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Greater Cambridge Greenways

Melbourn Greenway: Outline Business Case

Greater Cambridge Partnership

17 February 2023

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This document has 42 pages including the cover.

Document history

Document title: Melbourn Greenway: Outline Business Case

Document reference: -

Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
1.0	Draft issue	ART+GJ	GJ+SA	SA+GJ	RS	2/2/23
1.1	Addressing client comments and adding additional analyses	ART	SD	GJ	RS	15/02/2023

Client signoff

Client	Greater Cambridge Partnership
Project	Greater Cambridge Greenways
Job number	
Client signature/date	

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1. Introduction

Greater Cambridge Partnership (GCP) has a programme of Greenways. A Programme Outline Case (POC), covering the whole Greenways programme, has been produced and was approved by the GCP Executive Board on 28 September 2022.

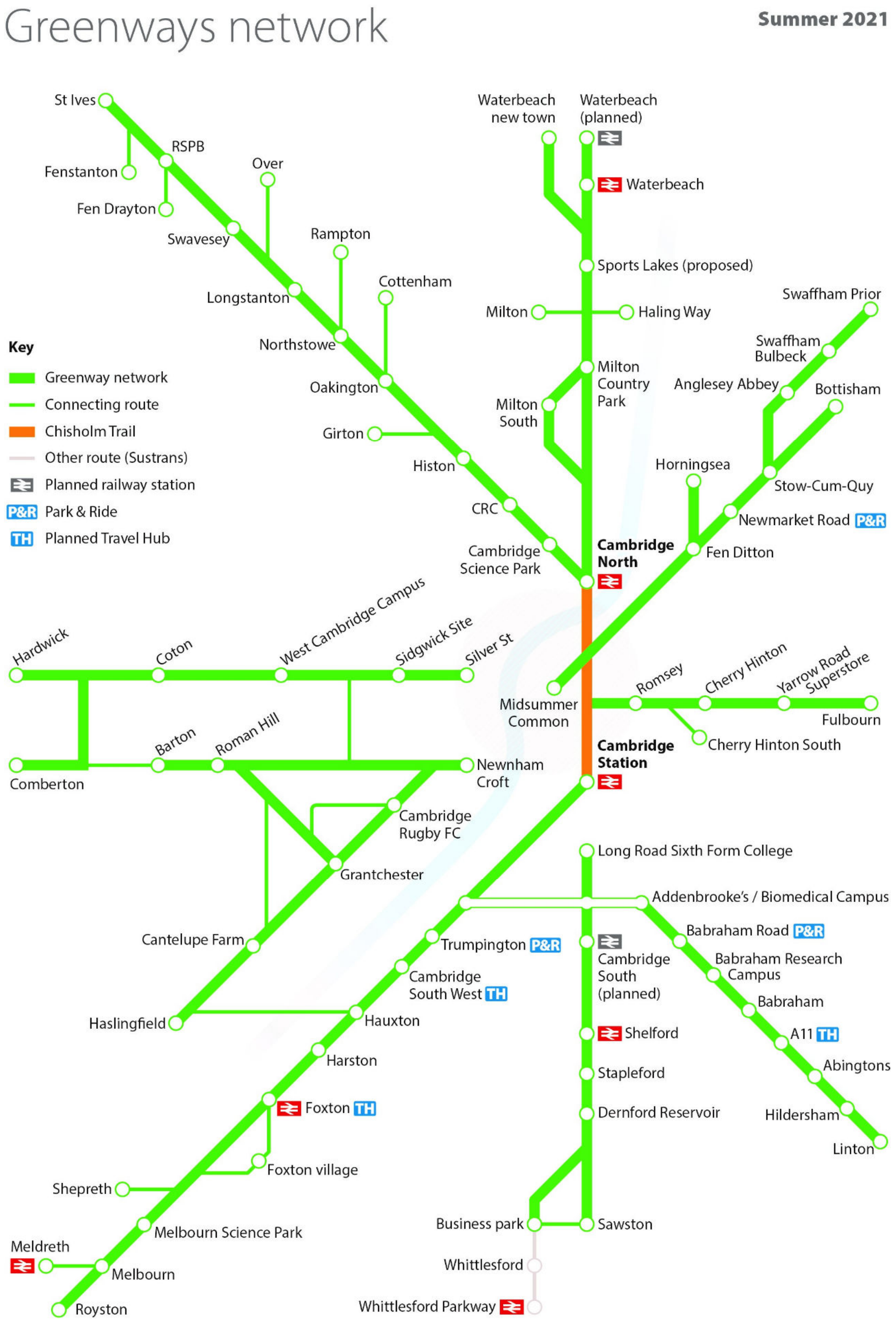
The POC envisaged that each Greenway would have a scheme-specific annex to the POC, acting as a proportionate Outline Business Case (OBC), covering mainly the economic appraisal of that scheme plus certain other scheme-specific matters. Table 1-1 shows what the OBCs will cover.

Table 1-1 - OBC content

Dimension	OBC content
Strategic	• Scheme-specific engagement/consultation results (will apply to all schemes) • Any major changes to scheme definition since the description given in the POC • Any major elements of the specific case that are unique to a particular scheme
Economic	• The economic appraisal (will apply to all schemes)
Financial	• Scheme costs (will apply to all schemes) • Any scheme-specific differences from the generic position given in the POC – eg if a scheme has developer contributions
Commercial	• Any scheme-specific differences from the generic position given in the POC
Management	• Any scheme-specific differences from the generic position given in the POC – eg involving land agreements, risk profile, the consents strategy, or future ownership of the infrastructure

This document is the OBC for the Melbourn Greenway. It forms an annex to, and should be read in conjunction with, the POC which covers programme-wide matters.

Figure 1-1 – The Greenways network



Source: GCP Greater Cambridge Greenways website

2. Strategic case

2.1. Introduction

The strategic case sets out a case for change that demonstrates how the proposal fits with GCP's priorities, government ambitions and the area being served by the scheme. Most of the strategic case is common to the whole programme and is set out in the POC. The scheme-specific OBCs therefore cover only the following:

- Any major changes to scheme definition since the description given in the POC
- Scheme-specific engagement/consultation results (will apply to all schemes)
- Any major elements of the strategic case that are unique to a particular scheme

2.2. Changes to scheme definition since the POC

The scheme definition remains in line with the description given in the POC.

2.3. Geographical scope of the scheme

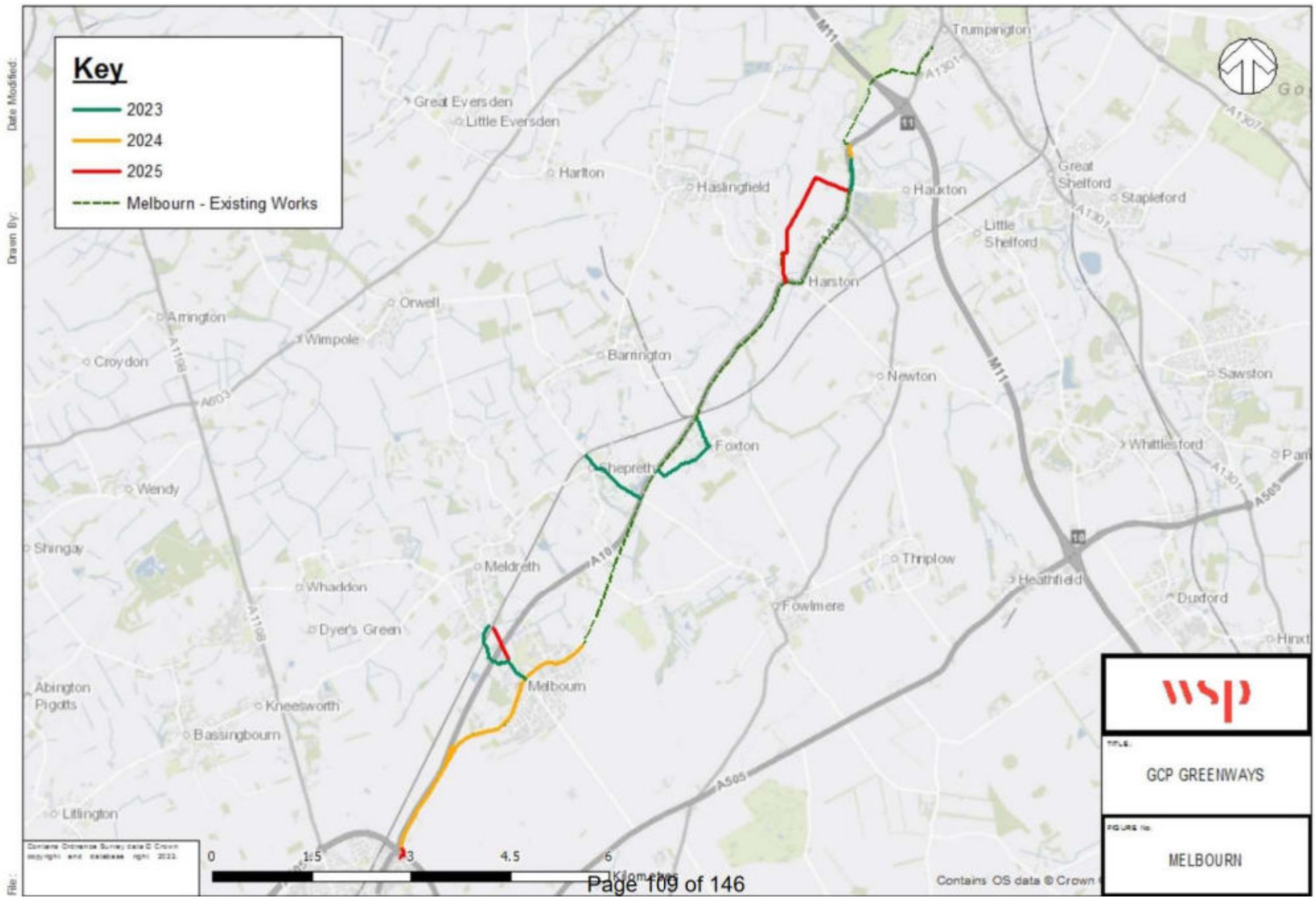
The Melbourn Greenway will provide a continuous link from Royston via Melbourn, Harston and Hauxton to southwest Cambridge/Trumpington, connecting to the Haslingfield Greenway near Harston and Hauxton (Figure 2-1).

The planned route begins with a new active mode bridge crossing the A505 south of its junction with the A10. A new mixed used path along the east side of the A10 (in addition to the existing mixed-use path west of the A10) would then be provided to the southern edge of Melbourn. Traffic calming measures would be provided through Melbourn, including a 20mph speed limit, until the existing mixed used path is met at Melbourn Science Park. From Melbourn Science Park to the A10/London Road junction in Harston, the main line of the Melbourn Greenway follows existing mixed-use paths along Cambridge Road, Dunsbridge Turnpike and the A10. From the A10/London Road Junction north, the Melbourn Greenway works involve widening the existing mixed-used path on the west side of the A10 up to a point just north of the River Cam bridge, where the existing cycle path veers west around the far side of some fields from the A10. Though the Melbourn Greenway route itself follows this path over the M11 on a farm access bridge and into Trumpington and southwest Cambridge, there are no improvements to the existing infrastructure as part of this programme of works to this section.

Several branches and loops away from the main line of the Melbourn Greenway are also proposed. These are:

- A branch from Melbourn to Meldreth railway station. This starts in Melbourn at the High Street/Station Road junction, and includes traffic calming measures (including a 20mph speed limit) to the point where Station Road diverges. The branch then forks in two:
  - The direct route from here to Meldreth railway station is currently a paved public footpath. This would be widened and upgraded to a mixed used path under the Melbourn Greenway programme.
  - The road route from here to the station would receive additional traffic calming measures.
- A branch to Shepreth diverges from the main line of the greenway at the A10/Fowlmere Road/Shepreth Road junction. It comprises traffic calming measures along Fowlmere Road into Shepreth as far as Shepreth railway station.
- A loop around Foxton is proposed starting at the A10/Shepreth Road junction and comprising traffic calming measures and a 20mph speed limit where possible along Shepreth Road, High Street (to the Station Road junction) and Station Road, re-joining the main line of the greenway at Foxton railway station.
- A loop around the west side of Harston is proposed comprising a new mixed-use path from Church Street along The Footpath and a field boundary until the north side of the first field is met. The loop then splits:
  - A short branch of mixed-use path is proposed to connect west to existing public footpath connecting to Button End.
  - The main loop continues as a new mixed-use path for approximately 75m along a field boundary, before turning north and following another field boundary until it meets the Haslingfield Greenway's branch to Hauxton. The Melbourn Greenway's Harston field loop then follows this branch of the Haslingfield Greenway until it joins the main line of the Melbourn Greenway at the A10, just south of the A10/Church Road junction in Hauxton.

Figure 2-1 - Overview of the Melbourn Greenway



2.4. Stakeholder and public engagement

The *Melbourn Greenway Engagement Summary Report*, which is being issued in parallel with this OBC, sets out the stakeholder and public engagement that took place in 2022. We summarise its key points below.

