

Intentions Paper

Broadband in Herefordshire

Developing a County
Approach





Working together for the people of Herefordshire



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Introduction

This paper aims to outline the options for improving Broadband in Herefordshire. The communities and businesses in the county are facing disadvantage in not having the same opportunities as other areas in the country to access information and wider services.

The paper, therefore, gives an outline of delivery options for further discussion that will shape the “intentions” of progressing broadband coverage and speed. The technology options linked to broadband seems to constantly change with new solutions emerging. However, the rewards of improved broadband for public services, communities, businesses and individuals is significant and as a result Herefordshire Public Services (HPS) intend to take a proactive approach to creating broadband solutions.

Vision and Objectives

The broadband vision for Herefordshire is to enable a fast and affordable broadband service that contributes to better outcomes for all people in the county, with greater range of service delivery, competitive advantage for businesses and escalated learning opportunities.

This will be achieved through the ambition of all homes and business premises being able to connect to a high speed broadband service offering at least 10Mbps download speed and 5Mbps upload speed, by 2015. In the short term, by 2012, all homes and premises to have affordable access to broadband at speeds of 2Mbps. By 2020 any home and business should have the opportunity to access 100Mbps download speed with a choice of upload speeds. Broadband services in Herefordshire must be affordable to the user and in most cases offer a choice of Internet Service Provider.

How the vision should be delivered is subject to a range of technical options, but the majority of homes and premises should be served by a county wide fibre optic infrastructure. New homes and new premises on business parks should be built by their developers with fibre optic connections.

Objectives

- To eliminate areas of no, and low speed, broadband coverage, to ensure that rural communities do not suffer disadvantage through only being able to access low speed broadband.
- To develop services that can maximise use of technology taking a long term view of public service delivery that can improve quality of service, increase value for money and extend reach into the community.
- To create equal competitive advantage for the county’s businesses to enable comparable broadband speeds elsewhere in Europe.
- To support communities to create their own solutions to address broadband coverage and speeds.
- To ensure cost, lack of skills and knowledge are not barriers to residents and businesses accessing electronically delivered services.

Context

The Herefordshire Council undertook a piece of work in early 2008 that identified the extent of broadband "not-spots" and "not-very-good spots" in Herefordshire. A separate survey of broadband issues was conducted in autumn 2008 backed up the Research findings. A meeting was held in February 2009 with BT Openreach (which looks after BT's infrastructure) to discuss the findings, and as a result Openreach are looking at some issues affecting larger communities. BT is the only known provider of landline communications infrastructure in Herefordshire.

Two significant central government broadband consultations have taken place in the last year: Delivering Digital Inclusion and Digital Britain. In summary, the Delivering Digital Inclusion report findings were that about 75% of rural internet users say they use the internet for transactions; this is higher than the UK average of 69%. Only 1.5% of homes in villages and hamlets can access cable-based broadband services, compared with almost 60% of urban homes. 26% of Broadband users in rural areas receive broadband speeds less than 2Mbps, compared with 12% in market towns and 6% in towns of more than 10k inhabitants. Only 54% of rural households have a public internet access point within 2 km, compared to 90% in urban areas. 813,000 rural homes may not be able to receive a 2Mbps service on a commercial basis.

The Digital Britain report in June 2009 recommended a universal 2Mbps broadband service in the UK as a compromise between what would be desirable and what might be achievable by 2012. Mobile phone 3G coverage has been suggested as one way forward to achieve this objective, although this was only one of a range of solutions. Mobile phone coverage in Herefordshire is already patchy and the existing 3G broadband coverage is even more restricted. BT has also committed to further improvements in its network if the legislation is eased to allow it to make a return, but this may be focused on the urban areas where it is cheaper to implement. Some funding sources were identified but insufficient to pay for implementation of a long term solution such as fibre optic cabling.

The UK has been one of the most successful countries in opening its communications market and achieving a high level of take up in homes. However, this has come about through legislation from OFCOM that now inhibits private companies such as BT investing in new infrastructure, along with the public and business expectation of low charges for broadband services – thought without a clear financial business case it is unlikely they will invest heavily in infrastructure. AWM conducted an exercise funded in 2006 to enable all exchanges for broadband to achieve a 512Kb service, though this is now inadequate for recent applications. The Government and EU may put money into broadband but this is still uncertain.

