
The Cambourne to Cambridge Order

Transport And Works Act 1992

Transport And Works (Applications And Objections Procedure) (England And Wales) Rules 2006

Design and Access Statement

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Cambourne to Cambridge

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Section 1 Introduction

The Scheme

Cambridgeshire County Council (CCC) on behalf of the Greater Cambridgeshire Partnership (GCP) is applying to the Secretary of State (SoS) for Transport for a Transport and Works Act Order (TWAO) to authorise the construction, operation and maintenance of a guided busway between the town of Cambourne and Cambridge City referred to as the Cambourne to Cambridge Better Public Transport project ('the Scheme').

The objectives of the Scheme as set out in the Outline Business Case are to:

- Achieve improved accessibility to support the economic growth of the Greater Cambridge region;
- Deliver a sustainable transport network/system that connects areas between Cambourne and Cambridge along the A428/A1303 transport corridor; and
- Contribute to enhanced quality of life by relieving congestion and improving air quality within the surrounding areas along the A428 /A1303 corridor and within Cambridge City.

The Scheme proposes the development of a dedicated guided busway running for approximately 13.6km between the town of Cambourne and the edge of Cambridge City along the A428/A1303 transport corridor with a Travel Hub at Scotland Farm. It would serve existing and proposed communities in Cambourne and the proposed Bourn Airfield development, as well as in Hardwick, Coton and the West Cambridge campus. An emergency and maintenance access track will also be provided that will run alongside the majority of the guided busway, which would be accessible to pedestrians and cyclists. Part of the service track will also function as a bridleway.

The Scheme will enable people to travel by public transport for employment and education purposes, encouraging a modal shift to public transport via a congestion free alternative to private vehicular trips, facilitating sustainable development at key strategic economic and housing sites within the Greater Cambridge region.

Consenting Requirements

The application process for a TWAO is governed by the Transport and Works Act 1992 ('the 1992 Act') and the Transport and Works (Applications and Objections) (England and Wales) Rules 2006 ('the 2006 Rules'), as amended.

CCC will be applying for the TWAO referred to as The Cambourne to Cambridge Order ('the Order').

The Order would authorise CCC to carry out works to construct the bus-way, including a surfaced bus-way, bus stops, and associated hard and soft landscaping. The Order would also authorise CCC to operate and maintain the bus-way and allow them to compulsorily acquire land and rights permanently or on a temporary basis, to divert utilities, to make provision for temporary alternative routes or permanent diversions and to stop up or alter public rights of way.

As elements of the works are beyond the scope of CCC's permitted development rights, pursuant to rule 10(6) of the 2006 Rules the draft Order is accompanied by a Request for Deemed Planning Permission (document ref: CtoC-14-00) under Section 90(2A) of the Town and Country Planning Act 1990 which if given, would deem the grant of planning permission for development as set out in Section 55 of the Town and Country Planning Act 1990 and described in Section 4 of the Planning Statement (document ref: CtoC-15-00). The Request for Deemed Planning Permission (document ref: CtoC-14-00) seeks planning permission for the required change of use of land, along with the physical development and other works which make up the Scheme.

Certain details, such as the final location, layout scale and external appearance of certain structures and hard/soft landscaping works are 'reserved' for subsequent approval by the relevant local authorities. The Request for Deemed Planning Permission (document ref: CtoC-14-00) includes draft planning conditions in this regard with these to be informed by this Design and Access Statement (DAS).



Section 1 Introduction

Purpose of the Design and Access Statement

The DAS has been submitted for information to inform the consideration of the Request for Deemed Planning Permission (document ref: CtoC-14-00).

In accordance with Part 3, Article 9 paragraph 4(c) of the Town and Country Planning (Development Management Procedure) Order 2015, a Design and Access Statement (DAS) is not specifically required in support of the Request for Deemed Planning Permission (document ref: CtoC-14-00) as the Scheme constitutes an 'engineering operation' with only minor development that would be considered 'Buildings' as per Section 55 of the Town and Country Planning Act 1990.

Notwithstanding this, the project has prepared the DAS to demonstrate how the design of the Scheme and land required both temporarily and permanently for same (herein referred to as the Application Site) responds to its wider context and how it will be accessed by different users'.

The DAS has been prepared in line with the requirements of Article 9 of The Town and Country Planning (Development Management Procedure) (England) Order 2015 which states that a 'design and access statement must —

- *Explain the design principles and concepts that have been applied to the development;*
- *Demonstrate the steps taken to appraise the context of the development and how the design of the development takes that context into account;*
- *Explain the policy adopted as to access, and how policies relating to access in relevant local development documents have been taken into account;*
- *State what, if any, consultation has been undertaken on issues relating to access to the development and what account has been taken of the outcome of any such consultation; and*
- *Explain how any specific issues which might affect access to the development have been addressed'.*

The DAS should be read in conjunction with the Planning Statement (document ref: C2C-15-00) which sets out the full national and local planning policy context as well as the need for and benefits of the Scheme, drawing on the overall suite of documents and assessments that accompany the Order, notably the:

- Deemed Planning Drawings (document ref: CtoC-16-00)
- Environment Statement (document ref: CtoC-26-00) and related technical reports and appendices;
- Code of Construction Practice (document ref: CtoC-25-00); and
- Transport Assessment (document ref: CtoC-10-00).



Section 1 Introduction

Structure of the Design and Access Statement

The DAS is structured as follows:

- Section 2 sets out a brief background along with the vision and objectives for the Scheme in summary form. It then sets out a summary of the description of the Scheme with reference to the Application Site boundary;
- Section 3 sets out the context for the Scheme including the Economic and Social, Environmental and Transport Contexts;
- Section 4 sets out the Planning Policy Context as it relates to the design and access of the Scheme;
- Section 5 sets out the consultation undertaken to date in relation to the Scheme, specifically in relation to how this has influenced the design development process;
- Section 6 sets out the design principles that will guide the Scheme's development through the detailed design stage and how this will be captured through the proposed planning conditions included as part of the Request for Deemed Planning Permission (document reference CtoC-14-00);
- Section 7 sets out the Scheme's approach to sustainable design;
- Section 8 sets out the Scheme's approach to the ecological design;
- Section 9 sets out the Scheme's approach to the landscape design;
- Section 10 sets out the Scheme's approach to the lighting design;
- Section 11 sets out the Scheme's approach to inclusive design;
- Section 12 sets out the Scheme's approach to site specific elements including the design intent for the Travel Hub at Scotland Farm, the M11 overbridge and the Bin Brook Crossing;
- Section 13 sets out the Scheme's approach to access along the route; and
- Section 14 provides a summary of the DAS



Section 2 Scheme Background

Background, Vision and Objectives

Section 2 of the Planning Statement (Document Ref: CtoC-15-00) sets out detailed background information for the Scheme.

Section 3 of the Planning Statement (Document Ref: CtoC-15-00) sets out the need, objectives and benefits of the Project.

In summary the need for the Scheme is driven by constraints on the existing transport network in the Greater Cambridge region and the knock on impact this has in terms of constraining growth in the region. The A428/A1303 transport corridor contributes to a wide network of movement and connectivity within the region which, if enhanced sufficiently to link growth sites, could support wider business investment and confidence in the region and will ensure investment is targeted where businesses need it.

GCP’s vision for the Scheme as defined in the Outline Business Case (OBC) 2020 (document ref: C2C-20-01) is as follows:

“To connect existing and new communities along the A428/A1303 to places of employment, study and key services to enable the sustainable growth for Greater Cambridge. We will deliver this through improved, faster and more reliable High Quality Public Transport (HQPT) services, together with high quality cycling and walking facilities serving a new Travel Hub site to the west of Cambridge.”

To achieve the above vision the objectives of the Scheme as set out as part of the OBC 2020 are to:

- Achieve improved accessibility to support the economic growth of Greater Cambridge region;
- Deliver a sustainable transport network/system that connects areas between Cambourne and Cambridge along the A428/A1303; and
- Contribute to enhanced quality of life by relieving congestion and improving air quality within the surrounding areas along the A428 /A1303 and within Cambridge city centre.

Chapter 4 of the Environment Statement (document ref: CtoC-10-ES0) sets out how the scheme has developed through the Business Case stages, to the preferred option submitted as part of the TWAO.

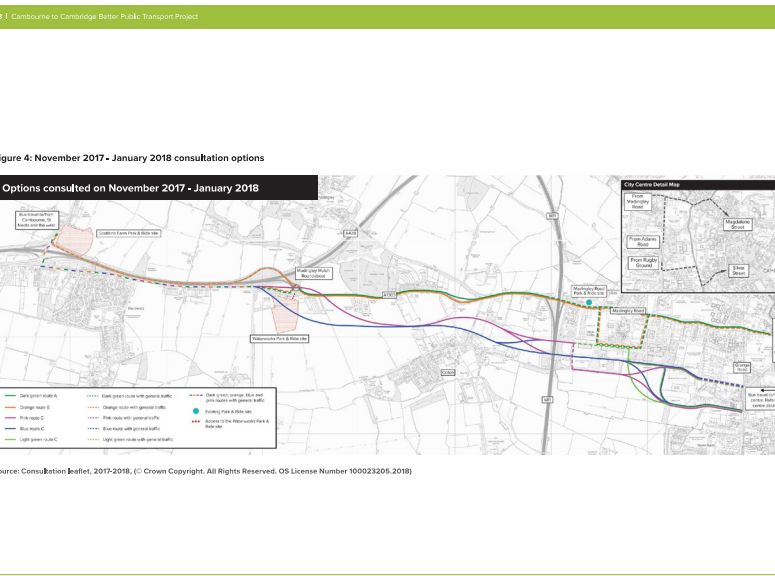


Figure 2-1 - Outline Business Case Documentation

Section 2 Scheme Background

The Scheme and its location

Planning permission is sought as part of the Scheme for the development in line with the works as set out in the draft Order (document Ref CtoC-02-00).

A detailed description of the Scheme is included in Chapter 3 of the Environment Statement (document ref: CtoC-10-ES0) but in summary proposes the development of a guided busway connecting Cambourne to the edge of Cambridge City. It includes sections of segregated and unsegregated carriageway (see Figure 2-1 and Figure 2-2).

The development will include public transport stops, operational lighting, bridges over the M11 motorway and Bin Brook and signalised junctions where the route interacts with existing roads.

The development will also include an emergency and maintenance access track that will run for the majority of the proposed route of the guided busway and will allow for use by pedestrians and cyclists and for equestrian users in certain sections.

The scheme includes a Travel Hub to be located at Scotland Farm with capacity for up to 2,000 cars including bus pick up/drop off points, coach parking, waiting room and welfare facilities, recharging points for electric powered vehicles and secure cycle parking for up to 300 bicycles.

The Scheme will require amendments to existing highways and accesses, parking arrangements and the erection/reinstatement of boundary fencing.

A number of temporary construction compounds are proposed along the route of the Scheme. Environmental mitigation including drainage features, earthworks and landscaping along with other ancillary works are also proposed.



Figure 2-1 - Location of the Scheme

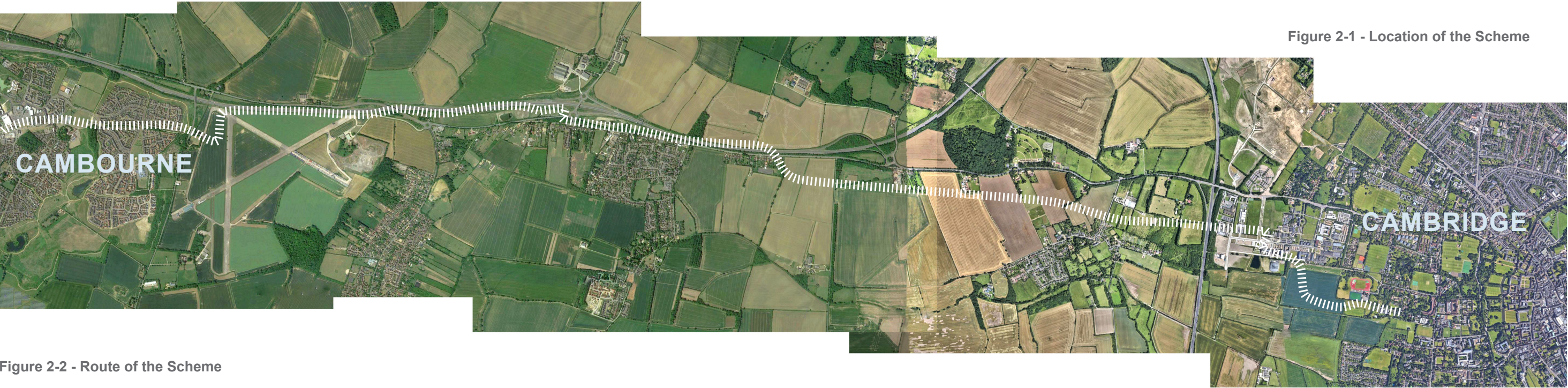


Figure 2-2 - Route of the Scheme

Section 3 The Context

The Application Site

The Application Site is shown within the redline in Figure 3-1. The figure shows the Applications Site's context including the route, the built environment along the route, any major national or local designations (such as Green Belt or Sites of Special Scientific Interest) and access along the proposed route.

A more detailed description of the Application Site and the proposed route is set out in section 4 of the Planning Statement (document ref: CtoC-15-00) and in Chapter 3 of the Environment Statement (document ref: CtoC-10-ES0) with a detailed description of the environment along the route provided in Chapter 5 of the Environment Statement (document ref: CtoC-10-ES0)

In summary the route, running from west to east, extends from Sterling Way to the east of the town of Cambourne to Grange Road in Cambridge City. The Application Site passes through the administrative areas of South Cambridgeshire District Council and Cambridge City Council and through several settlements running from west to east including Cambourne, Bourn Airfield, Hardwick, Coton, West Cambridge and the Cambridge fringe.

The Application Site comprises a relatively narrow corridor that allows sufficient space to construct the guided busway, public transport stops, overbridges (proposed at the M11 and at Bin Brook), along with ancillary works including landscape and ecological mitigation. The exception to this is an area of land located off Scotland Road to the north of the A428 dual carriageway, which would be used for the Scotland Farm Travel Hub.

A summary of the Application Site and its surrounding context under the following headings is provided below to illustrate how the context has informed the design and access of the Scheme:

- Social and Economic Context;
- Built Environment;
- Natural Environment; and
- Transport Context.

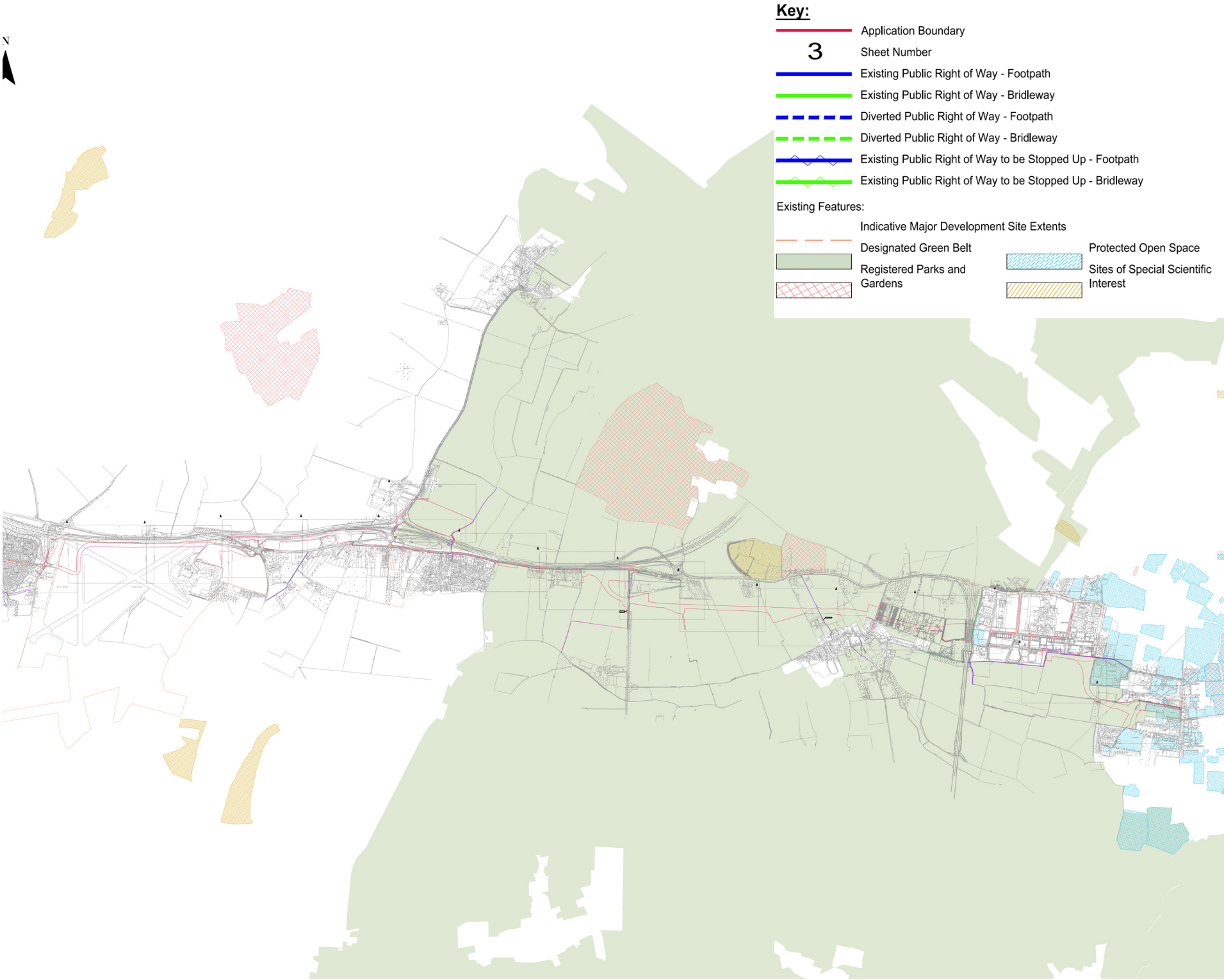


Figure 3-1 - The Application Site

Section 3 The Context

Scheme background

As Cambridge is one of the most successful cities within the UK where economic success, high quality of life and quality of place are inextricably linked. With the globally renowned University of Cambridge at its centre, the Greater Cambridge region has become a global hub for research, technology and innovation and as a result is one of the most successful and fastest growing economies in the UK. The OBC 2020 (document ref CtoC-20) for the Project identified several key underlying drivers for the need for change along the A428/A1303 route for the investment in CtoC. The project can be summarised as follows:

- The A428 is a nationally important route and forms part of the nationally strategically important Oxford-Milton Keynes-Cambridge arc - highlighted by the National Infrastructure Committee as a priority for growth.
- Large population growth will require the delivery of significant additional housing, much of which is planned to be located to the West of Cambridge along the A428/A1303 route;
- Employment is growing rapidly within Cambridge, including in destinations on the edge of the city such as West Cambridge and the Biomedical Campus to the South, with a need for effective transport connections from existing and future settlements.
- The demand generated by the growth in housing and employment will generate ever greater levels of demand for travel in and around Cambridge thereby exacerbating current congestion issues;
- Car ownership in Cambridge is high, with 85% of households having access to a car compared to the national average of 74%;
- The rail network does not serve movements along the A428/A1303 route;
- The existing A428/A1303 is inadequate for walking and cycling as a mode of transport into Cambridge;
- Congestion on the route means that current public transport services are unable to offer an attractive alternative to private car; and
- Without intervention, those living and working in the new developments could become locked into a cycle of car dependency and low use of other modes exacerbating capacity issues along the route.

Built Environment Context

In summary the Scheme passes through or by several main settlements as follows:

- Cambourne;
- Bourn Airfield;
- Hardwick;
- Coton;
- West Cambridge; and
- The West Cambridge Fringe.

The Local Plans for South Cambridgeshire District Council and Cambridge City Council also propose significant new housing to the west of Cambridge city by 2031, with an additional 8,000 new homes in the Cambourne to Cambridge area and 44,000 new jobs to be created in or around the city. Much of the housing which will be required to support this growth in population is anticipated to be west of Cambridge along the A428/A1303 which the Scheme will directly service. The following major development sites as shown in Figure 3-2 along the proposed route are considered pertinent in terms of their likely interaction with the Scheme:

- A - Cambourne West - Within South Cambridgeshire, the Project will support the projected growth associated with Cambourne West, which has a resolution to grant permission for the erection of up to 2,350 dwellings, together with formal and informal open space, new community and retail facilities and new infrastructure under planning ref: S/2903/14/OL. Outline planning permission has already been granted for a bus link between Sterling Way Upper Cambourne and the Broadway (planning ref: S/3329/16/OL) in January 2023.
- B - Bourn Airfield and Bourn Quarter - Between Broadway and St Neots Road the Project will pass through the former Bourn Airfield site, which has the potential to deliver approximately 3,500 new dwellings with outline planning permission applied for in 2018 (planning ref: S/3440/18/OL). Outline permission granted 30 July 2024
- C - West Cambridge - The West Cambridge Area of Major Change is subject to a current outline application on behalf of the University of Cambridge for 383,300m3 of employment comprised predominantly of academic floor space (planning ref: 16/1134/OUT).

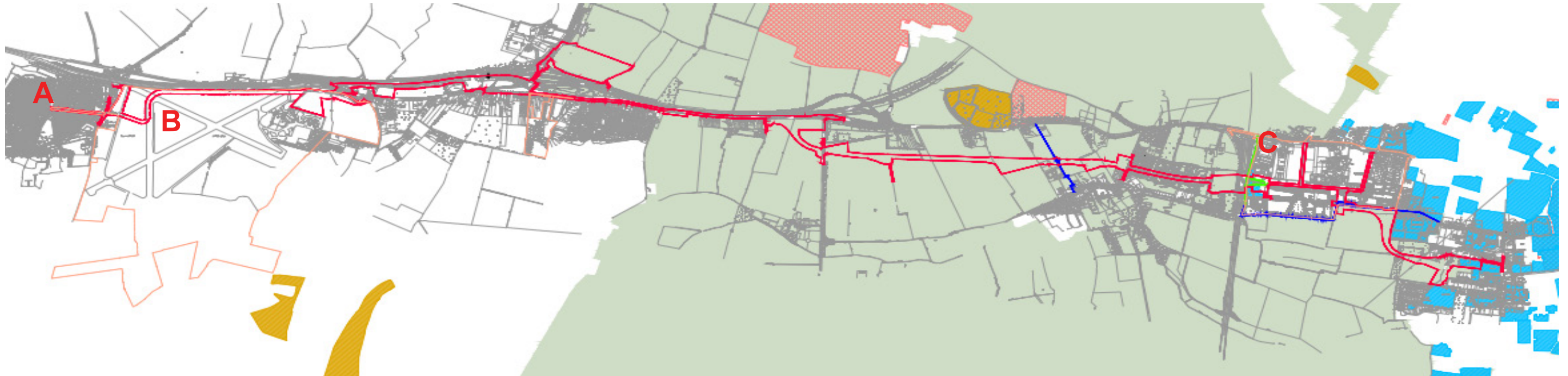


Figure 3-2 - Major Development Sites

Section 3 The Context

HERITAGE

Registered Parks and Gardens - There are two Registered Parks and Gardens of Special Historic Interest in England in close proximity to the Application Site namely Grade II Madingley Hall and the Grade I American Military Cemetery.

Conservation Areas - The following conservation areas are located close to or within the Application Site:

- Hardwick, designated in 1988;
- Madingley, designated in 1976;
- Coton, designated in 1978 and extended in 1988; and
- West Cambridge, designated in 1972 and extended in 1984 and in 2011.