2.4.1. Stakeholder engagement

Key stakeholders associated with the Melbourn Greenway were engaged with throughout 2022 and will continue to be engaged with as the project progresses. Stakeholders ranged from council members, partner authorities, representatives of walking, cycling and equestrian groups and relevant landowners whose agreement is needed in order to construct and manage the route. The *Engagement Summary Report* sets out the activities undertaken.

2.4.2. Public engagement

A public engagement period was held from 3 to 28 October 2022. The *Engagement Summary Report* sets out the activities undertaken as part of this, and the survey feedback that was received.

Overall, feedback received was overwhelmingly supportive to all sections of the proposed Melbourn Greenway. A number of suggestions were raised that will be considered and possibly incorporated into the design of the Greenway.

For Section 2 (Harston Off-Road Path), 30% of people supported the proposals generally, 33% of the open-ended responses suggested adjustments to the proposed route alignment, with 25 comments expressing concerns over the lack of improvements catered towards the community of Newton to the east of the A10 from Harston. When considering the open-ended responses in conjunction with feedback from the in-person drop in events, respondents expressed dissatisfaction over the off-road route, questioning its usability and potential environmental impacts.

Concerns were raised over the Bridges comprised within Section 6 of the Melbourn Greenway proposals. Respondents highlighted the need to either improve the bridge at Meldreth Station (accessed via the off-road underpass) so that step free access can be achieved or widen the road bridge on Station Road so that it can be safely traversed by all users.

A lot of support (61% in favour) was received for Section 7 (A10 Royston Road) and the proposed shared use path on the east side of the road through this section.

The A505 bridge proposal (Section 8) received the most support out of all of the proposed sections to the Melbourn Greenway, with 125 responses (70% of the total responses for this section) generally in favour of the proposals. The general consensus is that the intersection of the A505 and A10 is a major constraint to active travel in the area and restricts movement for walkers and cyclists looking to travel between Royston and the settlements to the north.

2.4.3. Actions taken in response

Information on actions taken in response to the engagement feedback has been provided separately, in parallel to this OBC. It outlines where the project team has acted on suggestions and made changes to the design of the Greenway, or where they have not made changes and the reasons for this.

2.5. Any major elements of the strategic case that are unique to the scheme

2.5.1. Foxton Rural Travel Hub

Foxton Rural Travel Hub is a GCP project to improve connectivity to Foxton railway station by providing additional car parking spaces and higher quality cycle parking. On completion this project could reduce active travel trips on the corridor as parking at Foxton station would become easier. However, this is likely to be offset by additional cycle parking capacity (at least 48 spaces) including the provision of charging points for electric cycles. This will reduce the concern potential cyclists might have about finding parking at the station.

New junctions crossing the Melbourn Greenway will be required to allow vehicular access to the new car parks. However, the design is also expected to include a new crossing of the A10, allowing improved permeability from the Foxton branch of the Melbourn Greenway (east of the A10) to the main line of the Melbourn Greenway (west of the A10). Public toilets are also expected to be provided as a part of the Foxton Rural Travel Hub, which would also benefit users of the Melbourn Greenway.

2.5.2. Haslingfield Greenway

One of the other 12 Greenway schemes proposed by the GCP, the Haslingfield Greenway connects to the Melbourn Greenway just south of the Church Road/A10 junction in Harston. It also forms the connection from the northern extent of the proposed new fields path bypassing Harston on the Melbourn Greenway, back to the main line of the Melbourn Greenway just south of the aforementioned Church Road/A10 junction.

To avoid double counting with the Haslingfield Greenway OBC, the only flows passing over the Haslingfield Greenway considered in this Melbourn Greenway OBC are those transiting the link between the northern extent of the new fields path to the A10.

Trips from Hauxton to Haslingfield are assumed to pass over only the Haslingfield Greenway (being the most direct route) and trips from Harston to Haslingfield are also assumed to take other, more direct, routes. This is because trips from northern Harston to Haslingfield are – like those from Hauxton to Haslingfield – liable to only use the Haslingfield Greenway, whereas those from the south of Harston to Haslingfield are more likely to take the more direct existing road and public footpath routes. Here the existing routes are between a half and two-thirds of the proposed route via the Melbourn and Haslingfield Greenways. Given also the apparent low latent demand for active travel trips between these settlements, it seems unlikely that that many, if any, trips would reroute or be generated by the provision of the Melbourn Greenway here.

If the Haslingfield Greenway were not to be constructed, it is not expected that the Melbourn Greenway would be substantially affected. This is because the section of the Haslingfield Greenway that interacts the Melbourn Greenway is already a bridleway along a hard-paved farm track, so is neither busy nor likely to degrade in adverse weather conditions.

2.5.3. Cambridge South-West Travel Hub

The Cambridge South-West Travel Hub (CSWTH) proposed by GCP is a new Park and Ride site to be built west of the M11/A10 junction (south of the M11, north of the A10). The proposed site is currently bounded by a mixed-use path that forms part of the Melbourn Greenway.

The CSWTH scheme will realign this path along a more direct route across the site, with a new active mode bridge to replace the existing farm access road bridge that carries the Melbourn Greenway across the A10. If CSWTH is built, active mode trips passing through the site on the A10 are unlikely to be substantially affected by the rerouting across the site as the change is distance is minor.

The CSWTH is expected to have cycle locker storage for at least 80 cycles. However, these cycle lockers are primarily aimed at commuters who would store their cycles at the site overnight and use them to complete their commute from the Park and Ride site to their place of work. As most of these places of work are expected to be in Cambridge rather than further south along the Melbourn Greenway corridor, these trips are not expected to encounter any of the interventions in this Melbourn Greenway OBC, so have not been quantitatively assessed here.

Public toilets are likely to be provided at the CSWTH. These would also benefit users of the Melbourn Greenway.

3. Economic case

3.1. Introduction

The economic case demonstrates the scheme's value for money.

For the greenways programme, the economic case for each scheme is wholly contained within its OBC. An overall approach to appraisal has been agreed that covers all the Greenway corridors. The detailed technical method for each corridor may vary according to the needs of each corridor but will be in line with the overall approach.

The appraisal is on a proportionate basis aimed at indicating the overall scale of benefits. Each greenway corridor is appraised in its own right, assuming that none of the other Greenways are in place apart from the committed Chisholm Trail, but any key corridor-specific synergies between corridors will be identified.

3.2. Approach to economic appraisal

The appraisal has been undertaken in line with the Department for Transport's *Transport Analysis Guidance* (TAG), which in turn is aligned with the Treasury *Green Book*. All costs and benefits have been converted to 2010 prices and values, using the parameters in the November 2022 TAG data book.

The scheme opening year is assumed to be 2025. The appraisal period is 20 years, reflecting the likely asset life of the main physical measures before major renewal is required.

Equestrian users are not included in the AMAT methodology, but the numbers of equestrian users are small in comparison to the numbers of walkers and cyclists and this will have no material effect on the conclusions.

3.3. Demand

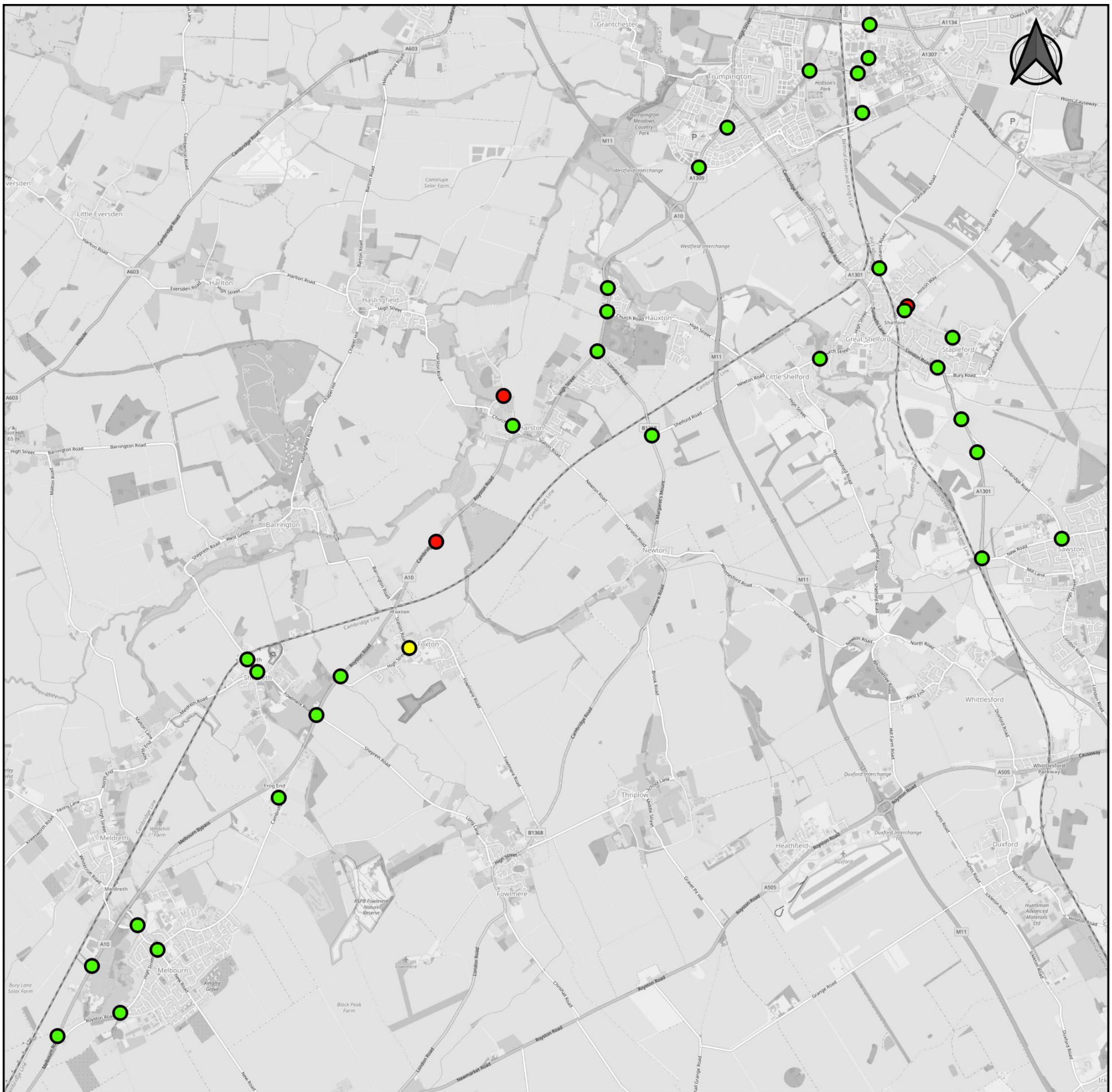
3.3.1. Baseline demand

Baseline demand was estimated from manual classified counts made in November 2022 at a range of junctions along the corridor (Figure 3-2). Each count covered three mid-week days from 0700 to 1900. The counts included pedestrians, cyclists, equestrians and scooters. The locations that counts were commissioned (as well as whether or not the surveys commissioned returned useable data) are shown in **Figure 3-1**.

At each count location, the daily totals were averaged across the three days to produce an average daily weekday demand figure.

To take account of seasonal variations in flows, an annualisation factor was derived from 2018 cycle flows over the network of fixed cycle counters installed throughout Cambridgeshire, as available from the Cambridgeshire County Council website. The factor for November was determined to be 1.23 and this was applied to the count data to produce the seasonally-adjusted final baseline (2022) demand figure.

Figure 3-1 – Count locations



Melbourn and Sawston Greenways - Manually Classified Counts obtained for OBC

Legend

Manually Classifed Counts by level of success

- No useable data returned
- Some data returned useable
- All data returned useable

Drawn: ART, 16/02/2023	Version: 1.0
Reference:"P:\GBLOW\TP\HB\PROJECTS\5209430 - Waterbeach Greenway - MATH2310\03 Technical\Business Case\GIS\Corridor shp+kmz (snapshot 27 Apr 2020)\02 Shapefiles\99 Required Count Sites\Survey Locations Workbook_v0.1.qgz"	0 1 2 3 4 5 km

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5 Wellbrook Court, Girton Road, Cambridge, CB3 0NA

3.3.2. Do-minimum demand

The do-minimum demand represents the future active travel demand along the corridor if the scheme were not to be built. It reflects background demand growth and is created by applying a growth factor to the baseline demand.

In line with the standard process in the DfT's AMAT workbook, the do-minimum demand was input to the workbook as the baseline demand and is scaled internally from the scheme opening year for 20 years, in line with TAG guidance. A background growth rate in trips of 0.75% was assumed over this period based on National Travel Survey Data from 2006 to 2016, as per the AMAT default.

Conservatively, no extra allowance has been made for specific sites on the corridor. It is assumed the Melbourn Science Park expansion currently under development is a part of this uplift. However, as future expansions are planned at this site and may generate a higher growth in journeys than this area average, a sensitivity test has been undertaken to assess the impact this would have on the scheme, as detailed in Section 3.12.

