BALQUHIDDER BROADBAND
CONNECTING THE GLENS

Balquhidder Community Broadband
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BALQUHIDDER COMMUNITY BROADBAND: ECONOMIC IMPACT

VERSION 1.3, 12 SEPTEMBER 2016, RICHARD HARRIS

1 SUMMARY

The provision of effective broadband to the Balquhidder community will generate significant economic uplift, in the form of trading revenue for local enterprises, through stimulation of inward migration and investment, economic diversity, improvement in economic resilience and through uplift to local property values. Other, less metric or less direct benefits are identifiable in community cohesion and in environmental impact.

Basic modelling has demonstrated significant differences between service models and technologies in economic outcome in first and subsequent years and in the sustainability of the economic uplift generated.

*A universal or near-universal FTTP service to the Balquhidder area (197 potential connections in those postcodes defined as white areas by DSSB) would conservatively generate direct economic uplift of **c.£1.1M** in the first full year of service, a figure that would build in future years. An increase of **c.£7M** to domestic property values would also accrue.*

*The total delivered economic value for a Fibre to the Premises (FTTP) network is potentially in excess of **£8M** in the first full year of service.*

The uplift from alternative services was also modelled: A Fibre to the Cabinet (FTTC) service, delivered to the BT/DSSB model would, even in an optimistic scenario, be unlikely to generate more than 26% of the overall economic uplift of an FTTP service, 11% of the economic activity and 30% of the uplift in asset value. A universal wireless (WTTP) service was modelled but has proven technically infeasible due to local conditions. Such a service would have generated an overall uplift similar to FTTC, albeit with a greater benefit to trading activity.

As market and demand develop in line with global trends, both FTTC and WTTP technologies would rapidly revert to an uncompetitive level of service and would require wholesale and expensive replacement of infrastructure to support future enhancement. An FTTP service is contractually scaleable into the foreseeable future.

2 BACKGROUND

The provision of competitive, scaleable and future proof broadband services to the Balquhidder area is essential to break the area's spiral of relative rural decline and to create self-perpetuating economic and community uplift. Such an initiative can also act as a model for and facilitator of similar initiatives in other rural communities.

Any internet access for a community is better than no internet access. However, the nature of the access provided has a significant impact on both the magnitude and sustainability of the economic uplift created.

A service which offers marginal performance relative to national or global best practice or which cannot be scaled to keep up with changing requirements to maintain at least parity with that best practice will simply cause a brief levelling of that downward spiral of rural decline that typifies communities without effective connectivity.

Conversely, a service which meets current needs, is readily scaleable to meet future demand and which provides visible (and therefore marketable) parity with global best practice will help drive a virtuous circle of economic diversity, inward migration, investment and social inclusion. It will thereby lift both economic activity and the asset value of an area. It will also increase that community's resilience to threats to any given sector of the community, a prime example of this being the economic devastation caused by the 'double whammy' of the 2001/2 Foot and Mouth epidemic, which simultaneously decimated both farming businesses and visitor numbers.

The Balquhidder community, through BCB, the community interest company formed to deliver its broadband service, has modelled baseline current demand, likely future requirements and created a requirements profile for a service to meet those needs. That was set out in the ITT for the CBS-approved procurement exercise carried out in 2015, the outcome of which was the selection of a preferred and community-driven FTTP solution for the area. That procurement was intended to supplement at least *de minimus* level funding from CBS with business connection funding through the

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Broadband Voucher Scheme. That scheme however was withdrawn at zero notice in October 2015 and work since has focussed on alternative procurement and funding models.

Modelling of the likely economic impact of that FTTP access network is presented here. For comparison, the same model has been run for an optimistic case of FTTC deployment to the BT/DSSB model and for the most common alternative, wireless-based internet access. A comparison of the first two is provided here: the figures for a wireless (WTTP) service have been disregarded due to the unacceptably poor grade and quality of service of such a solution locally.

