enhanced Capacity at Cambridge Station

6.3.5 Proposals are advancing for the provision of additional capacity at Cambridge Station with the provision of two new platforms. The station is subject to high demand, and this is anticipated to increase further in the future. However, the growth in patronage would be limited by the lack of platform capacity. Proposals contained within the Cambridgeshire Corridor Study produced by Network Rail in 2019 detail the scope to provide new platforms to address this issue.

6.3.6 Access to and from the station could also be enhanced through the provision of a new eastern access, but the concept is still at an early stage.

Network Improvements

6.3.7 Alongside the provision of new and enhanced capacity stations on the network, line improvements are also proposed in the Cambridge area that will further increase capacity and reliability of service provision. The most advanced and strategically important of these are those associated with East-West Rail and confirmation that the Central Section of the link between Oxford and Cambridge will travel between Bedford, between St Neots and Sandy, and enter Cambridge from the south via Cambourne[16]. Further consultation on a specific route alignment was launched in March 2021

6.3.8 Beyond Cambridge, the requirements of the route further east is also progressing with consultants Steer appointed in the summer of 2020 to develop a business case for infrastructure requirements through to Norwich and Ipswich to cater for both future passenger and freight demand. This is likely to include the need for the double tracking of the line between Cambridge and Newmarket, a scheme identified in Network Rail's Cambridgeshire Corridor Improvements Study from February 2019.

6.4 Highway Proposals

A14 Improvement Scheme

6.4.1 The £1.5bn A14 Cambridge to Huntingdon improvement scheme includes a major new bypass to the south of Huntingdon and upgrades to 21 miles of the A14[17]. Work officially started in November 2016 and the new road opened in May 2020[18] providing capacity improvements to this strategically important east-west link.

Coldham's Lane

6.4.2 Plans are progressing which could see the reconfiguration of the Coldham's Lane – Brooks Road – Barnwell Road roundabout into a more pedestrian and cycle friendly junction, although there is currently no commitment to delivery. Alongside these works, the suitability of a modal filter is being considered for the road as part of the second tranche of COVID-19 transport measures being funded by Central Government.

16 https://eastwestrail.co.uk/the-project/central-section

17 https://highwaysengland.co.uk/a14-cambridge-to-huntingdon-improvement-scheme-about/

18 https://highwaysengland.co.uk/our-work/a14-cambridge-to-huntingdon/about-the-scheme/

6.5 Walking & Cycling Proposals

Chisholm Trail & Other Greenways

6.5.1 The Chisholm Trail will provide a new walking and cycling route, creating a mostly off-road and traffic-free route between Cambridge Station and the new Cambridge North Station. It will link to Addenbrooke's Hospital and the Biomedical Campus in the south and to the business and science parks in the north. In all the full trail provides a 26km route from Trumpington and Addenbrookes to St Ives. The central section from Cambridge Station to Cambridge North Station, which this project deals with, is a 3.5km route.

6.5.2 The north-to-south route which closely follows the railway line, provides a quicker and safer route across Cambridge. It would be largely off-road or along quiet streets, avoiding busy junctions and would link up green spaces in Cambridge including: Coldham's Common, the Leper Chapel Meadows and Barnwell Lake area, with Ditton Meadows (as well as Stourbridge Common beyond).

Fulbourn Greenway

6.5.3 The existing Tins path is proposed to be upgraded as part of delivering the Fulbourn to form a segregated, 4m wide, footway cycleway link. The current route connects Brookfields (east end of Mill Road) to Orchard Estate in Cherry Hinton. A new bridge over the railway line will form part of the proposals to ease the existing pinch point.

Mill Road Corridor Improvements including Railway Bridge for Cyclists

6.5.4 The Mill Road corridor runs east west between the A1134 Brooks Road and A603 East Road, traversing the railway line via a narrow bridge with footways on either side. Corridor improvements with associated junction works have been identified as a package of measures to be delivered within the Transport Strategy for Cambridge and South Cambridgeshire. The package includes options to provide a new high-quality footway-cycleway bridge over the railway line to the north of Mill Road. Option identification has not been undertaken yet.

Mercers Row Cycle Improvements

6.5.5 Cycle lane provision will be provided in both directions to allow for two-way cycle flow along this one-way street. This will facilitate an accessible route from Riverside towards the Barnwell estate.

Chesterton Road Roundabout Cycle Improvements

6.5.6 The Queen Elizabeth Way / Chesterton Road roundabout junction has been identified for cycling improvements.

Riverside Improvements

6.5.7 Proposals to improve the east-west Riverside corridor to the north of Newmarket road (adjacent to the River Cam) have been listed within the Transport Investment Plan. Whilst studies have yet to commence, this route could be greatly improved for cyclists through on-street parking demand management, public realm improvements and potentially full pedestrianisation (with cycle access).

East Road Corridor Improvements

6.5.8 The A603 East Road is a key orbital link that forms part of the Cambridge city inner ring road. East Road connects the Queen Elizabeth Way roundabout to the A1307 signal junction at Regent Street / Hills Road, providing access to several major destinations, not least Anglia Ruskin, Cambridge Crown Court and the Grafton Centre.

6.5.9 At present, the road is heavily trafficked with movement priority given to vehicles. This has resulted in a dominating landscape that alienates pedestrians and cyclists, and results in heavy congestion that has an adverse effect on public transport, not least the Newmarket Road Park and Ride bus service.

6.5.10 The corridor has been identified for major improvement within the Transport Investment Plan, which will seek to reallocated road space to facilitate better public transport access as well as walking and cycling connectivity. Whilst there is no strategy in place at this moment in time, a vision for the northern section of the corridor is contained within the Eastern Gate SPD, with the St Matthew's Street and Queen Elizabeth Way junctions identified as major focuses for significant improvement.

Developer Funded Improvements

6.5.11 A series of improvements to existing infrastructure and service provision are set to come forward through the securing of developer contributions associated with the granting of planning permission for several sites detailed in Section 5.3. These include:

- A contribution of £250,000, associated with the Marleigh development to the north of Newmarket Road, to support bus service provision, which is envisaged to support a new north-south orbital service between the development and Addenbrookes Hospital.
- Contributions towards the Jubilee Widening Improvements scheme and Stourbridge Common Bridge.
- Access from Land North of Cherry Hinton along Coldham's Lane and via the Nuttings to Coldham's Common and the Chisholm Trail.

6.6 Covid-19 Experimental Schemes

6.6.1 As part of the need to reconfigure and rethink transport networks in the light of the Covid-19 pandemic, in May 2020 the DfT updated advice contained within the Network Management Duty Guidance of the Traffic Management Act (2004), to enable local authorities to reallocate road space to pedestrians and cyclists.

6.6.2 Subsequently a series of schemes were identified for the Cambridge area. In terms of access into the city from the east the following interventions were proposed:

- Newmarket Road: Cone or barrier off on-road cycle lanes.
- Newmarket Road: Temporary bi-directional on-road segregated cycle lane on outbound carriageway.
- Elizabeth Way and Newmarket Road: Temporary bi-directional on-road segregated cycle lane between St Andrews Road junction on Elizabeth Way and Abbey Street crossing on Newmarket Road. Widen footway and remove guard railing on the footway adjacent to the cycle way at the roundabout.
- East Road between Newmarket Road and Mill Road: Cone off on-road cycle lanes where possible. Remove guard rail Mill Road / East Road junction.
- Coldham's Lane: Modal filter or investigate alternative measures if not feasible.
- Mill Road: Temporary bus gate installation at the existing railway bridge to prohibit the throughflow of general traffic.
- East Road, Newmarket Road, Elizabeth Way: Look to shrink entries / exits / circulatory areas to reduce speeds to improve safety, particularly for cyclists and pedestrians, whilst traffic flows are reduced.
- Newmarket Road, Barnwell Road, Wadloes Road: Look to shrink entries / exits / circulatory areas to reduce speeds to improve safety, particularly for cyclists and pedestrians, whilst traffic flows are reduced.

6.6.3 Whilst most of these measures were proposed on a temporary basis, it provides a basis for their potential longer term, permanent adoption whilst a second tranche of changes is being considered.

6.7 Land Use

6.7.1 The Joint Greater Cambridge Local Plan covering Cambridge and South Cambridgeshire is currently in development. As such there is uncertainty in terms of the totality of sites anticipated to come forward in the east of the city and beyond, which will influence travel patterns, demands and pressures on the Newmarket Road corridor.

6.7.2 Notwithstanding the current uncertainty, there are several sites with planning permission in place, and others which can be deemed to have a high probability of emerging over the coming years. These are detailed below.

Cambridge Airport

6.7.3 Cambridge Airport has been identified as a site for potential redevelopment on a significant scale. The owners of the airport, Marshall Aerospace and Defence Group (MADG), are looking to relocate and free up the site for the provision of up to 12,000 new dwellings and creation of almost 40,000 new jobs on the 271ha site, alongside new civic, cultural, educational and other supporting uses.

6.7.4 Whilst the site is safeguarded but not currently allocated in the respective Cambridge and South Cambridgeshire Local Plans, it has been identified as a site for major change and an Area Action Plan is in place which provides a framework for how it could be redeveloped. The latest proposals from Marshall extend beyond the safeguarded land.

6.7.5 The site is only likely to be deliverable at the proposed scale if supported by high quality, high capacity public transport provision, with connectivity to the city centre and station integral to its success.

Land North of Cherry Hinton

6.7.6 Outline planning permission was granted in 2020 for a maximum 1,200 dwellings (including retirement living facility, a local centre, primary and secondary schools, community facilities, open spaces, allotments, landscaping and associated infrastructure on land to the north of Cherry Hinton. The development will be focused on a new link road between Cherry Hinton Road and Coldham's Lane, designed to accommodate local movements as opposed to forming a bypass of the new community.

Marleigh (Land North of Newmarket Road)

6.7.7 The Marleigh development on land to the north of Newmarket Road, adjacent to the Park and Ride site, was granted planning permission for the creation of a new community in 2019. The urban extension will comprise up to 1,300 homes, a primary school (for 400 children), food store, community facilities, open spaces, landscaping and associated infrastructure[19].

6.7.8 It will be accessed via two new junctions on Newmarket Road, with no access from High Ditch Road, whilst cycle links will be provided into the Fison Road Estate, including through the extension of the Jubilee Cycleway and use of the former Cambridge to Mildenhall rail line.

Land South of Coldham's Lane

6.7.9 Whilst there is currently no planning permission in place, the land to the south of Coldham's Lane is identified as an 'Area of Major Change' in the current Cambridge Local Plan. The site is owned by the Anderson group, who undertook consultation in Autumn 2018 to identify the type of development residents would like to see[20]. To date there is no masterplan in place but consultation on a vision commenced in 2021.

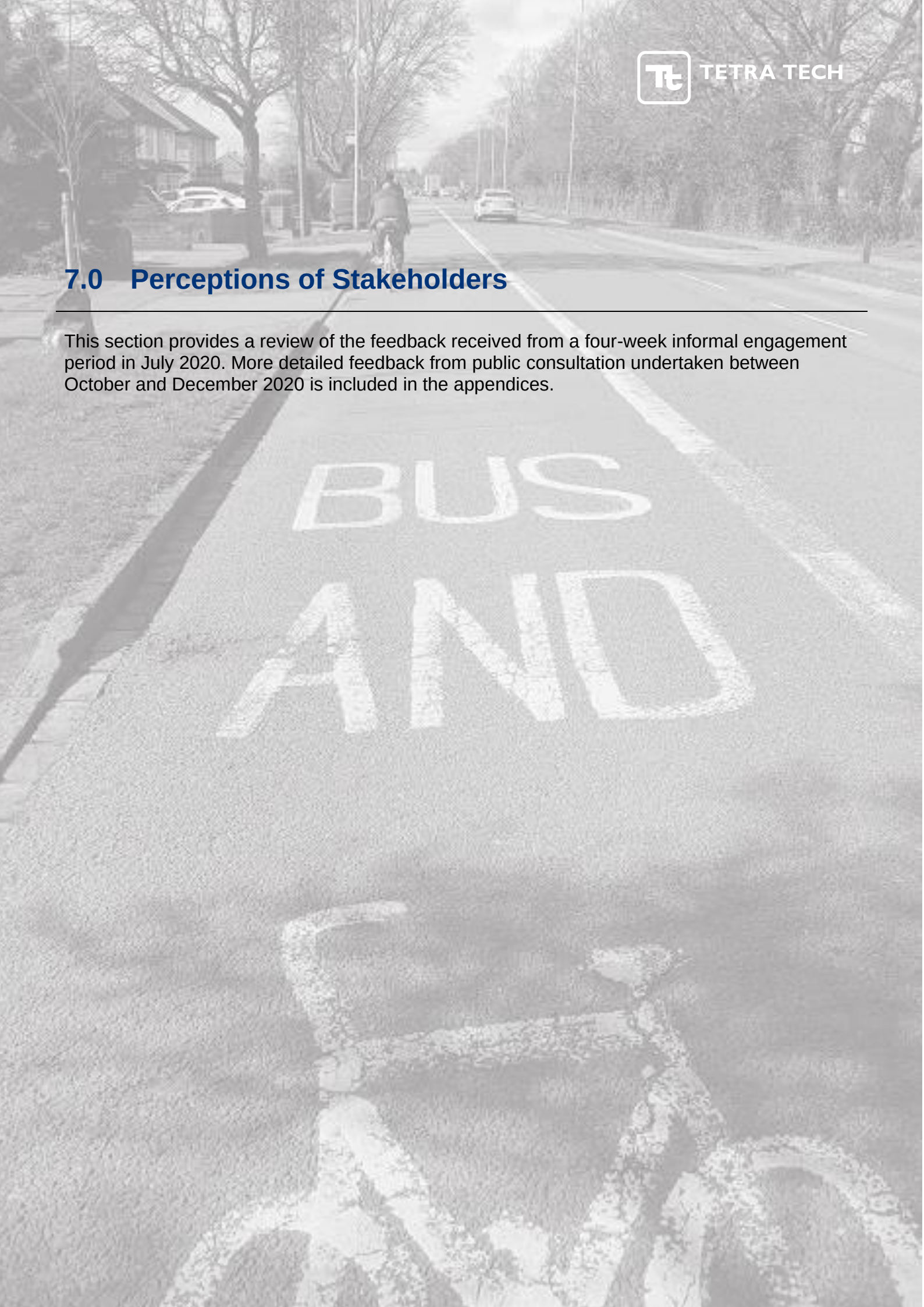
6.8 Summary

6.8.1 A significant amount of investment is earmarked for the transport network in and around the east of the city, and it is important that interventions on Newmarket Road complement these schemes. In addition, the large-scale development opportunities likely to emerge through the Local Plan, and those already with a high degree of probability in coming forward will change the context within with improvements are provided.

6.8.2 The increase in demand and change in travel patterns and behaviours they will influence need to be understood to ensure that the Cambridge Eastern Access scheme is future proofed and resilient to provide the capacity and connectivity to facilitate growth.

[19] https://marleigh-cambridge.co.uk/

[20] https://www.landsouthofColdham'slane.co.uk/



7.0 Perceptions of Stakeholders

This section provides a review of the feedback received from a four-week informal engagement period in July 2020. More detailed feedback from public consultation undertaken between October and December 2020 is included in the appendices.

7.1 Overview

7.1.1 The Greater Cambridge Partnership has sought to engage with stakeholders and the general public, and several co-ordinated activities were programmed through which to capture the views, opinions and perceptions of interested parties. An Engagement Summary Report has been produced as part of a suite of documents to support the SOBC process. This section provides a high-level overview of the Report. It touches on the need for engagement and the activities and timing of the activities undertaken, along with an analysis of the quantitative and qualitative feedback received.

7.2 Need for Engagement

7.2.1 The engagement process has been undertaken to meet several objectives, as follows:

- To provide all relevant stakeholders with clear, well-structured details of the GCP vision, project objectives and possible options, as well as being clear about what this project will not cover.
- To create opportunities for stakeholders to express their opinions and encourage the opportunity to impact the outcomes of the project freely and openly.
- To use an appropriate methodology for collecting the stakeholder responses and analyse them.
- To ensure wide feedback across the relevant areas to assist in decision making.
- To create a consistent message across all projects to ensure stakeholders are aware that the access to Cambridge from the east is part of a wider vision set forward by the GCP.
- To identify advocates for the project.
- To manage any reputational risks associated with the project.
- To raise the profile of the GCP and its work.

7.3 Activities

7.3.1 Engagement and consultation to inform the study was undertaken in two main parts: the first comprised an informal engagement period between January 2020 and August 2020, and the second comprised more formal consultation between October 2020 and December 2020. The specific activities undertaken as part of the engagement are detailed in Table 7.1.

Table 7.1: Engagement & Consultation Activities

Date	Activity
Part 1: Informal Engagement	
January 2020	• One to One Meetings with Stakeholders
31 January 2020	• Park & Ride User Survey
11 March 2020	• Accompanied Cycle Ride / Site Visit with Cambridge Cycling Campaign
1 July 2020	• Interactive Online Workshop with Members and Parish Councils
2 July 2020	• Interactive Online Workshop with Stakeholders
July 2020	• One to One Meetings with Stakeholders
6 July to 3 August 2020	• Four Week Informal Online Engagement Process Commences via ConsultCambs platform
6 July to 3 August 2020	• Promotional social media campaign on Twitter, Facebook and LinkedIn
Part 2: Formal Consultation	
2-25 October 2020	• Pre-consultation warm-up on social media
21 October 2020	• Pre-consultation briefing for local members
22 October 2020	• Pre-consultation briefing for local members
28 October 2020	• Consultation briefing for local members
26 October – 18 December 2020	• Eight week online consultation commences on ConsultCambs
26 October – 6 November	• 23,000 consultation booklets to all homes and business in East Cambridge
26 October – 18 December	• Newspaper adverts in Cambridge News, Cambridge Independent, Newmarket Journal

Date	Activity
26 October – 18 December	• Posters at Newmarket Road Park and Ride and Newmarket, Dullingham and Cambridge Railway station.
26 October – 18 December	• Information material sent to all Parish councils and schools in study area for onward promotion on Parish Websites and parent mail.
19 November 2020	• Online consultation event on Zoom for stakeholders and the public (briefing session)
26 November 2020	• Online consultation event on Zoom for stakeholders and the public (bookable one-to-one timeslots)
9 December 2020	• Twitter Q&A for stakeholders and the public
26 October – 18 December 2020	• Promotional social media campaign on Twitter, Facebook and LinkedIn
26 October – 18 December	• Meetings with parish councils, stakeholders and interest groups

7.3.2 The ConsultCambs consultation and engagement platform [21] formed the focal point of the engagement activity with regular updates provided, including a promotional video. A consultation leaflet was also sent to over 20,000, and its content is illustrated in Figure 7.1.

7.4 Feedback from Local Authorities

7.4.1 The Greater Cambridge Partnership works closely with the Cambridgeshire and Peterborough Combined Authority (CPCA), Cambridge City Council, South Cambridgeshire District Council and Cambridgeshire County Council in the development of planning and transport proposals.

7.4.2 As the local transport authority, the Cambridgeshire and Peterborough Combined Authority provided their views from a network management perspective. Key areas of concern were highlighted as:

- The need for bus lane enforcement due to the number of infringements along the corridor.
- A recognition that the number of side roads undermined the effectiveness of the existing bus lanes.
- The potential demand for an orbital bus service between the north and south of the city.
- The implications of a relocation of the Park & Ride site.

7.4.3 Local councillors expressed concerns regarding the need to protect the Meadows, whilst feedback was also received from local authority officers and parish councils.

7.4.4 Discussions with these partner organisations have emphasised the need for the continued alignment of investment, and any measures to be taken forward through the Cambridge Eastern Access Study should complement the emerging Cambridgeshire Autonomous Metro proposals.

7.4.5 The local authorities are partners in the East-West Rail Consortium which has commissioned a review of the potential to upgrade the Cambridge to Newmarket railway line.

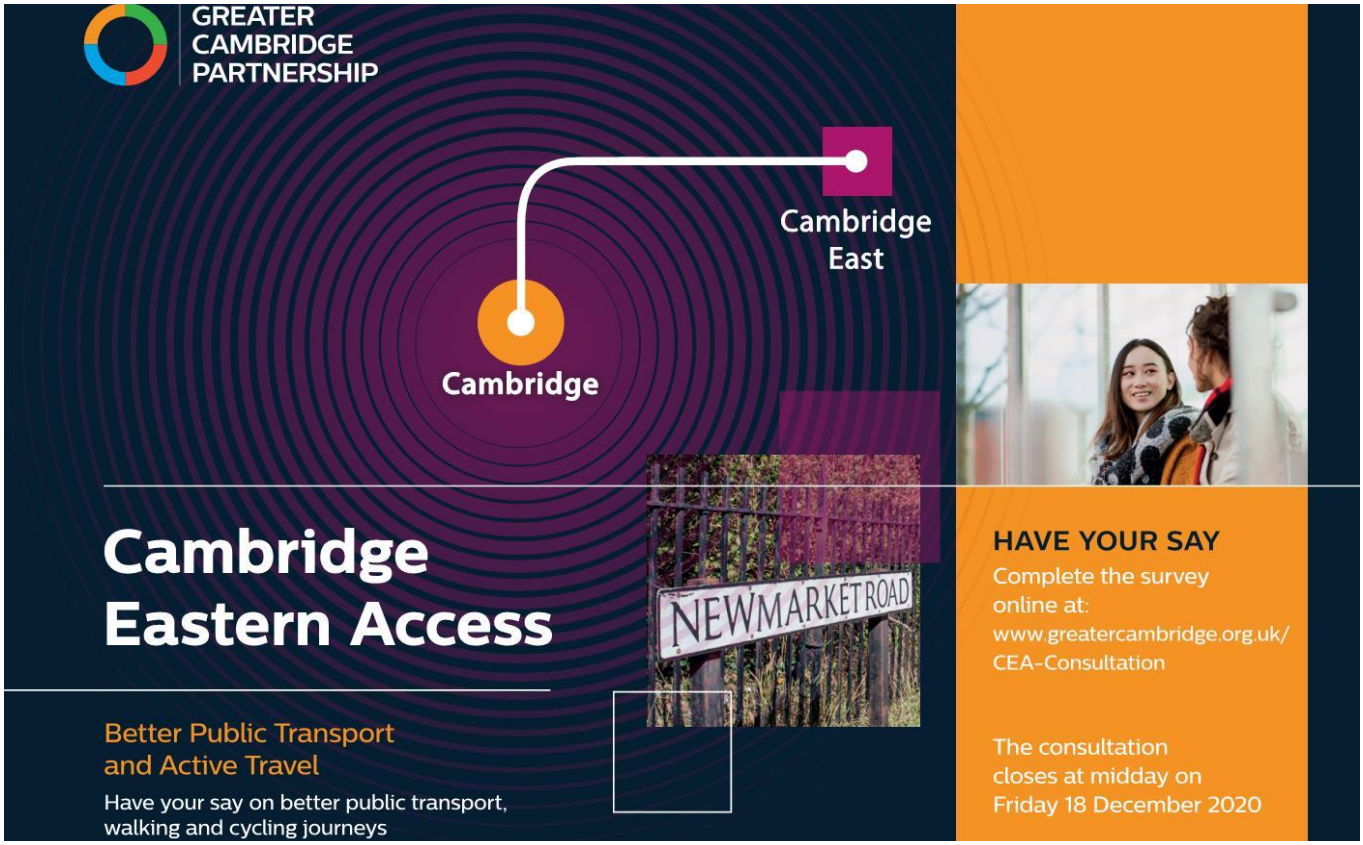
7.5 Feedback from Highway Authorities

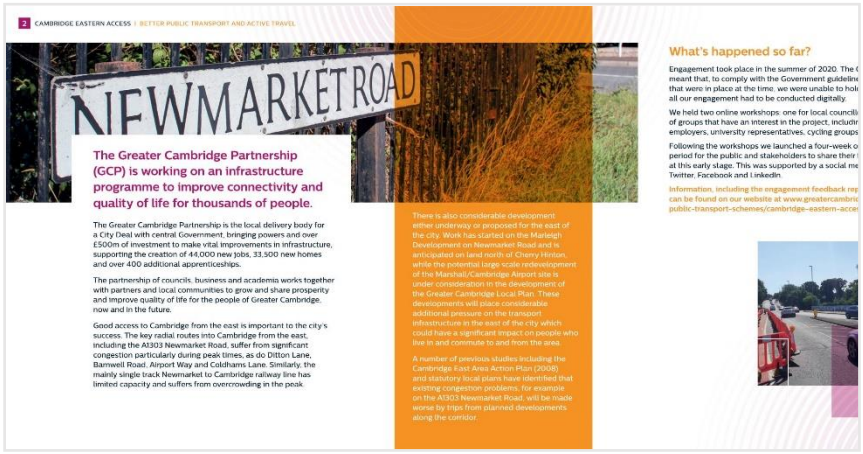
7.5.1 Highways England and Cambridgeshire County Council are the strategic and local highway authorities respectively and have a duty to maintain the safe and efficient operation of their networks. This remit formed the basis to both organisations' input to the engagement process.