3.3.3. Do-something demand

The do-something demand represents the future active travel demand along the corridor if the scheme is built. It reflects the impacts of the scheme and is created by applying growth factors (or 'uplifts') to the do-minimum demand. As with the do-minimum demand, the background uplift in flow over time is applied in the AMAT workbook.

The uplifts are based on data in the DfT's Cycling and Walking Investment Strategy (CWIS) Active Travel Investment Models. These involve data from the evaluation of previous walking and cycling schemes, which were categorised as either flagship, traffic calming or network (**Table 3-1**). The average of the observed uplifts in the CWIS research for each category have been used in this appraisal. A sensitivity test has also been undertaken (see Section 3.12) wherein the uplift factors used by WSP to appraise other greenways with the wider GCP Greenways programme have been applied. This was found to return a similar level of benefit.

Table 3-1 - Uplift factor summary

Uplift category	Representing	Uplift factors in source (CWIS)		Mean uplift factor (applied to Greenways)	
		Walking	Cycling	Walking	Cycling
Flagship	Sections of high-quality active travel infrastructure, such as separated cycleways/footpaths.	Reading: 11% Sustrans: 47%	Reading: 14% Sustrans: 61%	29.0%	37.5%
Traffic calming	Reduced speed limits and new signage and may include speed bumps or chicanes	Edinburgh: 7% Portsmouth: 9%	Edinburgh: 5% Portsmouth: 8%	8.0%	6.5%
Network	Sections with no active travel provision of their own, but benefit from the higher level of cycling encouraged by quality infrastructure on sections around them	Range of observed uplifts for cycling and walking: 0.5% to 6%		2.3%	2.3%

Each count arm at each count location was allocated to one of the three uplift categories, according to the nature of the intervention appropriate to that arm. The corresponding uplift was then applied, producing the do-something volumes.

Two sections of the greenway did not follow this process to create do-something demand due to:

- The creation of a new route across the fields west of Harston, meaning a rerouting effect is expected here; and
- The current poor quality and condition of the Melbourn–Royston link supressing do-minimum demand here to near zero, making a scaling approach with such low growth factors unsuitable.

The new route across the fields west of Harston was therefore assigned a portion of the demand observed on the existing parallel A10 corridor through the village. The proportion was calculated by comparing the observed demand on the A10 link that passes through the A10/M11 junction to the demand on the parallel mixed-use path that crosses the M11 on a farm access bridge west of the junction. This comparison was used as, like the proposed new route across the fields west of Harston, the mixed-used path in this case is less direct than following the A10 but is more pleasant for active mode users.

This methodology determined that 67% of pedestrian demand currently on the A10 through Harston would reroute onto the new route across the fields west of Harston, along with 31% of cycle demand. This was on top of the existing small, mostly pedestrian, demand calculated using the standard CWIS derived do-something methodology from observations of the southern section of this route, which is an existing public footpath.

Although the Melbourn – Royston link currently has a segregated mixed-use path alongside the highway, its use presently requires pedestrians and cyclists to cross the A10 and the A505 at unsignalised crossings “at grade” at either end. In addition the current path is narrow and in poor condition, thus the proposals to widen and relocate the path, as well as providing a bridge over the A505 at Royston, are likely to be transformational. This transformational upgrade is expected to release significant suppressed demand for cycling (and to a lesser extent – given the distances involved – walking) on the Melbourn – Royston segment of the greenway. As such, the scaling approach was replaced entirely with a census and mode share derived approach.

Here 2011 Census journey to work data was used to assess the total number of commuters transiting the Melbourn – Royston link, regardless of mode. This amounted to 1,546 trips per day (sum of both directions). The assumption was then made that the walk and cycle mode shares achievable in the do-something on the Melbourn – Royston link would be similar to that for Sawston – Addenbrooke’s as per the 2011 Census, based on the quality of the infrastructure and the relative distances. It was found that:

- The walk mode share was 2%; and
- The cycle mode share was 42%.

Applying these mode shares to the 1,546 daily trips over the link (regardless of mode) yielded a do-something demand on this link of:

- 25 walk trips; and
- 649 cycle trips.

The do-minimum demand observed on this link for walk and cycle trips is part of this do-something demand, so is not added on top of it.

3.3.4. Estimation of key corridor flows

The count data and local knowledge were used to identify the main origin-destination walking and cycling flows along the corridor. The volume of each flow (in the baseline, DM and DS scenarios) was estimated by averaging the count data for relevant movements along the length of the flow. A typical or average trip distance was also estimated for each flow.

For simplicity, all flows passing over the new route across the fields west of Harston and the Melbourn–Royston link are assumed to be of the same type and to travel only between the settlements at either end of the respective links, as it is not possible to infer the do-something flow routings at these interventions.

These flows illustrate the main current active travel uses of the corridor, but also feed into the AMAT analysis described below.

Table 3-2 shows the walking flows that have been included in the AMAT appraisals. The largest flows are those within the villages.

Table 3-3 shows the cycling flows that have been included in the AMAT appraisals. Unlike walking, the largest flow is the radial flow between Hauxton or Harston and Cambridge, until the supressed demand on the Melbourn – Royston link is released in the do-something.

Table 3-2 – Main walking flows used in the AMATs

Flow ID	Flow Definition	Distance (km)	Basis of Measured Distance	Observed Flow	Annualised Flow	DS Flow
1	Cambridge - Hauxton/Harston	6.9	Cambridge Station - London Road	38	47	61
2	Intra-Hauxton	0.8	St Edmund's Church - London Road	23	29	35
3	Hauxton - Harston	2.0	St Edmund's Church - Station Road	18	22	26
4	Harston - Foxton Station	3.2	Baptist Church - Foxton Station	N/A	N/A	N/A
5	Intra-Foxton	0.8	Foxton Station - Foxton Village Hall	174	214	232
6	Foxton - Shepreth	2.4	Foxton Village Hall - Meldreth Road	9	11	11
7	Foxton/Shepreth - Melbourn	4.8	Foxton War Memorial - Melbourn Crossroads	48	60	61
8	Intra-Shepreth	0.3	Shepreth Station - Angle Lane	91	112	118
9	Intra-Melbourn / Melbourn - Meldreth	1.1	Meldreth Station - Melbourn Crossroads	438	541	585
10	Melbourn - Royston	5.0	Melbourn Crossroads - Royston Station	2	2	25
11	Hauxton - Harston via "New" Fields Path	3.0	St Edmund's Church - Station Road via Fields	17	21	90

Flow 4 does not pass over any of the interventions. *Source: Scenarios spreadsheet, 'flows' tab Annualised and DS flows represent opening year flows as input to the AMAT. AMAT then applies background growth to these.*

Table 3-3 – Main cycling flows used in the AMATs

Flow ID	Flow Definition	Distance (km)	Basis of Measured Distance	Observed Flow	Annualised Flow	DS Flow
1	Cambridge - Hauxton/Harston	6.9	Cambridge Station - London Road	185	229	314
2	Hauxton/Harston - Foxton Station	3.9	London Road - Foxton Station	N/A	N/A	N/A
3	Intra-Foxton	0.8	Foxton Station - Foxton Village Hall	4	5	5
4	Foxton - Melbourn	5.0	Foxton War Memorial - Melbourn Crossroads	5	6	6
5	Cambridge - Shepreth	10.9	Addenbrooke's - Angle Lane	6	7	7
6	Cambridge - Melbourn	14.0	Addenbrooke's Melbourn Crossroads	40	50	64
7	Melbourn - Meldreth	1.1	Melbourn Crossroads - Meldreth Station	36	44	47
8	Melbourn - Royston	5.0	Royston Station - Melbourn Crossroads	1	1	649
9	Hauxton/Harston - Foxton Station via "New" Fields Path	5.3	St Edmund's Church - Foxton Station via Fields	0	0	73

Flow 2 does not pass over any of the interventions. *Source: Scenarios spreadsheet, 'flows' tab Annualised and DS flows represent opening year flows as input to the AMAT. AMAT then applies background growth to these.*

3.4. Benefits estimated using the Active Mode Appraisal Toolkit (AMAT)

3.4.1. Overview

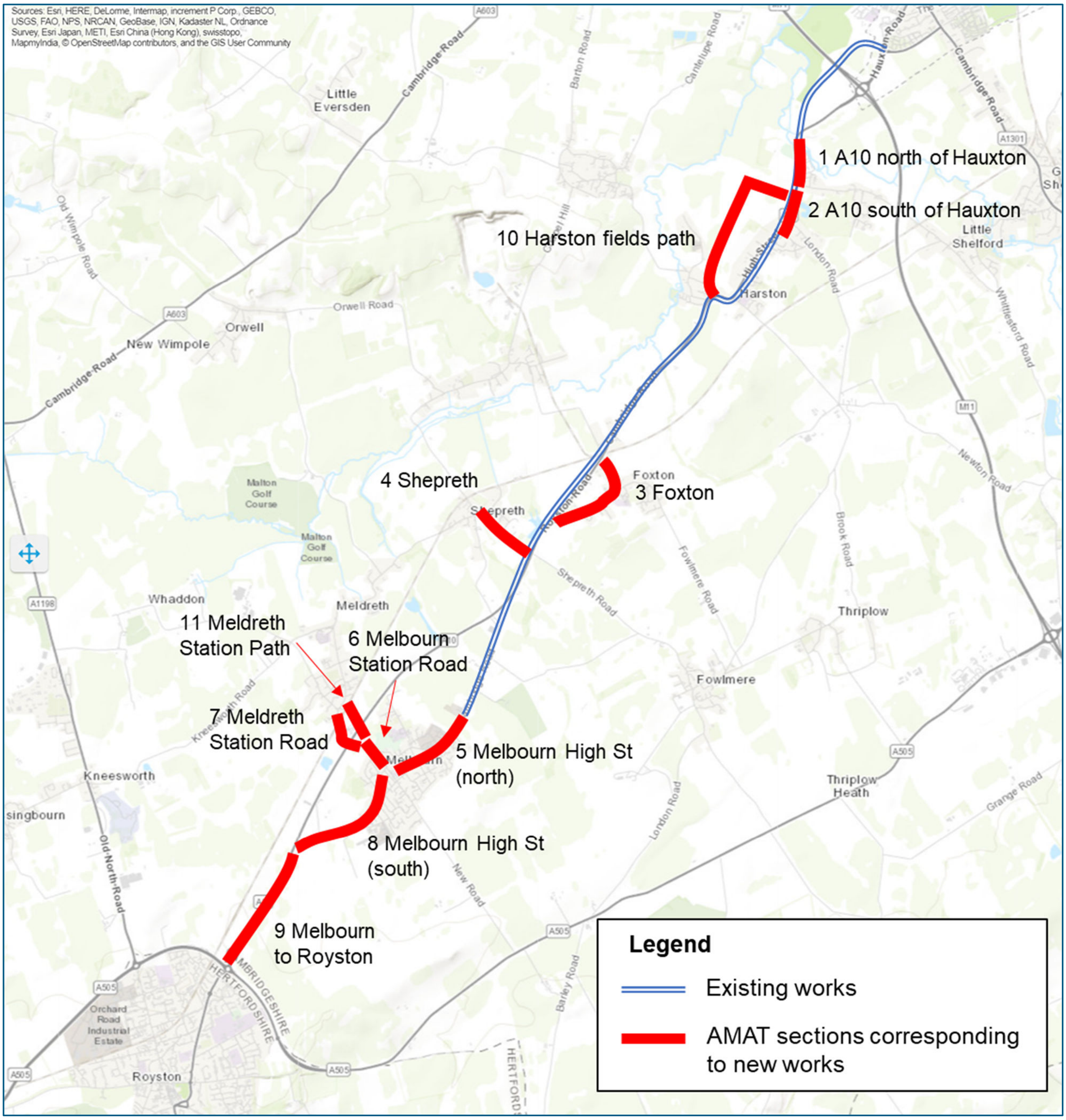
The DfT's Active Mode Appraisal Toolkit (AMAT) (November 2022 version) has been used to estimate most of the scheme's monetised benefits.

Journey quality benefits were assessed using separate AMAT workbooks for each key section of proposed intervention. Health and mode shift benefits were appraised separately in a corridor-wide AMAT workbook to avoid double-counting of individual users and trips. Costs were appraised separately from the AMATs to avoid the need to apply some inflation to the input values separately, as is the case in AMAT workbooks.

3.4.2. AMAT sections and their demand volumes (for journey quality benefits)

Figure 3-2 shows the Greenway corridor, the areas of intervention, and how these have been split onto individual AMAT sections.

Figure 3-2 - AMAT sections



For each section, the do-minimum and do-something cycling and walking volumes were estimated by averaging the relevant volumes at the count locations along that section. Table 3-2 summarises these, along with the intervention lengths and do-minimum demand to do-something demand (DM to DS) percentage increases.

The Foxton weighted average walking distance cell is highlighted yellow as the weighted average walking distance is less than the intervention length. This means, unusually, that the average trip over this intervention does not use the entire intervention.

