



FIBRE AT A CROSSROADS – PART I

An ICBAN Report on 'Infrastructure Solutions for High Speed Internet in the Central Border Region of Northern Ireland / Ireland '.



[FULL REPORT](#)

[ABSTRACT](#)

This report focuses on the progress made and steps needed to bring world-class connectivity to the Central Border Region.

By Mike Kiely, The Bit Commons, June 2016

INFRASTRUCTURE SOLUTIONS FOR HIGH SPEED INTERNET IN THE CENTRAL BORDER REGION OF NORTHERN IRELAND / IRELAND

'Fibre at a Crossroads – Part I'

1 FOREWORD BY ICBAN CHAIR, COUNCILLOR SINÉAD MAGUIRE

This technical report into internet infrastructure solutions for the Central Border Region has as its ultimate goal the improvement of quality of life for all citizens of our Region. The aim is to encourage business and enterprise to foster jobs and prosperity intended to our local economies.

During this process we met many such individuals who had the ability and drive to grow our economy but were prevented from so doing through the inadequacy of the internet service they currently have. I have outlined a sample of these here:

- The hoteliers in the three Council areas who want to keep existing customers and attract new business to their beautiful areas
- The business in the foothills of the Sperrin Mountains in Mid Ulster who have the potential to grow their export markets and create new employment
- Large food producers in Armagh who want to develop their operations and introduce more efficiencies
- A Banbridge building contractor who needs to be able to submit tenders online and who would like to develop vacant buildings as a hub for cottage industries
- An IT Executive keen to reduce commuting time from Loughgall to perform similar tasks from home
- An international sales manager for a major hospitality business, who can't issue promotional materials or CAD based tenders from home in rural Banbridge without having to travel to a nearby town or city
- The insurance broker in Lisnaskea frustrated at not being able to adequately access a remote server to support many of their daily tasks
- Those with passions to see rural dwellers accessing the same online services as urban residents
- And those with the ambitions to develop Omagh as a 'Gigabit Town' through Project Kelvin.

These are common business challenges and frustrations in our Region, which arise from not being able to access and use the internet, by virtue of location alone. This is not forgetting the teachers whose interactive white boards can't operate to support curriculum content, the farm family worried about submitting their returns online and on time, or University students less inclined to return home as much as they might like to because the home wifi doesn't meet their expanding demands.

This report by the Irish Central Border Area Network (ICBAN) Ltd. is an initiative to help address these challenges by focusing on technical infrastructure solutions. The document is referred to as Part I, in that it focuses on the Northern Ireland Council areas of Armagh City, Banbridge and Craigavon, Fermanagh and Omagh, and Mid Ulster. Work is now commencing on a Part II of the report which will focus on the County Council areas within the Partnership of Cavan, Donegal, Leitrim, Monaghan and Sligo.

The need for internet connectivity improvements has been a priority for our cross-border partnership for some time. Within ICBAN's EU funded cross-border strategy, the 'Regional Strategic Framework for the Central Border Region' (RSF), the ambition was established for an 'Accessible and Connected Region', whereby all citizens would be able to avail of a high quality internet service (measured at 24Mbps). This report, 'Fibre at a Crossroads' draws on specialist technical expertise and provides pragmatic practical solutions. This is by nature a technical document and a Glossary of Terms is included as an Appendix.

The RSF also sets out our ambition for a Sustainable Region and it is the view of this Board that the key to that is to future-proof high quality internet access within the Region. Rural broadband is of course a highly emotive issue. In today's advancing world access to reliable telecommunications is becoming an essential part of everyday life. It is a common concern that the investment required in infrastructure and services will not be forthcoming for rural NI Council areas. The sparseness of the population together with the additional costs that rural living brings are competing with other market interests for a timely resolution. It is our belief that solutions must reach all communities in the identified Council areas, including not-spot areas. After all rural citizens have the same needs and rights to demand a service comparable to urban dwellers elsewhere on these islands and continent.

Tackling our internet infrastructure challenge tallies with ICBAN's record of delivering on ambitious, complex and strategic projects. There is no doubt that this is a challenging field but if we can continue to harness and apply the same drive and determination that we found from elected representatives, officials, businesses and citizens in the development of this report, then the delivery of these ambitions is achievable.

The report acknowledges that much has indeed already been achieved and those involved should be commended. We have fibre delivery and access across many parts of our Region. However, too many frustrations still exist and many citizens don't have a service that meets their needs and indeed many have no service yet at all. Efforts must therefore continue to work towards these ambitions and ensure that such digital isolation is adequately addressed and the job that has been started must be effectively advanced. ICBAN will play its part in this work but we would encourage all interested parties to bring their positive energies to bear.

