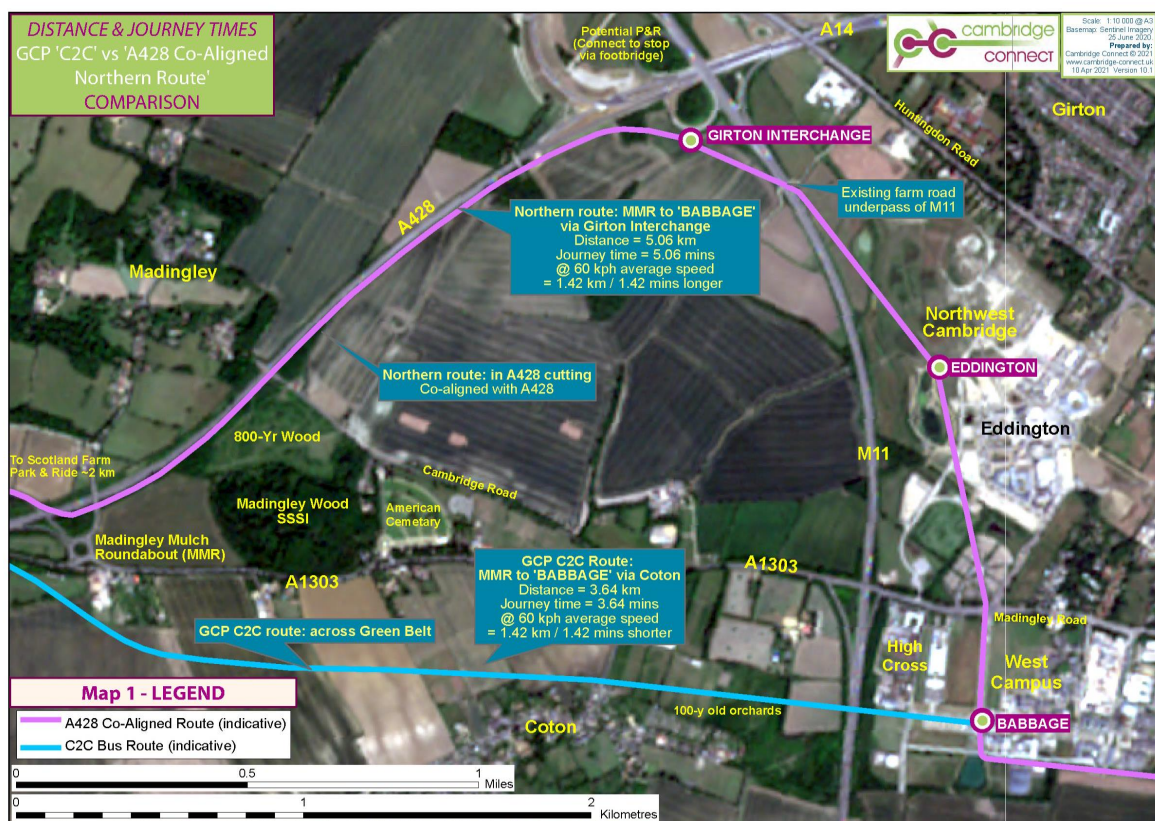


Cambourne - Cambridge Bus Road (C2C) Independent Audit



Submission prepared by Colin M. Harris
25 April 2021 (v1)



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Supporting sustainable and enduring solutions for Cambridge transport

1 Introduction

Cambridge Connect was initiated to promote a strategic and sustainable approach to public transport in Cambridgeshire. Emphasis is placed on an integrated and multi-modal approach to meeting the transport needs for Cambridge and the surrounding region. We recognise the need to link local solutions into broader regional strategies. Cambridge Connect has coordinated with a range of individuals, companies and organisations in developing its proposals. In particular, Railfuture and UK Tram have played a prominent role in the overall development of a light rail network for the region.

This submission made to the Cambourne – Cambridge Bus Road (C2C) Independent Audit focuses on an alternative to the preferred scheme proposal by the Greater Cambridge Partnership.

The alternative proposal is co-aligned with the A428 over a critical part of the route, and would avoid severance of, and landtake within, the Green Belt in this area (Figure 1).

2 Summary conclusions

In summary, Cambridge Connect:

- 1 Supports development of a new public transport route to the west of Cambridge following a fully segregated alignment immediately adjacent to, and co-aligned with, the A428 highway in the section between Madingley Mulch Roundabout and the Girton Interchange.
- 2 Does not accept the assumption by the GCP that an alternative fully segregated public transport route aligned to avoid severance of, and impacts on, the Green Belt is not possible, in particular because this conclusion is not supported by thorough and adequate evidence.
- 3 Does not support the route preferred by the GCP because of unacceptably high and unnecessary impacts on the Green Belt and on the highly valued rural landscape which lies in close proximity to Coton and Cambridge in general, which have not been sufficiently taken into account.
- 4 Does not support the current proposals of the GCP for the large Park & Ride at Scotland Farm, the size of which is likely to encourage and support travel by private cars to that point. Rather investment should instead consider any additional P&R, if deemed necessary, with emerging plans for both East-West Rail (EWR) and the CAM 'metro' public transport network.
- 5 The COVID-19 pandemic has demonstrated that current approaches to public transport delivery do not have sufficient resilience to operate effectively in the face of such shocks. The current bus road proposals are based on old approaches from the last century, and do not have sufficient resilience to cope with similar potential scenarios in the future. At a minimum, the C2C scheme should be paused to allow detailed consideration to changes that are necessary to build in greater resilience to our public transport systems, especially those for access to critical services such as healthcare and research centres.
- 6 Supports the submission made by the Coton Parish Council, which includes the independent technical report prepared by specialist transport consultancy i-Transport which forms an integral part of the submission by Coton Parish Council.
- 7 A series of maps and figures illustrating the A428 co-aligned alternative to the C2C preferred alignment is provided with this submission.