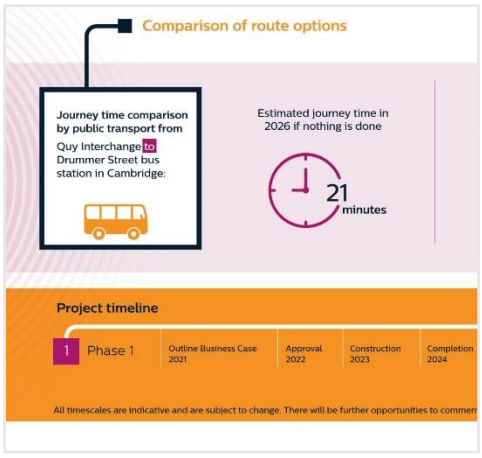
7.5.2 Regarding Highways England, the nationally important A14 runs parallel to Newmarket Road and skirts the northern edge of the study area. It was stated that any interventions within the study area need to ensure that the functioning of neither J34 nor J35 is impeded, whilst any measures which can be demonstrated to reduce pressure on the network would be welcomed.

[21] https://consultcambs.uk.engagementhq.com/cambridge-eastern-access

Figure 7.1: Images of the Consultation Material Issued







7.6 Feedback from Bus Operators

The main bus operator along Newmarket Road, including the provider of the Park & Ride services, is Stagecoach and they provided an insight into operational issues along Newmarket Road supplemented by data of journey times from their scheduled services.

7.6.1 Specific areas of discussion focused upon:

- The piecemeal approach to bus priority along the corridor.
- Service timings and areas of delay.
- The appropriateness of the location for the Park & Ride.

7.7 Feedback from the Rail Industry

7.7.1 The potential role of rail in a multi-modal approach to accommodating travel demand into Cambridge from the east was explored with representatives from key players at Network Rail, train operating company Greater Anglia, the East-West Rail Consortium, the East-West Rail Company and interest group Rail Futures.

7.7.2 Key issues highlighted in the discussions focused upon:

- The scope for additional line capacity.
- The scope for additional platform capacity at Cambridge Station.
- The ability to increase service frequencies with and without the additional capacity.
- The strategic benefits of improvements to the east of the city.
- The local benefits of improvements to the east of the city.
- The potential for new stations between Cambridge and Newmarket.
- The ability to access Cambridge Station (on foot and by bus/bike).
- Linkages to Cambridge North Station.
- The implications for the study area of the opening of Cambridge South Station.
- The implications of new development on the future demand for rail-based travel, and
- The implications of East-West Rail.

7.7.3 These wide-ranging discussions demonstrate the potential benefits of a fit-for-purpose rail connection between Cambridge, Newmarket, Bury St Edmunds and Ipswich, but that the complexities and hurdles which must be overcome at both a local and strategic level would be significant and potentially expensive.

7.7.4 Notwithstanding such concerns, it was clear that there was broad support for further exploring the opportunities within the study and as part of the wider East-West Rail Consortium's remit.

7.8 Feedback from Developers

7.8.1 In advance of the adoption of the emerging Greater Cambridge Local Plan, there are several large-scale development opportunities within the east of the city and further afield which are under consideration.

7.8.2 To provide due diligence, but without compromising the planning process, discussions were held with the Marshall Group which owns and operates Cambridge Airport and L&G Estates, which has an interest in a strategic site at Six Mile Bottom, to understand how their aspirations may influence the future travel patterns and demand in the study area.

7.8.3 Whilst both sites are very different in nature, both promoters see the opportunities presented by investment in sustainable mass transit improvements to the east of Cambridge, in the form of either the Cambridgeshire Autonomous Metro and/or rail-based enhancements to the Newmarket to Cambridge line.

7.9 Feedback from Transport Interest Groups

7.9.1 Cambridge benefits from several very active transport orientated interest groups and both the Cambridge Cycling Campaign and Smarter Cambridge Transport were engaged as part of the early and informal engagement process.

7.9.2 Several themes emerged from these discussions, with the most substantive points being:

- A recognition that the Newmarket Road corridor is the least well catered for route into the city from a sustainable transport perspective.
- As well as the corridor in general, key junctions are poor in terms of their provision for pedestrians and cyclists, not least the Elizabeth Way roundabout and Barnwell Road roundabout.
- Cyclists should be segregated from both general traffic and buses where possible. An attractive cycle corridor along the River Cam does not compensate for the inadequacies and lack of safety on Newmarket Road itself.
- Given the lack of physical space to accommodate all modes of transport safely and effectively, demand management techniques should be explored to better regulate flow and enable a reallocation of road space to sustainable transport users where possible.
- The current location of the Park & Ride is inappropriate and there is the scope to consider locating it further east and closer to the junction with the A14.
- The future operation of Mill Road should be explored. It is a destination in its own right and is not appropriate for large buses. Priority should be given to pedestrians and cyclists.
- The opportunities presented by a realignment of the Cambridge to Newmarket line, not just from a rail perspective but in terms of localised walking and cycling improvements and the removal of the existing level crossings.

7.9.3 Encouragingly, both groups committed to working with the GCP in the development of the optimum solution for the corridor.

7.10 Feedback from Other Interest Groups

7.10.1 During the informal engagement period representations were submitted by other interest groups with an interest in the future of the Newmarket Road corridor and wider study area. Both Cambridge Past, Present and Future (CPPF) and the National Trust are landowners and property owners who value the heritage of the city.

7.10.2 Both parties indicated an understanding of the current pressures the highway network is subject to and a desire to see improvements in terms of the provision of realistic alternatives to the car, albeit in a way which does not compromise key landscape and built heritage assets of the city. CPPF also highlighted that:

- Two significantly important green corridors in the study area: (1) The River Cam corridor, which includes Stourbridge Common, Ditton Meadows and the village of Fen Ditton, and (2) The green corridor that runs from the River Cam, Ditton Meadows, Coldham's Common, Cambridge Airport and into the fens on the western edge of Cambridge. CPPF would be opposed to the development of large and damaging engineering schemes in these corridors, however they consider there are opportunities for these green corridors to provide better facilities for walkers and cyclists.

- Little Wilbraham Fen Site of Special Scientific Interest and surrounding wetland is a nationally important wildlife site which is a site for one of the rarest breeding birds in the UK (and one that is prone to disturbance and requires large areas of undisturbed space).

  CPPF would be strongly opposed to any developments which would have direct or indirect impacts on this important site. For example, the location of a Park & Ride facility nearby. Any such development may also face opposition from government agencies and the local planning authority.

7.10.3 Responses were also submitted by Fen Ditton Parish Council, the British Horse Society and Historic England.

7.11 Feedback from the General Public

7.11.1 A four-week informal engagement period commenced on 6 July and concluded on 3 August 2020 during which time the general public could provide their first thoughts on the issues and opportunities within the study area. Around 72% of respondents who provided their postcode live either in the study area or to the east of Cambridge. In total:

1,172	People visited the project website. Of these, 55% of visitors (643 people) visited more than one page, viewed the Frequently Asked Questions (FAQ) section or contributed to the mapping tool.
136	Participants who either filled in a survey or used an interactive map to place pins with their comments and suggestions.
299	Individual comments made utilising the interactive mapping function on the website, with 'pins' dropped in the appropriate locations for which issues were a concern.
112	Survey responses were received in relation to questions posed on the ConsultCambs website, focusing on issues and constraints in the study area, as well as features individuals would like to see improved.

7.11.2 Whilst the feedback received was wide ranging, the comments received could be categorised within the three broad objectives of the study, namely:

- **Capacity** – Provide the public transport capacity to accommodate the projected increase in travel demand associated with housing and employment growth.
- **Connectivity** – Improve accessibility to jobs and opportunities by public transport and active travel modes through a reduction in journey times and increased ease of interchange and align with the emerging Cambridgeshire Autonomous Metro.
- **Communities** – Contribute towards the creation of safe and attractive communities by reducing emissions and the dominance of traffic, particularly in residential areas.

7.11.3 The comments provided by the general public on ConsultCambs targeted all three objectives, with 'pins' in relation to creating safe and attractive communities the most prevalent (192 comments), followed by those in relation to connectivity (125 comments) and capacity (71 comments).

7.11.4 There were other comments however that critiqued the existing provision within the study area and as such these things hindered capacity, connectivity and community. There were 37 comments that noted that the existing provision had a negative impact on community, whilst connectivity and capacity both received 20.

7.11.5 Some 61 comments made online provided a critique of existing provision within the study area. These comments mostly focused on the inadequacy of infrastructure, such as cycle paths, bridges, junction arrangements or pedestrian crossing facilities. Other issues that were raised included overgrown vegetation, flooding, parking and safety.

7.11.6 In terms of the scope to improve existing provision, 107 comments were received associated with infrastructure and services within the study area. In a similar fashion to the critiques made, many of the comments focused on improving infrastructure such as cycle lanes, carriageway surfacing and junction arrangements.

7.11.7 Comments made with regards to new solutions were dominated by pedestrian-cycle infrastructure, with 70 out of the 129 comments received referring to new cycle lanes/paths, new pedestrian-cycle crossings, or new pedestrian-cycle routes. The most expressed concern of respondents in terms of using public transport is the lack of convenient connections. Poor accessibility to a bus and no direct route to their destination was mentioned 30 times (34% of people answering the question) in the feedback received.

7.11.8 People don't feel comfortable cycling in heavy traffic, with fast vehicles passing them, and they have concerns about conflicts between pedestrians and cyclists. Many people are disappointed by the quality of surfacing and the poor maintenance of both cycleways and footways.

7.11.9 Some people mentioned the importance of a fully connected cycle network with no gaps. Several horse riders, who feel overlooked, also expressed their concerns regarding problems for equestrians.

7.11.10 About half of the respondents want to see safe cycle infrastructure as a priority. Bus improvements, such as bus gates, better bus lanes and more convenient bus routes, were mentioned by 14 people (14%). Only six respondents expressed support for a tram network or monorail, whilst there were views that a radical rethink of the entire transport system is needed.

7.11.11 When asked about what should be avoided or treated with caution in terms of areas of investment, concerns associated with the negative impact on the environment were raised on several occasions. Most people mentioned this vaguely and said that the green belt must remain intact, felling trees should be avoided and any green areas and countryside should be protected.

7.11.12 Amongst other issues to ensure, respondents referred to concerns associated with poor bus provision (7x), not to be anti-car as it should be respected that some people still need to drive (5x), or in creating more congestion and worsening the already poor traffic conditions (4x). Some people, on the other hand, warned against being focused on cars and improving the situation for them (4x).

7.11.13 Specifically, with regards to active travel, it was felt that combined bus and cycle lanes should be avoided as well as shared use paths. Cycle lanes which are only 'painted' on the road were also viewed in a negative light. Whilst some warn against 'incomplete' routes, others argue that if any further delay is caused by something not being 100% perfect, it should be avoided. Those who ride horses said that they don't want to be overlooked again.

7.11.14 Most respondents felt that there is a big opportunity to improve bus services in the area. Included within the feedback was a suggestion that more direct/orbital services could be provided so that passengers wouldn't always have to go to the city centre first. Suggestions to increase frequency and introduce early/late/weekend services were mentioned multiple times as well as measures to improve reliability. Cheaper/subsidised buses and greener/electric buses would be welcome too.

7.11.15 The public's suggestions regarding active travel improvements were dominated by calls for safe cycle infrastructure which were mentioned by half of the respondents. This was felt to be in the form of wide lanes, fully segregated from traffic, buses and pedestrians. They should form a connected network without exposing riders to dangerous situations at junctions. The need for a pleasant environment and smooth surfacing were also stipulated.

7.11.16 In terms of other suggestions, many people reiterated their concerns discussed in previous questions. Some people would like to see the Council taking action to discourage car use by introducing a congestion charge, zero emission zone or limit access to the city in the morning peak hour for non-residents. A possible relocation of the Newmarket Road Park & Ride further to the east and improvements to the A14 Quy junction were also mentioned.

7.12 Stakeholder Engagement Consultation

7.12.1 The Cambridge Eastern Access public consultation ran for eight weeks from 26 October to midday on 18 December 2020. It followed a period of public engagement in the summer of 2020 and subsequent approval from the Greater Cambridge Partnership Executive Board to move ahead with the project in October 2020.

7.12.2 The consultation sought views at an early stage from stakeholders and the public on potential options to improve transport to the east of the city. The five options were as follows:

- Option A1: Newmarket Road improvements
- Option A2: Newmarket Road improvements plus Park & Ride relocation
- Option B1: High Quality Public Transport Route via Coldham's Lane
- Option B2: High Quality Public Transport Route via The Tins
- Option B3: Long term rail opportunity

7.12.3 Due to the Covid-19 pandemic the consultation took a ‘digital by default’ strategy with all activity online:

- All information, including a survey, frequently asked questions and an introductory video, was available on a dedicated page on ConsultCambs, our engagement and consultation platform.
- The Cambridge Eastern Access page on our website was updated with information about the consultation.
- A social media campaign ran across our Twitter, Facebook and LinkedIn pages to encourage people to respond. We also used it to publicise the consultation and our online events.
- Bulletins were sent to around 1,500 people via our online mailing system, GovDelivery.

7.12.4 In addition, over 22,000 hard copy consultation brochures were distributed to homes and businesses in the area. To enable people without internet access to respond to the consultation we posted out a hard copy of the online survey on request.

7.12.5 Adverts were placed in the local press, including the Cambridge News and Newmarket Journal, which appeared in print and online at various points during the consultation period. A press release was also issued at the start of the consultation and was picked up in local newspapers.

7.12.6 We contacted Parish Councils in the area and offered to advertise in their parish magazine. This was taken up by Swaffham Parish Council in the Swaffham Crier. In addition, all schools within the wider study area were contacted and asked to promote the consultation via their parent mail system.

7.12.7 We advertised on Cambridge 105 radio via a joint advert with another GCP consultation to help raise awareness. The advert ran for a period of three weeks and was accompanied by a separate interview which explained the projects.

7.12.8 Advertising space at the Newmarket Road Park & Ride site and at Newmarket, Dullingham and Cambridge railway stations was booked for the eight weeks of the consultation.

7.12.9 In normal circumstances we would have held face to face events where people could find out more about the project and the options. However, due to the ongoing Covid-19 outbreak, it was not possible. To provide an opportunity for people to raise issues and ask questions we arranged and publicised online public events:

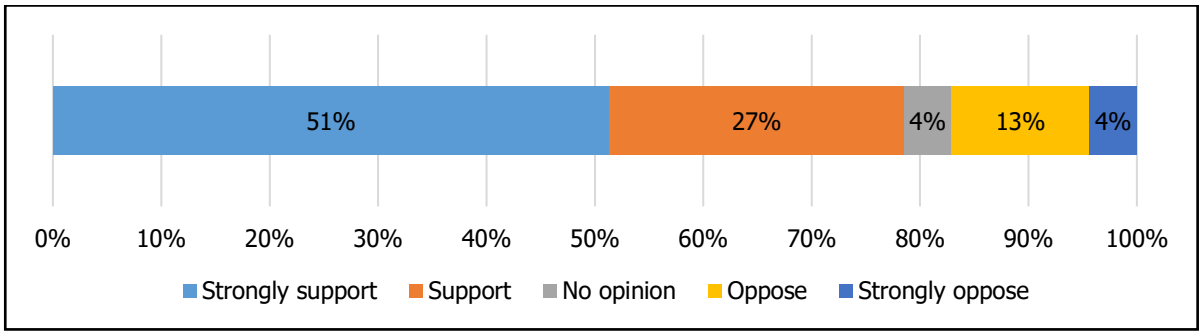
- A Zoom webinar, primarily about the CEA consultation but which also covered other GCP projects relevant to the area. This took the format of a presentation followed by a Q&A with the project team.
- A Zoom Q&A where members of the public could book a 10-minute slot to ask their specific questions of the project team.
- A Twitter Q&A where people could tweet their questions to the project team.

7.12.10 As well as our own meetings we attended virtual meetings set up by other groups as requested during the consultation period. These are included below:

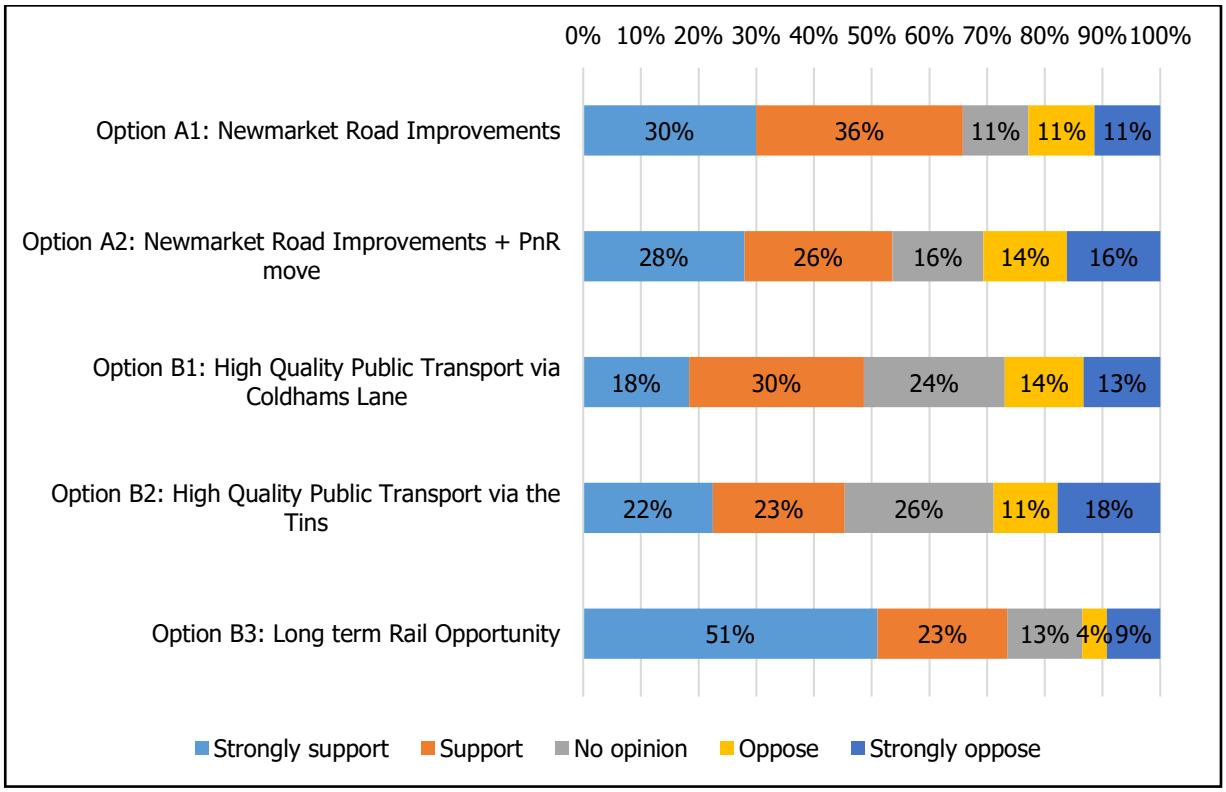
- A to B1102 Transport Group
- Abbey People
- Coldham's Lane Residents' Association
- East Area Committee
- Great and Little Wilbraham and Six Mile Bottom Parish Council
- Romsey residents, set up by Romsey councillors
- Teversham Parish Council
- Transport Strategy Team

7.12.11 Formal analysis of the survey responses, social media responses and other written submissions from stakeholders and the public has been undertaken by Cambridgeshire County Council's Business Intelligence Unit. A detailed report of Consultation Findings is published alongside the SOBC. The key findings of this piece of work are:

- The majority of respondents (79%) supported the proposal to improve public transport and associated active travel routes into Cambridge from the East of the city.



- All Options considered were supported by a majority of respondents expressing an opinion on that option. Three of the five proposed routing options were supported by the majority of respondents ('Option B3: Long term Rail Opportunity', 'Option A1: Newmarket Road Improvements', 'Option A2: Newmarket Road Improvements + PnR move'). Just under half of respondents (48% and 45% respectively) supported the two other routing options 'Option B1: High Quality Public Transport via Coldham's Lane' and 'Option B2: High Quality Public Transport via the Tins'.



- The majority of respondents indicated that access to 'Cambridge City Centre shops and businesses'; 'Cambridge Main Railway Station'; 'Addenbrooke's/Cambridge Biomedical Campus'; 'Beehive Centre and other shops on Newmarket Road' be given 'somewhat high' or 'very high' priority on the route.

- Two fifths of respondents indicated that ‘access to Cambridge Science Park’ was a ‘somewhat high priority’ or ‘very high priority’
- The majority of people thought that ‘Option B3: Long term Rail Opportunity’ would have a ‘Somewhat positive environmental impact’ or ‘Positive environmental impact’. Over two fifths of respondents felt the other options would have a ‘Somewhat positive environmental impact’ or ‘Positive environmental impact’

- A great deal of detailed comments were received, from which the most common areas of discussion were:

- Discussions about the need for improvements to cycling and walking infrastructure across the proposals and further east
- Discussions about the importance of the improvements to the rail network
- Concerns about the proposals’ impact on nearby areas, particularly Coldham’s Lane and Mill Road
- Debate about the need for and location of a new Park & Ride site
- Discussions about the need for general improvements to public transport, including reduced fares, increased regularity, and connections to rural locations

- Responses were also received on behalf of 54 different groups or organisations. All of the responses from these groups will be made available to GCP Executive Board Members in full and will be published alongside the results of the public consultation survey.

7.12.12 Some key themes have emerged from the meetings that we have conducted and attended as part of this consultation process. Whilst these early high level themes are summarised below it is important to recognise that full understanding of stakeholder and public views on the options will not be known until the Business Intelligence Unit has produced its report.

7.12.13 Early key high level themes from the meetings with stakeholders set out above include:

- There is broad recognition among a wide range of stakeholders that Newmarket Road is a poor environment for many users and the idea of improving the road, particularly for cycling and walking, is welcome.
- There is concern that any improvement to Newmarket Road would shift traffic congestion to other parts of Cambridge’s road network. Coldham’s Lane, the Sainsbury’s roundabout, the B1102 and the Quy Interchange (A14 J35) were all raised by stakeholders as areas of concern that could suffer from increased congestion if changes were made to Newmarket Road.
- There is a mixture of views both for and against closing or restricting access at J34 of the A14 (Fen Ditton Turn).
- There are currently significant traffic problems at the Newmarket Road/Barnwell Road junction caused by tailbacks from the drive through McDonalds on Wadloes Road. Several stakeholders are looking to this project to address and solve those issues.
- Several stakeholders raised concerns around the environmental impact of relocating the Park & Ride site as set out in Option A2.
- Option B2 is more unpopular among stakeholders, particularly in the Brookside and Burnside area. There is concern about the potential environmental impact on The Tins and the suitability of Brookside to accommodate vehicles from the transit way ahead of the central tunnelled sections of CAM being built.
- On the Rail option (Option B3) there is wider spread support for improving capacity on the Newmarket to Cambridge railway line to increase frequency of service. There is support for the idea of building a new station at Cambridge East and/or reopening Fulbourn or Six Mile Bottom railway station.

7.12.14 Further engagement and/or consultation will take place as the project develops depending on Executive Board approval to proceed.

7.13 Ongoing Discussions

7.13.1 The Cambridge Eastern Access Study will influence and will be influenced by several other ongoing studies within the Cambridge area and as such regular internal discussions have been held to align thinking and in helping to understand the wider implications of changes to transport provision in the broad corridor.