The rows used as the input to the journey quality AMATs are highlighted grey for cycling and blue for walking.

Table 3-4 – Cycling and walking volumes in each AMAT section

Journey Quality AMAT Grouping Name		A10 North of Hauxton	A10 South of Hauxton	Foxton	Shepreth	Melbourn High St. North	Melbourn Station Road	Meldreth Station Road	Melbourn High St. South	Melbourn - Royston	Harston Fields Path	Meldreth Station Path
Journey Quality AMAT ID		1	2	3	4	5	6	7	8	9	10	11
Flow Sources: MCC IDs or other explanation		MCC39 - MCC40	MCC40 - MCC41	MCC49 - MCC50	MCC46, MCC47 & MCC51	MCC55	MCC53 & MCC55	MCC53	MCC55 & MCC57	MCC57 - MCC58	MCC43 & Prop. of MCC41 (DS Only)	MCC53
Length Parameters	Intervention Length (km)	0.7	0.5	1.5	1.1	0.8	0.6	0.5	0.8	2.5	1.7	0.8
	Weighted Ave. Cycle Dist. (km)	8.4	9.8	2.9	10.9	9.6	1.1	1.1	3.1	5.0	5.3	1.1
	Weighted Ave. Peds Dist. (km)	6.9	4.2	1.1	1.5	1.3	1.1	1.1	1.3	5.0	3.0	1.1
Observed Volume	Cycling	233	187	6	6	49	36	7	3	0	0	20
	Pedestrian	45	52	90	104	729	389	75	141	3	9	335
Cycling Volume	DM	287	231	7	7	60	44	8	3	0	0	25
	DS	395	317	7	7	64	47	9	3	649	73	35
Pedestrian Volume	DM	56	64	111	129	900	480	93	174	8	21	414
	DS	72	82	120	139	972	518	100	188	25	90	534
DM to DS Percentage Increase	Cycling	37.5%	37.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	*	*	37.5%
	Pedestrian	29.0%	29.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	*	*	29.0%

Source: Scenarios spreadsheet, 'AMAT' tab.

**The DM to DS increase for AMAT IDs 9 and 10 reflects bespoke demand estimates as described in the text. Percentage increase figures for these would not be meaningful in the same way as for the other AMT IDs.*

3.4.3. Trip distances

The default AMAT walking and cycling trip lengths were not used, as the November 2022 count data enabled local estimates to be made.

In the journey quality AMATs, the key flows relevant to that section were used to derive flow-weighted average walking and cycling trip distances for that section. These flow-weighted average trip lengths were used alongside the length of the intervention considered in the individual AMATs to determine the journey quality impacts following the standard AMAT methodology. Although the average trip distance itself is redundant in calculating the journey quality benefit, they were still input to the AMATs as they helped flag instances where the average trip length was less than the intervention length, meaning the proportion of an average trip using the intervention would differ – as was the case for walking trips in Foxton.

The health and mode shift AMAT used a single corridor-wide flow-weighted average trip length, based on all the key flows identified in the corridor as described in section 3.3.4. This method assumes, for simplicity, that each new pedestrian or cyclist appears on only one flow. The AMAT calculations for these benefits use the trip length and not the intervention length or the proportion of the trip using the intervention.

3.4.4. Infrastructure interventions

The AMAT cycling journey quality benefits are based on assigning the route section to one of AMAT's limited number of infrastructure categories for both current and proposed provision. **Table 3-5** shows the 'real world' current and proposed provision, and the AMAT categories to which the section has been assigned.

Table 3-5 – AMAT cycling infrastructure classifications

Ref	Journey quality AMAT name	Current infrastructure (actual)	Proposed infrastructure (actual)	AMAT category - current *	AMAT category - proposed *
1	A10 north of Hauxton	Mixed-use pavement	Wider mixed-use pavement	Off-road segregated cycle track	Off-road segregated cycle track
2	A10 south of Hauxton	Mixed-use pavement	Wider mixed-use pavement	Off-road segregated cycle track	Off-road segregated cycle track
3	Foxton	On road, 30mph	Quiet road, 20mph	No provision	Shared bus lane
4	Shepreth	On road, 30 or 60mph	On road, 30mph	No provision	No provision
5	Melbourn High St (north)	On road, 30mph	Quiet road, 20mph	No provision	Shared bus lane
6	Melbourn Station Road	On road, 30mph	Quiet road, 20mph	No provision	Shared bus lane
7	Meldreth Station Road	On road, 30mph	On road, 20 or 30mph	No provision	No provision
8	Melbourn High St (south)	On road, 30mph	Quiet road, 20mph	No provision	Shared bus lane
9	Melbourn to Royston	Mixed-use pavement	Wider mixed-use pavement	Off-road segregated cycle track	Off-road segregated cycle track
10	Harston fields path	No public right of way	Mixed-use path	No provision	Off-road segregated cycle track
11	Meldreth Station Path	Paved public footpath	Mixed-use path	No provision	Off-road segregated cycle track

** Note: the existing provision and the scheme proposals are shown in the 'actual' columns. The entries in the 'AMAT category' columns are purely technical parameters that are used to represent (and may be proxies for) levels of journey quality enhancement; they do not necessarily correspond to the actual nature of the current or proposed provision on the ground.*

The AMAT walking journey quality benefits are based on whether the route has, or is proposed to have, a range of infrastructure relevant to walking. The existing provision was identified from Google Street View and the proposed provision was identified from scheme drawings.

Certain measures, such as reduction in speed limits on roads, cannot be captured directly in the AMAT. However, the do-something growth uplifts used in this appraisal (described in section 3.3.3) reflect the overall level of measures. This means the impact of these measures is reflected in demand growth and hence the health and mode shift benefits as described below.

3.4.5. Estimation of health and mode shift benefits

As described in section 3.4.1, the health and mode shift benefits were estimated using a single corridor-wide AMAT workbook for this purpose.

As described in section 3.4.2, the sum of the cycling and walking volumes across all the flows shown in **Table 3-2** and **Table 3-3** represents the DM and DS 'headcounts' of people using the corridor. These headcounts form the DM and DS volumes for health and mode shift. The trip lengths are as described in section 3.4.3.

Table 3-6 shows the headcounts and their average weighted trip length. As AMAT health and mode shift benefit calculations do not require the proportion of a trip using the intervention, the intervention lengths can be ignored for this analysis. The do-minimum to do-something percentage increase in flow is also included for information.

Table 3-6 – Global corridor attributes for health and mode-shift benefits

Mode	Scenario	Volume	Ave. Trip Length (km)
Cycling	DM	342	6.2
	DS	1,167	
Pedestrian	DM	1,058	1.6
	DS	1,244	
DM to DS percentage increase	Cycling	241%	
	Walking	17%	

Source: Scenarios spreadsheet, 'flows' tab

3.4.6. Other AMAT parameters and costs

The AMAT default value of 253 relevant days per year (representing weekday but not weekend demand) was retained as no evidence was available to show weekend demand.

All other default AMAT parameters were retained.

Costs were appraised in a separate workbook following the DfT's TAG Unit A1-2 (Scheme Costs) guidance. This workbook was cross checked against an AMAT costs appraisal and found to return the same values for a given scheme, but avoided the need to apply some inflation to the input values separately, as is the case in AMAT workbooks. The cost factors used in this costs workbook were obtained from the November 2022 DfT TAG Data Book (v1.20.1) in line with the November 2022 AMAT workbook.

3.4.7. AMAT results

Table 3-7 shows the total benefits from all the AMATs, covering the entire length of the Greenway.

Table 3-7 – AMAT-based benefits

Category	£'000s (2010 prices and values)
Congestion	136.31
Infrastructure maintenance (counts towards PVC not PVB)	2.94
Accidents (reductions due to mode shift)	21.08
Local air quality	3.13
Noise	1.08
Greenhouse gases	35.43
Reduced risk of premature death	5535.51
Absenteeism	852.73
Journey ambience	321.03
Indirect taxation	-41.38
Private sector contributions (as a negative benefit to the private sector)	-83.94

3.5. Journey time benefits for existing users

The Greenway generally provides upgrades to the quality of existing infrastructure over much of its length, rather than providing additional connectivity with shorter routeings. Minimal journey time savings are therefore expected, and these have not been monetised.

Where additional connectivity is provided – for instance the new path across the fields west of Harston – this additional connectivity duplicates an existing route of similar length. Thus no significant journey time savings can be claimed.

3.6. Safety benefits

Safety benefits from mode-shift (due to reduced motor vehicle kilometres) are estimated through the AMAT as described above.

In addition to this, the scheme is expected to improve safety through the physical measures themselves making the route safer than it is today. This has been estimated by reviewing recent collision data along the route, identifying the collisions involving active travel users, and identifying those which may have been prevented by the scheme (had it been in place) (**Table 3-8**). These are then converted into annual equivalents, and the TAG valuations applied to them over the appraisal period. The estimated value of this safety benefit is £1.00m (present value).

Table 3-8 – Safety benefits from reduced collisions

	Fatal	Serious	Slight	Total
Total collisions along the route (2015-2019)	1	10	46	57
Of which, involving active travel users	0	5	13	18
Of which in areas where interventions are being made under Greenway Scheme	0	2	5	7
Of which, which may have been prevented by the scheme (2015-2019)	0	2	3	5
Annual equivalent	0	0.4	0.6	1

3.7. Social and distributional impacts

3.7.1. Social Impact Appraisal

3.7.1.1. Methodology

The Social Impact Appraisal was undertaken in accordance with requirements set out in Transport Appraisal Guidance (TAG) unit A4-1. A proportionate approach has been undertaken to deliver the social impact assessment. A qualitative assessment of each of the social impact indicators has been undertaken, supplemented by quantitative measures where appropriate.

3.7.1.2. Safety

The scheme intends to deliver a high-quality walking and cycling improvements and traffic calming along the corridor, both along sections of the A10 and through the villages. The scheme will create a safer and better-connected environment for walking, cycling and horse-riding and will encourage people away from private vehicles. These interventions are expected to contribute to reducing risk of collisions for all active mode and highway users (or at least maintain current level of risk). As a result, safety benefits are anticipated from the implementation of the scheme and, overall, it is expected that the impact of the scheme on safety and collisions will be **Moderate Beneficial**.

This is also supported by the monetised safety benefits. The safety benefits from the AMAT assessment are £21,080 in 2010 Present Value Benefit (PVB), and additional safety benefits will be monetised in the final version of this business case.

3.7.1.3. Physical Activity

In conclusion, the combined effect of improved pedestrian and cycle connectivity and a mode shift from car to active mode in the area would result in a small increase in active mode trips. As providing new sustainable transport infrastructure is an effective means of promoting an increase in active commuting, the overall impact assessment for Physical Activity has been appraised as **Moderate Beneficial**.

Physical activity benefits have also been monetised by the AMAT assessment, which found a 2010 PVBs of £852,730 from reduced absenteeism and £5,535,510 from reduced risk of premature death.

3.7.1.4. Security

At this stage of the scheme development, security measures have not been confirmed in detail. In accordance with the requirements of TAG unit 4-1, an indicative high-level assessment of key security indicators is shown below in Table 3-9.

Table 3-9 - Summary of security appraisal

Security Indicator	Relative Importance	Scheme Impact	Comments
Site perimeters, entrances and exits	Medium	Neutral	The scheme is not expected to have any material impact on site perimeter issues.
Formal surveillance	High	Slight beneficial	Changes to CCTV have not been confirmed as part of the scheme at this stage. However, proposals should incorporate good-quality street lighting and CCTV to improve safety and security of users.
Informal surveillance	Medium	Neutral	Information regarding informal surveillance is not available at this stage. However, it is not anticipated that the scheme will have a material impact on informal surveillance.
Landscaping	Medium	Neutral	Little/ no change to current landscaping which would impact on security.
Lighting and visibility	High	Slight beneficial	Good quality lighting will be provided in any locations where new pedestrian and cyclist routes are proposed or where better lighting is needed. A general lighting strategy is being considered at this stage.
Emergency call	Low	Neutral	There will be no changes to the provision of emergency phones as part of this scheme.

The overall assessment for security is considered to be **Neutral**. Care should be taken when considering the result of this assessment because the level of data available affecting security are limited at this stage.

3.7.1.5. Severance

There are currently gaps in crossing provision for pedestrians at key locations on the A10, and the existing crossing facilities are complex and dangerous. In general, connectivity by walking and cycling is limited in places. This has resulted in a perceived severance between communities and key amenities for travel by foot or by bike, despite many being in close proximity.