Where do we want to go?

It is clear that the demand for broadband bandwidth is rising exponentially over time. Applications such as iPlayer are stretching the whole network, and streaming television services, Quad HD and even 3-dimensional television are in the labs and will be available in homes within the next few years. With the expense of maintaining services in rural areas it would save costs of delivery and travel for the HPS if more of these services could be made available interactively via the internet. Reducing travel would reduce CO₂, and this would be helped by more home-working – if suitable broadband connections were available. The Digital Region project in South Yorkshire is key for those councils' teleworking policy as they foresee 25% savings in their property budgets as they move towards a universal teleworking policy. This is allied to a reduction in 'lost days' where someone is too ill to travel but might work from home, and provides greater flexibility for disabled workers. Having people working from home at a time when their children were around would increase demand on bandwidth even more. Young people are among the most demanding broadband users, running multiple applications at time, eg. downloading music, streaming videos and communicating with friends anywhere in the world at the same time as doing research for

homework. Applications for monitoring people's health in their homes are available now but depend on having suitably high bandwidth connections – and these applications could help people to live at home longer as well as save money.

Creative businesses, often working from home, need high bandwidth to move complex images around the world and allow on-line editing from any customer. This sort of application needs equally fast upload and download speeds rather than the asymmetrical service available now – with more demand on bandwidth. All businesses may benefit from running accounts or production software over the internet, avoiding the need to maintain software on their own computers and simplifying the use of computer systems. In a global environment just-in-time systems for production ordering may work across the world, with complex part specifications needing to be rapidly communicated between manufacturers and suppliers. Good quality video links can avoid the need for some business travel, saving CO₂, time and costs. Recent research has estimated that users would need an average download speed of 11.25Mbps and an upload speed of 5Mbps in order to be comfortably placed for future applications.

Herefordshire already has trouble providing 2Mbps to users and these issues need to be considered now. However, if the county is not to be left behind the rest of the world we need to look at implementing a communications infrastructure that will last for 50 years or longer, and provide a high quality service to all residents in the county. Once that infrastructure is in place, although it may sometimes lag behind the major urban areas, it should enable Herefordshire to keep up with the rest of the world and be add to the appeal of the county as somewhere to live and set up business. The most future proof technology to meet that need is currently considered to be fibre optic cabling, at least for the main backbone of all services. Appendix 1 outlines the technologies that are being considered for future broadband provision.

Strategic options for Herefordshire Council to consider

1. Do Nothing

Most parts of the UK now have a viable broadband service as a result of commercial market forces, and only in the more rural areas have subsidies been required from central government to deliver some form of broadband. With the Digital Britain report committing the government to providing a 2Mbps services to all homes and businesses by 2012 it could be argued that the Council needn't do anything. However, the funding identified for this is insufficient to provide a fibre infrastructure and a 2Mbps service will soon become insufficient for user needs. BT is the only significant infrastructure provider in Herefordshire and without competitive pressure and a good financial business case it has shown in the past that it is highly unlikely to invest heavily in new infrastructure, particularly for rural users, without some incentive.

Users without broadband could get a service via satellite (particularly expensive for an individual) or from a wireless broadband service provider. The local company, Allpay, is working to provide a wireless service for communities that are currently unable to get a good service, and other companies are operating in Herefordshire. However, the speed of these services will depend on the speed of the "backhaul" the provider can get to its initial transmitter. 20Mbps services are possible but will be expensive due to the cost of the backhaul, and would only be feasible with sufficient demand. None of the current wireless providers are proposing to use WIMAX, with the possible exception of a provider at Rotherwas.

