
SOUTH BATH



TRANSPORT OPTIONS REPORT
DOCUMENT C



ARUP

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1 Introduction

1.1 Purpose

The South Bath Transport Options project seeks to identify a potential transport solution to the mobility and transport problems outlined in the ***Baseline Report***.

This ***Transport Options Report*** outlines work undertaken to find a proportional transport solution which will have direct benefits to the south Bath area and associated benefits to the wider city. This report:

- Briefly sets out the main transport options considered;
- Makes a high level assessment of this ‘long list’;
- Sets out the ‘short list’ options considered in more detail; and
- Makes some overall conclusions.

1.2 Objectives

The ***Baseline Report*** details information gathered about the area and considers the local, regional and national policy context. Objectives are derived from the issues identified in the Baseline Report and referred to throughout this document as the ‘scheme objectives’. They are as follows:

- Deliver improved connections and journey time savings between the city centre and south Bath as part of an integrated transport network for the city;
- Improve equality of access to services and opportunities by delivering a sustainable, affordable, resilient and convenient transport link;
- Support and enable inclusive economic growth, competitiveness and job creation through the provision of enhanced transport facilities that help tackle congestion;
- Realise environmental benefits by improving air quality, reducing carbon emissions, supporting climate resilience, minimising noise impacts and protecting and enhancing Bath’s World Heritage assets;
- Improve quality of life; promoting safety, health and wellbeing; and
- Deliver a viable solution supported by a robust business case with a clear means to gain planning consent that can be operated sustainably.

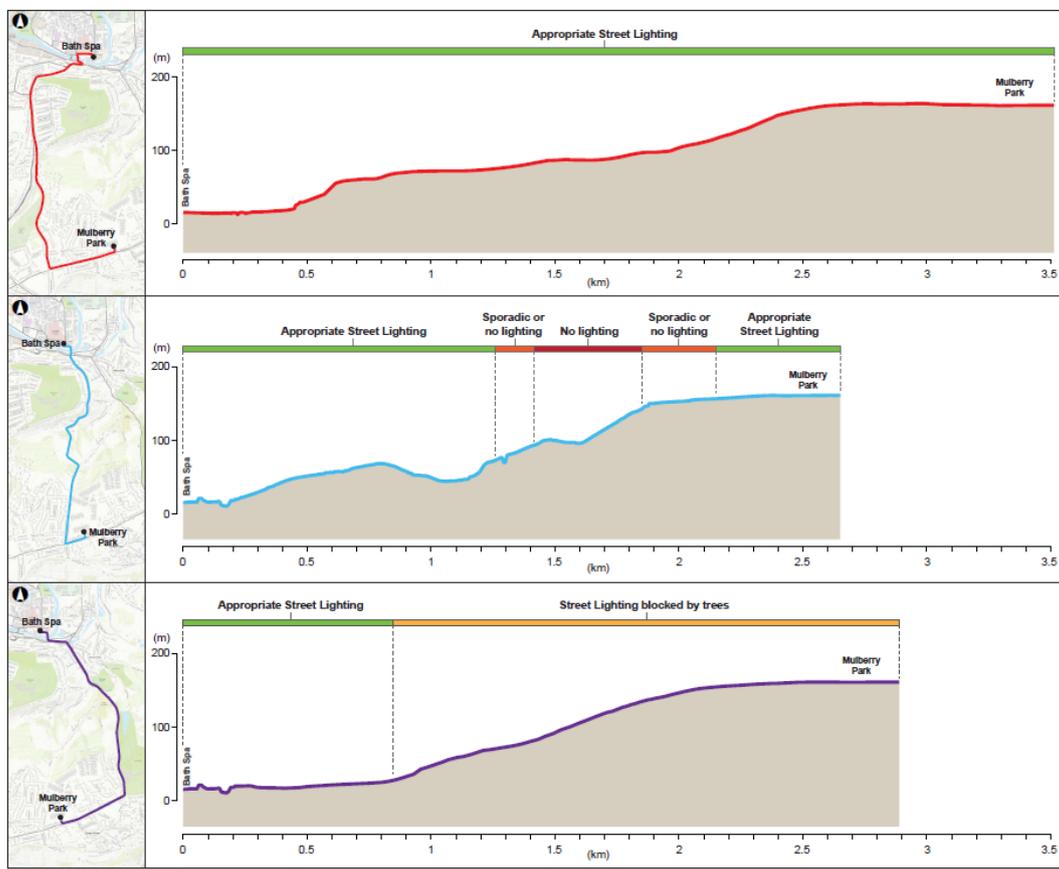
2 Options Development and Assessment

2.1 Options Development

South Bath is atypical from other UK urban areas; most notably in its topography, the presence of a World Heritage Site designation and narrow historical streets which all of which limit what can practically be done.

As shown in Figure 1, the topography of south Bath is especially challenging rising over 100m from Bath Spa station to Mulberry Park. This presents constraints in terms of what is feasible, as well as the potential effectiveness of options relating to walking and cycling. However it also presents opportunities for more innovative transport schemes.