7.13.2 This has included engagement with:

- The Cambridgeshire Autonomous Metro Study
- The Waterbeach to Cambridge Corridor Study
- The East Barnwell Regeneration Study
- The City Access project
- The Chisholm Trail programme of works
- North-East Cambridge Area Action Plan

7.14 Summary

7.14.1 The comprehensive engagement and consultation programme undertaken highlighted the level of interest in future transport investment in the Newmarket Road corridor. A range of views were identified from individuals and organisations with different interests and perspectives.

7.14.2 Despite the mix of opinions, commonalties could still be identified. These focused on the need for intervention improving the transport offer in the east of the city, and the desire to see realistic alternatives to the car in place through targeted improvements to pedestrian, cycle and bus links.

8.0 Socio-Economic Context

This section provides an overview of socio-economic trends in Cambridge, Greater Cambridge and Cambridgeshire. Primarily it identifies challenges and opportunities regarding population growth and employment levels.

In assessing pertinent socio-economic trends, this section of the report relies on data sources from the Office of National Statistics and Nomis as well as independent reports commissioned by the Cambridgeshire and Peterborough Combined Authority (CPCA).

8.1 Overview

8.1.1 The demographic context of the city and county, the areas of employment, and how these will change in the future will influence travel demand in and around the Newmarket Road corridor. Understanding these changes will help to ensure that any interventions to improve the sustainable transport offer in the east of the city are resilient to any changes and can provide the capacity and connectivity to meet the future requirements of the city.

8.2 Population

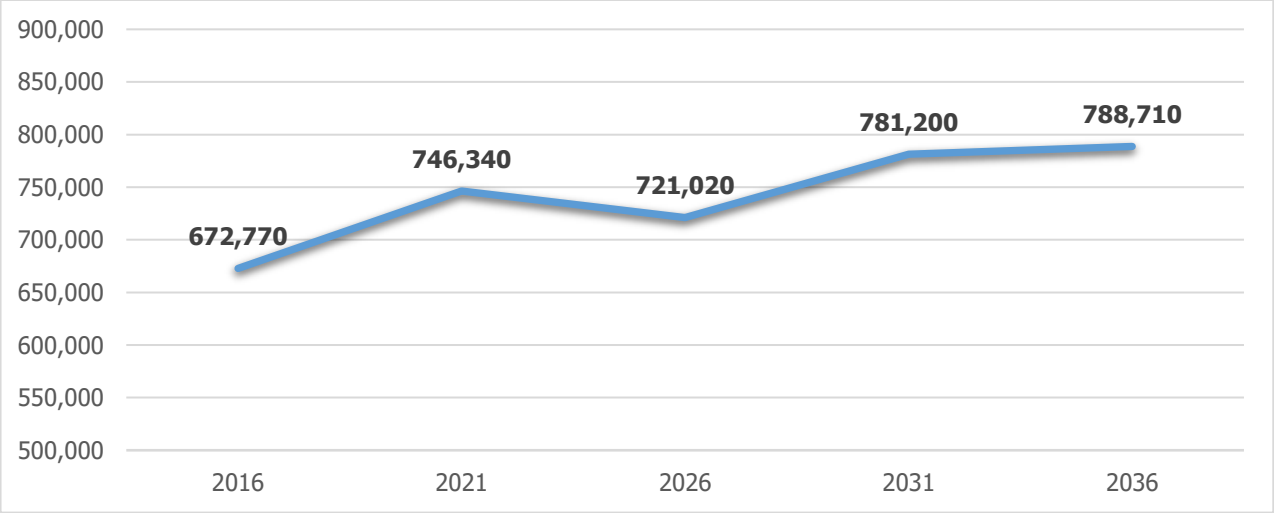
8.2.1 Cambridgeshire's[22] population has grown steadily over previous decades. However, more recently the population has experienced a significantly faster rate of growth with people coming from elsewhere in the UK as well as overseas, attracted by the high skilled employment opportunities, with a total population growth of 4.2% over just 5 years. The latest count in 2017 found Cambridgeshire's population to stand at 648,237, a figure expected to continue to grow rapidly over coming years.

8.2.2 The population of Cambridge itself is estimated to stand at 145,624 and is forecast to reach 150,000 within the next decade[23]. A contributing factor to Cambridge's population is that the city hosts a large academic population from the University of Cambridge and the Anglia Ruskin University. Cambridge's two universities serve around 30,000 students, by some estimates[24].

8.2.3 Since students represent a significant proportion of the population in Cambridge, the population can fluctuate according to term time. The impact of such fluctuations will become more severe as the student population continues to grow alongside the growth of the University and associated research and academia facilities. As a result, it is possible that Cambridgeshire will annually exceed the previous years' peak population as each academic year commences.

8.2.4 Figure 8.1 provides the population projections for Cambridgeshire up to 2036. Statistics indicate significant growth over the next 20 years. By 2036 the population can be expected to reach 788,710, an increase of nearly 20% when compared to 2016.

Figure 8.1: Population Projection for Cambridgeshire between 2011 and 2036



Source: https://cambridgeshireinsight.org.uk

[22] Data extracted from Nomis is at a county level and covers the local authority areas of Cambridge, South Cambridgeshire, East Cambridgeshire, Huntingdonshire and Fenland. It does not include data for Peterborough.
[23] https://ukpopulation2019.com/population-of-cambridge-2019.html [Accessed 12 December 2019]
[24] The Complete University Guide. Archived from the original on 14 January 2013.

8.2.5 The rate of population growth anticipated for Cambridgeshire necessitates improvements to the existing transport infrastructure and to the number of travel options to ensure that congestion and capacity issues do not constrain growth and force individuals to consider relocation.

8.2.6 Table 8.1 below highlights the key issues and opportunities in relation to population in Cambridgeshire.

Table 8.1: Summary of Key Population Issues and Opportunities

Issues	Opportunities
• The population of Cambridge and Cambridgeshire is growing rapidly and there is an increasing academic population. However, the current transport infrastructure is not evolving at a pace which matches population increase. • Transport infrastructure which is inadequately equipped to accommodate a rapidly growing population may force people to relocate away from the area, slowing the rate of economic growth which has recently been experienced. • Cambridge's dense population is over-spilling into the periphery. A small proportion of the overspill are choosing to live to the east of Cambridge city centre, however, the limited housing supply to the east has resulting in commutes from satellite settlements further to the east (e.g. Stow-cum-Quy, Lode, Bottisham, Newmarket, Bury St Edmunds). This has placed increasing pressure on the radial routes into and out of Cambridge.	• A greater number of people living in the area will create indirect and induced economic impacts, spending their incomes locally and using local services, resulting in the growth of the economy. • A sustainable transport network will allow Cambridgeshire to continue its success in academia, technology and research through close ties between campuses enabling knowledge sharing and innovation. A transport system that supports growth of the area and economic growth will benefit the wider UK economy. • Futureproofing existing transport infrastructure will support the requirements of future generations and will ensure a successful and sustainable future for Cambridgeshire. • Cambridge has a large student population who are more likely to use public transport and cycle modes of transportation. Enhancing the sustainable transport options will benefit the future growth of the Universities in Cambridge enabling Cambridge, and in turn the UK, to maintain its international competitiveness while also relieving pressure on the transport network. • Providing safe cycling and walking routes will provide residents and students with travel options and will contribute to health and wellbeing.

Implications for Cambridge Eastern Access

The Newmarket Road corridor currently experiences periods of acute congestion, resulting in delays for users. With Cambridgeshire's population set to grow, overspill from central Cambridge will result in increasing populations in settlements on the hinterland of Cambridge, placing increased pressure on the city's radial routes.

The Newmarket Road corridor provides one of the city's key radial routes into Cambridge from the east, serving a number of key communities, including Bottisham and Newmarket, as well as providing access onto the A14 and the rest of the Strategic Road Network. If transport infrastructure along the Newmarket Road corridor does not evolve to accommodate population growth, conditions along the corridor will likely worsen, resulting in an adverse impact on quality of life.

The Cambridge Eastern Access scheme will improve cycling, walking and public transport provision within the east of the city, providing users with an attractive and viable alternative to private car travel. Measures proposed as part of the scheme will ultimately ensure that people can travel through east Cambridge in a reliable, timely and safe manner, whilst also futureproofing the corridor to accommodate the growth in trips associated with Cambridgeshire's increasing population.

8.3 The Cambridge Economy

8.3.1 Greater Cambridge is renowned for being a world-leading centre for research, innovation and technology. Over the past 50 years there has been an explosion of globally significant companies and innovations across bioscience, medicine and technology. The 'Cambridge Phenomenon', is a term that describes the thriving hi-tech and biotech industry, which has developed since the 1960's. The GCP's current vision is to:

"Unleash a second wave of the 'Cambridge Phenomenon', with the aim of 'securing sustainable economic growth and quality of life for the people of Cambridge and South Cambridgeshire'".

8.3.2 Rapid business creation and growth in Cambridge associated with the 'Cambridge Phenomenon' has created jobs and prosperity in Greater Cambridge. The success of Greater Cambridge brings jobs and opportunities, not only for the City Region, but for the whole region and helps the UK economy to compete and attract high calibre knowledge-based individuals to fill gaps and increase economic growth. The city embodies the key foundations of the National Industrial Strategy[25] for the UK to become the world's most innovative economy.

8.3.3 The success experienced over recent years is largely due to[26]:

- A world class university that draws talent from across the globe, fostering innovation and encouraging new businesses.
- The area's scale and connectedness allow overlapping networks to develop and facilitate a culture of co-operation and cross-fertilisation between entrepreneurs and academics.
- 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.

8.3.4 The University of Cambridge (UoC), which is amongst the world's top universities, attracts global talent, fosters innovation and encourages business start-ups.

8.3.5 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.

8.3.6 This entrepreneurial environment and concentration of people focused on science and engineering is attracting international businesses to invest in the area. 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. 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.

8.4 Business Growth

8.4.1 Building on the success of the 'Cambridge Phenomenon', Cambridgeshire has successfully built a reputation as an attractive location to invest and expand businesses, bringing businesses to Cambridge which might otherwise not have invested in the UK. Economic growth experienced has been driven primarily, but not entirely, by rapid business creation.

8.4.2 Rapid growth in business start-ups occurred between 2013 and 2017, with an impressive increase of nearly 10% during this four-year period. The slowest rate of growth was between 2017 and 2018, and although the data presented was published before the end of 2018, it suggests growth is possibly slowing down.

8.4.3 If this is indeed the first indication of growth slowing, Cambridgeshire must identify and address the factors which may have recently deterred businesses from investing in the area at the same rate as previously experienced.

[25] Industrial Strategy: Building a Britain fit for the future, HM Government, November 2017.
[26] City Deal, Greater Cambridge City Deal Document, 2014.

8.4.4 Cambridge and South Cambridgeshire's recent economic success is also attributable to the connectivity across the City, and its surrounding area. Likewise, this slowdown in business start-up rates could be linked to supply side constraints, such as labour market accessibility.

8.4.5 Transport infrastructure in the area needs to be able to support not only the current pace of growth, but also be future proofed to prepare for further emerging opportunities. A lack of investment in infrastructure could limit future growth in Cambridgeshire and may lead to slower economic growth and a loss of international competitiveness for the UK.

8.4.6 The growth seen in Cambridgeshire and South Cambridgeshire in particular, is unlikely to be sustained in the future without further and significant investment in the infrastructure. Businesses are already beginning to note this as a major concern, suggesting action must be taken imminently[27].

8.5 Gross Value Added

8.5.1 Recent work undertaken as part of the CPIER has provided the most up to data analysis of GVA for the Cambridgeshire and Peterborough Combined Authority (CPCA) area. It highlighted how GVA growth across the CPCA area has increasingly outpaced both the East of England and the rest of the UK, with record high GVA levels recorded in 2016.

8.5.2 Research suggests that GVA growth across the CPCA area has been primarily driven by Cambridgeshire and more specifically, South Cambridgeshire. GVA generated in South Cambridgeshire is primarily a result of the ongoing growth of the technology and science clusters centred around the Cambridge Biomedical Campus.

8.5.3 Ongoing growth in South Cambridgeshire, brings huge opportunities for the East of the city. However, in tandem this also brings burgeoning issues associated with the transport infrastructure and limited sustainable transport options both along the eastern corridor and around the Cambridge radial.

8.5.4 The current demand alone has led to capacity issues along the corridor, poor accessibility and issues associated with delays and air quality. Failure to respond to these issues may compromise the rate of growth in Cambridge, particularly to the east of the city.

8.5.5 Table 8.2 below highlights the key issues and opportunities for the Cambridge Eastern Access scheme in relation to economy and business in Cambridgeshire.

Table 8.2: Summary of Key Socio-Economic Employment Issues and Opportunities

Issues	Opportunities
• Cambridge is strategically important for attracting international investors into the UK and maintaining the UK's international competitiveness. However, this relies on Cambridgeshire continuing to offer strong links between businesses, training campuses and housing developments. • Rapid business creation and the number of businesses choosing to locate in Cambridgeshire has increased pressure on the existing transport network. • The existing transport network is inadequately equipped to accommodate current demand. If the network does not evolve at the same rate as economic growth, this problem will inevitably worsen. • Businesses may be deterred from investing if accessing the employment site is difficult for their workforce.	• Cambridgeshire has a worldwide reputation and strong existing economic base, and one which continues to grow. Infrastructure to support and facilitate continued access to employment and homes will equip the area to deal with expansion and therefore support sustainable economic growth. • The proposals associated with the Travel Hub(s) will improve accessibility to key employment sites such as the Cambridge Biomedical Campus, encouraging investment and supporting existing businesses. This will also alleviate pressure along the Newmarket Road corridor. • Cambridgeshire must ensure that sustainable modes of travel are attractive to an ever-increasing number of commuters. The proposed scheme will provide a viable alternative to private car travel, reducing

[27] Cambridgeshire and Peterborough Independent Economic Review, 2018.

Issues	Opportunities
• Existing businesses may struggle to attract labour from outside of the local area as journey times are long and unreliable. This may also deter investors and businesses locating to the area. • The rate of business start-ups has slightly declined recently. Cambridgeshire must establish the reason for this and seek to address concerns.	congestion along key routes and providing benefits for the environment and quality of life.

Implications for Cambridge Eastern Access

The Newmarket Road corridor is a key commuter route, serving central Cambridge, Cambridge Biomedical Campus, Capital Park and several other employment centres. Growth of employment opportunities at several locations, has placed increased pressure on the transport corridor, leading to delays during peak times and unreliable journey times for commuters.

Delivery of a dedicated public transport infrastructure and new Travel Hub facilities as part of the Cambridge Eastern Access scheme will alleviate existing demand for private car travel on the corridor and futureproof it to accommodate anticipated growth in demand. The scheme will improve the provision of sustainable transport modes along the corridor, providing commuters with an attractive and viable alternative to car travel.

Improvements to the transport corridor could support access to a wider workforce and strengthen the links between key training and employment centres, bringing benefits of agglomeration and knowledge sharing. In this way, attractive and sustainable travel options could support sustainable economic growth across Cambridgeshire and help to maintain Cambridge's world-leading offer, and in turn the UK's international competitiveness.

8.6 Employment and Skills

8.6.1 In order to continue to support economic growth, the population within the employment catchment area needs to possess the required skills and the transport network must be flexible and efficient enough to expand the catchment area to ensure that jobs created as a result of growth can be filled.

8.6.2 Cambridge and South Cambridgeshire import a larger proportion of labour than is exported, both from other Cambridgeshire local authorities and further afield. The significant number of job opportunities and sector specific requirements of the dominant science and engineering industry necessitate that employers must attract labour from outside of the immediate area. Reliance on external labour results in high commuter demand on the transport network, particularly during peak hours.

8.6.3 Employment rates in Cambridgeshire have remained consistently higher than the rest of the East of England and Great Britain throughout the analysis period. The number of people in employment increased rapidly in the 24-month period between 2016 and 2018. A percentage increase of 2.0% was observed during this period. The rapid growth experienced over the 24-month period could be an indication of the growth in employment which can be expected over forthcoming years.

8.6.4 Since the height of the recession in 2012 when unemployment rates were at their highest, Cambridgeshire has recovered well. A 4% decrease in unemployment can be observed between 2012 and 2018. The unemployment rate in Cambridgeshire was at an all-time low in 2017, with only 1.7% of the population not in employment. The impressive recovery demonstrated in Cambridgeshire is testament to the growing economy of the area and sustained investment despite national instability.

8.6.5 Analysis of employment and unemployment levels for Cambridgeshire demonstrates that there is a strong and active economy. The economy is well positioned to initiate further growth as emerging opportunities are presented. Table 8.3 below shows the number of people who are employed in Cambridgeshire, East England and Great Britain, providing an indication of the extent of Cambridgeshire's role as a source of employment for the surrounding region.

Table 8.3: Total Employee Jobs

Year	Cambridgeshire	East of England	Great Britain
2015	311,000	2,608,000	28,565,000
2016	319,000	2,680,000	29,045,000
2017	327,000	2,735,000	29,375,000
% Increase	5.1	4.9	3.0

Source: ONS Business Register and Employment Survey

8.6.6 In 2017, 327,000 people were employed in Cambridgeshire. The number of jobs available in Cambridgeshire represent a significant proportion of those available in the East of England, particularly when considering that the area represents less than 1% of the UK's land mass and population.

8.6.7 The economic performance of Cambridgeshire is very positive, particularly when compared with Great Britain. A recent review of businesses undertaken as part of the Cambridgeshire and Peterborough Independent Economic Review (CPIER) suggests that employment and turnover growth have been picking up right across the area[28].

8.6.8 The provision of adequate transport infrastructure to accommodate the expansion of existing businesses whilst attracting further public and private sector investors is vital to the further growth of the area. Employment growth drives increased demand for housing and higher levels of commuting, therefore both factors must be addressed in order to support the growing economy of the area[29].

8.7 Jobs Growth

8.7.1 The East of England Forecasting Model (EEFM)[30] suggests that the East of England economy will employ a further 980,000 people over a twenty-year period by 2036, representing growth per annum of 0.7% and above the national average of 0.6%. Growth nationally is anticipated to continue to focus on the Greater South East (London, South East and East) given the high levels of innovation (compared to the other government office regions). The number of jobs in Cambridge compared to the wider area are shown in Table 8.4 below.

Table 8.4: Growth in Total Employee Jobs

Year	Cambridge	South Cambs.	Greater Cambridge	Combined Authority	East of England	United Kingdom
Population (1000s)						
2016	131	157	286	847	6,114	65,572
2036	160	195	355	1,010	7,096	73,361
2045	172	210	382	1,071	7,456	76,055
Absolute Change (1000s)						
To 2036	29	38	67	163	982	7,789
To 2045	40	53	94	224	1,342	10,483
Absolute Growth Rate (CAGR)						
To 2036	1.0%	1.1%	1.0%	0.9%	0.7%	0.6%
To 2045	0.9%	1.0%	1.0%	0.8%	0.7%	0.5%
Total Employment (1000s)						
2016	107	82	189	464	3,040	34,008
2036	123	90	213	519	3,359	36,582
2045	130	94	224	543	3,498	37,815

[28] Cambridgeshire and Peterborough Independent Economic Review (CPIER). September 2018.
[29] Cambridgeshire and Peterborough Independent Economic Review, 2018.
[30] The East of England Forecasting Model (EEFM) has been designed to facilitate the setting of consistent housing and jobs targets by providing a set of baseline forecasts prepared by Cambridge Econometrics for the East of England region and sub-regions (counties, unitaries and district authorities). The overall model structure captures the interdependence of the economy, demographic change and housing at a local level, as well as reflecting the impact of broader economic trends on the East of England. EEFM forecasts are based on historical past trends and are unconstrained, i.e. they do not take into account any policy or other constraints that might prevent their actual realisation on the ground. For more information refer to: https://cambridgeshireinsight.org.uk/EEFM/

Year	Cambridge	South Cambs.	Greater Cambridge	Combined Authority	East of England	United Kingdom
Absolute Change (1000s)						
To 2036	16	8	24	54	319	2,574
To 2045	24	12	35	79	458	3,806
Annual Growth Rate (CAGR)						
To 2036	0.7%	0.5%	0.6%	0.6%	0.5%	0.4%
To 2045	0.7%	0.5%	0.6%	0.5%	0.5%	0.4%

Source: EEFM, Cambridge Econometrics, 2016

8.7.2 Table 8.5 below compares the growth forecasts from the East of England Forecasting Model (EEFM)l to the growth targets within the Local Plans and actual employee growth over the 2011-16 period. Overall, the total job growth in Greater Cambridgeshire over the planning period, 2011-31, was established as 44,100 jobs which informed the growth identified within the City Deal. Although this growth is ambitious when compared to the latest EEFM 2016 figures (36,000 jobs over 2011-2031), it is in line with recent actual employee growth recorded in the national data.

Table 8.5: Comparison of Jobs Growth Forecasts

Area	Local Plans (2011 – 2031)	EEFM (2011 – 2031)	Actual (2011 – 2016)
Cambridge	22,100	25,300	13,000
South Cambs	22,000	10,700	11,600
Greater Cambridge	44,100	36,000	24,600

Source: EEFM, Cambridge Econometrics, 2016

8.7.3 The CPIER articulates that not only has historical employment growth been underplayed but future employment growth could be much higher than these levels. The report has set out four scenarios for the future, which inform recommendations about how development will be carried out and what infrastructure is likely to be needed to position the area well, to maximise the benefits presented by opportunities associated with growth in the future. This includes examining the options for densification, fringe growth, dispersal, transport corridors and deeper digital transformations.

8.7.4 The modelling carried out was 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:

- **Local Use Plans** – Capturing the assumptions around the employment targets underpinning the Local Plans.
- **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).
- **Employment Growth** – Shorter term rate. Based on a continuation of the 2010-2015 employment growth trends according to the recent Centre for Business Research (CBR) data.
- **Employment Growth** – shorter term (ST) rate returning to longer term (LT) rate. This is the central projection of the four. It assumes first a continuation of growth rates closer to higher recent Office of National Statistics (ONS) employment growth rates, before gradually returning to longer term ONS growth rates.

8.7.5 If employment grows as anticipated at local land use plan levels, there will be an increased number of commuter trips and resultant issues across the transport network. If employment grows at higher rates (under the Shorter-Term rate scenario) there could be 82% more commuters travelling into Cambridge by 2031 when compared with 2011 levels[31], with a number of significant transport issues arising as a result if the transport network does not evolve to accommodate such growth.

[31] Cambridge & Peterborough Independent Economic Review (CPIER), Final Report, September 2018.

8.8 Employment Sectors

8.8.1 A summary of employment by sector is provided in Table 8.6. Employment is mostly concentrated in the professional, scientific and technical services and the education sectors. The dominance of these sectors can largely be attributed to the growing biomedical campus and the expansion of the University of Cambridge and associated facilities which has attracted both UK and international businesses.

8.8.2 The proportion of jobs in Human Health and Social Work activities is shown to be significant, representing 12.8% of all jobs in Cambridgeshire. This proportion can also largely be attributed to the significance of the Biomedical sector within Cambridgeshire and the ongoing investment from large pharmaceutical companies such as AstraZeneca which moved its global research headquarters to Cambridge in 2016.

Table 8.6: Employment Sectors in Cambridgeshire

Employment Sector	Employee Jobs	% of Cambs Jobs	% of East Jobs	% of British Jobs
Manufacturing	32,000	9.8	8.0	8.2
Electricity, Gas, Stream and Air Conditioning	600	0.2	0.3	0.5
Water Supply	3,000	0.9	0.6	0.7
Construction	14,000	4.3	5.5	4.8
Wholesale and Retail Trade	42,000	12.8	17.1	15.2
Transportation and Storage	10,000	3.1	4.9	4.7
Accommodation and Food Service Activities	21,000	6.4	6.8	7.5
Information and Communication	18,000	5.5	3.6	4.4
Financial and Insurance Activities	4,000	1.2	2.4	3.5
Real Estate Activities	4,500	1.4	1.5	1.7
Professional, Scientific and Technical Activities	46,000	14.1	9.3	8.4
Administrative and Support Service Activities	24,000	7.3	10.5	9.1
Public Administration and Defence	9,000	2.8	3.0	4.3
Education	41,000	12.5	8.8	8.9
Human Health and Social Work Activities	42,000	12.8	12.6	13.3
Arts, Entertainment and Recreation	7,000	2.1	2.7	2.6
Other Services	7,000	2.1	1.9	2.0

8.8.3 Cambridgeshire displays a higher proportion of people in managerial positions, professional occupations and associated professional technical positions in comparison to the East of England and Great Britain. This means that employers need to attract labour from outside of the immediate area to recruit individuals with the necessary skills to fill these positions.

