Abernant Tunnel – The Business Case

A study looking at the business case for reopening the disused Abernant railway tunnel for walking and cycling

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County Borough Council
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1 Introduction

A study of the economic benefits of reopening the Abernant Tunnel as a walking and cycling route, to inform the business case presented to Merthyr Tydfil County Borough Council.

This analysis will inform the business case for opening the Abernant railway tunnel based on the benefits to local economies from tourism, increased amenity value as well as community development (cohesion and social development).

This work is informed by past analyses of the economic impact of converting railway tunnels to walking and cycling routes, in particular the scoping study for converting disused railway tunnels into walking and cycling routes as part of the National Cycle Network Wales.

The Abernant Tunnel lies between two major valley towns in South East Wales, Aberdare and Merthyr. The length of the Abernant Tunnel is 1.4 miles (2.3 kilometres) and the total additional route proposed to be built under this scheme would be 2.4 miles (3.8 kilometres), including both new build and upgrades to existing routes.

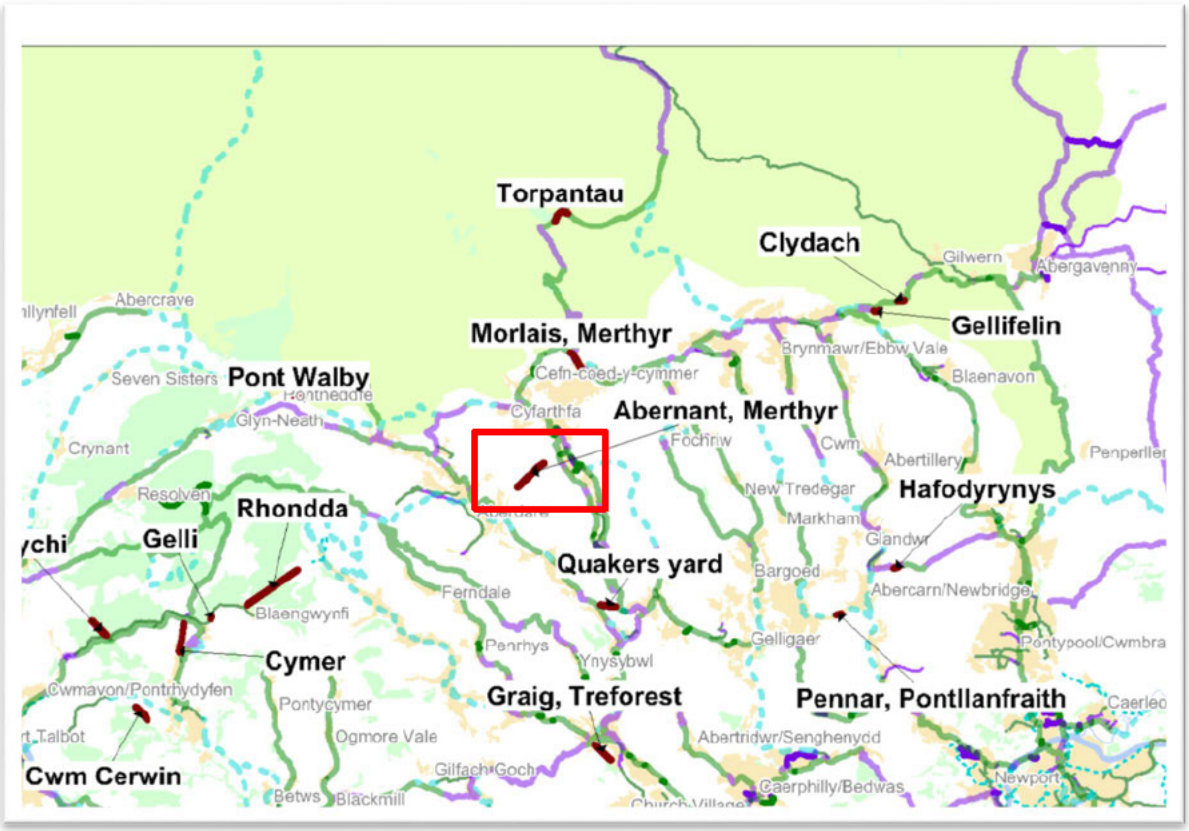


Figure 1 - The Abernant Tunnel in relation to the National Cycle Network

The tunnel is well-placed to be linked to existing routes on the National Cycle Network (NCN) with potential connectivity to the Cynon Trail on NCN478 near Aberdare and the Taff Trail on

NCN8 on the Eastern side. These good quality easily accessible connecting routes are vital to scheme success. The tunnel is also located in close proximity to the Gethin Woodland Park and Bike Park Wales, a recreational cycle park that is a significant attraction in the area with approximately 70,000 visitors per year.

Opening up new infrastructure routes has proven benefits in many areas. This report will summarise the research and case studies available to evidence the business case for opening the Abernant Tunnel to walking and cycling by presenting the following evidence:

- How important infrastructure is to overcome barriers and linking communities to promote cycling and walking.

- The tourism impact of developing the Abernant Tunnel route is outlined, using evidence from past Sustrans research on the economic benefits of tourism spending.

- The evidence on the economic benefits of opening the Abernant Tunnel is presented using an economic appraisal conducted using the WebTAG (web-based Transport Appraisal Guidance) and HEAT (Health Economic Assessment Tool.

- A Localised model of the economic benefits to potential commuters using the route is discussed
- The impact of the proximity to Bike Park Wales, tourism and direct job creation is also examined.

Due to methodological restrictions, not all of these impacts can be combined into a holistic Benefit-Cost Ratio (BCR) but these impacts provide additional information about the local context that can be used to support a judgment on the business case for reopening the Abernant Tunnel.

In summary, this analysis of the business case for the Abernant Tunnel finds that the potential tourism impact of the route is substantial given its proximity to the well-known Taff Trail and the attraction of Bike Park Wales.

In addition to the significant tourism-related economic impact, analysis of existing commuter behaviour in the area surrounding the tunnel supports the notion that individuals who commute in the area will benefit from the development of the Abernant Tunnel, as this opens up a cycling route for commuting directly between Abernant East and West; potentially benefitting 1,741 individuals.

Based on these additional benefits that are specific to the local context around the Abernant Tunnel, the economic benefits modelled in WebTAG that capture the higher scenarios of walking and cycling increases (the 90% or 130% scenarios) can be considered a reasonable prediction of the expected benefits of reopening the Abernant Tunnel.