Finally and on behalf of ICBAN I would like to record our thanks to all those who have contributed to this project, from all sectors, interests and walks of life. Your inputs, passions, positive contributions and support are all much appreciated.



Councillor Sinéad Maguire
ICBAN Chair – June 2016

2 PURPOSE OF THE REPORT

The Bit Commons commend this report to ICBAN on the status of the solutions needed and the actions required to bring world-class connectivity to the Central Border Region of Ireland / Northern Ireland.

Due to the planned delivery of the National Broadband Plan in Ireland, the focus of this Paper is on the three Northern Ireland Council areas of the Central Border Region of Ireland / Northern Ireland: Armagh City, Banbridge and Craigavon; Fermanagh and Omagh; and Mid Ulster. This arises from the realisation that upon completion of the current subsidised broadband programmes, some 30% of all premises in the referenced NI Council study area will not be able to order a fixed line broadband service of more than 10Mbps. The concern is and has been that this would leave these areas at a significant competitive disadvantage with other areas of NI and indeed with the Border County areas of the Irish Republic, which are set to benefit from the ambitions of the Irish National Broadband Plan. It is also intended that the learning from this report will be of much value to the Irish County Councils of Cavan, Donegal, Leitrim, Monaghan and Sligo, as they continue to engage on the delivery of world-class connections in their respective areas. Opportunities for cross-border co-operation have also been identified. A copy of the Terms of Reference is included in Appendix 17.6 and a profile of the principle author in Appendix 17.7

This report outlines a strategy and plan from which ICBAN and its member Councils are able to develop and refine. Although some of the proposals are innovative, they are not controversial and are no more than restating an existing ambition for world-class connectivity. The key issues are the pace and vigor with which the ambition outlined is pursued. The findings of this report are there to support the fulfillment of that ambition.

The nature of the problem is old. The transition from the telegraph service to the telephone service had been resisted fiercely as the telegraph service was highly profitable and demand for a universal telephone service could not be foreseen a century ago. In 2016, the debate is a little more advanced and might appear more obvious but the issues are not dissimilar. Why should your computing and networking devices not get unrestricted access to the underlying data transport capabilities of optical fibre cable? Change is not easy, but the potential available for rejuvenating and integrating the rural economy is so great, that forcing such change is essential.

I wish to thank all those who have contributed to this report. I hope the report reflects the ambition and vigor of the people I met who want to develop their communities, and businesses keen to use their computing and networking devices unencumbered by poor or partial service. Finally, I hope the report is respectful of the progress made to date in rolling out network upgrades. It is only by fully appreciating the progress made to date that the ambition for a continued upgrade can be requested and acted upon.

Mike Kiely, Founder, The Bit Commons – June 2016

3 REPORT CONTENTS

| | | |
|-------|---|----|
| 1 | Foreword By ICBAN Chair, Councillor Sinéad Maguire | 1 |
| 2 | Purpose of the Report..... | 3 |
| 3 | Report Contents..... | 4 |
| 4 | Summary of Recommendations..... | 7 |
| 4.1 | BT Related | 7 |
| 4.1.1 | Restating the Vision | 7 |
| 4.1.2 | True up and reconciliation of costs and reinvestment of excess subsidy..... | 7 |
| 4.1.3 | Universal Service Obligation based on Fibre Services | 7 |
| 4.2 | Competition and the Gigabit Vision..... | 7 |
| 4.2.1 | ‘Sons of Kelvin’ | 7 |
| 4.2.2 | Councils as Owners of Passive Infrastructure | 8 |
| 4.2.3 | Securing 4G coverage for the Border Region..... | 8 |
| 4.2.4 | Rural Development Programme Opportunities..... | 8 |
| 5 | Introduction | 9 |
| 5.1 | Why ‘Fibre at a Crossroads’? | 10 |
| 5.2 | The Focus on Fibre To The Premise (FTTP) | 10 |
| 5.3 | The Use of Exemplars..... | 11 |
| 6 | Structure of the Report..... | 12 |
| 7 | Findings and Proposed Strategy | 13 |
| 7.1 | Acknowledging the progress made..... | 13 |
| 7.2 | Acknowledging the gaps | 13 |
| 7.3 | A ‘true up’ on existing DFE/BT programme | 13 |
| 7.4 | Focusing the Superfast Rollout Programme (SRP2)..... | 14 |
| 7.5 | Resourcing the ambition..... | 14 |
| 7.6 | The Universal Service Obligation for Broadband | 15 |
| 7.7 | Fibre to The premise – a starting point..... | 15 |
| 7.8 | Using Project Kelvin fibre to drive a ‘Gigabit’ ambition..... | 15 |
| 7.9 | Fibre To The Premise at Business Parks and Town Centres..... | 15 |
| 7.10 | The A5 /N2 and Investing in Passive Infrastructure..... | 16 |
| 7.11 | Fulfillment of the 4G Coverage Obligation | 16 |
| 7.12 | The Cross-Border Ambition..... | 16 |