Listed Buildings - A number of Listed Buildings are located within close proximity to the Application Site. The Grade II* listed building Clare Hall, is located 25m north of the Scheme at its eastern end.

11 Grade II listed buildings, the closest of which is No. 48 Grange Road, is 20m to the east of the Scheme. Twenty-two other listed structures lie within 250m of the Scheme, including one Grade I (St Peter’s Church, Coton) and two Grade II* listed buildings. Several locally listed buildings can also be found near the Scheme.

Natural Environment Context

Notable environmental constraints along the route of the Scheme are set out below.

AIR QUALITY

Much of Cambridge City is located in an Air Quality Management Area (AQMA) which extends west as far as Grange Road where the Scheme terminates.

SOILS AND GEOLOGY

Agricultural Land Classification maps (post 1988) show land between Cambourne and the Scotland Road area to be a mixture of Grade 2, 3a and 3b quality land. The better-quality Grade 2 areas are associated with slight topographic lows which align with drainage features in the area.

The Natural England dataset indicates the vast majority of the Scheme to be on Grade 2 land, the exceptions being east of the M11 and around the village of Coton and Hardwick, where Grade 3 land prevails.

WATER ENVIRONMENT

Surface Water Features - At the eastern end of the proposed route, the Scheme crosses the Bin Brook. This is classified as a main river by the Environment Agency and is the only main river that the Scheme crosses. There are numerous tributaries of the Bin Brook flowing predominantly in a north to south direction, which are mainly land drains following the borders of fields. The Callow Brook is an ordinary watercourse and flows from south to north, starting just south of the A428 in the village of Hardwick. It is culverted under the A428 and St Neots Road and flows adjacent to Scotland Road. An unnamed tributary runs adjacent to the Callow Brook, west of Scotland Road. Like the Callow Brook it is most likely also culverted under the A428 and St Neots Road.

Flood Risk - A Flood Risk Assessment has been prepared to accompany the Environment Statement (document ref: CtoC-10-ESO). In summary the majority of the Application Site crosses land of very low (Flood Zone 1) flood risk. However, there is a small area in high (Flood Zone 3) flood risk, where the risk of flooding from Bin Brook, associated with the floodplain of the River Cam, is greater than 1 in 100 in any year. There are pockets of land at high flood risk from surface water sources, typically associated with natural overland flow paths and local depressions in topography where surface water runoff can accumulate during or following heavy rainfall.

LANDSCAPE

Topography - The A428 and A1303 follow a ridge-line which descends into Cambridge east of the American Military Cemetery. The land slopes away from the ridge to the Fens in the north and the Bin Brook valley to the south.

National Character Area - The Application Site lies wholly within the Bedfordshire and Cambridgeshire Claylands National Character Area. The key characteristics of the area in relation to its landscape character are as follows:

- Gently undulating, lowland plateau dissected by shallow river valleys;
- Underlying geology of Jurassic and Cretaceous clays overlain with boulder clay and sand and gravel on the river valleys;
- Lime-rich, loamy and clayey soils;
- Variable woodland cover comprised woodland belts, plantations, copses, secondary woodland, pollarded willows and poplar along river valleys and clusters of ancient woodland;
- Open arable farmland landscape of planned and regular fields bounded by open ditches and trimmed, often species poor hedgerows;
- Major transport routes, including the M11 cross the area; and
- Larger settlements cluster along major roads and rail corridors with smaller settlements often nucleated around a church or village green

Section 3 The Context

Local Landscape Character - The local character is broadly large-scale arable farmland with open fields, sparse trimmed hedgerows and watercourses often cleared of bank-side vegetation. There are scattered woodlands, some of which are ancient semi-natural woodlands of considerable importance in the context of the wider county. The landscape has been affected by modern agricultural practices. Increased mechanisation has led to the removal of hedgerows and amalgamation of fields. Many of the remaining hedges are punctuated by gaps and trimmed by regular cutting.

The key characteristics of the area are:

- Scattered, small blocks of woodland, including some ancient woodland, linked by mature, fragmented hedgerow network.
- Irregular, generally rectilinear field pattern.
- Distinctive repetition of designed parkland features including historic parkland and the American Cemetery.
- A landscape divided by straight linear features including roads, tracks and a dismantled railway.
- Dense settlement pattern of small and medium sized villages concentrated close to main roads.
- Villages generally have well defined edges delineated by mature hedgerows, woodlands and clumps of trees.
- Distinctive wide, open views towards Cambridge from Coton Countryside Reserve and towards Ely from the American Cemetery.
- The gently undulating topography is divided by broad, shallow valleys - (Figure 3-3).
- Occasional parklands and orchards add interest and variety in the landscape and closer to Cambridge the landscape character transitions to a more urban character.

The key characteristics of the urban area to the west of Cambridge are:

- An area dominated by university and college buildings.
- Comprised colleges, playing fields, and large bespoke residential houses built for Fellows of the University.
- Houses set back from the road with large gardens and mature trees giving the area a green, leafy character.
- A corridor of rural land penetrates the urban area, running in to the University rugby ground on Grange Road.

The key local landscape types are shown in Figure 3-4.

Green Belt - The sections of the route running westwards from Scotland Farm to Cambourne are not located within the designated Green Belt. The proposed Scotland Farm Travel Hub is located within the designated Green Belt. The section of the route that runs eastwards from the Scotland Farm to the proposed M11 over-bridge is also located within the designated Green Belt.

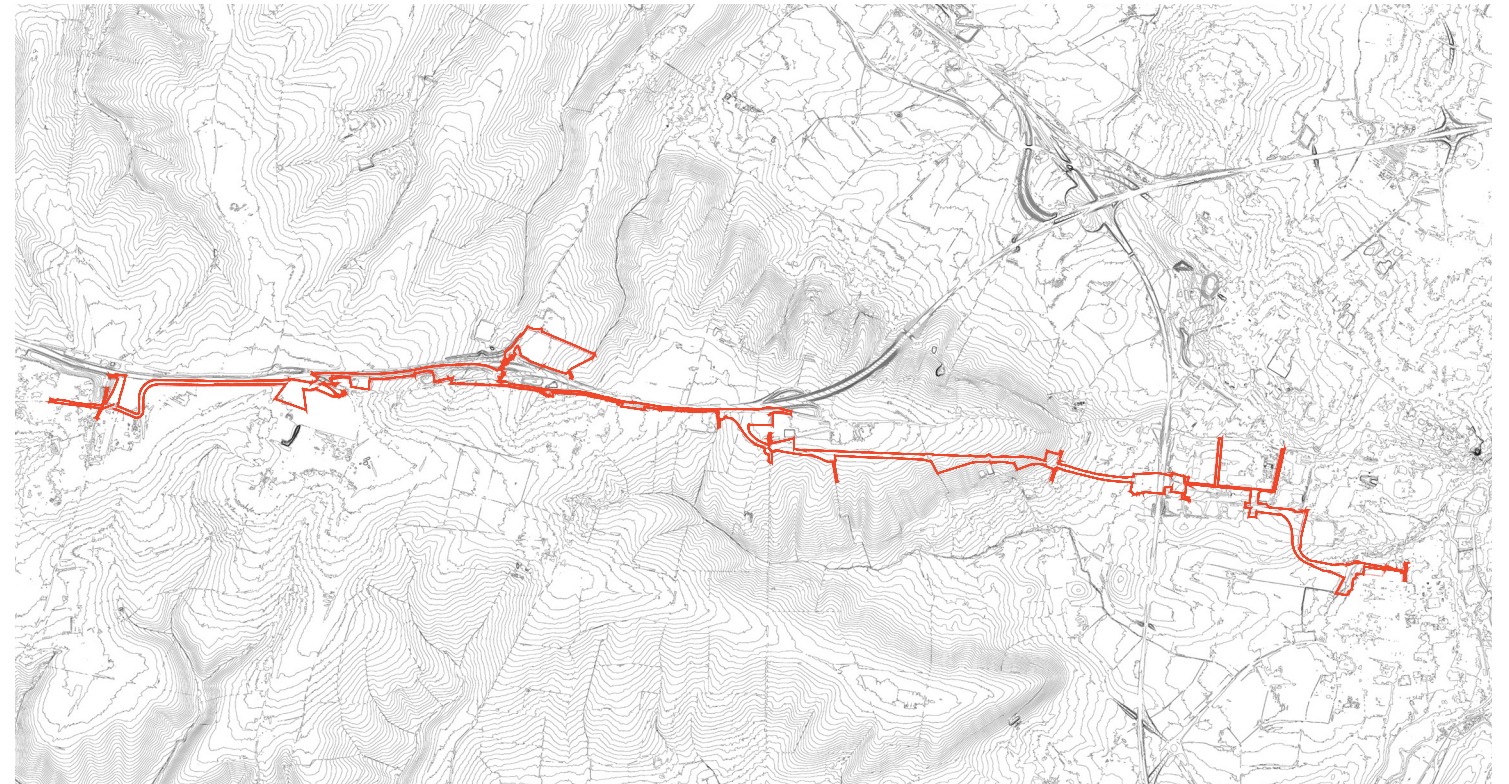


Figure 3-3 - Topography

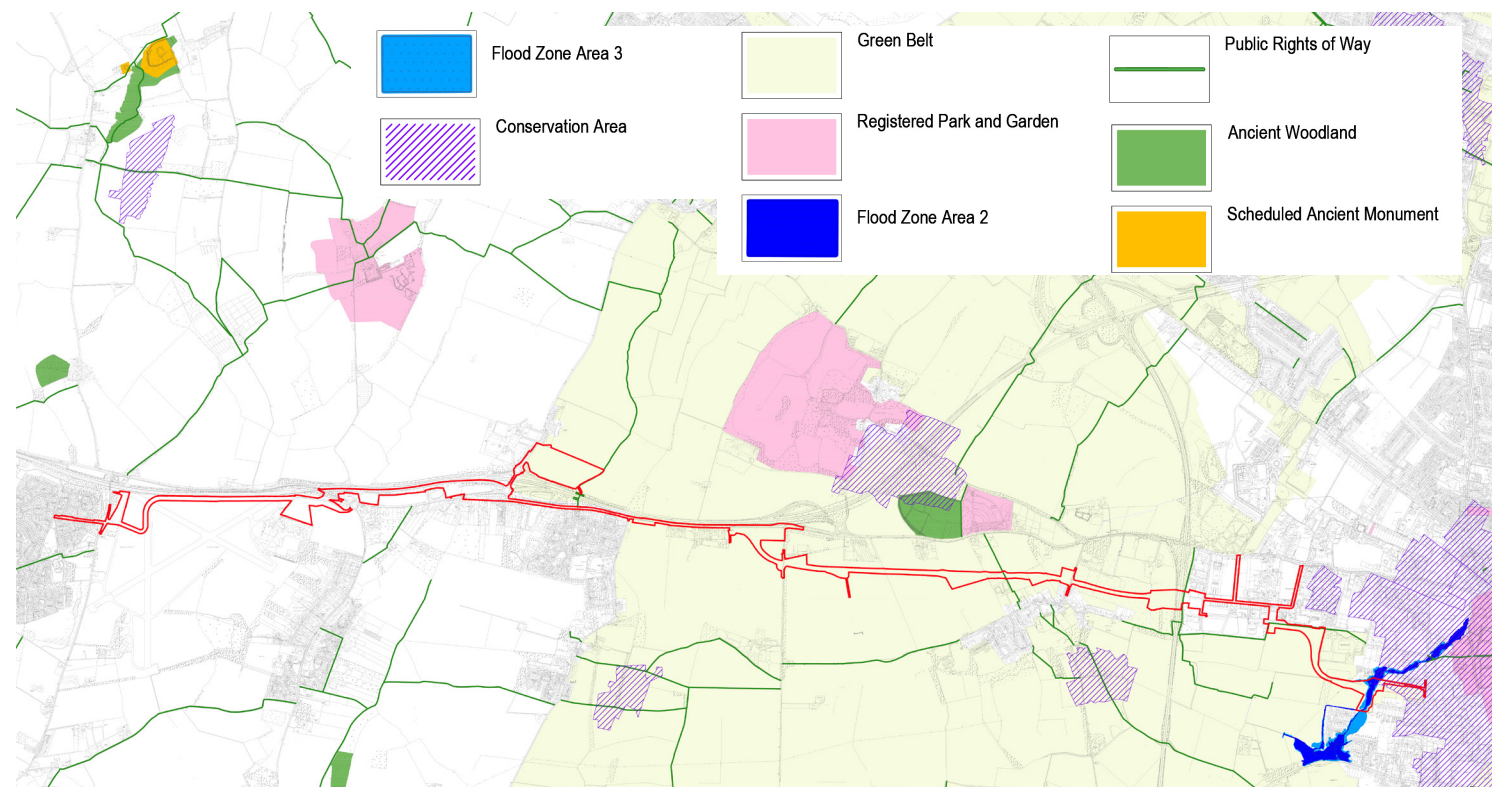


Figure 3-4 - Local landscape Types

Section 3 The Context

Transport Context

Existing Road Network - The Application Site broadly runs in parallel to the A428 and A1303 corridors between Cambourne and Cambridge, including St Neots Road and a new route through Bourn Airfield. The route then passes through and then to south of the West Cambridge development site, after which it follows the route of the existing Rifle Range Path until the junction with Grange Road.

The proposed Travel Hub is bounded by Scotland Road to the west and arable land to the north, south and east with some properties to the north-east. An existing Public Right of Way (PRoW) runs in a north / south direction to the east of the Travel Hub.

Existing Cycle and Pedestrian Network - The existing cycle network between Cambourne and Cambridge is relatively poor, with limited cycling infrastructure. At present there is not a continuous and convenient segregated cycle route between Cambourne and Cambridge, with users instead required to travel on carriageway along St Neots Road before joining a shared foot and cycleway that runs along the A1303 towards Cambridge.

The existing pedestrian infrastructure is limited and generally confined to urban areas and along key inter-urban routes such as St Neots Road. There is generally no dedicated infrastructure to facilitate the movement of pedestrians along rural routes connecting smaller towns and villages.

Pedestrian infrastructure becomes more prominent to the east from Madingley Road Park and Ride into Cambridge.

Due to the rural nature of the area and the proximity to the A428, the existing pedestrian infrastructure within the vicinity of the Scheme route is limited, however, a narrow footway is provided along the southern side of St Neots Road. At the eastern end of the route on Grange Road, footpaths are provided on both sides of the road, providing pedestrian connections along Grange Road to A1303 Madingley Road and A603 Barton Road.

The proposed Scotland Farm Travel Hub site is accessible from Hardwick via the existing footway which runs along St Neots Road and through the A428 / Scotland Road Grade Separated Junction. The eastern end of the travel hub site can also be accessed from St Neots Road via the blue bridge crossing (over the A428).

The proposed route is intersected by four of the existing Public Rights of Way (PRoW), predominately to the east of the route as follows:

- Bridleway 39/30: runs between the A1303 Madingley Road and the M11 footbridge, to the east of the M11.
- Footpath 39/31: connects with Bridleway 39/30, running east to Wilberforce Road.
- Footpath 55/2: runs between A1303 Madingley Road and High Street, Coton.
- Footpath 66/17: runs from Dry Drayton to the A428 to the north of Hardwick, running east of the travel hub. Includes a footbridge over the A428 to the southeast of the Travel Hub before meeting the guided busway.

Wider Transport Context - The wider transport context (the study area denoted by the redline in Figure 3-5) as used in the Transport Assessment (document ref: CtoC-25-00)) is bounded by: Rouges Lane, Boxworth Road and the A14 to the northeast; Cambridge Ring Road to the east; the B1046 to the south; and A1198 to the west. The A428 runs through the centre of this study area.

The M11 is situated in the east of the study area, connecting to the A14 to the north of the study area. Other notable routes within the study area include the A1303 Madingley Road which connects the A428 to Cambridge, as well as the A1307 Huntingdon Road which provides connectivity between the north of the study area and the centre of Cambridge.

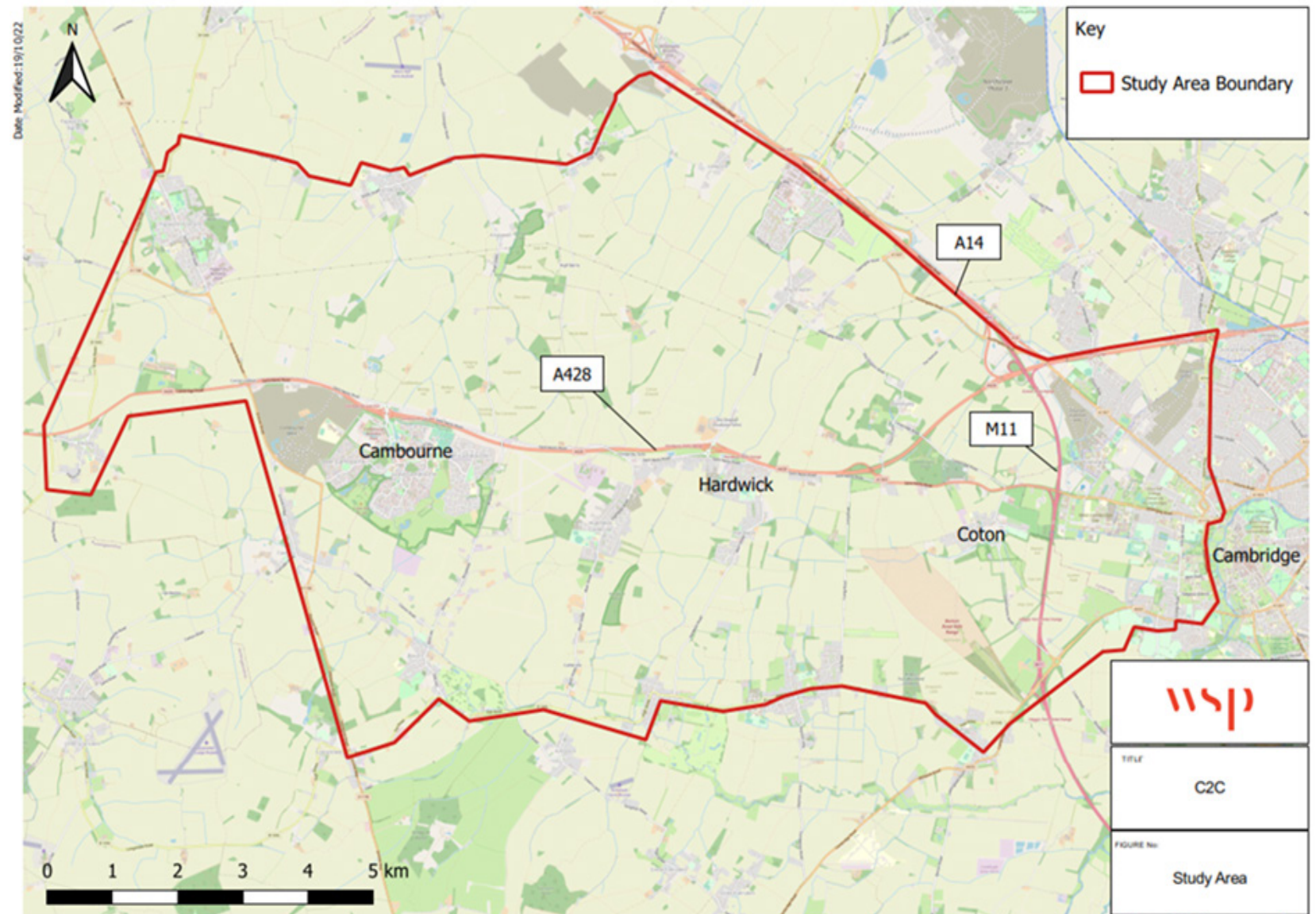


Figure 3-5 - Wider Transport Context (Study area from Transport Assessment outlined in red)

Section 4 Planning Policy and Guidance

The design, route and access arrangement for the Scheme has been influenced by relevant planning policy with these informing the development of the design vision and principles as set out in Section 6 of the DAS.

A more detailed description of the planing policy context for the Scheme is set out in section 6 of the Planning Statement (document ref: CtoC-15-00). The policies deemed to be of most relevance to the design of the Scheme have been summarised below.

The National Planning Policy Framework 2023

The National Planning Policy Framework (NPPF) published in December 2023 sets out the Government’s planning policies for England and how these should be applied in decisions for new development proposals.

At the heart of the NPPF 2023 is a presumption in favour of sustainable development. The presumption highlights that proposals which accord with an up to date development plan should be approved without delay unless material considerations indicate otherwise.

The objective of sustainable development can be summarised as ‘meeting the needs of the present without compromising the ability of future generations to meet their own needs’ (Paragraph 7 of the NPPF 2023).

Paragraph 8 of the NPPF 2023 goes onto state that ‘*Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives)*’: The three overarching objectives are as follows:

- *an economic objective – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure.*
- *a social objective – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering well-designed beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities’ health, social and cultural well-being; and*
- *an environmental objective – to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.*

For decision-taking (Paragraph 11 of the NPPF 2023) this means:

- approving development proposals that accord with an up-to-date development plan without delay; or
- (d) where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date, granting permission unless:
 - (i) *the application of policies in this Framework that protect areas or assets of particular importance provides a clear reason for refusing the development proposed; or*
 - (ii) *any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole.*

Paragraph 108 of the NPPF 2023 outlines that:

‘transport issues should be considered from the earliest stages of plan-making and development proposals, so that:

- *‘the potential impacts of development on transport networks can be addressed;*
- *opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised – for example in relation to the scale, location or density of development that can be accommodated;*
- *opportunities to promote walking, cycling and public transport use are identified and pursued;*
- *the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; and patterns of movement, streets, parking and other transport considerations are integral to the design of schemes, and contribute to making high quality places’.*

The following sections of the NPPF 2023 are of specific relevance to the determination of this application:

- Section 2 Achieving sustainable development;
- Section 4 Decision-making;
- Section 5 Delivering a sufficient supply of homes;
- Section 6 Building a strong, competitive economy;
- Section 8 Promoting healthy and safe communities;
- Section 9 Promoting sustainable transport;
- Section 11 Making effective use of land;
- Section 12 Achieving well-designed and beautiful places;
- Section 13 Protecting Green Belt land;
- Section 14 Meeting the challenge of climate change, flooding and coastal change;
- Section 15 Conserving and enhancing the natural environment; and
- Section 16 Conserving and enhancing the historic environment.

National Planning Policy Framework - Draft Text for Public Consultation 2024

A consultation draft of an amended version of the NPPF was published for an 8 week public consultation period from 31 July 2024 to 24 September 2024. Whilst the 2023 NPPF remains the relevant planning policy, a review of the proposed updates to NPPF has been carried out in order to establish whether these would affect the planning case for the the Scheme that is subject to this TWAO application. The main changes in the consultation draft are aimed at using planning policy to help better meet the UK’s housing need by increasing housing land supply particularly in relation to Green Belt designations. These changes are not considered to materially affect the planning policies affecting the Scheme and those aspects of the NPPF which are relevant to the Scheme and references to planning policy set out elsewhere in this TWAO application documentation remain materially unchanged by this consultation draft.

Section 4 Planning Policy Context

National Planning Practice Guidance

The National Planning Practice Guidance (NPPG) supports the above NPPF and provides further guidance in relation to policies considered relevant to the Scheme under the following paragraphs:

- **Open Space** - Paragraph: 001 Reference ID: 37-001-20140306.
- **Air Quality** - Paragraph: 001 Reference ID: 32-001-20191101.
- **Climate Change** - Paragraph: 001 Reference ID: 6-001-20140306.
- **Green Belt** - Paragraph: 001 Reference ID: 64-001-20190722.
- **Noise** - Paragraph: 001 Reference ID: 30-001-20190722.
- **Natural environment** - Paragraph: 004 Reference ID: 8-004-20190721.
- **Design: process and tools** - Paragraph: 001 Reference ID: 26-001-20191001.