Based on the interventions proposed and given the existing conditions it is likely that the effect of the Melbourn Greenway on severance will be beneficial. Key reasons supporting this assessment are described below:

- Speed limit reductions in places including through the settlements of Harston, Foxton, Shepreth, and Melbourn.
- Traffic calming measures to encourage low speeds through the villages including junction tightening, vertical traffic calming such as road bumps, raised table uncontrolled crossing points, raised entry treatments and imprinted paved sections.
- Enhancements at existing crossings, as well as new pedestrian and cyclist crossings being introduced, including new toucan and zebra crossings, and uncontrolled and raised table crossings.
- Widening of existing shared use paths.
- Introduction of new shared use paths for cyclists and pedestrians, included but not limited to long stretches along the A10 (1.5km) and to the west of Harston (1.6km) as well as shorter shared use paths along other sections of the A10, and along local roads through villages.
- Enhancements to the existing bridleway close to Hauxton and improved verge for equestrian users, as well as new provision parallel to the shared use path west of Harston.
- Linkage with a potential NMU bridge over the A505 which would provide an active travel connection between Royston and Melbourn, and address severance issues between the two settlements.
- The improved cycle and pedestrian infrastructure, particularly the introduction of new crossings and the enhancement of existing crossings are expected to benefit residents in the area. Therefore, the overall severance impact of the scheme has been assessed as **Large Beneficial**.

3.7.1.6. Journey Quality

Journey quality is generally understood as the cumulative travelling experiences of the quality and ambience of a journey. As recognised in TAG unit A4-1, it represents a measure of the real and perceived physical and social environment experienced while travelling and includes factors such as perceptions of safety, information provision and comfort. Specifically, journey quality impacts can be sub-divided into three groups:

- Traveller care (cleanliness, level of facilities, information);
- Travellers' views (the view and pleasantness of external surroundings for the duration of the journey); and;
- Traveller stress (frustration, fear of accidents and route uncertainty).

Table 3-10 presents a high-level qualitative assessment of the scheme in respect to these sub-categories.

Table 3-10 - Journey quality assessment

Category	Impact assessment
Traveller care	The proposed interventions are expected to improve traveller care factors, resulting in a better user experience for active mode users. Examples of specific measures include the shared use paths and crossings, separated from carriageway for active travel users. It has been shown that providing segregated facilities has a particular strong positive effect in the user's perception. In the literature, results indicate that segregation is needed in order to achieve target levels of increased cycle use. Further to this, the greenway will widen existing paths and provide traffic calming measures, for example speed limit reductions, to create a safer environment for pedestrians and cyclists. All these measures are anticipated to contribute to an improved user experience.
Travellers' views	Journey quality is likely to be improved for pedestrians and cyclists using the network. The improvements are expected to deliver benefits to non-motorised users by enhancing pedestrian and cycling infrastructure and improving the connectivity along the corridor. More specifically, the quality and ambience of a journey is expected to be upgraded from

Category	Impact assessment
	the traveller's viewpoint by the active travel interventions. The connectivity will be improved through new and upgrades at existing crossing points benefitting the overall pleasantness of journey for users.
Traveller stress	The scheme will provide active mode users with greater route certainty through dedicated and safe crossings, segregated shared use paths, and a number of different traffic calming measures along the A10 and on local roads through the villages. It will provide active travel links with a number of transport hubs, rail stations and other trip attracting sites. Examples of specific measures include: • Speed limit reductions through villages; • Traffic calming measures to encourage low speeds through the villages including junction tightening, road bumps, raised table uncontrolled crossings, raised entry treatments and imprinted paved sections; • Introduction of new zebra and toucan crossings, as well as enhancement at existing crossings; • Widening of existing shared use paths and new shared use paths along the A10 and sections of local roads; and, • Enhancements to existing bridleway in Hauxton, plus new verge for equestrian users along the shared use path through the fields to the west of Harston.

The overall journey quality impact of the scheme has been assessed as **Moderate Beneficial**.

This beneficial assessment is supported by the AMAT assessment, which gives a journey ambience 2010 PVB of £321,030.

3.7.1.7. Option Values and Non-use Values

An option value is the benefit an individual receives from knowing a service exists should they need to use it. A non-use value stems from the knowledge that other people can use the service providing an altruistic benefit.

As indicated in the guidance (TAG unit A4-1), option values and non-use values relate to the implementation or withdrawal of a public transport service and should only be assessed if the scheme includes measures that will substantially change the availability of transport services within the study area.

As there are no changes to any public transport routes or services provided in the area, no significant impacts are anticipated on this regard. Therefore, **no further appraisal is required** for this indicator.

3.7.1.8. Accessibility

Most accessibility barriers relate more to public transport than they do to private vehicles. The provision of the new crossing facilities and enhancements at existing crossings may improve accessibility to bus stops along the corridor.

The greenway is expected to improve connectivity between the settlements along the corridor, and accessibility to local services and amenities. As discussed in the Strategic Case, the Melbourn Greenway will provide connections to key areas including Cambridge City Centre and rail station, the Melbourn Science Park, the proposed Foxton and Cambridge South West Travel Hubs and other key amenities along the route. The greenway will provide direct and safe walking and cycling options for those living in settlements along the Melbourn Greenway, encouraging active travel uptake.

The Melbourn Greenway will also connect with other greenways including the Hasingfield, Sawston, and Linton Greenways. The overall connectivity of the corridor, between settlements and into Cambridge, will be improved through the delivery of the Greenway.

Overall, improvements in accessibility are attributed to the improved walking and cycling access to key employment, transport and leisure sites along the route. Building on this analysis whilst taking into account that the scheme does not propose major improvements or changes to public transport provision or service in the area, the overall impact assessment for accessibility has been appraised as **Slight Beneficial**.

3.7.1.9. Personal Affordability

Monetary costs of travel can be a major barrier to mobility for certain groups of people, impacting their ability to access key destinations. Consideration of personal affordability issues should take place throughout the appraisal process in cases where the following changes occur:

- Parking charges
- Car fuel and non-fuel operating costs (where, for example, rerouting or changes in journey speeds and congestion occur resulting in changes in costs)
- Road user charges
- Public transport fare changes; and
- Public transport concession availability

The Melbourn Greenway provides options for modal shift away from private vehicles and public transport to walking and cycling, creating affordability benefits, as people will be able to shift away from other modes towards active travel. The greenway is expected to generate affordability benefits from reduced car fuel and non-fuel operating costs (fuel and non-fuel) as well as decreasing costs of travel (bus fares) for those switching from public transport, as a result introducing a new, direct and accessible walking and cycling route.

Based on the above, the overall impact assessment for personal affordability has been appraised as **Slight Beneficial**. This beneficial assessment is supported by the AMAT assessment, which gives decongestion benefit totalling £136,310.

3.7.2. Distributional Impact Appraisal

3.7.2.1. Methodology

Distributional impacts (DI) relate to the extent to which there are differences in the way impacts affect different groups in society. For example, the noise impacts of an intervention will affect different groups of households, with some experiencing increases, and others decreases.

This distributional impact appraisal was undertaken in accordance with the requirements set out in Transport Appraisal Guidance (TAG) unit A4-2 published by the Department of Transport (DfT). A proportionate three-step approach has been applied to undertake the analysis – see **Table 3-11**.

Table 3-11 - Overview of the DI process

Step		Description	Output
Screening	1	Identification of likely impacts for each indicator	Screening Results
Full appraisal	2	Assessment: • Confirmation of the area impacted by the transport intervention (impact area), • Identification of social groups in the impact area (such as transport users, people living in those areas affected by the scheme), • Identification of amenities in the impact area,	DIs social groups statistics and amenities affected within the impact area
	3	Appraisal of impacts: • Core analysis of the impacts (including providing an assessment score for each indicator based on a seven-point scale – large beneficial to large adverse).	Appraisal tables

Source: DfT (2020). TAG unit A4-2 Distributional Impact Appraisal.

The following DI appraisal will consider impacts to vulnerable groups living in proximity to the corridor; in this case a 1km assessment area has been defined as the scheme's impact area to capture characteristics of the local population. The socio-economic, social, and demographic characteristics of social groups in the impact area have been considered against the indicators. Supporting socio-demographic mapping for the study area has been included within Appendix A.

3.7.2.2. Accessibility

There will be some new crossings and upgrades to existing crossing facilities which could improve access to bus stops along the corridor and improve severance and accessibility. However, the scheme proposals are not expected to impact to the frequency, routings, or timings of current public transport services in a noticeable way.

As discussed previously, the scheme is expected to generate wider accessibility benefits for vulnerable groups in the local area, in terms of providing better walking and cycling access to services and amenities along the corridor.

Different social groups have different transport needs and priorities, and are particularly vulnerable to the effects of poor accessibility. These groups include children and elderly people, those with a disability, deprived households, and households without access to a private vehicle.

The scheme's 1km impact area has a slightly higher concentration of elderly people and children when compared to the national average. In terms of deprivation, the impact area is generally very affluent, with no households within income quintile 1, and likewise the proportion of disabled residents within the population is significantly lower than the national average. The proportion of households without access to a private car is over 25% of total households, significantly higher than the national average at just over 10%.

The vulnerable groups present in the area, in both the resident and day-time populations, are expected to benefit from the interventions proposed and experience improved access to local services and amenities.

Whilst there will be minimal to no impact to the frequency, routings, or timings of current public transport services, the greenway will create opportunities and benefits when it comes to accessibility to services in the local and wider area. As such the overall appraisal of safety is **Slight Beneficial**.

3.7.2.3. Safety

There was a total of 543 causalities from 454 collisions that occurred within the scheme impact area between 2016 and 2020. Notably, the rate of collisions involving cyclists is almost 30% greater than nationally at 41.1%. The rate of collisions involving pedestrians, motorcyclists, elderly people, and children is broadly in line with the national rate, whilst collisions involving young male drivers (between 16 and 24 years) is much higher than it is nationally at 9.4%.

There are no LSOAs captured within the impact area that are classified within the 20% most deprived LSOAs nationally.

The scheme proposes active travel improvements and measures that are expected to benefit the safety of users and vulnerable groups that either live or visit the local area, including the high concentrations of elderly people and children in proximity to the scheme. As such the overall appraisal of safety is **Moderate Beneficial**.

3.7.2.4. Air Quality

In the scheme's 1km impact area, the proportion of children is slightly higher than the national average. Children are particularly vulnerable to air quality issues, as are highly deprived households. The impact area is generally very affluent, with no households within income quintile 1 (20% most deprived LSOAs nationally).

The scheme intends to introduce a number of sustainable and active travel measures which will create a safer and better-connected environment for active mode uses and support all types of sustainable travel. Some of the measures are likely to benefit air quality, including traffic calming measures through the villages, alongside other interventions designed to create a continuous, high-quality and safer active travel network to encourage modal shift from private cars.

Whilst the impact on deprived households is considered neutral due to the lack of presence of income deprived households in the impact area, the high concentration of children in proximity to the scheme means the overall appraisal for air quality is considered **Slight Beneficial**.

3.7.2.5. Noise

The scheme's 1km impact area has a higher concentration of elderly people within it than the national average for England. The proportion of children is mostly in line with the national average. Older people and children are particularly vulnerable to noise, as are more deprived households. The impact area is generally relatively affluent, with no households within income quintile 1 (20% most deprived LSOAs nationally).

The scheme intends to introduce a number of sustainable and active travel measures which will create a safer and better-connected environment for active mode uses and support all types of sustainable travel. Some of the measures are likely to benefit noise, including traffic calming measures through the villages, alongside other interventions designed to create a continuous, high-quality, and safer active travel network to encourage modal shift from private cars.

Whilst the impact on deprived households is considered neutral, due to the lack of presence of income deprived households in the impact area, the higher concentration of children and elderly people in proximity to the scheme means the overall appraisal for noise is considered **Slight Beneficial**.

3.7.2.6. Personal Affordability

As discussed in the Social Impacts section, the Melbourn Greenway provides opportunity for modal shift away from private vehicles and public transport to walking and cycling, creating affordability benefits in the form of reduced car fuel and non-fuel operating costs (fuel and non-fuel) as well as decreasing costs of travel (bus fares).

Personal affordability has been assessed qualitatively based on the distribution of population per income group, with the primary group of interest in this case being people on low incomes. Income quintile 1 has no presence across the assessment area and therefore will receive no affordability benefits/disbenefits from the scheme, as such these have been appraised as neutral. The other four quintiles receive net benefits overall as the scheme is expected to instigate some mode shift from car to cycling and walking, as more people choose to walk or cycle rather than drive. The distribution of benefits is indicative only and is solely proportional to the overall distribution of population. It demonstrates the distribution of benefits for the scheme to be assessed as **Slight Beneficial**.

3.7.2.7. Security

There are no significant planned changes to public transport waiting/interchange services as part of this scheme. Similarly, there are no significant changes to pedestrian access beyond new and improved crossings being delivered at various locations. However, the proposed greenway is assumed to have a positive impact the level of security for transport users to a certain level.

The scheme will provide enhancements to lighting, visibility, and CCTV in areas where lighting is not currently of good quality. Locations where enhancements might be required have not been confirmed or proposed at this stage.

Based on available information at this stage, a security assessment based on the design element was undertaken as part of the Social Impacts Appraisal (see Section 3.7.1.4). At this stage in the assessment, it is not known how vulnerable groups in terms of security (children, older people, people with a disability and BME) will be impacted. The DI security impacts have not been appraised in this section.

