Abbey–Chesterton Bridge & Chisholm Trail, Cambridge
Cost Benefit Appraisals

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Prepared on behalf of WYG Environment Planning Transport Limited

Registered in England & Wales Number: 3050297

Executive Park, Avalon Way, Anstey, Leicestershire LE7 7GR
Tel: +44 (0)116 234 8000 Fax: +44 (0)116 234 8001
Email: info@wyg.com Website: www.**wyg**.com

WYG Environment Planning Transport Limited. Registered in England & Wales Number: 03050297
Registered Office: Arndale Court, Otley Road, Headingley, Leeds, LS6 2UJ

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Appendices

1.0 Introduction

1.1 Background

1.1.1 WYG has been appointed by Cambridgeshire County Council (CCC) to provide an independent cost benefit appraisal of two proposed transport schemes. This report summarises the methodology used and assumptions made, along with a commentary on the results on the assessments.

1.1.2 The schemes assessed are the Abbey-Chesterton cycle/ footbridge and the Chisholm Trail non-motorised user route.

1.1.3 It should be noted that the assessments are not intended to be fully WebTAG compliant. The Department for Transport's Active Mode Appraisal toolkit has been used to carry out the assessments.

1.2 Report Format

1.2.1 The structure of this report is as follows:

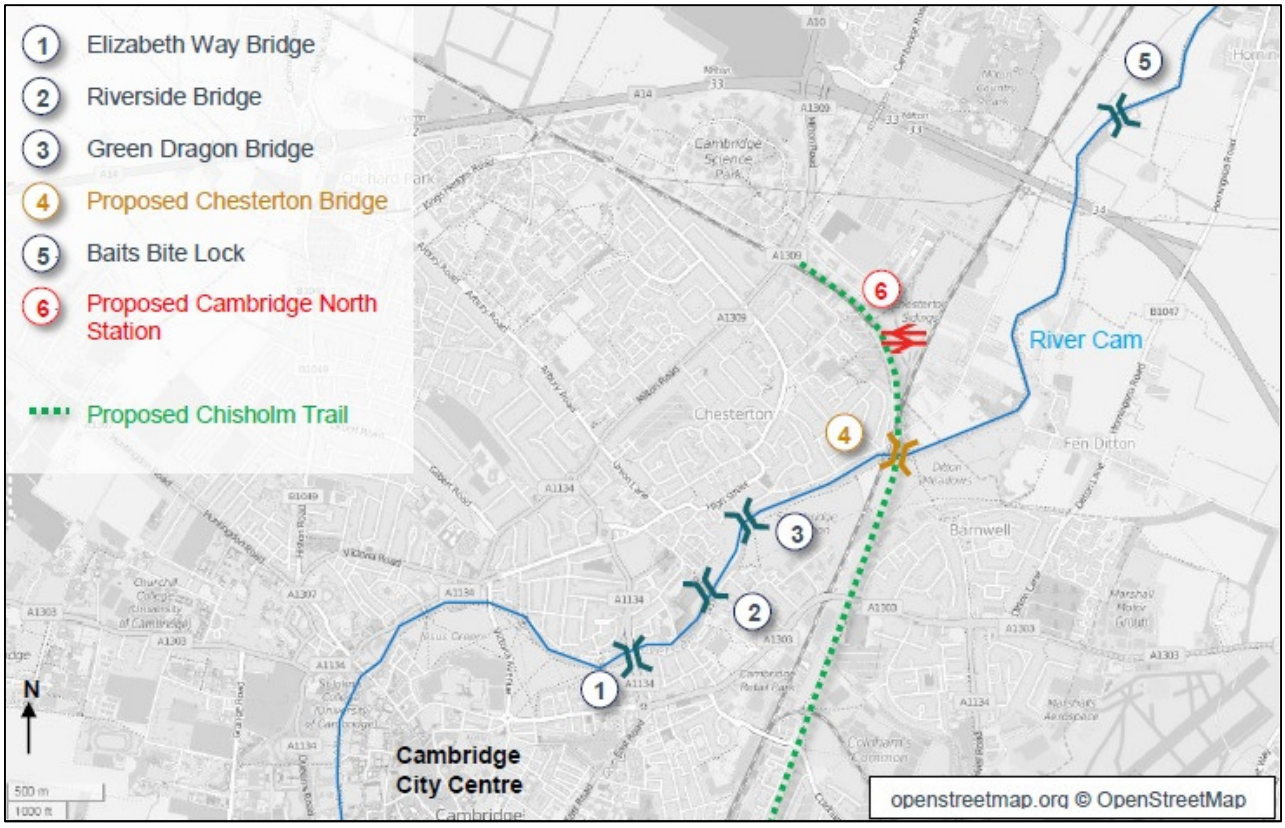
- Section 2 provides background information on both schemes;
- Section 3 discusses the appraisal for the Abbey-Chesterton bridge scheme;
- Section 4 discusses the appraisal for the Chisholm Trails scheme;
- Section 5 describes the sensitivity tests undertaken; and
- Section 6 provides a summary of the work carried out.

2.0 Scheme Background Information

2.1 Abbey-Chesterton Bridge

2.1.1 The Chesterton-Abbey Bridge forms an important part of the wider Chisholm Trail project described later in this Section. A bridge would also support a strategic link between the Science and Business Parks to the north of the river Cam, and link to retail areas and business hubs to the south, and residential areas to the east. The location of the proposed bridge and The Chisholm Trail are in **Figure 1** below:

Figure 1 – Location of Proposed Abbey-Chesterton Bridge (Including the Proposed Route of The Chisholm Trail)*



* Figure Source: Chesterton Bridge Demand Forecasting report (May 2016)

2.1.2 As part of the Section 106 agreement relating to the new Cambridge North railway station, which is scheduled to open in 2017, the County Council was required to produce a feasibility study report into the possible construction of a foot and cycle bridge over the River Cam at Chesterton, which

was completed in March 2014.