3 ECONOMICS AND COMPARISONS

3.1 BCB FTTP service model

This model is based on provision of either a universal (100% coverage) FTTP network operating symmetrically at 1000Mb/s or, as a fallback, the provision of FTTP services to 84% of properties, the remainder being served by viable point-to-point wireless links from the end point of the FTTP network – the geography of the area being such that 84% of connections would be served by 50% of the network length. Whichever approach proves deliverable, the economics do not vary significantly.

This basic model for the economic impact of a universal broadband service to the area of Balquhidder not addressed by the DSSB programme shows, that for a service that meets the community's needs and goals, the economic impact even in the first year of full service is significant. Economic studies of the impact of broadband deployment at the requisite level of detail are few and far between. This model is therefore based on such studies as have been carried out[1], and anecdotal evidence from areas[2] where similar services have already been introduced.

Table 1: Anticipated Economic Uplift from FTTP broadband

	Item (see below for definitions)	**Value**
1	Annual Economic Activity	**£1,084,250**
2	Annual Economic Activity Uplift (excluding property transaction)	**£721,325**
3	Property Asset value uplift	**£6,910,067**
4	Annual Value Total	**£7,994,317**
5	Year 1 Only transactions	**£285,780**
6	Total Year 1 Economic Uplift	**£8,280,097**

Table 1 summarises the modelled uplift. In this table:

1. **Annual Economic Activity** includes uplift realisable in the first full year of service and which forms a platform for further subsequent development:

a. Tariffs and occupancy rates in visitor accommodation.
b. Sponsored (or potentially sponsored) existing events in the glen, most notably the Mhor Festival. Excludes new events being facilitated by broadband provision.
c. Direct and attributable cost savings for different classes of business in the glen.
d. Inward investment and new businesses, including only two already known examples.
e. Domestic property transactions, based on local figures[3].

[1] B4RN – b4rn.org.uk

[2] LSE Discussion paper: http://www.spatialeconomics.ac.uk/textonly/serc/publications/download/sercdp0161.pdf

[3] Zoopla – zoopla.co.uk

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2. **Annual Economic Activity Uplift (excluding property transaction)**, includes only a to d (above) and provides an estimate of the uplift to business activity only.

3. **Property Asset Value Uplift**. Provides an estimate of the uplift in values of domestic properties only, including residences, holiday homes and holiday lets. This is based on average value and transaction data from zoopla.co.uk and is likely a significant underestimate.

4. **Annual Value Total**. Includes both transactional activity and asset value.

5. **Year 1 Only Transactions**. A further Year 1 only benefit of circa. £286,000 could be realised from uplift in the sale value of six building plots and two houses currently under development. As this is a one-off, it is not included in the headline uplift figure that carries over to future years.

6. **Total Year 1 Economic Uplift**. Total of all defined and realisable uplift accruing in the first year of service.

The full model is provided in Appendix I. This model does not however include:

- Benefits to the many local residents who work from home.
- Benefit to students having effective access to materials.
- Improvements to public communication access to visitors.
- Impact of inward migration (beyond the two examples given).
- Any attempt to measure increased resilience from economic diversification.
- Benefits accruing from deployment of emerging healthcare and monitoring technologies.
- Environmental and cost benefits from reduced travel and commuting.

3.2 Comparisons

The uplift from alternative services was also modelled, including BT's copper-based Fibre to the Cabinet (FTTC) service modelled after the BT/DSSB model and a hybrid wireless access service (WTTP) with fibre backhaul.

3.2.1 Fibre to the Cabinet (FTTC)

Were an FTTC service (the technology being deployed by BT under DSSB) to be offered to the area, the nature of the technology would inevitably create a partial and incomplete service and one which severely restricted future upgrades. Modelling here is based on uplift created by provision of two cabinets to the glen, one at Mhor 84 (at the entrance to the glen) and the other at Balquhidder Village Hall. This would however appear optimistic, given that Openreach quoted £50,000 in excess construction costs just to reach Mhor 84 and a further £280,000[4] to reach the Village Hall.

