
Subject	Review of C2C against CAM Objectives	Project Name	Cambridgeshire Autonomous Metro
Attention	Graeme Bampton	Project No.	B237400
From	Jacobs		
Date	26 June 2020		
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Executive Summary

Jacobs have been asked to review the current Cambourne to Cambridge (C2C) scheme against the CAM Objectives and Sub-Objectives which are set out in the Cambridgeshire and Peterborough Local Transport Plan: Cambridgeshire Autonomous Metro (CAM) Sub-Strategy. This document sets out four objectives which are aligned to the LTP objectives, to promote economic growth and opportunity, support the acceleration of housing delivery, promote equity and promote sustainable growth and development. Supporting these are 34 sub-objectives.

The C2C scheme aims to improve connectivity between new housing and key employment sites to support new infrastructure along the A428/A1303 and ensure that the housing and employment planned at the new settlements at Bourn Airfield and Cambourne West, North West Cambridge and Cambridge West are effectively linked between each other and with Cambridge city centre. It provides an interim solution for journeys into central Cambridge prior to the construction of the CAM City Tunnels section which will provide direct segregated links to the city centre, railway station and Biomedical Campus. The current intention is for C2C to connect directly into this section at a tunnel portal south of the University of Cambridge West Campus site.

The current C2C scheme is split into two phases, from West Cambridge to Madingley Mulch Roundabout and Madingley Mulch Roundabout to Cambourne. Both phases are expected to be constructed concurrently, with an opening date in 2024. The route is mainly segregated except through Upper Cambourne to the Hub in central Cambourne which runs on existing roads and from Grange Road in west Cambridge where services run on existing roads to the city centre and the route to the Biomedical Campus via the M11. C2C plans to run up to six services, per hour to the city centre and four to the Biomedical Campus. It uses low emission vehicles which are understood to be Electric or Euro VI Diesel. There is a mixed-use track alongside the segregated route which provides a cycling and walking network.

The publicly available C2C information has been reviewed with a focus on the Outline Business Case Options Appraisal Report, Strategic Outline Business Case reports, end of stage and summary reports, consultation leaflets and recent project updates. From this information, it can be concluded that C2C currently does not fully meet 12 of the CAM Sub-Objectives, and in turn does not support the four main objectives. In order for C2C to meet the objectives, it would need to commit to electric / zero emission vehicles, connect to the East West Rail Station, preferably via a segregated route around Cambourne, be future proofed for CAM central tunnels vehicles, provide a Metro-style service and minimise potential environmental impacts, particularly around Coton and Westfields.

It is recognised that a segregated route to the centre of Cambourne is unlikely to be feasible, so it is suggested that a segregated route which bypasses Cambourne to the south or north, with transport hubs connecting to local services and improved walking and cycling links is investigated.

1. Introduction

Jacobs have been asked to review the current Cambourne to Cambridge (C2C) scheme against the CAM Objectives and sub-objectives which are set out in the Cambridgeshire and Peterborough Local Transport Plan: Cambridgeshire Autonomous Metro (CAM) Sub-Strategy. The sub-strategy, is a daughter document of the Local Transport Plan (LTP), published in March 2020. The LTP outlines a series of key objectives aligned to three goals focused on improvements in Economy, Society and Environment.

One of the LTP's key objectives is to connect all new and existing communities sustainably so residents can easily access a good job within 30 minutes, spreading the region's prosperity. To achieve this objective, the LTP outlines how large-scale investment in public transport must provide extra capacity for people to travel sustainably across the region. CAM is an essential component of the overarching LTP vision and transport strategy as it will deliver a step change in connectivity, helping to deliver agglomeration benefits, and encouraging modal shift to low-carbon modes. The CAM vision is for an expansive high-quality, fast and reliable 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 urban centres.

2. CAM Objectives

Within the CAM Sub-Strategy, a series of four objectives and 34 sub-objectives has been produced and aligned to the LTP objectives to ensure these are considered and where appropriate can be delivered through the scheme. The four main objectives are summarised as:

- **CAM 1: Promote economic growth and opportunity** - CAM will improve employment opportunities as more residents will have 30 minutes or better access by high quality sustainable travel to key employment locations. It will also increase the attractiveness of surrounding towns to businesses to establish and expand their operations, thus spreading the growth benefits of the science and tech economy across the wider region.
- **CAM 2: Support the acceleration of housing delivery** - CAM is critical to delivering sustainable transport to support the required housing growth, much of which is on the edge or outside of Cambridge.
- **CAM 3: Promote Equity** - CAM will provide a high-quality, integrated passenger transport network to provide people, in both the urban and rural areas, with access to the opportunities and benefits that contribute to the enjoyment of a better quality of life. CAM will be aligned with the Bus Reform Task Force conclusions, other key public transport and highway schemes, East-West Rail and Cambridge South Station.
- **CAM 4: Promote sustainable growth and development** - CAM stops at the optimum location for accessibility, interchanges have easy step free access, and both are located at or close to key locations and integrated with walking and cycling routes.

The publicly available C2C documents were reviewed with a particular focus on the Outline Business Case Options Appraisal Report, Strategic Outline Business Case reports, end of stage and summary reports, consultation leaflets and recent project updates including GCP joint assemble papers. Our comparison of the current C2C scheme against these objectives and sub-objectives is shown in Table 1

in Appendix A and summarised in section 4 below, and a list of the key documents and information which were reviewed is contained within Appendix B.

3. Overview of C2C scheme

3.1 Project aims and drivers

The project aims to improve connectivity between new housing and key employment sites to support new infrastructure along the A428/A1303 and the long-term vision for the Cambridge-Milton Keynes-Oxford Arc. In particular it aims to ensure that the housing and employment planned at the new settlements at Bourn Airfield and Cambourne West, North West Cambridge and Cambridge West are effectively linked both between each other and with Cambridge city centre. The project aims to contribute to the South Cambridgeshire and Cambridge Local Plans, which is summarised in the C2C OBC.