2.1.3 Following further design and feasibility work, alongside consultation exercises, the scheme proposes a new cycle/ pedestrian bridge to the east of the existing railway line/ bridge alongside Coldhams Brook.

2.1.4 The proposed bridge would provide a direct, convenient link between employment, residential and educational establishments on each side of the river. On the north and west side:

- Cambridge Science Park;
- Cambridge Business Park and St John's Innovation Park;
- Cambridge Northern Fringe East Development Area (up to 27,000 future jobs);
- Cambridge North railway station;
- Cambridge Regional College
- The Cambridge to St Ives Guided Busway; and
- Kings Hedges, Arbury, East Chesterton, Milton, Histon and Impington.

2.1.5 On the south and east side:

- Retail Parks on Newmarket Road;
- Marshalls;
- Abbey, Romsey and Fen Ditton; and
- Onward journeys to Addenbrooke's, the Biomedical Campus and educational establishments including Sixth Form colleges, the University Technical College and private schools.

2.1.6 CCC has provided a breakdown of the scheme funding by year as summarised in **Table 1**. This information has been used in the Active Mode Appraisal of the scheme as described in **Section 3** of this report.

Table 1 – Abbey-Chesterton Bridge Funding Profile

Year	Total Scheme Costs (in £1,000s)	Third Party Contributions (in £1,000s)
2014	4	0
2015	267	0
2016	283	0
2017	2,000	554
2018	1,946	1,946

2.2 Chisholm Trail

2.2.1 The Chisholm Trail project seeks to provide a high quality strategic foot and cycle link between the existing and new railway stations in Cambridge, and a link at each end of the Busway cycle route. **Figure 2** shows the proposed alignment of the route, which would be enhanced by the Abbey-Chesterton Bridge being constructed.

Figure 2 – The Chisholm Trail

2.2.2 The proposed scheme provides a shared use cycle/ pedestrian path of 3.5m in width between the Abbey-Chesterton Bridge and Coldhams Lane. South of Coldhams Lane towards Cambridge railway station, the route is a combination of shared use paths, segregated wherever feasible to, up to 5m in width and quiet roads suitable for cycling and walking on.

2.2.3 CCC has provided a breakdown of the scheme funding by year as summarised in **Table 2**. This information has been used in the Active Mode Appraisal of the scheme as described in **Section 4** of this report.

Table 2 – Chisholm Trail Funding Profile

Year	Total Scheme Costs (in £1,000s)	Third Party Contributions (in £1,000s)
2015	235	0
2016	840	0
2017	2,500	0
2018	4,100	0
2019	600	372
2020	128	128

3.0 Abbey-Chesterton Bridge Appraisal

3.1 Introduction

3.1.1 The costs and benefits of the scheme have been assessed using the Department for Transport's Active Mode Appraisal Toolkit. This section describes the values input to the toolkit, the rationale for these values/ any assumptions made to calculate these values and the resultant scheme costs and benefits.

3.2 Assumptions

Scheme Opening Year/ Scheme Last Year of Funding

3.2.1 2018 opening year and 2018 last year of funding.

Decay rate

3.2.2 WebTAG Unit A5.1[1] states that *"the existing evidence base is relatively sparse on how long the benefits of active mode schemes last".* A number of sensitivity tests have therefore been carried out as discussed in **Section 5** of this report.

3.2.3 For the core appraisal presented in this section of this report, a **decay rate of 10%** from the last year of funding has been used. This is in line with research such as the economic evaluation of Cycling Demonstration Towns.

Appraisal period

3.2.4 An asset maximum life of **20 years** has been used. Walking and cycling interventions are typically assessed as having a maximum life of 10 or 20 years, rather than 60 years as is common for highway schemes. As this is for infrastructure which will be constructed and maintained by Cambridgeshire County Council a value of 20 years has been used, rather than 10 years which might be used for a smarter choices intervention. However, in the case of the cycle/ footbridge scheme 20 years is felt to be extremely robust, as a bridge will typically be designed to have a maximum life similar to that of a highway scheme.

[1] https://www.gov.uk/government/publications/webtag-tag-unit-a5-1-active-mode-appraisal

Cycling and Walking Journeys – Do Nothing Scenario

3.2.5 Existing journeys have considered those which are likely to divert onto the bridge once available. This has reviewed possible origins and destinations within a 5km (average cycling) and 1.3km (average walking) distance of the proposed bridge. It has also considered the proximity of existing crossings of the River Cam at Green Dragon Bridge (circa 775m south west of the proposed bridge, cyclists must dismount to use this bridge also which is likely to make the new bridge more attractive even where it is a marginally longer distance on journeys), Riverside Bridge (circa 1,250m south west) and the A1134 Elizabeth Way (circa 2km south west).

3.2.6 The 2016 Atkins report, Chesterton Bridge Demand Forecasting[2] provides information regarding existing average daily trips on the existing bridges as replicated in **Table 3** and **Table 4**.

Table 3 – Average Daily Cycling Trips (One Way)*

Bridge Name	Base Year	With Abbey-Chesterton Bridge (Difference from Base)
Elizabeth Way	1,897	1,676 (-221)
Green Dragon	2,520	1,868 (-652)
Riverside	2,458	2,049 (-409)
Chesterton		1,132 (N/A)
Total	*6,875*	*6,725*
Transferred Trips		**1,282**

* Information replicated from Table 2-4 of the Chesterton Bridge Demand Forecasting report (May 2016).

Table 4 – Average Daily Walking Trips (One Way)*

Bridge Name	Base Year	With Abbey-Chesterton Bridge (Difference from Base)
Green Dragon	1,136	768 (-368)
Riverside	1,079	1,024 (-55)
Chesterton		458
Total	*2,215*	*2,250*
Transferred Trips		**423**

* Information replicated from Table 2-5 of the Chesterton Bridge Demand Forecasting report (May 2016).