8.8.4 Cambridgeshire needs to ensure therefore that links into and out of the area are improved to provide ease of access and present an attractive offer to individuals with the specified skills set.

8.8.5 Table 8.7 highlights the key issues and opportunities for the Cambridge Eastern Access scheme in relation to employment and skills in Cambridgeshire.

Table 8.7: Summary of Key Socio-Economic Employment Issues and Opportunities

Issues	Opportunities
• Highly skilled professionals are required to fill a relatively large proportion of the jobs on offer in Cambridgeshire. Employers in Cambridgeshire therefore recruit from outside of the immediate area in order to find individuals who meet the specific requirements of job roles on offer. • As a result, many individuals work in Cambridgeshire but live outside of the area, leading to a high number of peak time commuters. • High numbers of commuters cause congestion problems during peak times, particularly along the radial corridors into and out of the city, including the Newmarket Road corridor that comprise the eastern radial.	• Cambridgeshire has a large population of people working in professional, scientific and technical activities compared to the national average. Increased employment within these sectors presents the opportunity to further excel Cambridgeshire, and in particular South Cambridgeshire as a destination of excellence in science and industry. Thereby attracting more jobs, employment opportunities and investment and boosting the local economy. • Will provide attractive sustainable travel options that will help to accommodate existing and future commuter demand, providing a more efficient and sustainable transport network overall. Enhanced public transport and provision of improved and new travel hubs will alleviate pressure along the corridor.

Implications for Cambridge Eastern Access

The Newmarket Road corridor is a key route into the centre of Cambridge and provides links to Cambridge Biomedical Campus and several other employment centres to the north, south and east of Cambridge from the east. In recent years business growth across Cambridgeshire has placed increased pressure on the corridor, leading to long delays during peak times and unreliable journey times.

Delivery of Cambridge Eastern Access will support existing demand along the corridor whilst futureproofing the corridor to accommodate further growth. The provision of attractive sustainable transport modes along the corridor will provide commuters with a viable alternative to car travel. Improved travel choice and reduced pressure on the road network will ensure employers can continue to attract the necessary workforce to fill employment opportunities and that skilled individuals are not discouraged from seeking opportunities in Cambridgeshire as a result of unreliable journey times and a lack of other alternative modal options.

8.9 Deprivation

8.9.1 Notwithstanding the obvious success of the Cambridge and Cambridgeshire economy, inevitably there are parts of the city, where life chances are compromised. The Index of Multiple Deprivation provides an understanding of the comparative health of an area based upon income, employment, health and barriers to housing provision. Whilst the city suffers from low levels of deprivation, Figure 8.1 highlights that some areas within the east of Cambridge are more disadvantaged than elsewhere.

8.10 Impacts of Covid-19

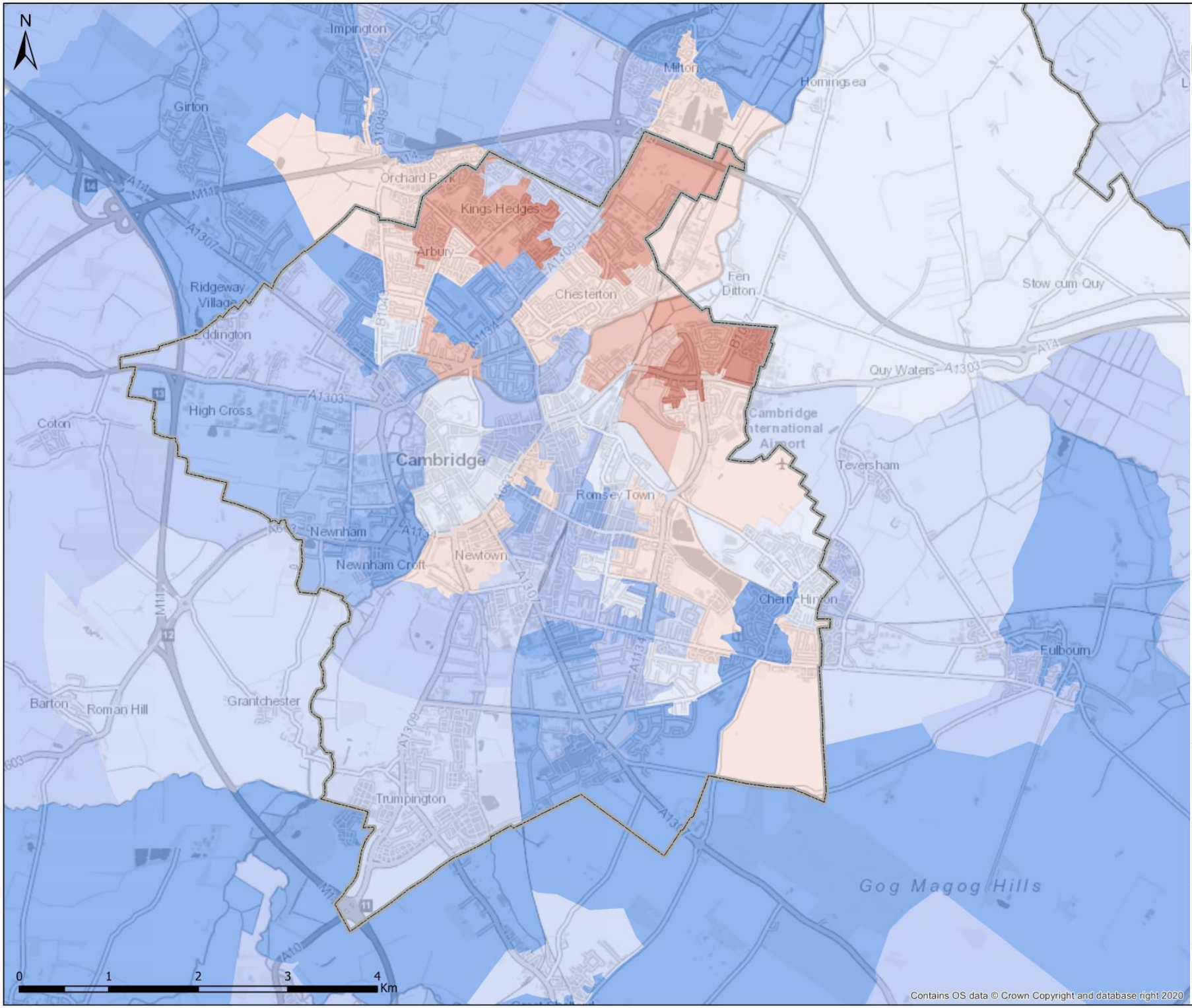
8.10.1 The long-term impacts of Covid-19 on the economic outlook of the city are unclear. However, with its knowledge-based economy, including a focus on life sciences, it is envisaged that Cambridge will prove resilient and form an important part of the national recovery in 2021 and beyond. It is therefore of even greater importance than the transport network is fit for purpose and supports the bounce back from the impacts of the virus and associated restrictions on growth.

8.10.2 GCP has been benchmarking a range of economic comparisons against comparable cities (such as Oxford, Bristol, Edinburgh, Brighton) and Cambridge consistently out-performs comparators on indicators such as the lowest levels of benefit claimants, take-up of employment retention furlough funds and unemployment.

8.10.3 Whilst no firm conclusions can be drawn whilst the pandemic is ongoing, the emerging data confirms that Cambridge has been less adversely impacted and is well placed to return to growth in advance of many other UK cities.

8.11 Summary

8.11.1 The Cambridgeshire economy has been historically buoyant. However this cannot be taken for granted and a combination of increasing delays and congestion, existing pockets of deprivation, and the potential long term impact of Covid-19 demonstrate the need for the transport network, to be in a position to facilitate growth, and provide access to jobs and opportunities. The Cambridge Eastern Access scheme has the potential to provide much needed intervention in this regard.



Legend

Authority Boundary

Index of Multiple Deprivation 2019

- 10% Most Deprived
- 2nd Decile
- 3nd Decile
- 4nd Decile
- 5nd Decile
- 6nd Decile
- 7nd Decile
- 8nd Decile
- 9nd Decile
- 10% Least Deprived

REV	DESCRIPTION	BY	CHK	APP	DATE

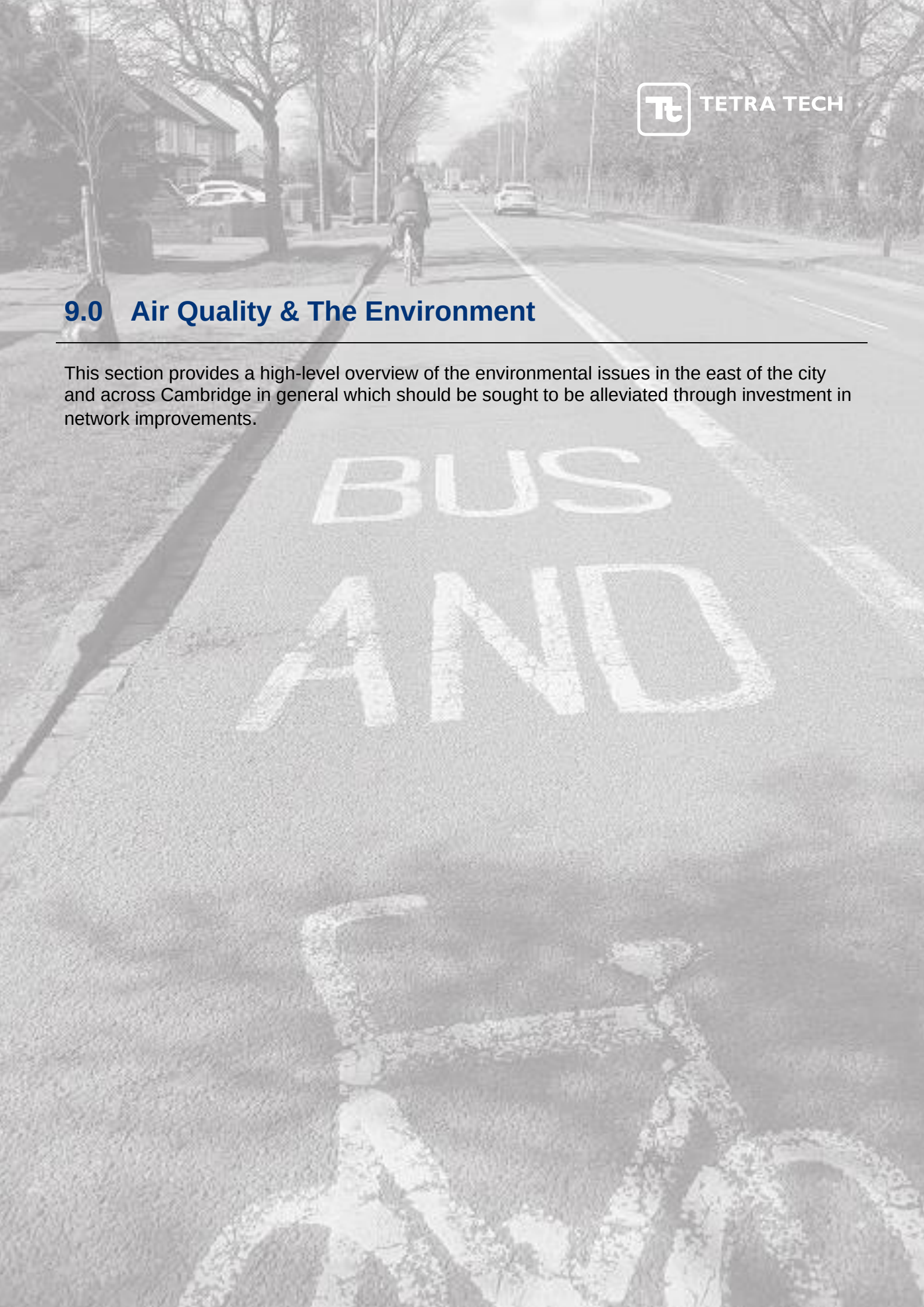
Client:
Greater Cambridge Partnership

EXECUTIVE PARK
AVALON WAY
ANSTEY
LEICESTER
LE7 7GR
TEL: +44 (0)116 234 8000
FAX: +44 (0)116 234 8001
e-mail: leicester@wyg.com

Figure 8.1: Indices of Multiple Deprivation

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	JJC	29/03/21	BK	29/03/21	ASG	29/03/21

Project No.	Office	Type	Drawing No.	Revision
A081175-146	35	18	056	-



9.0 Air Quality & The Environment

This section provides a high-level overview of the environmental issues in the east of the city and across Cambridge in general which should be sought to be alleviated through investment in network improvements.

9.1 Overview

9.1.1 The east of Cambridge is benefits from many historic and environmental assets, ranging from the Grade 1 listed Leper Chapel, to Ditton Meadows and Coldham's Common, which investment in the transport network should seek to protect and enhance. This section details the key issues and the potential ability of the Cambridge Eastern Access scheme to support the built and natural environment.

9.2 Air Quality

9.2.1 The centre of Cambridge has had an Air Quality Management Area (AQMA) since 2004 due to poor air quality (mainly due to high Nitrogen Dioxide from traffic) that does not meet National Air Quality Objectives. The AQMA extends along Hills Road (A1307) to the main London-Kings Lynn railway line.

9.2.2 To implement improvement in air quality a series of Air Quality Management Plans have been implemented and integrated into the local transport plans. The latest air quality management plan is the Cambridge Air Quality Management Plan (2018 – 2023). Air quality outside of the city is deemed to be good as indicated by DEFRA's modelling of air quality across the UK.

9.2.3 Public transport schemes are considered to have lower environmental impact because they can move a greater number of people per unit of pollutant emitted. The proposed scheme would encourage fewer private vehicles to enter Cambridge by providing high-quality public transport alternatives, including new non-motorised user routes into the city centre.

9.2.4 There is also the opportunity to move to electric or other non-fossil fuel powered public transport vehicles on the proposed route in the medium-term. This will help to reduce Nitrogen Dioxide (NO2) emissions and offers a sustainable journey into Cambridge.

9.3 Noise

9.3.1 Noise is increasingly understood to have an impact on human physical and mental health (e.g. by disrupting sleep patterns (physical health) and leading to stress, inability to concentrate, and frustration (mental health)). Traffic noise can be a significant contribution to ambient noise levels, with adverse consequences for human health. Hence, any scheme that seeks to reduce noise levels can bring benefit to human health. It is worth noting that changes in traffic levels need to be significant before noticeable improvements in ambient noise levels are noticed.

9.4 Historic Environment

9.4.1 Beyond Cambridge City Centre, with its world-famous historic built and natural environment that generates a very significant tourist industry in addition to providing the setting for its outstanding academic institutions, Newmarket Road also benefits from several listed buildings. The most significant is the Grade 1 listed Leper Chapel, located immediately to the north of Newmarket Road and east of the Cambridge – Ely Line (see Figure 9.1).

9.4.2 It is vital to preserve the setting of the historic buildings and open spaces, which the City Council has a duty to do, in the exercise of its development management functions, particularly within designated Conversation Areas. There are 17 such Conservation Areas in and around the centre of Cambridge, including the Mill Road and Riverside and Stourbridge Common conservation areas.

9.4.3 Whilst the emphasis in the conservation areas is to preserve and enhance the built environment (townscape) there is also a need to manage traffic levels to avoid noise, congestion and pollution which can have a significant impact on the character and appearance of the city.

9.5 Landscape

9.5.1 The landscape within the study area is predominantly flat and urban in the west, with the River Cam forming a natural boundary to the north of the study area. There are also two designated commons adjacent to the urban areas, Stourbridge Common to the north and Coldham's Common in the centre, Ditton Meadows also occupies a large amount of green space to the east of Stourbridge Common (see Figure 9.1).

9.5.2 In the east of the study area, the landscape becomes far more rural, comprised of flat agricultural fields to the east of Airport Way and Fenland south of Quy Interchange. These areas of agricultural and fen land are separated by Quy Water.

9.5.3 There are opportunities to enhance the landscape character of the area by changing the vertical profile of the proposed route and landscape mitigation in the form of sensitive planting along the route. The District Design Guide Supplementary Planning Document (SPD) and the Landscape in New Developments SPD have several landscape enhancement measures identified for the East Anglian landscape which would be considered when delivering the Cambridge Eastern Access scheme.

9.6 Green Belt

9.6.1 The Green Belt has a strong protection at both National and Local Level. Policy 4 of the adopted Cambridge City Local Plan (2018) sets out a presumption against inappropriate development in the Green Belt. Policy NH/8 of the South Cambridgeshire Local Plan 2018 also sets out the presumption against inappropriate development in the Green Belt.

9.6.2 When considering the acceptability of the principle of scheme development within the Green Belt, the key policy criteria is set out within paragraph 146 of the NPPF. Paragraph 146 of the NPPF states the following:

" Certain other forms of development are also not inappropriate in Green Belt provided they preserve the openness and do not conflict with the purposes of including land within it… Local transport infrastructure which can demonstrate a requirement for a Green Belt location."

9.6.3 The southern busway alignment, proposed as part of the Phase B interventions within the Cambridge Eastern Access scheme, crosses the green corridor preserved within the Cambridge Local Plan that connects Coldham's Common with the existing extent of Green Belt land in the vicinity of Teversham. The relocation of the Park and Ride site as part of Option A2 may require land within the Green Belt.

9.7 Biodiversity

9.7.1 There are several Sites of Special Scientific Interest (SSSI) in the area including:

- The Wilbraham Fens SSSI, the largest SSSI in the area, which is located south east of Quy Interchange, located less than 100m away from the proposed scheme along the Newmarket Road corridor.
- Fulbourn Fen SSSI and Great Wilbraham Common SSSI, both are close the existing alignment of the Cambridge to Newmarket Railway line.
- Coldham's Common also comprises a Local Nature Reserves (LNR) within the study area.

9.7.2 It is important to avoid any direct land take that could affect a SSSI area, but it is equally important to reduce traffic and thus nutrient loading from exhaust emissions – which could impact the important flora in SSSIs.

9.7.3 The Cambridge Eastern Access project has the potential to deliver positive gain for biodiversity. There are significant opportunities to achieve this strategic objective as part of the design, providing both wildlife corridors by prioritising linking current areas of habitat together and creating new habitat in other areas.

Figure 9.1: Examples of the Built & Natural Environment in the East of Cambridge

Leper Chapel on Newmarket Road

River Cam and Ditton Meadow

9.8 Water and Flood Risk

9.8.1 There are numerous policies at national and local level relating to the protection of water resources. The general theme of all the policies is that the development and day to day activities must avoid any negative impacts on the quality of water bodies (surface or groundwater) from any anthropological activities, including from transport schemes where the greatest risks are from road drainage and accidents.

9.8.2 National and local policies on flooding all have a common basis to prevent development in flood zones that are not flood resilient. The Environmental Permitting Regulations (EPR) 2010 aim to protect groundwater and surface waters from pollution by controlling the inputs of potentially harmful and polluting substances.

9.8.3 The project crosses the flood plains of Quy Water, between High Ditch Road and Quy Interchange, and Coldham's Brook, which runs along the eastern and northern fringes of Coldham's Common before crossing underneath Newmarket Road adjacent to the Abbey Stadium. The flood plain of the River Cam also lies immediately to the north of the Riverside and Barnwell residential areas, occupying much of the land comprising Ditton Meadows.

9.8.4 The scheme design will account the for potential effects on flood risk on these flood plains and on all land adjacent to the scheme. It will also avoid risk of contamination from surface run-off alongside the need to conserve water resources.

9.9 Climate Change

9.9.1 The Climate Change Act commits the UK government to reduce greenhouse gas emissions to net zero by 2050 and embodied carbon which contributes towards life limiting illnesses. Transport schemes present both a risk to reducing greenhouse gas emissions and an opportunity if modal shift to lower emitting transport can be achieved.

9.9.2 Public transport schemes such as the Cambridge Eastern Access project have the potential to reduce greenhouse gas emissions by introducing a carbon efficient public transport fleet, removing traffic off the road and reducing congestion. There is also potential for the public transport vehicles to be electric or other zero-emission vehicles in the medium term, therefore creating a scheme that should support the GCP's move to meet the government policy.

9.9.3 The Cambridge City Local Plan 2018 policy 29 promotes the generation of renewable energy from projects where possible. The Cambridge Eastern Access scheme provides the opportunity to introduce infrastructure that helps generate renewable energy. Opportunities to do so will be assessed at a later stage of the scheme's development.

9.10 Constraints

9.10.1 An audit has been undertaken of potential constraints to the provision of public transport priority improvements both along the corridor itself, and on alternative alignments in the wider area. Figure 9.2 highlights the location of listed buildings, floodplains, pipelines, cables and other potential constraints to future provision.

9.10.2 The process has highlighted several constraints which have shaped the nature of the Eastern Access improvements being taken forward, notably:

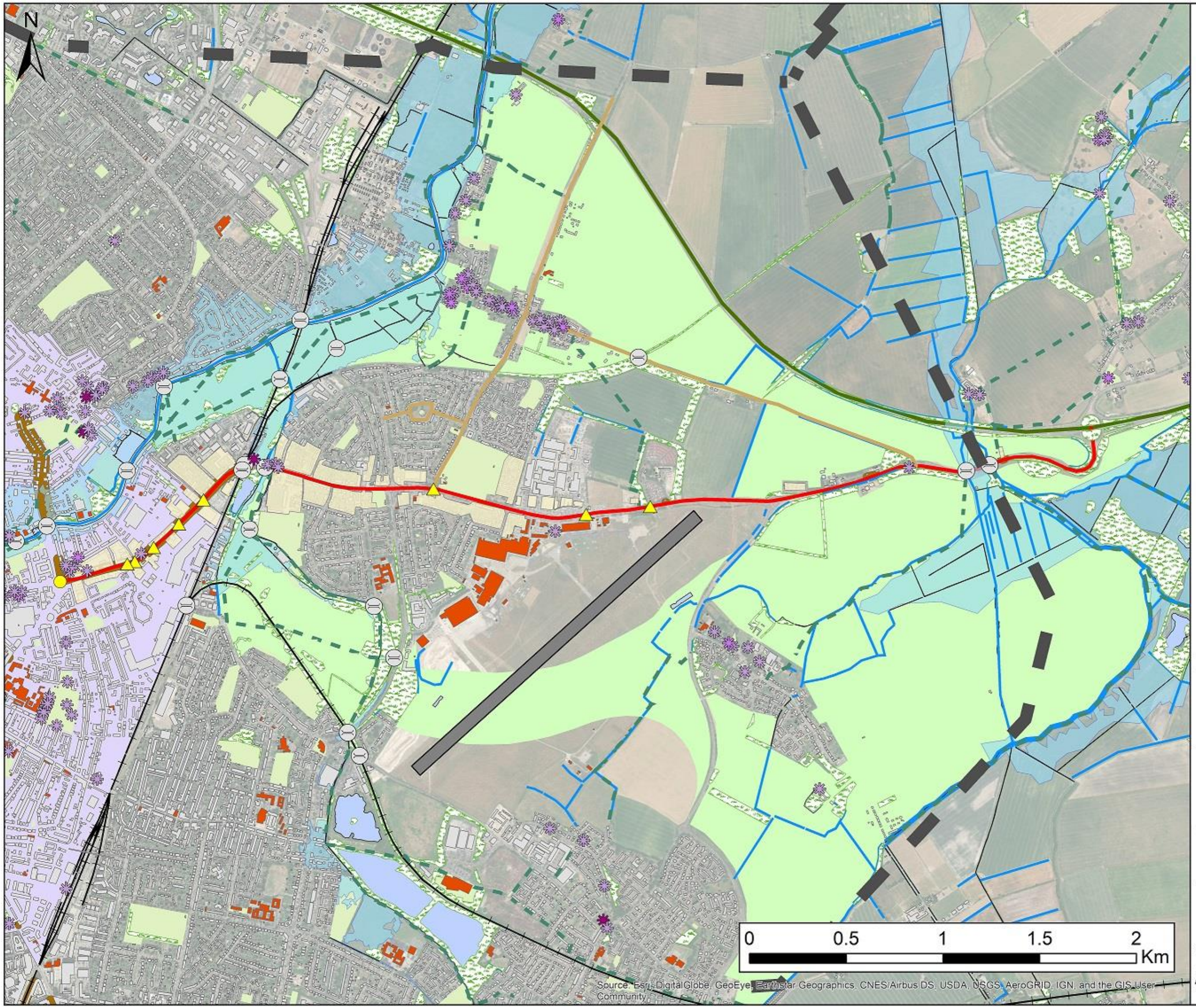
- High value is placed on green spaces within and around the city, not least the commons and fens, both of which are afforded considerable protection by stakeholders and the general public alike.
- Watercourses including the River Cam and Coldham's Brook provide natural barriers and severance to movement to varying degrees.
- The Cambridge to Newmarket train line and to a lesser extent the A14 also provide a severing effect to movement within the east of the city.
- The Leper Chapel is the most prominent of several listed buildings in the area whose setting must be protected.