3.7.2.8. Severance

The scheme has been assessed as **Moderate Beneficial** for this DI appraisal of severance. There are high concentrations of vulnerable groups in the impact area (particularly elderly residents and no car households), and it is expected they will benefit from the interventions proposed including new crossing points, segregated shared use routes and traffic calming in locations along the corridor, and hence experience a reduction in both actual and perceived severance.

3.7.2.9. User Benefits

In line with the personal affordability assessment, user benefits have been assessed qualitatively based on the distribution of population per income group. Income quintile 1 has no presence across the assessment area and therefore will receive no benefits/disbenefits from the scheme, as such these have been appraised as neutral. The other four quintiles receive net benefits overall as the scheme is expected to instigate some mode shift from car to cycling and walking, as more people choose to walk or cycle rather than drive. The distribution of benefits is indicative only and is solely proportional to the overall distribution of population. It demonstrates the distribution of benefits for the scheme to be assessed as **Slight Beneficial**. A slight beneficial assessment is expected in the absence of a monetary value for overall user benefits. This should be considered a conservative approach and is based on a hypothetical distribution of user benefits.

3.7.3. Summary of Findings

A summary of findings for the Social Impact Appraisal (**Table 3-12**) and Distributional Impact Appraisal (**Table 3-13**) is outlined below. This provides a final assessment for each indicator as a result of the scheme.

Table 3-12 - Summary of findings from the Social Impact Appraisal

Social Impact Appraisal indicators	The Melbourn Greenway scheme
Safety	Moderate Beneficial
Physical Activity	Moderate Beneficial
Security	Neutral
Severance	Large Beneficial
Journey Quality	Moderate beneficial
Option Values and Non-use Values	No assessment required
Accessibility	Slight Beneficial
Personal Affordability	Slight Beneficial

Table 3-13 - Summary of findings from the Distributional Impact Appraisal

Distributional Impact Appraisal indicators	The Melbourn Greenway scheme
Safety	Moderate Beneficial
Noise	Slight Beneficial
Air Quality	Slight Beneficial
Security	No assessment required
Severance	Moderate Beneficial
Accessibility	Slight Beneficial
User Benefits	Slight Beneficial
Personal Affordability	Slight Beneficial

3.8. Other environmental impacts

The scheme is expected to produce mode shift from motorised to active modes, and hence a reduction in motorised vehicle-kilometres. This in turn results in reduced noise, improved local air quality and reduced greenhouse gas impacts (carbon emissions). The monetised benefits from these have been reported in **Table 3-7** above.

Other environmental impacts are assessed qualitatively. These assessments are in progress and will be reported in a future update to the business case.

Table 3-14 – Environmental impacts

Impact	Assessment
Noise	See AMAT results
Local air quality	See AMAT results
Greenhouse gases	See AMAT results
Landscape	Assessment in progress – to be reported in final business case
Townscape	Assessment in progress – to be reported in final business case
Historic environment	Assessment in progress – to be reported in final business case
Biodiversity	Assessment in progress – to be reported in final business case
Water environment	Assessment in progress – to be reported in final business case

3.9. Other qualitative assessments

In addition to the benefits covered in the sections above, some other potential benefits of the greenway schemes have been identified. These are assessed, for this greenway, as follows:

- **Capacity:** Existing shared paths will be widened to at least 3m where possible, allowing a higher capacity of users. New shared paths will also be built to this width. This does not include the width of any verges for equestrian users. A 4m wide path with segregated walk and cycle markings may be required in vicinity of the A505 Bridge at Royston should that structure be forthcoming.
- **Ability to unlock growth:** The greenway is not, in itself, anticipated as 'unlocking' any individual growth sites. However, it should be seen as part of the overall package of transport measures necessary to deliver sustainable growth in Greater Cambridge, particularly at Melbourn Science Park, as described in the strategic case within the POC.
- **Ease of interchange with public transport:** The greenway directly improves active travel access to Foxton, Shepreth and Meldreth stations from the villages they serve along the corridor. It also improves active travel access from the corridor to Cambridge station and the future Cambridge South station, via the existing guided busway cycle path. The greenway also connects with the existing Trumpington park-and-ride and the proposed Cambridge South-West Travel Hub and Foxton Rural Travel Hub.

3.10. Costs

The scheme capital costs, and what they include, are described in the financial case. These have been converted to present value costs (PVC) for use in economic appraisal, in accordance with the guidance in TAG unit A1-2.

It is assumed that all costs will be incurred as per the latest draft programme (January 2023) between the 2023/24 year and the 2025/26 year as the scheme is designed and constructed. Real cost inflation of 2.1% per year between the base cost year and the year in which the design and construction costs are incurred has been applied in accordance with TAG unit A1-2. Although TAG unit A1-2 recommends an optimising bias uplift of 23% is applied to the base cost for active mode schemes at the OBC stage, the costs team have indicated that, in this instance, the uncertainty surrounding the costs made an optimism bias uplift of 46% more appropriate. This is in accordance with a typical scheme at SOBC level according to TAG unit A1-2.

The costs have been converted to market prices, deflated and discounted to represent 2010 prices and values. **Table 3-15** shows the PVC for the capital costs.

Table 3-15 – Present value of capital costs

Element	Value
Base cost (2022 prices)	£9.11m
Real cost inflation to years costs incurred	2.1% annually
Base cost (years costs incurred prices)	£9.58m
Optimism bias uplift	46%
Base + OB cost (years costs incurred prices)	£13.98m
Deflated to 2010 prices	£10.85m
Discounted to 2010 values	£6.61m
Market price conversion factor	1.19
Present value of costs	£7.86m

Operational and maintenance costs are not yet confirmed and have not yet been incorporated in the PVC. It is not expected that major renewal will be required for interventions with bound surfaces, which make up most of the interventions for the Melbourn Greenway, within the 20-year appraisal period.

Infrastructure maintenance cost savings on the wider highway network, as estimated by the AMATs, also count towards the PVC.

Additionally, private sector contributions totalling £83.9k in 2010 prices are expected towards this project. These are not included in **Table 3-15**.

3.11. Appraisal results (core scenario)

Table 3-16 summarises the monetised benefits and costs described above, and shows the net present value (NPV) and benefit-cost ratio (BCR). Note the private sector contributions appear both as a negative benefit, due to it being a negative benefit to the private sector, as well as a negative cost, as it is a reduction to the costs incurred by GCP.

Table 3-16 – Summary of monetised benefits, costs and BCR (core scenario)

Category	£'000s (2010 prices and values)
Benefits	
Congestion	136.31
Safety benefits – from mode shift (AMAT)	21.08
Safety benefits – from collisions addressed	999.60
Local air quality	3.13
Noise	1.08
Greenhouse gases	35.43
Reduced risk of premature death	5,535.51
Absenteeism	852.73
Journey ambience	321.03
Indirect taxation	-41.38
Private sector contributions (as a negative benefit to the private sector)	-83.94
Present value of benefits (PVB)	**7,780.60**
Costs	
Infrastructure maintenance saving (negative cost – from AMAT)	-2.94
Investment costs	7,866.96
Operating costs	0.00
Private sector contributions (as a negative cost to GCP)	-83.94
Present value of costs (PVC)	**7,780.08**
Net present value (NPV)	**0.51**
Benefit-cost ratio (BCR)	**1.00**

Appendix B provides the Public Accounts (PA) and Analysis of Monetised Costs and Benefits (AMCB) tables. The Transport Economic Efficiency (TEE) has not been included as the user benefits were estimated using the DfT's AMAT congestion benefit which does not split the benefits by commuter, business and leisure users.

Appendix C provides the Appraisal Summary Table (AST).

3.12. Sensitivity tests

Sensitivity tests have been carried out to demonstrate the sensitivity of the appraisal results to a range of changes to the inputs.

The sensitivity tests undertaken were:

- A – WSP uplift factors;
- B – Higher background growth;
- C – Melbourn Science Park additional growth;
- D – 20% cost increase;
- E – No transformational Melbourn – Royston effect;
- F – 30-year appraisal period; and
- G – 50% reduction in collision benefit.

In Sensitivity Test A, the pedestrian and cycling uplifts were as used by WSP on some of the other Greenways, namely 10% for walking and 25% for cycling. These uplifts rates were applied evenly across all count data regardless of upgrade type.

In Sensitivity Test B, the background growth used for was 1.30% annually, in comparison to the 0.75% AMAT default. This was derived from the CSRM2 GCP High Growth land use assumptions, as used in the GCP busway corridors CSRM2 modelling.

In Sensitivity Test C, further development at Melbourn Science Park, currently in the early stages of planning, is assumed to be delivered in the 20-year appraisal period. The additional uplift this has on the Melbourn – Royston link is the primary change in this test.

In Sensitivity Test D, the costs (excluding developer contributions) are increased by 20%.

In Sensitivity Test E, it is assumed that the expected transformational increase in flows on the Melbourn – Royston link does not occur, even when the link is upgraded (including the A505 bridge). This test leaves the do-something uplift for this section of the greenway as per the CWIS-derived methodology detailed in Table 3-1, rather than using the bespoke demand methodology detailed in Section 3.3.3.

In Sensitivity Test F, a 30-year appraisal period is used instead of a 20-year appraisal period. For simplicity, this test assumes that no renewals are required in this extended appraisal period.

In Sensitivity Test G, the collision benefit is reduced by 50%.

Table 3-17 shows the results of these sensitivity tests alongside the Core scenario using 2010 prices and values.

Table 3-17 - Sensitivity tests

Test ID	Test name	PVB £m	PVC £m	NPV £m	BCR
Core	Core	7.78	7.78	0.00	1.00
A	WSP uplift factors	7.75	7.78	-0.03	1.00
B	Higher background growth	8.17	7.86	0.39	1.05
C	Melbourn Science Park additional growth	8.93	7.78	1.15	1.15
D	20% cost increase	7.78	9.35	-1.57	0.83
E	No transformational Melbourn – Royston effect	3.22	7.78	-4.65	0.41
F	30-year appraisal period	11.12	7.78	3.25	1.41
G	50% reduction in collision benefit	7.28	7.78	-0.50	0.94

3.13. Value for money statement

The core scenario BCR represents borderline poor/low value for money (VfM) in terms of the VfM categories set out in DfT guidance. This should be seen in the context of the inevitable approximations and limitations when appraising schemes such as this one. The sensitivity tests show the BCR either remaining around the poor/low VfM category border, falling into the poor VfM category or rising into the low VfM category, with a range of different input assumptions on the costs or the benefits being used.

The BCR alone is not a complete measure of VfM. Non-monetised impacts, differential impacts and the extent to which the scheme meets local and national strategic objectives are also factors but are not captured in the BCR.

The assessment of non-monetised impacts has shown a number of positive impacts to severance, user benefits, and security. The assessment of differential impacts has shown that the scheme has particular benefits to certain disadvantaged or vulnerable groups, particularly those most reliant on walking or cycling. These groups include children and elderly people, of which the population around the Melbourn Greenway corridor includes a proportion above national average.

The strategic case within the POC has set out the wider policy objectives and transport strategy, and how the Greenways programme supports these. The appraisal results indicate that this Greenway is in line with those objectives, even if its individual contribution is modest. Furthermore, although the appraisal considers the Greenway as a standalone scheme, it can also be seen as part of the broader programme of Greenways and other measures that may together offer broader synergies towards achieving those objectives.

4. Financial case

4.1. Introduction

The financial case sets out the scheme's affordability, funding arrangements and any technical accounting issues.

The outline budgets for each Greenway, and the overall programme funding arrangements, are set out in the POC. The scheme-specific OBCs therefore cover only the following:

- Scheme costs
- Any scheme-specific differences from the generic position given in the POC – eg if a scheme has developer contributions

4.2. Scheme costs

The scheme costs were estimated by Faithful & Guild based on the concept designs. The following allowances and exclusions have been made:

- VAT has been excluded.
- Contaminated material assumed not present.
- Client direct costs including management and finance excluded.
- Land purchase, leasing and compensation excluded.
- Sunk Costs excluded.
- Allowances have been assumed as 7% (contractor overhead and profit (OHP)), 2% (insurance), 15% (design), 20% (contingency) and 7.5% (client supervision).
- Q4 2022 prices.

Table 4-1 summarises the cost estimate. The A505 bridge has not yet been costed in its own right, so an allowance of £2.5m (base cost) has been included in the overall total. For clarity, this is split out so that the costs excluding that element of the scheme can be seen.

The estimated total cost in Q4 2022 prices, including the A505 bridge, is £15.11 million. The outturn, allowing for inflation to the date of construction, is forecast to be higher as set out in **Table 4-1**. This can be compared to the £6.50m budget value for the scheme previously set out in the POC.

Additionally, private sector contributions totalling £83.9k in 2010 prices are expected towards this project from Melbourn Science Park and a proposed office development in Foxton.

Operation and maintenance costs have not yet been estimated.