Figure 1: Topography between city centre and south Bath



Transport options were developed considering the specific characteristics of south Bath as identified in the **Baseline Report**. An initial long list of options was formed which, within reason, could connect the two areas of the city. At the first stage these were largely unconstrained by feasibility and affordability factors in order to capture as many options as possible.

In selecting the point at which any solution will serve the city centre a number of factors were considered:

- Onward journey opportunities and connections to other modes of public transport;
- Proximity to city centre services, employment areas and the Bath Riverside Enterprise Area;
- Minimising disruption to the city centre transport network and highway network;
- The availability of space to construct a transport node; and
- Avoidance of creating a new crossing over the active mainline railway line.

In light of these factors, there is an overwhelming case for locating the city centre terminus on the south side of railway as close to Bath Spa Railway and Bus Stations as possible. This would provide the maximum potential for onward and integrated public transport journeys, acting as an extension of the public transport network with interchange to both bus and rail.

2.2 Assessment Process of Options

The assessment of the long list of options is based upon the scheme objectives and the ‘five cases’ model as set out in the Department for Transport’s *Transport Business Case*¹ guidance. This model uses five business case categories on which to assess transport schemes:

- Strategic case – the case for change and fit with wider objectives and policy;
- Economic case – the proposal’s value-for-money and impact on the economy;
- Financial case – the proposal’s financial affordability to build;
- Commercial case – the proposal’s commercial viability (in terms of procurement); and
- Management case – the proposal’s feasibility and deliverability.

In the first stage of the assessment process the initial long list of options are set out and were qualitatively assessed at a very high level against the scheme objectives and practical feasibility and affordability.

The overall objective of this first stage was to identify a shortlist of solutions that have a reasonable chance of technical feasibility and affordability to take forward to a second stage of assessment.

At the second stage, shortlisted options were developed in more detail from options that performed relatively better. These were then assessed using the five case model criteria in the DfT’s ‘*Early Assessment Sifting Tool*’ (EAST)².

Overall conclusions are made in a third stage, and benefits and dis-benefits of an identified option discussed.

¹ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/85930/dft-transport-business-case.pdf

² https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/4475/east-guidance.pdf

3 Long List of Options

3.1 Bus

Bus options have been split into ‘Conventional Bus’, ‘Bus Rapid Transit’ and ‘Park and Ride’ options but are not mutually exclusive with the potential to combine various elements into larger packages.

A number of conventional bus options have been considered, including:

- Improvements to existing services – comprising bus stop upgrades, new buses with improved on-board experience, additional payment options such as contactless payment on the bus and a new stop on approach to the city centre;
- Bus priority on existing routes along Wellsway and/or Ralph Allen Drive;
- Additional bus routes that bypass existing congestion ‘hotspots’ by not entering the city centre and stopping on the A36 gyratory with pedestrians making use of the Halfpenny Bridge (to Bath Spa station) or the bridge to the bus station;
- Conventional bus package – comprising a combination of the three options above providing priority where possible, upgrades to passenger experience and a new service completing a clockwise loop (Fox Hill Rd, Wellsway, A36 gyratory, Ralph Allen Drive, Fox Hill Rd) with a stop on the A36 gyratory; and
- Office buses for specific employers or destinations.

A single bus rapid transit (BRT) option has been considered comprising a two-way guided busway on a new route from Fox Hill Rd to Prior Park Road via Perrymead.

Three park and ride (P&R) options have been considered at this initial stage:

- Improving existing facilities and services from all P&R sites in Bath to capture more trips at the city boundary thus freeing up additional road space on local roads for other users;
- Shuttle Bus to Odd Down P&R or a dedicated P&R stop on Wellsway; and
- Divert existing Odd Down P&R services via Fox Hill Rd.

3.2 Cable Car

A cable car system would comprise two stations, one located in south Bath and the other in/near the city centre with two fixed cabins of a capacity of around 80 people per cabin. The stations would be positioned to ensure good connectivity to the local areas and to the existing transport networks to ensure high quality onward travel connections. The system would be adaptable to different markets with speeds and prices being adjustable to accommodate commuter and tourist demand/expectations.

3.3 Highways

The highways options assessed comprise a new highway link, additional city centre parking and the use of connected or autonomous vehicles. The new highway link would connect Fox Hill Rd to Prior Park Road either via a widened Perrymead or a new link that bypasses existing residential properties on Perrymead.

Additional parking in the centre could be achieved by converting at-grade car parks to multi-storey car parks (MSCPs), constructing new MSCPs either on brownfield or greenfield sites or introducing automated parking solutions that reduce the amount of space required per parking space.

Autonomous vehicles (AVs) offer future generations a multitude of opportunities for transport mobility and would apply equally to public transport solutions and personal vehicles. AVs do not need to park in the centre and, when all vehicles are autonomous, may lead to reduced congestion as traditional junctions would not be required.