Cambridge City Local Plan 2018

The Cambridge Local Plan 2018 sets out the vision, policies and proposals for future development during the Plan Period from 2018 to 2031. The following general policies are considered of specific relevance to the design of the Scheme:

- **Sustainability** - Policy 1
- **Green Belt** - Policy 4
- **Setting of the City** - Policy 8]
- **Carbon reduction, community energy networks, sustainable design and construction, and water use** - Policy 28
- **Flood Risk** - Policy 32
- **Light pollution** - Policy 34
- **Responding to context** - Policy 55
- **Designing new buildings** - Policy 57
- **Supporting sustainable access** - Policy 80

Policies specifically focused on design that are considered of relevance are set out below in more detail.

Policy 56 (Creating Successful Places) states that development that is designed to be attractive, high quality, accessible, inclusive and safe will be supported and that proposals should *'create and improve public realm, open space and landscaped areas that respond to their context and development as a whole and are designed as an integral part of the scheme'*.

Policy 56 explains that development which is designed to be attractive, high quality, accessible, inclusive and safe will be supported. The policy goes on to set out the key design requirements which development should seek to achieve. These include, but are not limited to, the following aspects:

- *'be designed to remove the threat or perceived threat of crime and improve community safety.*
- *use materials, finishes and street furniture suitable to the location and context.*
- *create and improve public realm, open space and landscaped areas that respond to their context and development as a whole and are designed as an integral part of the scheme.*

- *embed public art as an integral part of the proposals as identified through the Council's Public Art Supplementary Planning Document.*
- *ensure that proposals meet the principles of inclusive design, and in particular meet the needs of disabled people, the elderly and those with young children'.*

Policy 59 (Designing landscape and the public realm) provides guidance in relation to landscaping and public realm design considerations associated to new developments. The policy explains that external spaces, landscape, public realm, and boundary treatments must be designed as an integral part of new development proposals and coordinated with adjacent sites which surround the new development.

South Cambridgeshire Local Plan 2018

The South Cambridgeshire Local Plan 2018 forms part of the statutory development plan and sets out strategic planning policies for South Cambridgeshire Distirct Council (SCDC) against which all development proposals are to be assessed. The following general policies are considered of specific relevance to the design of the Scheme:

- **Sustainable Development** - Policy S/3
- **Cambridge Green Belt** - Policy S/4
- **Sustainable Drainage Systems** - Policy CC/8
- **Protecting and Enhancing Landscape Character** - Policy NH/2
- **Artificial Lighting** - Policy SC/9

Policies specifically focused on design that are considered of relevance are set out below in more detail.

Policy HQ/1 (Design Principles) explains that SCDC requires all new development to be of a high quality design, which follows a clear vision in terms of how the proposal will make a positive contribution to its local and wider context. The policy goes on to outline the key design principles which developments need to consider. These principles range from the conservation and enhancement of important natural and historic assets to the provision of safe and convenient access for all users and abilities to public buildings and spaces.

Policy NH/4 (Biodiversity) highlights SCDC's commitment to the protection and enhancement of biodiversity. The policy sets out clear biodiversity related considerations and requirements that development proposals must comply with.

Other Relevant Design Policy and Guidance

- **Greater Cambridge Biodiversity Supplementary Planning Document (prepared jointly with Cambridge City Council)** - adopted February 2022
- **Cambridgeshire Flood and Water SPD** - adopted November 2018
- **Sustainable Design and Construction SPD (prepared jointly with Cambridge City Council)** - adopted January 2020
- **District Design Guide SPD - South Cambridgeshire District Council** - adopted March 2010
- **Inclusive Mobility - A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure** - DfT
- **Accessible Bus Stop Design** - TfL
- **Traffic Signs Manual** - DfT

Section 5 Consultation

Consultation undertaken to date

Since the inception of the scheme, extensive consultation with key stakeholders (statutory and non-statutory) and the local community has been undertaken.

The purpose of the consultation undertaken to date is to ensure that statutory bodies, landowners, members of the public and other stakeholders understand the Scheme, the case for and benefits of it and the potential effects it may have on the environment.

The consultations have given those who attended a series of opportunities to comment on the proposals at key stages of development. The project team have worked to ensure that these responses were considered as part of the Scheme's design and construction planning.

A detailed description of the consultation undertaken to date as part of the TWAO process is set out in the Consultation Report (document ref: CtoC-06-00). The development and progression of the design was anchored with a preliminary route option selection consultation in 2015 and three further consultation rounds in 2017, 2019 and 2022.

These consultation events included a wide range of consultation initiatives including public exhibitions, working groups and local liaison forums to reach both community and statutory stakeholders.

More detailed consultation in relation to the design of the Scheme was undertaken in March 2022 with the Quality Review Panel.

Table 5-1 sets out the major consultation events undertaken to date with references to the relevant parts of the Consultation Report (document ref: CtoC-06-00), where further details can be found.

A summary of the consultation events is provided overleaf, showing how feedback was considered further and reflected as part of design change.

Stages	Detail	Relevant Section of the The Consultation Report
Better Bus Journeys consultation 2015	Exploring whether people want better bus connections - six high level route options. The Scheme was divided into Area 1 and Area 2 with three options for each.	Section 4 of the Consultation Report (document ref: CtoC-06-00).
Phase 1 consultation 2017 - 2018	Consulting on the area between Cambridge and Madingley Mulch Roundabout – various on-road/ off-road options including Park & Ride alternatives at Madingley and Scotland Farm.	Section 5 of the Consultation Report (document ref: CtoC-06-00).
Phase 2 consultation 2019	Consulting on the area between Madingley Mulch roundabout and Cambourne – various options including Park & Ride alternatives at Madingley and Scotland Farm.	Section 6 of the Consultation Report (document ref: CtoC-06-00).
EIA Consultation 2022	Consulting on preferred alignment - Cambourne to Cambridge (with route options at Hardwick) looking at environmental impact.	Section 7 of the Consultation Report (document ref: CtoC-06-00).
Quality Review Panel	The Project presented the Scheme to the Quality Review Panel (QRP) panel in March 2022 based on initial designs and layout.	Section 5 of the Design and Access Statement

Table 5-1 - Consultation Summary

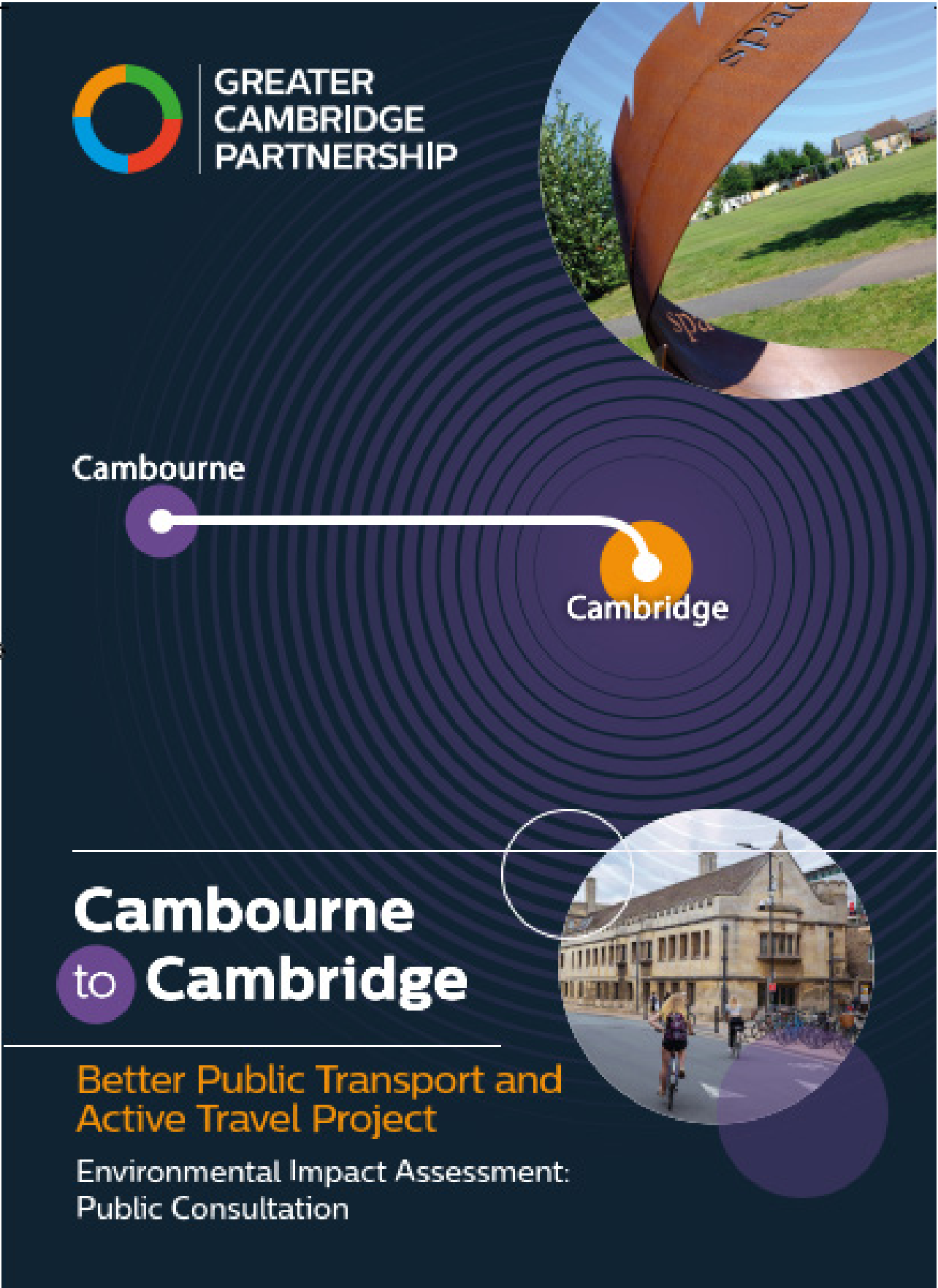


Figure 5-1- EIA Public Consultation 2022 Brochure

Section 5 Consultation

Consultation and how it has influenced design development

BETTER BUS JOURNEYS CONSULTATION 2015

A number of alternative proposals were submitted by consultees during the Better Bus Journeys consultation proposing modifications of the options as set out in the consultation material or different strategies to achieve similar objectives. Some proposals were out of the scope of the Scheme and some were being considered as part of other Greater Cambridge Partnership schemes in development. The remaining proposals were assessed and taken into further consideration for detailed corridor designs.

PHASE 1 CONSULTATION 2017 - 2018

The consultation findings led to a number of refinements to the three proposed Options. Support for Option B (see Figure 5-2 below) was high but would require regular gantries to provide signage along the route. The construction of gantries was not well received by consultees because of concerns regarding the visual impact. Therefore, the bi-directional bus lanes, along with an optimised on-road option to include both inbound and outbound bus priority, were not taken forward for further consideration.

The consultees suggested that there should be better cycle provision from High Cross junction to Lady Margaret Way. Taking this into account, the bus lane has been removed from the on-road option and proposals to upgrade cycle infrastructure in advance of the Scheme were taken forward as the Madingley Road improvements.

Alternative Park & Ride sites were also suggested, with some residents and the Local Liason Forum (LLF) advocating a new site in Cambourne, and some residents suggesting that the existing Madingley Road Park & Ride site be retained. However, stakeholders expressed a clear preference for the proposed Scotland Farm site.

As a result of consultation feedback and further detailed technical work, the preferred route selected was primarily off-road between Madingley Mulch roundabout and Bourn Airfield. The section at Hardwick received mixed views and was revisited in the 2022 consultation due to the impacts on trees on the off-road section between St Neots Road and the A428.

The preferred route through Cambourne was through the town with existing traffic via Upper Cambourne, rather than on the A428, and this route was selected for final route alignment at the next stage.

Scotland Farm was selected as the preferred Park & Ride location as a result of feedback and options assessment against the Waterworks site (north of Coton) throughout Phase 1 and 2 consultations. At the next stage of consultation (EIA consultation in 2022), the Scotland Farm Park & Ride site was selected and renamed as a travel hub and further detail around landscape mitigation was provided.

EIA CONSULTATION 2022

As a result of the EIA consultation in 2022 detailed discussions led to amendments of the route through the West Cambridge site, with a new junction connecting an existing bridleway. The route will tie in with the current well-used cycleway in West Cambridge site, south of the University buildings and will connect with Grange Road via the Rifle Range Access.

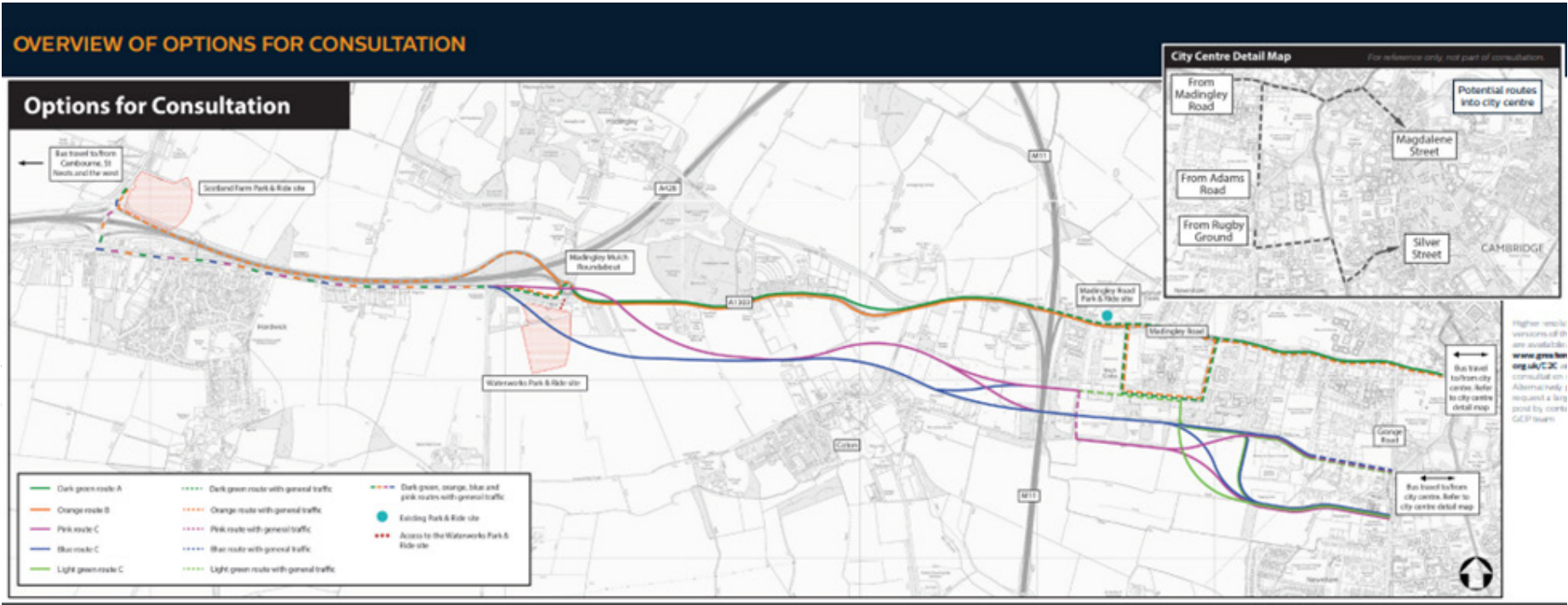


Figure 5-2- Scheme Options for Phase 1 Consultation

Section 5 Consultation

Quality Review Panel March 2022

The project team presented the Scheme to the Quality Review Panel (QRP) in March 2022. The Cambridgeshire Quality Charter for Growth sets out the core principles for the level of quality to be expected in new development across Cambridgeshire.

The QRP, which included architects, landscape architects and other relevant professionals, provides independent, expert advice to developers and local planning authorities against the four core principles of the Charter: connectivity, character, climate, and community. At that point the alignment was still under review, however broad design principles were in place and indicative layouts were presented.

The QRP summarised that the Scheme is a welcome sustainable scheme that will offer much besides public transport connections to the west Cambridge corridor. The panel highlighted possible opportunities to develop the wider benefits of the Scheme and well as other guidance notes and questions. Table 5-2 below captures these and the project team's response.

Local Planning Authority

The project team presented a draft version of the DAS to the Greater Cambridge Shared Planning Service as part of a suite of draft planning documentation throughout 2023 with comments received in May 2023 with comments on the design and access of the Scheme addressed, agreed and reflected in the draft planning conditions as set out in the Request for Deemed Planning Permission (Document Ref: CtoC 14-00) - these conditions as they relate to the DAS are set out in the following relevant sections of the DAS. The team continued to work with the Greater Cambridge Shared Planning Services up to submission of this TWAO application.

QRP comment	Detail
Develop a scheme vision	<p>Alongside functional new infrastructure, the route and its corridor should be designed to maximise access and movement, biodiversity, a sense of place, local character, sustainable water resources and enhanced health and well-being.</p> <p>Vision should be developed further in line with above. This has been undertaken with the route developed to create a green corridor that will be a multi-functional asset within the existing landscape for the use of the the existing and future communities.</p>
Design the scheme beyond a transport route	<p>In line with the project vision, the design has been developed to expand it beyond a functional commuter route, by offering new amenity spaces for social, leisure, or recreation purposes; namely:</p> <ul style="list-style-type: none">· Landscaping by Callow Brook· Linear landscape along Coton Orchard· Extending Cambridge University Athletics Track pond area· Landscaping to Bin Brook flooding basin· A linear park along the route through Bourn Masterplan (Designed by others) <p>Proposals for such areas should only be located in spaces that are required for delivery or mitigation as part of the TWAO - this is because standalone amenity spaces cannot be justified as part of a TWAO.</p> <p>Further community engagement was and will be undertaken as the design developed for the above areas, with the detailed deisgn to be agreed with local planning authority via the relevant planning conditions.</p>
Bus stop in Coton	<p>Final bus stop locations were not determined at this stage - the submittted design includes a stop in Coton. Additional care must be invested in designs at these locations in the next stages of design, an articulated layout for each stop will consider materiality, wider movement, and placemaking features - the detailed deisgn to be agreed with local planning authority via the relevant planning conditions.</p>
The Travel Hub should be more than just a car park	<p>Designs of the Travel Hub aim to incorporate green and blue infrastructure at a strategic level, as well as a new green space adjacent to Callow Book, adjacent to existing PRow. At this stage of the TWAO, the brief for the Travel Hub cannot be extended as part of a TWAO submission to allow future flexibility for the operator.</p>
Liaise with developers	<p>The design team and the client have been in constant and ongoing engagement with adjacent developers and their teams to maximise benefits for both schemes.</p>
Lighting design is crucial	<p>At the time of the presentation, the final design, layout and type of lighting were not designed. - the detailed lighting deisgn is to be agreed with local planning authority via the relevant planning condition.</p>
Maintain the open landscape character north of Coton	<p>In response to the Panel's comments, the extent of planting north of Coton was reviewed and redefined– tree planting and hedgerow extents were reduced to better consider long views and specifically visibility of the church spire from the PRow. However, the open nature of the landscape had to be balanced with the need to provide visual mitigation at certain locations.</p>
Consideration to Climate and Biodiversty Net Gain (BNG)	<p>The project team is taking a holistic view of the sustainable design of the Scheme, in particular concerning EIA. Traditionally EIA is mostly about identifying negative effects and finding ways of mitigating them. The project has however ensured that the environment team is working closely with the engineers so that opportunities to embed environmental betterment are achieved as part of the TWAO submission.</p> <p>The Scheme aims to achieve 10% BNG with an aspiration to achieve 20%.</p>

Table 5-2 - QRP Comments

Section 6 Design Principles

Design submitted as part of the Order

The design for the Scheme has been developed sufficiently to inform the application for the Order. The Order process allows for flexibility in the design process through the authorisation of development within certain limits. These limits include the 'limit of deviation' (LoD) as shown on the Works and Land Plans (document ref: CtoC-12-00) that allow for permanent works to deviate both horizontally within the LoD and vertically up to a certain number of metres for linear works as shown on the sections also included in the Works and Land Plans. Additionally temporary works and permanent mitigation can be located within an additional limit - the Land to be Acquired and Used.

The development for which deemed planning permission is requested is for development within any of the limits or any of the places authorised by the Order.

In view of the need for flexibility within the design of the Scheme, the detailed designs of certain elements of the scheme have not been finalised.

Development of Design Principles

It is an established planning principle that good design is a fundamental component of sustainable development. As noted in Section 4 of the DAS, Paragraph 131 of NPPF states that ‘*Good design is a key aspect of sustainable development, creates better places in which to live and work and helps make development acceptable to communities*’.

To assist in design development, the project team has developed a set of design principles to guide the development of the Scheme in line with Paragraph 131 of the NPPF. The Scheme objectives (section 2 of the DAS), the Application Site's context (section 3 of the DAS), the relevant national and local policy (section 4 of the DAS) and the consultation and engagement with relevant stakeholders undertaken to date (section 5 of the DAS), have informed the development of these principles and the design submitted as part of the Order application.

Approval of Detailed Design

The Planning Direction sought form the Secretary of State (SoS) is intended to be granted subject to the proposed planning conditions set out in Schedule 1 to the Request for Deemed Planning Permission (document reference CtoC-14-00), in accordance with Rule 10(6)(b) of the 2006 Rules 2006.

For the purposes of Rule 10(6)(c) the proposed planning conditions reserve certain matters including detailed designs of certain elements of the scheme for subsequent approval by the relevant local planning authority. These include matters relating to:

- Phasing of development;
- Contaminated land;
- Archaeology;
- Construction and demolition related matters;
- Construction traffic arrangements;
- Works to trees and hedgerows;
- Handling of agricultural soils;
- Replacement Open Space land;
- Drainage;
- Biodiversity;
- Sustainability;
- Hard and soft landscaping;
- Appearance, access, layout and scale of elements of the development;
- Ancillary works; and
- Bringing into use conditions

To ensure that the principle of good design is reflected in the detailed design of Scheme, the approval of the above detailed matters via the proposed planning conditions will also be guided by the below design principles.

Sections 7 to 13 of the DAS set out how each of the design principles has been reflected as part of the Order application, how they relate to specific design policies and how they will be secured through the relevant planning conditions included as part of the Request for Deemed Planing Permission (document ref: CtoC-14-00). These have been set out under the following headings:

- Sustainable Design
- Ecological Design
- Landscape Design
- Lighting Design
- Site Specific Design
- Inclusive Design and
- Access

Section 6 Design Principles

Design Principles

The below design principles have been developed from the scheme objectives as set out in the OBC 2020.

Objective - To achieve improved accessibility to support the economic growth of Greater Cambridge region

- 1. A design that connects existing and proposed communities along the route using sustainable modes of transport;
- 2. A design that does not impede existing road traffic, resulting in increased delays on the existing road network; and
- 3. A design that improves access, legibility and movement along the route of the scheme.