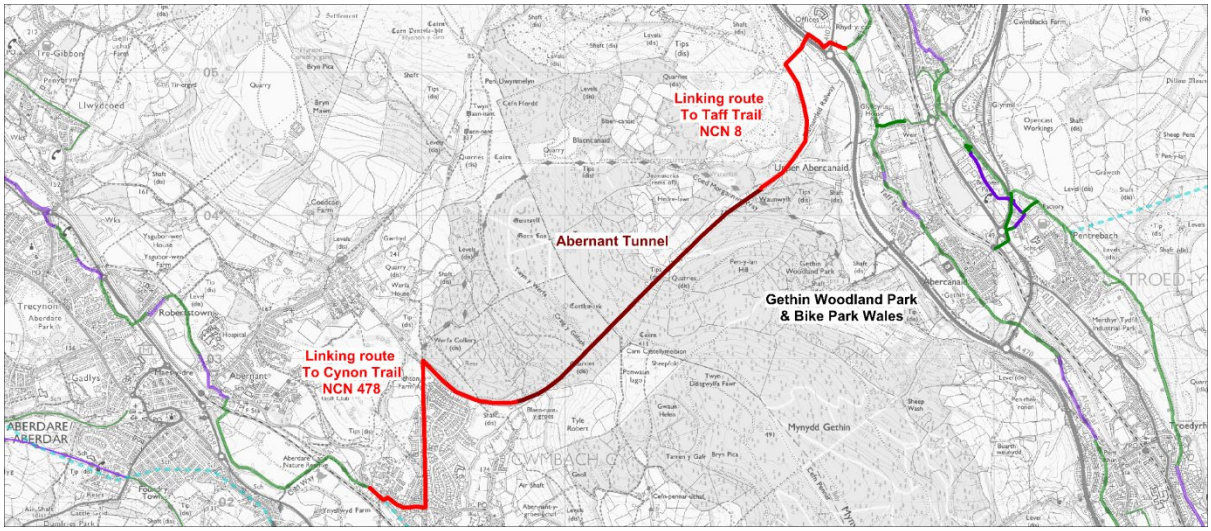


Figure 2- Plan showing the alignment of the tunnel and proposed linking routes to the Taff and Cynon Trails

2 New infrastructure to overcome barriers and link communities

Physical barriers, whether natural or man-made, can strongly influence the extent to which people are willing and able to travel sustainably. Local travel can be transformed by overcoming these barriers to enable walking and cycling to become part of everyday life.

Spatial analysis using census data shows that the commuter travel patterns indicate a high potential benefit of opening this route for commuters who currently travel in both East and West directions near the site on a daily basis.

The conversion of this tunnel constitutes the removal of a barrier that may currently be preventing a greater number of commuters from walking or cycling to work in this area. The economic value of these benefits will be explored later in the report.

Examples of infrastructure projects from recent years, including bridges, tunnels and traffic free links demonstrate a range of possible positive impacts, including benefits to local amenities (schools and businesses) and health, as well as overall positive returns on investment from using infrastructure to improve links across communities. The full range of these benefits can be expected with the opening of the Abernant Tunnel, examples of which are illustrated below.

2.1 Connect2 - Bath Two Tunnels

Prior to the conversion of two disused railway tunnels into a route connecting the centre of Bath and North East Somerset, no adequate cycling and walking link existed between these locations. As part of Connect2, a four-mile stretch of the former Somerset and Dorset railway line was transformed. The route was designed to run through Linear Park to the disused Devonshire Tunnel at Bloomfield and over the Tucking Mill Viaduct, which were both

renovated. The second tunnel at Combe Down is the longest cycling tunnel in Britain, at just over a mile long. People flocked to Bath from all over the country to celebrate the opening of the Two Tunnels Greenway and to experience the UK's longest cycling tunnel. Not only has it become a well-used route for local people, but it has also become a tourist attraction in its own right. As the second longest walking and cycling tunnel in the world, the Rhondda Tunnel opening might have considerable impact as a tourist attraction.

Benefits of Connect 2 Bath Two Tunnels:

- Schools benefiting from the scheme: Oldfield Park Junior School;
- Amenities benefiting from the scheme: Bath Queens Square, Sydney Gardens, Royal Victoria Park;
- 131% increase in total route usage after the opening of the route – 366% increase in cycling, and 50% increase in walking;
- Estimated economic benefits over 30 years - £13,760,994 (with 62% of these benefits coming to health), giving a BCR of 3.4.

2.2 Monsal Trail

The Monsal Trail is in the centre of the Peak District National Park. There are hundreds of interesting things to see along the Monsal Trail including wildlife, geology, industrial and rail heritage. The trail is a way-marked route with coordinated interpretation panels and listening posts to help people enjoy all it has to offer. You travel through four railway tunnels - each tunnel is about 400 metres long and is lit during normal daylight hours. They are operated by a light sensor, so in winter when the hours of daylight are less, the lights in the tunnels will switch off earlier in the day - around 4.30pm.

The route was voted the nation's favourite cycle route under 30 miles in results from voting as part of the celebrations of the National Cycle Network's 20th anniversary in 2015, demonstrating the clear potential for the Abernant Tunnel (located within the attractive Welsh Valleys) to develop as a popular tourist attraction for pedestrians and cyclists.

2.3 Connect2 – Argoed

People living in and around Argoed were limited in their ability to access the beautiful surrounding countryside on foot and by bike. There was a missing link on the National Cycle Route 467 between Blackwood and Hollybush and people were forced to use a busy rural road that was dangerous for cyclists and pedestrians. Sustrans, in partnership with Caerphilly County Borough Council and funded by the Valleys Regional (VRP), built a new bridge which was the centrepiece of a traffic-free walking, horse riding and cycling network.

With the bridge in place, local people have been able to make smarter travel choices and travel by foot or bike for more of their journeys. The route is incredibly popular with 44% of people using it every day to get to work, school or the shops, or for leisure. Because the route is safe and traffic free it has given people a great place to exercise more frequently with 18% of cyclists on the route having recently started riding again.

Benefits of Connect 2 Argoed:

- Schools benefiting from scheme: Markham Primary School;
- Workplaces benefiting from scheme: Argoed High Street, Oakdale Industrial Estate;
- 127% increase in total route usage after the opening of the route – 203% increase in walking;
- Estimated economic benefits over 30 years - £2,181,070 (with 81% of these benefits coming to health), giving a BCR of 17.2.

2.4 Connect2 - Pont y Werin Bridge, Cardiff

This bridge, delivered by the Connect2 programme, connects Cardiff and Penarth and carries over 1,300 journeys every day, with a growth in trips across the whole scheme network of 86% following the opening of the bridge. From our monitoring on the scheme, 85% of route users said the scheme had helped them to increase their levels of physical activity. The health benefits arising from the intervention are also substantial, equating to over £4 million (calculated using the WHO HEAT), contributing to a benefit cost ratio of 3:1.

3 Economic benefits of cycle tourism

Tourism is a crucial sector of the UK economy. It is the UK's fifth largest industry, employs 2.72 million people (2011) and is worth £115 billion a year. The industry is therefore critical to rebuilding the UK's economy and for generating employment, particularly among young school-leavers and in rural communities.