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Supporting sustainable and enduring solutions for Cambridge transport

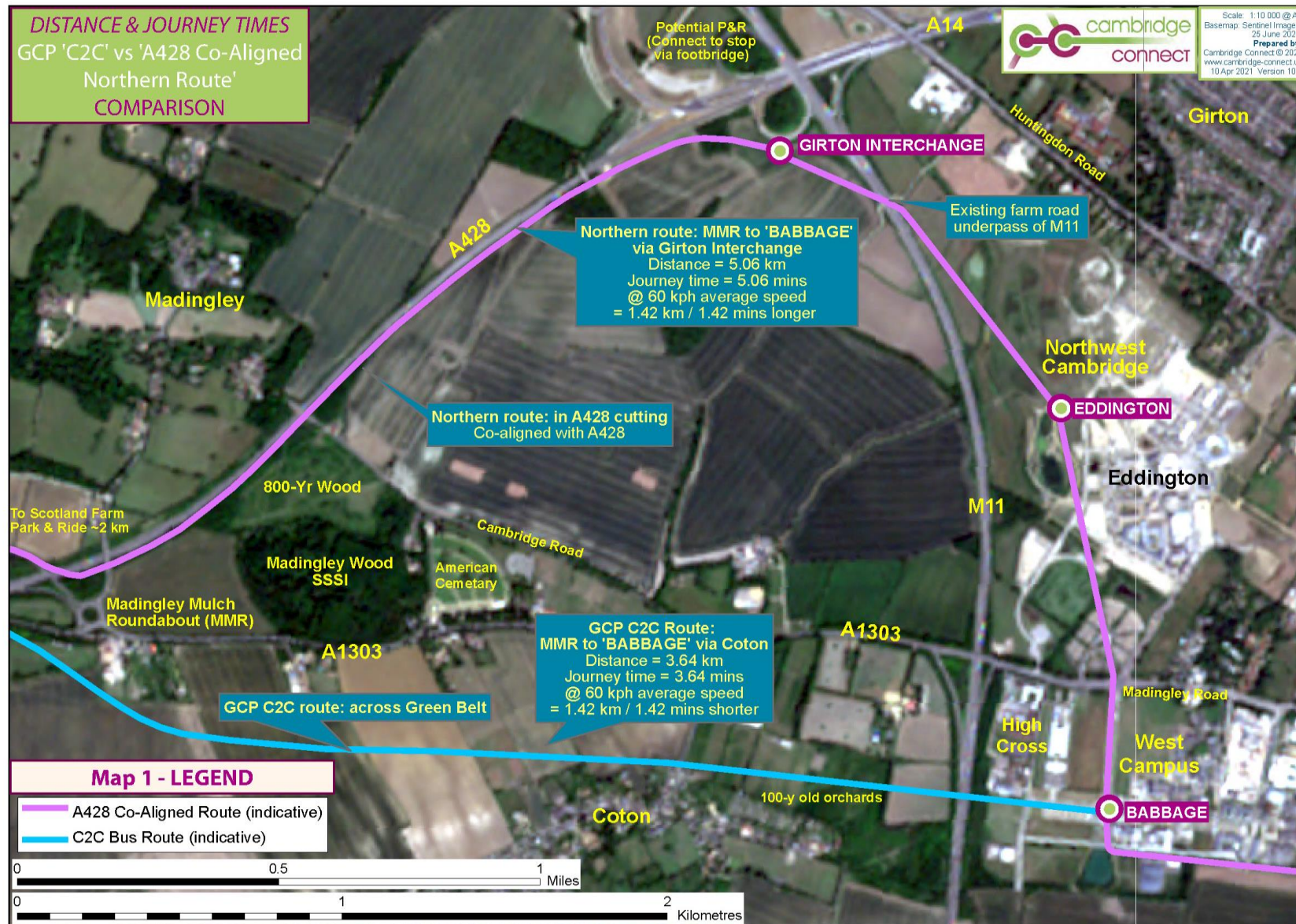


Figure 1. A428 alternative C2C alignment – co-aligned with the A428 in section from Madingley Mulch to West Campus overview.

3 Long-term transport planning

Cambridge Connect considers that infrastructure development needs to be fit-for-purpose for the region with a planning horizon into the 2030s and beyond. The key drivers of economy, population, demand, education, science & technology environment & heritage, and social & cultural values all need to be taken into account with a long-term view, and these need to be balanced against the cost and investment needed for future generations.

It is important that communities are tightly integrated into future public transport provision, and this is vital to ensure the best possible up-take of the services, and to provide excellent connections for residents.

Before progressing new busways or bus roads, a detailed plan for delivery of the long-term strategy for Cambridgeshire public transport needs to be set out and adopted. Local solutions should then be designed so they integrate seamlessly into the overall strategic plan, both in terms of technologies used for the 'metro' and also the routes. This strategy should be at an advanced stage of development when implementing local solutions, even if this would mean a short-term delay in delivery of some local improvements. This approach would avoid waste and bring cost-savings over the medium-term.

4 Implications of the pandemic

The implications of the current COVID-19 pandemic for public transport are major and cannot be ignored. The pandemic has demonstrated that we need to design our public transport systems to be more resilient to shocks. The science tells us that COVID-19 is unlikely to be the last pandemic we face. It is clear that current approaches and systems have been inadequately designed and prepared for such challenges.

The authorities should carefully consider the implications for bus-based solutions which are inherently based on existing models, which have been shown to lack the capacity and technologies to enable more resilience in public transport. While light rail is by no means a panacea, it does have the substantial advantage of much greater capacity than buses, and in this it has the potential to be much more flexible and resilient to future shocks.

Before rushing to deliver a bus road solution – with major damage to the local landscape – the authorities should carefully consider how improved resilience can be built into our public transport systems. This is particularly the case in C2C which should play a vital role in servicing communities and education facilities, as well as the City Centre, to which key workers need continued access during pandemics.