Objective - To deliver a sustainable transport network/system that connects areas between Cambourne and Cambridge along the A428/A1303

- 4. A design the incorporates high quality design to facilitate ease of movement via a number of sustainable modes of transport, supporting sustainable access to existing and proposed developments where priority of access is given to walking, cycling and public transport;
- 5. A design that improves active travel opportunities providing high quality and safe pedestrian and cycle connections; and
- 6. A design that connects existing communities that are isolated or severed by the existing road network through appropriate mitigation

Objective - To contribute to enhanced quality of life by relieving congestion and improving air quality within the surrounding areas along the A428 /A1303 and within Cambridge city centre

- 7. A design that creates a green corridor along the route that will be a multi-functional asset within the existing landscape context. Alongside functional new infrastructure, the corridor will be designed to maximise access and movement, biodiversity, a sense of place, local character, sustainable water resources and enhanced health and well-being;
- 8. A design that seeks to create attractive, high quality, accessible, inclusive and safe areas to benefit existing and proposed communities along the route;
- 9. A design that seeks to minimise impacts on the Green Belt, responding to the changing context along to route, seeking to reduce requirements for cut and fill and increasing opportunities to access the Green Belt and wider Green Infrastructure;
- 10. A design that provides access to and creates new/enhanced Green Infrastructure to reverse the decline in biodiversity, mitigate and adapt to climate change, promote sustainable growth/economic development and support healthy living and well-being;
- 11. A design that creates new Blue Infrastructure that will mitigate flood impacts and enhance biodiversity and landscape elements of the design;
- 12. A design that delivers a minimum of 10% biodiversity net gain (BNG), with the aim of achieving 20%. Opportunities to increase hedgerow and woodland connectivity through additional planting to link existing or proposed open spaces, hedgerows and ecological corridors will be explored;
- 13. A design that seeks to minimise land take as part of both the construction and operational phases of the scheme;
- 14. A sustainable design that meets the challenges of adaptation to climate change including mitigation focused on carbon reduction, water management, site waste management and the sustainable use of materials;
- 15. A passenger focused design facilitating the safe and efficient use of the guided bus-way and its related facilities enhancing their quality of experience;
- 16. A design that is safe by design notably in relation to artificial lighting, CCTV, clear signage and well-designed boundaries/perimeters providing a scheme that people will chose to use, live close to and visit;
- 17. A people focused design, designed for people not just for operational vehicles;
- 18. A design that considers how pedestrians and cyclists would experience the proposed routes as they move through and around them; and
- 19. An inclusive, responsive and flexible design so that all users can use the scheme safely, easily and with dignity.

Section 7 Sustainable Design

During the Scheme’s 60-year appraisal period (the anticipated lifetime of the Scheme) and 100-year lifespan for the bridges, changes in climate are likely to be experienced along the route. This has the potential to pose a risk to the Scheme's assets; for example through deformation and deterioration of asphalt surfacing associated with extreme temperatures and changes in precipitation; that could also affect foundation strength.

The Scheme has been designed to be resilient to the changes in the projected future climate scenarios as described in Technical Report 3 – Climate Resilience (document ref: CtoC-11-00), in particular:

- Drainage and Flooding - A decrease in summer precipitation by 18% by the 2080s, an increase in winter precipitation by 31% by the 2080s, and increased frequency of extreme precipitation events;
- Increase in average temperatures – an estimated increase of 5°C in the summer and 3°C in winter by the 2080s; increase in maximum summer temperature to 39°C; and increase in frequency of heatwaves is anticipated; and
- Increased intensity and frequency of high winds and storms.

Drainage and Flooding - policies CC/7 and CC/8 of the South Cambridgeshire Local Plan (2018) and Policy 31 of the Cambridge City Council Local Plan (2018).

In terms of flooding impacts the Scheme will be designed to be safe from fluvial, pluvial, groundwater and surface water runoff during the projected flood events, including any effects of scour (erosion at bridges etc.) in line with policies CC/7 and CC/8 of the South Cambridgeshire Local Plan (2018) and Policy 31 of the Cambridge City Council Local Plan (2018).

Guidance from the CIRIA SuDS Manual (C753) and Cambridgeshire County Council Surface Water Planning Guidance (June 2021) has been followed in developing the drainage design for the scheme. A Drainage Strategy Report prepared for the Scheme (Annex TR13.1.3: Surface Water Drainage Strategy of Appendix TR13.1: Flood Risk Assessment. (Document ref: CtoC-11-TR13-00) accompanies the Order application. The Drainage Strategy has been developed in line with these guidance documents, that emphasises the use of sustainable techniques. A drainage network utilising Sustainable Drainage System (SuDS) components is proposed, which will:

- Ensure that surface water drainage is managed as close to the source as possible and maintain natural ground conditions;
- Provide at-source pollution control without the need for proprietary treatment systems;
- Limit discharge rates to greenfield run-off rates to protect downstream watercourses;
- To attenuate run-off up to the critical rainfall event and minimise flooding for the exceedance rainfall event.

As detailed in the Flood Risk Assessment (Annex TR13.1.3: Surface Water Drainage Strategy of Appendix TR13.1: Flood Risk Assessment. (Document ref: CtoC-11-TR13-00), the measures included in the design in relation to flooding and drainage include:

- The fluvial design event is the 1 in 100 year plus climate change (19%);
- The route has been designed to be located above the 1 in 100 year plus 19% climate change flood level;
- The design includes a number of detention ponds for storm water storage and attenuate discharge to the drainage network are included as part of the design (see Table 7-1)

Detention pond	Size	Discharge point
1: Between Bourn Airfield and Childerley lodge	132m x 24m	Existing ditch adjacent to the route
2: Between Childerley Lodge and Hardwick	80m x 44m	Existing ditch south of the detention pond
3: East Hardwick	88m x 44m	Existing ditch to the southeast of the detention pond which flows south to Bin Brook
4: Between Long Road and Coton	72m x 44m	Existing ditch which flows into Bin Brook
5: Between Coton and the M11	80m x 44m	Existing ditch to the south of the detention pond
6: East of the M11 and up to Grange Road	80m x 36m	Bin Brook
7: East of the M11 and up to Grange Road	76m x 28m	Bin Brook
8: Scotland Farm Travel Hub	100m x 76m	Callow Brook

Table 7-1 - Detention Basins

The final layouts of the detention ponds will be confirmed at detailed design and will be sized to meet the 1% annual exceedance probability (AEP) rainfall event with a 300 mm freeboard (freeboard is an additional amount of height above the Base Flood Elevation used as a factor of safety). For the 1% AEP rainfall event, plus 40% for climate change, runoff volumes will be contained within detention ponds. As such exceedance flows arising from the guided busway are proposed to be contained within the proposed bus-way corridor;

- Attenuation will be provided within swales (a form of man-made ditch for drainage purposes), which will be designed to ensure a 100 mm freeboard is maintained;
- Assessments of the volumes of attenuation storage have been carried out for each catchment. These are based on the 1% AEP plus 40% climate change rainfall event and allowable discharge rate for the site to be agreed with the lead local flood authority or the EA;
- Other minor watercourse crossings have been designed to the 1 in 1000 year event (0.1%AEP) which accounts for flows greater than the 1 in 100 year plus 40% for climate change allowance;
- At the Scotland Farm Travel Hub, surface water runoff will be directed eastwards to a detention pond before being discharged to Callow Brook. The preferred SuDS options for this area will be confirmed at detailed design stage and will be designed to accommodate the projected changes in rainfall;
- Runoff rates will be agreed with the Lead Local Flood Authority at the detailed design stage.
- For the 1% AEP rainfall event +40% climate change, some flooding is permitted, however, it is managed such that it doesn’t enter buildings or disrupt emergency routes.

In the rural sections of the route, and due to ground conditions, surface water will be captured using dropped kerbs, laid flush, before passing across filter strips and then into swales or lined swales. These are preferred in order to meet water quality treatment and pollution control requirements. Surface water runoff will be conveyed within a network of swales before discharging to detention basins/ponds, which will then slowly discharge to the local watercourses at flow rates restricted to QBAR (value of the average annual flood event recorded in a river) or less, to help mitigate flooding.

Road junctions and roundabouts will be drained via combined kerb and drainage systems or gullies, which will discharge into the SuDS network or to an existing drainage network, where possible.

Section 7 Sustainable Design

Drainage as part of the ecological design

The verges, swales, and detention basins proposed as part of the Scheme will regularly be dry and are proposed to include planting that includes shrubs and trees where constraints allow. This will add to the wider green landscape and increase the number of trees and shrubs within the local area.

The ponds will support emergent and submerged vegetation along their shoreline and in shallow, marshy zones, which enhances treatment processes and biodiversity. The proposed planting at the detention basis and and swales that will run adjacent to the route, will provide a pleasant environment and encouraging active travel along the route for both leisure and commuting (see Figures 7-1 and 7-2).

The swales are proposed between the Emergency and Maintenance Access Track and the busway providing a buffer zone between bus and pedestrian/cycle traffic and enhancing the experience of active travel users.

Drainage as part of the landscape design

Landscaping proposals will also help reduce surface water runoff and burden in the watercourse network during heavy rainfall events. Landscaping is proposed on both sides of the carriageway where possible and will be incorporated within the verges, swales, detention basins and ponds that form the drainage design for the scheme. These will provide green corridors adjacent to the route, reducing overall run-off and mitigating against the increase in impermeable areas and the loss of trees in other areas along the route.

Planting is proposed to provide a diverse range of plants that are suited to the specific conditions of a SuDS swale (tolerant of varying water levels, slight pollution, etc.). The planting mix within the swale will be determined at the next stage of design. Where above and below ground constraints allow and visibility splays are not impacted, trees will be incorporated along the top of the swale. Regular monitoring and maintenance of the drainage features will be implemented for the operational design life, including inspections prior to and after extreme rainfall events. The detailed drainage design will be subject to the approval of the relevant local planing authority in line with proposed condition 14 as set out in the Request for Deemed Planning Permission (document ref: CtoC-14-00).



Figure 7-1 - Planted detention basins as part of the route

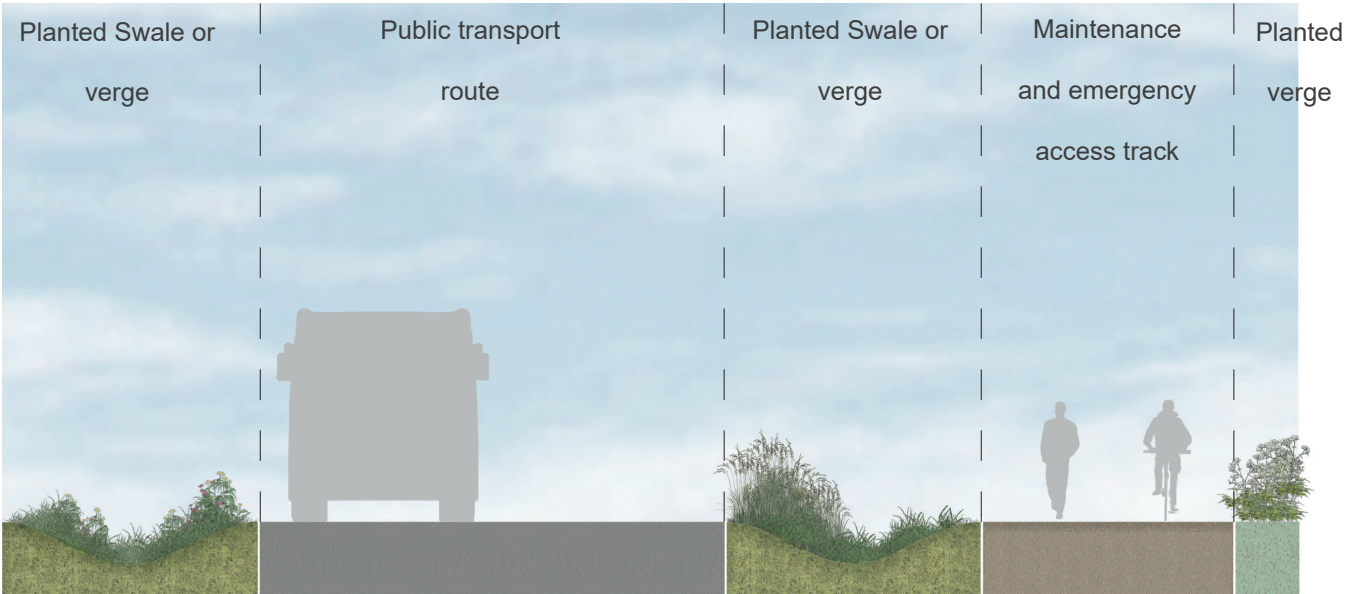


Figure 7-2 - Planted Swales as part of the route

Section 7 Sustainable Design

Increase in average temperatures - Policies SS/7 (9), CC/1, and CC/3 of the South Cambridgeshire Local Plan (2018) and the Greater Cambridge Sustainable Design and Construction SPD (2020) and Policy 28 of the Cambridge Local Plan (2018)

In line with projected changes in temperatures the detailed design for embankments will seek to mitigate impacts from changes in ground conditions which could cause potential failure of embankments or damage to structures.

The design will maximise self-sustaining habitats such as woodland or grassland and where possible to avoid any subsidence or dry-outs.

Regular monitoring and inspection of embankments after extreme temperature events will be implemented to assess impacts or damage caused by climate hazards. Details of planting and ground materials are not included as part of the TWAO application design, however design layouts allow for drought-tolerant planting to be implemented.

Tree planting providing shading is proposed near crossings or dwelling points on the shared use path providing natural cooling.

Increased intensity and frequency of high winds and storms

Projected changes in wind and storm conditions will be allowed for in the detailed design to ensure electrical equipment is protected from wind and rain ingress and lightning strikes.

Carbon Reduction

As part of the optioneering stages, the Scheme design was optimised, and the decision was taken to realign approximately 2km of the route from off-road to using the existing highways facilities, therefore saving carbon emissions associated with the construction of a similar length of route off-road.

The details related to the sustainable design elements of the scheme will be subject to the approval of the relevant local planing authority in line with proposed condition 16 as set out in the Request for Deemed Planning Permission (document ref: CtoC-14-00).

Operational Stage - Policies 28 and 36 of the Cambridge City Local Plan 2018 and

Construction Stage - Policies CC/6, SC/9, SC/10, SC/11, SC/12 and SC/14 of the South Cambridgeshire Local Plan (2018); Greater Cambridge Sustainable Design and Construction SPD 2020 and policies 28, 34, 35 and 36 of the Cambridge City Council Local Plan (2018).

The construction works will be in accordance with an approved Construction Traffic Management Plan (CTMP). It will seek to minimise construction traffic, congestion and re-routing to minimise carbon emissions.

A Code of Construction Practice (Doc Ref: CtoC-26-00) accompanies the Request for Deemed Planning Permission (Doc Ref: CtoC-14-00 Request for Deemed Planning Permission).

A Local Environmental Management Plan (LEMP) will cover all matters specified in the Code of Construction Practice and will be approved in writing by the relevant local planning authority. As part of the LEMP the applicant will undertake all construction works in line with an approved Site Waste Management Plan(s) to ensure that waste arising from the development is minimised and that which is produced is handled in such a way that it maximises opportunities for re-use or recycling. Similarly a Material Management Plan will be developed as part of the LEMP.

The details related to the sustainable construction elements of the scheme will be subject to the approval of the relevant local planing authority in line with proposed conditions 8 and 9 as set out in the Request for Deemed Planning Permission (document ref: CtoC-14-00).

Section 7 Sustainable Design

Policies CC/1, SC/12 and SC14 of the South Cambridgeshire Local Plan 2018.

The Scheme will incorporate hybrid electric vehicles, with the aim of providing a reliable public transport route whilst limiting noise and air pollution. The hybrid approach to the Scheme involves the use of electricity to power the buses within the town of Cambourne and the city of Cambridge. On leaving these areas the buses will transfer to the use of alternative fuels.

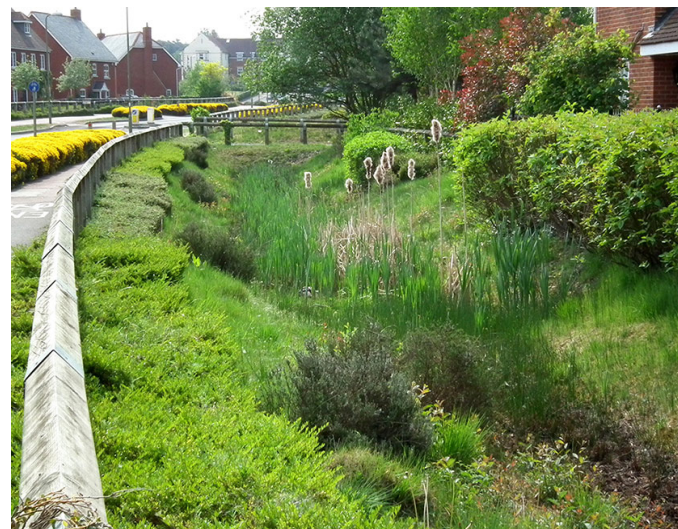
The details related to the type of engine technology will be conditioned in line with proposed condition 32 as set out in the Request for Deemed Planning Permission (document ref: CtoC-14-00).

The Scheme is expected to encourage a modal shift to public transport. This is forecast to reduce private vehicle kilometres travelled on the road network by 1.25 million kilometres a year, or more than 75 million kilometres over the 60 year appraisal period, with an associated reduction in carbon emissions of 4,500 tCO₂e.

The Scheme is anticipated to encourage modal shift to active modes, resulting in a reduction of 61,000 vehicle kilometres annually, equivalent to a carbon reduction of approximately 220 tCO₂e (based on Active Mode Appraisal Toolkit analysis).

The Emergency and Maintenance Access Track will allow pedestrians, cyclists and horse riders greater access to the wider Cambridge area via active modes of travel, yielding a reduction in private vehicle kilometres travelled and a reduction in the associated emissions. This will add to the growing rural walking and cycling network as it integrates with other new schemes, such as the planned Comberton Greenway and Madingley Road scheme, as well as existing routes. This in-combination effect is anticipated to further increase carbon savings associated with modal shift, which in turn may be enhanced with the future supportive policy and infrastructure measures. This means, the carbon savings attributed to modal shift are likely to be higher over time than that has so far been quantified.

Link-by-link modelling provides analysis on the local transport system that will result from the Scheme, by reviewing the changes in traffic flows, speeds, and journey time savings. The modelling results show an estimated reduction in emissions of 30,960 tCO₂e within the study area over the 60-year appraisal period. Provision of the bus-way and park and ride facility is anticipated to reduce delays across the network, thereby improving traffic efficiency, reducing stop-start traffic, and reducing fuel consumption of vehicle trips across the network.



Section 8 Ecological Design

The GCP is committed to developing new habitat as part of the Scheme's that will result in an overall gain in biodiversity of at least 10% and with the aim of achieving 20%. The Scheme's approach to this is set out below under the headings of:

- Habitats
- Notable Species; and
- Biodiversity Net Gain

Habitats

The route of the Scheme and its design has been devised and refined to limit the extent of habitat loss as far as practicable.

Compensatory habitat creation is included as part of the Scheme proposals, often serving as wider mitigation for potential landscape or flooding impacts. These have been conceived to maximise biodiversity benefits through the selection of native plant species and habitats of higher ecological value, such as lowland mixed deciduous woodland and scrub. Woodland planting is located to complement existing woodland outside of the Scheme limits. Other areas of habitat have been included within the landscape proposals to support certain groups and species of animal (notably bats).

Areas of particular note where habitat creation is proposed include areas at Callow Brook, Coton Orchard, west of the University Sports Ground and the Rifle Range/Bin Brook areas. The ecological design forms part of the landscape proposals for the Scheme. These seek to maximise the ecological benefits with Green and Blue infrastructure proposed as part of the overall landscape design. Further details in relation to the ecological design of these areas are provided as part of the landscape design in Section 9 below.

Approximately 5km of hedgerows will be lost, but will be replaced within the Scheme limits and will, within five years of maturity, have compensated for the hedgerow loss, and mitigated the significant effect. Offsite habitat creation may be required at other locations that will be agreed with the local planning authority and relevant landowners.

Several detention ponds (see Table 7-1 above) along the route have been designed to maintain wet habitat where possible, so benefiting general biodiversity and increasing habitat complexity. Ponds west of the Cambridge University sports ground, southwest of the M11 overbridge, and alongside Callow Brook will hold water on a more permanent basis.

Notable Species

The surveys and assessment of potential impacts on species along the proposed route has influenced the design of the Scheme in a number of specific areas in relation to the below notable species.

Bats

Where potential for increased collision risk to bats has been identified along the route, the design will include raised levels on the corners of relevant junctions and mature standard trees on top to encourage higher flight height over any junctions. The landscaping proposals as set out in Section 9 below include planting of woodland, trees and hedgerows at all points intersecting identified bat commuting routes, sometimes using bunds and/or with more mature standard trees specified to ensure the shortest duration of potential severance, and to encourage higher (4m+) flight routes. Planting scrub species on the raised levels such as blackthorn will also encourage denser vegetation that bats will have to fly over. The existing hedgerow at such locations will be retained or if necessary, replaced so that connectivity is maintained.

As a rule, the gap between the canopy heights either side of the guided busway will be less than 20m to encourage bats to maintain their elevation over the route. Monitoring will be undertaken of landscape mitigation features that are designed to encourage higher flight paths in line with proposed planning condition 18 of the the Request for Deemed Planning permission. This will be undertaken to monitor the effectiveness of these mitigation features to determine whether bats cross at safe heights (i.e. >4m). This will also determine the need for remedial action where reasonably practicable.

Although construction will be principally a daytime activity, artificial lighting could deter feeding and commuting bats, although this risk will be minimised by specification of low intrusion lighting, as it will be also for the small number of permanent lighting points where these affect commuting routes. A sensitive operational lighting design will also be developed noting that all junctions will need to be lit. This lighting design will seek to include mitigation measures that could include timers, dimming, bollard lighting and screening from vegetation.

Badgers

On the completion of the Scheme, badger-proof fencing will be installed as necessary, particularly where the bus-way severs common commuting routes, foraging areas and near to setts. Underpasses/Mammal tunnels will be installed under the route within sensitive areas to allow badgers, as well as other wildlife, to cross safely. The location of fences and other final design elements will be determined at the detailed design stage including in the Coton Orchard .

Section 8 Ecological Design

Trees

The route has where possible sought to avoid woodland or wooded areas. In areas where more notable trees could be affected, arboriculture surveys have been undertaken to establish risks and to provide guidance to protecting potentially affected trees or groups of trees.

Vegetation loss will occur during construction of the Scheme. Much of this would be restored through replacement planting, introducing the equivalent of approximately 1,600 trees. Further details in relation to the approach to retention of and replacement of trees along the route are provided as part of the landscape design in Section 9 below but areas of particular note are:

- A428 corridor and Hardwick where tree planting is proposed north and south of the route;
- the section of route to the South of Madingley Wood: and
- Coton Orchard

The details related to the ecological design elements of the scheme will be subject to the approval of the relevant local planing authority in line with the following proposed conditions as set out in the Request for Deemed Planning Permission: (document ref: CtoC-14-00).

- 17 in relation to the development of the soft landscaping scheme (see Section 9 below); and
- 10 and 11 in relation to the retention, removal and replacement of Trees.

As the detailed design for Scheme is developed, the project will seek to improve the Biodiversity Net Gain BNG outcomes such as increasing creation of habitats onsite. This should focus on creation of hedgerows as well as the required medium and high distinctiveness habitats on site, where possible.

The details related to the approach to Biodiversity Net Gain will be subject to the approval of the relevant local planing authority in line with proposed condition 15 as set out in the Request for Deemed Planning Permission (document ref: CtoC-14-00).

Section 9 Landscape Design

Landscape Vision and Opportunities

Landscape Vision – Bringing it all together.

The vision is to create a green corridor that will be a multi-functional asset within the existing landscape. Alongside functional new infrastructure, the corridor will be designed to maximise access and movement, biodiversity, a sense of place, local character, sustainable water resources and enhanced health and well-being.