2. Subsidise Broadband Connections

This is similar to the Do Nothing option, but with EU or Council funding being used to subsidise better broadband connections for individuals or communities. This is unlikely to lead to significant new infrastructure being provided, but if sufficient funding was available this might persuade BT to

undertake some major infrastructure work to fix problems in some communities. BT has announced its new BET technology that can enable 1 or 2Mbps broadband for users up to 12km from their exchange, but has a requirement of at least 10 users on an exchange taking the upgrade at a cost of £1,000 each. Alternatively funding could be used for a community satellite service, or help pay for a fast wireless service to be provided. Where the Council wanted to deliver services by broadband the subsidy would allow this to be arranged. The savings the Council and PCT might make could compensate for the subsidy costs in the long term, and the subsidy for individuals could be reduced over time as the service became more valued by them.

There are around 30,000 premises or homes in Herefordshire that can only receive 1Mbps broadband or less. To give a scale of cost a £200 subsidy for each to get an improved broadband service would cost £6M. Some funding may be possible through RDPE but overall the costs will still be high with no certainty of major improvement to the infrastructure.

3. Community led "Patchwork Quilt" Development

The Community Broadband Network has promoted the idea of communities developing their own Next Generation (ie fibre optic) Open Access Broadband Network (OABN). This was picked up by the Digital Britain report in a recommendation to create a standards body to ensure that all these OABNs used the same interconnection standards so they could all communicate and form a seamless "patchwork quilt" infrastructure across the UK. These OABNs are like mini-BT infrastructure networks and the owning communities sell access to the network and its users to any Internet Service Provider (ISP). The concept is working in Alston Moor and Rutland, and in these places the local Councils and PCT have also made use of the networks. Communities would need to raise some funding themselves but may be able to get EU funding. Costs can be less if the communities can carry out some work themselves, and particularly if farmers can be involved to lay ducting for the fibre along the edges of their fields. The technical solution could be fibre to the home or cabinet, and in the latter case the final mile could be by copper or wireless. A recent consultation has been announced to make it easier to string fibre optic cabling between posts, like phone lines, and this might reduce the costs of implementation. The income from usage charges from ISPs can eventually provide pay back but the period will depend on the number of users. The Council could act as a facilitator to help these schemes happen.

The risk of leaving this to communities is that they will require substantial local commitment to achieve anything, and we will inevitably end up with many areas where there is insufficient interest to make anything happen. Consequently many not-spots will remain, and the Council will be unable to exploit the availability of a universal broadband service to deliver services and save costs. Many individual homes and businesses that want higher speed broadband will remain unserved and will need to look to much more expensive alternatives.

4. Council owned OABN development

This is similar to option 3, except that the Council would provide a wholly owned OABN covering the county. This could provide the basis of the HPS network, with fibre being laid to public buildings, or other suitable locations, and then the final link to homes and businesses by wireless. Work would be contracted but fully funded by the Council. The Council could ensure that a satisfactory broadband service was available to every home that it required to have one for delivery of services. Some infrastructure providers have suggested that payments from ISPs could provide payback from 25 to 40 years depending on costs and usage, but in addition to this would be any savings the Council could make from use of broadband to deliver services and the overall economic benefits from more productive local businesses. Some funding might be found from EU sources to improve broadband for rural communities, reducing the cost.

Apart from the cost aspects this would take the Council into a whole new area of service provision that would probably need to be contracted out. It would be taking a risk that the costs would not be recovered if users chose not to use the service, for example if satellite broadband became substantially cheaper and the speed increased – or mobile phone broadband became more available.

5. Council/BT Joint Venture

The obvious partner for a joint venture to improve broadband is BT, since it owns the bulk of the infrastructure already in the county. BT have advised that all exchanges in the county are already connected by fibre optics, and Council, or EU funding (if legislation permitted), could be used to provide further fibre from the exchange to a cabinet in smaller communities to ensure that 99.9% of homes and businesses were served. BT's new BET technology, or a wireless service, would help extend a higher bandwidth service to homes and businesses several miles away from fibre optic termination points. Very remote homes might be served by a subsidised satellite service.

This is still an expensive option, but costs would be shared with BT, and there might be scope to share some income. However, there is no element of competition in the provision of the infrastructure, although the work of installing it could be competed. The OFCOM rules ensure that the BT network is open to other ISP's to use so there is an element of competition for the final provision of broadband (although OFCOM is considering this requirement in the light of the need to encourage infrastructure investment).