- Whilst operational, Cambridge Airport occupies a large site within the east of the city, limiting potential routing alignments. However, from discussions with Marshall's who operate the facility, it is understood that land to the east of the runway could be made available if required whilst the airport remains in use.

9.11 Summary

9.11.1 There are many built and natural assets within the east of the city with various levels of protection. The Cambridge Eastern Access scheme must be not just cognisant of these assets but should look to improve and enhance the context in which they sit.

9.11.2 Intervention to deliver substantial sustainable travel improvements in the Newmarket Road corridor also has the potential to address environmental concerns associated with the historic reliance on the private car for travel around the city. Providing real and attractive alternatives will help to address concerns associated with carbon emissions, air quality and noise, enhancing the health and well-being of individuals as well as reducing he impact of transport on the environment.



Cambridge Eastern Corridor
A14
Signalised Intersection
Signalised Roundabout
Electricity Transmission Line
Grade I Listed Building
Grade II* Listed Building
Grade II Listed Building
Other Important Building
Existing Development Frontages
Bridges
PRoW
7.5t Weight Restriction
Railway Line
Runway
Woodland
Water Course
Floodplain
Green Belt (South of
Other Green Space

REV	DESCRIPTION	BY	CHK	APP	DATE

Client:
Greater Cambridge Partnership

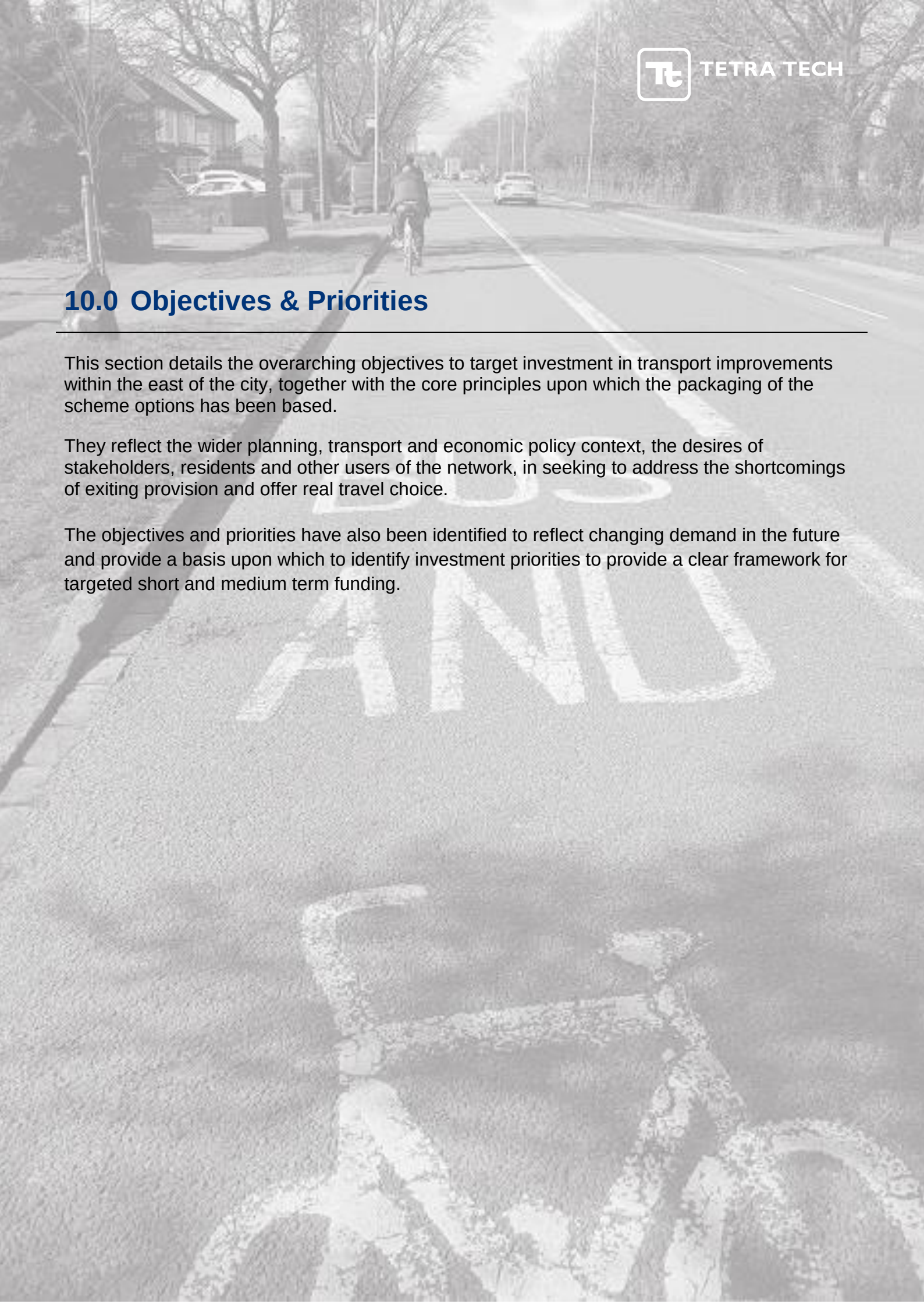
TETRA TECH

Project:
Cambridge Eastern Access

Figure 9.2 Constraints in the East of the City

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	BG	28.01.20	BK	28.01.20	BK	28.01.20

Project No.	Office	Type	Drawing No.	Revision
A081175-146	35	18	009	-



10.0 Objectives & Priorities

This section details the overarching objectives to target investment in transport improvements within the east of the city, together with the core principles upon which the packaging of the scheme options has been based.

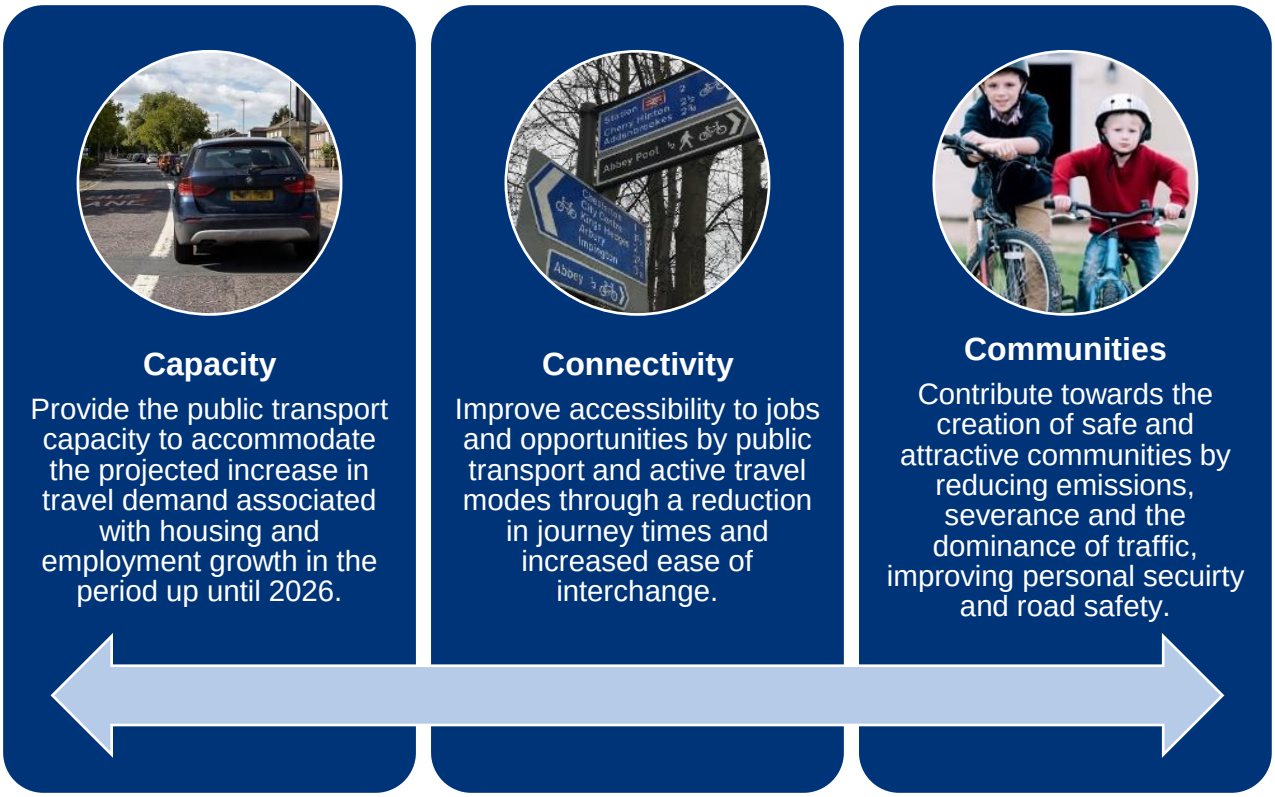
They reflect the wider planning, transport and economic policy context, the desires of stakeholders, residents and other users of the network, in seeking to address the shortcomings of exiting provision and offer real travel choice.

The objectives and priorities have also been identified to reflect changing demand in the future and provide a basis upon which to identify investment priorities to provide a clear framework for targeted short and medium term funding.

10.1 Overarching Objectives

10.1.1 Based upon the policy context, feedback from stakeholders and the identification of the current and future issues facing the corridor, three objectives have been identified to provide a direction and framework for investment and a basis upon which to develop options for the Newmarket Road corridor and more widely across the east of the city. These objectives are illustrated in Figure 10.1 below:

Figure 10.1: Overarching Objectives for the Corridor



10.1.2 These objectives reflect the emphasis of national, regional and local transport policy and the ability of transport investment to contribute towards wider economic, social and environmental agendas. They provide a clear and concise focus and enable progress towards them to be easily quantified.

10.1.3 The performance indicators associated with each of the objectives are detailed within Table 10.1. They provide measurable data sets through which robust scrutiny of performance can be ascertained.

Table 10.1: Performance Indicators

Objective	Indicators
Capacity	• Increase in Public Transport Capacity • Ability to contribute to 24% reduction in traffic levels • Propensity to Reduce Congestion / Delay
Connectivity	• Reduced Journey Time for Public Transport • Increased Reliability for Public Transport • Ease of Interchange • Benefits to Active Travel • Supports CAM • Scale of Catchment (Jobs/Housing) • Ability to Unlock Growth
Communities	• Road Safety • Protection of Green Spaces

Objective	Indicators
	• Environment, Air Quality and Carbon • Quality of the Public Realm • Severance

10.2 Short, Medium and Long Term Priorities

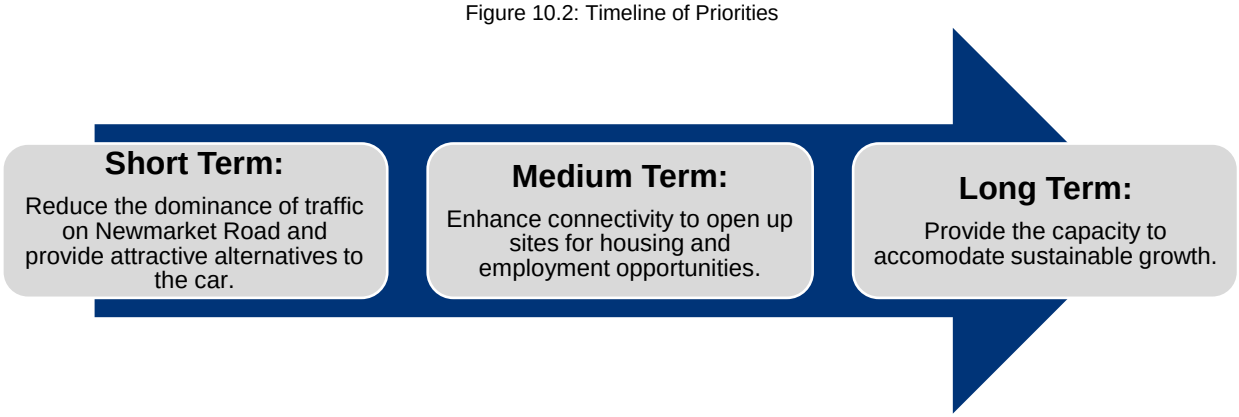
10.2.1 Within the framework provided by these overarching objectives, there are distinct transport priorities for the east of the city which need to be address in the short, medium and long term, as illustrated in Figure 10.2.

10.2.2 In the short term the focus is on addressing the existing issues along Newmarket Road. The dominance of general traffic and lack of attractive alternatives to the car, undermines the quality of life for communities, not least in Barnwell. It also contributes towards low levels of active travel and delays throughout the day, stifling economic growth, social interactions and a move towards a low carbon economy.

10.2.3 In the medium to longer term, there is a need to provide additional capacity in the transport network to facilitate growth, together with opening up opportunities for potential new housing and employment provision through improved connectivity both to the city centre other employment centres to the north and south of the city, and to the strategic transport networks and connections in and out of Cambridge.

10.2.4 To meet these short and longer term priorities, the Cambridge Eastern Access scheme consists of two phases – the first to deliver improvements within around five years, and the second to be delivered in the subsequent 10 to 15 years, alongside housing and employment growth coming forward.

Figure 10.2: Timeline of Priorities



10.3 Core Principles

10.3.1 The identification, prioritisation, and ultimately the delivery of improvements to meet the overarching objectives and the short, medium and longer term priorities, has been based upon a series of core principles underpinning this business case, notably an integrated approach, balancing priorities and seeking to deliver marginal gains.

Integrated Approach

10.3.2 To maximise the effectiveness of investment in the transport network, an integrated approach is required, which aligns with and support other transport initiatives across the city, particularly the progression of the Cambridgeshire Autonomous Metro (CAM).

10.3.3 The Eastern Access scheme has also been developed within the context of emerging planning and economic objectives and proposals with the desire to ensure that sustainable travel choice is embedded into new communities from the outset, as opposed to being ‘retro-fitted’ at a later date.

Balancing Priorities

10.3.4 There are often contradictory and competing demands placed on the transport network which have to be balanced to ensure that it caters for all. Examples of these within the Newmarket Road area include:

- Meeting the needs of strategic trips into the city and local movements within Barnwell.
- Use of the limited highway capacity by general traffic, buses, cyclists, pedestrians, and equestrians.
- Conflicts between north-south orbital trips and east-west radial movements into the city centre.
- Providing additional capacity and improving journey times but not drawing in suppressed demand.
- The movement function and 'place' function of Newmarket Road.

10.3.5 It is accepted that compromises are required in areas, but that where there is the justification, accommodating different needs along the corridor should be sought.

Marginal Gains

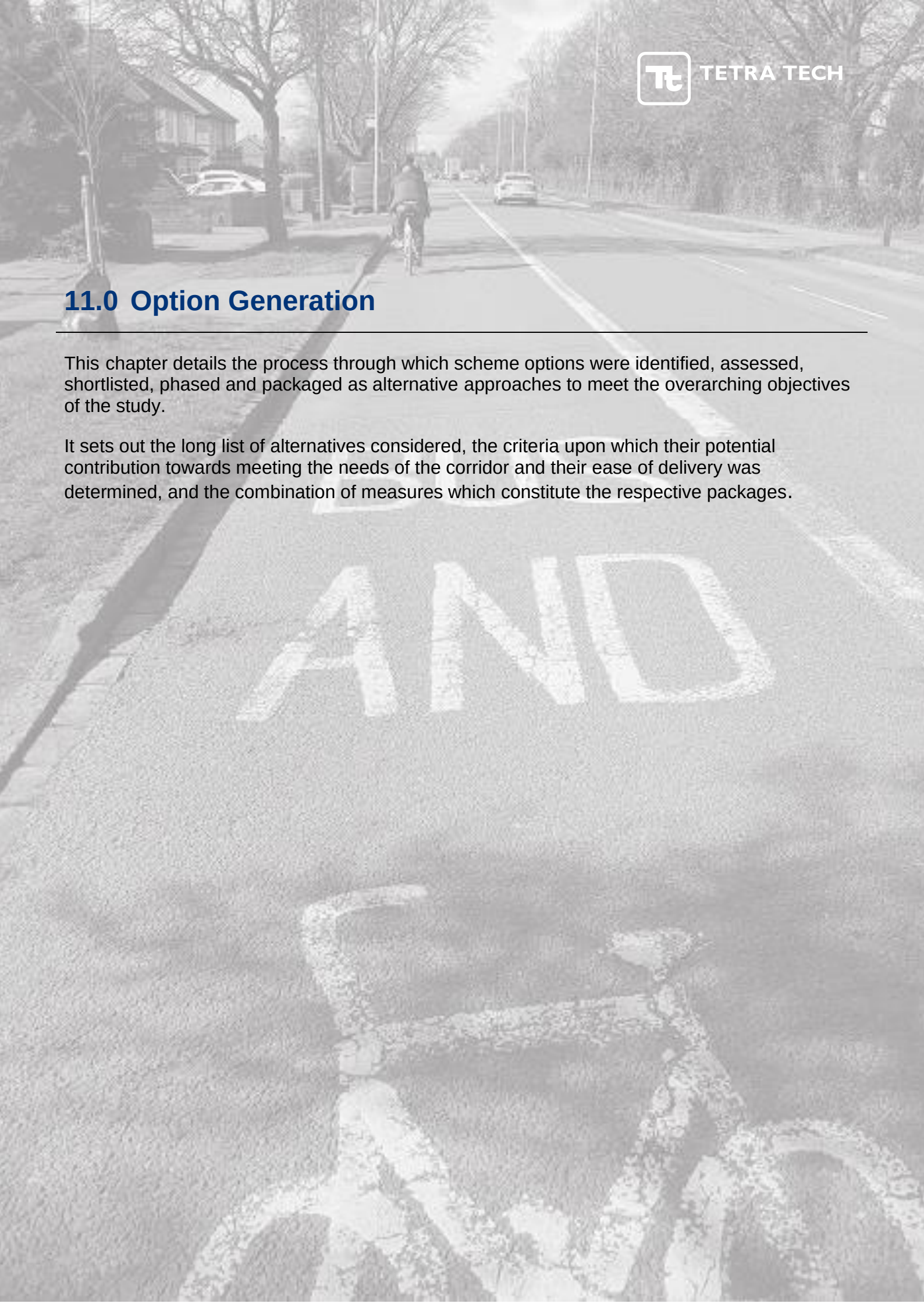
10.3.6 The Cambridge Eastern Access scheme options represent significant interventions in the network and the changes in the transport offer would be matched be similarly sized funding requirements. Alongside these measures, however, is the need to consider the small scale, local level, low cost improvements to transport provision which can have a cumulative impact on the travel choices individuals make.

10.3.7 As the scheme options are refined and developed in more detail, a series of marginal improvements should be sought to complement larger interventions through which to further enhance the effectiveness of the movement function of the corridor and to ensure that the public realm is more inclusive and convivial. This may be through:

- The signing and lining of the carriageway.
- Timing of traffic signals.
- Attractive, accessible bus stops.
- Information on existing services.
- Dropped kerbs across the pedestrian network.
- The removal of guard railing to open up desire lines.
- Seating and lighting and general street furniture.
- Quality surfacing of footpath and cycle lanes.
- Cutting back vegetation and maintenance of links.
- Fingerposts and directional signing.

10.4 Summary

10.4.1 The overarching objectives and short, medium and long term priorities for the Cambridge Eastern Access scheme provide a focus and framework which has allowed the identification of packages of schemes which will most effectively meet the needs of the corridor and wider network. The context they offer will demonstrate a clear correlation between areas of investment and the impacts of those schemes and the transparent evaluation of its success in the future.



11.0 Option Generation

This chapter details the process through which scheme options were identified, assessed, shortlisted, phased and packaged as alternative approaches to meet the overarching objectives of the study.

It sets out the long list of alternatives considered, the criteria upon which their potential contribution towards meeting the needs of the corridor and their ease of delivery was determined, and the combination of measures which constitute the respective packages.

11.1 Overview

11.1.1 There is a clear need for significant investment in Newmarket Road and the surrounding transport network to address both the current issues facing the corridor, and to help to facilitate the significant level of proposed growth in the east of Cambridge.

11.1.2 The problems and constraints associated with travelling into the city highlighted in previous chapters, formed the evidence upon which potential solutions were identified to transform the corridor into a high-quality sustainable travel route.

11.1.3 This assessment, together with input from a programme of extensive engagement activities[32] including with elected members and transport providers, generated a series of potential areas of intervention, and within these, individual schemes were identified which were felt could potentially address the overarching objectives of the corridor. Some 59 schemes were identified in total, as listed in Table 11.1 below.

11.1.4 Not all of the options identified represented viable solutions and the process through which these were identified and omitted from the optioneering process is detailed within later sections of this chapter.

Table 11.1: Long List of Interventions

Ref.	Scheme Options
Busways	
BW.01	Online - full length of Newmarket Road.
BW.02	Online - between Elizabeth Way Roundabout and Leper Chapel.
BW.03	Online - between Leper Chapel and Park and Ride.
BW.04	Online - between Park and Ride and A14.
BW.05	Offline (north) - between Leper Chapel and Quy Water via former rail line and High Ditch Road.
BW.06	Offline (north) - between Cambridge North Station and former rail line.
BW.07	Offline (south) - between Leper Chapel and Barnwell Road via Coldham's Common.
BW.08	Offline (south) - between Barnwell Road and P&R via Marshall's Airport (west of runway).
BW.09	Offline (south) - between East Road and Brookfields via Mill Road
BW.10	Offline (south) - between Brookfields and Coldham's Lane via a new bridge over the rail line.
BW.11	Offline (south) - between Coldham's Lane and P&R via Marshall's Airport (east of runway).
BW.12	Offline (south) – Coldham's Lane between Newmarket Road and south of runway.
Bus Lanes	
BL.01	Extend inbound bus lanes to provide continuous link between P&R and City Centre.
BL.02	Remove inbound bus lanes.
BL.03	Remove outbound bus lanes.
BL.04	Extend outbound bus lanes to provide continuous link between City Centre and P&R.
BL.05	New outbound bus lane between Elizabeth Way and the Leper Chapel.
BL.06	New tidal bus lane (or busway) between Elizabeth Way and the Leper Chapel.
BL.07	Conversion of the Cambridge to Newmarket Rail Line into a two-way bus lane.

[32] Eastern Access Study – Engagement Summary Report; WYG, August 2020.