Enhance local character and assets

Placemaking is critical to a design to reinforce the local character, respecting the geographic, cultural and historic elements of the landscape and settlements. Opportunities include celebrating the existing historic features through targeted interventions such as wayfinding engraved into the ground and referencing traditional orchards which characterise Cambridgeshire, to celebrate local character as well as acknowledge contemporary trends such as food growing and picking. The use of local mounding and planted screening could also be used to mitigate any potential severance to the local character.

Design with future trends in mind

The scheme will have a design life of decades, when society may have different needs, technologies may have changed, more extreme weather events are likely to occur due to rising temperatures and fossil fuels are phased-down. Opportunities include designing parking spaces for an increasing electric car ownership or careful consideration of existing attenuation features such as brooks and natural flood plains.

Increase biodiversity and ecological features

Hedgerow and woodland are proposed to create new or enhanced existing open spaces and ecological corridors. Early or advanced planting may help to divert and create alternative routes for wildlife to replace those that have been lost. Opportunities also include supplementing existing hedgerows with additional native mixed species planting, especially to fill any gaps. Proposed swales and wetlands can be planted or sown with wetland species, which can range from grasses to wetland forbs to trees such as alder and willow – all of which further reduce runoff rates. Wetlands also create a rich biodiverse habitat for a wide range of species.

Improve Health and Well-being

Good green infrastructure connects people with green spaces, facilities and workplaces, which helps to promote a healthy lifestyle and reduce stress levels, as can proximity to water. By providing high-quality access for walking, cycling and public transport, the Scheme is helping to connect existing and new communities in a sustainable way. In addition, such new links enables local communities to more easily connect with and enjoy the surrounding countryside. It is therefore important that pathways and junction points are welcoming to encourage use by being carefully designed. The scheme will connect to several existing routes and links. A legible and accessible walking and cycling network can increase recreational activities, and promote general health and well-being.

Opportunities to improve connections to existing walking and cycling routes such as Wimpole Way (below)



Section 9 Landscape Design

Landscape Opportunities with Emerging Context

A scheme part of a landscape framework

The Scheme is set within a rich and diverse mixture of landscapes, dwellings and infrastructures. The Scheme is also set within an emerging development context, notably Bourn Airfield development, West Cambridge, and others.

During the design process, opportunities to further maximise the project vision were explored, such as enhancing the green corridor or improved local networks.

Figure 9-1 below presents the Scheme alongside a number of major development sites as well as other landscape, nature positive, placemaking or local movement opportunities. These are not proposed as part of the scheme, instead the scheme may enable these or others to materialise.



Figure 9-1 - The Scheme in relation to major developments sites

Section 9 Landscape Design

Landscape design principles

The following design principles were set out to help shape and guide the landscape designs as the scheme progressed.

1. Setting out layout typologies
2. Designing within Clear Character Areas
3. Enhancing Placemaking by 'Staging' Local Assets
4. Maximising Blue and Green Infrastructure
5. Improved Access, Legibility and Fine Grain Movement

1. Setting out layout typologies

Along the length of the scheme, the character, function, and spatial arrangement naturally vary. Four layout typologies were identified, relating to the characteristics and geographical constraints of the place. Each typology presents an approach to the depth and height of planting, how landforms or mounding are used, and whether site specific measures are appropriate.

Where widths are constrained the landscape would be minimal and formed of a carriageway, a dual-use maintenance track and planted verges. Particular attention should be made to reduce impact of the engineering as well as segregating the walking/ cycling routes. Linear stretches of planting will be specified to enhance pollination, add aesthetic values, and provide cooling and shading.

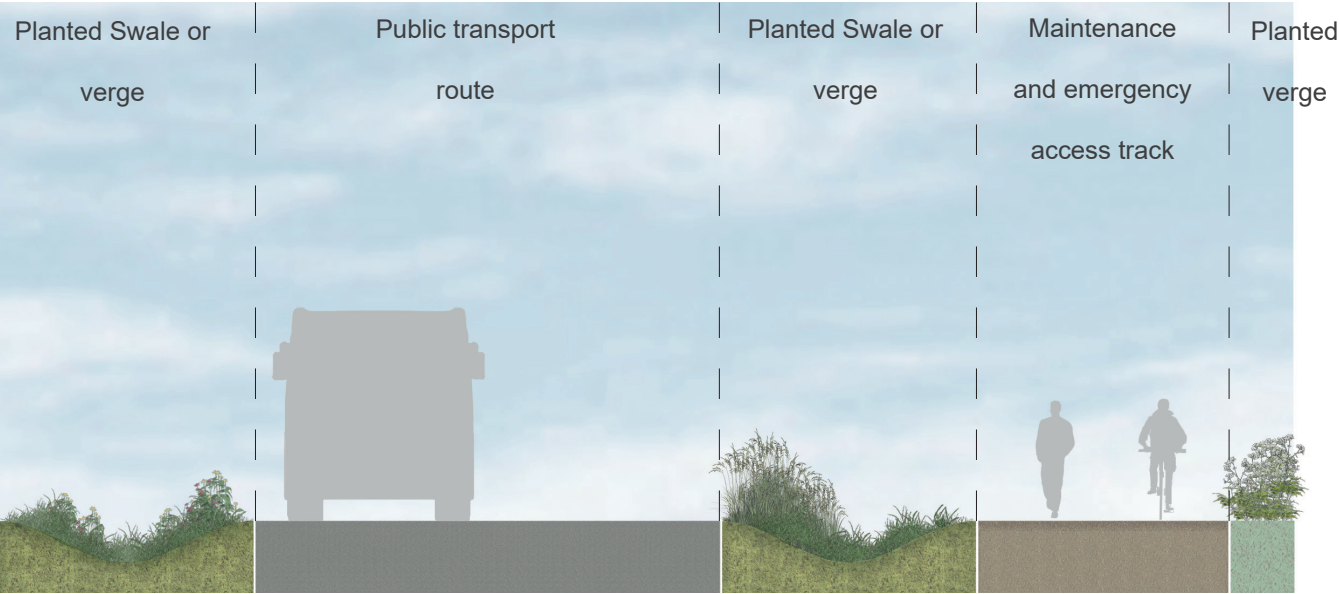
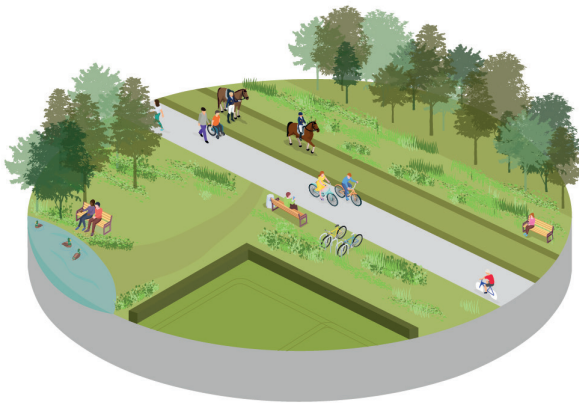


Figure 9-2 Busway profile and Layout Typologies



Where appropriate, the landscape can extend to create local amenities or enhanced green networks. Other gains may include measures to reduce risk for erosion. Larger areas of planting can play a part in carbon storage.



This typology is predominantly within the urban or suburban lengths of the Scheme. Here, the designs will fit within the public realm. Paving and other landscape features will extend the existing look-and-feel of the place. Tree planting, rain gardens and other smaller areas of planting can be introduced to enhance pollination and visual amenity, as well as providing cooling and shading.



Well designed articulated layouts are proposed at key moments along the route such as bus stops or where the scheme meets existing paths. At these points, natural wayfinding elements such as feature trees may be appropriate, alongside seating or cycle parking.

Section 9 Landscape Design

Landscape design principles

2. Designing within Clear Character Areas

Trees, open views, screening, ground materials and clearings can create places with varied or distinct characters, rhythm and place-specific proposals that respond to existing and future contexts. These Character Areas have been identified to help break up the new linear route, create destinations and vary the experience of those walking, cycling or driving along or crossing the route. Designing within defined Character Areas can minimise the 'corridor' feel of this new infrastructure, and thereby reduce the impact of the scheme on its surroundings. Furthermore, it enables the scheme to better respond to existing local assets helping to enhance the sense place.

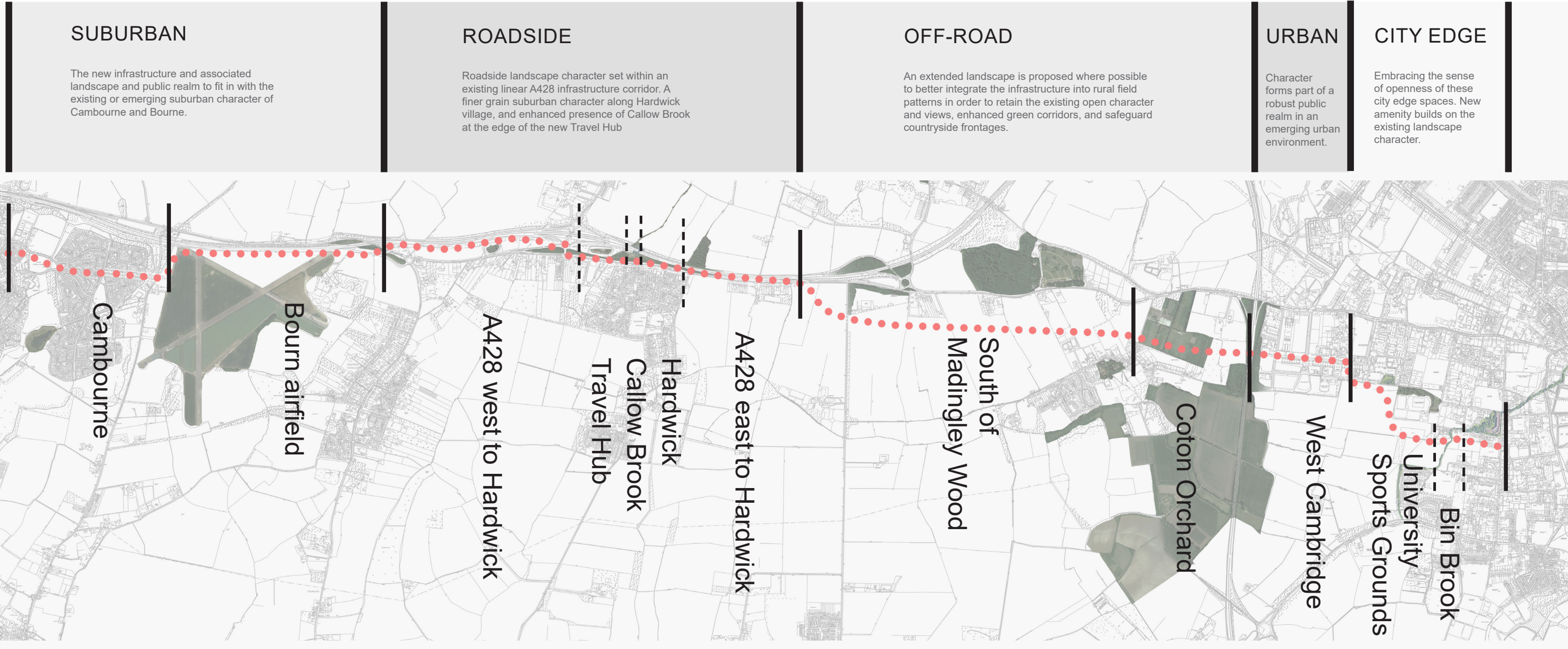


Figure 9-3 Annotated Character Areas

Section 9 Landscape Design

Landscape design principles

3. Enhancing Placemaking by 'Staging' Local Assets

Set between existing infrastructure, the wider area is rich with unique places, historical names or infrastructure, institutions of public relevance, and landscape features. The designs aim to celebrate local assets by integrating or referencing these at different scales. In this way some broad Natural Capital Gains as set out in the The Green Book (2022)¹ could be achieved, such as Education & Knowledge, Interaction with Nature, Recreation and a Sense of Place.

Opportunities include:

- Naming bus stops or new walking routes or new bridges to refer to (lesser known) local assets.
- Reinforce the local character through the incorporation of appropriate planting and habitat creation.
- Enhance local characteristics through the appropriate use of materials.

Figure 9-4 Key local assets below identifies and maps key local assets within three broad categories:

Green Assets and Open Spaces	Local, heritage, cultural or historical assets	Existing Water Infrastructure
<ul style="list-style-type: none">• Madingley Wood;• Coton Countryside Reserve;• Unnamed roadside pocket woodlands;• Red Meadow Hill;• Cambridge Green Belt;	<ul style="list-style-type: none">• Madingley Hall and grounds;• Cambridge American Cemetery;• Cambridge University Coton Orchard	<ul style="list-style-type: none">• Bin Brook;• Callow Brook• Unnamed ponds and standing water bodies;• Sirius Lake

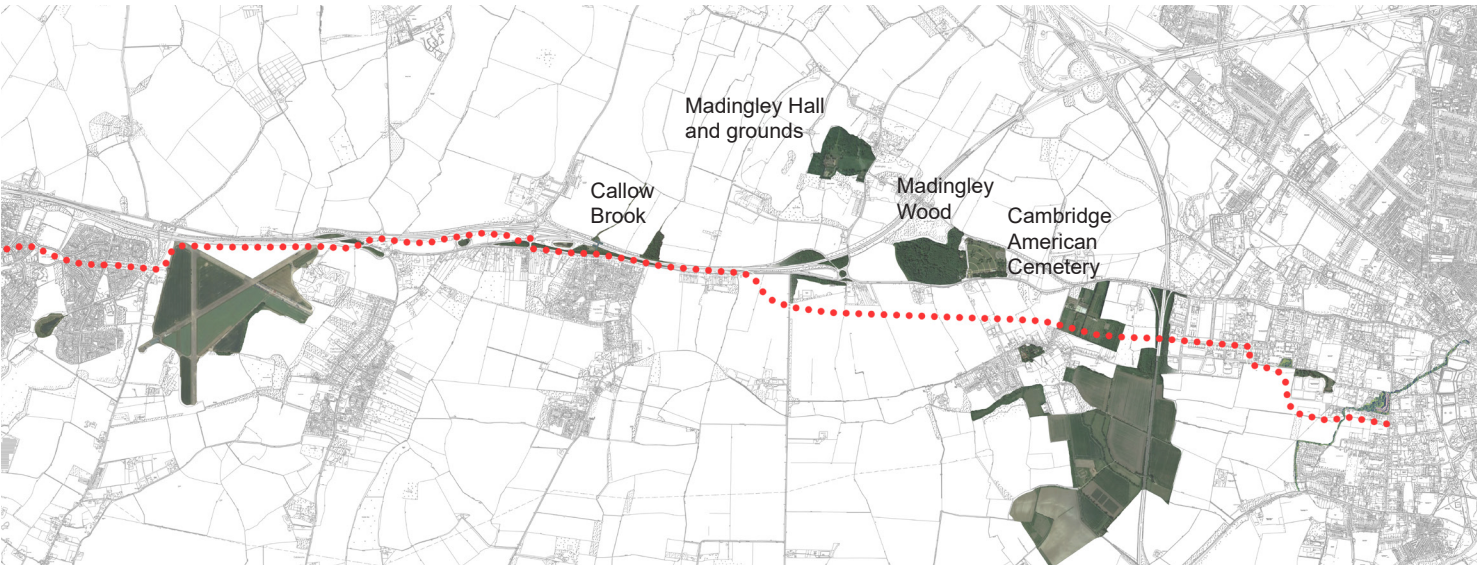


Figure 9-4 Key Local Assets

1. <https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government/the-green-book-2020>

4. Maximising Blue and Green Infrastructure

The landscape proposals strive to maximise the ecological benefits by delivering blue and green infrastructure alongside the new busway.

Extensive planting will be proposed where it is most beneficial - stitching existing habitat corridors or compensating for any loss of planting. Emphasis is also given to using species that are beneficial to wildlife, whilst meeting the maintenance regime available. Planting within new green infrastructure create visual interest for different users, with factors such as scent, tactile foliage, shade, and colour considered. Where possible productive green environments can be incorporated to support health and well-being.

The water environment is also key, providing a wide range of benefits for recreation and biodiversity as well as potentially creating a sense of place. Consideration of local hydrology and issues relating to flooding or pollution is essential and offers the opportunity to mitigate against any predicted issues related to climate change. Enhancing linear features such as brooks and ditches also creates opportunities to improve landscape connectivity both for biodiversity and access for recreation by providing a natural focus of 'routes' through the landscape.

Opportunities include:

- Increase hedgerow and woodland connectivity through additional planting, forming high-quality wildlife corridors.
- Safeguard and expand existing valuable habitats, enriching their existing biodiversity.
- Maximises biodiversity through an appropriate soft landscaping palette that is in keeping with local native species and habitats.
- Provide productive landscapes for example free-standing or small clusters of fruit trees, to encourage informal fruit picking.
- Introduce planting schemes which support pollinators.
- Extensive sustainable drainage features to help deal with the effects of climate change.
- A reduction in surface water runoff and burden in the watercourse network during heavy rainfall events through the incorporation of additional tree planting.
- Swales and attenuation adjacent to the new infrastructure.
- Planting alongside existing brooks.



Extensive tree planting



Planted swales



Ecological balancing ponds

Section 9 Landscape Design

Landscape design principles

5. Improved Access, Legibility and Fine Grain Movement

Focus is given to people-led arrangements, with the designs seeking to provide simple, straightforward layouts to accommodate accessible, safe and legible movement. The aim is to achieve good interrelations and integrations between routes and spaces as well as maintaining a landscape that is well screened and separated from the parallel bus-route. The Scheme also accommodate connections to existing paths, hence articulating layout at relevant points are important.

Opportunities include:

- Articulated layouts at key moments to encourage people to stop and appreciate places.
- Cycle parking and wayfinding are positioned to encourage people to explore the wider environment.
- Specific landscape features to provide legibility and define a changing character of the linear route.
- Bus stops are designed to be visible, accessible and inviting.
- Tie in with the wider Greenways Waymarking strategy.



Resting points or cycle parking at appropriate locations, and natural materials

Creating legibility by naming the walking route, example of wayfinding features

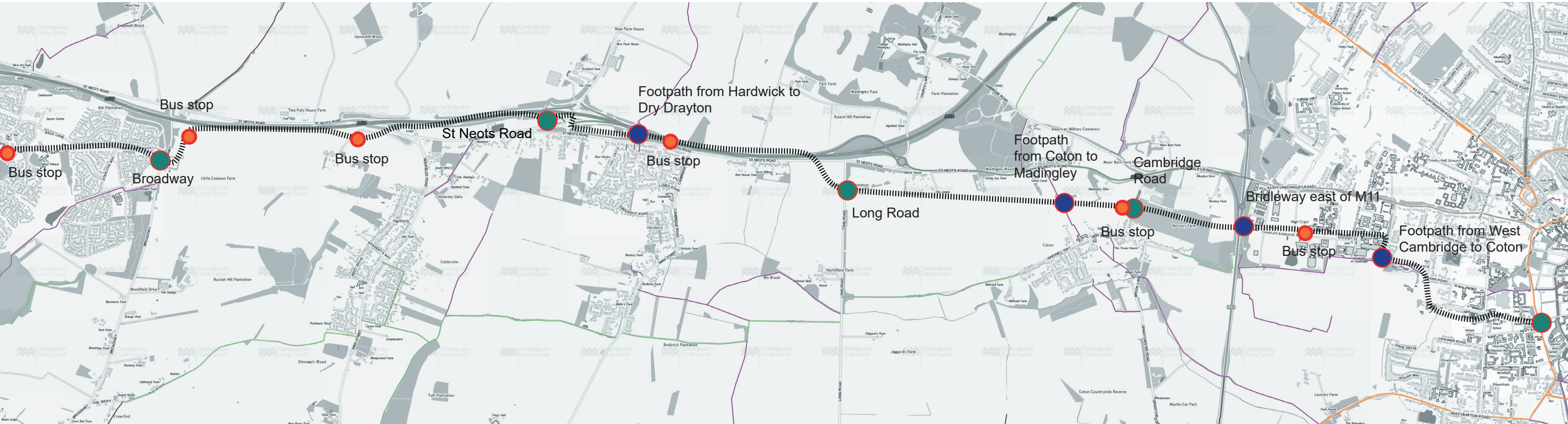


Figure 9-5 Existing networks, proposed bus stop locations and points of potential articulated public realm connections

Section 9 Landscape Design

Key areas

Rifle Range and Bin Brook

Grange Road junction is where the Scheme meets the existing urban fabric. The new signalised junction is repaved, with a colourful feature tree proposed to signal a new local link. Further west, along the Rifle Range track, ground materiality will ensure that as many of the existing trees are retained where possible.

Bin Brook is a significant local asset in the area, and so as part o the new bridge structure a subtle in-ground sign naming the brook to enhance its presence is proposed. Areas of additional flood storage will be surrounded by a new water-side riparian planting design, to enhance visual amenities.

Within the Bin Brook flood catchment area, higher biodiversity values planting is proposed - a major component of the green corridor along the scheme. The visibility of water tolerant species (as illustrated and named below) signals a clean well-structured basin, with many seasonal and wildlife opportunities. In addition cluster of wetland tolerant trees will enhance existing planting and ensure resilience.