A cabinet at Mhor 84 would provide 17% of properties with service at the OFCOM Next Generation Access (NGA) threshold of 30Mb/s, which would be available to approximately 1km from cabinet. A cabinet at the Village Hall would provide 33% of properties with service at the same level. The two together would address 50% of properties at or above the OFCOM threshold, with service rapidly decaying with distance and making little to no difference to the remaining properties in the area. BT's plans for future upgrades to their copper service would exacerbate the problem: their higher speed services have much shorter ranges and suffer from high levels of self-interference without the introduction of compensating technology.

Table 2 shows the modelled uplift in the first full year of service from even the optimistic provisioning model used. Such a service would not benefit much of the Balquhidder area and future performance upgrades would progressively benefit fewer and fewer properties and businesses. Comparison in Table 3 shows that even the optimistically specified FTTC service described would be unlikely to generate more than 26% of the overall economic uplift of an FTTP service, 11% of the economic activity and 30% of the uplift in asset value. Due to the rapid fall-off and low headline figure of an FTTC service, parameters used in the model are averaged across the area, with a higher benefit accruing to those properties within NGA range of a cabinet. A more detailed comparison is given in Appendix II.

[4] Original quote pro-rated to August 2016 20% rise in ECCs

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Table 2: Anticipated Economic Uplift from FTTC Broadband

	Item (definitions as for 3.1 above)	**Value**
1	Annual Economic Activity	**£220,786**
2	Annual Economic Activity Uplift (excluding property transaction)	**£81,665**
3	Property Asset value uplift	**£1,727,517**
4	Annual Value Total	**£1,948,303**
5	Year 1 Only transactions	**£190,520**
6	Total Year 1 Economic Uplift	**£2,138,823**

Table 3: Relative Economic Impact by Service Model

1	Factors (relative benefits of each model)		2	Totals (Economic Uplift - excluding property asset values)		3	Totals (Trading Economic Uplift - excluding property asset value & transactions)	
	FTTP	FTTC		FTTP	FTTC		FTTP	FTTC
FTTP	-	387%	FTTP	-	333%	FTTP	-	883%
FTTC	26%	-	FTTC	30%	-	FTTC	11%	-

3.2.2 Wireless to the Premises (WTTP)

This was not tendered by any supplier and the end-to-end wireless services tendered (including backhaul) failed to demonstrate the ability to cope with local conditions[5], to meet baseline performance requirements or show future scaleability to match developing demand. Had such a service been viable however, it would have generated an overall uplift similar to FTTC, albeit with a greater balance toward trading activity and a more distributed impact across the service area.

3.2.3 Future Impact

As market and demand develop in line with global trends[6], both FTTC and WTTP technologies would rapidly revert to an uncompetitive level of service and would require wholesale and expensive replacement of infrastructure to support future enhancement. An FTTP service is contractually scaleable into the foreseeable future.

Balquhidder Community Broadband (BCB)

Balquhidder Community Broadband is a Community Interest Company (CIC), SC509141, set up to deliver effective and sustainable broadband services to the community of Balquhidder and the surrounding areas. Richard Harris, has more than thirty years experience as a technology and strategy consultant and technology entrepreneur. He has been an internet user since 1979, a researcher/developer since 1985 and has consulted widely in terrestrial, satellite and mobile service provision. David Johnston is an experienced IT project manager and was responsible for the rollout of the Airwaves emergency radio network for Strathclyde Police. Both are co-founders and directors of Balquhidder Community Broadband.

[5] Trees, weather, mountains and water. But particularly trees

[6] See BCB Bandwidth Demand & Technology Summary

Appendix I

Economic Impact of FTTP Provision to Balquhidder Glen (based on design for 1Gb/s symmetrical P2P network with PoP at Mhor 84)