Ref.	Scheme Options
Bus Services	
BS.01	Increase the frequency of existing P&R services.
BS.02	New bus service between the station, Mill Road, Cambridge East and the Park and Ride.
BS.03	Provide new service from P&R to Addenbrookes hospital and the Biomedical Campus.
Park and Ride	
PR.01	Expansion of current Park and Ride site.
PR.02	Relocation of Park and Ride to south of Newmarket Road and east of Airport Way.
PR.03	Relocation of Park and Ride to north of Quy Interchange (A14 Junction 35).
PR.04	New Park and Ride site to the north of Fen Ditton.
Bus Gates	
BG.01	Bus Gate on Newmarket Road.
BG.02	Bus Gate on Mill Road (at bridge over rail line).
Rail	
RA.01	Reinstate the Cambridge to Mildenhall Line.
RA.02	Double track the Cambridge to Newmarket Line.
RA.03	Realignment of the Cambridge to Newmarket Line to the north of Cherry Hinton.
RA.04	Provide new station at 'Cambridge East'.
RA.05	Provide new station at Cherry Hinton.
RA.06	Provide new station at Barnwell.
RA.07	Provide a new Parkway Station at Six Mile Bottom
RA.08	Provide a passing point near Fulbourn on the Cambridge to Newmarket Line.
Junctions	
JC.01	Reconfiguration of Elizabeth Way Roundabout, including the removal of Subway (higher capacity).
JC.02	Reconfiguration of Elizabeth Way Roundabout, including the removal of Subway (lower capacity).
JC.03	Reconfiguration of the Newmarket Road & Coldham's Lane junction.
JC.04	Signalisation and reconfiguration of the Newmarket Road & Barnwell Road junction (higher capacity).
JC.05	Signalisation and reconfiguration of the Newmarket Road & Barnwell Road junction (lower capacity).
JC.06	Reconfiguration of the Newmarket Road & Ditton Lane junction (higher capacity).
JC.07	Reconfiguration of the Newmarket Road & Ditton Lane junction (lower capacity).
JC.08	Reconfiguration of A14 Junction 34 (with Ditton Lane) to remove slips.
JC.09	Signalisation of the junction of Newmarket Road and Airport Way.
JC.10	Signalisation and Reconfiguration of Quy Interchange
Highways	
HW.01	Additional lane(s) on Newmarket Road to east of Airport Way junction.
HW.02	One-way traffic on Newmarket Road, Coldham's Lane and Barnwell Road to form gyratory.
HW.03	Priority lane for Ultra Low Emission Vehicles only on Newmarket Road.
HW.04	Removal of two lanes (one inbound, one outbound) between Elizabeth Way and Coldham's Lane.
HW.05	Carriageway widening along Coldham's Lane south of the airport, with a left turn filter lane for buses at the Sainsbury's roundabout.

Ref.	Scheme Options
Intelligent Transport Systems	
ITS.01	Reconfiguration of all signals to manage/control flow along Newmarket Road & wider network.
Active Travel	
AT.01	Provision of continuous segregated inbound cycle lane along Newmarket Road.
AT.02	Provision of continuous segregated outbound cycle lane along Newmarket Road.
AT.03	Promotion of Park and Cycle from the P&R site.
AT.04	Provide a new shared use ped/cycle bridge(s) over the rail line and Coldham's Lane to link the existing 'Tins' cycle path with the airport site.
AT.05	Provide new dedicated cycle lanes along Brookfields / Mill Road.
AT.06	Provide new cycle lanes along Coldham's Lane between the airport site and the Sainsbury's roundabout and enhance existing cycle provision along Brooks Road.
AT.07	Provide a new off-carriageway ped-cycle link from the airport site to connect into the Chisholm Trial via Barnwell Road and Coldham's Common.

11.1.5 For several of the schemes identified there were potentially numerous variations and sub-options. For example, the provision of a bus lane could vary in terms of its length, hours of operation, nature of vehicles permitted to use it, or if it catered for inbound or outbound buses.

11.1.6 The process therefore sought to strike a balance between the detail of each option and not overwhelming the assessment process with every possible permutation. The level of detail associated with each scheme was commensurate with the early stage the Strategic Outline Business Case represents in the delivery process, and as such refinement of the final schemes' parameters and design will be undertaken further down the line.

11.1.7 Several areas of intervention were omitted from the assessment, including light rail, personal rapid transit and monorails for example. This was on the basis that any measures brought forward would be required to fit the local context and be compliant with the emerging Cambridge Autonomous Metro.

Cambridgeshire Autonomous Metro

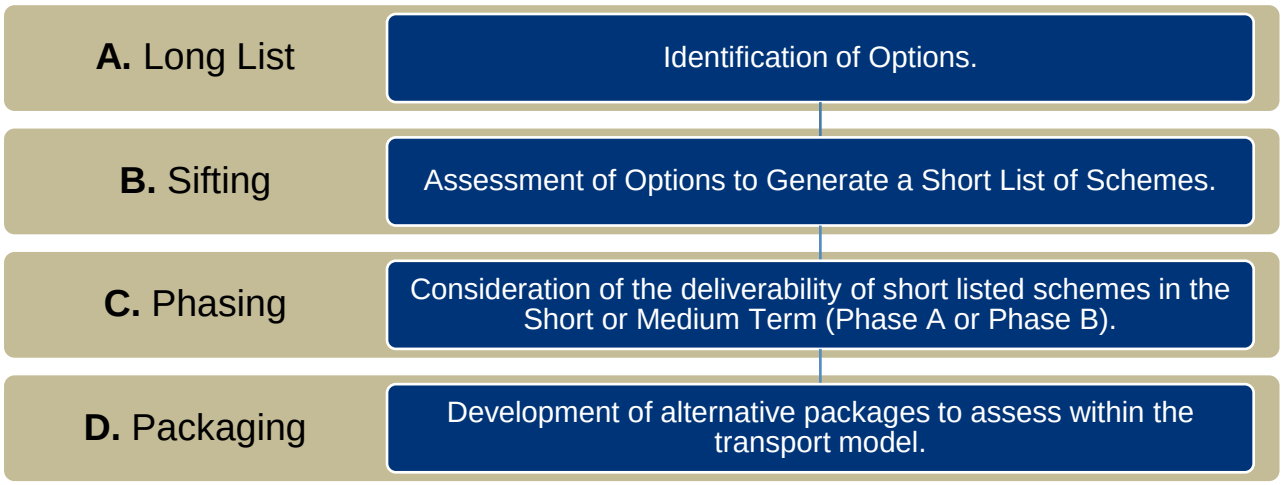
11.1.8 The Long List focused on measures to improve the provision of surface level transport which could either complement the Cambridgeshire Autonomous Metro (CAM) or form part of Phase 1 of the network. None of the options within the long list are considered to be alternatives to the CAM, but conversely none are reliant on the CAM being delivered in full or part. This is an important distinction and should inform the context when considering the listed options.

11.2 Sifting Process

11.2.1 Following the identification of the long list, a sifting process was undertaken through which to filter out those schemes which would not meet the overarching objectives of the study or which were deemed unrealistic from a deliverability perspective (see Figure 11.1).

11.2.2 Subsequently, the remaining schemes were identified as being either appropriate for delivery in the short or medium term to inform the packaging of the measures prior to their assessment within the Cambridge Paramics Model. The process and outputs of the sifting and assessment, together with the rationale behind the phasing and packaging of interventions, are detailed herein.

Figure 11.1: Sifting Process



Assessment Criteria

11.2.3 The sifting process focused on the ability of each measure to address locally specific objectives and deliverability issues which could form showstoppers preventing the options from having any realistic chance of implementation. Measures were expected to meet at least one of the objectives and present no major deliverability issues to be taken forward to the second stage of the sifting process, based upon a qualitative evaluation undertaken by an experienced panel of transport professionals.

11.2.4 The assessment criteria which formed the basis to the assessment are contained within Table 11.2, together with the rationale behind their use and suitability. The criteria reflected factors which would determine if the schemes were realistic and deliverable and correlated with the broad framework of the Department for Transport's Early Assessment and Sifting Tool (EAST).

Table 11.2: Assessment Criteria

Area	Criteria	Rationale
Objectives		
Capacity	Increase in Public Transport Capacity	The ability of the intervention to enable more people to travel to and from the city using public transport at any given time. This could be related to additional seating on existing services, increased frequency of existing services or entirely new services. Whilst not directly affecting these, various interventions could allow for the potential for any of these to be increased.
	Ability to contribute to 24% reduction in traffic levels	Actively discourages travel by car to help reduce traffic in Cambridge by 25% according to GCP goals. This could comprise reducing lane and junction capacity as well as closing off direct through-routes for general traffic. These interventions then detract from the attractiveness of the car when compared to other modes of travel.
	Propensity to Reduce Congestion / Delay	The extent to which the intervention will alleviate or bypass pinch points in the network.
Connectivity	Reduced Journey Time for Public Transport	Enables people to be able to travel to and from the city quicker using public transport when compared to the existing situation. What is also key is the competitiveness of public transport journey times against that of the car.
	Increased Reliability for Public Transport	Enables public transport vehicles to better serve their designated stops as timetabled and displayed. Interventions will also minimise risk of unannounced delay to public transport. This will also help to change public perceptions of lateness and '4 at once'.
	Ease of Interchange	Facilitates enhanced transfer between different modes of public transport whilst including provision for cycling. This enlarges the jobs market catchment for residents looking to travel by sustainable modes of transport whilst also encouraging those in cars to make a switch should no direct public transport service between their origin and destination be available to them.
	Benefits to Active Travel	Supports the attractiveness of walking, cycling and other active travel modes along the corridor. Benefits could be realised by interventions in various ways, including

Area	Criteria	Rationale
		connectivity – facilitating more direct routes, permeability – allowing ease of crossing major junctions and safety.
	Supports the Cambridge Autonomous Metro	Interventions that complement (or do not compromise or compete against) the delivery of CAM through providing early infrastructure for the CAM itself to utilise or by strengthening the public transport offer along the Eastern Corridor.
	Scale of Catchment (Housing/Jobs)	The size/population of existing residential and employment areas that any intervention could serve, based upon the 400m and 800m distances widely acknowledged as being the thresholds for which people will walk to a bus stop or station.
	Ability to Unlock Growth	Strengthens the case to develop currently undeveloped land in the vicinity of the intervention proposed that would be otherwise be inappropriate from a traffic and highways perspective, and/or helps to connect different areas of growth within the city.
Communities	Road Safety	Potential to reduce the number and severity of collisions upon implementation. This considers the safety of pedestrians and cyclists as well as general traffic.
	Protection of Green Spaces	Land comprising green space would remain at its current extent with the community value of these spaces potentially enhanced.
	Environment, Air Quality and Carbon	Contributes to the ambition of national and local policy objectives to mitigate against the adverse impacts of climate change. Implementation could have long term benefits to nature and to people's health.
	Quality of the Public Realm	Ability of the intervention to enhance the setting of key landmark features along the corridor, such as water courses, public art, streetscape and listed buildings.
	Severance	Produces an unwelcome disconnect between neighbouring places and spaces through the physical intrusion of hard engineering works which results in some form of metaphorical barrier that becomes more difficult to cross for various users.
Deliverability		
Physical	Engineering Constraints	The apparent difficulty of delivering an intervention in its proposed location due to level differences, land availability and competing infrastructure.
	Environmental Constraints	The apparent difficulty of delivering an intervention in its proposed location due to local sensitivities in the natural environment which can include impacts upon green spaces, water courses and habitats.
Legal	Landownership	Considers the availability of land, the potential need to purchase land, the supportiveness of landowners, and the complexity of multiple landowners. Schemes score better when there are no land take requirements, land is under the control of the local authority, or where there is a commitment from a landowner to be supportive of any works.
	Planning	The extent to which the scheme is likely to require planning permission and the likelihood of planning permission being granted.
Support	Political / Public	The apparent difficulty of delivering an intervention in its proposed location due to local opposition from council members or the general public – including residents and business owners.
	Stakeholders	The apparent difficulty of delivering an intervention in its proposed location due to local opposition from council members or the general public – including residents and business owners.
Financial	Capital Costs	Provides an indicative high-level estimate in terms of the relative costs of the scheme options.
Phasing	Deliverable in the Short Term (0-5 years)	Indicates if a scheme can be implemented in the short term
	Deliverable in the Medium Term (5-10 years)	Indicates if a scheme can be implemented in the medium term.

11.3 Phasing

11.3.1 In seeking to secure improvements in the capacity and connectivity of sustainable transport, together with benefits to local communities through a reduction in the impacts of travel through the area, two distinct time-based factors shaped the nature of the schemes to be taken forward and the packages within which they sat.

11.3.2 In the short term there is a requirement to improve the current transport offer along Newmarket Road. Relatively quick wins are required in the next five years to address the current inadequacies in provision and the lack of real travel choice for many, together with a need to kick start the economy following the impacts of the Covid-19 lockdown between March 2020 and April 2021.

11.3.3 In the medium term (5-10 years) there is the need to facilitate housing and jobs growth within the corridor, not least the opportunities presented in the emerging Greater Cambridge Local Plan. Potential measures should be free-standing but have the potential to form a pre-cursor to the implementation of the Cambridge Autonomous Metro either as an early deliverable of the CAM, or a complementary measure to support its operation once in place.

11.3.4 On this basis, it was determined which schemes should be taken forward as a short term or medium term measure, or both, at the conclusion of the sifting process.

11.4 Results of the Assessment

11.4.1 The assessment of the long list was based upon the qualitative judgement of a panel of transport experts from the public and private sectors. Each scheme was considered in terms of the extent to which it would make a major or minor, positive or negative impact on the criteria, or if the impact would be neutral. Cost bandings were identified in terms of the potential financial implications.

11.4.2 The results of the assessment determined that 33 interventions should be taken forward and 26 rejected, of the 59 measures initially identified. In terms of phasing, it was concluded that 10 should be considered in terms of Phase A interventions, 12 should be considered as part of a second phase of measures, and a further 11 should be considered for both.

11.4.3 The results of the assessment are summarised in Table 11.3.

Table 11.3: Scoring of Long List Options

Ref.	Scheme Options
Pass	Phase A
BL.05	New outbound bus lane between Elizabeth Way and the Leper Chapel.
JC.03	Reconfiguration of the Newmarket Road & Coldham's Lane junction.
JC.04	Signalisation and reconfiguration of the Newmarket Road & Barnwell Road junction (higher capacity).
JC.05	Signalisation and reconfiguration of the Newmarket Road & Barnwell Road junction (lower capacity).
JC.06	Reconfiguration of the Newmarket Road & Ditton Lane junction (higher capacity).
JC.07	Reconfiguration of the Newmarket Road & Ditton Lane junction (lower capacity).
JC.09	Signalisation of the junction of Newmarket Road and Airport Way.
AT.01	Provision of continuous segregated inbound cycle lane along Newmarket Road.
AT.02	Provision of continuous segregated outbound cycle lane along Newmarket Road.
AT.03	Promotion of Park and Cycle from the P&R site.

Ref.	Scheme Options
Pass	**Phase B**
BW.04	Online - between Park and Ride and A14.
BW.10	Offline (south) - between Brookfields and Coldham's Lane via a new bridge over the rail line.
BW.11	Offline (south) - between Coldham's Lane and P&R via Marshall's Airport (east of runway).
BS.02	New bus service between the station, Mill Road, Cambridge East and the Park and Ride.
RA.02	Double track the Cambridge to Ipswich Line between Cambridge and Newmarket.
RA.04	Provide new station at 'Cambridge East'.
RA.07	Provide a new Parkway Station at Six Mile Bottom
JC.08	Reconfiguration of A14 Junction 34 (with Ditton Lane) to remove slips.
JC.10	Signalisation and Reconfiguration of Quy Interchange
AT.04	Provide a new shared use ped/cycle bridge over the rail line and Coldham's Lane to link the existing 'Tins' cycle path with the airport site.
AT.06	Provide new cycle lanes along Coldham's Lane between the airport site and the Sainsbury's roundabout and enhance existing cycle provision along Brooks Road.
AT.07	Provide a new off-carriageway ped-cycle link from the airport site to connect into the Chisholm Trial via Barnwell Road and Coldham's Common.
Pass	**Both**
BL.02	Remove inbound bus lanes.
BL.03	Remove outbound bus lanes.
BS.01	Increase the frequency of existing P&R services.
BS.03	Provide new service from P&R to Addenbrookes hospital and the Biomedical Campus.
PR.01	Expansion of current Park and Ride site.
PR.02	Relocation of Park and Ride to south of Newmarket Road and east of Airport Way.
BG.02	Permanent Bus Gate on Mill Road (at bridge over rail line).
JC.01	Reconfiguration of Elizabeth Way Roundabout, including the removal of Subway (higher capacity).
JC.02	Reconfiguration of Elizabeth Way Roundabout, including the removal of Subway (lower capacity).
HW.01	Additional lane(s) on Newmarket Road to east of Airport Way junction.
ITS.01	Reconfiguration of all signals to manage/control flow along Newmarket Road & wider network.
Rejected	
BW.01	Online - full length of Newmarket Road.
BW.02	Online - between Elizabeth Way Roundabout and Leper Chapel.
BW.03	Online - between Leper Chapel and Park and Ride.
BW.05	Offline (north) - between Leper Chapel and Quy Water via former rail line and High Ditch Road.
BW.06	Offline (north) - between Cambridge North Station and former rail line.
BW.07	Offline (south) - between Leper Chapel and Barnwell Road via Coldham's Common.
BW.08	Offline (south) - between Barnwell Road and P&R via Marshall's Airport (west of runway).
BW.09	Offline (south) - between East Road and Brookfields via Mill Road
BW.12	Offline (south) – Coldham's Lane between Newmarket Road and south of runway.
BL.01	Extend inbound bus lanes to provide continuous link between P&R and City Centre.
BL.04	Extend outbound bus lanes to provide continuous link between City Centre and P&R.
BL.06	New tidal bus lane (or busway) between Elizabeth Way and the Leper Chapel.
BL.07	Conversion of the Cambridge to Newmarket Rail Line into a two-way bus lane.
BG.01	Bus Gate on Newmarket Road.
PR.03	Relocation of Park and Ride to north of Quy Interchange (A14 Junction 35).
PR.04	New Park and Ride site to the north of Fen Ditton.
RA.01	Reinstate the Cambridge to Mildenhall Line.
RA.03	Realignment of the Cambridge to Newmarket Line to the north of Cherry Hinton.
RA.05	Provide new station at Cherry Hinton.

Ref.	Scheme Options
RA.06	Provide new station at Barnwell.
RA.08	Provide a passing point near Fulbourn on the Cambridge to Newmarket Line.
HW.02	One way traffic on Newmarket Road, Coldham's Lane and Barnwell Road to form gyratory.
HW.03	Priority lane for Ultra Low Emission Vehicles only on Newmarket Road.
HW.04	Removal of two lanes (one inbound, one outbound) between Elizabeth Way and Coldham's Lane.
HW.05	Carriageway widening along Coldham's Lane south of the airport, with a left turn filter lane for buses at the Sainsbury's roundabout.
AT.05	Provide new dedicated cycle lanes along Brookfields / Mill Road.

11.5 Rejected Schemes

11.5.1 The majority of those schemes rejected at this stage were as a result of deliverability concerns, particularly environmental constraints such as loss of sensitive public open space, the physical ability to accommodate the schemes within a tight carriageway without significant disbenefits to many local residents, and the timeframe it would take to deliver major infrastructure – despite in some instances being very credible schemes in their own right.

11.5.2 Table 11.4 summarises the rationale behind the rejection of the 22 discounted options.

Table 11.4: Basis for the Rejected Long List Schemes

Ref.	Scheme Options	Rationale for Rejection
BW.01	Online - full length of Newmarket Road.	Providing a busway along large parts of Newmarket Road would be extremely difficult, or arguably, impossible given the road widths, severance, frontage access issues and mature trees. This would have to be at the expense of general traffic (which would be re-routed), footpaths and cycle lanes, and even residents' properties in some cases. It would also have a severing impact on the local community given the design requirements limiting crossing points. It was therefore concluded that in several respects the option would undermine the overarching objectives we are trying to achieve, whilst deliverability would also be extremely problematic and unpopular.
BW.02	Online - between Elizabeth Way Roundabout and Leper Chapel.	Would require the use of significantly more road space and be considerably more expensive to deliver than a more conventional bus lane, to the determent of cyclists and other road users.
BW.03	Online - between Leper Chapel and Park and Ride.	Providing a busway along large parts of Newmarket Road would be extremely difficult given the land required (to the east of the Leper Chapel). This would have to be at the expense of general traffic (which would be re-routed), footpaths and cycle lanes, and even residents' properties in some cases. It would also have a severing impact on the local community given the design requirements limiting crossing points. It was therefore concluded that in several respects the option would undermine the overarching objectives we are trying to achieve, whilst deliverability would also be extremely problematic and unpopular.
BW.05	Offline (north) - between Leper Chapel and Quy Water via former rail line and High Ditch Road.	Provides a relatively direct, segregated link into the city centre. The additional distance buses would have to travel on the alignment could be offset by the faster speed at which they could operate and the removal of buses from Newmarket Road would present an opportunity to prioritise provision for pedestrians and cyclists. However, there are concerns in terms of the additional mileage impacting upon bus operators' costs and that services would be removed from Newmarket Road, which could affect revenue. The ability to accommodate a new junction on Newmarket Road to the east of the Leper Chapel, the impact on the setting of the Chapel, on the alignment of the Chisholm Trail, and to the open space to the north of Barnwell together provide too many concerns to make this a suitable option.
BW.06	Offline (north) - between Cambridge North Station and former rail line.	This intervention has the potential to supplement other measures in terms of benefits to orbital movements and direct access to Cambridge North Station. It would also enable better connectivity between jobs and growth in the north and east of the city, and as such take pressure of capacity in the city centre. A bridge alignment adjacent to the existing could minimise the visual intrusiveness of the scheme, although the need to traverse the popular open space to the south of the river could be difficult to mitigate, particularly where the original track bed has been encroached upon.
BW.07	Offline (south) - between Leper Chapel and Barnwell Road via Coldham's Common.	Whilst this alignment could provide improved bus access to the Marshall development, the impacts on Coldham's Common and the brook would be significant and detrimental. There is likely to be little public or political support and engineering difficulties in terms of managing the watercourse and providing a new junction on Newmarket Road would add further complications to delivery. Diversion of the Newmarket Road Services via this route would add mileage and costs for the bus operator, and potentially could lose passengers who currently board on the Newmarket Road.
BW.08	Offline (south) - between Barnwell Road and P&R via	The alignment would be such that it could serve both existing communities and new development on the Marshall's site, whilst the impact on the current network and key environmental assets would be minimal. However, it would not be deliverable whilst the airport is operational as it would

Ref.	Scheme Options	Rationale for Rejection
	Marshall's Airport (west of runway).	sever the airport buildings from the runway and as such could not be in place within the timescale required. Diversion of the Newmarket Road Services via this route would add mileage and costs for the bus operator, and potentially could lose passengers who currently board on the Newmarket Road.
BW.09	Offline (south) - between East Road and Brookfields via Mill Road	A busway along Mill Road would require extensive property acquisition and demolition, the removal of traffic and its re-routing within the wider network, restrictions on pedestrian and cycle access, and severance issues. It could be considered that this section of route is totally unsuitable for high frequency bus operation. The alignment between the lakes and bridging the rail line would add further complications to a scheme which would provide a very poor fit in terms of meeting the range of objectives required from investment in public transport in the east of the city. The provision of a busway on a single track or operating in one direction would still fail to mitigate many of its drawbacks.
BW.12	Offline (south) – Coldham's Lane between Newmarket Road and south of runway.	The lack of carriageway width, impact on general traffic, particularly the complexity of movements associated with the retail park and the significant pinch points along Coldham's Lane, would make it extremely difficult to provide a busway along the corridor. In addition, the potential negative impacts it would have on the common and walking and cycling movements make this an unpalatable option.
BL.01	Extend inbound bus lanes to provide continuous link between P&R and City Centre.	This is an excellent option in terms of the objectives of the study. However, there is not the width to deliver a continuous bus lane (in either direction) without significant compulsory purchase of properties and loss of pedestrian and cycle facilities along the corridor. Whilst less intrusive than a busway and having the ability to be used more flexibly in terms of permitted vehicles and hours of operation, a bus lane would require the widening of the carriageway, unless general traffic was prohibited completely.
BL.04	Extend outbound bus lanes to provide continuous link between City Centre and P&R.	There is not the width to deliver a continuous bus lane (in either direction) without significant compulsory purchase of properties and loss of pedestrian and cycle facilities along the corridor. Whilst less intrusive than a busway and having the ability to be used more flexibly in terms of permitted vehicles and hours of operation, a bus lane would require the widening of the carriageway, unless general traffic was prohibited. This could possibly accompany a Bus gate option on Newmarket Road.
BL.06	New tidal bus lane (or busway) between Elizabeth Way and the Leper Chapel.	A tidal lane would not provide the level of bus priority required throughout the day, given that demand on the corridor doesn't 'peak' at specific points in the day. Such provision may also add confusion to motorists and introduce a safety risk.
BL.07	Conversion of the Cambridge to Newmarket Rail Line into a two-way bus lane.	The replacement of the rail line between Cambridge and Newmarket with a two way bus only link would provide fast and direct into the city from not only from Newmarket town centre but other towns and villages within the broad corridor, providing greater public transport connectivity. However, the scheme would see the rail link between Cambridge, Newmarket and the ports lost with huge implications for strategic public transport capacity and the ability to move freight sustainably. On this basis alone, it is considered inappropriate to take forward.
BG.01	Bus Gate on Newmarket Road.	The removal of through traffic from Newmarket Road would result in significant re-routing, resulting in the deterioration in performance of the rest of the network, an increase in emissions and buses becoming stuck in queues elsewhere in the city.
PR.03	Relocation of Park and Ride to north of Quy Interchange (A14 Junction 35).	Both in terms of the provision of the infrastructure and operation of the supporting services, the site would present problems. Located in the green belt it would have an impact on the environment and landscape. Perceptually it could be unappealing for users, in being cited further away from the city centre, and operationally there would be issues in terms of increased costs and travel times (including negotiating the Quy Interchange). Whilst it would intercept many vehicles sooner, those travelling from the south via Airport Way would have further to travel.
PR.04	New Park and Ride site to the north of Fen Ditton.	The site offers potential to support a northern route realignment and intercept traffic travelling towards the busy Ditton Lane junction with Newmarket Road, catering for traffic exiting the A14 at J34 and utilising existing service provision. However measures to be introduced as part of the Cambridge North to Waterbeach Study are likely to cater for any demand from further north in places such as Horningsea, and given the limitations on demand and impact of works on the Green Belt, it is not recommended that it is taken forward.
RA.01	Reinstate the Cambridge to Mildenhall Line.	The principle of reinstating a heavy rail link to serve large new developments in Mildenhall is undermined by the practical realities. Much of the original alignment has been sold and developed and the cost and timescales for delivery would be significant. There is also the danger that it could duplicate the serve to be provided by CAM and compete for the same market of commuters, and damage areas of open space popular with local residents.
RA.03	Realignment of the Cambridge to Newmarket Line to the north of Cherry Hinton.	The realignment of the existing Cambridge - Newmarket line could generate significant benefits, for all modes of travel. Rail journey times and capacity would both benefit, as would the potential for the provision of East-West Rail in the future. At a more local level, the realignment would enable the removal of the level crossings which currently cause delays to general traffic and a safety concern for all road users. However, the costs and timeframe to implement, the impact on Coldham's Common and the complex planning and legal requirements to be met make it an unrealistic proposition for taking forward within this study.
RA.05	Provide new station at Cherry Hinton.	Local growth and the lack of attractive alternative travel options for existing Cherry Hinton residents, could provide enough demand for the new station. Concerns persist with regards to the