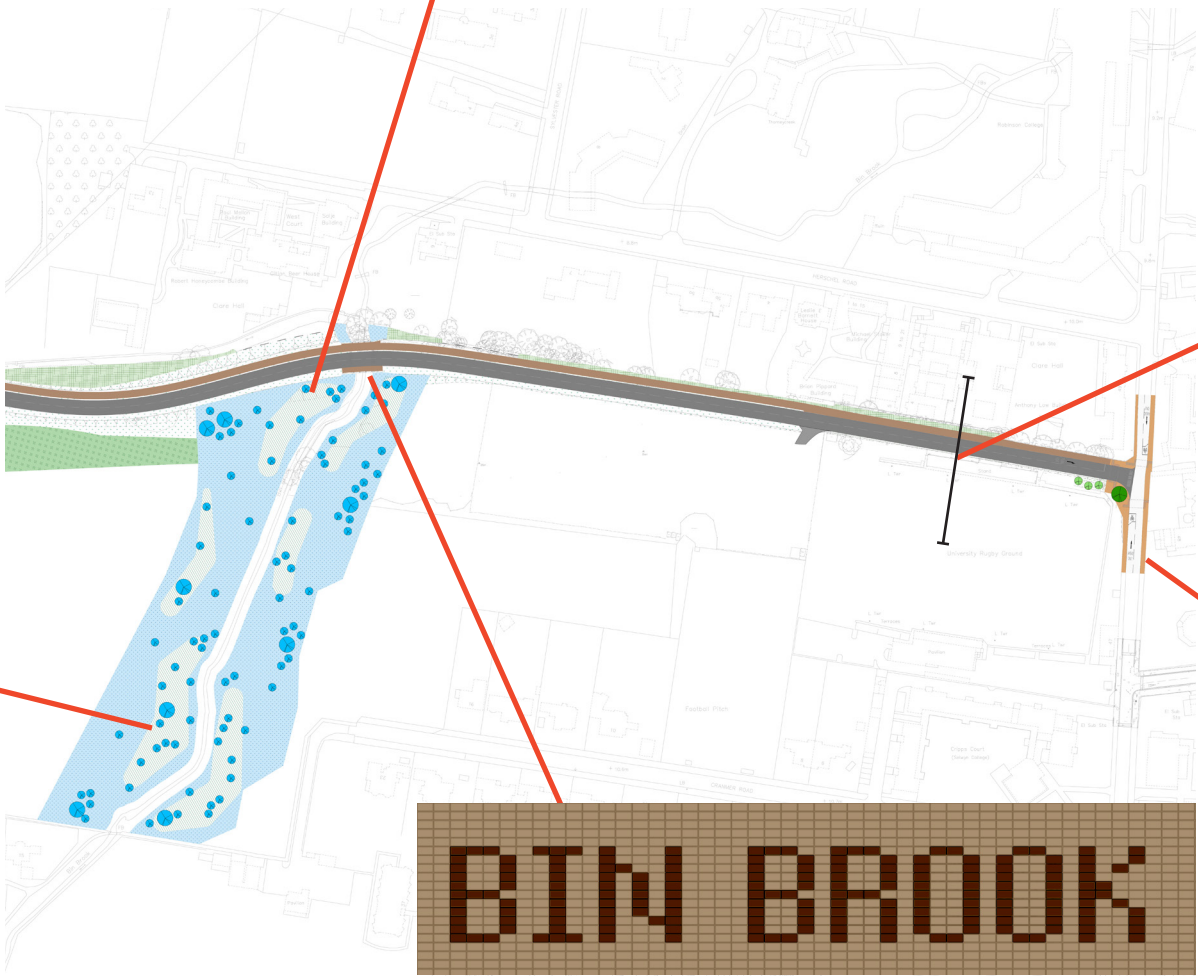


View of Bin Brook crossing looking east, with the extensive riparian planting of the flood catchment area

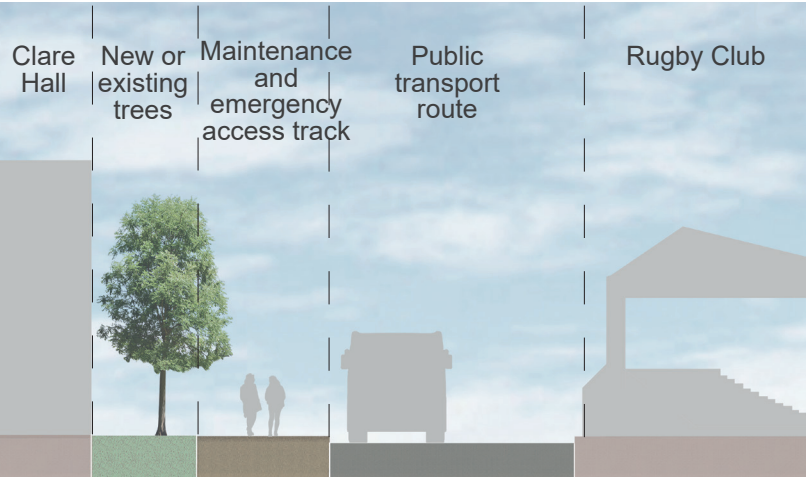


Sample water tolerant trees for Bin Brook	
Species Name	Common Name
Alnus cordata*	Italian alder
Betula pendula*	Silver birch
Betula nigra *	River birch
Salix caprea *	Goat willow

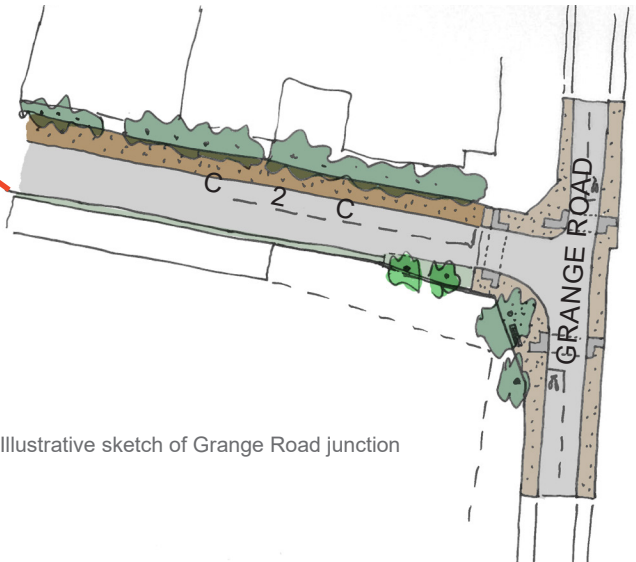
Bin Brooke riverside amenity riparian planting



Potential for site specific signage at Bin Brook crossing point to enhance awareness of the brook. For example contrasting bricks set in the ground.



Illustrative section through Rifle Range



Illustrative sketch of Grange Road junction

Section 9 Landscape Design

Key areas

Land west of University Sports Grounds

The triangular space created by the alignment, shown in the extract from the landscape plan opposite offers an opportunity to make use of a space that might otherwise become sterilised land, offers to utilise a space that otherwise may become sterilised land. The Scheme seeks to transform it into a series of new amenity spaces available for local, residential and university use.. New pathways, seating and amenity grass-land planting as well as planted water features are proposed. Materials and specifications will need to match the surrounding palette to enhance the existing character. The permanent wet areas are proposed within the new detention ponds, extending the habitat further west.

The designs aim to integrate the new infrastructure into the existing context whilst maintaining significant views out and enhancing legibility. The intention is to try and conceal rather than pronounce the new linear bus-way by introducing clumps of tree planting as well as enhanced planting along the lines of field boundaries.

Tree planting within this area will enhance the urban-edge character. Strategic placement of tree clumps ensures a more naturalistic landscape integration as it breaks up the linear route. Along the northern edge of the space, standalone feature trees will enhance natural wayfinding and strengthen a sense of place.

Outside the new amenity space, woodland planting is proposed as an extension of existing planted blocks, strengthening green networks. Native low-growing shrubs help to create eye-level interest within the under-story and ensure openness within the woodland structure integrating it more into the urban environment.



'Nature stops' besides newly planted ponds. Publicly accessible wet detention basins with higher biodiversity values portray a clean well-structured wet space which can also attract wildlife. Surrounding wild-flowers such as 'Butomus umbellatus' provide oxygenators to help naturally oxygenate the standing water.



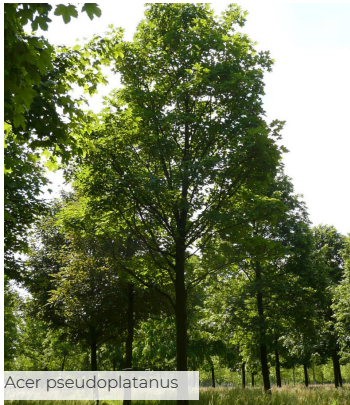
Aesculus hippocastanum



Corylus colurna



Salix caprea*



Acer pseudoplatanus

Sample tree species proposed for the new green space. * water tolerant trees suitable to be planted adjacent to the new ponds.



Landscape plan - NTS

Figure 9-7 Land west of University Sports Grounds



Illustrative section through the new green space

Section 9 Landscape Design

Key areas

West Cambridge

The route follows Charles Babbage Road through the West Cambridge campus where traffic signal control ensures public transport priority and where a new urban bus stop is proposed.

The public realm and landscape associated with the new route will be provided by the developer of the West Cambridge development (planning ref: 16/1134/OUT) in line with the approved masterplan.

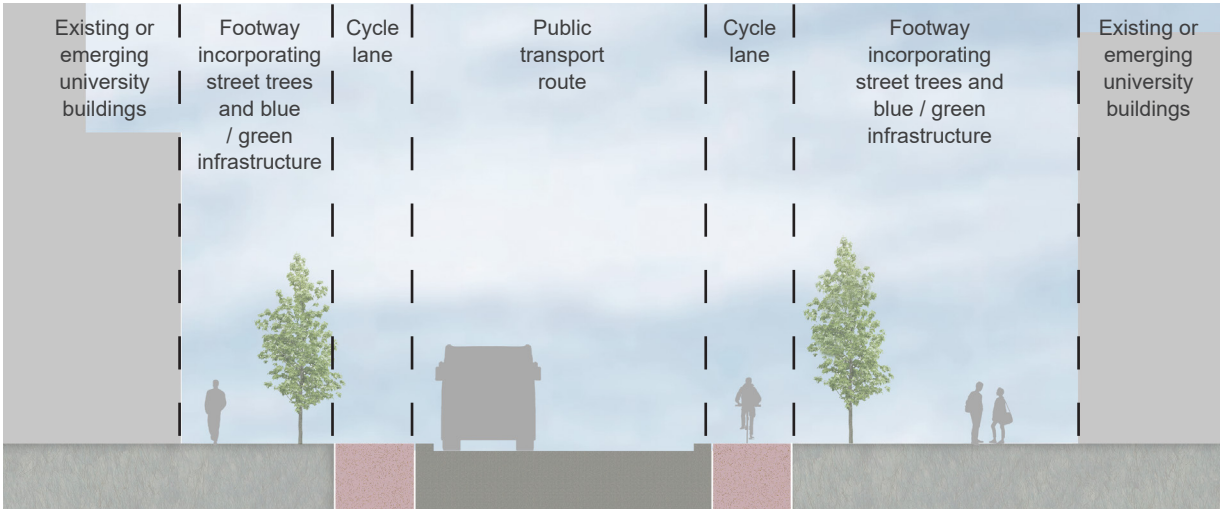
The Applicant will work with the West Cambridge developer and the local planning authority to reflect the urban setting with street trees and rain-gardens proposed where possible to enhance a sense of a green neighbourhood providing amenity for people and attract wildlife. Ground materials will be in line with the overall material palette for the West Cambridge masterplan with all detailed landscaping design to be approved by the local planing authority.

Street trees will be located primarily within paved areas and will be selected based on their ability to perform under these stressful and harsh environments. Species such as Golden Honey Locust trees and Callery pear rees, ensure long-term success and capability of withstanding future challenges such as disease and climate change. Where space allows, larger street trees will be proposed as they provide greater long-term visual impact and benefits, such as precipitation interception and shading.

Sample Street Trees Species	
Species Name	Common Name
Acer Campertre ‘Streetwise’	Field Maple
Gleditsia triacanthos ‘Sunburst’	Golden Honey Locust
Prunus sargentii ‘Rancho’	Upright Sargent’s Cherry
Prunus ‘Sunset Boulevard’	Cherry ‘Sunset Boulevard’
Pyrus calleryana ‘Chanticleer’	Callery pear
Ulmus ‘New Horizon’	Resistant Elm
Tilia cordata ‘Winter Orange’	Small-leaved lime ‘Winter Orange’
Liquidambar styraciflua ‘Parasol’	Sweet gum ‘Parasol’



West Cambridge illustrative masterplan



Charles Babbage illustrative typical cross section

Figure 9-8 West Cambridge development

Section 9 Landscape Design

Key areas

Coton Orchard

In terms of the landscape design, the route through Coton Orchard aims to reinforce the presence of the existing orchard and the unique biodiversity habitat it creates, as well as reflecting the historical landscape feature of the area. Orchard trees are valued not only for their fruit but also for their blossom, with a typical early blossom after the long winter months.

The key proposal along this section of the route will be rigid planting of fruiting and non-fruiting tree species reflecting the distinct character of the existing orchard. Non-fruiting species can be selected to allow a clear blossom path defining the character area and providing additional pollination opportunities supporting the existing orchard. Scattered fruiting species are included in the mix, to encourage informal fruit picking. The sample species of fruiting trees are based on Cambridge’s local fruit varieties, with a range of fruiting seasons and potential uses (i.e. cooking, eating etc.).

Sample Pollinator Tree Species	
Species Name	Common Name
Malus 'Directeur Moerlands'	Apple 'Directeur Moerlands'
Malus sylvestris	Common Crab apple
Prunus avium	Sweet Cherry
Pyrus communis	European pear
Sample Fruiting Tree Species	
Malus domestica 'Saint Everard'	Apple 'Saint Everard'
Malus sylvestris 'Evereste'	Crab apple 'Evereste'
Malus domestica 'Lord Burghley'	Apple 'Lord Burghley'
Malus domestica 'Red Victoria'	Apple 'Red Victoria'

For ground cover between the new trees, a general purpose meadow mix is proposed to enhance opportunities for pollinators and to increase biodiversity in areas which require more restricted access, such as on the northern side of the route and within the commercial orchard.

Mammal tunnels are to be incorporated within Coton Orchard section of the Scheme. The locations and design of the tunnels are to be fully developed during the detailed design stage.

Section 13 sets out further details of the route's approach to development within the existing Coton Orchard in terms of how the alignment was chosen as part of the optioneering process.



Sample species of fruiting trees is based on Cambridge's local fruit varieties, with a range of fruiting seasons and potential different uses such as cooking or eating.



Typical section through Coton Orchard - NTS

Figure 9-9 Coton Orchard

Section 9 Landscape Design

Key areas

South of Madingley Wood

The route runs through existing farmland on a gentle south sloping landscape which is open in character. The aim is to move away from a new horizontal linear feature across the fields by introducing north-south planting schemes along the lines of old field boundaries. Whilst taking careful consideration of maintaining views.

Planting and landforms will be key to making the scheme fit into the existing landscape. Planted low earth mounds are proposed as a minimum, to screen views of the new route from surrounding public routes. Where additional visual mitigation is required low-level hedgerows, or areas of tree planting are proposed.

Trees are proposed in small clusters or pockets rather than linear formations as a way to reduce the presence of new infrastructure geometry. Feature trees are positioned at junction points where they can support natural wayfinding or within small areas of new woodland providing sizes to help ensure the establishment has core tree planting.

Where the Scheme cuts existing hedgerows, replanting is proposed ensuring potential gaps are minimised, retaining any existing green corridors, and maintaining the structured field patterns. Tree planting within the hedgerows will be kept low with key native shrub species such as 'Crataegus monogyna' and 'Cornus sanguinea' proposed, strengthening the existing landscape character on the one hand and increasing biodiversity on the other hand.

A bus stop will be provided to the west of Cambridge Road. Screening in the form of planting and only minimal lighting will be provided. Traffic signals will be needed at the Cambridge Road junction and will also help pedestrians cross to the bus stop.

The footpath from the school in Coton to Madingley Road crosses the scheme and will be kept, with the maintenance and emergency access track providing additional connectivity.

Several potential Barbastelle bat crossing points have been identified. A detail at bat crossing point has been developed with a combination of mounds and vegetation guard against a dipping in flight as bats cross the new road (flight height is highest when vegetation is highest, while bats dip in flight when crossing open space.) The mounds are also positioned as close as possible to the carriageway to minimise the distance of a potential lowering in flight in the first place. In addition, a willow waffle fence or similar is proposed to keep other bat species that fly through vegetation up above the height of traffic.

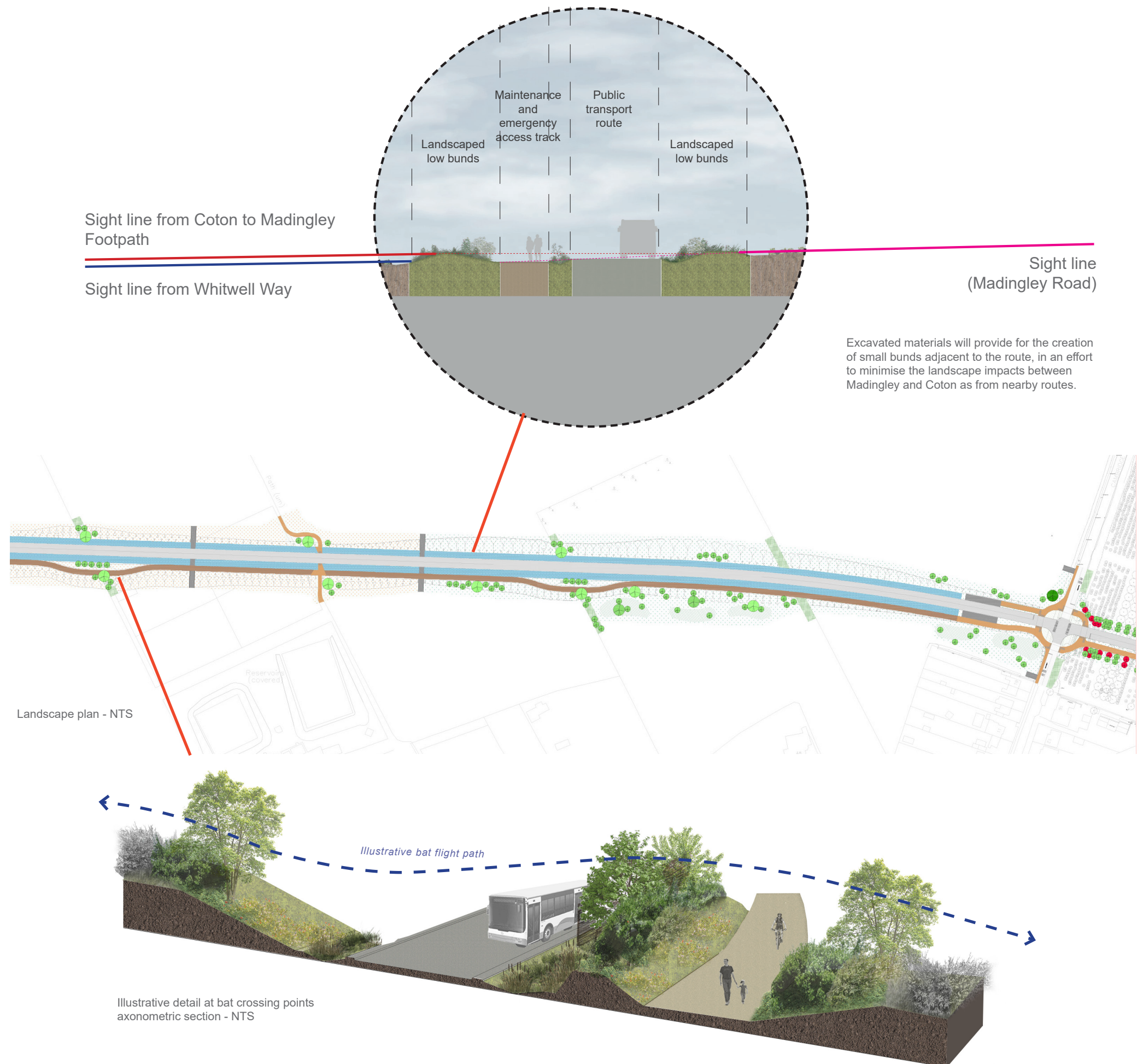


Figure 9-10 South of Madingley Wood

Section 9 Landscape Design

Key areas

A428 corridor and Hardwick

Along the A428 corridor

The route through this section is either on road or follows land that would have been disturbed during the construction of the A428 and which has now been replanted as part of the associated landscaping. Existing planting disturbed by the construction of the new route will be rehabilitated with additional woodland and shrub planting, ensuring the design ties seamlessly back into the existing landscape. While existing verges disturbed by the construction will be reinstated with species-rich planting to add biodiversity, and ensure longevity with water-logging tolerance in swales and natural wayfinding. Clusters of trees at road junctions are proposed to create shading, and natural wayfinding, and enhance any existing green networks.

St Neot's Road and Hardwick Village

Through Hardwick the proposed landscape seeks to enhance a linear street scape character. Street trees and enhanced verges along the improved pavements will provide added benefit to the residence by increasing biodiversity, providing shade and act as natural wayfinding for those walking or cycling through. A variety of street tree species ought to be selected to ensure long-term success from challenges such as disease and climate change. Larger stand-alone trees with a distinct character are located to create natural wayfinding.

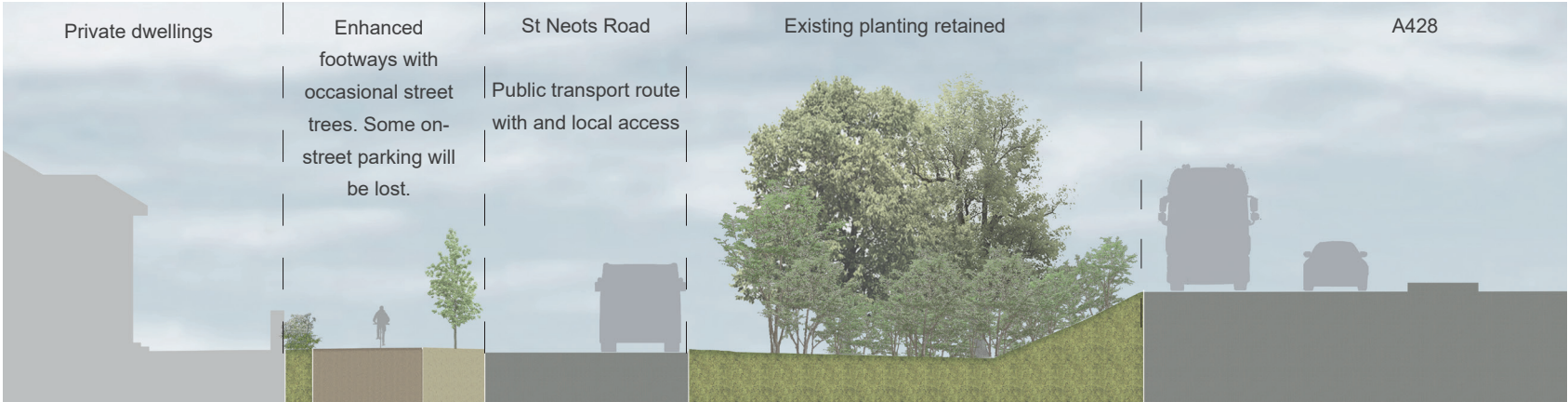
Bus stops

A new bus stop will be provided on St Neots Road, or by Millers Way to provide high frequency services. Existing stops will be kept along St Neots Road for legacy local services.

Link to Callow Brook

A proposed crossing point by the existing A428 footbridge will ease the link to Callow Brook, the Travel Hub (Section 12 of the DAS) and beyond.

Hardwick Village Sample Street Trees	
Species Name	Common Name
Acer campestre 'Elsrijk'	Field maple 'Elsrijk'
Gleditsia triacanthos 'Sunburst'	Golden Honey Locust
Ulmus 'New Horizon'	Elm 'New Horizon'
Feature Trees / Stand Alone Trees - sample species	
Quercus ilex	Holm oak
Aesculus hippocastanum	European horse-chestnut
Clusters at Junctions - sample species	
Betula pendula	Silver birch
Prunus padus	Bird cherry
Prunus avium	Sweet Cherry
Sorbus aucuparia	Rowan



Typical section through Hardwick Village - NTS

Figure 9-11 A428 Corridor and Hardwick

Section 9 Landscape Design

Key areas

Callow Brook

The proposed development of a new area of green space along Callow Brook is a major contributor to the development of green infrastructure as part of the Scheme. It also offers improved links, a new amenity space and extensive habitat creation. The proposed green space is an important part of the wider landscape design of the adjacent proposed Travel Hub site (see Section 12 below).

Accessed from the ‘Blue Bridge’ or from the Travel Hub the new space connects to the existing PRoW between Hardwick and Dry Drayton. The space also offers an extended walking route around a new pond with potential informal resting points along it.