5 Sustainability

Around one third of energy consumption is used on transport (MacKay, 2009: *Sustainability without the hot air*: p.118). The evidence shows that rail remains the most energy-efficient means of public transport available, being at least twice as efficient as buses and up to 18 times more efficient than cars. Improving the energy efficiency of our transport systems must be a key consideration in our choice of transport solutions. This approach is consistent with commitments made at the 2015 Paris Summit on Climate Change, and with the more recent declarations by the UK Government of the 'Climate Emergency' and in specific carbon reduction targets, in particular with respect to the need to adopt more sustainable approaches to city planning and transport. Light rail has been demonstrated to drive higher levels of modal shift than buses. These important conclusions have been emphasised at recent Climate summits.

Light rail also performs much better than other public transport on pollutant emissions. Fine particulate pollution is released by rubber-tyred vehicles, and these pollutants enter the atmosphere, terrestrial and water systems. These emissions have been shown to account for as much particulate pollution as released by vehicle tail-pipes, so even if the proposed buses were electric a substantial air pollution problem remains. Rubber tyres are largely made from synthetic plastics, which take a very

long time to degrade. The microplastics from wear enter into aquatic and terrestrial systems, and are taken up by organisms. In addition, large numbers of waste tyres are produced, and for a high frequency metro operation this could lead to many hundreds or thousands of waste tyres per year. The C2C proposals do not address these aspects of sustainability adequately.

Light rail is more sustainable for metro operation than buses because it consumes substantially less power than rubber-tyred buses, owing to the low rolling resistance of steel wheels on rails (~ one tenth of rubber tyres on road). Light rail lines may also offer benefits through more sustainable water drainage systems than the extensive tarmac / concrete needed for bus roads.

These considerations, in particular with respect to the selection of mode for transport delivery (ie bus or light rail) need to be reviewed and taken into more consideration in the development of the C2C scheme.

6 Alternative to the alignment proposed by GCP

- 6.1.1 **Cambridge Connect strongly opposes the alignment proposed by the Greater Cambridge Partnership for C2C.**
- 6.1.2 The Girton interchange is one of the most important strategic junctions in the region, being as it is at the crossroads of nationally and regionally important highways of the M11, A14, A428 and A1307 (Huntingdon Road). However, the GCP has specifically excluded this from detailed consideration for reasons which do not hold up to scrutiny. The assessments that have been made to date have been based on poor and superficial evidence.
- 6.1.3 Maps 1-5 and two figures presented below outline how the alternative alignment along the A428 highway (suggested by Cambridge Connect) could be configured.
- 6.1.4 From Madingley Mulch Roundabout the alignment could proceed on either side of the A428 to the Girton Interchange, although maps presented here illustrate only the option for the alignment on the south / southeast side of the A428. An alignment on the north side would also seem feasible, although would need investigation of options for crossing to the south (and hence to the West Campus) at some point either at or before the Girton Interchange.
- 6.1.5 The alignment presented to the south / southeast of the A428 highway would proceed immediately alongside the A428 highway (co-aligned to the side of the highway with appropriate barrier separation), follow under existing bridges over the A428, then from the Girton Interchange proceed under the M11 using an underpass (in the area where the M11 is already elevated and an underpass currently exists), thence south via the general vicinity Eddington and the Madingley Park & Ride to the West Campus. This proposal is necessarily indicative at this stage, although it has been confirmed that the proposal is viable at a high level of consideration and as such warrants detailed investigation as a realistic alternative before the C2C scheme alignment should be further progressed.
- 6.1.6 Inadequate evaluation has been made of this alternative, and others, which seems to have occurred because the C2C scheme has been based on a number of false assumptions. Most important amongst those has been the assumption that the Girton Interchange option should not be considered as a potential route because it would take too long to deliver and is more complex and costly. This assumption fails to consider that the route could be delivered via the Girton Interchange area without necessarily altering the Girton Interchange itself.
- 6.1.7 Alterations to the Girton Interchange involve changes to the road network, while the alignment presented in this alternative is separate and fully segregated from the road network and is not dependent on alterations to the Girton Interchange itself.
- 6.1.8 Even without alterations to the interchange itself, the alternative offers substantial benefits by co-alignment with major existing transport routes and also by avoiding sensitive Green Belt and heritage resources, while still serving the communities and scheme objectives. The alternative therefore represents a realistic alignment that could be brought forward irrespective of whether or not Highways England make alterations to the interchange itself.