It aims to provide, potentially via onward connections, better linkages to other key fringe growth locations, particularly Cambridge Biomedical Campus and North East Cambridge. The improved connectivity is predicted to be delivered through additional services and the Economic Case presents journey time savings from Cambourne to the centre of Cambridge (Parker Street) of approximately 20 minutes within the morning peak.

3.2 Current proposed route

The current C2C scheme is split into two phases, as shown in the figure below, from the Economic Case of the C2C Outline Business case:

- Phase 1 – West Cambridge to Madingley Mulch Roundabout
- Phase 2 - Madingley Mulch Roundabout to Cambourne

Although consultation was undertaken separately for each phase, the C2C Paper presented at the GCP joint assemble 4th June 2020 stated *'The OBC is for a single scheme and both phases are expected to be constructed concurrently, with an opening date in 2024.'*

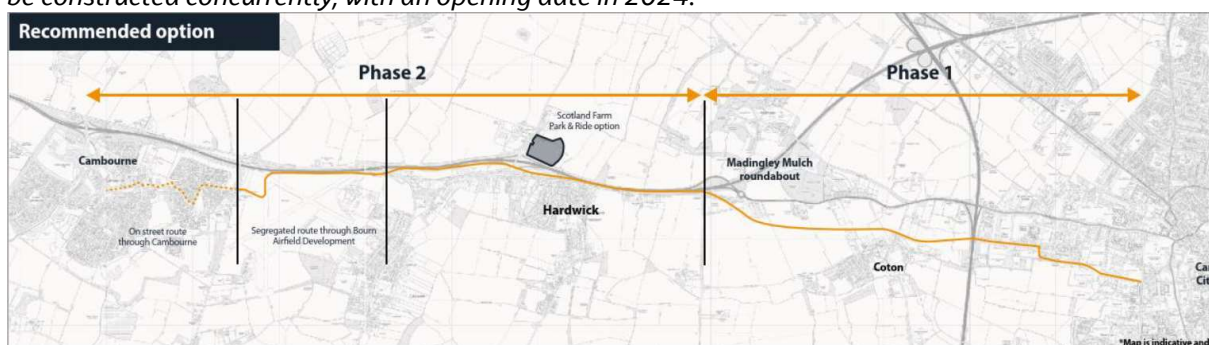


Figure 3.1 – C2C route alignment plan

The scheme connects into expected developments neighbouring the proposed Scotland Farm Park & Ride, Bourn Airfield and Upper Cambourne. The Greater Cambridge Partnership submission to government in consideration of the forthcoming second Roads Investment Strategy (RIS2) September 2018 sited a potential 6,000 homes in Cambourne & Bourn and 3,000 at Northwest Cambridge, as well as 14,000 new jobs at the Cambridge Biomedical Campus and 14,000 new jobs at the University

of Cambridge's West Cambridge site. It stated that it is 'expected that a significant proportion of new residents and new workers will need to make orbital trips between the north, west and south of Cambridge and interventions are required that will support them to make those trips without travelling through the city centre.'

The route is mainly segregated except through Upper Cambourne to the Hub in Central Cambourne which runs on an existing road, shared with other services. At the eastern end of the route it connects onto Grange Road where it uses the existing road network to run services to the city centre, with passengers travelling to the Cambridge Biomedical Campus needing to change onto the U Bus service or using one of the four C2C services an hour which run there via the M11. Key sections of the route including these non-segregated areas are discussed in further detail below.

3.3 Cambourne Route

It is understood that the route through Cambourne crosses Sterling Way and runs along Lancaster Gate which experiences some congestion during the morning peak, which will presumably be more congested once developments within Upper Cambourne and Bourne Airfield are completed:

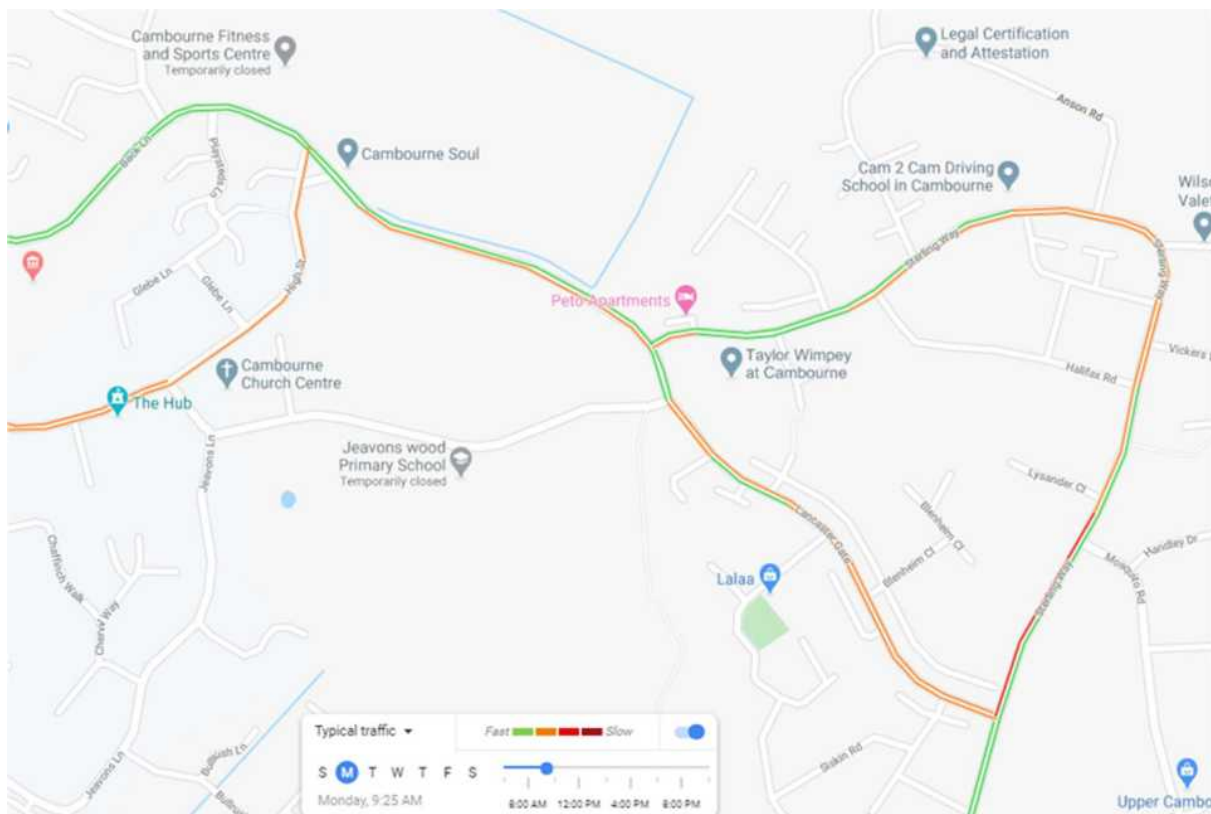


Figure 3.2 – Google map typical traffic data for Cambourne in the morning peak

The route does not currently connect into the planned East West Rail Station south west of Cambourne, as shown in the current east west Rail route map below:

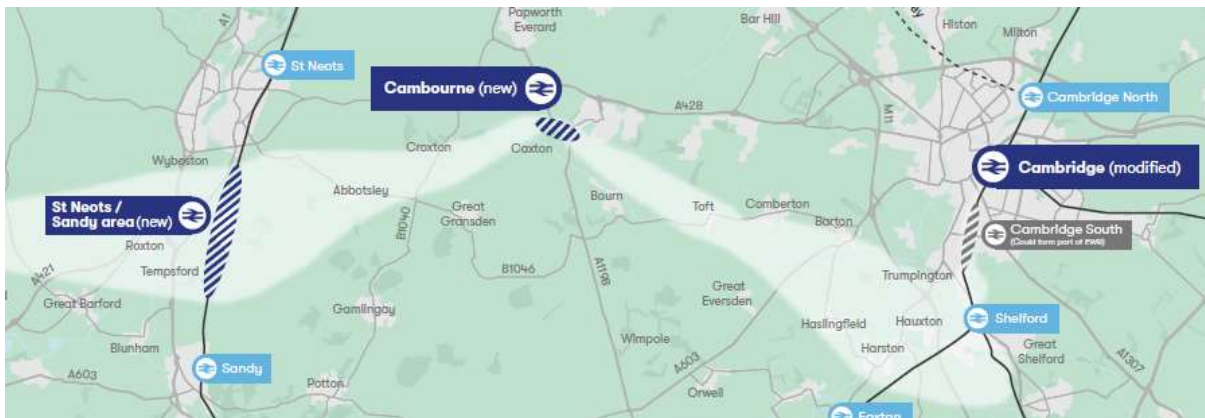


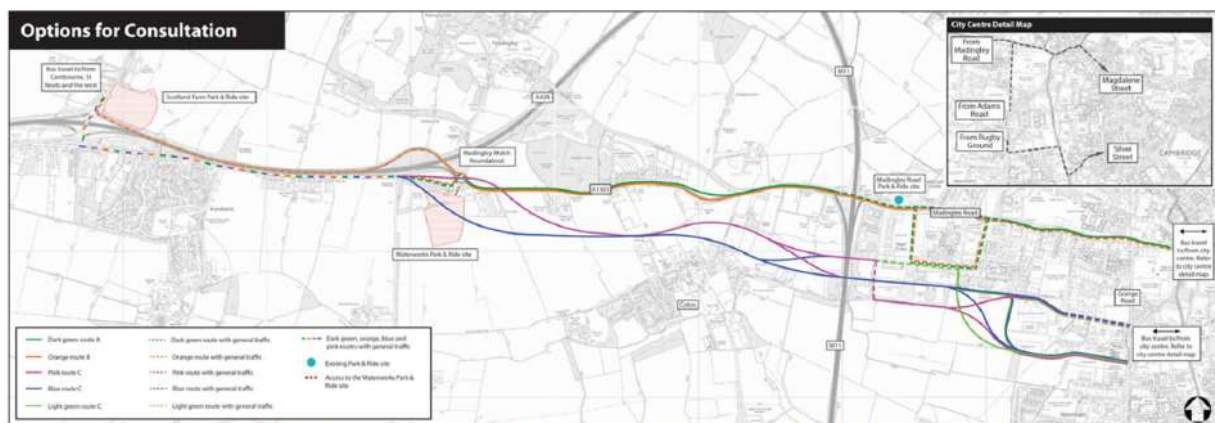
Figure 3.3 – East West Rail 2020 Route Map Plan

The C2C Paper presented at the GCP joint assemble 4th June 2020 stated, 'a review of the western end will be required once there is clarity with regards to proposals for East West Rail and a station in the Cambourne area.'

It is suggested that to avoid congestion within Cambourne impacting journey times, this review should also consider CAM maintaining either a north or south segregated route around Cambourne. Transport hubs would serve developments, EWR station and the town via local bus services, such as the Citi 4 Stagecoach Bus Route and improved cycling and walking routes.