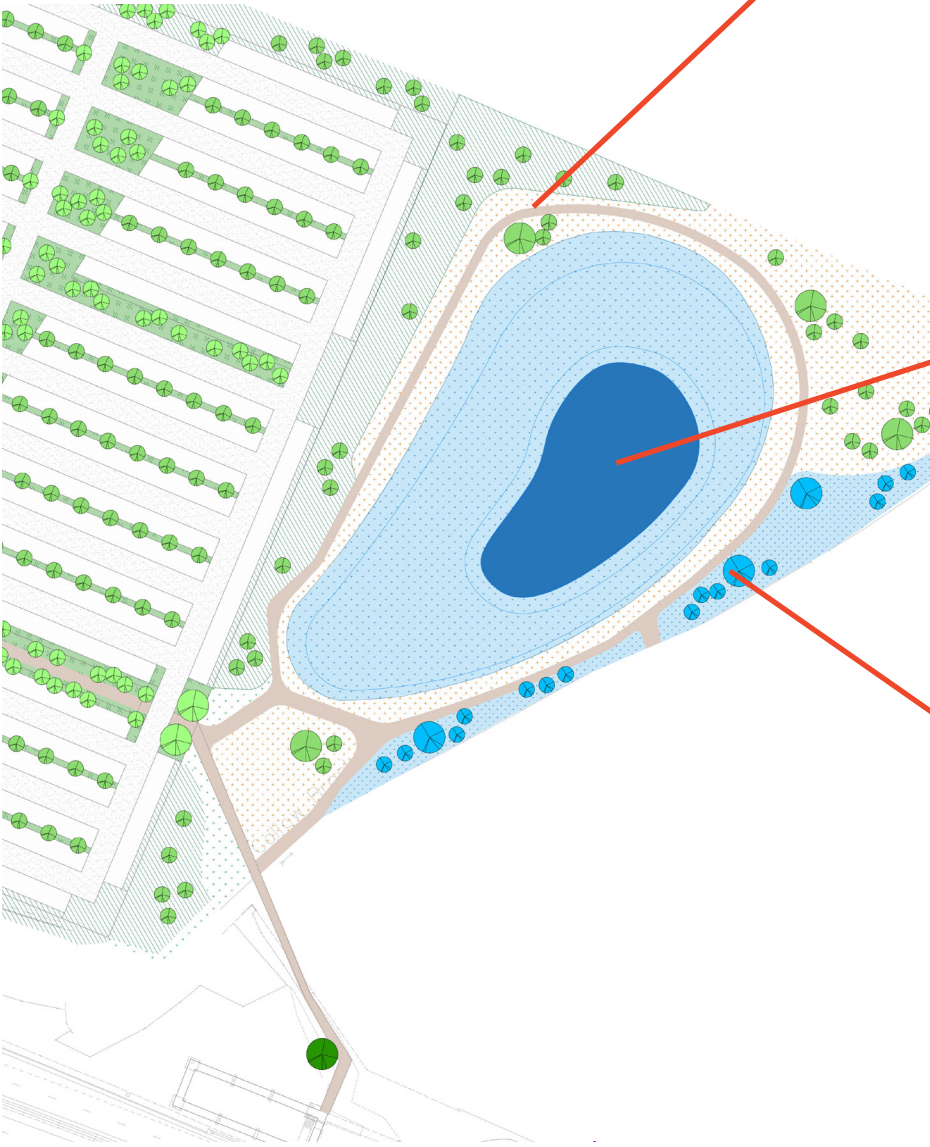
The space will also create a new biodiverse habitat with the introduction of areas of deep water with the pond, water-side planting as well as enhanced riparian planting along Callow Brook.

Tree planting within the space can reflect the waterside nature of the space and could include:

Sample Tree species within Callow Brook Amenity space	
Species Name	Common Name
Alnus cordata *	Italian Alder
Betula nigra *	River birch
Salix caprea *	Goat willow

Within the detention basins, low maintenance planting with self-seeding species is proposed, which can increase opportunities for biodiversity. Mixes can include:

Marginal/Reed/Aquatic/Floating Oxygenates Mixes	
Species Name	Common Name
Carex acuta	Acute sedge
Eleocharis palustris	Spike-rush
Mentha aquatica	Water Mint
Caltha palustris	Marsh Marigold
Typha angustifolia	Narrowleaf cattail
Butomus umbellatus	Flowering rush
Sparganium Erectum	Simplestem bur-reed
Typha Latifolia	Bulrush
Typha Laxmanii	Graceful cattail
Nuphar Pumila	Yellow pond-lily
Potamogeton Lucens	Shining pondweed



Landscape plan - NTS



Informal seating and wayfinding features along the new paths along the brook and surrounding the new pond



Ecological balancing ponds



Enhanced riparian planting along the brook

Figure 9-12 Callow Brook area

Section 9 Landscape Design

Key areas

Bourn Airfield and Cambourne

Bourn Airfield Development is a proposed development of 3500 houses located on the former World War II airfield. As a fundamental component of the project, Bourn Airfield will deliver a section of the Scheme. The route through the site is to:

- Provide dedicated bus lanes and cycle paths running parallel running along the northern corner of the site for most of its length, without any crossing to allow for the scheme to reach optimal speed;
- Access the site from a dedicated entrance in north-west corner of the site and out of the north-west of the site, to then continue its way through Cambourne;
- Link the two stations that conveniently serve the whole development: one by the Village Centre and another by the north-eastern gateway.

A permeable network of foot and cycle connections has been designed as part of the Bourn Masterplan that connects to the proposed CtoC walking and cycling route.

The Bourn Airfield New Village A Spatial Framework & Infrastructure Delivery Plan Supplementary Planning Document (October 2019) prepared by South Cambridgeshire District Council provides an overview of the site Bourn Airfield context and key issues. It states that the new village at Bourn Airfield should incorporate a HQPT route as a segregated system. The SPD explains that this HQPT will allow residents to travel to Cambridge more reliably and quickly than driving.

Cambourne

Outline planning permission was granted in January 2023 for a bus link between Sterling Way Upper Cambourne and the Broadway (planning permission ref: S/3329/16/OL). The design of this bus link is being undertaken and promoted by Taylor Wimpey Ltd. It is proposed that the Scheme will link with the bus link to be developed pursuant to planning permission ref: S/3329/16/OL.

In the future, should East West Rail be confirmed as a funded project, the location for a station at Cambourne would influence an additional direct link to a travel hub at the station.



Figure 9-13 Bourn Airfield development

Section 10 Lighting Design

Lighting designs have been developed for the operational stage of the Scheme that outlines design principles and recommends target lighting levels and equipment performance specifications. CCC has a standard luminaire for use on highways, however, specific luminaire selection will be discussed and agreed through proposed condition 21 as set out in the Request for Deemed Planning Permission: (document ref: CtoC-14-00). However the Lighting Strategy requires that all operational lighting should:

- Right light - correctly apply lighting standards which define the required lighting levels dependent upon the tasks being undertaken and the level of activity. This also looks to the use of the right light source which should be as energy efficient as possible and will include due consideration of LED lighting whilst also taking due consideration of the mitigation requirements for the impact of the light source on bats and wildlife.
- Right time - the standards permit light levels to be changed dependent upon use, i.e. when traffic levels fall then the light class can be redefined. With respect to this development the lighting will be in situ for residents, visitors and commuters to the development during the hours of darkness to ensure safe navigation. The lighting scheme could be considered by the adopting authority, and by the Applicant in respect to some areas of lighting, for part-night lighting e.g. the lighting will be switched off between the hours of midnight and 5.30am (or other agreed and defined switching/dimming regime).
- Right place - ensuring that only the tasks required are illuminated thus reducing spill and obtrusive light and is achieved through the careful consideration of luminaries and how they are mounted / installed.
- Right system - the most energy efficient lighting installation requires a suitable control system that could also permit monitoring and the operation of the lighting dependent on the operating parameters.

Design recommendations

General

The choice of lighting equipment, especially luminaire units, their mounting height and location will be critical to ensure that the proposed lighting installation meets the requirements and limitations developed as part of the Lighting Strategy. CCC highway lighting policy reflects the established norm within the industry for a move away from the more traditional light sources to the more efficient, popular, and rapidly developing LED technology. The following lighting specification parameters will guide the detailed design of the lighting scheme to ensure minimal impact of the proposed scheme and associated lighting installation on the surrounding area and local wildlife:

- Luminaires shall be of type utilised for roads with a maximum luminous intensity of 0 cd/klm at 90 degrees (excluding low level bollards) in accordance with BS EN 13201-2:2015 to ensure obtrusive light is controlled.
- Luminaires shall comply with the parameters of a proposed environmental zone.
- Luminaires shall be LED with a colour temperature of $\leq 3000\text{K}$ for ecologically sensitive areas and $\leq 4000\text{k}$ for all other areas.
- Luminaires shall be IP 67 rated.
- Luminaires shall be mounted at 0 degrees where possible to ensure no light spill above the horizontal plane occurs.
- Luminaires shall be Post-Top mounted or where required shall have an outreach bracket of $\leq 0.5\text{m}$, such as twin arrangements.
- Column mounting heights shall be kept to a minimum to ensure light trespass does not encroach beyond the site boundary, but at an appropriate height to ensure lighting points are kept to a minimum, resulting in an energy and light efficient installation.

Highways Lighting

Lighting will not be provided along the full length of the transport route, but only to provide suitable lighting to areas where the route intersects and crosses existing CCC highway resulting in areas of conflict. There would be no safety or economical benefit to provide lighting to the full length of the route for singular transport use. The lighting of the highway will be to the CCC lighting standards and policy with ‘white’ LED technology lighting used throughout. Impacts on bats are greatest at the blue end of the spectrum and thus warm white (3000K or less) luminaires shall be used on key bat routes where agreed with CCC.

Neutral (4000k) will be used in less sensitive areas. Where lighting columns are used, primarily adjacent to open space areas or where road widths may compromise ambient lighting on the carriageway, they will be designed as a part of the overall street furniture range.

Bus stop area lighting

There is no specific standard or levels of required illumination in relation lighting of bus shelters. For the purposes of safety and security, it is recommended that a suitable and nominal level of illumination be applied to such areas.

Bus Shelters

As the bus stop locations are remote it is likely that the nearest power supply would not be ideally located to provide an economic and viable connection point. Consideration should be given to the provision of solar powered bus shelters and area lighting luminaires to be used in such instances. This would ensure the area is lit to a minimum level during the hours of darkness and at a time when it is only needed, the provision of solar lighting will allow for the illumination of bus shelters using modern technology in solar lighting which meets with industry guidance for the lighting of bus stops and associated lux level limits.

Section 10 Lighting Design

Such lighting could be set to a minimum level of illumination when not in use but could ramp up to the required levels through presence detections such as Passive Infrared Sensor's (PIR) when pedestrian traffic approaches the bus shelter areas.

The Travel Hub

The Travel Hub within the scheme shall be lit to 20 Lux in accordance with BS 5489-1:2020 and BS EN 12464-2:2014. Luminaires in outdoor car parks should be selected and mounted such as to avoid obtrusive lighting and excessive spill to the immediate surrounding area. The Travel Hub perimeter shall be lit to 5 Lux in accordance with BS EN 12464-2:2014.

Levels could potentially be reduced by one or two classes in order to save energy and carbon in addition to reducing the potential visual and ecological impacts of the scheme.

Remote walking and cycling paths

Remote walking and cycling routes should ideally not be lit unless there is a specific identified safety reason for the provision of lighting through risk-based analysis.

Consideration should be given to utilising alternative methods or lower impact forms of illumination where there is potential to cause disruption to flora and fauna, for example, through the more remote and sensitive areas of the scheme where full lighting installations are not being considered; the use of Solar Studs to introduce wayfinding effect lighting only; but this needs to be balanced with the safety and security of pedestrians and cyclists using the transport route during the hours of darkness.

The detailed lighting design will be subject to the approval of the relevant local planning authority in line with proposed condition 21 (Operational Lighting) as set out in the Request for Deemed Planning Permission (document ref: CtoC-14-00).

Section 11 Inclusive Design

Route Wide

An Equality Impact Assessment (EqIA) has been prepared. This considers the impact of the Scheme on persons or groups of persons who share characteristics which are protected under Section 4 of the Equality Act 2010.

Based on the outcomes of the EqIA a number of recommendations will be carried forward as part of the detailed design with these summarised as follows:

- The Scheme will provide wider existing footways, segregation from traffic, flush surfaces and safer crossings, which will be an improvement on current pedestrian and cycle provision along the route and will benefit all users;
- Busway stops will be designed to be inclusive and to discourage criminal behaviour, in accordance with best practice guidance such as the Inclusive Mobility guidance and Accessible Bus Stop Design guidance;
- Controlled and uncontrolled crossing design will be designed in accordance with the Traffic Signs Manual, Chapter 6, CD 143 Designing for walking, cycling and horse-riding and with consideration of the Inclusivity Mobility guidance; and
- Use of tactile paving within the design of the Emergency and Maintenance Access Track and associated infrastructure will be designed in accordance with the Inclusivity Mobility guidance, CD 143 Designing for walking, cycling and horse-riding and Guidance on the Use of Tactile Paving Surfaces.

Scotland Farm Travel Hub

- The design of the Scotland Farm Travel Hub will be guided by inclusive design guidance including Inclusive Mobility guidance and Accessible Bus Stop Design guidance to ensure that facilities are suitable for disabled users;
- As stated in the Inclusive Mobility guidance, a minimum of 2% of the volume of parking will be designated disabled user bays;
- Cycle stands located at the Travel Hub will be inclusive and suitable for all types of cycle;
- Cycle lockers at the Travel Hub will be accessible. People with limited mobility may struggle more with higher bike lock-ups so a design solution should be used which is accessible for all. Women, who are typically shorter may struggle more with higher bike lock-ups so a design solution should be used which is accessible for all. The lockers are proposed to be placed near the waiting area, and therefore visibility should be good and improve perceptions of safety for users;
- The Travel Hub will include a Toilet Block. Accessible toilet provision will be included within this with consideration given to gender neutral toilets (or a mix of single sex and gender neutral), with single contained units providing a safe environment for all users;
- Signing and information (including audible announcements for the visually impaired) will be in accordance with Inclusive Mobility guidance; and
- The Travel Hub will be lit in accordance with BS 5489-1:2020. Security measures such as CCTV should be considered to act as a deterrent to anti-social and violent behaviour for vulnerable groups, particularly outside of daylight and peak hours.



Section 12 Site Specific Design

Travel Hub at Scotland Farm

Design, access, layout and uses

The Travel Hub will be located to the north of the Scotland Road A428 roundabouts. The site for the Travel Hub is located within the designated Green Belt.

The detailed design in terms of the finished site levels, access, layout and appearance has not yet been undertaken and will be subject to further approval by the local planing authority as part of the proposed planning conditions as set out in the Request for Deemed Planing Permission (Document Ref: CtoC-14-00). An indicative layout is however shown in the Planning Direction drawings (Proposed Site Plan (Sheet 7 of 17)).

The proposed layout has sought to maximise functionality with the site including up 2,000 car parking spaces and up to 300 cycle parking spaces.

In line with the design principle 9 as set out in Section 6 of the DAS, the Applicant will seek to work with the local planing authority to develop a design that minimises impacts on the Green Belt through maintaining the existing site levels as far as possible to reduce visibility across the site and preserve its openness.

The Travel Hub will also include ancillary structures to provide shelter and seating, passenger information and toilet facilities. These will be located centrally within the site, with the final design seeking to make these 'light weight' in appearance, without significant massing with all structures being a single storey in height. Significant landscaping is proposed within the site between parking areas and around the boundaries to reduce visual impacts (see Soft and Hard Landscaping section overleaf).

The ancillary buildings will include provision for disabled access throughout with disabled parking spaces loacted within close proximity of the drop off and pick up area. Disabled access and a disabled toilet have also been proposed as part of the design of the drop off and pick up area.

Public transport and private vehicles will access and egress the Travel Hub from a single access point via the proposed junction with Scotland Road. This junction will be signalised by traffic lights to allow traffic to turn right into the site, exit the site and to turn left onto Scotland Road.

The drop off and pick up area will be located within the centre of the site and has been designed around a one way system, with up to 6 bus stops to maximise ease of travel with minimal conflicts within the busway.

Proposed walking and cycling routes will be provided to the north and south of the Scotland Road entrance point with further routes provided in the south-eastern corner of the site where it will then link to the existing Footpath 66/17 and a proposed new amenity area at Callow Brook.

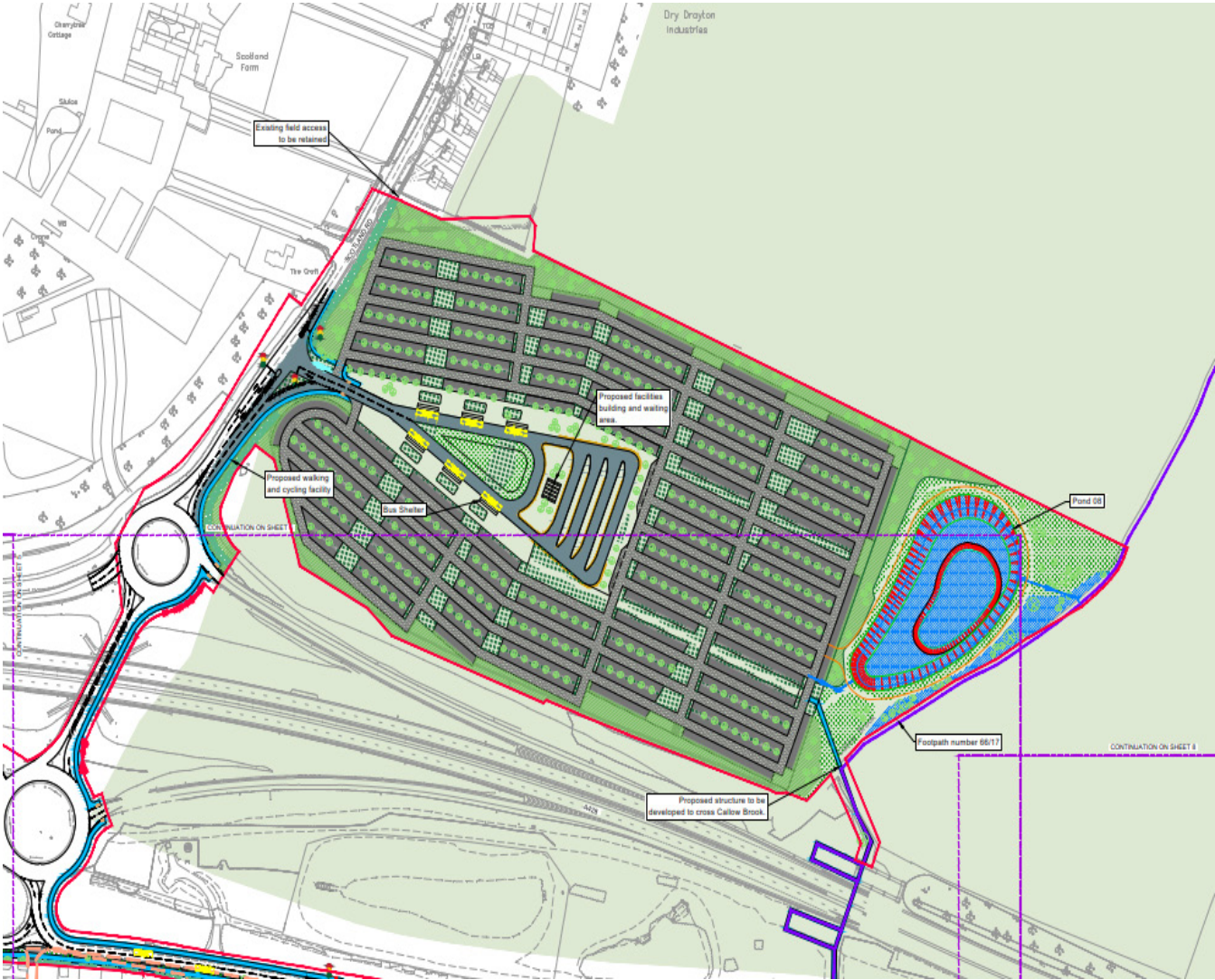
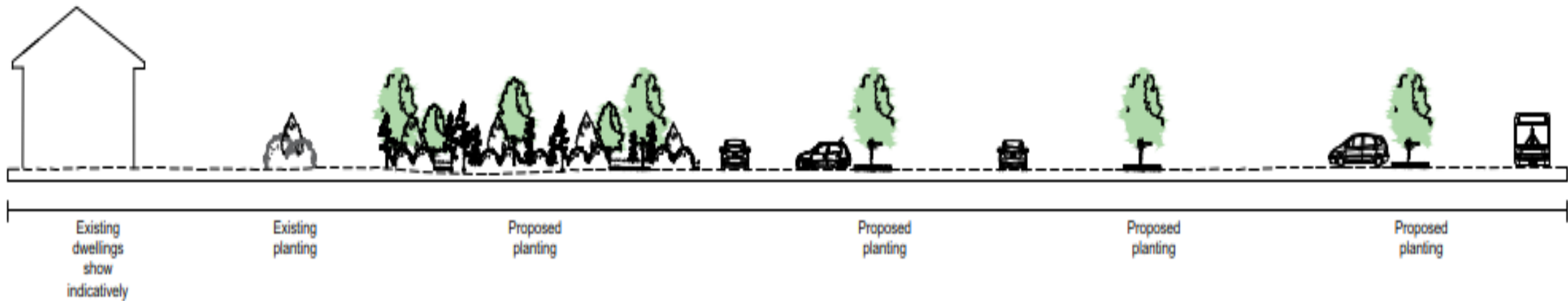


Figure 12-1 Travel Hub Plan and Section View

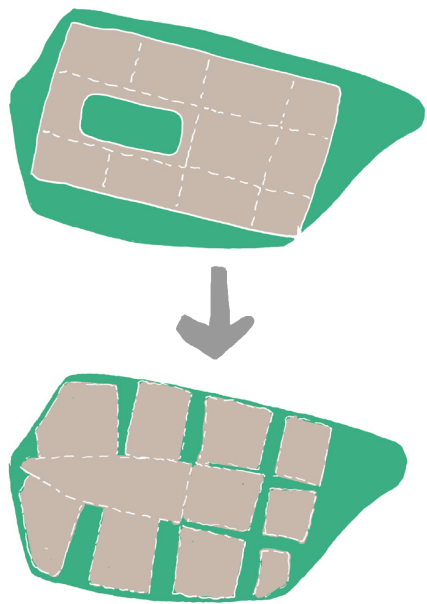


Section 12 Site Specific Design

Travel Hub at Scotland Farm

Soft and Hard Landscaping

In terms of landscape, the hard-standing parking space is 'spliced' by planted 'green fingers' forming a green network and increasing opportunity for SuDS. The tree and shrub planting within the 'green fingers' also soften the grid layout within the car-park space. In terms of movement, the east-west 'green finger' creates a legible connection between Hardwick and Scotland Road.



Conceptual sketch illustrating smaller islands of hard-standing surrounded by greening instead of a singular hard-standing area.

Screening the surrounds

Woodland planting, formed of trees and under-planting will surround the core of the car parking area. The woodland structure proposed is a compact canopy with a high percentage of trees within the mix, including fast growing trees like Poplars (*Populus alba* and *Populus tremula*) which will help to provide early structure and height. Along the southern edge new woodland planting will tie with the existing.

Lighting

Column mounting heights shall be kept to a minimum to ensure light trespass does not encroach beyond the site boundary, but at an appropriate height to ensure lighting points are kept to a minimum, resulting in an energy and light efficient installation. The Travel Hub perimeter shall be lit to lower Lux levels, while consideration should be given to utilising established technologies in order to implement dimming and/or switch off during off peak or hours of low use.

Example of a single storey Travel Hub building which will provide shelter and other passenger facilities.



Shrub and woodland planting surrounding the travel hub are designed to soften the geometry of the perimeter and help to screen views.



Broad planted 'Green Fingers' are proposed to soften the perception of large areas of parking.



Within the parking bays, orderly trees create a shading and a sense of green horizon.

Figure 12-2 Indicative Landscaping design at the Travel Hub

Section 12 Site Specific Design

M11 Bridge

A new overbridge is required to carry the new bus-way over the M11 to the west of Cambridge. When developing the structural options the following assumptions and constraints have been considered:

- Provision of a cost-effective/structurally efficient solution.
- Minimum of disruption to the M11 operation during construction as required by National Highways.
- A widened overall M11 carriageway width of 39.3m making a passive provision for future widening of the northbound exit slip lane. The cross-section increases to 40m for structural options comprising supports that are positioned immediately behind the verges.
- All services potentially impacting the works shall be protected or diverted accordingly.
- The bridleway running along the top of the east M11 cutting will be diverted behind the structures or stopped up.