[2] http://planning.cambridgeshire.gov.uk/swift/MediaTemp/41128-1950957904.pdf

3.2.7 The results indicate that the implementation of the proposed Chesterton Bridge will primarily draw cyclist and pedestrian trips from the nearby Green Dragon Bridge. Some cycling trips from the Riverside Bridge and the Elizabeth Way Bridge are also drawn to the new bridge. There is a slight decrease in the total number of trips using the existing bridges within the corridor owing to the diversion of trips from zones north of the river travelling to the new Cambridge North railway station rather than the existing Cambridge railway station in the future scenarios modelled in Chesterton Bridge Demand Forecasting study.

3.2.8 Based upon the case study in WebTAG Unit A5.1, it is assumed that **90% of trips** are part of a return journey using the same route. A return trip is counted as two journeys.

3.2.9 Using the one-way data shown in **Table 3** we have assumed that the number of existing cycling journeys per day in the Do Nothing Scenario (which will transfer to the Abbey-Chesterton Bridge in the Do Something Scenario) is **2,435** (1,282 * 1.9 to include 90% return trips).

3.2.10 Using the one-way data shown in **Table 3** we have assumed that the number of existing walking journeys per day in the Do Nothing Scenario (which will transfer to the Abbey-Chesterton Bridge in the Do Something Scenario) is **803** (423 * 1.9 to include 90% return trips).

Cycling and Walking Journeys – Do Something Scenario

3.2.11 Number of cycling journeys per day average = **4,562**. This uses the value in the Scheme Impact Proforma for the Greater Cambridge Cycle City bid[3] of 2,401 new one way trips and multiplies by 1.9 to account for 90% of journeys being return trips.

3.2.12 Number of walking journeys per day average = **1,693**. This uses the value in the Scheme Impact Proforma for the Greater Cambridge Cycle City bid of 891 new one way trips and multiplies by 1.9 to account for 90% of journeys being return trips.

Average journey length/ speed

3.2.13 Average journey length values for cycling and walking trips have been derived from the 2015 National Travel Survey[4]. Table NTS0306 shows that the average trip length in 2015 was 0.8 miles

[3] http://www.cambridgeshire.gov.uk/info/20006/travel_roads_and_parking/68/transport_funding_bids_and_studies

[4] https://www.gov.uk/government/statistics/national-travel-survey-2015

(1.29km) for walking and 3.0 miles (4.82km) for cycling. For reference car driver trips were on average 8.55 miles (13.77km) in the same year.

3.2.14 An average journey length of **5km has been used for cycling and 1.3km for walking** has been used in the assessments in the Do Nothing and Do Something scenarios.

3.2.15 The DfT's Local Transport Note 2/08 Cycle Infrastructure Design[5] (p41) states that *"the average speed of cyclists on a level surface is around 12mph*". When converted to kph, this equates to 19.31kph. For simplicity an **average cycling speed of 20kph** has been used in the assessments in the Do Nothing and Do Something scenarios.

3.2.16 Average walking journey speed is assumed as 3mph. For simplicity an **average walking speed of 5kph** has been used in the assessments in the Do Nothing and Do Something scenarios.

Journey Quality Impacts

3.2.17 Journey quality impacts show the proportion of the average journey that will be made on the improved infrastructure. In the case of the bridge this is not just the length of the bridge, but the length of distance which is currently travelled on foot or cycle to cross the river between Abbey and Chesterton. Table 2-1 in the Chesterton Bridge Demand Forecasting report shows that alternative routes using existing bridges are 2.2km, 2.5km and 2.6km in length respectively. Therefore, for cycling trips the journey quality values have assumed that cyclists will use the new bridge/ improved route for 2.2km (the lowest, 'worst case' of these options) of their overall average journey of 5km (NTS0306).

3.2.18 For pedestrians the bridge is likely to provide a significant saving in walking distance and quality of route for users in the vicinity of the bridge. In the absence of detailed origin and destination information regarding existing and future trips, the NTS average walking trip of 1.3km has been used as a proxy to calculate the journey quality impacts of pedestrian trips. To ensure this assumption is fair a number of sensitivity tests have been undertaken regarding pedestrian journey quality impacts and these are described in **Section 5**.

3.2.19 WebTAG A5.1 (p17-18) describes the process for calculating journey quality impacts for a cycling

[5] https://www.gov.uk/government/publications/cycle-infrastructure-design-ltn-208

and walking scheme. For the Abbey-Chesterton Bridge scheme the following journey quality impacts have been assumed using the WebTAG Journey Quality tab in the Active Mode Appraisal Toolkit:

- Cycle journey quality impacts = **3.09p per minute** (7.03p * 44% (2.2km/5km)) – bridge is segregated from traffic, so segregated value used.
- Cycle journey quality impacts = **0p per trip** – no additional facilities such as cycle parking proposed
- Pedestrian journey quality impacts = **1.5p per km**, comprising:
  - 0.9p per km (pavement evenness);
  - 0.6p per km (directional signage).

Decongestion benefits – Percentage of journeys which would otherwise be made by car

3.2.20 This considers the proportion of new users to the facility which would otherwise use a car. The work previously undertaken as part of Greater Cambridge Cycle City bid assumed that **20%** mode shift to cycling was reasonable and this value has been retained for this assessment. It has been assumed that **10%** of new walking journeys would have otherwise been made by car. The bridge improves connectivity for people living close by, meaning that more short journeys could be undertaken on foot.

Background growth rate and period over which growth applies

3.2.21 TEMPRO version 7 growth factors for the Cambridge Authority Area have been used to estimate the annual background growth rate of cycling and walking trips. The growth rate has been applied to a period of **20 years** to accord with the asset life appraisal period.

3.2.22 In TEMPRO a base year of 2018 and future year of 2038 was used, along with all trip purposes, an average weekday time period and production/ attraction trip end types. Growth factors for both cycling and walking have been calculated. For a robust assessment the factors for cycling, which are far lower than walking, have been used. The 20 year production growth factor of 1.0196 and attraction factor of 1.0803 have been averaged resulting in an overall growth factor of 1.0500. Dividing this figure by the 20 year period gives an annual growth factor of **0.25%**.