Ref.	Scheme Options	Rationale for Rejection
		capacity of the current line to accommodate a level of service frequency that would make the station viable, but as part of a wider scheme which would see capacity enhancements, it could provide excellent strategic connectivity for the area. However, a train station at Cherry Hinton could not be justified in addition to a station at Cambridge East.
RA.06	Provide new station at Barnwell.	The station would be dependent on the Cambridge to Mildenhall line being reinstated to be considered a possible option (and this unrealistic). However in its own right, the scheme has significant shortcomings, not least the impact on the open space in which it would be located, in terms of operational issues as a result of its proximity to Cambridge Station, and due to the lack of local growth opportunities and catchment it could serve.
RA.08	Provide a passing point near Fulbourn on the Cambridge to Newmarket Line.	A passing point would provide an incremental approach in providing more rail capacity. However, it was felt that an intervention which could provide greater strategic benefit in the long term (double tracking) would present a more comprehensive approach. The use of passing loops so close to Cambridge station where there is a high risk of delay can lead to significant downstream delay.
HW.02	One way traffic on Newmarket Road, Coldham's Lane and Barnwell Road to form gyratory.	Whilst this could free up highway capacity for sustainable transport measures, it could see a large increase in vehicle miles and become an inconvenience for many, particularly residents (as well as buses themselves). One way systems often see increases in vehicle speeds with the subsequent road safety connotations, and it is unlikely to be popular with the public or stakeholders, particularly the emergency services.
HW.03	Priority lane for Ultra Low Emission Vehicles only on Newmarket Road.	There is not the width to deliver a continuous ULEV lane (in either direction) without significant compulsory purchase of properties and loss of pedestrian and cycle facilities along the corridor. Whilst less intrusive than a busway and having the ability to be used more flexibly in terms of permitted vehicles and hours of operation, a ULEV lane would require the widening of the carriageway.
HW.04	Removal of two lanes (one inbound, one outbound) between Elizabeth Way and Coldham's Lane.	The removal of capacity for general traffic would provide scope for sustainable travel improvements and would be relatively straight forward in engineering terms. The question is, would the traffic just disappear with motorists switching to other modes, would it seek alternative routes, or would queues lengthen and delays increase. There is likely to be an element of all three, but as a result bus journey times are likely to suffer to the extent that the public realm and active travel benefits cannot be deemed to outweigh the impact.
HW.05	Carriageway widening along Coldham's Lane south of the airport, with a left turn filter lane for buses at the Sainsbury's roundabout.	There is insufficient carriageway width to widen the carriageway due to the building line and the rail bridge. Land acquisition would be required, and a new bridge provided for the Newmarket to Cambridge line, making the intervention unviable.
AT.05	Provide new dedicated cycle lanes along Brookfields / Mill Road.	There is insufficient carriageway width to deliver segregated cycle lanes along Mill Road. In order to pass cyclists safely, vehicles would have to cross onto the other side of the carriageway creating a road safety risk. Vehicles could also end up queuing to overtake cyclists increasing the likelihood of delays, particularly for buses.

11.5.3 Whilst the above schemes have been discounted, it is not to suggest that they do not have merit. Several of the options could prove to be effective strategic interventions when considered within a city wide or sub-regional context.

11.5.4 Likewise, the removal of highway capacity between Elizabeth Way and Coldham's Lane could facilitate the transformation of the public realm and create an attractive gateway into the city. However, given the balance which has had to be struck between managing the movement and place functions of Newmarket Road, the decision was taken to reject the scheme at this stage. Such an option might be revisited in due course to complement the City Access Strategy.

11.6 Packaging of the Options

11.6.1 Improving the capacity and connectivity of public transport along the Newmarket Road corridor and the surrounding area would not be achieved through the piecemeal implementation of individual measures. An integrated multi-modal package based approach is required to provide a step-change in the quality of provision, the journey experience and the travel choices available to all users[33].

[33] City wide initiatives to reduce overall travel demand are likely to be necessary given the finite capacity on the network.

11.6.2 Such an approach reflects the complexities of the network, and the need for comprehensive route treatment. The current sustainable transport offer along Newmarket Road highlights the shortcomings of incremental investment. The packaging of the short-listed options will avoid such pitfalls.

11.6.3 Within this context, there are two distinct requirements to make the sustainable transport offer fit for purpose. Firstly, immediate improvements are required to the operation of Newmarket Road, and as such alternative short-term 'Phase A' packages have been identified.

11.6.4 These will be complemented by more medium-term improvements through which to open up growth opportunities to the east of Cambridge, with alternative 'Phase B' packages detailed herein which would build upon the short-term interventions.

11.7 Phase A (Short Term) Packages

11.7.1 Two distinct packages were identified through which improvements to sustainable transport could be achieved along Newmarket Road in the short term, considered to be the next five years. These consisted of:

Package A1: Newmarket Road Improvements

11.7.2 This would form a light touch approach to maximise the efficiency with which buses can operate along Newmarket Road based upon the management of traffic flow via sensors in the road to detect queuing and signal timings to respond accordingly.

11.7.3 The technology will hold traffic back at strategic junctions on all major roads feeding into Newmarket Road so that at no point would there be excess vehicles to cause delays to buses downstream. The buses themselves would be given priority at the junctions with Selective Vehicle Detection (SVD) technology designed to give them a 'green wave' along the corridor.

11.7.4 This would require the reconfiguration of all junctions and their signalisation, with traffic 'held' on approaches away from residential areas. As traffic can't be held back within the city centre for outbound movements, bus priority measures would be 'switched' to cater for eastbound services. All works would be deliverable within the existing highway boundary.

11.7.5 It was felt that the package would make more effective use of the existing road space, see journey time benefits for buses, remove the need for dedicated bus lanes allowing space to be reallocated to pedestrians and cyclists, and improve safety and reduce severance at major junctions. The schemes contained within the package are detailed in Table 11.5 and illustrated in Figure 11.1.

Table 11.5: Package A1 Component Schemes

Ref	Schemes
ITS.01	Reconfiguration of all signals to manage/control flow along Newmarket Road & wider network.
PR.01	Expansion of current Park and Ride site.
JC.01	Reconfiguration of Elizabeth Way Roundabout, including the removal of Subway (higher capacity).
JC.03	Reconfiguration of the Newmarket Road & Coldham's Lane junction.
JC.04	Signalisation and reconfiguration of the Newmarket Road & Barnwell Road junction (higher capacity).
JC.06	Reconfiguration of the Newmarket Road & Ditton Lane junction (higher capacity).
JC.09	Signalisation of the junction of Newmarket Road and Airport Way.
JC.10	Signalisation and Reconfiguration of Quy Interchange
BL.02	Remove inbound bus lanes.
BL.05	New outbound bus lanes between Elizabeth Way and the Leper Chapel.
AT.01	Provision of continuous segregated inbound cycle lane along Newmarket Road.
AT.02	Provision of continuous segregated outbound cycle lane along Newmarket Road.
AT.03	Promotion of Park and Cycle from the P&R site.

Package A2: Newmarket Road Improvements + Park and Ride Relocation

11.7.6 This approach built upon Package A1 by providing a greater degree of physical intervention to support the technology and management of traffic flow along Newmarket Road. The new infrastructure would see more significant changes made to key junctions in the corridor and the surrounding network, the relocation of the existing Park and Ride site to a location more suitable to intercepting vehicles before they enter the city, and an additional lane(s) between Airport Way and the Quy Interchange to accommodate queuing traffic.

11.7.7 The package was thought to have the potential to further reduce the dominance of traffic on Newmarket Road with the closure of A14 J34 and reconfiguration of other major junctions creating a safer and more sustainable transport corridor, and more convivial and civilised public realm. The schemes contained within this package are detailed in Table 11.6 and illustrated in Figure 11.2.

Table 11.6: Package A2 Component Schemes

Ref	Schemes
ITS.01	Reconfiguration of all signals to manage/control flow along Newmarket Road & wider network.
HW.01	Additional lane(s) on Newmarket Road to east of Airport Way junction.
JC.02	Reconfiguration of Elizabeth Way Roundabout, including the removal of Subway (lower capacity).
JC.03	Reconfiguration of the Newmarket Road & Coldham's Lane junction.
JC.05	Signalisation and reconfiguration of the Newmarket Road & Barnwell Road junction (lower capacity).
JC.07	Reconfiguration of the Newmarket Road & Ditton Lane junction (lower capacity).
JC.08	Reconfiguration of A14 Junction 34 (with Ditton Lane) to remove slips.
JC.09	Signalisation of the junction of Newmarket Road and Airport Way.
JC.10	Signalisation and Reconfiguration of Quy Interchange
BL.02	Remove inbound bus lanes.
BL.05	New outbound bus lanes between Elizabeth Way and the Leper Chapel.
PR.02	Relocation of Park and Ride to south of Newmarket Road and east of Airport Way.
AT.01	Provision of continuous segregated inbound cycle lane along Newmarket Road.
AT.02	Provision of continuous segregated outbound cycle lane along Newmarket Road.
AT.03	Promotion of Park and Cycle from the P&R site.

11.8 Phase B (Medium Term) Packages

11.8.1 In terms of measures to be delivered within the medium term as a pre-cursor to the opening of the CAM and in seeking to maximise housing and economic development opportunities within the east of the city, a further three packages were identified.

Package B1: High Quality Public Transport Route via Coldham's Lane

11.8.2 The provision of a continuous busway from a new Park and Ride facility, to the east of Airport Way, through the current airport site to Coldham's Lane would provide a fast and unhindered link to the edge of the urban area. From here buses would utilise Coldham's Lane and Brooks Road to connect into Mill Road, a destination in its own right, and travel inbound to the city centre.

11.8.3 This new corridor would open up the airport site for possible redevelopment, and located to the east of the current runway, could be delivered whilst the airport is still operational. The package is future proofed in that in the longer term it could form part of the eastern arm of the Cambridgeshire Autonomous Metro.

11.8.4 A bus gate on Mill Road would reduce the volume of general traffic on Mill Road freeing up capacity for bus service provision whilst complementary cycle infrastructure improvements would also help in increasing the connectivity of the airport site by sustainable modes. The schemes contained within this package are detailed in Table 11.7 and illustrated in Figure 11.3.

Table 11.7: Package B1 Component Schemes

Ref	Schemes
BW.04	Online - between Park and Ride and A14.
BW.11	Offline (south) - between Coldham's Lane and P&R via Marshall's Airport (east of runway).
BG.02	Bus Gate on Mill Road (at bridge over rail line).
BS.02	New bus service between the station, Mill Road, Cambridge East and the Park and Ride.
BS.03	Provide new service from P&R to Addenbrookes hospital and the Biomedical Campus.
PR.02	Relocation of Park and Ride to south of Newmarket Road and east of Airport Way.
AT.04	Provide a new foot-cycle bridge(s) over the rail line and Coldham's Lane to link the existing Tins cycle path with the airport site.
AT.06	Provide new cycle lanes along Coldham's Lane between the airport site and the Sainsbury's roundabout and enhance existing cycle provision along Brooks Road.
AT.07	Provide a new off-carriageway foot-cycle link from the airport site to connect into the Chisholm Trial via Barnwell Road and Coldham's Common.

Package B2: High Quality Public Transport Route via The Tins

11.8.5 This package differed from Package B1 through the provision of a bridge from the south of the airport site, spanning Coldham's Lane and the Cambridge to Newmarket rail line, before running between the two lagoons and joining Mill Road via Brooklands.

11.8.6 Whilst a more expensive option than Package B1, it was felt it could provide a more direct connection into Mill Road and then on to the Station and the city centre. The bridge could be converted into a pedestrian and cycle link as and when the tunnels associated with the Cambridgeshire Autonomous Metro become operational. The schemes contained within this package are detailed in Table 11.8 and illustrated in Figure 11.4.

Table 11.8: Package B2 Component Schemes

Ref	Schemes
BW.04	Online - between Park and Ride and A14.
BW.10	Offline (south) - between Brookfields and Coldham's Lane via a new bridge over the rail line.
BW.11	Offline (south) - between Coldham's Lane and P&R via Marshall's Airport (east of runway).
BG.02	Bus Gate on Mill Road (at bridge over rail line).
BS.02	New bus service between the station, Mill Road, Cambridge East and the Park and Ride.
BS.03	Provide new service from P&R to Addenbrookes hospital and the Biomedical Campus.
PR.02	Relocation of Park and Ride to south of Newmarket Road and east of Airport Way.
AT.04	Provide a new foot-cycle bridge(s) over the rail line and Coldham's Lane to link the existing Tins cycle path with the airport site.
AT.06	Provide new cycle lanes along Coldham's Lane between the airport site and the Sainsbury's roundabout and enhance existing cycle provision along Brooks Road.
AT.07	Provide a new off-carriageway foot-cycle link from the airport site to connect into the Chisholm Trial via Barnwell Road and Coldham's Common.

11.9 Phase C (Long Term) Package

11.9.1 The option sifting and package development process highlighted the potential scope for rail-based investment to meet the longer-term transport capacity demand in the east of the city. This would have much wider implications for the city and wider sub-region given the proposals for East-West Rail to connect Cambridge to the Haven ports and as such it was felt that it would be most appropriate for this to be taken forward outside of this business case. However, for completeness, a potential rail based package which emerged from the optioneering has been identified below.

Package C1: Long Term Rail Option

11.9.2 This package could provide a step change in rail capacity to the east of the city through the double tracking of the line between Cambridge and Newmarket, coupled with the provision of new stations at a site to serve the southern edge of the airport site, and in the Six Mile Bottom area, the latter of which could operate as a Parkway Station given its proximity to the A11 and A14.

11.9.3 Such investment in the rail network would provide potential benefits above and beyond this study. The enhancements would seek to reflect the wider aspirations of the East-West Rail Consortium to improve the capacity and connectivity of rail service between the Haven ports, Ipswich, Cambridge and beyond, but would also need to work at a local level in terms of traversing Coldham's Common and addressing level crossing issues in Cherry Hinton.

11.9.4 The schemes contained within this package are detailed in Table 11.9 and illustrated in Figure 11.5.

Table 11.9: Package B3 Component Schemes

Ref	Schemes
RA.02	Double track the Cambridge to Newmarket Line.
RA.04	Provide new station at 'Cambridge East'.
RA.07	Provide a new Parkway Station at Six Mile Bottom

11.10 Summary

11.10.1 The packaging process identified alternative approaches to potentially meet the short-term needs of the Newmarket Road corridor and the longer-term requirement to provide the capacity and connectivity to facilitate housing and economic growth in the city. They represented distinctly different approaches within the confines of a heavily urbanised and trafficked study area.

TETRA TECH

KEY

- Major development sites
- Expansion of Newmarket Road Park and Ride site. Promotion of park and cycle
- Install new segregated cycle lane along all of Newmarket Road in both directions
- Improve all traffic lights along Newmarket Road and nearby road to control traffic flow
  Remove inbound bus lanes
  Provide new outbound bus lanes between Elizabeth Way and the Leper Chapel
- Access to Chisholm Trail
- Reconfiguration of Elizabeth Way Roundabout, including the removal of Subway and reduce junction capacity
- Reconfiguration of the Newmarket Road & Coldhams Lane junction
- Install traffic lights and reduce junction capacity at Newmarket Road and Barnwell Road
- Reconfiguration of the Newmarket Road & Ditton Lane junction and reduce junction capacity
- Install traffic lights at the junction of Newmarket Road and Airport Way
- Improve capacity at Quy Interchange

Figure 11.1: Option A1 - Newmarket Road Improvements

DATE: 09.10.20 SCALE: 1:17,500 @ A3

DRAWN BY / REVIEWED BY: BR / BK

PROJECT NO:	DRAWING NO:	REVISION:
A081175-146	050	C

WYG
Quay West at MediaCityUK, Trafford Wharf Road,
Trafford Park, Manchester M17 1HH
Tel: 0161 872 3223
www.wyg.com

1. DO NOT SCALE FROM THIS DRAWING.
2. THIS DRAWING IS TO BE CHECKED WITH ALL OTHER RELEVANT DRAWINGS.
3. ANY DISCREPANCIES CHECK WITH WYG, IF IN DOUBT ASK.
4. DRAWING TO BE USED FOR PURPOSES OF THE ISSUE AND NOTED ON PLAN.

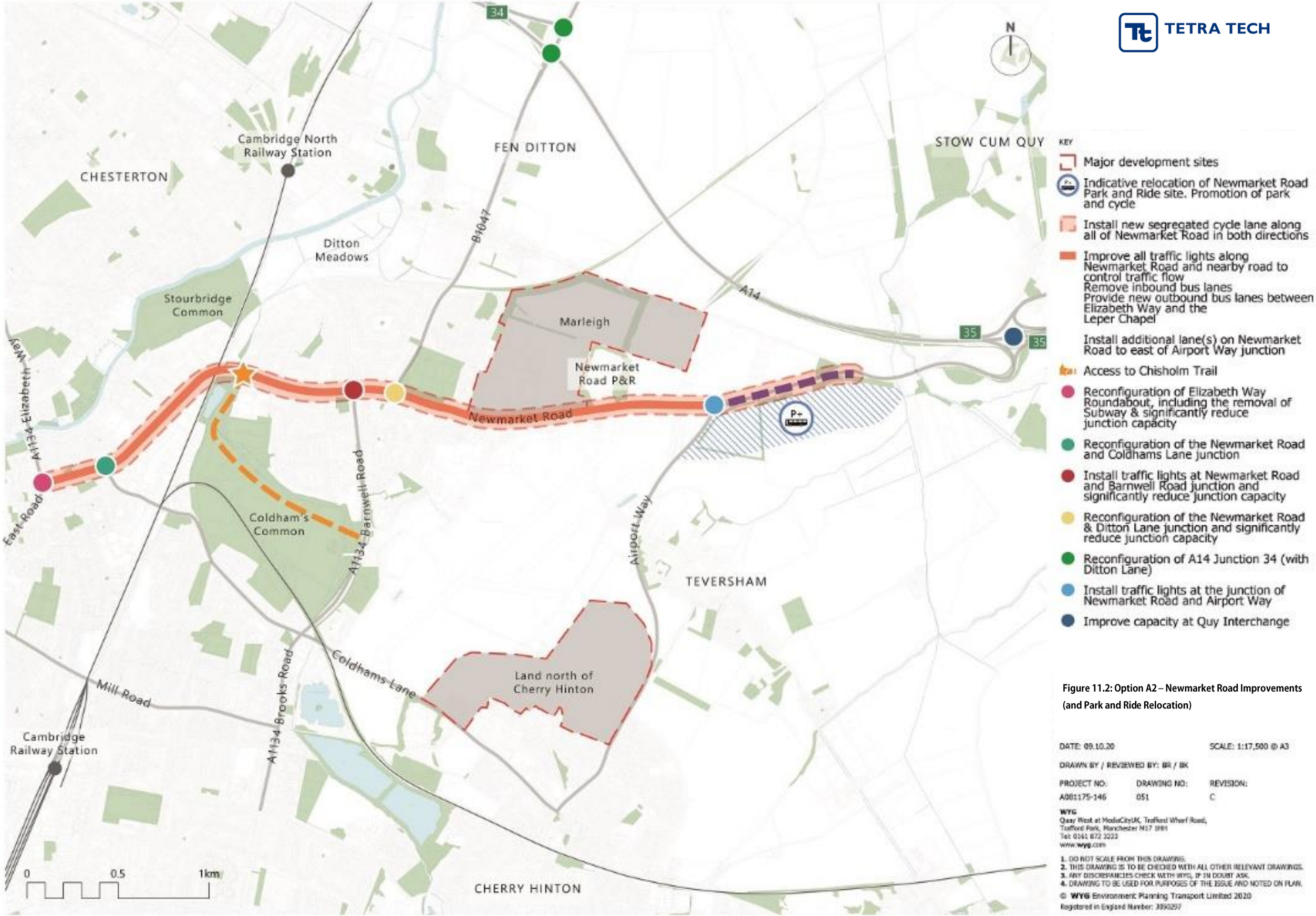


Figure 11.2: Option A2 – Newmarket Road Improvements (and Park and Ride Relocation)

DATE: 09.10.20 SCALE: 1:17,500 @ A3

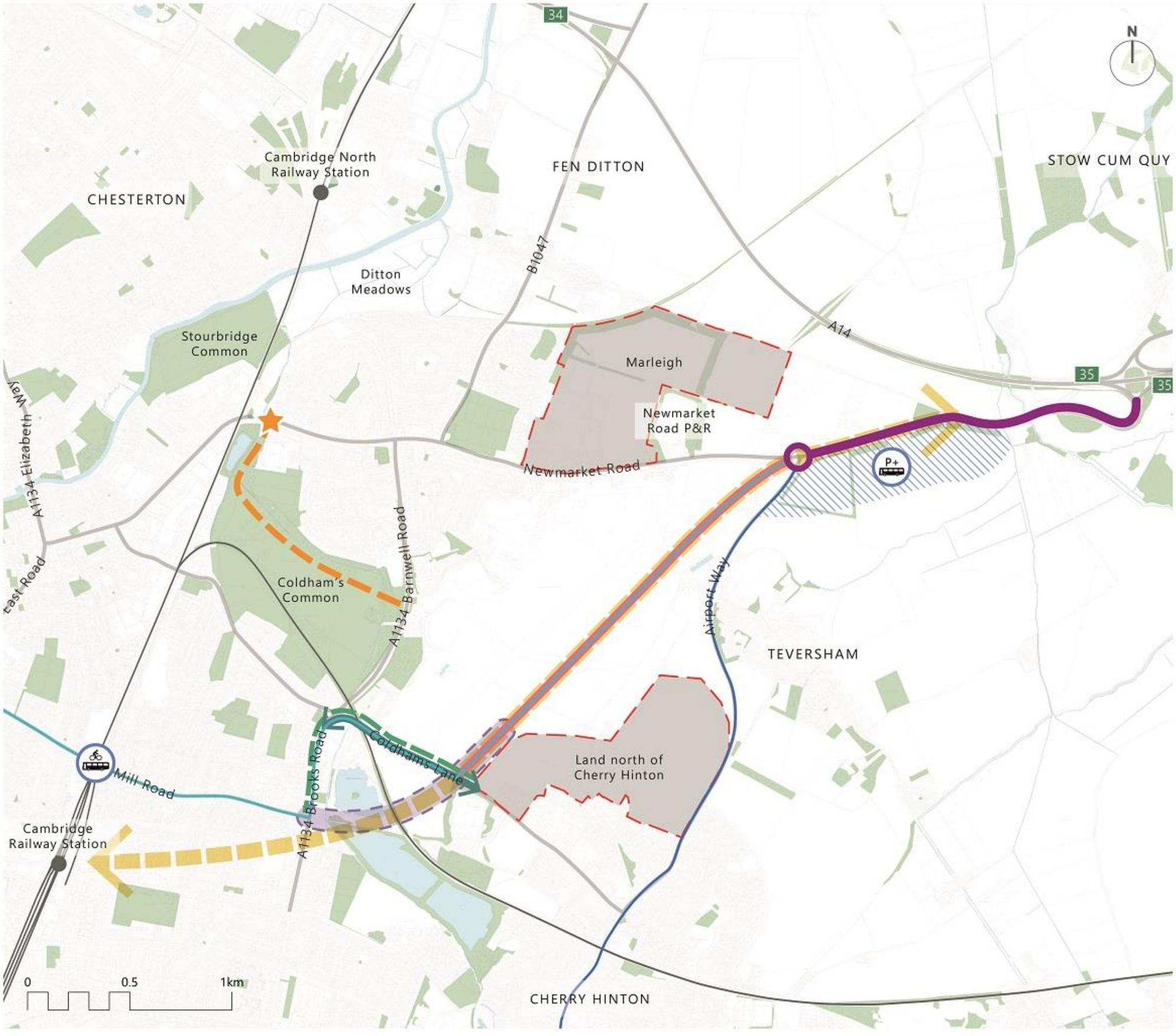
DRAWN BY / REVIEWED BY: BR / BK

PROJECT NO:	DRAWING NO:	REVISION:
A081175-146	051	C

WYG
Quay West at MediaCityUK, Trafford Wharf Road,
Trafford Park, Manchester M17 1HH
Tel: 0161 872 3223
www.wyg.com

1. DO NOT SCALE FROM THIS DRAWING.
2. THIS DRAWING IS TO BE CHECKED WITH ALL OTHER RELEVANT DRAWINGS.
3. ANY DISCREPANCIES CHECK WITH WYG, IF IN DOUBT ASK.
4. DRAWING TO BE USED FOR PURPOSES OF THE ISSUE AND NOTED ON PLAN.