Tourism can contribute to the economy through direct spending, indirect spending and social value - determined by a 'willingness to pay' calculation. Cycle tourism represents a growing and valuable tourist market, particularly in rural areas, and can provide new incentives for people to visit an area and help support local trade and businesses. Long distance cycle routes, which are predominantly rural, can generate as much as £30 million per year to the local economy; enough to sustain over 600 full time equivalent jobs.

- Coast 2 Coast (Northern England) carries over 240,000 trips per annum (of which 14,000 is end-to-end usage), stimulates a spend of £10.7 million in the route corridor, and supports up to 173 FTE posts

- The Way of the Roses (Northern England) carries over 130,000 trips per annum (of which 7,000 is end-to-end usage), stimulates a spend of £3million in the route corridor, and supports up to 60 FTE posts

3.1 1: Tourism Spend and Route Usage on Key Tourist Routes in the United Kingdom

Route	Year	Distance (km)	Cycle trips	(of which end to end)	Total yearly expenditure	Jobs supported
C2C	2006	287	241,051	14,000	£10,700,000	173
Coast and castles	2006	151	68,000	8,100	£3,300,000	53
Hadrian's Cycleway	2006	234	160,242	7,500	£6,500,000	105
Pennine Cycleway	2006	184	39,182	2,100	£1,800,000	27
Celtic Trail	2008	734	940,000	-	£32,500,000	601
Taff Trail	2008	97	400,000	-	£14,000,000	259
Way of the Roses	2012	274	131,000	7,000	£3,000,000	60

3.2 Tourism spend on the VCN

In 2013, the Cycle Route Economic Impact Model (developed by Sustrans and The University of Central Lancashire) was used to estimate the impact of tourist spending on the Wales Valleys Cycle Network (VCN), and indicates the significant potential for the Abernant Tunnel to bring considerable economic benefits to the local area. Here it was estimated that:

- Average home-based spend per head was £8.77
- Average tourist spend per head at sites where tourists were surveyed was £22.52
- Average total yearly spend was £103,050 per site
- In 2011, tourists contributed 11% of the annual spend with home-based cyclists contributing 89%.
- In 2012 tourists contributed 4% and home-based cyclists 96%.

3.3 Tourism spend on the Celtic and Taff Trails

A study from 2008 commissioned by Sustrans Cymru to examine the tourism impact of the Celtic and Taff Trails finds support for the argument that the tourism value of a route is significant. As the Taff Trail is located on NCN8, at the Eastern side of the proposed site of the Abernant Tunnel, these findings are highly relevant to any examination of this proposed route.

The Taff Trail attracts an estimated 628,000 user trips per annum and expenditure by visitors along this route exceeds £21 million each year. This includes direct expenditure and indirect expenditure by businesses that benefit from the existence of the trails. This, combined with

corresponding figures for the Celtic Trail, gives a total impact of £75 million per year in the local economies of South Wales.

One of the main economic impacts of this is on employment. This spending generates or safeguards 367 jobs along the Taff Trail in total of which 30 are generated by inbound tourism. Along the Celtic Trail, this is attributed to 1,002 FTE jobs, of which 153 are from tourist expenditure. This gives an overall employment figure of 1,399 in the South Wales economy that can be directly attributed to the existence of the trails, supporting the notion that the tourism value of a route provides significant economic benefits.

3.4 Wider benefits of cycle tourism

There are other benefits of cycle tourism including enhancing personal health and fitness and it can help to improve cycling provision for local people, thereby encouraging utility cycling[3]. It can also lead to a reduction in pollution and traffic congestion[4]. Moreover, cycling is a socially inclusive activity and appeals to many ages and demographics[7].

4 Frameworks for the region

Development of the Abernant Tunnel and resulting extension of the surrounding NCN routes fits into the following framework detailing a wider plan of action for the surrounding area:

4.1 Valleys Region Park Evaluation Report (August 2014)

The VRP has aimed to "encourage healthy lifestyles, offer 'outstanding' outdoor recreation and learning opportunities and provide a quality visitor destination, thereby changing perceptions of the region and making the Valleys a prime location to live, work and visit".

- 39 infrastructure and landscape projects given full committal for delivery were completed;
- 40 interpretation projects and events took place;
- 151 km of managed access to the countryside had been created;
- 543 participants had been trained and acquired recognised qualifications through the Community Tourism Ambassadors programme;
- 16 new direct jobs had been created in visitor centres with 14 more anticipated;
- Employment generated by associated work directly on construction and site development is estimated to equate to 60 Full Time Equivalent jobs;
- £1,736,000 could be generated every year from visitor spending at 24 capital investments, and equates to supporting some 87.3 FTE jobs;
- Eight events are estimated to have generated an additional £73,339.00 GVA, and therefore supported around 3.5 FTE jobs for one year.

A study of existing research and a look into the benefits already experienced from similar routes and developments make a strong case for the likely impacts from the Abernant Tunnel opening, including (amongst others):

- Improved links between communities, bringing benefits to a range of local amenities including schools, workplaces and services.
- Direct and indirect job creation from the infrastructure works themselves and increased numbers of users now cycling and walking on the route.
- Increased tourism and associated spending at local businesses.
- Positive benefits to health from the increased levels of walking/cycling in the region.
- Overall positive returns on investments.

The actual level of economic benefits expected from the Abernant Tunnel opening (across a range of different areas) can be explored.

5 Estimating the impact of the Abernant Tunnel

The following section outlines the application of a model to examine the likely impacts of the opening of the Abernant Tunnel, including:

- Improved links between communities, bringing benefits to local amenities including schools, workplaces and services;
- Direct and indirect job creation from the infrastructure works themselves and increased users cycling and walking on the route after opening;
- Increased tourism and associated spending at local businesses;
- Positive benefits to health from the increased levels of walking/cycling in the region;
- Overall positive return on investment.

5.1 WebTAG

In-order to estimate the economic benefits of the Abernant Tunnel opening, the Department for Transport's WebTAG methodology can be used. This tool models the expected monetized benefits from different scenarios of usage by pedestrians and cyclists of the route to be opened under this scheme. This is conducted using an Annual Usage Estimate (AUE) and forecasting a range of scenarios in which this usage would increase due to the proposed route opening.

It should be noted that in Wales the WelTAG tool is typically used in the appraisal of transport initiatives. Although this tool is adapted to Welsh-specific objectives and the outcomes and strategic priorities of the Wales Transport Strategy, the methodology is closely similar to WebTAG. Sustrans RMU have used guidance set out in WebTAG to build a tool which can be used in the appraisal of sustainable transport initiatives.

5.2 Estimating the Annual Usage Estimate

In order to use the WebTAG tool, an Annual Usage Estimate (AUE) for the route being examined is required. Currently, no AUE for the Abernant Tunnel exists. There are no available AUE's for the NCN478 on the Western side of the tunnel. There is one Automatic Cycle Counter (ACC) on the Eastern side of the tunnel that is located on the NCN8 which consists of the popular Taff Trail leisure route, a heavily used section of the National Cycle Network (NCN). This counter is limited to providing an estimate of cycling only (as pedestrians are undetected) and is likely to be biased upwards due to its location on the Taff Trail.