Number of days in the year usage will apply

3.2.23 The scheme is expected to provide excellent access to transport interchanges and places of employment as well as for leisure use. A value of **251 days** per year has been therefore been used, to account for working days when the predicted levels of usage are expected to apply. This is felt to be a 'worst case' appraisal as usage will also occur on other days by leisure users.

Constant Price Base Year/ Optimism Bias

3.2.24 Using the guidance in Table 7 of WebTAG Unit A1.2[6] the proposed bridge is considered to be a Local Authority scheme at Stage 2 (Conditional Approval). Table 8 of the same guidance, translates this to a value of **15% Optimism Bias** for local road schemes (which WebTAG considers to include bicycle and pedestrian infrastructure). A constant price base year of 2010 has been used.

3.2.25 The values used in the appraisal are summarised in **Table 5**.

[6] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/427087/TAG_Unit_A1.2_-_Scheme_Costs_November2014.pdf

Table 5 – Summary of Active Mode Appraisal Inputs: Abbey-Chesterton Bridge

Element	Value
Scheme Opening Year	2018
Last Year of Funding	2018
Decay Rate	10%
Appraisal Period	20 years
Number of Cycling Journeys (Do Nothing)	2,435
Average Cycling Trip Length and Speed	5km and 20kph
Number of Walking Journeys (Do Nothing)	803
Average Walking Trip Length and Speed	1.3km and 5kph
Return Trips	90%
Number of Cycling Journeys (Do Something)	4,562
Number of Walking Journeys (Do Something)	1,693
Journey Quality Impacts - Cycle per minute	3.09p
Journey Quality Impacts - Cycle per trip	0p
Journey Quality Impacts - Pedestrians per km	1.5p
Percentage of New Journeys Otherwise Made by Car – Cyclists	20%
Percentage of New Journeys Otherwise Made by Car – Pedestrians	10%
Annual Growth Rate	0.25%
Period Over Which Growth Applies	20 years
Number of Days Per Year the Usage Figures are Expected	251
Constant Price Base Year	2010
Optimism Bias	15%

3.3 Results

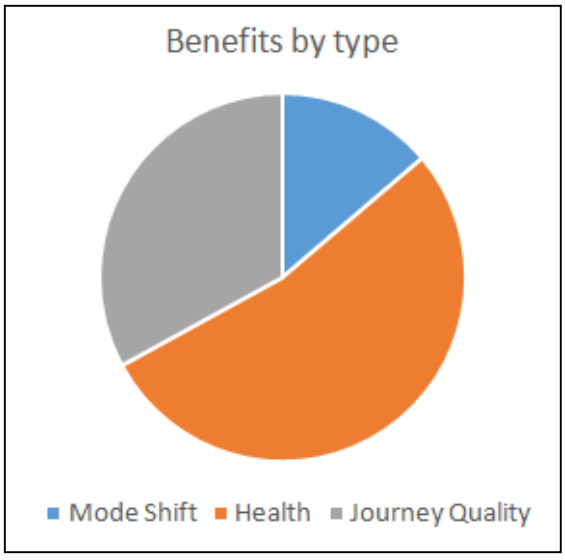
3.3.1 The appraisal produced the resultant Analysis of Monetised Costs and Benefits as shown in **Table 6**.

Table 6 – Analysis of Monetised Costs and Benefits Table

Value	£ (in 1,000s)
Noise	7.78
Local Air Quality	1.32
Greenhouse Gases	32.88
Journey Quality	5,407.95
Physical Activity	8,741.97
Accidents	117.56
Decongestion	2,276.36
Indirect Taxation	-184.40
Private Contribution	-2,278.69
Present Value of Benefits (PVB)	14,122.74
Present Value of Costs (PVC)	2,517.91
Benefit Cost Ratio (BCR)	**5.61**

3.3.2 The DfT's Value for Money Assessments guidance[7] considers schemes with a BCR of greater than 4.0 to have a very high Value for Money. **Figure 3** illustrates the benefits of the scheme by type. The scheme benefits primarily relate to health but journey quality benefits also make up over a third of the benefits.

Figure 3 – Abbey-Chesterton Bridge Benefits by Type



[7] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/255126/value-for-money-external.pdf

4.0 Chisholm Trail Appraisal

Scheme Opening Year/ Scheme Last Year of Funding

4.1.1 2020 opening year and 2020 last year of funding.

Decay rate

4.1.2 A **decay rate of 10%** from the last year of funding has been used to assess the scheme.

Appraisal period

4.1.3 An asset maximum life of **20 years** has been used for the scheme appraisal.

Cycling and Walking Journeys – Do Nothing Scenario

4.1.4 Existing and future journeys have been derived from the 2016 Atkins report, The Chisholm Trail Transport Assessment[8]. Atkins built a spreadsheet 'Logit' model, which used cycle/ pedestrian surveys, 2011 Census Travel to Work and National Travel Survey data to show existing and predict future travel patterns and route choice of cyclists and pedestrians to predict the demand for the new Chisholm Trail.

4.1.5 It should be noted that the modelling of the Chisholm Trail scheme assumed that the proposed Chesterton Bridge is in place. As part of the modelling exercise, the Chisholm Trail route was segregated into three parts in order to allow for more detailed prediction of trips on individual segments. The three sections are:

- North – covering the trail to the north of Coldhams Lane, of which no sections are existing;
- Middle – covering the trail from Cromwell Road roundabout to Coldhams Lane, of which all sections are existing; and
- South – covering the trail from Cambridge Station to Cromwell Road Roundabout, of

[8] The Chisholm Trail Transport Assessment has been supplied by Cambridgeshire County Council to inform the appraisal for this study. However, at the time of writing the Transport Assessment is not yet within the public domain.

which some sections are existing.

4.1.6 **Table 7** replicates relevant data/ estimates from the Transport Assessment (TA) which has been used to inform this appraisal.