3.4 Area around Coton

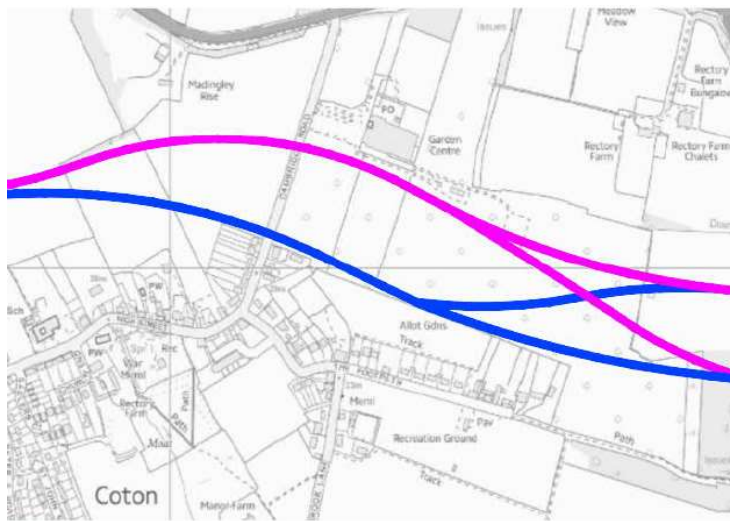
In 2017/18 the following routes were consulted on for the C2C scheme:



Source: GCP – Cambourne to Cambridge Better Public Transport consultation leaflet, November 2017

Figure 3.4 – C2C 2017/18 consultation options

The Wider Economic Impacts assessment, summarised within the Outline Business Case Options Assessment Report (Part 3) concluded that there were substantial benefits to an off-road segregated route, compared to on-road options. The recommended off-road option is the "Blue" route through Madingley Mulch, Coton Village. The OBC Options Appraisal Report (Part 1) shows the two options in more detail past Coton:



Area 3: Coton Village

Area 3 covers the alignment past the village of Coton. It also passes through Coton orchard. The pink route is further away from the village. The blue route runs closer to the village and crosses the southern edge of the orchard.

Figure 3.5 – Option appraisal routes considered in the Coton area

The Options Assessment Report explains the Blue alignment was preferred as

'the pink route is higher on the topography and there would be greater visual impacts to the Coton Village up to Cambridge Road'.

The report noted that the blue option is anticipated to have a low noise overall but there are properties within 50m which are to be considered as sensitive receptors along Cambridge Road. The blue route passes closer to Coton than the pink route but is also set lower down in the landscape which would assist in limiting impacts to views and retain the conservation area edge whilst avoiding severance of the field. Both routes would have an impact on Cambridge Historical Environment Record (CHER) entries, the blue route has the potential to impact 2 No. CHER entries, whereas the pink route would only have an impact on 1 CHER entry. When reviewing impact on Green belt the report said the blue route follows boundaries and is situated lower down and therefore less visible in the surrounding landscape. For the land impact review the amount of land required through Coton is approximately the same between options but the pink route causes more severance to the orchard.

The assessment summary INSET scoring table in the appendices shows that Blue and Pink routes scored equally with an average of 3.94 but it was noted the blue route would be expected to have Numerous stakeholder objections. The C2C 2019 working groups 'highlighting the need to review alignments around Coton'

It is recognised that at the SOBC stage and during recent design development and stakeholder liaison work additional options have been considered between the pink and blue routes and we recommend these alternative options within this area continue to be examined, along with potential routes north of the A1303.

3.5 West Cambridge Campus

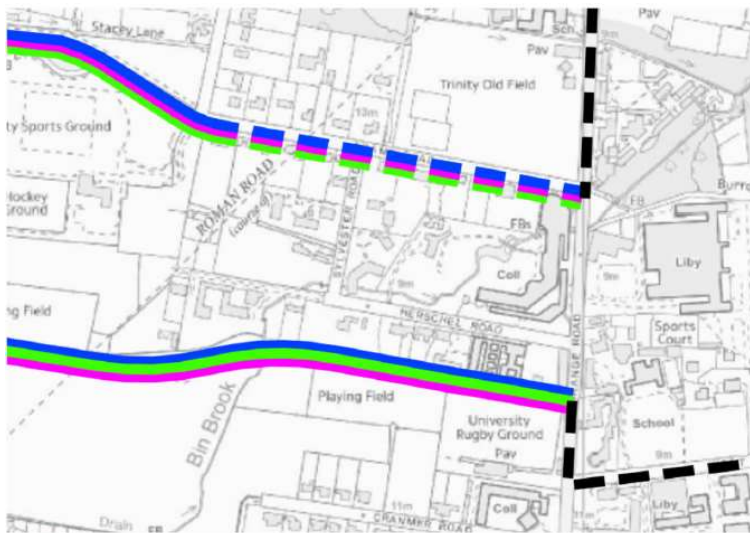
Initially a segregated route running alongside Charles Babbage Road was planned through the University of Cambridge West Campus. The OBC Options Assessment Report (Part 3) explained that *'engagement with UoC has indicated a desire to remove the segregated route and have vehicles*

running on Charles Babbage Road itself. Measures are being considered by the University to reduce traffic on Charles Babbage Road to ensure reliability for the public transport vehicles. Plans currently retain the segregated route but it is recognised that work should continue to develop this route alongside the developing West Cambridge plans'

Due to the limited use of Charles Babbage Road and the University's support for the scheme this would seem to be a sensible approach.

3.6 Connection to Grange Road

Within the OBC Options Appraisal Report (Part 1) the preferred connection to Grange Road in West Cambridge, was the former Rifle Range track, with Adams Road highlighted as an alternative.



Area 5 is the end of the route, connecting into the existing bus routes around Cambridge city centre. The first option is along Adams Road. This would make a section of Adams Road bus only eastbound prior to the junction with Grange Road. The second option would be to construct a new dedicated busway along former Rifle Range track.

Area 5: Adams Road/Former Rifle Range track

Figure 3.6 – C2C routes considered to Grange Road

The rifles range route had an average score of 4.24, whereas Adams road scored 3.06, out of 7. An alternative route was reviewed for the Rifle Range route to minimise impacts on the green belt, but discounted due to concerns on the sharp corners in the alignment and their impact on journey times:



Figure 3.7 – Routes assessed across Grange Farm, connecting to the former Rifle Range track

However, the OBC Option Appraisal Report (Part 3) noted

'as the scheme has progressed results from consultation with key stakeholders and members of the public have been received, raising several questions concerning the impact on the West Fields, access and land ownership. Also, further studies were completed such as the 2019 addendum to the 2017 LDA report on the impact of various Phase 1 alignments on the Green Belt, including various routes through the West Fields.'