In order to overcome this, an average AUE was calculated from the most recent available estimates (either 2012 or 2013) of usage from across a combination of sites across the Valley Cycle Network (VCN). The sites outlined in below that were used to calculate the average AUE taken forward as a proxy for current usage on routes around the Abernant Tunnel site.

AUE's of Valley Cycle Network (VCN) Sites

Site	Year	Total AUE	Cyclist AUE	Pedestrian AUE
Aberavon	2012	47,521	20,764	24,687
Aberbeeg	2012	15,213	1,520	13,240
Afan Argoed	2012	35,045	5,583	29,462
Blaenau Gwent	2013	8,749	2,202	6,547
Brynmwar	2012	26,923	6,334	19,160
Caerphilly	2013	4,451	-	-
Church Village Bypass	2013	59,533	24,319	29,747
Darran Valley	2012	8,979	3,573	5,104
Dowlais Top	2012	35,887	1,507	34,313
Ebbw Vale	2012	57,574	8,748	47,943
Gellideg	2012	14,126	858	13,013
Glyntaff	2012	103,365	43,399	57,862
Hirwaun Cynon Trail	2012	76,011	15,570	55,262
Llantrisant	2013	72,909	7,383	60,622
Llynfi	2012	40,971	7,274	32,802
Maesteg	2013	31,235	5,944	24,764
Parc Bryn	2012	140,434	15,980	116,292
Pontymoel Basin	2013	124,098	44,289	71,604
Sirhowy Country Park	2012	97,618	45,888	48,099
Torfaen	2013	30,685	2,079	28,010
Treforest	2013	31,138	5,334	24,364

From this, a total baseline AUE of 50,606 has been estimated, equating to 13,437 cyclists and 37,145 pedestrians. These values have been used as a proxy for a baseline level of usage on routes surrounding the Abernant Tunnel, and as a basis for calculating forecasted increases in usage resulting from the opening of the tunnel to estimate the economic benefits of this occurring.

5.3 AUE increase scenarios

A number of past cases where railway tunnels have been reopened as walking and cycling routes provide an indication of the scenarios of walking and cycling uplift that can be modelled with regard to the Abernant Tunnel.

The Bath Two Tunnels case has been used as the maximum increase in AUE on which the impact of the Abernant Tunnel opening will be modelled. The Bath Two Tunnels project involved opening up a route between two popular cities and usage of the route increased by 130%. This is likely to be due to increased active travel between the two cities along this route and due to the fact that this reopening of a train tunnel was the first project of its kind and therefore attracted a lot of momentum through numerous events and promotional activity related to the project.

WebTAG will therefore be used to model the expected monetized impacts from a maximum increase in the cyclist and pedestrian AUE of 130%. To account for the possibility that this substantial increase in usage can be attributed to the novelty and uniqueness of the Bath Two Tunnels project, two other scenarios will be modelled, namely AUE increases of both 50% and 90% above baseline levels. Such increases are within the range of increases seen at similar developments (such as Afan Argoed and Rodney Street Tunnel in Edinburgh).

The following outlines the pre and post-development AUE's for cycling and walking have therefore been used in WebTAG.

Table 2: Pre and Post Walking and Cycling AUE's – Abernant Tunnel

Pre cycling AUE	Pre walking AUE	Increase	Post cycling AUE	Post walking AUE
13,437	37,144	50%	20,156	55,717
		90%	25,531	70,575
		130%	30,906	85,433

Other inputs required in WebTAG include, separated by cyclists and pedestrians, include:

- Trip frequency
- Journey Purpose
- Trip distance
- Proportion not using a car for any part of their journey
- Proportion who could have used a car for their journey but have chosen not to

These inputs for WebTAG were taken from data aggregated across all VCN RUIS (Route User Intercept Survey see appendix for sample) results from 2013, the same source as the data that provided the AUE. It is therefore important to note that these figures represent a model of usage across the VCN that can be used to provide a theoretical assessment of the expected benefits of the Abernant Tunnel opening but are not specific to the site itself.

The values used in each of these variables have been kept consistent between baseline and follow-up, in-order to measure the economic benefits of forecasted changes in usage (in the AUE) from the opening of the tunnel only.

Although the variables outlined above can be expected to change between baseline and follow-up, it is difficult to estimate accurately the level of these changes in the local context.

Therefore, in the results presented in section 5.5 using the aggregated VCN data, these variables have been held constant in the pre and post-route development scenarios. This means that these figures illustrate the economic benefits of increases in usage (rather than type or frequency of usage) only.

Depending on what occurs in practice and how these variables change in response to the schemes, the valuations obtained in this manner may reflect an economic value that is either higher or lower than the reality.

5.4 Economic appraisal of health benefits using HEAT

The WebTAG tool permits the inclusion of the economic value of health benefits associated with increased walking and cycling as a result of the uplift scenarios modelled under both schemes. The Health Economic Assessment Tool (HEAT) has been developed by the World Health Organisation (WHO) and is accessed at the following link: http://www.heatwalkingcycling.org/

Table -3: Health Economic Benefits of the Abernant Tunnel (HEAT)

Cycling AUE increase	**50%**	£275,000	**Walking AUE increase**	**50%**	£1,776,000
	90%	£503,000		**90%**	£3,197,000
	130%	£732,000		**130%**	£4,617,000

5.5 Economic benefits of Abernant Tunnel (Aggregated VCN analysis)

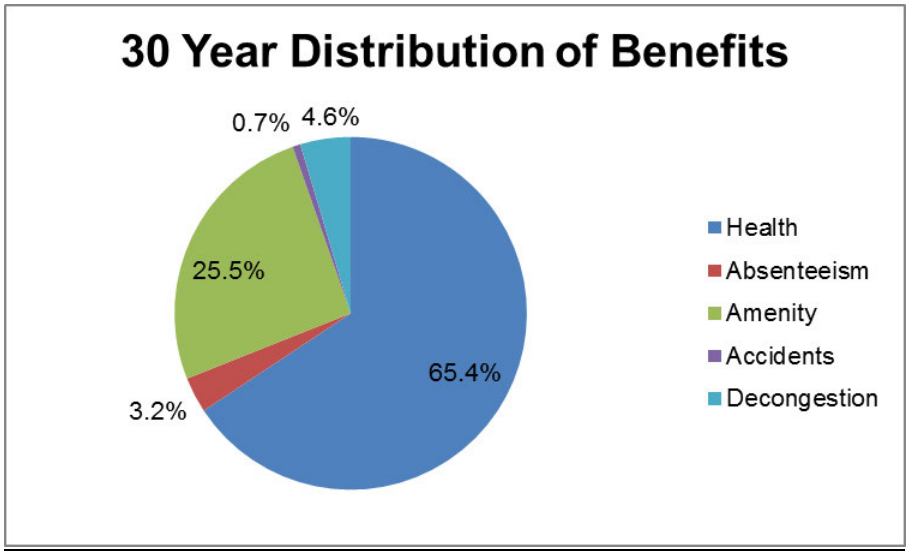
The table below shows the estimated economic impacts for each of the different scenarios over a 30 year appraisal period with a 3.5% discount rate, consistent with Department for Transport (DfT) guidance on conducting infrastructure appraisals:

Table -4: WebTAG and HEAT Combined Economic Benefits of the Abernant Tunnel

		Walking AUE increase		
		50%	**90%**	**130%**
Cycling AUE increase	**50%**	£ 4,190,821	£ 5,785,694	£ 7,379,567
	90%	£ 4,803,314	£ 6,398,187	£ 7,992,059
	130%	£ 5,416,806	£ 7,011,678	£ 8,605,552

These economic benefits are drawn from a range of areas, as illustrated below using the 90% increase in both cycling and walking AUE scenario:

Table -5: 30-year Distribution of Economic Benefits in WebTAG (90% Uplift Scenario)



Note Amenity value definition: Amenity value in this context refers to a valuation of aspects of the journey quality of a route and/or any travel modes used on a route, either real or perceived by the user. These quality factors are related to the physical and social environment of a journey, and can include things like comfort, convenience or pleasure. Amenity value captures aspects of journey quality that aren't considered elsewhere, thus excluding things like journey times, time savings and reliability of the route, etc.

5.6 Tourism Impact of the Abernant Tunnel

The Sustrans tourism model can also be used to estimate the economic impact of cycle tourists on the route from each of the different scenarios of AUE uplift already discussed. The model estimates the total annual spend and a 'spend per head' for all recreational users and separated into home-based users and tourists. It also calculates the number of full time equivalent (FTE) roles this would support.

The model was developed in 2007 by Sustrans and the University of Central Lancashire (UCLAN) to estimate the economic impact of cycle tourism in the North East of England. The original research was based on four key long distance tourism routes in the North East. Since 2007, the model has been updated iteratively within Sustrans to improve the usability of the model, most recently in March 2014.

All required inputs to the model were also taken from the outputs from aggregated results across all VCN RUIS results from 2013, to maintain consistency with the WebTAG estimations. As the tourism model only estimates the economic impact of cyclists, only the different AUE uplifts scenarios for cyclists have been modelled for.

Table -*7* below shows total annual route spend by cycling tourists to vary upwards from £120,360 (for a 50% increase in cycling) to £184,552 (for a 130% increase in cycling), with most of this spend coming to the food and drink sector. The average spend for cycling tourists on the route is shown to be £25.71 per head and £9.25 per head for home-based cycling tourists.

Table -6: Tourism Model Output (Aggregated VCN)

Area of benefit		Pre	50%	90%	130%
Social value of trips	All recreational	£47,314	£70,973	£89,899	£108,825
Route spend	Total route spend	£80,238	£120,360	£152,456	£184,552
Spending by sector	Accommodation	£1,422	£2,133	£2,701	£3,270
	Food and drink	£58,387	£87,582	£110,938	£134,294
	Retail	£1,605	£2,407	£3,049	£3,691
	Car costs	£9,319	£13,980	£17,707	£21,435
	Cycle costs	£2,376	£3,564	£4,515	£5,465
	Public transport	£2,407	£3,611	£4,574	£5,537
	Other	£4,722	£7,082	£8,971	£10,860
Employment	Direct employment	1.2 FTE	1.8 FTE	2.3 FTE	2.7 FTE
	Indirect employment	0.68 FTE	1.02 FTE	1.29 FTE	1.56 FTE
Spend per head	All recreational	£9.48	£9.48	£9.48	£9.48
	Tourists	£25.71	£25.71	£25.71	£25.71
	Home-based	£9.25	£9.25	£9.25	£9.25

The tourism model spending outlined above is considered additional to the economic benefits that have been calculated using aggregated VCN data in WebTAG.

In addition to the Sustrans tourism model output, analysis conducted on tourism expenditure along the Taff Trail found that expenditure by users along this route exceeds £ 21 million per year.

5.7 Benefit-Cost Ratios (BCR): WebTAG and Tourism Model

The following table outlines BCRs using combined output from both WebTAG and the Tourism Model using data aggregated across the VCN. The BCRs have been calculated for three total scheme cost scenarios of £1.5 million, £3 million and £5 million.

Table -7: Benefit-Cost Ratios (BCRS): WebTAG and Tourism Model – Abernant Tunnel

AUE increase in both cycling and walking	WebTAG Benefits	Tourism Model Benefits	Combined	Cost Scenario 1: £1.5 million	Cost Scenario 2: £3 million	Cost Scenario 3: £5 million
50%	£4,190,821	£70,973	£4,261,794	2.84	1.4	0.85
90%	£6,398,187	£89,899	£6,488,086	4.3	2.16	1.30
130%	£8,605,552	£108,825	£8,714,377	5.8	2.9	1.74

6 Commuting Impact of the Abernant Tunnel

The total number of potential commuters that stand to benefit is 1,741, with 31 of those currently using an active travel mode to commute. This figure of 1,741 is the highest out of a number of sites where the commuting potential of converting railway tunnels into walking and cycling routes has been examined in Wales, as shown in **Table** *-9* below which outlines total commuter trips in selected Census (2011) Middle Layer Super Output Area (MSOA).

Table -8: Commuting Potential at Proposed Tunnel Developments in Wales

Census MSOA	Total Current Commuter Trips
Abernant	**1,741**
Pennar	620
Wenvoe	468
Clydach	330
Cwm Cerwin	170
Cymer	144
Quakers Yard	130
Gyfychi	50

In order to examine the high potential for the construction of the Abernant Tunnel to convey benefits for commuters, a WebTAG appraisal was conducted specific to commuters who use an active travel mode in the area around the Abernant Tunnel.