Table 7 – Estimated Daily Pedestrian and Cycle Trips (One Way)*

Mode	Scenario	North Section	Middle Section	South Section
Cycling	Do Nothing	0	1,558	**5,200**
	Do Something	1,879	1,722	**5,142**
Walking	Do Nothing	0	549	**6,555**
	Do Something	969	475	**6,629**

* Information replicated from Table 5-1 of The Chisholm Trail Transport Assessment (September 2016).

4.1.7 It should be noted that the total Do Nothing and Do Something values are not the sum of the three sections. This is because some trips will use multiple segments across the course of their journey. For both walking and cycling, the majority of trips are concentrated in the entirely new section of the Trail. The increase in trips to the middle and south of the route is solely a result of the increase in attractiveness in cycling and walking infrastructure available to commuters. For the purposes of this appraisal the South Section values have been used and it has been assumed that the Trail scheme is fully open (i.e. all sections of the Trail have been constructed).

4.1.8 Using the one-way data shown in **Table 7** it has been assumed that the number of cycling journeys per day in the Do Nothing Scenario is **9,880** (5,200 * 1.9 to include 90% return trips).

4.1.9 Using the one-way data shown in **Table 7** we have assumed that the number of walking journeys per day in the Do Nothing Scenario is **12,455** (6,555 * 1.9 to include 90% return trips).

Return Trips

4.1.10 Based upon the case study in WebTAG Unit A5.1, it is assumed that **90% of trips** are part of a return journey using the same route. A return trip is counted as two journeys.

Cycling and Walking Journeys – Do Something Scenario

4.1.11 Using the one-way data shown in **Table 7** we have assumed that the number of cycling journeys per day in the Do Something Scenario is **9,770** (5,142 * 1.9 to include 90% return trips).

4.1.12 Using the one-way data shown in **Table 7** we have assumed that the number of walking journeys per day in the Do Something Scenario is **12,595** (6,629 * 1.9 to include 90% return trips).

4.1.13 The appraisal is considered to be robust as it does not include additional cycling and walking trips associated with future developments. It also does not consider additional cycling and walking trips associated with match days at the nearby Abbey Stadium. The Chisholm Trail Transport Assessment estimates that *"an additional 74 cycle trips and 89 pedestrian trips will use the northern section of the route on event days and an additional 178 cycle trips and 214 pedestrian trips are likely to use the middle / southern section of the Trail on event days at the Abbey Stadium*".

Average journey length/ speed

4.1.14 An average journey length of **5km has been used for cycling** and **1.3km for walking** has been used in the assessments in the Do Nothing and Do Something scenarios.

4.1.15 An **average cycling speed of 20kph** and an **average walking speed of 5kph** has been used in the assessments in the Do Nothing and Do Something scenarios.

Journey Quality Impacts

4.1.16 Journey quality impacts show the proportion of the average journey that will be made on the improved infrastructure. The proposed Trail is around 4km in length, however cyclists will not necessarily be using the entire route as part of their journey. As an estimate it has been assumed that cyclists will use the Trail for half (2.5km) of an overall average journey of 5km (NTS0306).

4.1.17 As with the bridge assessment, in the absence of more detailed origin and destination details it has been assumed that the benefits apply for the entire NTS average walking journey (1.3km). A sensitivity test assuming that the journey quality impacts only apply for half of an average walking journey is described in **Section 5**.

4.1.18 For the Chisholm Trail scheme the following journey quality impacts have been assumed using the WebTAG Journey Quality tab in the Active Mode Appraisal Toolkit:

- Cycle journey quality impacts = **3.21p per minute** (7.03p * 50% (2.5km/5km) – 0.3p) – route is predominantly segregated from traffic, so segregated value used. A discount of 0.3p per minute has been applied to account for the section of the Trail which is on

road and not segregated.

- Cycle journey quality impacts = **0p per trip** – no additional facilities such as cycle parking proposed.
- Pedestrian journey quality impacts = **6.8p per km**, comprising:
  - 3.8p per km (streetlighting, lit bollards and studs to be used);
  - 0.9p per km (pavement evenness);
  - 0.9p per km (information panels);
  - 0.6p per km (benches);
  - 0.6p per km (directional signage).

Decongestion benefits – Percentage of journeys which would otherwise be made by car

4.1.19 This considers the proportion of new users to the facility which would otherwise use a car. The work previously undertaken as part of Greater Cambridge Cycle City bid assumed that **20% mode shift to cycling** was reasonable and this value has therefore been used for this assessment. It has been assumed that **10% of new walking journeys** would have otherwise been made by car. The Trail improves connectivity for people living close by, meaning that more short journeys could be undertaken on foot.

Background growth rate and period over which growth applies

4.1.20 TEMPRO version 7 growth factors for the Cambridge Authority Area have been used to estimate the annual background growth rate of cycling and walking trips. The growth rate has been applied to a period of **20 years** to accord with the asset life appraisal period.

4.1.21 In TEMPRO a base year of 2020 and future year of 2040 was used, along with all trip purposes, an average weekday time period and production/ attraction trip end types. Growth factors for both cycling and walking have been calculated. For a robust assessment the factors for cycling, which are far lower than walking, have been used. The 20 year production growth factor of 1.001 and attraction factor of 1.0660 have been averaged resulting in a growth factor of 1.0331. Dividing this figure by the 20 year period gives an annual growth factor of **0.165%**.

Number of days in the year usage will apply

4.1.22 The scheme is expected to provide excellent access to transport interchanges and places of employment as well as for leisure use. A value of **251 days** per year has been used, to account for working days when the predicted levels of usage are expected to apply. This is felt to be a robust, 'worst case' appraisal as usage will also occur on other days by leisure users.

Constant Price Base Year/ Optimism Bias

4.1.23 The scheme is considered to be a local authority scheme at Stage 2 (Conditional Approval) which translates to a value of **15% Optimism Bias.** A constant price base year of 2010 has been used.