TETRA TECH



KEY

- Major development sites
- Indicative relocation of Newmarket Road Park and Ride site to south of Newmarket Road and east of Airport Way
- Bus Gate (which would only allow buses through) on Mill Road Bridge
- Indicative CAM alignment
- New on road High Quality Public Transport route
- New off-road High Quality Public Transport route between relocated park and ride and Coldhams Lane via Marshall's Airport (to the east of the current runway)
- New High Quality Public Transport service between the station, Mill Road, Cambridge East and relocated park and ride
- New High Quality Public Transport service between Addenbrooke's hospital, Biomedical Campus and relocated Park and Ride
- New pedestrian and cycle bridges over the railway line and Coldhams lane to connect Tins cycle path with the airport site
- New cycle lanes along Coldhams Lane between the airport site and the Sainsbury's roundabout. Improve existing cycle provision along Brooks Road
- New pedestrian and cycle link from the airport site to connect into the Chisholm Trial
- Widen Coldhams Lane south of the airport. Install left turn filter lane for buses at the Sainsbury's roundabout

Figure 11.3: Option B1 – High Quality Public Transport Corridor (via Coldham's Lane)

DRAWN BY / REVIEWED BY: BR / BK

PROJECT NO:	DRAWING NO:	REVISION:
A081175-146	053	C

WYG
Quay West at MediaCityUK, Trafford Wharf Road,
Trafford Park, Manchester M17 1HH
Tel: 0161 872 3223
www.**wyg**.com

1. DO NOT SCALE FROM THIS DRAWING.
2. THIS DRAWING IS TO BE CHECKED WITH ALL OTHER RELEVANT DRAWINGS.
3. ANY DISCREPANCIES CHECK WITH WYG, IF IN DOUBT ASK.
4. DRAWING TO BE USED FOR PURPOSES OF THE ISSUE AND NOTED ON PLAN.

TETRA TECH

KEY

- Major development sites
- Indicative relocation of Newmarket Road Park and Ride site to south of Newmarket Road and east of Airport Way
- Bus Gate (which would only allow buses through) on Mill Road Bridge
- Indicative CAM alignment
- New on road High Quality Public Transport route
- New off-road High Quality Public Transport route between relocated park and ride and Coldhams Lane via Marshall's Airport (to the east of the current runway)
- New High Quality Public Transport service between the station, Mill Road, Cambridge East and relocated park and ride
- New High Quality Public Transport service between Addenbrooke's hospital, Biomedical Campus and relocated Park and Ride
- New pedestrian and cycle bridges over the railway line and Coldhams lane to connect Tins cycle path with the airport site
- New cycle lanes along Coldhams Lane between the airport site and the Sainsbury's roundabout. Improve existing cycle provision along Brooks Road
- New pedestrian and cycle link from the airport site to connect into the Chisholm Trial
- New off-road High Quality Public Transport service between Brookfields and Coldhams Lane via a New bridge over the rail line

Figure 11.4: Option B2 – High Quality Public Transport Corridor (via the Tins)

DATE: 09.10.20 SCALE: 1:17,500 @ A3

DRAWN BY / REVIEWED BY: BR / BK

PROJECT NO:	DRAWING NO:	REVISION:
A081175-146	054	C

WYG
Quay West at MediaCityUK, Trafford Wharf Road,
Trafford Park, Manchester M17 1HH
Tel: 0161 872 3223
www.wyg.com

1. DO NOT SCALE FROM THIS DRAWING.
2. THIS DRAWING IS TO BE CHECKED WITH ALL OTHER RELEVANT DRAWINGS.
3. ANY DISCREPANCIES CHECK WITH WYG, IF IN DOUBT ASK.
4. DRAWING TO BE USED FOR PURPOSES OF THE ISSUE AND NOTED ON PLAN.

TETRA TECH

KEY

- Major development sites
- Indicative CAM alignment
- Chisholm Trail
- Double track the Cambridge to Newmarket Line
- Provide new station at 'Cambridge East' (indicative location)
- Provide a new Parkway Station at Six Mile Bottom (indicative location)
- Provide new station at 'Fulbourn' (indicative location)

Figure 11.5: Option C1 – Long Term Rail Option

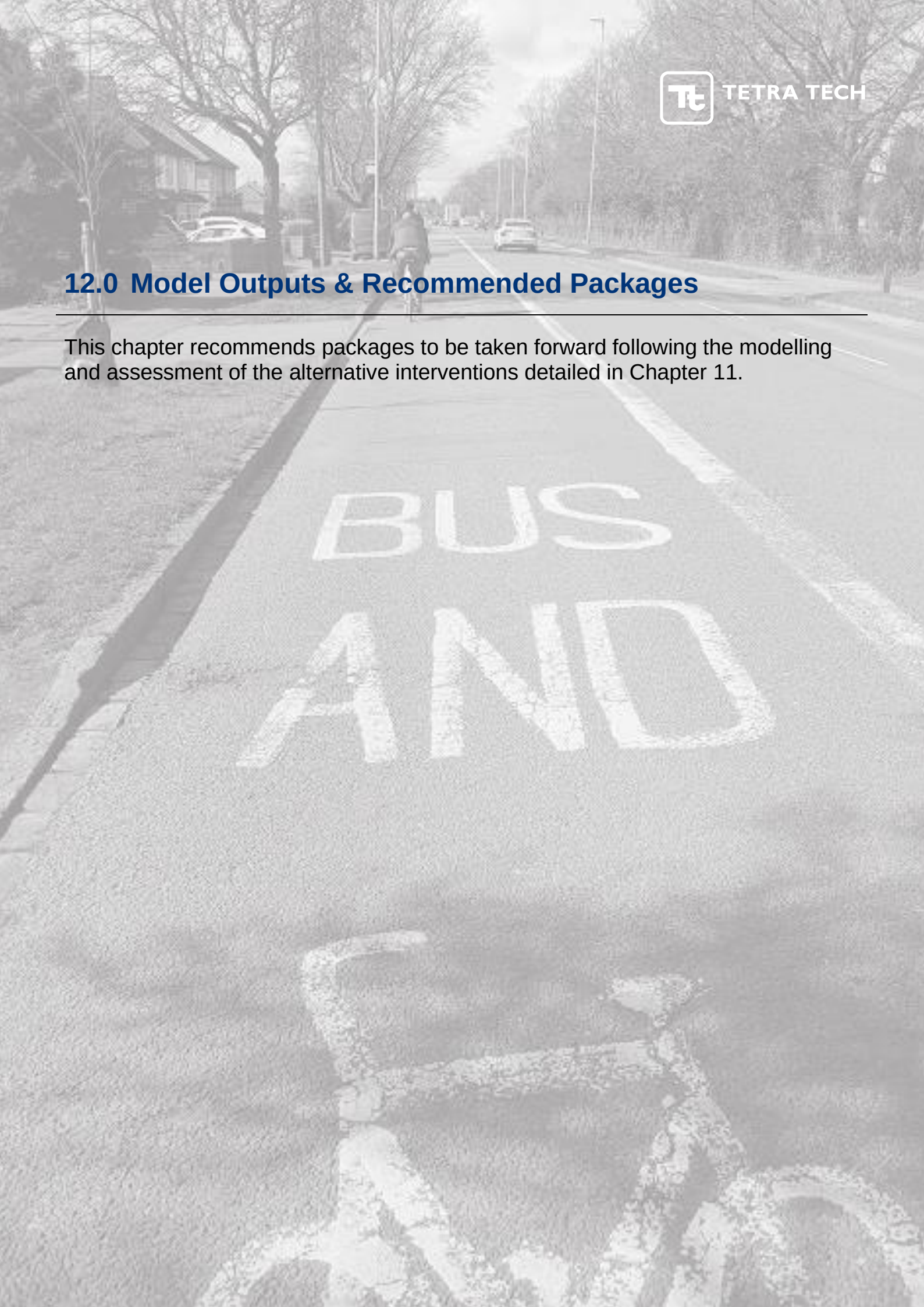
DATE: 09.10.20 SCALE: 1:17,500 @ A3

DRAWN BY / REVIEWED BY: BR / BK

PROJECT NO:	DRAWING NO:	REVISION:
A081175-146	055	E

WYG
Quay West at MediaCityUK, Trafford Wharf Road,
Trafford Park, Manchester M17 1HH
Tel: 0161 872 3223
www.wyg.com

1. DO NOT SCALE FROM THIS DRAWING.
2. THIS DRAWING IS TO BE CHECKED WITH ALL OTHER RELEVANT DRAWINGS.
3. ANY DISCREPANCIES CHECK WITH WYG, IF IN DOUBT ASK.
4. DRAWING TO BE USED FOR PURPOSES OF THE ISSUE AND NOTED ON PLAN.



12.0 Model Outputs & Recommended Packages

This chapter recommends packages to be taken forward following the modelling and assessment of the alternative interventions detailed in Chapter 11.

12.1 Overview

12.1.1 This section provides a high-level summary of the findings from the assessment of the alternative short and medium term packages of investment in transport improvements in the east of the city. A more detailed breakdown of the outputs is provided in the Economic Case.

12.1.2 The assessment was undertaken using the Cambridge Paramics Model and generated outputs relating to traffic volumes and comparative journey times for both buses and general traffic, resulting in a recommended way forward for the Newmarket Road corridor.

12.2 Modelling Process

12.2.1 The modelling and assessment of the packages was undertaken in a series of phases. Firstly, a reference case was established which demonstrated how the network would perform in 2026 with only committed planning and transport schemes coming forward.

12.2.2 This scenario highlighted how the network would be operating close to capacity with significant implications for future travel times. It also raised issues in terms of the ability to identify the performance of the respective packages, because in such a saturated network, the schemes identified would be insufficient to deliver many tangible benefits to the corridor. It suggested that more significant and city-wide demand management measures would be required to free up some of the road space to enable a repositioning of road user priorities to be considered.

12.2.3 Considering this, a 10% reduction in demand was applied to the scenarios in which the packages were critiqued. This was felt to be reasonable and realistic given:

- The Paramics model was not a variable demand model and so would not directly attribute a mode shift to reflect the improvement and interventions that would benefit pedestrians, cyclists and bus users.
- The City Access project and targeting on demand on other corridors into the city is anticipated to have a global impact on demand across the city and should be reflected in the evaluation of the Newmarket Road corridor.

12.3 Phase A – Short Term Interventions

12.3.1 Two alternative short-term packages of intervention were assessed within the model. Both packages of short-term interventions proposed for the Newmarket Road corridor would see a shift in road user priorities away from the car, with a reduction in capacity and junction configurations suited to pedestrians and cyclists. Package A1 formed a lighter touch approach, with Package A2 proposing more significant reductions in junction capacity, including the closure of A14 J34.

12.3.2 The redesign of major junctions with Elizabeth Way and Barnwell Road would see the safety and comfort of pedestrians and cyclists increase, albeit with the resultant loss of highway capacity. The use of an Intelligent Transport System throughout the corridor was also intended to regulate flow to make more efficient use of the capacity and avoid delays on Newmarket Road itself in both packages.

12.3.3 It soon became clear however, that due to the sheer demand to travel in the corridor in the 2026 scenario, any reduction in highway capacity would not just impact upon the journey times of general traffic but that buses would also get caught in the delays, undermining efforts to provide improved journey times and reliability.

12.3.4 Through various sensitivity tests it became clear that a hybrid approach, which utilised elements of both Package A1 and Package A2, provided the optimum balance between managing the demand and needs of all future road users in the corridor.

12.3.5 The hybrid package consisted of the individual schemes detailed in Table 12.1 and illustrated in Figure 12.1.

Table 12.1: Package A2 (Hybrid) Component Schemes

Ref	Schemes
ITS.01	Reconfiguration of all signals to manage/control flow along Newmarket Road & wider network.
JC.02	Reconfiguration of Elizabeth Way Roundabout, including the removal of Subway.
JC.03	Reconfiguration of the Newmarket Road & Coldham's Lane junction.
JC.05	Signalisation and reconfiguration of the Newmarket Road & Barnwell Road junction.
JC.07	Reconfiguration of the Newmarket Road & Ditton Lane junction.
BS.01	Increase the frequency of existing P&R services.
BS.03	Provide new service from P&R to Addenbrookes hospital and the Biomedical Campus.
BL.02	Remove inbound bus lanes.
BL.05	New outbound bus lane between Elizabeth Way and the Leper Chapel.
AT.01	Provision of continuous segregated inbound cycle lane along Newmarket Road.
AT.02	Provision of continuous segregated outbound cycle lane along Newmarket Road.
AT.03	Promotion of Park and Cycle from the P&R site.
HW.01	Additional lane(s) on Newmarket Road to east of Airport Way junction.
JC.09	Signalisation of the junction of Newmarket Road and Airport Way.
JC.10	Signalisation and Reconfiguration of Quy Interchange
PR.02	Relocation of Park and Ride to south of Newmarket Road and east of Airport Way.

12.4 Phase B – Medium Term Interventions

12.4.1 The two packages considered for delivery in the medium term focused on the provision of a high-quality public transport route through the current Cambridge Airport site and into the city centre via Mill Road.

12.4.2 They differed in terms of the connection between the airport and Mill Road, with Package B1 seeing buses re-join the road network at Coldham's Lane before heading down Brooks Road to join Mill Road, whilst Package B2 proposed the provision of a bridge between the airport and Brookfields and The Tins, spanning Coldham's Lane, the rail line and Cherry Hinton brook.

12.4.3 The latter of these two packages provided a more direct route and one which offered significantly more priority to buses. However, the feedback from public consultation between October and December 2020, including raised concerns over the impact on the Tins and identification of the challenges associated with the use of Brookfields, (which lies in the Mill Road Conservation Area), confirmed that it was deemed inappropriate to pursue further.

12.4.4 With attention focused on the route via Coldham's Lane, it became clear that the bus gate introduced on Mill Road as part of the COVID-19 emergency measures, would see large scale re-routing of traffic by 2026. In turn the model identified queues forming along Coldham's Lane in which the buses themselves would get caught.

12.4.5 A subsequent sensitivity test highlighted the need for a 50% reduction in travel demand on the network from those previously using Mill Road would be required to enable the surrounding network to function to the extent that buses could operate freely.

12.4.6 This might be achieve by the potential use of a Modal Filter on Coldham's Lane, a solution under consideration as a further eTRO. In addition, delivery of improvements to the Coldham's Lane roundabout would be needed. This would also provide an alternative bus route to the City Centre via Coldham's Lane and back onto Newmarket Road which would address issues around poor connectivity from the Coldham's Lane area,

12.5 Longer Term Interventions

12.5.1 The rail improvement option has not been assessed in detail because the scale and timescale for such work is beyond that available to GCP, and because, whilst adding significant value to East Cambridge, it does not directly address the issues on Newmarket road. It is, however, clearly complementary to the study and should be developed further with rail sector delivery bodies.

12.6 Conclusions

12.6.1 Doing nothing is not an option for the future of Newmarket Road. With demand in an already congested corridor set to grow, queuing and delays will not just undermine the ability to deliver housing and employment growth, but will see further deterioration in the quality of the public realm and detract from efforts to encourage walking and cycling in the corridor. These concerns are bourn out both by the analysis of data, but also strong endorsement from stakeholder and the public.

12.6.2 In accepting that intervention is required, the question then arises as to what should be done, particularly given the number of constraints the corridor faces in picking its way through the tightly built up urban area.

12.6.3 A balance must be struck between road users which is not apparent at present. As such the recommended packages to be taken forward seek to offer a solution which:

- Offer significant enhancements to the capacity of public transport provision in the corridor.
- Improve the ease and safety of connectivity for pedestrians and cyclists.
- Reduce the negative impacts of through traffic on local communities.

12.6.4 In identifying a package of works to achieve that, it is clear that the options do not resolve the situation when considered in isolation. If they are considered alongside the eTRO measures as a complement to the City Access package then there is an opportunity to significantly improve access for cyclists and pedestrians, enhance public transport, and reduce the environmental impact of the private car on the environment and urban realm.

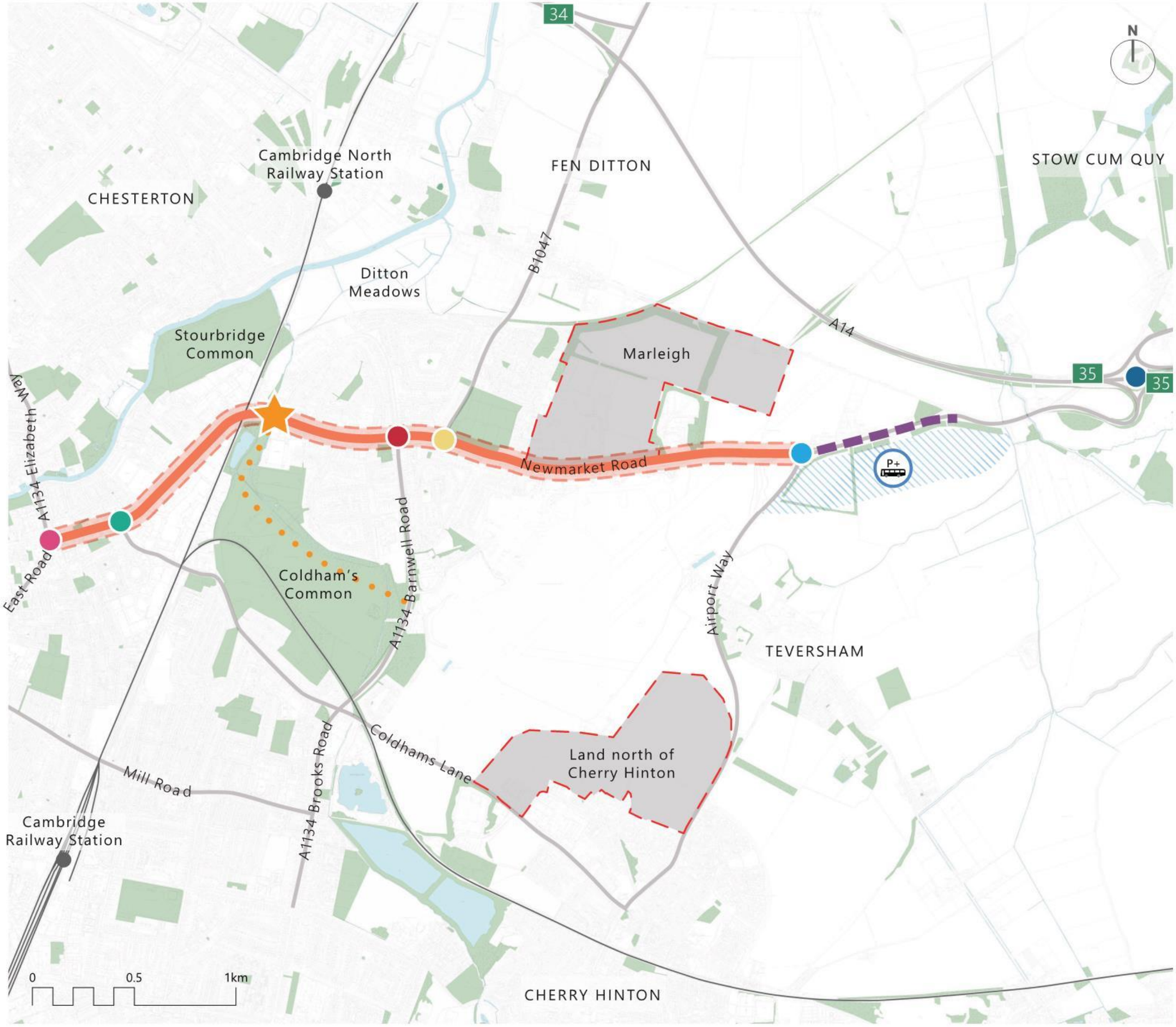
12.6.5 Such interventions will set the tone for longer term investment in mass transit solutions in the form of the Cambridgeshire Autonomous Metro and/or heavy rail improvements and facilitating sustainable housing and economic growth within the city.

12.7 Recommendations

12.7.1 It is recommended that:

- The hybrid package of measures is taken forward in the short term, following which the development of a high quality public transport corridor through the airport site into the city centre via Coldham's Lane should be developed once the is clarity with regards to the development of the Marshall site.
- The high-quality public transport corridor should be developed in line with the emerging requirements for the CAM system.
- In addition, the GCP should work with East West Rail and Network Rail to seek to maximise the amenity afforded by the Cambridge to Newmarket Line.

TETRA TECH



KEY

- Major development sites
- Indicative relocation of Park and Ride to south of Newmarket Road and east of Airport Way. Promotion of park and cycle
- Install new segregated cycle lane along all of Newmarket Road in both directions
- Improve all traffic lights along Newmarket Road and nearby roads to control traffic flow
  - Remove inbound bus lanes
  - Provide new outbound bus lane between Elizabeth Way and the Leper Chapel
  - Install additional lane(s) on Newmarket Road to east of Airport Way junction
- New pedestrian and cycle link from the airport site to connect into the Chisholm Trial
- Reconfiguration of Elizabeth Way Roundabout, including the removal of subway & reduce junction capacity
- Reconfiguration of the Newmarket Road and Coldhams Lane junction
- Install traffic lights and reconfiguration of Newmarket Road and Barnwell Road junction and reduce junction capacity
- Reconfiguration of the Newmarket Road & Ditton Lane junction and reduce junction capacity
- Install traffic lights at the junction of Newmarket Road and Airport Way
- Signalisation and reconfiguration of Quy Interchange

Greater Cambridge Partnership
Cambridge Eastern Access

Figure 12.1: Option A2 - Hybrid Package

Tetra Tech (formerly WYG)
Quay West at MediaCityUK, Trafford Wharf Road,
Trafford Park, Manchester M17 1HH
Tel: 0161 872 3223
www.**tetratecheurope**.com

For more information contact:

Telephone: 01223 699906
Email: contactus@greatercambridge.org.uk