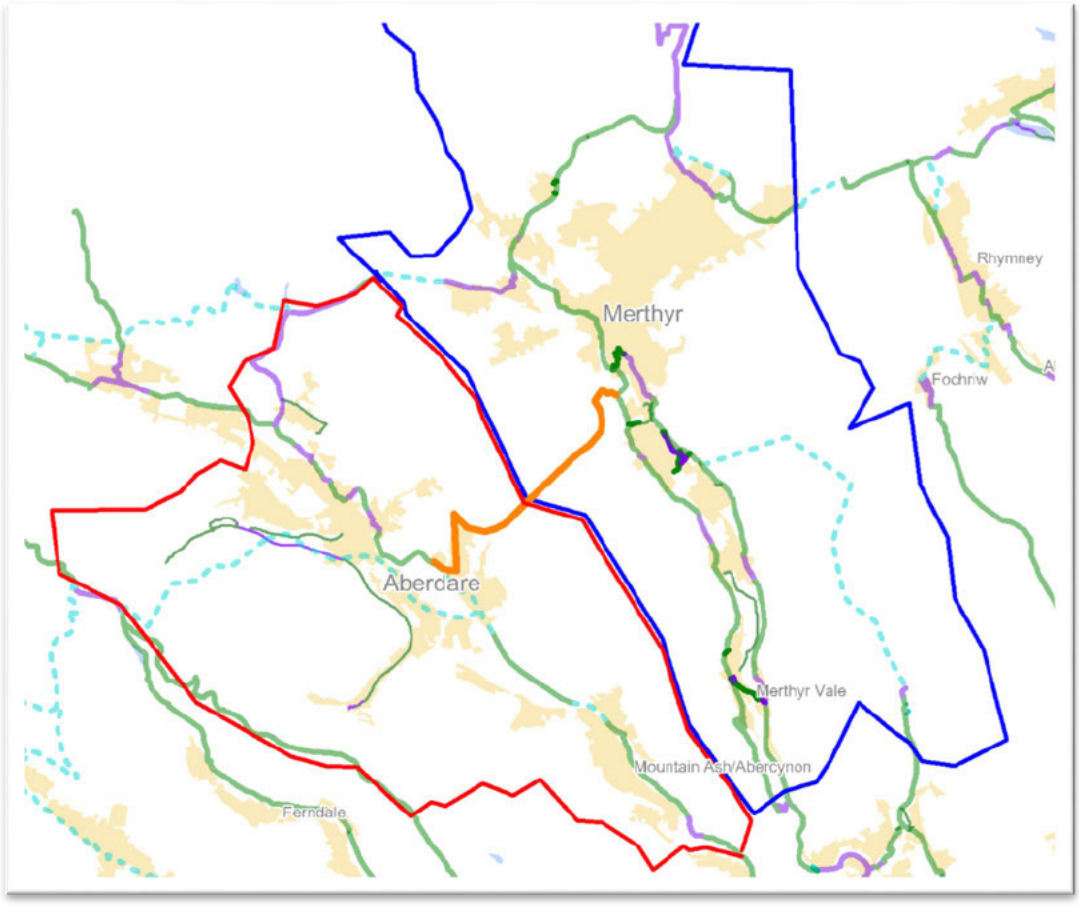


Figure 3 Map showing the MSOA's areas in red (Aberdare) and blue (Merthyr). The orange line shows the alignment of the tunnel and its connecting links

The information outlined in **Table** *.-10* below illustrates the high commuter potential in Census Middle Layer Super Output Areas (MSOA's) on either side of the Abernant Tunnel according to travel mode as declared in the Census.

Table .-9: Abernant Tunnel – Potential Commuter Use

Residence Area	Workplace Area	Total trips	Private Vehicle	Public Transport	Active Travel	Other modes
Abernant East	Abernant West	417	396	15	4	2
Abernant West	Abernant East	1,324	1,225	71	27	1
Total potential commuters		1,741	1,621	86	31	3

The number of individuals who have declared that they usually commute using an active travel mode at the time of the 2011 Census as listed above is 31. As the current commuting distance between the MSOA's of Abernant East and Abernant West is approximately 16 kilometres, it is reasonable to assume that these individuals are not commuting on foot and are cyclists.

An AUE has been generated from the count of these 31 individuals alongside responses for commuters on trip frequency, whether they combine their travel with a car and whether they could have used a car but chose not to from the aggregated VCN dataset as previously described. From this, an Annual Average Daily Traffic (AADT) figure is calculated from which an AUE can be generated. This process involves projecting the declared number of trips across the whole year, accounting for any seasonal bias. These values are as follows:

Table -10: AADT and AUE for Commuters – Abernant Tunnel

Annual Average Daily Traffic (AADT)	Annual Usage Estimate (AUE)
21.8	9,406

This AUE has been run in a WebTAG model developed to examine the economic benefits to local commuters that have been identified in both Abernant East (Merthyr side) and Abernant West (Aberdare side) who currently commute between these two MSOA's. These commuters represent a proportion of the population likely to benefit from the opening of the Abernant Tunnel as the opening of this route will create a commuting route for walking and cycling of direct use to these individuals.

In addition to using the AUE generated from the local-level data around the Abernant Tunnel site, the distances in the WebTAG model have been amended to better reflect the local situation. The distance of the completed Abernant Tunnel and links to existing routes will be 3.8 kilometres. The current distance of commuting by road between Abernant East and Abernant West is approximately 16 kilometres. These distances have been used in WebTAG to calculate the car kilometres replaced for a range of projected increases in commuting

individuals cycling through the open Abernant Tunnel instead of driving between the two MSOA's on the existing route.

The other inputs into WebTAG remain the same as those in the aggregated VCN model. The scenarios of increased commuting by bike that have been modelled for these individuals are a 50%, 90% and 130% increase above current commuting by bike in the local area.

6.1 Economic Benefits of the Commuter Impact

The economic benefits in this localised model of commuter cycling have been calculated in WebTAG with input from HEAT. As this AUE has been generated for cyclists only, these economic benefits only capture outcomes for increased levels of commuting **by bike** on this route and do not consider pedestrian activity.

Table -11: Commuter Impact of Abernant Tunnel – Economic Benefits (WebTAG and HEAT)

AUE Commuting by Bike (Pre)	Commuter Cycling Uplift	AUE Commuting by Bike (Post)	HEAT Benefits	Combined WebTAG and HEAT
9,406	50%	14,109	£96,000	£1,660,028
9,406	90%	17,871	£146,000	£2,020,044
9,406	130%	21,633	£196,000	£2,380,060

It is important to note that these benefits have been derived using data that cannot be combined with the Benefit-Cost Ratios (BCRs) outlined in **Section 5.7** on page 18 as these figures have been derived from localised data whereas the BCRs above have been generated from data that is aggregated across the VCN. The calculations are based on two different sets of individuals and route users and therefore cannot be combined into a holistic BCR.

Despite this, these figures are a highly useful for isolating the potential economic benefits of increased commuter use on the Abernant Tunnel route, an area where significant increases in road usage of this type can be expected based on the findings **Table** *-9* above that capture current commuter activity based on Census 2011 data.

These isolated benefits are unique to the proposed Abernant Tunnel route compared to other potential tunnel routes in Wales, as no other proposed tunnel location has such high levels of existing commuting to MSOA's located on either side of the tunnel, and are therefore highly relevant to any discussion about the proposed Abernant Tunnel conversion. As outlined above in **Table** *-12*, the potential economic benefits of increased commuter travel along the Abernant Tunnel are significant.

7 Bike Park Wales Impact

Bike Park Wales is the UK's first full scale mountain bike park in the heart of the South Wales valleys, built by riders for riders. It is located within the Merthyr Tydfil County Borough Council area on the Eastern side of the Abernant Tunnel. The Bike Park opened to the public in August 2013 and currently receives approximately 70,000 visitors per year and has received over 150,000 visitors to date since its opening.