3.4 Personal Rapid Transit

A Personal Rapid Transit (PRT) system using a fleet of automated vehicles operating along a segregated guideway can provide an on-demand, non-stop journey in a small, high-quality vehicles with off-line stations. PRT infrastructure is relatively light-weight, requires a minimal footprint and the vehicles are able to navigate tight radii and steep gradients. This makes the technology a good fit for sites such as Mulberry Hill where access corridors must take account of numerous constraints, especially a steep gradient.

3.5 Rail

Two rail based options are: light rail (tram) and a funicular railway.

The challenging topography and existing urban form would mean that light rail routes to and within the centre would need to run on existing highways which would require either priority running or the closure of certain roads to vehicular traffic.

A funicular could provide a direct connection to Bath Spa from Mulberry Park or other locations in south Bath. The system would run in a straight line, through tunnels and elevated sections as necessary, and can handle very steep gradients. Stations would only require an access portal above ground with facilities below and the track could be entirely in tunnels until it reaches the southern side of Lyncombe Hill.

3.6 Smarter Choices

A smarter choices package is, primarily, a series of low cost initiatives that, when combined, could have an impact on modal choice. For this options report we have considered a package of walking and cycling measures (see Section 3.7) and two options that could result in a significant impact. These options are:

- A taxi sharing service – a managed service that would enable 3-4 people to share a taxi with common origins and/or destinations;
- On demand mini-buses – similar to a shared taxi service but with a set origin/destination point (in this case the city centre) and larger vehicles.

3.7 Walking and Cycling

A number of walking and cycling options have been assessed at this initial stage, including:

- Walking super highway – a continuous link with pedestrian priority using raised table junctions, zebra crossings or grade separation if necessary. The link could be made safer with natural surveillance and adequate lighting;
- Escalator / moving walkway link – using the premise of a walking super highway but with the addition of mechanical aids including moving walkway on flat sections as in an airport and escalators to traverse the steep gradients on the route. Given the typical weather conditions, it is likely that any mechanical aide would need to be fully enclosed to avoid any electrical problems;
- On road cycle improvements – improving cycle facilities between the city centre and south Bath, primarily focussed on Wellsway, Ralph Allen Drive and Perrymead / Fox Hill Rd;
- Electric bike scheme – comprising free personal electric bikes or a voucher towards an electric bike for residents to encourage cycling to work and for leisure purposes. Option would require some level of on road cycle improvements to encourage modal shift;
- Cycle lift – comprising a footplate that pushes a cyclist up a hill at a speed of 4-5mph using ski lift type technology that is buried underground. The above ground structure comprises a narrow channel that can be driven over and a control interface. The final steep gradient on approach to Fox Hill Rd is around 700m (requiring two 350m lifts) with users transferring from one to the next;
- Extension of Cycle Hire scheme – comprising new stations and bikes in south Bath, expanding the existing NextBike offer to a, potentially, city wide network of hire stations. Electric bikes could be introduced for travelling up the steep gradients to south Bath;
- Combe Down Tunnel Lift – connecting the development to the Two Tunnels Greenway with a lift large enough to accommodate bicycles as well as pedestrians. The Greenway passes underneath the North East of the Mulberry Park area and such a lift would facilitate access to the cycle network.

4 Option Assessment

4.1 Bus

Conventional bus options are deliverable and practical. But, as individual projects, would contribute little against the scheme objectives. Individual measures would be affordable, each costing several million or less, with ongoing costs at least partially covered by increased revenues. However, as projects on their own, they would be unable to significantly improve journey times and would do little to provide better connectivity between south Bath and the City Centre.

Whilst the BRT option might have a greater impact in terms of improving connectivity and reliability, through a segregated guideway, it would still be subject to congestion when re-joining the highway. It would also be more expensive than conventional bus measures, with a cost in the tens of millions. Crucially, it would have significant landscape and heritage dis-benefits in the Perrymead area. As a result, BRT is not considered feasible.

A package of conventional bus measures has the potential to fulfil some of the scheme objectives and perform well against the five cases and has been developed at a high level for consideration at the shortlist stage.

4.2 Cable Car

A cable car scheme would be able to provide a wide range of benefits to south Bath and contributes to all of the scheme objectives providing a fast, reliable, and environmentally friendly mass transit option that has the potential to realise significant modal shift in the area. In terms of practicality, urban cable cars are now common with a number already in operation in Europe, and North and South America. Several schemes are also being developed in French cities. Feasibility work suggests a cable car is deliverable and practical.

The cost of a cable car would be around £40m and has the potential to attract private investment. Ongoing costs could be covered by operational revenues with commuters using the service in the morning and evening peak and tourist, leisure and visitor traffic using the cable car in the off peak periods.

In terms of connectivity, the cable car would provide a large reduction in journey time and a high degree of journey time reliability. A cable car would have a small physical footprint; landscape impacts could be reduced by using two large cabins working in relay as opposed to many small gondolas on a continuous loop. There are some potential landscape dis-benefits in terms of the impact of the towers and the system would oversail some property.