- 6.1.9 Thus, a connection into, and integration with, the Girton Interchange is not a necessary part of such an alignment. However, if adopted, that option would be available when and if this is considered desirable and affordable in the future. An alignment via the general location of the Girton Interchange, without alterations to it, enables it to be future-proofed for future developments by ensuring that the C2C route proceeds via the immediate vicinity of what is arguably the most important strategic junction in the region.
- 6.1.10 The assumption has also been made that the route via the Girton Interchange would represent a diversion that would compromise the attractiveness of the public transport route between Cambourne and Cambridge because of the extra distance. However, we have shown that the alternative route would add only approximately 1 ½ minutes to journey times on a segregated route compared to the preferred C2C route. When considered against the range of major benefits of the alternative alignment, this small journey time penalty is acceptable.
- 6.1.11 The alternative route would directly support the community of Eddington. Moreover, the route would open up opportunities for onward connections to communities such as Bar Hill and Northstowe in the future.
- 6.1.12 The C2C route makes an unnecessary incursion into Green Belt and development of major infrastructure for a busy transport route across relatively tranquil and unspoiled rural landscapes of high aesthetic value. It will impact local ecology and recreational uses, as well as commercial farms. It will create additional severance of the Madingley Hill and Bin Brook valley from local communities. These values have not been given sufficient consideration in the decision to pursue this route. The GCP preferred C2C route requires major new land-take from the Green Belt. There is insufficient justification for this because a feasible route via the A428 / M11 exists utilising existing transport corridors.
- 6.1.13 The GCP route runs counter to policies that seek to minimise the impact of infrastructure and development on Green Belt land, and against policies that seek to protect landscapes of high value. The landscape affected is immediately adjacent to one of the very few elevated sites in the Cambridge region, namely Madingley Hill. This site is already compromised by the A1303 highway, and a further major public transport route across this landscape will further degrade and despoil the remaining high landscape values.
- 6.1.14 The focus of this submission has been on the section of alternative between Madingley Mulch Roundabout and the West Campus because this section represents a major strategic failing in the C2C scheme. There are also significant failings in Hardwick and the City Centre.
- 6.1.15 Cambridge Connect has wider proposals for an integrated scheme across the Cambridge region using light rail, including for a short tunnel (2.6 km) extending from near the West Campus through the city centre to the Cambridge Rail Station. Details of these proposals can be accessed on the Cambridge Connect website (www.cambridge-connect.uk). These wider proposals address deficiencies in the C2C scheme within the Cambridge city centre, where a coherent plan for practical public transport that is transformative of journeys is largely missing from the GCP C2C scheme. The existing plans for how C2C would work within the City Centre are inadequate and fail to show how the scheme would be delivered in an integrated and coherent manner without significant impacts on city residents and businesses.

6.2 *Opportunities for long-term gains – developing an integrated approach to improvements in rail and public transport in Cambridge*

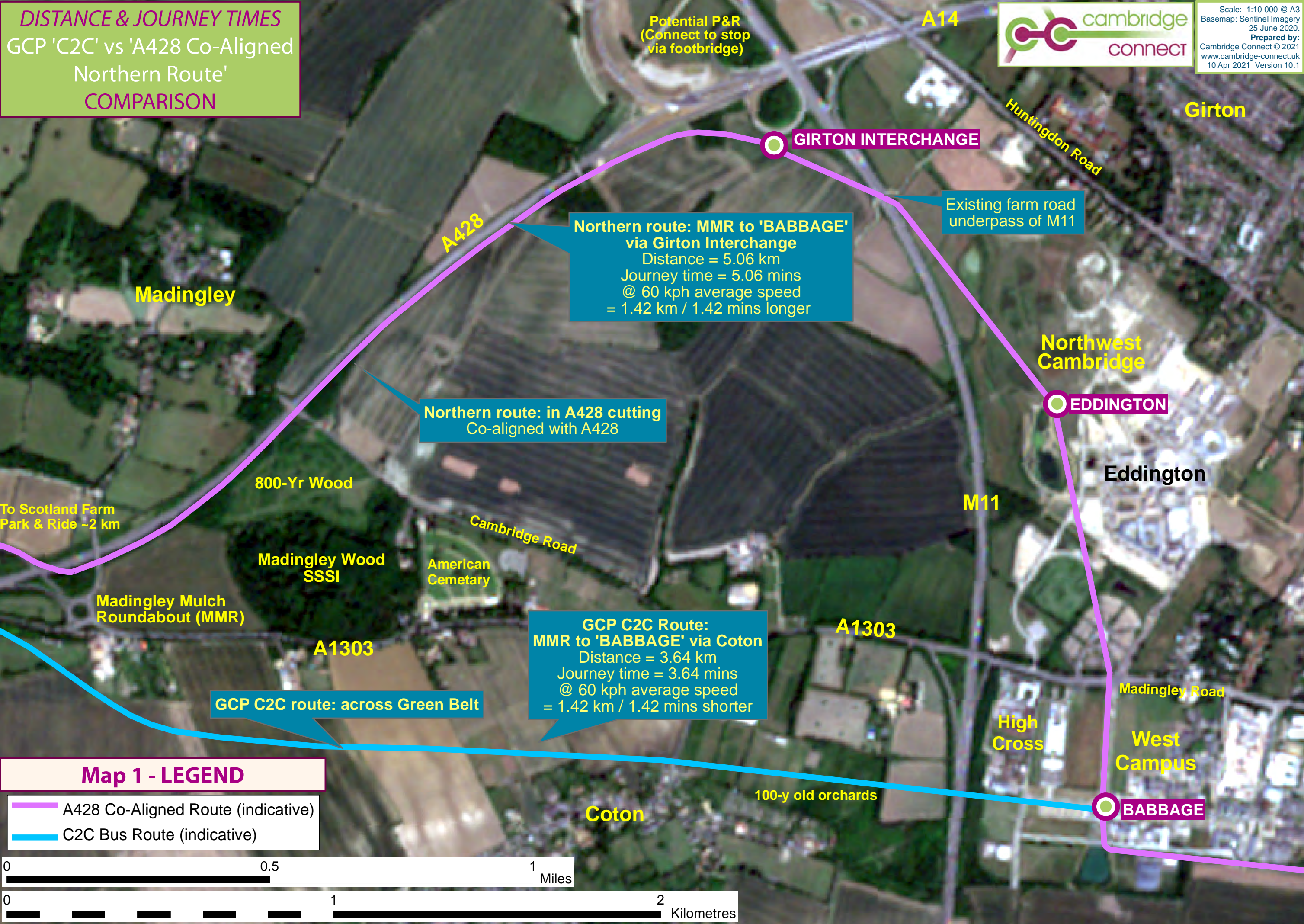
- 6.2.1 Future developments of the heavy rail network need to be taken into consideration. For example, developments such as Cambridge South Station, East-West Rail (EWR), and service improvements more generally will influence activity and services on the main rail lines.
- 6.2.2 C2C should not be progressed without detailed planning for integration with CAM.
- 6.2.3 C2C should not be progressed without detailed planning for integration with EWR.