Table 4-1 – Scheme costs (£'000s, Q4 2022 prices)

Item	Scheme excluding A505 bridge	A505 bridge (allowance)	Total including bridge
100 Prelims	988.70	0.00	988.70
200 Site clearance	166.43	0.00	166.43
300 Fencing	0.00	0.00	0.00
400 Road restraint systems	0.00	0.00	0.00
500 Drainage	157.50	0.00	157.50
600 Earthworks	972.84	0.00	972.84
700 Paving	250.08	0.00	250.08
1100 Kerbs, footways and paved areas	865.79	0.00	865.79
1200 Traffic signs and road markings	388.65	0.00	388.65
1300 Road lighting columns and brackets	0.00	0.00	0.00
1400 Electrical work for road lighting and traffic signs	0.00	0.00	0.00
1700 Structural concrete	0.00	2,500.00	2,500.00
2400 Brickwork and blockwork	0.00	0.00	0.00
3000 Landscaping and ecology	80.91	0.00	80.91
Night working	140.29	0.00	140.29
Stats	605.20	0.00	605.20
Traffic management	327.12	0.00	327.12
OHP	346.05	0.00	346.05
Insurance	105.79	0.00	105.79
Design team	809.30	0.00	809.30
Site supervision	404.65	0.00	404.65
Subtotal - base cost (Q4 2022 prices)	**6,609.29**	**2,500.00**	**9,109.29**
Contingency	1,240.93	0.00	1,240.93
Optimism bias @46%	3,611.10	1,150.00	4,761.10
Total cost (Q4 2022 prices)	**11,461.31**	**3,650.00**	**15,111.31**
Inflation to 2Q24 (BCIS TPI 378)	247.81	78.92	326.73
Inflation to 2Q25 (BCIS TPI 388)	557.58	177.57	735.14
Inflation to 2Q26 (BCIS TPI 399)	898.32	286.08	1,184.40

Note: The Optimism bias line item for financial case purposes is a further contingency allowance, and does not necessarily correspond to the Optimism Bias used in the economic case.

4.3. Any scheme-specific differences from the generic position

No scheme-specific differences from the generic position set out in the POC have been identified.

5. Commercial case

5.1. Introduction

The commercial case sets out the commercial viability of the proposal and the procurement strategy that will be used.

The POC set out the procurement approach for the Greenways programme. The scheme-specific OBCs therefore only cover any scheme-specific differences from the generic position given in the POC.

5.2. Scheme-specific differences

None have been identified for this scheme.

6. Management case

6.1. Introduction

The management case assesses whether a proposal is deliverable. It tests the proposal's planning, governance structure, risk management, communications and stakeholder management, benefits realisation, and assurance.

Most of the management case is common to the whole programme and is set out in the POC. The scheme-specific OBCs therefore only cover any scheme-specific differences from the generic position given in the POC – for example, involving land agreements, risk profile, the consents strategy, or future ownership of the infrastructure.

6.2. Scheme-specific risks

The main risks for the Greenways programme as a whole were set out in the POC. The main risks specific to this particular scheme are:

- Any design elements that include elevation to ground levels at Fowlmere Road in Shrepreth will require further flood risk work.
- Any works to watercourse crossings (including OW crossing under A10, A10 crossing over the River Granta and Station Road crossing of the River Mel) may require additional work from the water and flood risk teams. Current design assumes no alterations to watercourse crossings. If this changes further work may be required.
- Large sections of route run alongside existing hedgerow. With seasonal growth this may reduce the effective width of the proposals leading to increased conflict between users. This is being addressed in the design process.
- Existing oil pipeline markers on A10 identified on site south of junction with Royston Road.
- Overhead lines cross the location of the southern end of the A505 bridge.
- Construction and ground investigation access to either side of the A505 bridge is constrained – on the north side by a steep slope and on the south side through a residential area.
- Promotion of footpath link to Meldreth Station prior to accessibility upgrades to footbridge could mislead people with mobility disabilities to an inaccessible point in the route.

6.3. Consents

A Planning and Consents Strategy is being developed for the Greenway, setting out the optimal planning and consents approach for each individual section.

The key scheme-specific consents issue for this Greenway relates to sections that require third party land consents and TROs. Additionally, the Greenway will cross Public Rights of Way (PRoW) which will need the appropriate strategy.

Appendix A. Socio-demographic mapping

The figures in this Appendix support the analysis presented in the Social and Distributional Impacts Section 3.7. They show each of the vulnerable groups identified for the impact area, including the elderly people (over 70 years old), children (under 16 years old) and DLA claimants. Further income indicators have also been identified for the local population, including households with no car or van and income deprivation.

Figure A-1 - Children (aged 16 and under) population - Highest 20% Output Areas (OAs) nationally

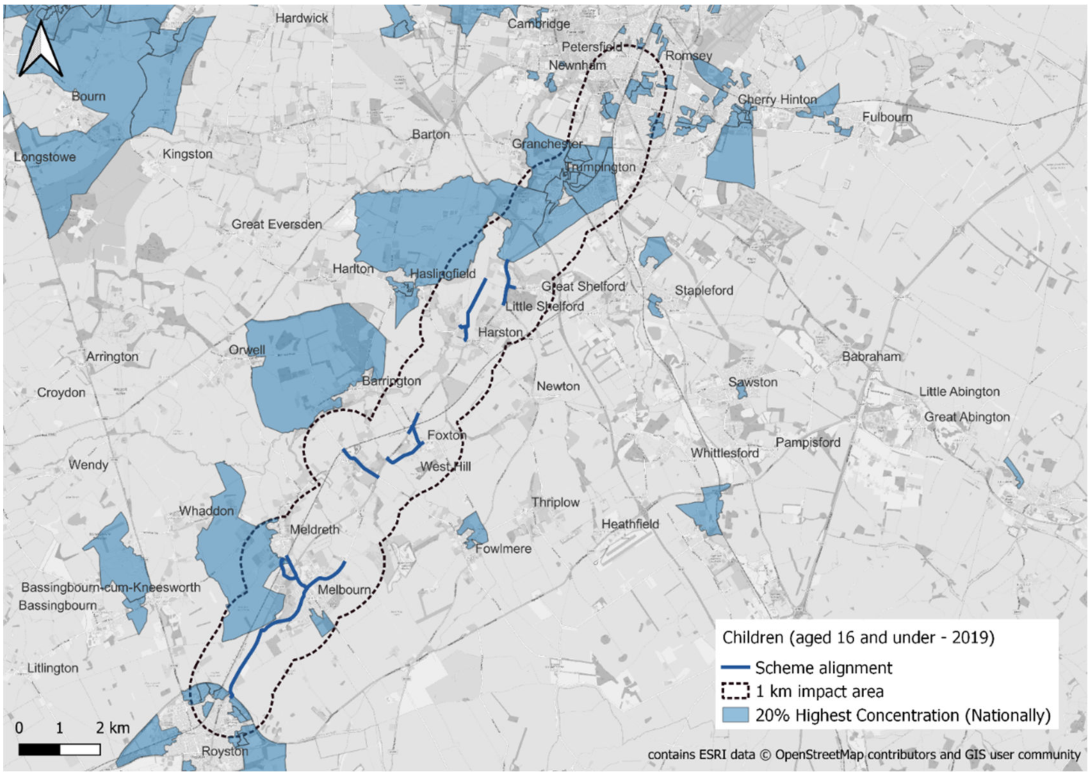


Figure A-2 - Older people (aged 70 and over) population - Highest 20% Output Areas (OAs) nationally

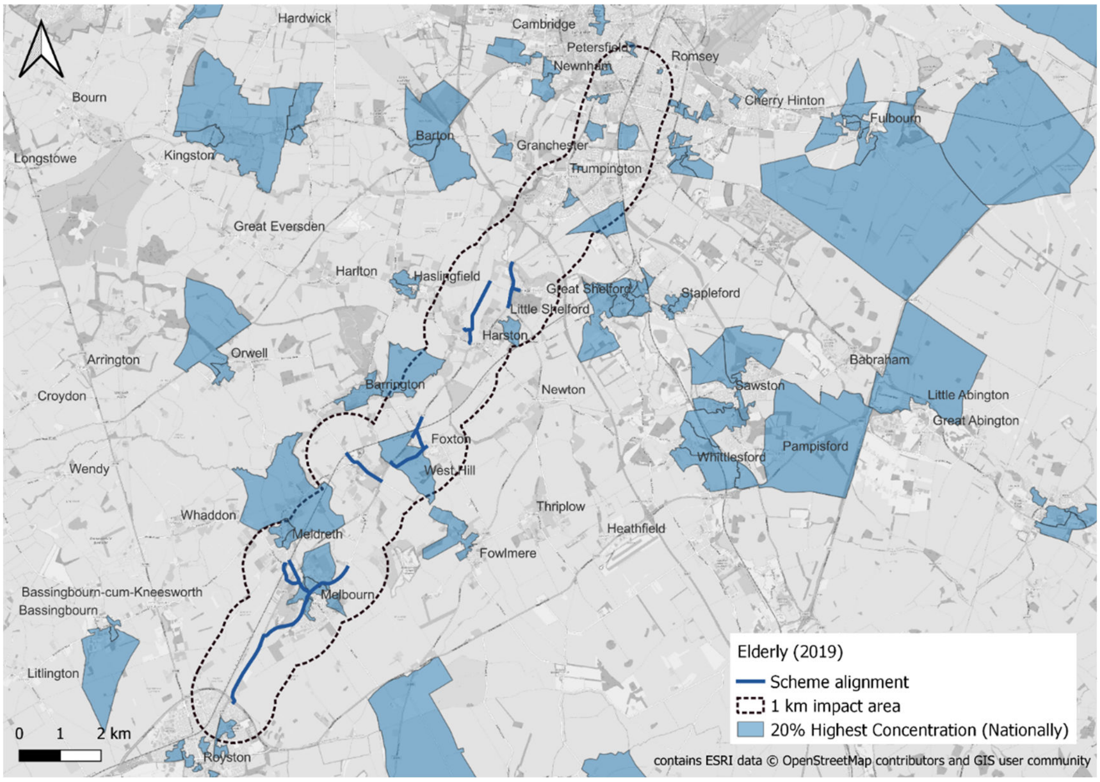


Figure A-3 - DLA Claimants - Highest 20% Lower Super Output Areas (LSOAs) nationally

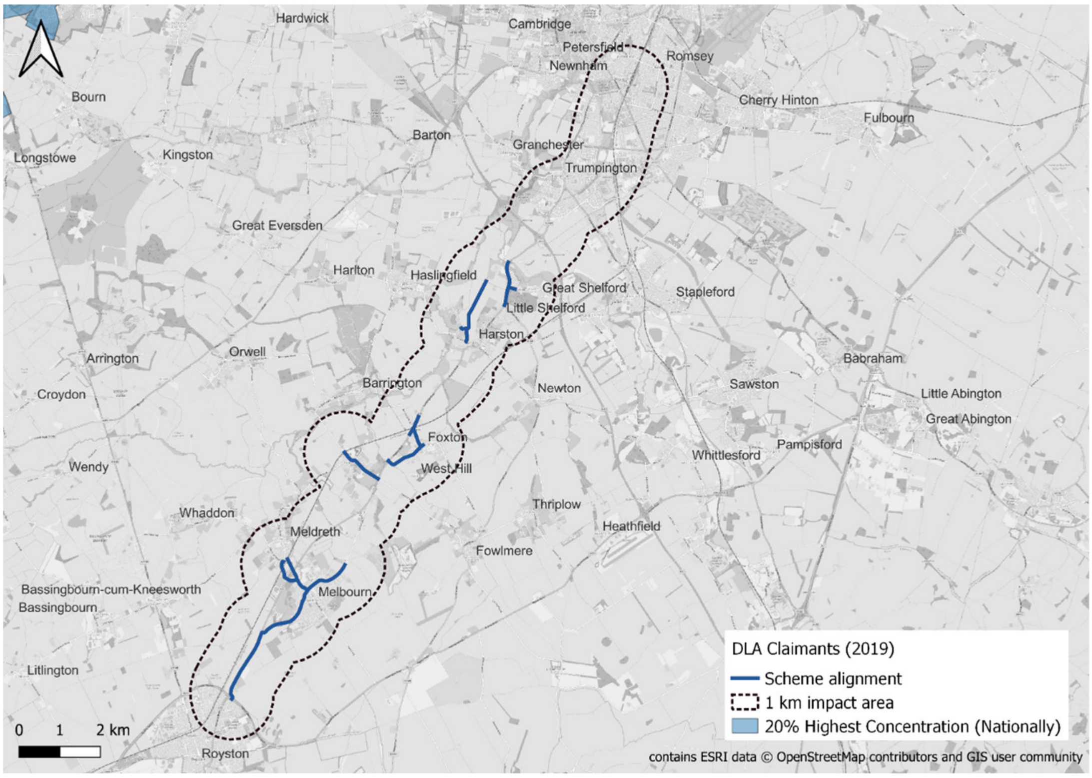


Figure A-4 - Households with no car/van – Highest 20% Output Areas (OAs) nationally