4.1.24 The values used in the appraisal are summarised in **Table 8**.

Table 8 – Summary of Active Mode Appraisal Inputs: Chisholm Trail

Element	Value
Scheme Opening Year	2020
Last Year of Funding	2020
Decay Rate	10%
Appraisal Period	20 years
Number of Cycling Journeys (Do Nothing)	9,800
Average Cycling Trip Length and Speed	5km and 20kph
Number of Walking Journeys (Do Nothing)	12,485
Average Walking Trip Length and Speed	1.3km and 5kph
Return Trips	90%
Number of Cycling Journeys (Do Something)	9,770
Number of Walking Journeys (Do Something)	12,595
Journey Quality Impacts - Cycle per minute	3.21p
Journey Quality Impacts - Cycle per trip	0p
Journey Quality Impacts - Pedestrians per km	6.8p
Percentage of New Journeys Otherwise Made by Car – Cyclists	20%
Percentage of New Journeys Otherwise Made by Car – Pedestrians	10%
Annual Growth Rate	0.165%
Period Over Which Growth Applies	20
Number of Days Per Year the Usage Figures are Expected	251
Constant Price Base Year	2010
Optimism Bias	15%

4.2 Results

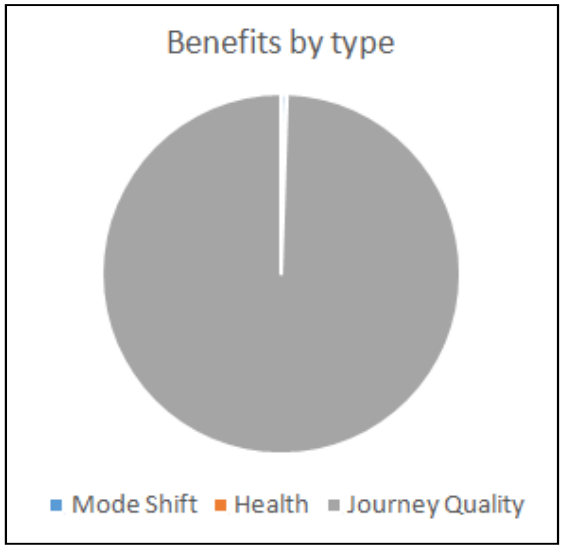
4.2.1 The appraisal produced the resultant Analysis of Monetised Costs and Benefits as shown in **Table 9**.

Table 9 – Analysis of Monetised Costs and Benefits Table

Value	£ (in 1,000s)
Noise	-0.32
Local Air Quality	-0.02
Greenhouse Gases	-1.25
Journey Quality	22,324.04
Physical Activity	23.17
Accidents	-4.63
Decongestion	-92.94
Indirect Taxation	6.76
Private Contribution	-433.15
Present Value of Benefits (PVB)	21821.65
Present Value of Costs (PVC)	7,250.11
Benefit Cost Ratio (BCR)	**3.01**

4.2.2 The DfT's Value for Money Assessments guidance considers schemes with a BCR of 2.0 to 4.0 to have high Value for Money. **Figure 4** illustrates the benefits of the scheme by type. The scheme benefits almost entirely relate to an improvement in journey quality.

Figure 4 – Chisholm Trail Benefits by Type



5.0 Sensitivity Tests

5.1.1 This section summarises the sensitivity tests which have been carried out to appraise both schemes further.

5.2 Abbey-Chesterton Bridge

Sensitivity Test 1

5.2.1 The appraisal period was reduced to 10 years. This resulted in a **BCR of 3.60**.

Sensitivity Test 2

5.2.2 The decay rate was varied, however the Value for Money still achieved the high category until the decay rate was towards 40% per annum. A decay rate of 20% resulted in a **BCR of 3.25**, a decay rate of 25% resulted in a **BCR of 2.65**, a decay rate of 33.3% resulted in a **BCR of 2.11**, and a decay rate of 40% resulted in a **BCR of 1.84**.

Sensitivity Test 3

5.2.3 Return trips were reduced from 90% to 50% of trips. This resulted in a **BCR of 4.23**.

Sensitivity Test 4

5.2.4 Decongestion benefits were altered with new users reduced to 5% of pedestrians/ cyclists transferring from cars. This resulted in a **BCR of 4.94**. Repeating the test to assume that no new pedestrian/ cycle trips were transferred from car trips still produced a **BCR of 4.71**.

Sensitivity Test 5

5.2.5 Journey quality benefits for pedestrians were reduced so that they only applied for 50% of a 1.3km average trip length (1.5p * 50% = 0.75p per km) resulting in a **BCR of 5.59**. Reducing the journey quality benefits for pedestrians so that they only applied for the bridge length, 50m (1.5p * 50/ 1,300 = 0.058p per km) or so that they did not apply at all resulted in a **BCR of 5.58**.

5.3 Chisholm Trail

Sensitivity Test 1

5.3.1 The Do Nothing and Do Something values have been amended to use the North section data shown in **Table 7**. This considers the scheme as an effectively new route as it shows a Do Nothing scenario with no pedestrians and cyclists on, with the Do Something scenario showing new users to the section of the trail to be constructed close to the new railway station.

5.3.2 The sensitivity test results in a **BCR of 2.91** with benefits type focussed on health, rather than journey quality as is the case with the core appraisal presented in **Section 4**. The South section values shown in the core appraisal are felt to be more appropriate for use in assessing a route which currently exists in part.

Sensitivity Test 2

5.3.3 The appraisal period was reduced to 10 years. This resulted in a **BCR of 1.65**.

Sensitivity Test 3

5.3.4 The decay rate was varied, however the Value for Money remained within the high category. When the decay rate was increased to 20%, 25%, 33.3% or 40% the BCR remained as per the core appraisal presented in **Section 4**. The scheme appraisal is resilient to increases in the decay rate because it has a high level of existing users, whose journey quality is being improved by the proposals.