Various structural options have been assessed and compared taking into consideration aspects such as construction programme duration, initial environmental impact, buildability, capital and whole life cost and construction risks.

Based on the high-level information available at this stage and consultation with CCC, a long single-span steel composite deck option has emerged as the preferred option. However, the other options can be revisited later as the scheme develops further and more information becomes available.

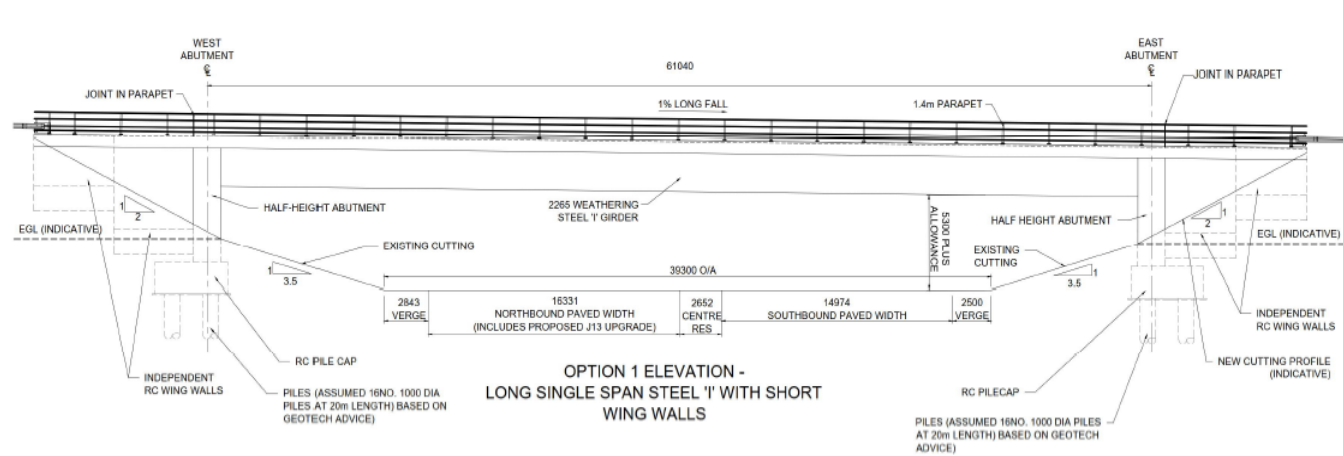


Figure 12-3 M11 Overbridge indicative design elevation

Bin Brook Bridge

A single-span pre-stressed concrete beam and concrete infill fully integral with end abutments is proposed for this structure. This form of construction has the advantage that there is no requirement for falsework to support the deck soffit – the beams provide support to the in-situ concrete. The beams themselves would be pre-cast off-site at the supplier's factory and delivered to site in advance of installation.

The pre-cast pre-stressed beams would be placed on top of the abutment walls which would comprise a traditional cantilever wall cast in-situ – these would have the advantage of not requiring as many joints and would allow the use of piled foundations to limit the base size if needed.

This form of construction is also relatively fast as the pre-cast beams can be installed very quickly.

The construction depth for this option is the shallowest of options tested which then reduces the required length of the northeast retaining wall in comparison with other options tested.

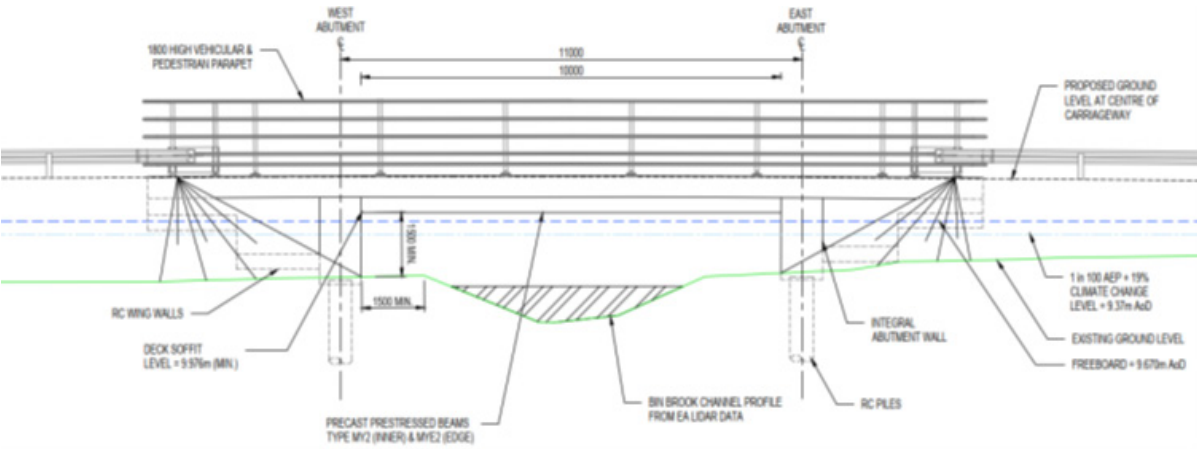


Figure 12-4 Bin Brook Crossing indicative design elevation

Section 13 Access

Response to Environmental Context

Access and from the Scheme has been developed in response to both the existing and future context of the area as set out in Sections 3 and 4 as summarised below under the relevant headings.

Built Environment

The route alignment will connect the following existing and proposed settlements in an east-west direction as shown in Figure 3.2:

- Cambourne;
- Bourn Airfield Development;
- Hardwick;
- Coton;
- West Cambridge Development; and
- The West Cambridge Fringe

The proposed Travel Hub at Scotland Farm will also allow people travelling via private vehicle or coach from outside of the above communities to park their car and continue their journey into Cambridge via the Guided Busway or via the proposed pedestrian and cycle routes that the Emergency and Maintenance Access Track will provide.

The communities and other users will access the bus services via a number of existing, relocated and proposed Busway stops along the route described from west to east as follows:

Existing and Relocated Bus stops located:

- To the north and south of the St Neots Road carriageway to serve the existing residential dwellings along St Neots Road, the village of Hardwick and the approved planning permission for up to 176 dwellings (20/02728/REM (153 dwellings) & 21/01832/FUL (23 dwellings) south of no. 279 St Neots Road;
- 50m to the west of the junction of St Neots Road and Cambridge Road serving the village of Hardwick;
- 100m and 400m to the east of the junction of St Neots Road and Cambridge Road serving the residential dwellings to the south of St Neots Road (no.'s 1 to 77); and
- North and south of the junction of the Scheme and Grange Road

Proposed Bus-way Stops located:

- North and south of the carriageway (to be designed as part of the Broadway Buslink (planning ref: S/3329/16/OL) close to where the route begins at Sterling Way to serve the residential communities in Cambourne and Bourn Airfield
- West and east of the development at Bourn Airfield (to be designed as part of planning ref: S/3440/18/OL;
- North and south of the carriageway, 40m to the west of the proposed routes junction with Cambridge Road just north of the village of Coton;
- North and south of the carriageway, 50m east of junction of Edington Avenue and Charles Babbage Road (to be designed as part of the Cambridge West development)

The locations of the existing, along with the indicative locations for the relocated and proposed Busway Stops are shown on the Planning Direction drawings (Sheets 1 to 18) with the final location, layout and external appearance to be approved by the relevant local planning authority via proposed planning condition 19 as set out in the Request for Deemed Planning Permission (document ref: CtoC-14-00).

Natural Environment

Landscape

Within Cambourne the guided busway will be developed as part of the Broadway Buslink (planning ref: S/3329/16/OL) and will use existing roads and a short section of new road between Sterling Way and Broadway. The alignment at this location has sought to reduce impacts on the townscape and surrounding landscape at Cambourne by using existing highways.

The guided busway will then follow a northern route around Bourn Airfield development (planning ref: S/3440/18/OL) largely parallel to the A428. The alignment at this location has sought to reduce impacts on the surrounding landscape with the alignment being developed as part of the proposed landscaping and townscape proposed as part of the Bourn Airfield development (planning ref: S/3440/18/OL).

From Bourn Airfield to Scotland Farm the guided busway runs close to and parallel to the existing A428. The alignment will generally be viewed from nearby residences as part of the existing highway infrastructure running to the south of the A428.

From Scotland Road the guided busway is located between the existing highway infrastructure of St Neots Road at Hardwick and the A428.

Between Madingley and Coton there are parcels of land on either side of Madingley Road that are subject to covenants held by the National Trust. The alignment of the guided busway through this section has been designed to be as level as possible across the hill ridgeline using shallow cutting through much of this area to reduce landscape impacts.

The guided busway will then run through the West Cambridge development (planning ref: 16/1134/OUT) on Charles Babbage Road . The alignment at this location has sought to respond to impacts on the existing/future townscape and the surrounding landscape to the south of the university by using the existing highways.

From here the guided busway will run tight to the Cambridge University Athletics Grounds and utilise the existing Rifle Range Path. This alignment has sought to reduce impacts on the surrounding townscape and landscape running parallel and tight to the urban area of Cambridge.

Appropriate landscaping as set out in the indicative Landscape Mitigation Plans will be provided along the alignment at all locations. The location, layout and high level planting types proposed as part of the hard and soft landscaping are shown on the CtoC-16-00 Deemed Planning Drawings (Sheets 1 to 18) with the final details and management plans to be approved by the relevant local planning authority via proposed planning conditions 17 and 25.

Section 13 Access

Response to Environmental Context

Water Environment

The alignment has been designed with the majority crossing land of very low (Flood Zone 1) flood risk. However, there is a small area in high (Flood Zone 3) flood risk, where the risk of flooding from Bin Brook, associated with the floodplain of the River Cam. Suitable flood mitigation forms part of the design at this location is provided for within the permanent land take for the Scheme (see Section 6),

Ecology

The guided busway avoids all sites that are statutorily designated for ecological purposes except where it crosses the City Wildlife Site on the eastern side of the M11 where the proposed M11 Overbridge is to be located. Replacement Open Space land will be provided to the east of the M11 overbridge as part of the Scheme with ecological enhancements also being provided.

The guided busway also passes through a non-designated habitat of value - Coton Orchard. Given the environmental sensitivity of the orchard, the project's lead ecologist, arboriculturist and engineer prepared possible variations to the alignment, as presented in the 2022 public consultation, with the objective of finding an option that would lessen potential ecological impacts.

A more northerly alignment option was considered. This followed a gap between the oldest trees, so avoiding the need to fell them. It did however follow a more central route through the orchard and would have required greater land take to enable earthworks. This option and the original consultation option are shown below in Figure 13-1

The project decided to retain the consultation alignment option as the preferred option on the basis of its impact on farmland west of the orchard and of Cambridge Road. The more northerly alignment would have moved northwards across the farmland, resulting in greater land severance at this location.

When comparing the two options, the relevant landowner expressed a preference for the original consultation option. And with no preference expressed by the orchard owner for one route over the other, the decision was made to retain the original consultation option as per the 2022 public consultation.

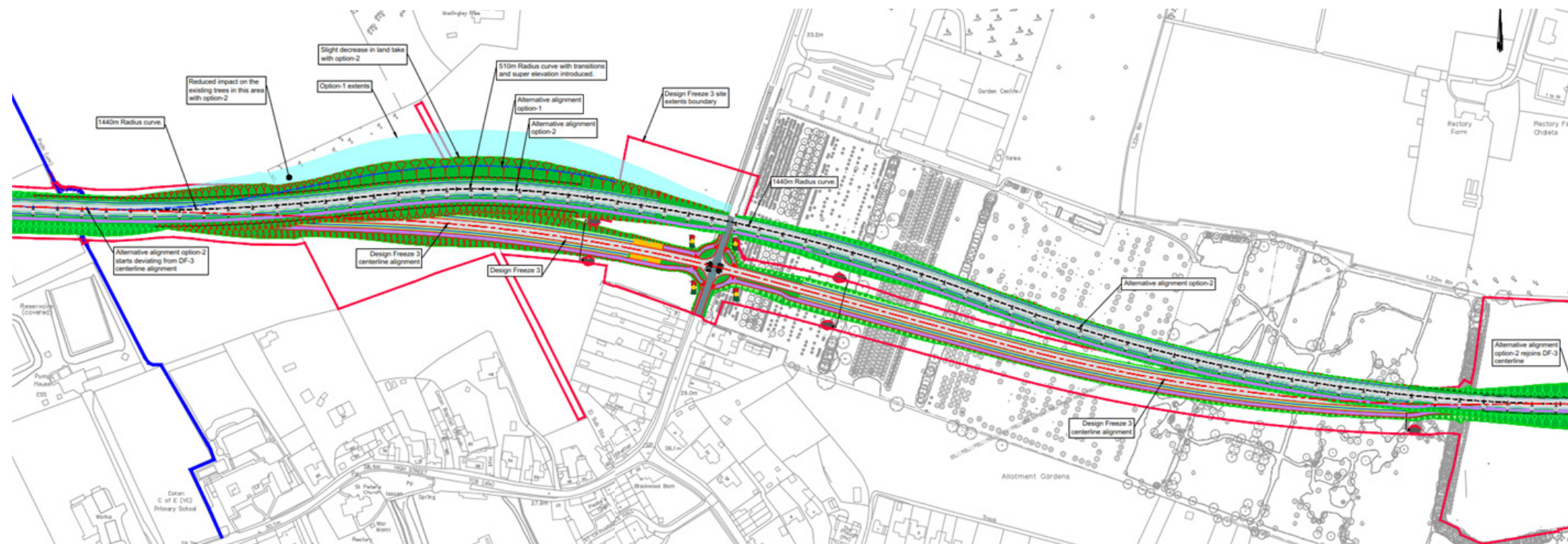


Figure 13-1 - Route through Coton Orchard

Section 13 Access

Response to Transport Context

The Alignment

The Transport Statement (Document ref: CtoC-25-00) shows that the existing car mode share on the A428/A1303 corridor is high with future residential and employment growth expected to generate additional demand for car use in this area. On the A428/A1303 route, conventional public transport offers little to no competitive advantage over private cars. This has meant that private car is the dominant transport mode, leading to congestion on the wider transport network. This in turn causes disruption to existing bus routes.

The design of the Scheme has considered alternative transport choices into Cambridge from the wider region and how they tie into the A428/A1303 corridor as follows:

- Rail - There are currently no rail links connecting the west of Cambridge to the city centre. For Cambourne and other settlements along the A428/A1303, Cambridge Station is the closest rail link available, approximately 9 miles away. The East West Rail scheme (Bedford to Cambridge stage) may complement the Scheme as preliminary options proposed a new station at Cambourne, which could be used to create a multimodal interchange location. This could lead to an increase in public transport use in general that is a fundamental aspiration of the Scheme. However the Bedford to Cambridge stage of the East West Rail scheme is currently not a committed development and so a programme for operational opening is not currently known. This East West Rail scheme would also not deal with the immediate issues of traffic congestion along the A428/A1303 transport corridor and within Cambridge city centre in the short to medium term nor would it directly serve the major housing developments such as Cambourne West, Bourn Airfield and West Cambridge. The Scheme is planned for completion by 2027 and will address the existing and worsening issues of congestion and will also serve the noted major housing developments along the route.
- Bus Connections – Without rail connections the main form of public transport provision for Cambourne and other settlements along the A428/A1303 is therefore the bus network. In total there are eight bus services that operate on the A428/A1303 route
- Cycling and walking - The area along the proposed alignment currently has some local cycling links with a combination of signed on and off-road routes as well as local links connecting villages with on road and segregated paths. However, there are no end to end segregated cycle routes from Cambourne through to Cambridge.

The Scheme will enable people wishing to access Cambridge from the west to make that journey by bus, rather than by car and will have a beneficial effect on traffic conditions in Cambridge. It will therefore play a key role in providing an attractive and competitive alternative to car use on this route, which will alleviate a number of network operation issues, notably congestion, poor journey time reliability and long delays. In addition the Scheme will help to accommodate future growth planned to the west of Cambridge, improve access to housing and employment sites, and improve the quality of life in the local communities.

Interaction with Existing Highways

The alignment of the route will interact with existing highways requiring widening of existing carriageways and the formation of:

- A proposed signalised junction with Broadway where the route crosses over from Cambourne to the Bourn Airfield site;
- A proposed signalised junction with St Neots Road to the north-west of the existing roundabout at Highfield Road;
- A proposed signalised junction on St Neots Road to the west of the existing Scotland Road roundabout;
- Upgrades to the existing Scotland Road roundabout;
- A revised priority junction between St Neots Road and Long Road;
- A proposed signalised junction at Long Road;
- A proposed signalised junction with Cambridge Road north of the village of Coton; and
- A proposed signalised junction to Grange Road where the route ends.
- The proposed junctions will be signalised, with priority for buses.

The locations of the junctions are shown on the CtoC-16-00 Deemed Planning Drawings (Sheets 1 to 18) with the final location, design and layout to be approved by the relevant local planning authority via proposed planning condition 20.

Section 13 Access

Response to Transport Context

Cycle and Pedestrian Provision

The Scheme will significantly improve local walking and cycling connectivity between Cambourne and Cambridge through the creation of new high quality walking and cycling routes as part of the Emergency and Maintenance Access Track.

The Scheme will also improve connectivity to the existing PRow network, with pedestrian, cycle and equestrian crossing facilities provided where the Scheme intersects the existing PRow network (see Figure 13-2 below). As previously noted, four PRow intersect the Scheme. At these locations new crossing facilities will be provided to minimise the impact on pedestrians, cyclists and equestrians. These crossing facilities will also improve connectivity to the PRow network by enabling users to access PRow via the new active travel path that runs parallel to the guided busway.

Access to and within the Scotland Farm Travel Hub

The Scotland Farm Travel Hub will be accessed off Scotland Road via a signalised junction. The indicative location of the signalised junction is shown on the CtoC-16-00 Deemed Planning Drawings (Sheet 17 to 17) with the final location, design and layout to be approved by the relevant local planning authority via proposed planning conditions 19.

An indicative internal layout including internal access roads, waiting areas and busway stops at the Travel Hub are shown on the Planning Direction drawings (Sheet 18 of 18). It is proposed that up to 2000 car parking spaces will be provided as part of the Travel Hub with up to 300 cycle stands also provided.

Cyclists will be able access the guided busway from the Travel Hub via a new access track to the existing blue bridge footbridge over the A428 as shown on CtoC-16-00 Deemed Planning Drawings (Sheet 18 of 18). From here they will be able to access routes east and west using the Emergency and Maintenance Access Track. This will enable people to:

- Travel to the Travel Hub by cycle and interchange with local bus services.
- Travel to the Travel Hub by car and continue their journey via bicycle.
- Pedestrians will also be able to use this route to access the wider alignment and existing ProW network.

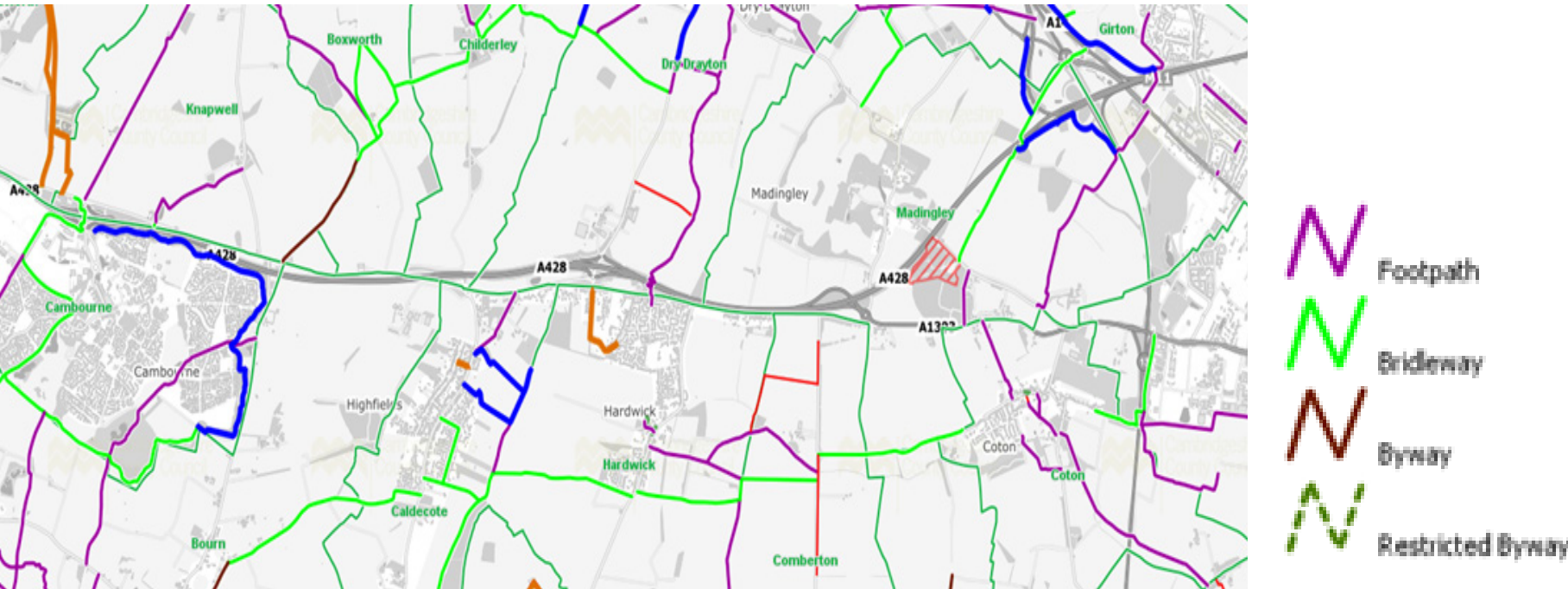


Figure 13-2 - Existing PRow

Section 14 Summary

This DAS forms part of a suite of documents submitted as part of the TWAO application.

The DAS describes how the suite of documents (the Order, Environment Statement, Planning Direction and related Planning Direction Drawings) and the Design Principles have been established through analysis of the context and requirements for the Scheme, developed by the consultation process with key stakeholders.

Where relevant, the DAS has demonstrated how options have been explored to establish optimum locations and siting, taking into account operational requirements and response to the surrounding landscape and environment context.

Based on the the vision and objectives (Section 2), the context (Sections 3 and 4) and the consultation undertaken to date (Section 5), it sets out the Design Principles (Section 6) which will guide the final design of the busway, public transport stops, Travel Hub, bridges and the wider landscape design which form the permanent physical components of the Scheme.

Section 6 sets out the proposed Design Principles which will ensure that the detailed design of the Scheme satisfies the principles of good design as a key aspect of sustainable development in line Paragraph 126 of NPPF 2021 as well as the wider framework of local design policy as set out in Section 4 of the DAS .

Sections 7-13 describe how the Design Principles and illustrative designs comply with local design policy as set out in Section 4 of the DAS, specifically in relation to the following elements of the design of the Scheme:

- Sustainable design.
- Ecological design.
- Landscape design;
- Lighting design.
- Inclusive design;
- Site specific elements including the design intent for the Travel Hub at Scotland Farm, the M11 overbridge and the Bin Brook Crossing.
- Design of the access along the route of guided busway.

The detailed designs will be subject to approval by the relevant local planning authority through the proposed planning conditions as set out in the Request for Deemed Planning Permission (document ref: CtoC-14) with each of these captured as they relate to specific elements of the design in Sections 7 to 13.