Two stations would be required, one in south Bath, and the other at the south side of Bath Spa railway station – chosen to avoid oversailing the railway, to integrate with public transport and to shield the cable car station from heritage assets in the city core.

The cable car option would fulfil the scheme objectives and perform well against the five cases and has been considered at the shortlist stage.

4.3 Highways

A new highway link and additional parking in the centre would not be able to meet the objectives and would contravene local policy.

The cost of a new highway with associated junction improvements and multi-storey car parks could be between £50m and £80m and would not represent good value-for-money.

Firstly, the option would only achieve small journey time savings for drivers, with the capacity of a new highway link limited by the road network that feeds into and out of it (including the already congested Rossiter Road system).

Secondly, a new highway link would have a significant impact upon the environment, the setting of the city and quality of life for local residents. Increasing parking in the centre is likely to result in increased congestion on all radial routes and have a significant detrimental impact on air quality.

Given that a new highway link would have an unacceptable impact on the landscape, contravene local policy, and does not fulfil many of the scheme objectives it is not considered further.

Automatic vehicles are currently in the concept testing phase of their development and are not a realistic option for consideration at the current time. Whilst AVs are likely to lead to a significant change in the way we travel in the future, timescales and impact are unclear and the full benefits of AVs will only be realised when all vehicles are capable of operating autonomously.

Highways options would not fulfil the scheme objectives, would perform poorly against the five cases and contravene policy and are therefore not taken forward to the shortlist stage.

4.4 Personal Rapid Transit

A PRT system could meet the Scheme objectives, with a significant positive impact on journey times and modal shift. However, the main impediment to a PRT option is practical feasibility and expense. There is no route that presents a feasible alignment and elevated tracks would have a significant negative visual impact on the surroundings and the built environment.

PRT systems are not good at accommodating peak levels of demand due to the limited number of pods and the small capacity of individual cars. This option is therefore not taken forward as it is not practically feasible or affordable.

4.5 Rail

Light rail would contribute to some of the scheme objectives, but it would be disproportionate to the problem and inappropriate to the need. The cost of a light rail route could be in the region of £150-£300m pounds based on costs of recent schemes in Nottingham, Manchester and Birmingham. A light rail route following the highway network would not be able to deliver journey time savings unless roads were closed to vehicular traffic which would have a large impact on the

functioning of the area. Overhead gantries would be required for some or most of the route which would impact on townscape and buildings.

Additionally, a modern light rail system, like those found in most European cities (Manchester, for example) would be unlikely to be able to navigate the tight corners and steep gradients like those found on Lyncombe Hill and Wells Rd. Whilst a small number of systems can handle such gradients these tend to be cable hauled or small carriage 'heritage' systems such as that found in Lisbon, Portugal. As a result, a direct route to Mulberry Park would be very difficult to implement.

A funicular would be able to meet the objectives for transport connectivity in south Bath providing many of the same benefits of a cable car. However, the high cost associated with tunnelling from the centre to the southern side of Lyncombe Hill and the elevated section from there to Mulberry Park would be in the hundreds of millions of pounds, is disproportionate to the problem, and is not considered feasible.

4.6 Smarter Choices

Smarter Choice measures are by their nature relatively easy to implement and practical to deliver.

However, individually, smarter choice measures would have an insufficient impact and fulfil very few of the scheme objectives. Depending on the measure, this would likely require ongoing revenue support and would be unlikely to pay back capital cost.

Whilst affordable, smarter choices measures would not provide a high capacity convenient alternative to driving and would only encourage limited mode shift. There are unlikely to be journey time savings and some journeys could lengthen, albeit on sustainable modes.

Measures such as taxi sharing and car clubs have potential to capture a large number of trips if critical mass is reached, but this would be very challenging. As a package, the impact could be higher, and would be relatively easy to implement.

On their own, the smarter choices measures would not fulfil the scheme objectives. When considered as part of a package alongside walking and cycling measures, there may be a stronger case and this concept is therefore developed further in the shortlist.

4.7 Walking and Cycling

Individually walking and cycling improvements would have very little impact and would not fulfil the scheme objectives. Even in aggregate, the topography of the site would present a real and perceived barrier to take up.

Whilst affordable, the practical feasibility for traffic-free cycle routes is limited by road width and public acceptability of making space for such measures through removal of parking spaces. Additional options such as an escalator / moving walkway link and the Combe Down tunnel lift are not considered practically feasible or to have a reasonable cost compared to the impact they will have on scheme objectives.

Individual walking and cycling measures would not make a significant contribution to the scheme objectives. However, in aggregate and alongside smarter choice measures there may be a stronger case and this is considered further as part of the smarter choices package in the shortlist.

5 Shortlist Options Assessment

Of the long list, the majority of options are not feasible based on cost, impact or policy (e.g. BRT, PRT and highways); insufficient to make a noticeable contribution to the scheme objectives on their own (e.g. hire bikes); or are disproportionate to the problem (e.g. light rail). Three options have been shortlisted from the long list and have been further refined to enable a more detailed assessment and comparison of the options. The shortlisted options are:

- An **express bus package** made up of an express bus route, route improvements and new city centre terminus;
- A **cable car** as a concept made up of two stations and cabins working in relay with towers and associated cable; and
- A **package of ‘smarter choice’ measures** which includes many of the smaller measures in the long list into one package.