7 Park & Ride proposal by GCP

- 7.1.1 Cambridge Connect opposes the proposed Park & Ride at Scotland Farm, and considers it in the wrong location. Cambridge Connect supports some form of new Park & Ride in the general vicinity of Cambourne.
- 7.1.2 However, as a general principle, it is important that the location selected and size is appropriate and can be practically integrated with future development of the CAM and EWR.

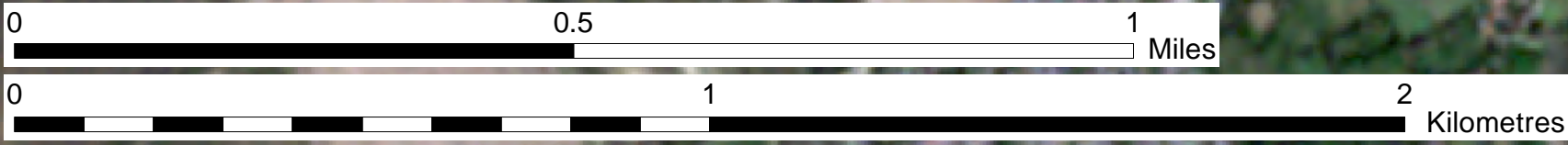
FOLLOWING BELOW: SUPPORTING MAPS AND FIGURES

DISTANCE & JOURNEY TIMES
GCP 'C2C' vs 'A428 Co-Aligned
Northern Route'
COMPARISON



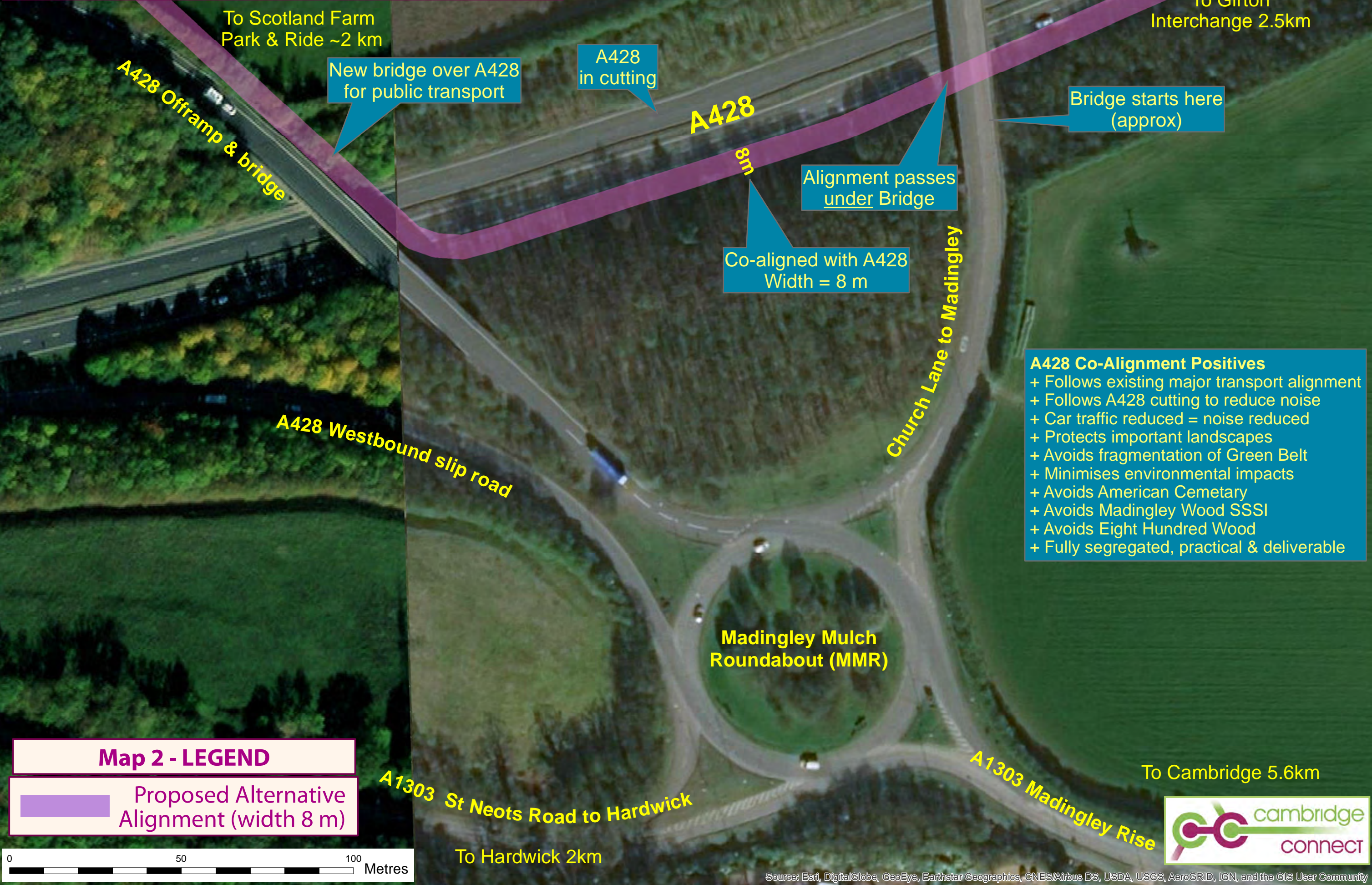
Map 1 - LEGEND

-  A428 Co-Aligned Route (indicative)
-  C2C Bus Route (indicative)



C2C INDICATIVE ALTERNATIVE ALIGNMENT
Northern Route to Girton Interchange Co-Aligned with A428
Alignment at Maddingley Mulch Roundabout

Scale: 1:1000 @ A3
Basemap: ArcGIS Imagery
Prepared by:
Cambridge Connect © 2021
www.cambridge-connect.uk
10 Apr 2021 Version 10.1