2.1 Direct Economic Uplift – Visitor Accommodation

1.1 Visitor Accommodation	2,5,6	**Notes**				**Before**					**After**					
	Properties	Rooms/ Property	Beds/Room	Beds/night (2beds/room)	Max Occupancy (bed nights)	Approximate Tariff pp/pn	Annual Revenue Potential	Bed Occupancy (SOAS 2015)	Bed nights	Gross Income	Broadband Occupancy Uplift	Bed nights	Broadband Tariff Uplift	Post-broadband Tariff	Gross Income	Annual Uplift
Hostel	1	3	4	12	4,380	£17	£74,460	52%	2,278	£38,719	10%	2,505	12%	£19	£47,702	£8,983
B&B	10	2	2	40	14,600	£35	£511,000	41%	5,986	£209,510	10%	6,585	15%	£40	£265,030	£55,520
Self-Catering (including holiday chalets)	15	3	2	90	32,850	£28	£919,800	48%	15,768	£441,504	15%	18,133	15%	£32	£583,889	£142,385
Hotel (Monachyle Mhor)	1	14	2	28	10,220	£130	£1,328,600	55%	5,621	£730,730	15%	6,464	0%	£130	£840,340	£109,610
Hotel (Mhor 84)	1	7	2	14	5,110	£40	£204,400	55%	2,811	£112,420	10%	3,092	10%	£44	£136,028	£23,608
Static Caravans	15	1	3	45	16,425	£20	£328,500	43%	7,063	£141,255	8%	7,628	5%	£21	£160,183	£18,928
Camping Pitches	2	10	4	80	29,200	£15	£438,000	43%	12,556	£188,340	10%	13,812	10%	£17	£227,891	£39,551
Totals	45				112,785		£3,804,760		52,082	£1,862,478					£2,261,064	**£398,585**

2.2 Direct Economic Uplift – Sponsored Events

1.2 Sponsored Events	**Before**				**After**									
	No Events/year	Visitors	Av. Spend/ visitor	Total Spend	No. Events/year	Visitor Uplift	Visitors	Visitor Spend uplift	Av. Spend/ visitor	Total Spend	Corporate Sponsorship	Total Income	Annual Uplift	Notes
Mhor Festival (est)	1	3500	£60	£210,000		25%	4375	0%	£60	£262,500	£10,000	£272,500	£62,500	
Bike Fest (est)	1	250	£8	£2,000		5%	263	0%	£8	£2,100	£2,000	£4,100	£2,100	
Corporate Hotel Events (est)	0	0	£0	£0	6		90	0%	£250	£22,500		£22,500	£22,500	
Totals				£212,000						£287,100		£299,100	**£87,100**	3

2.3 Business Cost Savings

	No. Businesses	**Monthly net saving**	**Annual**	**Primary reasons**	**Total for area**	**Notes**
Small Business (local)	7	£100	£400	Travelling to submit forms etc	£2800	
Small Business (online)	4	£125	£1500	Satellite & multiple line subscriptions	£6000	
Medium Business	4	£180	£2160	Satellite & multiple line subscriptions	£8640	9
Monachyle Mhor	1	£2200	£26400	Staff time, Satellite top-up, travel	£26400	8
Mhor 84	1	£150	£1800	Staff time, lines, cloud services	£1800	
Totals					**£45640**	1

2.4 New Opportunities & Diversification

Local Economic activity (PA)		
Enterprise	**Annual Uplift**	**Summary**
AI R&D lab (the Do Lab)	£150,000	Local spend on salaries & staff/client spend - year 1
Retreat (Stronvar House)	£40,000	Rental & client income
Totals	**£190,000**	

2.5. Domestic Property Value & Transactions Summary

	Before			**After**					
	Value	**Sales/year**	**Total transaction value**	**Broadband uplift**	**Value**	**Sales/year**	**Total value**	**Total uplift**	**Notes**
Domestic property asset values	£57,583,891			12%	£64,493,958			**£6,910,067**	4,6
Average selling price	£302,438	1.6	£483,900	12%	£338,730	2.5	£846,825	**£362,925**	4
Year 1 only benefits	£297,688	8	£2,381,500	12%	£333,410	8	£2,667,280	**£285,780**	16

2.6 Totals

Item	**Value**	**Notes**
Annual Economic Activity	**£1,084,250**	3,14
Annual Economic Activity1 Uplift (excluding property transaction)	**£721,325**	
Property Asset value uplift	**£6,910,067**	11
Annual Value Total	**£7,994,317**	
Year 1 Only transactions	**£285,780**	16
Total Year 1 Economic Uplift	**£8,280,097**	
Mhor Group Uplift	**£223,918**	