6. Council/Other Provider Joint Venture

Sub-loop unbundling means that BT must allow other providers access to their exchanges to fit equipment and provide services over the final link. The Council's network providers already use this ability to provide network services for the Council, in conjunction with other services provided by BT over its infrastructure. The Council could work with an independent network service provider to provide a fibre based OABN linked into BT's exchange network for the final link or providing services direct to the home/premises. This could be similar to option 4 except that the cost and risk would be shared, and the partner(s) would undertake management of the network and share in the income. There could be a competition to select a partner, and this might help in releasing EU funds to meet some costs. An example where this approach has been taken is the Baltic Business Quarter in Gateshead.

This option would still be expensive and would set up a parallel infrastructure to BT's in many areas – possibly providing competition but also involving extra cost. The Council would still be taking on the risk that the service failed to attract sufficient users to become economic.

Selecting a Strategic Option

All the options suggested would need much more work to clarify costs, opportunities and risks. There is the possibility of mixing options, for example supporting community led development of OABNs and providing a subsidy to those homes and business premises to that needed a better service but weren't served by a community service. The first issues will be to decide whether the Council should become involved at all in influencing the delivery of an improved broadband service and what the value of an improved broadband service would be to the Council.

The face of future broadband – the technologies

FIBRE TO THE HOME (FTTH)

Fibre to the home would bring speeds of between 50Mbps and 100Mbps, with the added benefit of being able to offer those speeds both upstream and downstream. This would make contributing back to the net - sending video files for instance - much easier. Unlike DSL technologies - which are carried along copper cables - it is not subject to noise issues. Fibre optics are encased in cable similar to an ordinary PC cable but inside are tiny, hair-size fibres of many colours. They are used to transmit digital information in the form of light signals. This means that a powered device is needed at most points where a signal needs to be taken off, unlike copper cabling which just requires a passive electrical connection. Fibre optic cables currently cost about the same as copper cables, but this may reduce over time. The fibre optic cables are normally laid in underground ducting in the UK but have been strung between poles in other countries, and there is a consultation underway that might make this approach easier. The fibre itself will have a long life but the active components will be subject to change over time and can fail. Providers such as BT would use the ethernet Internet Protocol over the fibre in order to provide broadband and telephone services. The biggest problem about FTTH is the cost of installing it everywhere. To provide fibre to the home across the UK would cost up to £15bn. BT is the most likely candidate to provide such a network and while it is involved in trial schemes of putting fibre in major new-build developments, nothing has been decided.

FIBRE TO THE CABINET (FTTC)

This is the cheaper option than fibre optics to the home - UK estimates are about £5bn for a nationwide rollout - and it is basically a hybrid solution utilising both copper and fibre. To provide FTTC across the UK will require the building of 90,000 new street cabinets - where wires from the telephone exchange are kept at street level. It is capable of supporting new high bandwidth applications such as HDTV, as well as telephone services such as voice-over IP and general internet access, over a single connection. It will not deliver the same speeds as fibre to the home, with a maximum of around 60Mbps. As with ADSL, speeds will be dependent on how close people live to the street cabinet. The final part of the connection to the home would run over ADSL or the latest flavour of ADSL, known as VDSL2. VDSL2 can provide data rates exceeding 100Mbps in both the upstream and downstream directions.

ADSL2+

This variant of existing DSL is being rolled out by BT in the UK with every exchange enabled by 2011. Hereford exchange has already been upgraded. The arrival of ADSL2+ is closely linked to work BT has been doing on its core network, upgrading it to an IP infrastructure in a project known as the 21 century network. ADSL2+ offers speeds of up to 24Mbps, but as it is distance-dependent a lot of people will not actually achieve those kind of speeds. Because the copper lines it operates on pick up electro-magnetic noise the line can be affected by some unusual issues, such as noisy fridges in the house or other problems en-route from the exchange. Old houses with old internal wiring will also affect the service, with possible breaks in service or speed slowdowns.