Map 2 - LEGEND

Proposed Alternative Alignment (width 8 m)

- A428 Co-Alignment Positives**
- + Follows existing major transport alignment
 - + Follows A428 cutting to reduce noise
 - + Car traffic reduced = noise reduced
 - + Protects important landscapes
 - + Avoids fragmentation of Green Belt
 - + Minimises environmental impacts
 - + Avoids American Cemetary
 - + Avoids Maddingley Wood SSSI
 - + Avoids Eight Hundred Wood
 - + Fully segregated, practical & deliverable

C2C INDICATIVE ALTERNATIVE ALIGNMENT
Northern Route to Girton Interchange Co-Aligned with A428
A428 cutting at Madingley

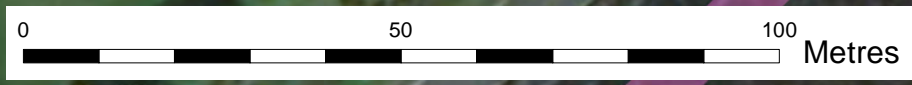
- A428 Co-Alignment Positives**
- + Follows existing major transport alignment
 - + In A428 cutting to reduce noise
 - + Car traffic reduced = noise reduced on A428
 - + Protects important landscapes
 - + Avoids American Cemetary
 - + Avoids Madingley Wood SSSI
 - + Avoids Eight Hundred Wood
 - + Avoids Green Belt fragmentation

Scale: 1:1000 @ A3
Basemap: ArcGIS Imagery
Prepared by:
Cambridge Connect © 2021
www.cambridge-connect.uk
01 Mar 2021 Version 10.0



Map 3 - LEGEND

Proposed Alternative Alignment (width 8 m)



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

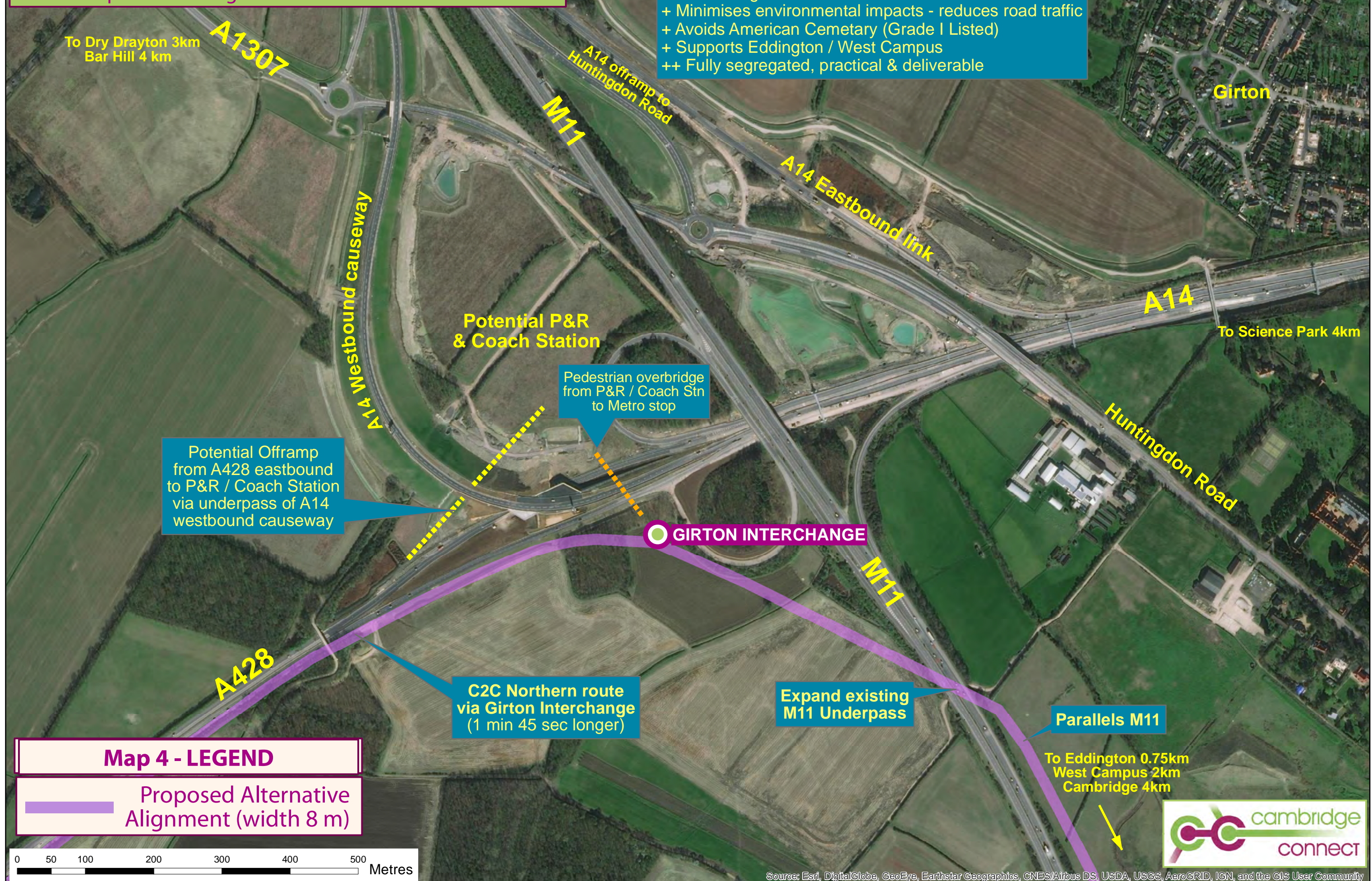
C2C INDICATIVE ALTERNATIVE ALIGNMENT

Northern Route to Girton Interchange Co-Aligned with A428
Option - Co-Aligned Southeast side of A428