When this was re-scored using the INSET criteria Adams Road was the preferred option:

- Adams Road = 3.18
- Rifle Range = 2.94

A significant change in the scoring was in the future proofing criteria which now recognised the CAM City Tunnels connection prior to Adams Road. However, the Cambourne to Cambridge Better Public Transport Project - C2C Outline Business Case – Supplementary Local Liaison Forum 02/06/2020 Presentation, highlighted that the scheme had been reviewed against the CAM objectives and sub-objectives and:

*'Policy CAM E15 calls for a segregated route as a default: the Adams Road proposal does not meet this expectation. Policy CAM S10 calls for the scheme to Support and Complement Walking and Cycling: overall C2C is compliant but local groups have voiced sustained concerns regarding cycling provision along Adams Road. As such, further assessment of the benefits of Adams Road and Rifle Range lead to a conclusion that **Rifle Range is the preferred alignment.**'*

It is recommended that the Rifle Range option be developed further to minimise the impact on the West Fields and fully integrate it with the western CAM tunnel portal. Once CAM Central Tunnels section is operational consideration also needs to be given to how the fields can be reinstated on the disused alignment, or if the alignment is maintained for other services/uses.

3.7 Bus Strategy

The current bus strategy described in the OBC Option Appraisal Report (Part 3) proposes three direct express services to:

- Cambourne to Cambridge City Centre at 10-minute interval service (six buses per hour)
- Cambourne to Biomedical Campus at 30-minute interval service (two buses per hour)
- A428 Park and Ride site to Biomedical Campus at 30-minute interval service (two buses per hour during peak periods)

The report states the routes are based on realistic service numbers and anticipated demand. From the schematic below and discussion in reports it is understood that the four bus services to Biomedical Campus are via the M11. The services to the Biomedical Campus via Cambridge Rail Station and Cambridge North Rail Station are via other, potentially enhanced, existed bus services, requiring passengers to interchange at stops on Grange Road:

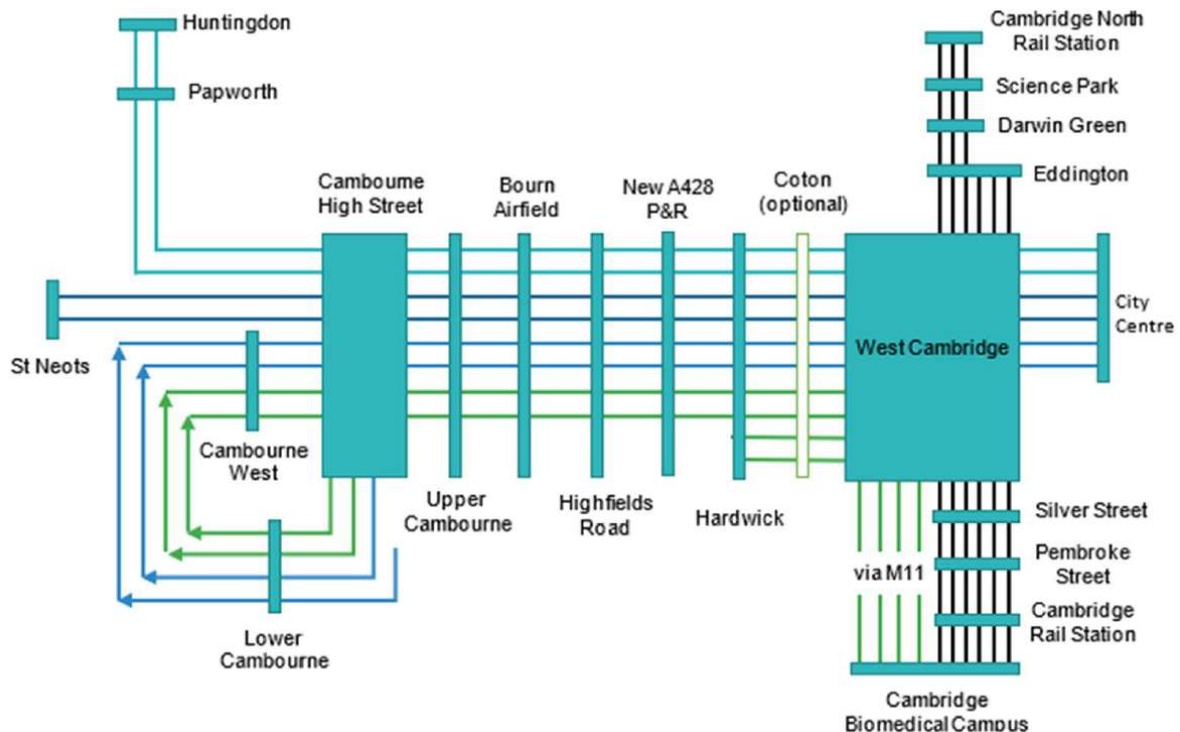


Figure 3.8 – C2C bus strategy routes

From and to Grange Road the routes to Parker Street in the City Centre, appear to follow fairly convoluted routes and congested roads, via Pembroke Street/Downing Street and Lensfield Road.

3.8 Vehicles

Documents do not seem to specify the vehicles, but these are understood to be Electric or Euro VI diesels and there is no evidence for provision of charging infrastructure, substations or depots. It is assumed that operators will need to provide their own depots. The OBC also states that existing bus services would have the option of using the new public transport route, providing they comply with clean vehicle standards, which we understand to mean they would need to be Euro VI compliant, as a minimum.

3.9 Cycling and Walking

The C2C scheme includes a mixed used track alongside the full segregated route which provides a cycling and walking network which links into the interchanges along the route, and the wider walking and cycling networks.

4. Summary of LTP & CAM Objectives Comparison

The C2C Paper presented at the GCP joint assemble 4th June 2020 stated:

In April 2020 the CPCA published a draft Sub-Strategy to the Local Transport Plan specifically dealing with CAM issues. The C2C proposals have been assessed against the policies in the Sub-Strategy and it is concluded that the scheme is compliant, although further review of the eastern end of the scheme has been undertaken and a review of the western end will be required once there is clarity with regards to proposals for East West Rail and a station in the Camboorne area.