Sensitivity Test 4

5.3.5 Return trips were reduced from 90% to 50% of trips. This resulted in a **BCR of 2.36**.

Sensitivity Test 5

5.3.6 Decongestion benefits were altered with new users reduced to assume that none of the new pedestrian/ cycle trips were transferred from car trips. This produced a **BCR of 3.02.**

Sensitivity Test 6

5.3.7 Journey quality benefits for pedestrians were reduced so that they only applied for 50% of a 1.3km

average trip length (6.8p * 650/ 1,300 = 3.4p per km) resulting in a **BCR of 2.72**.

Sensitivity Test 7

5.3.8 Do Something values have been amended to also include the predicted future demand associated with new developments as described in Section 5 of the Chisholm Trail Transport Assessment. The one way flows (which were multiplied by 1.9 to account for 90% of trips being return journeys before being used in the active mode appraisal for this sensitivity test) are shown in **Table 10**.

Table 10 – Total Predicted Daily Pedestrian and Cycle Demand*

Mode	Scenario	South Section (One Way)	South Section (Two Way)
Cycling	Do Nothing	**5,200**	**9,880**
	Do Something	**6,402**	**12,164**
Walking	Do Nothing	**6,555**	**12,455**
	Do Something	**7,491**	**14,233**

* Do Nothing information replicated from Table 5-1 and Do Something information from Table 5-5 of The Chisholm Trail Transport Assessment (September 2016).

5.3.9 These values resulted in a **BCR of 5.05**. Benefits were split between journey quality (64%), health (29%) and mode shift (7%).

5.4 Conclusion

5.4.1 Both schemes maintain at least high value for money with onerous sensitivity tests. The only exceptions to this are where a 40% decay rate was used to appraise the Abbey-Chesterton bridge scheme and a 10 year appraisal period was used to assess the Chisholm Trail scheme. It is therefore concluded that the core scenario appraisals detailed in **Section 3** and **Section 4** provide robust assessments of both schemes.

6.0 Summary and Conclusions

6.1.1 This report provides cost benefit appraisals of the Abbey-Chesterton cycle/ footbridge and the Chisholm Trail non-motorised user route in Cambridge.

6.1.2 The schemes have been appraised using the DfT's Active Mode Appraisal toolkit and this report does not constitute a fully WebTAG compliant appraisal.

6.1.3 Do Nothing and Do Something trips have been informed by reports provided by Cambridgeshire County Council. Assumptions made to calculate the other assumptions in the completed appraisal toolkits for each scheme have been detailed within this report.

6.1.4 The appraisal concludes that the Abbey-Chesterton cycle/ footbridge provides very high Value for Money, with a BCR of 5.61. Health benefits and journey quality benefits are predominantly generated through the scheme.

6.1.5 The appraisal concludes that the Chisholm Trail scheme provides high Value for Money, with a BCR of 3.10. The scheme benefits almost entirely relate to an improvement in journey quality.

6.1.6 Sensitivity tests have shown that both schemes maintain at least high value for money with onerous sensitivity tests. The only exceptions to this are where a 40% decay rate was used to appraise the Abbey-Chesterton bridge scheme and a 10 year appraisal period was used to assess the Chisholm Trail scheme. It is therefore concluded that both that the core scenario appraisals summarised in paragraphs 6.1.4 and 6.1.5 are robust assessments, demonstrating that the schemes provide at the very least high value for money.

Appendices

Appendix A – Abbey–Chesterton Bridge Active Mode Appraisal

Please answer the following questions with your best estimates to obtain a benefit cost ratio of your scheme.
By varying your answers you can test the importance of the input data on the overall value for money of your scheme.
The answers provided are for the example case study from Appendix B of WebTAG unit A5.1. This case study provides further helpful commentary that users of this tool might want to refer to.

Scheme details

When would the scheme be likely to open? 2018
What is the last year of initial funding? 2018
Decay rate (starting from last year of funding) 10.0%

WebTAG A5.1 explains - the impacts especially of revenue funded initatives such as cycle training or personalised travel planning are likely to diminish year by year following the investment. For the case study here this is likely to be conservative.

Appraisal period (should be the expected asset life, maximum 60) 20 yrs

Costs

Please provide estimates for upfront costs as well as future maintenance costs in the table below. Please enter the full costs of the scheme in the first column and any private sector contribution to those costs in the second. All other funds are assumed to be from local or central Government.

Please use a constant price base and specify the year her 2010
Please refer to WebTAG unit A1.2 to set Optimism Bias 15%

Do Nothing scenario

This is what is most likely to happen if the scheme is not implemented.
The data could for example be from automatic or manual traffic counts.

Number of cycling journeys 2,435 per day, average length 5 km and speed 20 kph
Number of walking journey 803 per day, average length 1.3 km and speed 5 kph
Ideally the data is taken from 'average weekday' in spring or autumn to avoid seasonal bias.
A return trip involves two journeys and would need to be counted as such.
To identify how many individual users this implies, please estimate the share of journeys that form part of a return trip here: 90%

Do Something scenario

Once your scheme has reached it's full impact (ignoring any initial build up here), how would these figures have changed (due to the intervention)?
Number of cycling journeys 4,562 per day, e.g. from automatic or manual cycle count.
Number of walking journey 1,693 per day
For simplicity it is assumed that the length and speed of journeys is largely unaffected by the intervention.

Journey Quality impacts

WebTAG units A5.1 and A4.1 provides guidance, the Databook provides suggested values that users might plac
on the improvemed infrastructure your scheme provides. The values are shown in the WebTAG journey quality ta
The improvement over the 'do nothing' scenario should be valued, rather than the absolut level.

For cyclists 3.09 pence per minute 0 pence per trip (e.g. shower facilities
For pedestrians 1.5 pence per km
As demonstrated in the case study, these values should take account of the proportion of the average journey that would be made on the improved infrastructure.