To allow for comparison between options, costs are capitalised over a five year period and a basic contingency of 20% has been added to all three of the shortlist options.

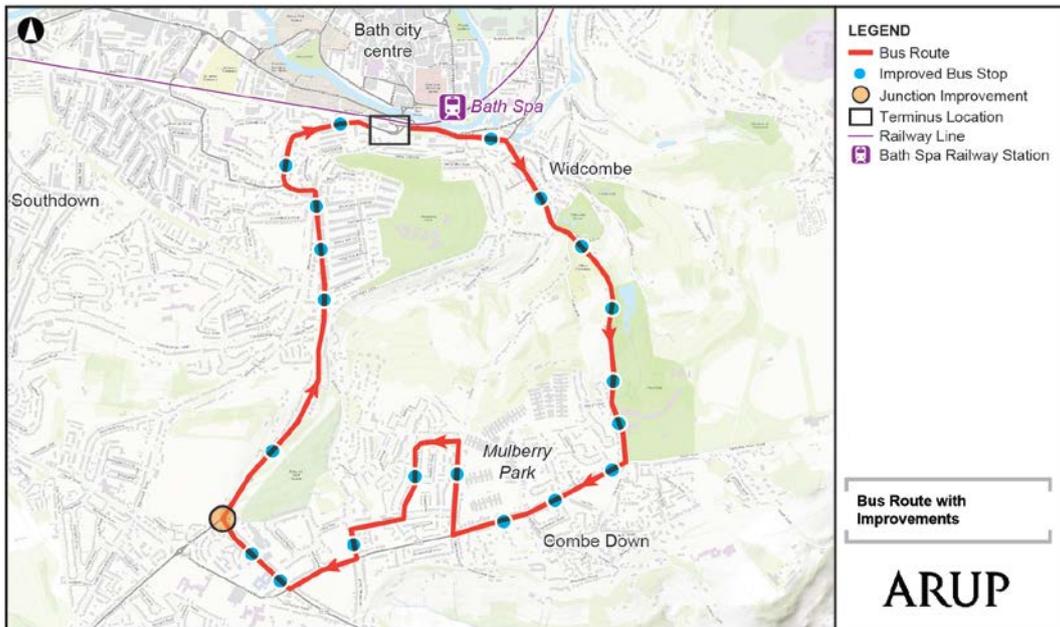
The DfT’s EAST categories are then used to assess the relative performance of the options against the 5 case model as set out in the Department for Transport’s *Transport Business Case* guidance.

5.1 Express Bus Package

An express bus package has been formulated with the aim of fulfilling as many of the scheme objectives as reasonably possible using conventional bus based transport. It is made up of:

- A new express bus route offering frequencies of about 6 minutes on a one-way clockwise circular loop. A clockwise loop has been identified in order to minimise turns across junctions and to take into account the new alignment around Widcombe Parade which prohibits an east bound movement to Rossiter Road;
- A fleet of modern low emission, ‘midi’ type buses which are best suited to the historic city environment;
- Improved bus stops with real time information and a comfortable waiting environment, similar to those being built by the nearby MetroBus project in Bristol; and
- A terminus on the south side of the river Avon with bus priority at the A36/A367 junction to avoid congestion and save time by staying outside of the city centre whilst integrating well with the bus and rail stations.