As highlighted above C2C's approach to vehicles and infrastructure provides an interim solution prior to the delivery of the CAM City Tunnels. On this basis the City Tunnels would need to provide additional facilities including potentially vehicle charging infrastructure, extended vehicles stops, transport hubs, depot facilities and new vehicles for the route, in order for it to fully meet the CAM Sub-Objectives.

Jacobs independent review has concluded that the C2C scheme does not currently fully meet the four CAM Objectives, as it does not fully meet the following sub-objectives.

- CAM 1: Promote economic growth and opportunity & CAM 2: Support the acceleration of housing delivery as it does not fully meet:
 - CAM-E1: Promote agglomeration
 - CAM-E6: Improve transport connectivity
 - CAM-E9: Directly serve and link into transport hubs including existing and planned rail stations
 - CAM-E13: Integration with other modes, including bus
 - CAM-E14: Integrated with main arterial corridors, including the projected East West Rail route and the upgraded A428, and key LTP infrastructure projects
 - CAM-E15: Dedicated segregated routes as default assumption.
 - CAM-E19: CAM will utilise sustainable, highly flexible, zero emission vehicles
- CAM 3: Promote Equity
 - CAM-S6: Facilitates seamless cross country and city journeys to outlying regional settlements, urban fringe employment sites and key satellite growth areas
 - CAM-S11: Improve air quality
 - CAM-S12: Promote low carbon economy
- CAM 4: Promote sustainable growth and development
 - CAM-EV1: Support environmental sustainability
 - CAM-EV2: CAM infrastructure will utilise zero emission vehicles

It is also considered that although C2C could be judged to have met the following sub-objectives the scheme could be strengthened in these areas to deliver greater benefits:

- CAM-E2: Support new employment by enhancing access to and attractiveness of key designated employment areas
- CAM-E3: Increase labour market catchment
- CAM-E7: Improve journey time reliability
- CAM-E12: Support the development of demand responsive modes
- CAM-E18: CAM must be future proofed and flexible in terms of capacity and technology.
- CAM-E20: CAM will be designed to maximise passenger trips in both directions and across the whole day.

The key reasons and suggested amendments to the scheme in order for it to fully comply with these sub-objectives are summarised below and shown in Table 1 contained in Appendix A.

The key reasons that C2C cannot be concluded to have met these objectives are:

1. There is no commitment to exclusive use of Electric / Zero Emission Vehicles, and it is not future proofed for the vehicles expected to run through the CAM City Tunnels
2. It does not currently connect to Cambourne East West Rail and the route through Cambourne is not segregated
3. Its potential environmental impact around Coton and Westfields

In addition, it is also suggested the vehicle service pattern be reviewed to understand whether the frequency is regular enough to provide a metro like service, as expected within the CAM Sub-Strategy.

4.1 Vehicles

The C2C Paper presented at the GCP joint assemble 4th June 2020 cited an independent review of alignment between the C2C scheme and the CPCA plans for a CAM, undertaken by Arup for CPCA, which concluded with several findings including:

'The vehicles operating along the route should comply with the principles of the CAM being a rubber-tyred, electrically powered, vehicle.'

However, there is no commitment within the information reviewed to electric or zero emission vehicles and the paper states that *'To align with the CAM, the scheme developed by GCP will need to deliver' measures including:*

*State of the art environmental technology, with easily accessible, environmentally friendly **low emission** vehicles such as electric/hybrids or similar.'*

CAM Sub-objective EV2 requires zero emission vehicles, which would also require charging infrastructure and compatible depots to support the C2C and CAM City Tunnels vehicle fleet.

4.2 Cambourne East West Rail and Segregated Route

The C2C Paper presented at the GCP joint assemble 4th June 2020 stated that:

With the exception of a bus gate and short section of bus route west of the Broadway, the first section of the route is on-road through Cambourne. This is an interim arrangement for the route subject to changes once other factors are known as set out in 10.9, at which point a final CAM-compliant route at Cambourne can be identified.

Paragraph 10.9 stated: *'Once a location for a Cambourne Station to be provided as part of East-West Rail is confirmed then the Travel Hub might be located at the station and the C2C scheme would support last mile journeys for train commuters'* so did not mention on street or segregated routes.

4.3 Coton Area Impacts

The C2C Paper presented at the GCP joint assemble 4th June 2020 stated that:

'As a result of discussions with local residents, Cambridge Past Present and Future and the National Trust, the route alignment to the north of Coton Village is proposed to move further north to a distance of 40-50 metres from the nearest houses.'

Work will continue beyond the current stage of scheme development to refine the alignment and investigate bunding options to hide infrastructure from view. Where fields are severed there will be an opportunity to retain more suitable areas of land for future use such as the creation of new wildlife habitats as part of the commitment to a net biodiversity gain.

5. Recommendations for addressing these issues

To fully meet the CAM objectives, it is recommended that the following is undertaken:

- C2C be designed to connect to East West Rail Station at Cambourne and a segregated route around Cambourne be examined.
- A commitment to use of electric / zero emission vehicles, with appropriate infrastructure included within the scheme.
- Route and vehicle stops future proofed to cater for CAM City Tunnels vehicles within the constraints imposed through the TWAO process.
- Alternative or amended routes around Coton continue to be reviewed, along with potential routes north of the A1303.
- Whilst maintaining an acceptable alignment the route through Westfields is amended to minimise environmental impacts and mitigations are developed.
- It is also recommended that a review be provided on the current Bus Strategy service patterns to understand whether it provides an adequate Metro service.