Decongestion benefits

What proportion of new users would most likely be using a car in the do nothing scenario?
for cyclists 20.0%
for pedestrians 10.0%

Which area type from the drop down is most similar to the area your scheme is located in?
London

Additional information

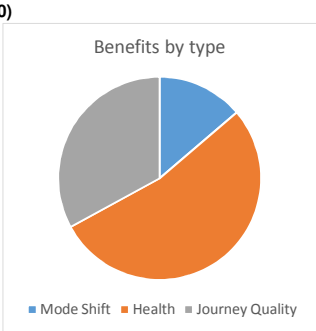
Background Growth
If you have an estimate of the growth in background use (in both scenarios), please set
the annual growth rate 0.25%
the period over which this applies 20 years

Number of days in the year that you would expect the above usage figures 251 days p.a.
In the case study this is assumed to the typical number of working days - but might more appropriately be set to the number of weekdays.

Results

Analysis of Monetised Costs and Benefits (in £'000)

Noise	7.78
Local Air Quality	1.32
Greenhouse Gases	32.88
Journey Quality	5407.95
Physical Acitivity (incl. absenteeism)	8741.97
Accidents	117.56
Decongestion	2276.36
Indirect taxation	-184.40
Private contribution	-2278.69
Present Value of Benefits (PVB)	14122.74
Present Value of Costs (PVC)	2517.91
Benefit Cost Ratio (BCR)	**5.61**



Year	Total scheme costs '000£	3rd party contributions '000£
2009		
2010		
2011		
2012		
2013		
2014	4	
2015	267	
2016	283	
2017	2,000	554
2018	1,946	1,946
2019		
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The case study in WebTAG unit A5.1 uses slightly different assumptions on the valuation of decongestion benefits which result in a higher estimated benefit there. This is due to the specfic nature of the case study and to fully replicate this approach here would have increased the complexity of this tool with no apparent benefit.

Appendix B – Chisholm Trail Active Mode Appraisal

Please answer the following questions with your best estimates to obtain a benefit cost ratio of your scheme.
By varying your answers you can test the importance of the input data on the overall value for money of your scheme.
The answers provided are for the example case study from Appendix B of WebTAG unit A5.1. This case study provides further helpful commentary that users of this tool might want to refer to.

Scheme details

When would the scheme be likely to open? 2020
What is the last year of initial funding? 2020
Decay rate (starting from last year of funding) 10.0%

WebTAG A5.1 explains - the impacts especially of revenue funded initatives such as cycle training or personalised travel planning are likely to diminish year by year following the investment. For the case study here this is likely to be conservative.

Appraisal period (should be the expected asset life, maximum 60) 20 yrs

Costs

Please provide estimates for upfront costs as well as future maintenance costs in the table below. Please enter the full costs of the scheme in the first column and any private sector contribution to those costs in the second. All other funds are assumed to be from local or central Government.

Please use a constant price base and specify the year her 2010
Please refer to WebTAG unit A1.2 to set Optimism Bias 15%

Do Nothing scenario

This is what is most likely to happen if the scheme is not implemented.
The data could for example be from automatic or manual traffic counts.

Number of cycling journeys 9,880 per day, average length 5 km and speed 20 kph
Number of walking journey 12,455 per day, average length 1.3 km and speed 5 kph
Ideally the data is taken from 'average weekday' in spring or autumn to avoid seasonal bias.
A return trip involves two journeys and would need to be counted as such.
To identify how many individual users this implies, please estimate the share of journeys that form part of a return trip here: 90%

Do Something scenario

Once your scheme has reached it's full impact (ignoring any initial build up here), how would these figures have changed (due to the intervention)?
Number of cycling journeys 9,770 per day, e.g. from automatic or manual cycle count.
Number of walking journey 12,595 per day
For simplicity it is assumed that the length and speed of journeys is largely unaffected by the intervention.

Journey Quality impacts

WebTAG units A5.1 and A4.1 provides guidance, the Databook provides suggested values that users might plac
on the improvemed infrastructure your scheme provides. The values are shown in the WebTAG journey quality ta
The improvement over the 'do nothing' scenario should be valued, rather than the absolut level.

For cyclists 3.21 pence per minute 0 pence per trip (e.g. shower facilities
For pedestrians 6.8 pence per km
As demonstrated in the case study, these values should take account of the proportion of the average journey that would be made on the improved infrastructure.

Decongestion benefits

What proportion of new users would most likely be using a car in the do nothing scenario?
for cyclists 20.0%
for pedestrians 10.0%

Which area type from the drop down is most similar to the area your scheme is located in?
London

Additional information

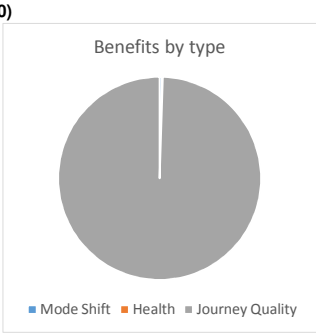
Background Growth
If you have an estimate of the growth in background use (in both scenarios), please set
the annual growth rate 0.17%
the period over which this applies 20 years

Number of days in the year that you would expect the above usage figures 251 days p.a.
In the case study this is assumed to the typical number of working days - but might more appropriately be set to the number of weekdays.

Results

Analysis of Monetised Costs and Benefits (in £'000)

Noise	-0.32
Local Air Quality	-0.02
Greenhouse Gases	-1.25
Journey Quality	22324.04
Physical Acitivity (incl. absenteeism)	23.17
Accidents	-4.63
Decongestion	-92.94
Indirect taxation	6.76
Private contribution	-433.15
Present Value of Benefits (PVB)	21821.65
Present Value of Costs (PVC)	7250.11
Benefit Cost Ratio (BCR)	**3.01**



Year	Total scheme costs '000£	3rd party contributions '000£
2009		
2010		
2011		
2012		
2013		
2014		
2015	235	
2016	840	
2017	2,500	
2018	4,100	
2019	600	372
2020	128	128
2021		
2022		
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The case study in WebTAG unit A5.1 uses slightly different assumptions on the valuation of decongestion benefits which result in a higher estimated benefit there. This is due to the specfic nature of the case study and to fully replicate this approach here would have increased the complexity of this tool with no apparent benefit.