

## Queensbury Executive Summary

This study was commissioned by City of Bradford Metropolitan District Council to investigate the viability of bringing Queensbury Tunnel (the Tunnel) into use for walking, wheeling and cycling as part of a network of active travel routes.

The study presents three possible routes between Keighley, Halifax, and Bradford, each developed to concept design level. For each route, options incorporating and excluding the Tunnel have been compared. Routes excluding the tunnel are termed the 'Alpine Option'.

There are therefore six routes in total:

- Most Advantageous and Attractive: Tunnel Option
- Most Advantageous and Attractive: Alpine Option
- Next Preferred: Tunnel Option
- Next Preferred: Alpine Option
- Low Cost Alternative: Tunnel Option
- Low Cost Alternative: Alpine Option

The study presents the development of the routes from the initial route option appraisal process through to concept design and costs for the final alignments. A Highways-England-commissioned report (Queensbury Tunnel Study, Jacobs, 13 April 2021), which presents a technical assessment of the works required to stabilise the Tunnel, was used to inform cost estimates for its restoration. Interim development reports, general arrangements and full estimated costs for the concept level designs are included in the appendices, along with a designer's risk register and ecological desk study.

The six routes are compared over five non-economic criteria: user experience, strategic success, risks to delivery, reliance of third-party schemes, and stakeholder satisfaction. An accompanying economic appraisal assesses the Benefit Cost Ratio (BCR), Tourism and Heritage benefits, and Carbon Impact of each route.

Usage figures for input into the economic appraisal are estimated using both the Department for Transport (DfT) Capital Fund Uplift Tool (CFUT) and past evidence from case studies of similar greenway and tunnel schemes. Comparative results for each approach are presented throughout. BCRs are calculated using the DfT Active Mode Appraisal Toolkit (AMAT). Tourism benefits are calculated using the Leisure Cycling and Leisure Walking Expenditure models<sup>1</sup>. Heritage benefits are calculated by switching analysis. Carbon impacts are estimated using the greenhouse gas emissions output from the AMAT. Sensitivity testing is carried out for all Tunnel options, by varying the estimated costs of works to bring Queensbury Tunnel back into use. A full explanation of the novel economic appraisal methodology is provided in the appendices.

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<sup>1</sup> <https://www.sustrans.org.uk/media/4475/4475.pdf>

Results of the economic appraisal show that BCRs for the six routes vary from 2.82 (High) to 1.50 (Low). Comparison of the CFUT and case study inputs do not reveal a consistent difference in outcomes between them. Tourism benefits are assessed to be between £5.98 million and £9.95 million. Tourism benefits are consistently higher when assessed using CFUT inputs. Per-trip heritage value calculated for the Tunnel options range from £13 to £33. The summarised and full results of the economic appraisal are presented in Chapter 7 and the appendices respectively.

Sensitivity testing is performed to assess how BCR would change under various circumstances. For the purposes of the sensitivity testing, the Most Advantageous and Attractive: Tunnel Option with case study uplifts is used as the benchmark case. Sensitivity testing shows that for the BCR to reduce to 1, present value costs for the route would need to increase by 182%. Sensitivity to baseline usage was also examined and is reported below.

The economic appraisal demonstrates that while the Most Advantageous and Attractive: Tunnel Option is the most expensive to deliver, it ranks highest in terms of value for money, using case study uplifts, and Tourism benefits. It also ranks highest when assessed against the five non-economic criteria. However, the Next Preferred Alpine Option and Low Cost and Quickest to Deliver Alpine Option have the highest value for money using the CFUT inputs and these options are also the cheapest to deliver. It is Sustrans' assessment that the Alpine Option for each route is valuable for the purposes of comparison but would in practice be a highly compromised solution in terms of level of service for users and would not deliver the heritage benefits of the tunnel.

A study of this complexity inevitably has limitations. The following limitations are identified across the analysis:

- There are no case studies to use as a direct comparator for tunnels of significant length used as walking and cycling routes in the UK. There is therefore a high level of uncertainty when using case study uplifts.
- Cost uncertainties are present due to expected unforeseen construction costs and known exclusions. Known exclusions include geotechnical and drainage works at Tunnel portals, and excavation and removal of material from the submerged Tunnel section. Cost uncertainties, and effects of inflation on costs were managed through sensitivity testing (described in Chapter 6) in agreement with CBMDC and DfT.
- Any baseline usage estimates have a level of uncertainty inherent, particularly as the tunnel alignment does not currently exist. The baseline estimates are based on population data, data from the National Travel Survey, and other assumptions.
- There is uncertainty around the assumption that between 20-50% of cycling and walking trips for people within 3.6 miles of the scheme would take place along the proposed routes. The assumptions used to generate the percentage of leisure journeys that would use the alignment are unevidenced estimates. These percentages were based on the lack of suitable infrastructure or other options for recreational walking and cycling along most of the proposed routes, especially in the more rural areas.

- The BCRs are dependent on the overall change in usage from baseline. For the BCR for the Most Advantageous and Attractive: Tunnel Option scenario to fall below 1, baseline usage would have to decrease by a factor of 2.8 (with the associated reduction in uplift).

In conclusion to the study, Sustrans summarises this complex and unique technical exercise and makes a recommendation from its position as a UK-wide charity. It must be acknowledged that DfT and CBMDC in particular have much greater weight of responsibility in assessing the significant risks and uncertainties that remain with this aspirational project such as:

- Concerns of securing access to the Tunnel, particularly from the south side
- The significant revenue cost exposure to the future owner of the Tunnel
- The delivery costs of the project will likely continue to rise due to inflation in the years it may take to prioritise the necessary funding.