As part of the proposed scheme a 1 kilometre (0.6 miles) link will be developed connecting the Taff Trail (NCN8) directly to Bike Park Wales. It is reasonable to assume that there are benefits of this, in that increased connectivity to the park would support visitor numbers, ensuring the job security of staff that work at the park (currently 35). Any increase in visitor numbers as a result of the new route would support the expansion of employment at Bike Park Wales.

A second benefit related to the proposed linkage of the Taff Trail to Bike Park Wales is tourism spending by visitors that supports economic activity in the area. Adding the Bike Park Wales as a point of interest along the already popular Taff Trail could support the sustainability of tourism-related income along this route. As illustrated below, the potential economic impact of supporting and increasing visitor numbers along this route is substantial. It is important to note that as these figures are from 2008, they are likely to differ from the situation at present.

Table -12: Economic Impact of Cycling and Walking along the Taff Trail (2008)

Total Demand Per Annum (visitor numbers)	Total user expenditure	Tourism impact*	Employment support (total jobs)	Jobs supported by inbound tourism
628,000	£21 million	£1.6 million	367	30

*The tourism impact measures the economic impact along this route of visitors who come from outside Wales. Therefore, it represents an injection of money into the Welsh economy.

8 Job Creation Impact

In addition to the jobs in the tourism and leisure industries that the Abernant Tunnel project can be expected to support as outlined above, a considerable number of jobs will be directly supported through the construction activities related to the project.

Every time Sustrans funds a project or scheme that spends money in the local and wider economy, jobs are created. In 2012, Sustrans' Research and Monitoring Unit carried out a study into the level of jobs sustained by the construction of walking and cycling routes. Using data from two infrastructure projects, the number of direct and indirect jobs that were supported could be estimated. The two projects were Community Links in Scotland and the Valley Cycle Network in Wales; both related to investment in 2011/12. Further work was then made to revisit Community Links with the 2012/13 schemes and add the 2012/13 Links to Communities projects in England. These four infrastructure projects accounted for 127 cycle and walking schemes and some of the data taken during the monitoring were cost, length and staff hours of each scheme. Key findings from the Sustrans Jobs Study (July 2013) include:

- 12.7 jobs are supported or sustained for every £1 million of investment in sustainable transport infrastructure;
- 1.6 jobs (direct, indirect and induced) are supported or sustained for every km of route constructed;
- The average cost per km of construction was £103,891.
- The average cost per scheme was £128,199 and there were on average 0.74 FTE jobs per km of path constructed.

With the opening of the Abernant Tunnel and extension to the NCN routes either side, a considerable number of jobs could be created in the local community. The total length of the route to be built and upgraded under the Abernant Tunnel project is 3.8 kilometres which, based on the findings above, would support 6.08 jobs directly through its construction.

The conversion of the Abernant Tunnel into a usable route will improve walking and cycling links to the Bike Park Wales and increase its connectivity to the Taff Trail, a major leisure route in the area. Any increased visitor numbers to the park as a result of this can be seen to support job security, and possibly job creation, at Bike Park Wales where 35 individuals are currently employed full-time. Furthermore, as part of the Abernant Tunnel project a new spur of upgraded track of a length of 1 kilometre will be built to Bike Park Wales, which will support 1.6 jobs through its construction, according to the figures above.

9 Summary of the business case

The information outlined above has examined a number of the benefits that could be expected from the opening of the Abernant Tunnel. These include:

- Benefits to local communities from increased infrastructure connectivity,
- An improvement in the local economy because of increased route usage demonstrated by applying WebTAG, HEAT and the Sustrans tourism model,
- The benefits to commuters in the local area of opening this route
- Benefits related to Bike Park Wales
- The potential job creation impact of the route.

Due to methodological limitations, all of the estimated benefits that have been calculated from these different areas cannot be combined into a single BCR but they can be examined alongside each other to provide greater depth to any assessment of the business case for re-opening the Abernant Tunnel.

A number of key indicators for each of the three walking and cycling uplift scenarios that have been identified in the report are outlined below. All of the BCRs are relevant to the 30-year appraisal period with a discount rate of 3.5%.

Table -13: Key Business Case Indicators – Summary

Walking and cycling AUE increase	Health economic benefits (HEAT)	Economic benefits (WebTAG and HEAT)	Tourism Model benefits	Combined benefits	BCR £1.5 million	BCR £3 million	BCR £5 million
50%	£2,051,000	£4,190,821	£70,973	£4,261,794	2.84	1.4	0.85
90%	£3,700,000	£6,398,187	£89,899	£6,488,086	4.3	2.16	1.30
130%	£5,349,000	£8,605,552	£108,825	£8,714,377	5.8	2.9	1.74

The above BCRs have been calculated assuming no difference in the quality or characteristics of the infrastructure investment proposed under the three cost scenarios examined. Where the cost scenarios do not represent a difference in scheme quality or characteristics that may affect the levels of cycling and walking uplift that materialise after a route is developed, it is to be expected that the BCR will be lower for a higher level of investment outlay. In this case, these figures represent a sensitivity analysis of the expected benefits in the face of uncertainty about the costs of the proposed route development and should not be interpreted as support for lower levels of investment in the Abernant Tunnel route development. Adequate investment in the route is required to secure any of the walking and cycling AUE increases that have been modelled in the above scenario and obtain the corresponding economic benefits.

In addition to the economic appraisal figures and BCRs outlined above, the following benefits of opening the Abernant Tunnel as a walking and cycling route can be expected.

Table *-15* presents the results of the localised model analysing the potential commuter benefits in **Section 6. Table** *-16* presents the results of research on tourism usage, spending

and job support along the Taff Trail carried out by Sustrans Cymru in 2008. The direct job creation figure has been generated from research conducted by Sustrans' RMU in 2012 and detailed in **Section 8.**

Table -14: Commuter Benefits of the Abernant Tunnel – Summary

Commuter Cycling Uplift	AUE Commuting by Bike (Post)	HEAT Benefits	Combined WebTAG and HEAT
50%	14,109	£96,000	£1,660,028
90%	17,871	£146,000	£2,020,044
130%	21,633	£196,000	£2,380,060

Table -15: Job Creation Impact of the Abernant Tunnel – Summary

Taff Trail User Expenditure	Taff Trail Tourism Impact	Taff Trail Tourism Employment Support	Taff Trail Inbound Tourism Job Support	Direct Job Creation from Route Constructio n	Bike Park Wales Jobs Supported
£21 million	£1.6 million	367	30	7.68	35

Overall, the evidence presented above suggests that the benefits of developing the Abernant Tunnel into a walking and cycling route is poised to present significant economic benefits to the local area. While it is impossible to know in advance what the impact of the route will be, the numerous additional benefits of this proposed development due to the placement of the proposed route near to the Taff Trail (NCN8) and Bike Park Wales suggest that high levels of leisure usage can be expected. In addition to high levels of tourism-related usage, the results of analysis summarised in **Table** *-15* demonstrate that substantial levels of commuter usage can also be expected along the route. Due to this additional supporting evidence, it would be reasonable to expect that the economic benefits of developing the Abernant Tunnel are likely to be represented by one of the higher scenarios of walking and cycling AUE increase (either 90% or 130%) and that the associated BCRs might be the most indicative of the outcomes of this project.