WIMAX

WIMAX stands for Worldwide Interoperability for Microwave Access and is the latest wireless broadband standard. It is based on the IEEE 802.16 standard, also known as WirelessMAN. It is often referred to as wi-fi on steroids, because of its ability to provide wireless data over much

longer distances, and more reliably, than wi-fi. In countries with good fixed line infrastructure, WIMAX acts as a filler but in some developing countries is the dominant infrastructure for broadband access. Countries such as Pakistan are planning nationwide WIMAX rollouts. It is possible for WIMAX to deliver speeds of up to 70Mbps and operate over distances of up to 50km, although not concurrently. It should be noted that in common with any wireless solution, including cell phones, this approach may raise health and safety fears about more radiation.

WiFi

WiFi broadband uses basically the same wireless standard as used in the home IEEE 802.11 b/g/n. It is a cheaper solution for smaller areas and with directional aerials can transmit over longer distances, from 15 to over 120 miles. It is not as good as WIMAX for bending round obstacles and is more prone to be affected by birds, foliage and bad weather. A range of different frequencies can be used to improve its characteristics and it can be configured to minimise interference problems with mesh, point-to-point and point-to-multipoint solutions. Maximum speeds are around 20Mbps and lower set up costs make it attractive for residential users.

CABLE

This is not worth reviewing as Herefordshire currently has no known cable provider.

SATELLITE

It is estimated that there are some 25 million rural homes around Europe with no broadband access. For some the answer could be satellite. Two broadband satellites are being launched in the next year - the first from UK firm Avanti, due to go up at the end of the year, which is promising to offer 2Mb for all UK homes for around £15 a month. The second is from French firm Eutelsat, which it says will offer the entire UK up to 10Mbps. Its Tooway satellite will use the Ka band of the microwave spectrum to offer faster speeds. The price tag will be welcome news to consumers as previously satellite broadband came with around a £50 a month fee. Set up costs - users will need a dish and a modem to send and receive data - will still be around £400. The delay as information is sent to the satellite and then out to the internet and back to the user - about 1.5 seconds for downloading a standard website - could cause frustration for some users. Upload speeds of around 384 kilobits could also be a problem.

MOBILE BROADBAND

Touted by many as the way to fill in the UK broadband gaps, mobile broadband comes either as a dongle or via a wireless router. Mobile broadband can be delivered from a range of technologies from 2G to 3G, with the highest speed currently possible in the UK being 7.2Mbps (megabits per second) With the advent of 4G technologies, and many are backing so-called LTE (Long-Term Evolution), which is due to come to the UK within the next two years, speeds are set to get faster. Most people will have some form of mobile coverage but it could be intermittent. For example, a lorry passing in front of a house could cut the signal off. The other big issue for mobile broadband is the amount of data available. While fixed broadband offers data allowances of up to 10Gb (gigabytes) a month or beyond, mobile data allowances are much smaller. A £10 a month fee may buy a user around 3Gb of data - if they exceed this they have to pay a premium which ranges from a few pounds per extra gigabyte to several hundred pounds. There are also concerns about whether mobile broadband can remain stable when many people are using the service.

BROADBAND ENABLING TECHNOLOGY (BET)

BET is a new exchange technology from BT that is capable of delivering a stable broadband service of ~1Mbps to homes that are up to 12km away from the exchange. This is more than

double the current 5km limit for broadband. Copper lines that are more than 5km long are generally unable to support a broadband service, as the broadband signal degrades with distance. BT have said that a national roll out of the technology would be dependent on securing funding and if successful, could be rolled out in 2010.

As part of the initial pilot, Openreach – the part of BT responsible for deploying the technology – will be rolling out the technology to a small number of lines in eight locations across the country, including in Berkshire, Worcestershire, and Northumberland. The pilot commenced on 30th September. Recent discussions with BT have suggested that it could be made available in Herefordshire, but would depend on at least 10 users of the exchange to be enabled agreeing to pay £1,000 each for the upgrade. These users need not all be in the same community – just using the same exchange. The payment would cover the cost of the exchange equipment and the equipment needed in each users home and part way along the line. By default this could provide a 1Mbps service to users 12 km from the exchange, but this could be upgraded to 2Mbps by using 2 connections; this should not increase the initial cost but would mean paying line rental on 2 lines.