1	Does not include domestic savings
2	Facilitated by a) absolute bandwidth and b) competitive advantage of FTTP
3	Does not consider new events being possible
4	Zoopla sales & market data (zoopla.co.uk)
5	Visit Scotland Annual Report 2015 (SAOS) (http://www.visitscotland.org/research_and_statistics/tourism_sectors/accommodation.aspx)
6	Based on discussions with B4RN regarding local uplift
7	Two specific examples from local knowledge
8	From figures provided by Tom Lewis, Monachyle Group
9	From figures provided by Mark Venables, Highland Marketing
10	Model does not include economic uplift from improved trading ability
11	Domestic properties only
12	FTTP: Fibre to the Premises @ 1,000Mb/s
14	Property uplift based on average calculated value of properties recorded by Zoopla, extrapolated to total no of domestic properties
15	Property transaction values and numbers based on average figures for area recorded by Zoopla from Land Registry
16	Year 1 only property benefits are from sale of 8* new build/plots at FK19 8PB

Appendix II

Comparison of Anticipated uplift from FTTP vs FTTC

2.1 Summary Economic Impact (FTTP vs FTTC)

Balquhidder Community Broadband **Summary of Economic Impact of different services**			
Solution		FTTP (BCB)	FTTC (BT)
Service Technology		FTTP @ 1,000/1,000Mb/s	FTTC @ 30/9.5Mb/s
	Note	6	8,9
Connection Reach (@ OFCOM NGA)	1	85-100%	50%
Annual Economic Uplift (trading + property transactions)	2	£ 1,084,250	£ 220,786
Annual Economic uplift (trading only)	3	£ 721,325	£ 81,665
Property asset value uplift (domestic only)	4	£ 6,910,067	£ 1,727,517
Year 1 only property transaction uplift	10	£ 285,780	£ 190,520
Year 1 Economic Uplift (trading + year one only property transactions)		£ 1,370,030	£ 411,306
Total sustained value uplift (trading + property transactions + property value)	5	£ 7,994,317	£ 1,948,303
Total Year 1 Economic Uplift (trading + property transactions + property value)		£ 8,280,097	£ 2,138,823

2.2 Relative Economic Impact by Service Model

Balquhidder Community Broadband **Relative Economic Impact of different services in first full year of service**									
1	Totals (trading+property transactions +property values), Net relative value		2	Totals (trading+property transactions), Net relative value		3	Totals (trading only), Net relative value	
	FTTP	FTTC		FTTP	FTTC		FTTP	FTTC
FTTP	£ 0	£ 6,141,274	FTTP	£ 0	£ 958,724	FTTP	£ 0	£ 639,660
FTTC	£ (6,141,274)	£ 0	FTTC	£ (958,724)	£ 0	FTTC	£ (639,660)	£ 0
4	Factors (relative benefits of each model)		5	Totals (Economic Uplift - excluding property asset values)		6	Totals (Trading Economic Uplift - excluding property asset value & transactions)	
	FTTP	FTTC		FTTP	FTTC		FTTP	FTTC
FTTP	-	387%	FTTP	-	333%	FTTP	-	883%
FTTC	26%	-	FTTC	30%	-	FTTC	11%	-

2.3 Notes

No.	Note
1	Percentage of connections initally at OFCOM NGA 30Mb/s threshold
2	First full year of service following full service availability
2	Direct Economic Activity, including property transactions, but excluding uplift in property values, based on term averages
3	Local trading only, excluding property transactions and uplift in property values
4	Asset value of domestic (private properties, holiday lets and holiday homes)
5	Overall value to local economy
6	Based on Community-driven local access network + backhaul via Cultybraggan bunker
8	Based on BT provision of 2 * FTTC cabinets, at Mhor 84 and at Balquhidder Village Hall (which would be optimistic)
9	A single FTTC cabinet at BVH would provide 30Mb/s to 33% of properties. A single FTTC cabinet at Mhor 84 would provide 30Mb/s to 17% of properties.
10	Year 1 only benefits are value uplift in sales of 8* current new build/building plots at FK19 8PB