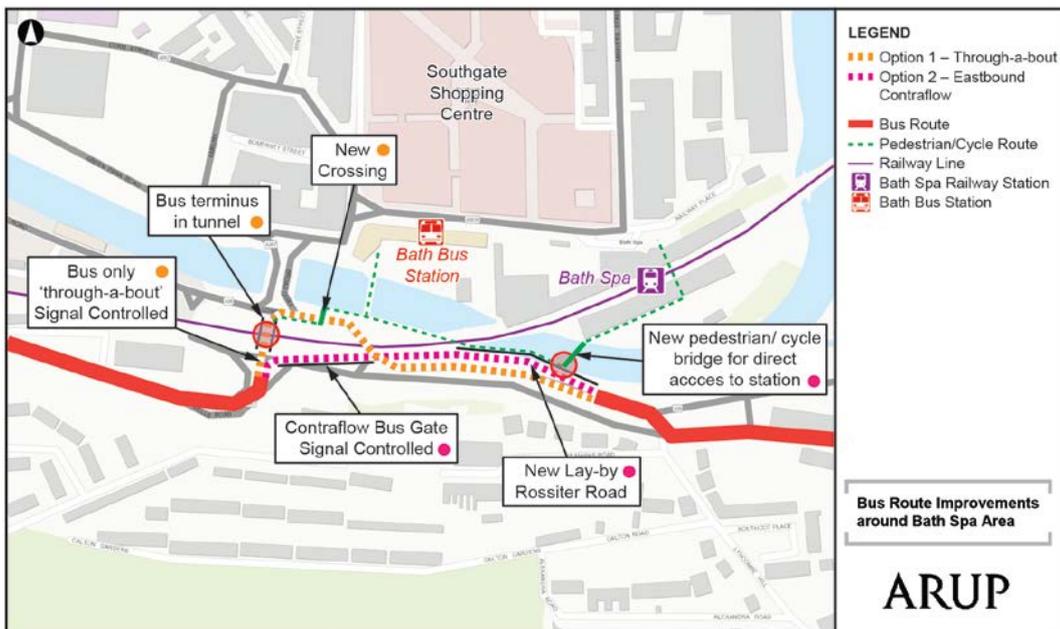
Figure 2: Bus package overview



Two further options could exist to provide a southern terminus to give the route the best possible chance of achieving journey time savings:

- A bus only ‘through-about’ at the A36 gyratory which then travels under the railway arch and terminates within the roundabout, with associated crossings and signalisation to allow a straight across movement from Wells Road; and
- An eastbound bus contraflow lane on the westbound A36 arm of the section of the roundabout south of the railway line, crossing to the north side of Rossiter Rd with a new layby to allow alighting.

Figure 3: Bus package – Terminus Options



Both options would include a footbridge to allow for direct access to bus station and the main access of the train station. For the purposes of this high level assessment both have been estimated to cost the same at around £17m including 20% contingency and 5 years of initial operating costs. This figure includes the capital cost of a new fleet of buses, 20 new bus stops, works at the southern terminus, and a new footbridge from the southern terminus to create a better link to the bus and rail stations.

Bus option assessment

Strategic Case: Good alignment with local and regional policies and objectives. Implementation is clear with a likelihood of wider public acceptability.

Economic Case: Scheme has a largely neutral impact against criteria; impact on connectivity, reliability, wider economy, network resilience and delivery of housing is weak. Bus option would have a broadly neutral impact on quality of place and the built environment.

Financial Case: Would likely require public investment in capital costs but could attract private investment. Risk of ongoing revenue costs. Manageable cost profile and risks.

Commercial Case: Bus option could attract private investment from bus operators, but whether it would cover its day-to-day running costs after the initial funding period is unclear.

Management Case: Option is practical and feasible with minimal engineering challenges / effort relative to other major schemes within local and national context.

Overall impact: Medium impact overall. Some mode shift could be expected but modest journey time savings could mean no significant shift so as to achieve what could be considered as a mass transit solution.

The maximum capacity of the system would be approximately 600 people in the peak hour. Journey time savings would be modest perhaps around 3 minutes from current schedule journey times of 20 minutes in the peak. There would be very little protection from congestion events and incidents and the service would still get caught up in traffic.

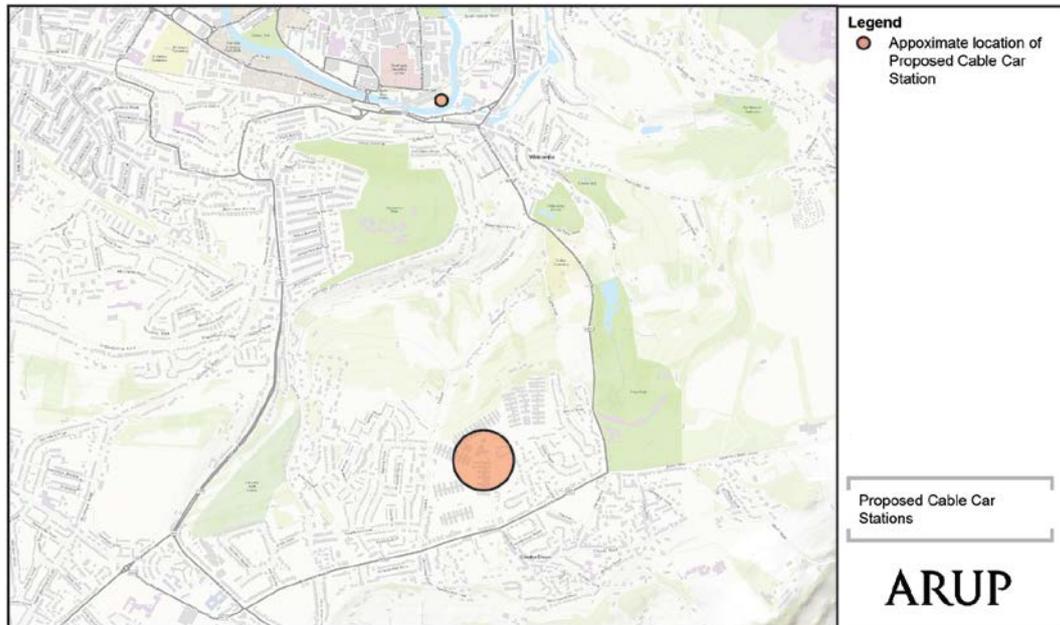
5.2 Cable Car

A cable car option has been considered at the high level feasibility stage. It comprises of:

- Two stations, one in the area south of Bath Spa railway station to the east of Halfpenny Bridge and another indicatively in the Fox Hill area;
- Towers constructed of sufficient height to carry the cable safely above property and trees;
- Two large cabins running in relay to minimise visual and oversail impact.