10 Next steps.

1. **Define linking route alignment from tunnel entrance to Aberdare and the Cynon Trail and ensure that any route upgrades can be constructed to Active Travel Act guidance standards**. All potential routes that will link the tunnel entrance to the Cynon Trail will be assessed for suitability looking at all aspects of the alignment such as land, desire line and suitability to be capable of meeting all aspects of the Active Travel Act (2013). The suitable routes will then be compared using Sustrans RATE tool. The Route Assessment and Transport Evaluation 'RATE' tool has been developed by Sustrans as a way to assess cycling/walking schemes and analyse areas for infrastructure development across the United Kingdom. Assessing schemes is a key attribute of the RATE tool which is achieved by providing each scheme with an overall rating and ranking. Each scheme is run through the 'RATE process' using 13 set criteria. The RATE score will then be used to recommend the final route option that should be taken forward.–

2. **Define linking route alignment from tunnel entrance to the Taff trail, including a spur to Bike Park Wales and ensure that any route upgrades can be constructed to Active Travel Act guidance standards**. All potential routes that will link the tunnel entrance to the Cynon Trail will be assessed for suitability looking at all aspects of the alignment such as land, desire line and suitability to be capable of meeting all aspects of the Active Travel Act (2013). The suitable routes will then be compared using Sustrans RATE tool

3. **Obtain an agreement in principal to purchase or lease the land required for the route on the Merthyr side when funding becomes available**. This is useful where the path developer does not want to commit itself to taking a lease until, for example, planning permission is granted or funding available. The terms of the lease will be settled as part of the agreement and the lease will be granted once the conditions have been fulfilled. **Sustrans can advise and could possible suggest sample agreements**

4. **Who will become the tunnel owner?** Sustrans can assist with discussion with Historic Estates department of Highways England. **Sustrans can advise and could possible suggest sample agreements**

5. **Carry out ecology studies, especially bats, as soon as possible.** Two elements will be needed to be carried out, an extended phase 1 habitat survey and bats survey The Extended Phase 1 Habitat Survey report comprises

    - A walkover survey to identify habitats along the route;
    - A desk study to identify designated nature conservation sites and records of protected and notable species in the area;
    - An assessment of whether notable or protected species may occur on site;
    - An assessment of potential impacts of the proposed works on habitats/species; and,
    - A list of recommendations to ensure no breaches in legislation or policy will occur.

The recommendations made in this report may include requirements for consultation with relevant authorities, measures to avoid/mitigate/compensate predicted impacts or may include the need for further species specific surveys.

Further surveys are required when a protected species is considered likely to occur on site and could be negatively impacted by the proposal. Additional specific surveys may be expensive or could take a long time to complete. It is therefore important to get the Extended Phase 1 Habitat Survey done as early as possible in order to plan these into the project budget and timeframe and whilst your plans are still flexible.

Bat Survey will comprise of:

- A preliminary roost assessment, preferably combined with the first other survey visit.

- Three emergence or re-entry surveys between May and October inclusive (up to two of these must be between May and August)
- Automated surveys (static detectors left in-situ for five night periods in late August, September and October);
- Hibernation inspections in mid January and mid February;
- If the tunnel has moderate or high potential (or has crevices that cannot be fully inspected): Automated surveys (static detectors left in situ for a minimum of two week periods in Dec, Jan and Feb). Also leave humidity and temperature loggers in-situ.

6. **Develop community support for the scheme.** This is essential if the scheme is to be a success. This would comprise of developing Community engagement strategy and a marketing strategy (prospectus and website)

Stakeholder and community engagement is a crucial part of the delivery process. Successful community engagement leads to successful schemes that address the needs of users, stakeholders and the local community. Opening disused railway tunnels can create a great deal of interest and the anticipation of the tunnel being opened in the very near future need to be managed. By successfully engaging with the stakeholders and the people of the community promoters of reopening the tunnel will be able to manage expectations effectively. Identifying the community and stakeholders, who are they?

The community engagement strategy would look at the following aspects:

- Identifying the community and stakeholders, who are they?
- Planning community engagement
- Correct level of engagement
- Setting up a steering/planning group
- Recording, measuring and reporting engagement
- Feedback to the community
- Feedback to the funder and partners

Successful community and stakeholder engagement will make sure:

- The scheme meets local needs, addressing the real issues of the community and stakeholders
- The views of people affected by the scheme are taken into account during the design stage and can help reduce objections to scheme, ensuring a smoother formal consultation and delivery through the planning system
- The local community feels ownership of the scheme, maximising usage of the scheme and volunteers may be more eager to help maintain and promote the route in the future
- Reputational risk is managed, as all stakeholders are invested in the process and understand the benefits of delivery
- Promotional opportunities are realised during the planning and opening stages

- There are opportunities provided to promote sustainable travel to the local community to improve health and well being

7. **A study should be carried out into tunnel maintenance and running costs and sources of income assigned to each item**.

In order to obtain funding one of the questions that will be asked is how the tunnel is maintained once it is re-opened. .. This study will ensure that a cost is attributed to all aspects of the day to day operations of the tunnel and its long term future. This will be carried out by looking at a number of other open walking and cycling tunnels. The study will look at:

- Lighting electricity costs (including emergency)
- Electrical testing (including emergency
- Annual inspection
- Principal inspection every 6 years
- Maintenance of safety systems
- Testing of safety systems
- Emergency access maintenance
- Path cleansing (litter sweeping etc.)
- Lighting replacement
- Drainage maintenance
- Management costs
- Ecology mitigation (bats)
- Project monitoring and evaluation
- On-going maintenance (, drain clearance, repairs and pointing)
- Grass cutting
- Portal vegetation clearance
- Volunteer/ ambassador training

8. **Route user monitoring**. The business case uses Annual Usage Estimates (AUE) based on average data collected from schemes from recent Valley Cycle Network (VCN) work. With the Abernant tunnel being close to the Taff and Cynon Trails more survey work could be carried out to obtain an AUE specific to this tunnels location. This data will allow a more robust estimate of BCR to be developed. To carry out a route user survey on both the Taff and the Cynon trail that would consist of Survey over 4 days, face to face. One week day during term time, one weekday during school

holidays, one weekend day during term time, one weekend day during school holidays

9. **Develop route from Taff Trail to Bike Park Wales up to planning and detailed design stage**. Taking the final route alignment proposed in point 2 above develop the design of a walking and cycling route from the Taff Trail to Bike Park Wales. This scheme could be developed as the first phase of the project. It would add value to Bike Park Wales allowing visitors to come to the site via sustainable means.