Appendix A – Comparison Table of C2C against CAM objectives




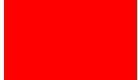
CAM Objective	CAM sub-objective	Degree C2C meets objective	Sub-Objective RAG rating *	Amendments proposed
<p>CAM 1: Promote economic growth and opportunity</p> <p>CAM 2: Support the acceleration of housing delivery</p>	CAM-E1: Promote agglomeration	Provides stops /transport hubs at key development sites and new developments in Cambourne. Does not currently connect to East West Rail (EWR) station proposal in West Cambourne. Connection to central Cambridge and Biomedical Centre via existing road network and journeys to the Railway Station and other destinations requires changes at Grange Road onto other bus services, until CAM City Tunnels Section is constructed.		Link to EWR to be developed and review of demand to provide additional services to central Cambridge and Biomedical Centre and direct services to the destinations across Cambridge including the Railway Station.
	<p>CAM-E2: Support new employment by enhancing access to and attractiveness of key designated employment areas by specifically enabling, serving and supporting:</p> <ul style="list-style-type: none"> New settlements and enterprise zones already included in existing adopted Local Plans New Garden Village settlements Existing settlements with anticipated employment growth <p>Supporting the development of</p> <ul style="list-style-type: none"> New settlements being brought forward by any future development corporations created in the Oxford-Cambridge corridor. 	<p>Direct link to employment at Cambridge West Campus and Cambourne. Connection to employment in central Cambridge and Biomedical Centre via existing road network and to Northern Cambridge via interchange with other services.</p> <p>Links provided to A428 corridor which is the road highlighted for the Oxford-Cambridge Expressway in this area. Currently no connection to EWR station or proposed development of new settlements in West Cambourne.</p>		Segregated link to EWR and West Cambourne to be developed. Suggested a north or south segregated route around Cambourne with transport hubs serving developments, EWR station and the town via local bus services, and improved cycling and walking routes is reviewed.
	CAM-E3: Increase labour market catchment	<p>Increased catchment for West Cambridge Campus from Cambourne and planned developments Scotland Farm P&R, Bourn Airport and Upper Cambourne.</p> <p>May provide increased wider catchment for UoC Campus from Oxford-Cambridge Expressway but currently would not provide increased catchment from EWR. It is expected that workers within central Cambridge using EWR would change at Cambridge South then use Guided Busway services.</p>		Link to EWR and West Cambourne to be developed and connections across Cambridge reviewed / improved.
	CAM-E4: Serve and support new areas for sustainable housing development	Serves new housing developments at Scotland Farm P&R, Bourn Airport and in Upper Cambourne, but not currently West Cambridge.		
	CAM-E5: Provide overall transport capacity to enable and accommodate future growth	Scheme designed for 263% increase in capacity and to link into CAM City Tunnels network.		
	CAM-E6: Improve transport connectivity	Improved connectivity between Cambourne, proposed developments and West Cambridge UoC Campus and West Cambridge, and city centre and Biomedical Campus via existing road network. Currently no direct link to EWR and reliant on existing road network in Cambridge.		Link to EWR to be developed and connections across Cambridge reviewed / improved.
	CAM-E7: Improve journey time reliability	Improved and more reliable journey times along A1303 although concern on Journey Times within Cambourne and Cambridge Road Network.		Review route through / around Cambourne to EWR and connections across Cambridge
	CAM-E8: Direct high-quality public transport access to key housing sites (existing designations)	Direct high-quality transport provided for new housing developments at Scotland Farm P&R, Bourn Airport and Cambourne including Upper Cambourne developments.		
	CAM-E9: Directly serve and link into transport hubs including existing and planned rail stations	Serves Scotland Farm Park and Ride and existing stops on bus networks. But due to National government's commitment to an EWR route C2C should aim to serve proposed station development at West of Cambourne		Link to EWR to be developed

CAM Objective	CAM sub-objective	Degree C2C meets objective	Sub-Objective RAG rating *	Amendments proposed
	CAM-E10: At transport hubs, support easy and rapid mode changes and transfers	It is assumed the detail of specific hubs is under development but C2C appears to be integrated into Scotland Farm P&R and easy transfer at West Cambridge Campus and existing bus stops.		
	CAM-E11: At transport hubs facilitate first and last mile connectivity to the local area	There are links to existing buses but generally C2C seems to be provide direct connectivity rather than using hubs. It is assumed hubs and stops will be high quality and include ticketing and provide passenger information.		
	CAM-E12: Support the development of demand responsive modes	Service provides up to 10 buses an hour (6 to the city centre and 4 to the Biomedical Campus) with capacity to increase services to meet demand.		Review this service to understand whether it provides an adequate Metro service.
	CAM-E13: Integration with other modes, including bus.	Integration with P&R and bus services on route but not EWR and no direct services to Cambridge Railway Station		Link to EWR be developed with segregated route around Cambourne using transport hubs for developments, town via local bus services, and improved cycling and walking routes. Connections across Cambridge including to the Railway station to be reviewed / improved
	CAM-E14: Integrated with main arterial corridors, including the projected East West Rail route and the upgraded A428, and key LTP infrastructure projects	Not currently integrated with EWR but runs along and aims to integrate with A428		Link to EWR to be developed.
	CAM-E15: Dedicated segregated routes as default assumption.	Provided except through Cambourne, on Charles Babbage Way through UoC and reliant on road network through Cambridge and to Biomedical Campus.		Review route through / around Cambourne to EWR.
	CAM-E16: CAM will use technology, infrastructure and concepts of operations that deliver safe, reliable, regular, resilient and inclusive transport	It is understood C2C will use modern reliable, safe and inclusive vehicles and route		
	CAM-E17: CAM must be deliverable within the current decade	Scheme involves standard highway construction and can operate with existing technology so is deliverable in this timeframe.		
	CAM-E18: CAM must be future proofed and flexible in terms of capacity and technology.	Designed for future capacity but may require minor modifications to route and platform extensions at stops, and may require CAM City Tunnel section to install charging facilities for electric vehicles to run on the longer routes.		Route and vehicle stops to be future proofed to cater for CAM central tunnels vehicles.
	CAM-E19: CAM will utilise sustainable, highly flexible, zero emission vehicles	No commitment to zero emission vehicles can be found and there is no evidence of charging facilities for electric vehicles being provided. The C2C Paper presented at the GCP joint assemble 4th June 2020 says the scheme will need to deliver 'environmentally friendly low emission vehicles such as electric/hybrids or similar.' From this and other information it is expected that C2C vehicles could be Euro 6 diesel, which are low but not zero emission.		Commit to use zero emission vehicles.
	CAM-E20: CAM will be designed to maximise passenger trips in both directions and across the whole day.	Use of segregated route for majority of route will enable trips to be maximised. It is questioned whether 6 bus services to the city centre and 4 to the Biomedical Campus is sufficient for potential demand, although it is recognised there is flexibility within the busway design to increase this.		Review this service to understand whether it provides an adequate Metro service.
CAM 3: Promote Equity	CAM-S1: Provision of safe and secure CAM network – safe by design, safe in construction and safe in operation – to meet all standards and global best practice	Understood to be safely designed to all applicable design and security standards		