The exact alignment and tower locations would be subject to further investigation and consultation. For the purposes of this high level assessment, costs have been estimated on straight line route at around £40m including 20% contingency. Figure 4 shows the areas where the stations are assumed to be located.

Figure 4: Approximate cable car station locations and alignment



Cable Car Option Assessment

Strategic Case: Strong alignment to policy and the scheme objectives especially regarding impressive journey time reductions. Implementation is clear with some likelihood of some public acceptability in the wider area. Some properties will be directly affected by oversailing and this needs to be recognised as a serious issue for those impacted.

Economic Case: Scheme has positive impacts against nearly all criteria. It makes a clear contribution to connectivity, reliability, wider economy and there is also positive impact on resilience and / or delivery of housing. The options would create a direct link between south Bath communities and employment in central Bath. There would be a localised impact on landscape as a result of towers but some benefits to the south side of Bath Spa station through regeneration.

Financial Case: Capital cost is proportional. Scheme revenue costs are self-funding through a mix of commuter and tourist traffic with manageable cost profile and risks.

Commercial Case: Strong commercial case. Scheme is proportional to problem and has a case for funding and could attract private investment. The option is likely to generate a surplus and require no ongoing subsidy. Some capital pay-back on construction costs.

Management Case: Option is practical and feasible with few engineering challenges relative to other major schemes within local and national context as it would not conflict with other infrastructure.

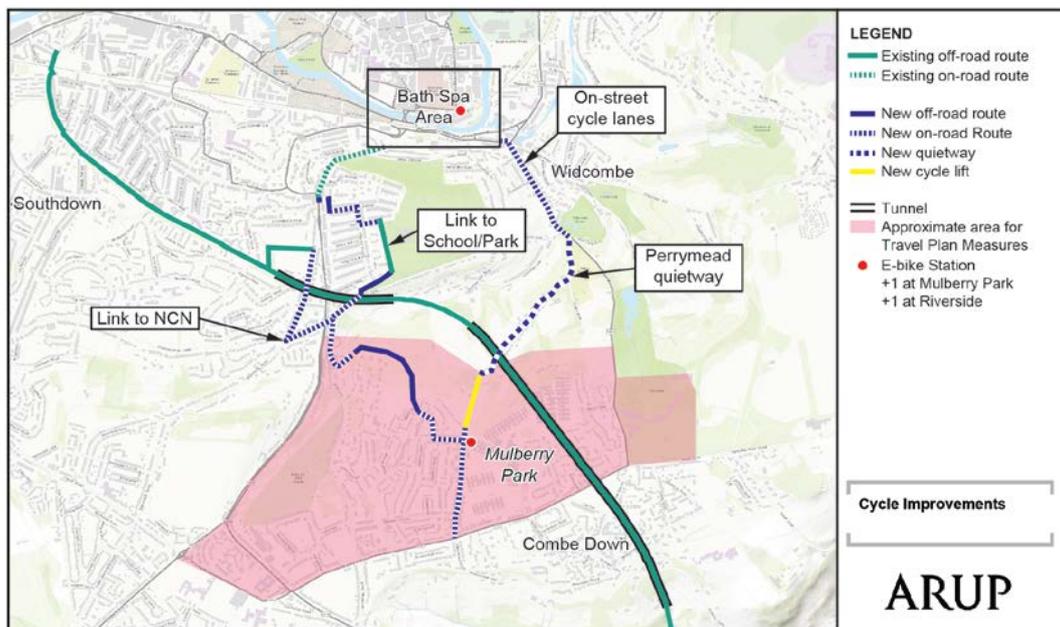
Overall impact: High impact overall. Scheme is proportional to problem and could achieve significant mode shift with opportunity to link into bus networks and rail network. Increased speed, resilience against congestion and capacity would mean that the options represents a mass transit solution.

The capacity of the system would be approximately 800 in the peak hour. Journey time savings would be significant, up to 15 minutes on scheduled bus times depending on walking distances in the peak. Scheme would be insulated entirely from congestion events and incidents.

5.3 Smarter Choices package

A smarter choices package, incorporating walking and cycling improvements has been formulated. The focus would be on physical improvements supported by smarter choice ‘travel planning’ type measures to encourage modal shift and active travel.