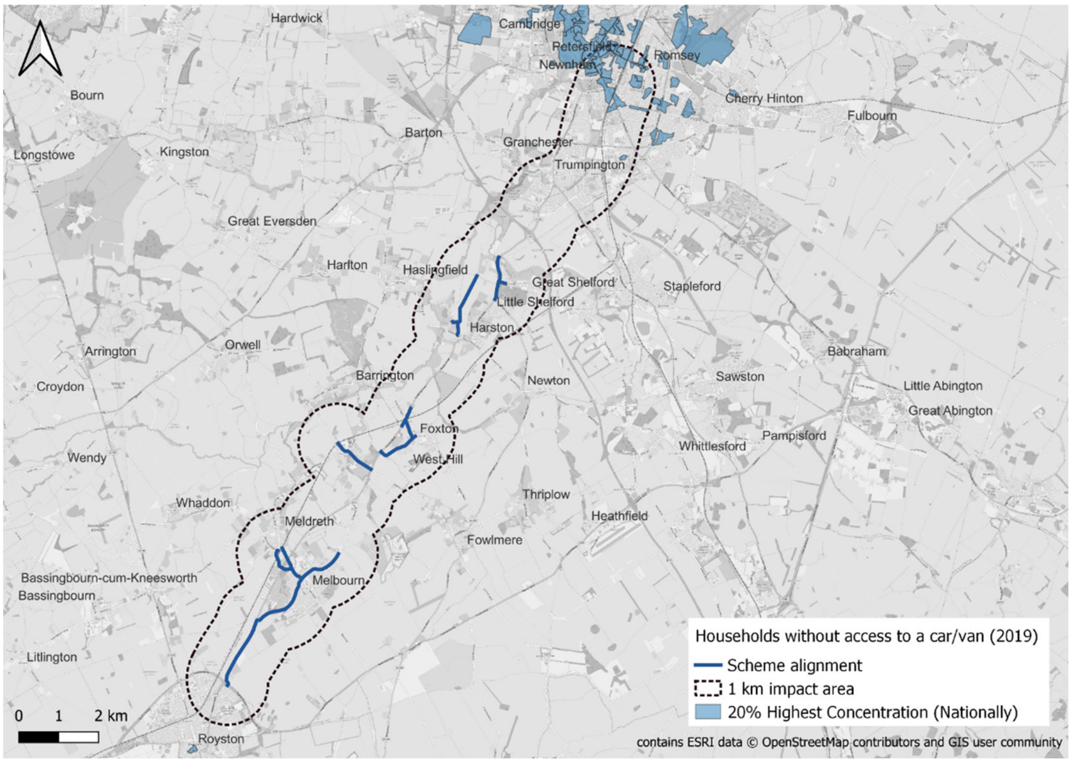
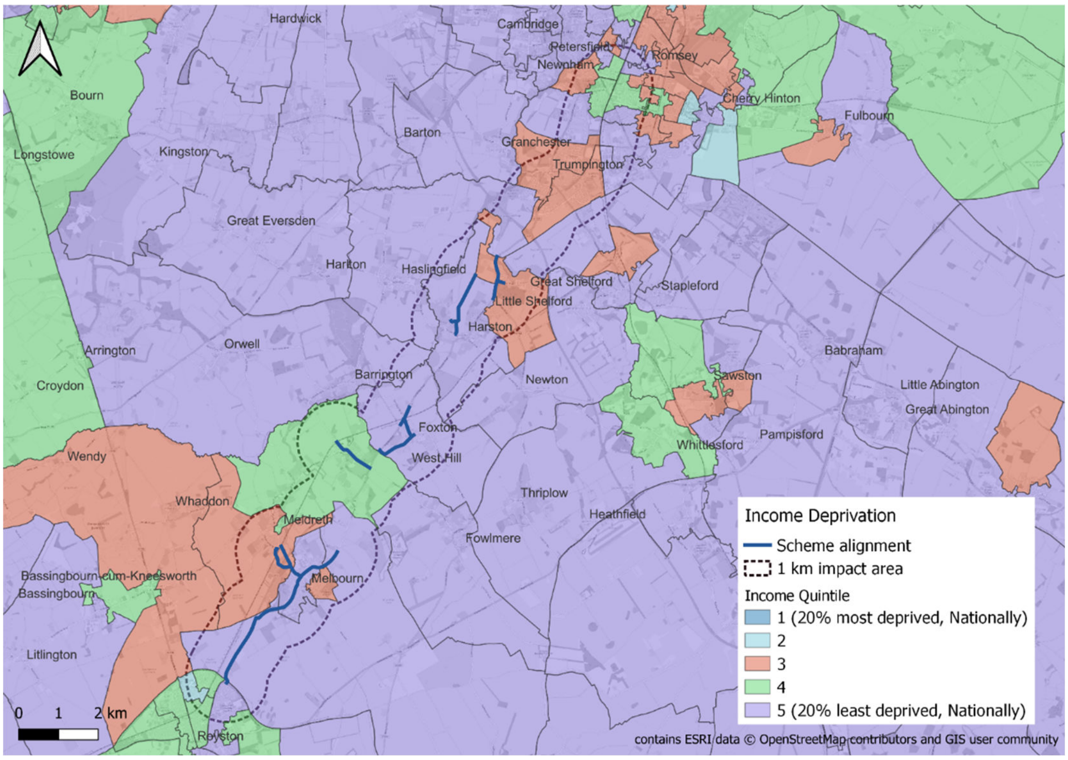


Figure A-5 - Income Deprivation (LSOAs)



Appendix B. PA and AMCB tables

The Transport Economic Efficiency (TEE) able has not been included as the user benefits were estimated using the DfT's AMAT tool which does not split the benefits by commuter, business and other users.

Public Accounts (PA) Table - Melbourn Greenway						
	ALL MODES		ROAD	BUS and COACH	RAIL	OTHER
Local Government Funding	TOTAL		INFRASTRUCTURE			
Revenue	0					
Operating Costs	-2,940		-2,940			
Investment Costs	0					
Developer and Other Contributions	0					
Grant/Subsidy Payments	0					
NET IMPACT	-2,940	*(7)*				
Central Government Funding: Transport						
Revenue	0					
Operating costs	0					
Investment Costs	7,866,960		7,866,960			
Developer and Other Contributions	-83,940		-83,940			
Grant/Subsidy Payments	0					
NET IMPACT	7,783,020	*(8)*				
Central Government Funding: Non-Transport						
Indirect Tax Revenues	-41,380	*(9)*				
TOTALS						
Broad Transport Budget	7,780,080	*(10) = (7) + (8)*				
Wider Public Finances	-41,380	*(11) = (9)*				

Notes: Costs appear as positive numbers, while revenues and 'Developer and Other Contributions' appear as negative numbers.

All entries are discounted present values in 2010 prices and values.

Analysis of Monetised Costs and Benefits (AMCB) Table - Melbourn Greenway

Noise	1,080	*(12)*
Local Air Quality	3,130	*(13)*
Greenhouse Gases	35,430	*(14)*
Journey Quality	321,030	*(15)*
Physical Activity	6,388,240	*(16)*
Accidents	1,020,680	*(17)*
Economic Efficiency: Consumer Users (All Users)	136,310	*(1a + 1b + 5)*
Private sector contributions (as a negative benefit)	-83,940	
Wider Public Finances (Indirect Taxation Revenues)	41,380	*- (11) - sign changed from PA table, as PA table represents costs, not benefits*
Present Value of Benefits (see notes) (PVB)	7,780,580	*(PVB) = (12) + (13) + (14) + (15) + (16) + (17) + (1a) + (1b) + (5) - (11)*
Broad Transport Budget	7,780,080	*(10)*
Present Value of Costs (see notes) (PVC)	7,780,080	*(PVC) = (10)*
OVERALL IMPACTS		
Net Present Value (NPV)	500	NPV=PVB-PVC
Benefit to Cost Ratio (BCR)	1.00	BCR=PVB/PVC

Note : This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

Appendix C. Appraisal Summary Table (AST)

Appraisal Summary Table

Date produced:	17	2	2023

Contact:	
Name	Thomas Fitzpatrick
Organisation	GCP
Role	Promoter/Official

Name of scheme:	Melbourn Greenways
Description of scheme:	Melbourn Greenway is one the twelve Greater Cambridge Greenways that aim to make journeys easier, cheaper, healthier, greener and pleasant into and out of Cambridge as well as to enjoy the countryside for leisure purposes. Melbourn Greenway provides improvements to walking and cycling facilities along the A10 corridor between Royston

Impacts		Summary of key impacts	Assessment: Quantitative	Assessment: Qualitative	Assessment: Monetary £(NPV)	Assessment: Distributional 7-pt scale/ vulnerable
Economy	Business users & transport providers	The scheme will result in decongestion benefits to road users as a result of modal shift to active modes. This impact has been estimated using the DfT's AMAT, and covers business, commuting and other users.	Value of journey time changes(£): Net journey time changes (£): 0 to 2min / 2 to 5min / > 5min	Slight Beneficial	136310 (all users)	Slight Beneficial (across all users)
	Reliability impact on Business users	Not assessed	-	Not assessed		
	Regeneration	Not assessed	-	Not assessed		
	Wider Impacts	Not assessed	-	Not assessed		
Environmental	Noise	The scheme is expected to produce mode shift from motorised to active modes, and hence a reduction in motorised vehicle-kilometres. This in turn results in reduced noise.	-	Slight Beneficial	1,080	Slight Beneficial
	Air Quality	Modal shift to cycling and walking and the associated reduction in road traffic due to the improvements and introduction of facilities is expected to result in improved air quality.	-	Slight Beneficial	3,130	Slight Beneficial
	Greenhouse gases	The scheme is expected to produce mode shift from motorised to active modes, and hence a reduction in motorised vehicle-kilometres. This in turn results in reduced	Change in non-traded carbon over 60y (CO2e): Change in traded carbon over 60y (CO2e):	-	35,430	
	Landscape	Assessment in progress - to be reported in FBC	-	-		
	Townscape	Assessment in progress - to be reported in FBC	-	-		
	Historic Environment	Assessment in progress - to be reported in FBC	-	-		
	Biodiversity	Assessment in progress - to be reported in FBC	-	-		
	Water Environment	Assessment in progress - to be reported in FBC	-	-		
Social	Commuting and Other users	The Greenway generally provides upgrades to the quality of existing infrastructure over much of its length, rather than providing additional connectivity with shorter routeings. Minimal journey time savings are therefore expected, and these have not been monetised.	Value of journey time changes(£): Net journey time changes (£): 0 to 2min / 2 to 5min / > 5min	Not assessed	See under 'business users'	See under 'business users'
	Reliability impact on Commuting and Other users	As above the greenway will not provide any additional reliability on the route, and has not been monetised.	-	Not assessed		
	Physical activity	The improvement to active mode facilities will encourage more walking and cycling, and a mode shift from car to active travel. This will result in a small increase in physical activity and promote active commuting.	-	Moderate Beneficial	6,388,240	
	Journey quality	The improvements to the cycling and walking infrastructure will reduce traveller stress, and improve pleasantness of the journey and user experience.	-	Moderate Beneficial	321,030	
	Accidents	The scheme is expected to result in a mode shift. Users switching from motorised vehicles to active modes will result in a reduction in motor vehicle kilometers and highway accidents. As set out in the economic case, the scheme is expected to improve safety through phyiscal measures along the active travel route making it safer than it is today and add traffic calming along the corridor.	-	Moderate Beneficial	1,020,680	Moderate Beneficial
	Security	The improved lighting provision will increase the feeling of safety for pedestrians and cyclists. Changes to CCTV have not been confirmed, but proposals should incorporate good-quality street lighting and CCTV to improve safey and security of users.	-	Neutral		No assessment required
	Access to services	New crossing facilities and enhancements may improve accessibility to bus stops along the corridor. The Melbourn Greenway will also connect with other greenways	-	Slight Beneficial		Slight Beneficial
	Affordability	Those switching to walking or cycling from bus or car will have a lower cost of transport as they will no longer pay fares or fuel and no-fuel vehicle operating costs.	-	Slight Beneficial		Slight Beneficial
	Severance	Introduction of the Melbourn Greenway will reduce the severance along the A10 by improving crossing provisions and share used paths. The NMU bridge over the A505 will provide connection between Royston and Melbourne, addressing severance issues.	-	Large Beneficial		Moderate Beneficial
	Option and non-use values	The proposed scheme does not introduce new travel options and is therefore not assessed.	-	Not assessed		
Public Accounts	Cost to Broad Transport Budget	The scheme requires funding from the Greater Cambridge Partnership City Deal Allocation.	-		7,780,080	
	Indirect Tax Revenues	The scheme will have a negative impact on indirect tax revenues through mode shift from cars to active modes.	-	-	41,380	

Graham James
Atkins Limited
5 Wellbrook Court
Girton Road
Cambridge
CB3 0NA

Tel: +44 (0)1223 276002
Fax: +44 (0)1223 277529
graham.james@atkinsglobal.com