CAM Objective	CAM sub-objective	Degree C2C meets objective	Sub-Objective RAG rating *	Amendments proposed
	CAM-S2: CAM will meet all planning and environmental requirements	Scheme designed to do meet these and requirements for TWAO application		
	CAM-S3: Affordable and fair fare structure.	Fair Structure to be confirmed but understood this aims to be affordable	N/A	
	CAM-S4: Compatible with county wide future integrated ticketing	Not highlighted within the documents	N/A	
	CAM-S5: Promotes seamless connectivity between regional settlements, major city fringe employment sites and key satellite growth areas across Cambridgeshire and Peterborough	C2C link to new developments and new park and ride and link to Cambridge West Campus and local employment in Cambourne, and through existing networks the City centre and Biomedical Campus.		
	CAM-S6: Facilitates seamless cross country and city journeys to outlying regional settlements, urban fringe employment sites and key satellite growth areas	Linked to fringe employment sites but not to east west rail for Oxford- Cambridge corridor.		Link to EWR to be developed.
	CAM-S7: Improve opportunities for all residents and communities	Improved opportunities through links to Cambridge West Campus and local employment in Cambourne, City centre and Biomedical Campus.		
	CAM-S8: Promotes high quality public realm at stations	Provides high quality urban realm at stops.		
	CAM-S9: Reduces adverse impacts of public transport provision on city, urban and village centre mobility for pedestrians and cyclists	Reduces impacts on congested A1303 and provides cycle / walking routes/network		
	CAM-S10: Support and be complimentary to walking and cycling.	Secure cycle parking provided at stops and provides cycle / walking routes/network.		
	CAM-S11: Improve air quality	Slight improvement through moving people onto public transport and reducing congestion but no commitment to zero emission vehicles.		Commit to use of zero emission vehicles
	CAM-S12: Promote low carbon economy	Supported through use of low emission public transport vehicles and encouragement for cycling and walking but use of diesel vehicles would not support this objective.		Commit to use of zero emission vehicles.
	CAM 4: Promote sustainable growth and development	CAM-EV1: Support environmental sustainability Minimises adverse impacts on conservation areas, heritage and natural community assets, including protecting the character of villages and avoiding encouraging unsustainable village fringe development. Meets net gain requirements and where possible offers additional visual and environmental enhancements.	Environmental impacts on West Fields and Coton highlighted.	
CAM-EV2: CAM infrastructure will utilise zero emission vehicles; other public transport zero emissions vehicles should be able to use sections of the CAM infrastructure if they are CAM compatible		No committed to zero emission vehicles has been found and there is no evidence of charging facilities being provided.		Commit to use of zero emission vehicles.

Table 1: Summary of C2C Comparison against CAM Objectives and Sub-Objectives

*** RAG Key:**

	Meets CAM Objective
	Could be strengthened to better meet CAM sub-objectives
	Does not fully meet CAM Sub-Objective
	Fails to meet CAM Sub-Objective

Appendix B - Key documents and information reviewed

The following publicly available key documents and information were used for this review:

- a. Available Outline Business Case documents – 2019/2020:
 - i. Economic Case
 - ii. Management Case
 - iii. A - Options Appraisal Report (Part 1)
 - iv. B - Options Appraisal Report (Part 2)
 - v. C - Options Assessment Report (Part 3)
 - vi. J - Strategic Economic Narrative & Economic Impacts Report Outline Business Case
- b. Phase 2 Consultation Leaflet – November 2019
- c. Cambourne to Cambridge Interim Planning Appraisal 10 sept 2019
- d. Project updates June 2019 and December 2018
- e. Interim Report - November 2018
- f. Summary Position Paper – 15 November 2018
- g. Strategic Outline Business Case documents including the Option Assessment Report - 2016
- h. Phase 1 & 2 Public Consultation Responses/Findings including:
 - a. Cambridgeshire County Council - Cambourne to Cambridge Phase 2: Summary Report of Consultation Findings, May 2019
- i. Draft minutes from and Papers presented to Greater Cambridge Partnership Executive Board, including at the meeting on the 6th December 2018, 4th June 2020 and 25th June 2020.
- j. GCP Cambourne to Cambridge Website information including Phase 1 & 2 sites
- k. Local Liaison Forum presentations, notes minutes and responses (contained on the GCP website) including:
 - a. Greater Cambridge Partnership submission to government in consideration of the forthcoming second Roads Investment Strategy (RIS2) September 2018, contained in 'C2C LLF Technical Note Northern Route 22-05-2019'
- l. Smarter Cambridge Transport response to Cambourne-Cambridge consultation 2017/18
- m. End Of Stage Report Sept 2017
- n. East west Rail RouteOption_Map_Master_2020 - https://eastwestrail-production.s3.eu-west-2.amazonaws.com/public/Preferred-Route-Option-Announcement/f025f41538/RouteOption_Map_Master_2020_WithKey.pdf
- o. CAMBRIDGE – MILTON KEYNES – OXFORD CORRIDOR: INTERIM REPORT – National Infrastructure Commission - <https://www.nic.org.uk/wp-content/uploads/Cambridge-Milton-Keynes-Oxford-interim-report.pdf>