A428 Co-Alignment Positives

- + Strategic location future-proofed for onward links
- + Follows existing major transport alignments
- + Avoids fragmentation of Green Belt
- + Minimises environmental impacts - reduces road traffic
- + Avoids American Cemetary (Grade I Listed)
- + Supports Eddington / West Campus
- ++ Fully segregated, practical & deliverable

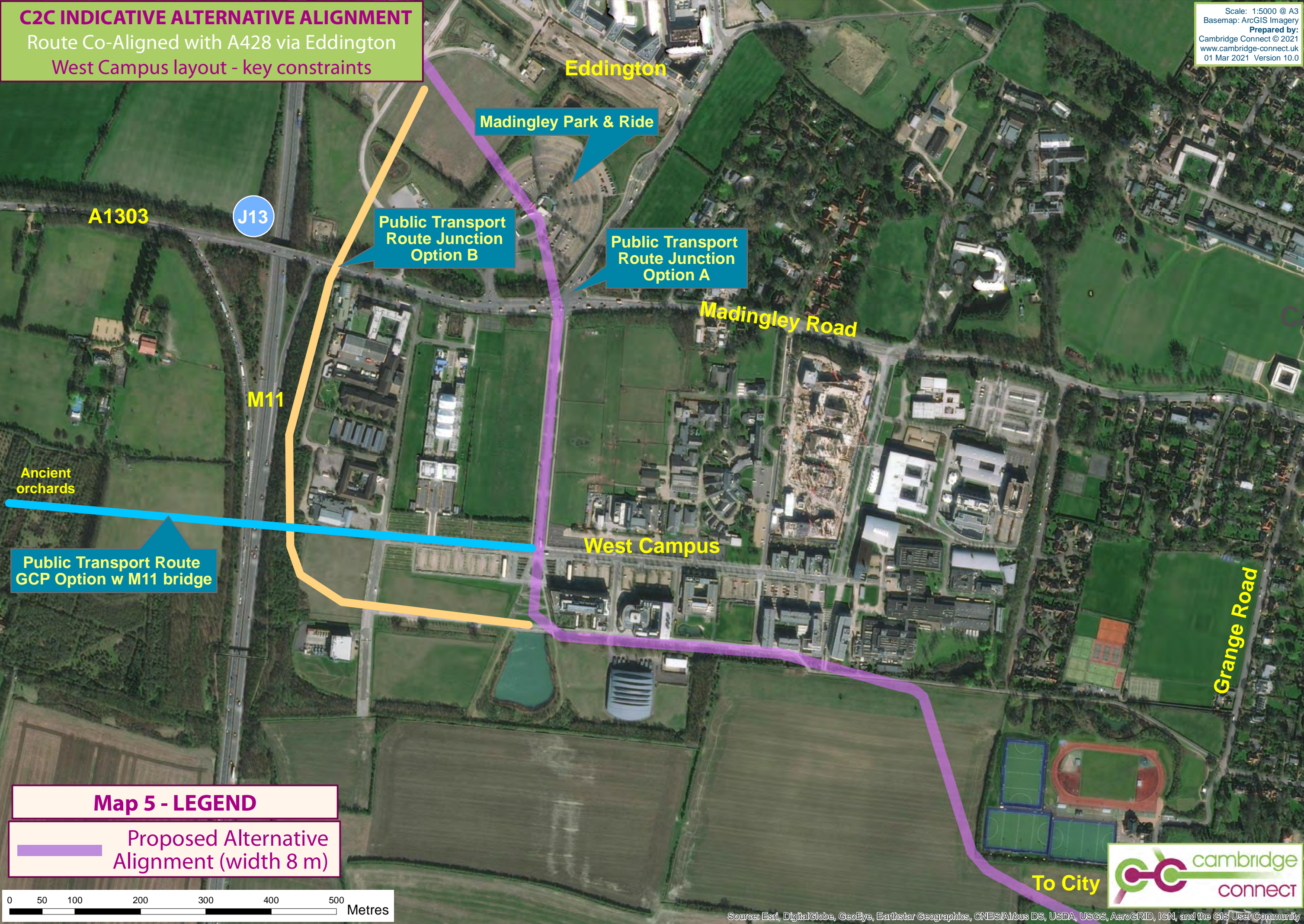
Scale: 1:5000 @ A3
Basemap: ArcGIS Imagery
Prepared by:
Cambridge Connect © 2021
www.cambridge-connect.uk
01 Mar 2021 Version 10.0



C2C INDICATIVE ALTERNATIVE ALIGNMENT

Route Co-Aligned with A428 via Eddington
West Campus layout - key constraints

Scale: 1:5000 @ A3
Basemap: ArcGIS Imagery
Prepared by:
Cambridge Connect © 2021
www.cambridge-connect.uk
01 Mar 2021 Version 10.0



Map 5 - LEGEND

Proposed Alternative Alignment (width 8 m)

0 50 100 200 300 400 500 Metres



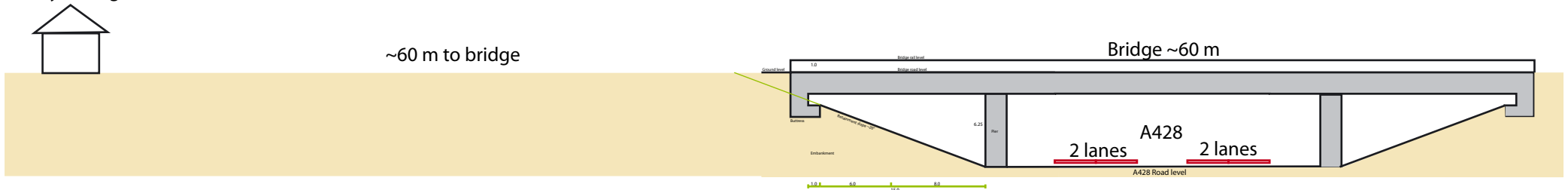
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Indicative schematic of cutting on A428 at Madingley - view west. Typical cross section. Dimensions in metres (approx).