Figure 5: Smarter Choices Package



The main elements would comprise of:

- A main cycling route from Widcombe Parade to Mulberry Park including walking and cycling improvements, changes to the junction at Widcome Parade and Prior Park Rd, and a ‘cycle lift’ up the steepest part of Fox Hill Rd;
- A new pedestrian and cycle bridge to link the path on the east side of the river Avon and more directly with the front of Bath Spa Station via Railway Place;

- New cycle hire stations which would include electrically assisted bicycles (e-bikes) to help overcome the hilliness of the area;
- Travel Plan type measures including personalised travel planning, working with employers and schools, loan bikes, travel marketing, and adult cycle training; and
- Car share groups, car clubs, taxi share schemes and electric vehicle charging points.

Costs have been based on the West of England's Local Sustainable Transport Fund 'WEST' project 2015/16 and include a 5 year operation of the smarter choices measures. The total cost of the package is estimated at £9m, which could be scaled up or down depending on the content.

Smarter Choices Option Assessment

Strategic Case: Alignment to policy but weak link to scheme objectives. Scheme implementation clear with good likelihood of wider public acceptability. Few risks with clear mitigation, but low overall impact.

Economic Case: Scheme has a largely neutral or mixed impact against criteria; connectivity, reliability, wider economy, contribution to network resilience or delivery of housing.

Financial Case: Capital Cost is modest but this reflects the likely impact. This option would almost certainly require ongoing operating costs. Scheme has broadly neutral impact on the quality of places and the built environment. Broadly neutral impact on enjoyment of heritage and landscape.

Commercial Case: Scheme has a case for funding and could attract some private investment from car club operators for example, but will likely require ongoing subsidy.

Management Case: Scheme is practical and feasible with minimal engineering challenges / effort relative to other major schemes within local and national context, but low overall impact.

Overall impact: Low impact overall. Limited mode shift could be expected but option is not a 'mass transit' solution. Topography and distances are likely to limit wholesale take-up of walking and cycling, but taxi share and car clubs could prove popular if critical mass is reached.

Scheme likely to have little discernable impact on costs or journey times along the route or across the wider area but some improvements to journey ambience and frequency. No or few journey time savings.

6 Conclusions

Bath faces challenges to accommodate future growth, improve air quality, and deal with congestion. To manage this growth and ensure that south Bath secures the benefits of economic development, additional transport provision is required and the case for this had been made in the *Baseline Report*.

The possible options and alternatives to deliver the required additional transport capacity and connectivity needed in south Bath have been assessed against the scheme objectives and the DfT's Transport Business Case criteria - the 'five case model'.

The smaller schemes presented in this report do not make a compelling case as their overall contribution to fulfilling the scheme objectives would be low. Large schemes, such as a funicular, whilst fulfilling some of the objectives, are unfeasible due to costs and technical/physical constraints.

Of the shortlisted schemes, even in aggregate, the Smarter Choice measures would have a low impact, require ongoing funding, and be limited by topography. The bus package delivers against some scheme objectives but would not provide the improvements to connectivity, journey time, or capacity required.

The cable car fits well with the strategic case, aligning to the scheme objectives and wider transport policy. The cable car would provide a direct, fast and frequent connection to the city centre – linking people with jobs and the interchange facilities at the bus and railway stations without adding to road based congestion.

6.1 Benefits and dis-benefits of a Cable Car

Main benefits of the cable car option are:

- **Economic:** The economic case is strong with a cable car option providing a quick and reliable connection for local residents as well as supporting the local visitor economy, and helping people in south Bath access jobs;
- **Financial:** Further work will be needed but considering the capital and operating costs, high frequency, short journey time and large capacity the cable car potentially offers excellent value-for-money.
- **Commercial:** Supporting the commercial case is the potential to bring new passengers to the bus and rail networks and low operating costs when compared to alternatives. There is the possibility of attracting third party funding and the ability to repay capital costs over time;
- **Delivery:** A cable car provides a strong management case with proven technology, relatively low capital and operating costs and established delivery model;
- **Wider impacts - environment:** The cable car would be low emission and could provide a boost to bus networks in south Bath and beyond to nearby towns and villages;

- Wider impacts and regeneration: A cable car could deliver regeneration in the vicinity of Bath Spa Station, re-activating the south of the station and regenerating underused space;

There are some dis-benefits which need to be considered:

- Some impact on the character and undeveloped land as a result of visual impact resulting from the towers in the area between Bath Spa Station and Mulberry Park, an Area of Outstanding Natural Beauty and a World Heritage Site;
- Whilst the exact alignment is not yet known, the cable car would oversail private property and potentially sensitive sites nearby including burial grounds, allotments and parkland;
- There is the potential for environmental impact including loss of trees and modest loss of open space from the towers;
- Like any fixed track solution, cable cars require regular planned maintenance and most systems are shut once a year for around a week; and
- Whilst cable cars are designed to operate in mountainous conditions and inclement weather, very high winds could occasionally close the system.

6.2 Overall conclusions

There is a compelling case for the cable car option and on balance it is considered that the overall transport, congestion, air quality, and connectivity benefits to the city outweigh the local dis-benefits.

A cable car running from Bath Spa station to south Bath presents an appropriate and feasible solution which achieves the scheme objectives, performs well against the five cases, and has numerous benefits to the area and city of Bath as outlined above.