PRESENT SITUATION

Trinity Cottages

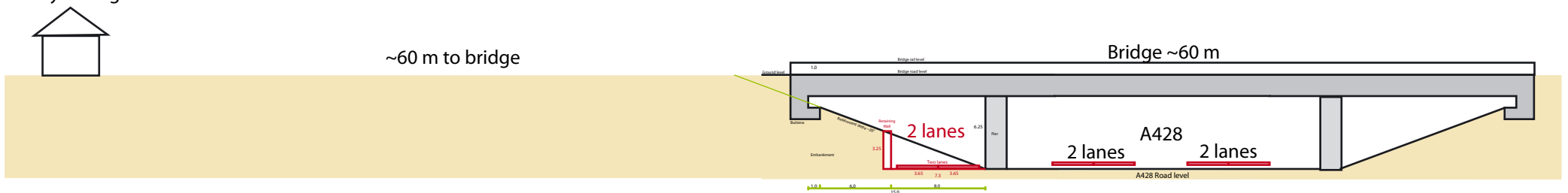
~60 m to bridge



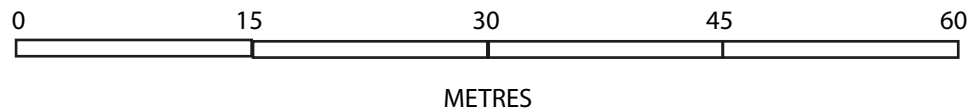
WITH PUBLIC TRANSPORT LANES CO-ALIGNED WITH A428

Trinity Cottages

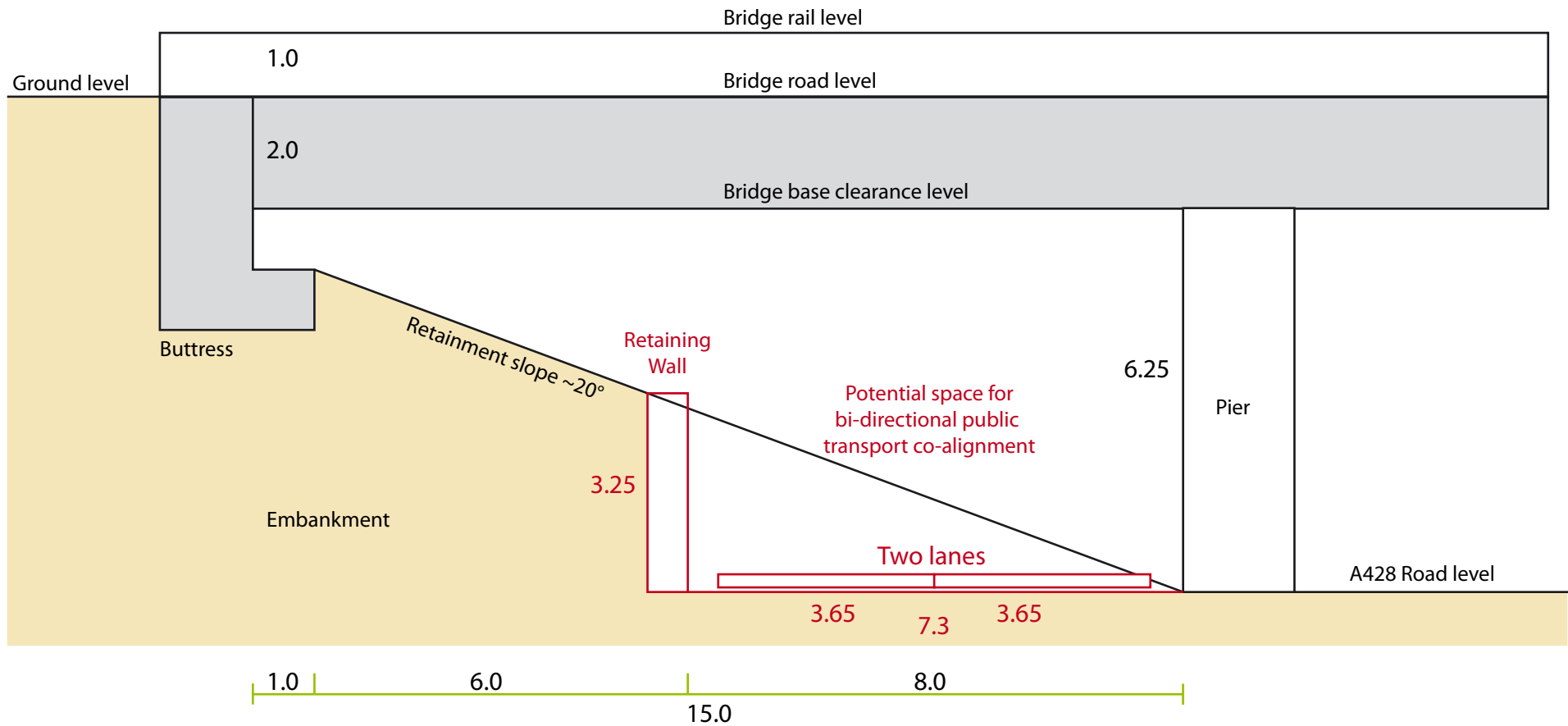
~60 m to bridge



APPROX SCALE



Schematic of bridges on A428 - south side, view west. Typical cross section. Dimensions in metres (approx).



Madingley dimensions - 15.0 m from pier to buttress edge, 6.25 m height from A428 road level to clearance under bridge.

Church Road dimensions - 16.0 m from pier to buttress edge, 8.0 m height from A428 road level to clearance under bridge.

A428 MMR Offramp dimensions - 15.0 m from pier to buttress edge, 5.0 m height from A428 road level to clearance under bridge.