| | | |
|--------|--|----|
| 7.12.1 | The Gigabit towns | 16 |
| 7.12.2 | Review A5/N2 passive infrastructure case, as per section 7.10. | 16 |
| 7.12.3 | 4G Coverage in the Border Areas..... | 16 |
| 7.12.4 | Rural Development Programme Opportunities..... | 16 |
| 7.12.5 | Value for Money | 17 |
| 7.12.6 | Crowd sourcing network performance data in the Region..... | 17 |
| 7.12.7 | A common approach to a USO for Broadband. | 17 |
| 8 | The Progress so far and the emerging gap | 18 |
| 8.1 | BT and DFE - 2009 to 2013..... | 18 |
| 8.1.1 | Investment levels and costs..... | 19 |
| 8.1.2 | BT Commercial Investment in Northern Ireland..... | 20 |
| 8.1.3 | Northern Ireland Broadband Improvement Project (NBIP) and Superfast Rollout Programme (SRP2)..... | 21 |
| 8.2 | Status of Fixed Wireless Access, Satellite and 4G Mobile..... | 22 |
| 8.2.1 | Satellite Internet services. | 22 |
| 8.2.2 | Fixed Wireless Services | 23 |
| 8.3 | The emerging gap in a modified Broadband Plan..... | 23 |
| 8.3.1 | Leadon Timberframes, Cookstown - distance creates a problem..... | 24 |
| 9 | Extending optical fibre cables into the Distribution Network (D-side)..... | 27 |
| 9.1 | The Fibre To The Cabinet (FTTC) Solution..... | 28 |
| 9.2 | Fibre To The Premise (FTTP) | 29 |
| 9.3 | Fibre To The Remote Node (FTTrn)..... | 30 |
| 9.4 | Fibre To The Distribution Point (FTTdp)..... | 31 |
| 9.5 | Indicative Cost for Delivering FTTdp infill to the Three Council Areas | 31 |
| 10 | The Universal Service Obligation and Fibre in the rural Distribution Network | 33 |
| 10.1 | Creating a USO (Universal Service Obligation) for Broadband where the customer has the right to order a fibre based product..... | 33 |
| 10.1.1 | A draft proposal for discussion and costing..... | 33 |
| 10.1.2 | Armagh City, Banbridge and Craigavon Borough Council..... | 35 |
| 10.1.3 | Estimated Volumes | 35 |
| 10.1.4 | Cost Variations Due to Geographic Density..... | 35 |
| 10.1.5 | A USO fibre product. | 35 |
| 10.1.6 | Blackwatertown, Loughgall, and Waringsford Road, near Banbridge..... | 36 |

| | | |
|--------|---|----|
| 10.1.7 | Next Steps..... | 36 |
| 11 | Planning Guidelines for FTTP in New Developments..... | 37 |
| 12 | Using Project Kelvin to establish Gigabit Towns..... | 38 |
| 13 | The importance of FTTP in Business Parks and Town Centres | 39 |
| 13.1 | Metro CCTV –Derryloran Industrial Estate, Cookstown | 40 |
| 13.2 | Walsh’s Hotel, Maghera..... | 40 |
| 13.3 | Don Carragh Hotel, Lisnaskea | 41 |
| 14 | The A5/N2 Project and the potential to create passive shared infrastructure | 42 |
| 15 | The 4G Coverage Obligation | 43 |
| 16 | Cross Council and Cross-Border Working. | 44 |
| 16.1 | The Gigabit Towns..... | 44 |
| 16.2 | 4G Coverage in the Border Areas..... | 44 |
| 16.3 | Rural Development Programme Opportunities..... | 44 |
| 16.4 | Value for Money | 45 |
| 16.5 | Crowd sourcing network performance data in the Region..... | 46 |
| 16.6 | A common approach to a USO for Broadband | 46 |
| 17 | Appendices..... | 47 |
| 17.1 | ICBAN response to DCMS Broadband USO Consultation. | 47 |
| 17.1.1 | ICBAN response to Ofcom Broadband USO Consultation: Call For Inputs..... | 53 |
| 17.2 | Planning Guidelines..... | 58 |
| 17.2.1 | The BT Rate Card for supporting FTTP in new developments. | 62 |
| 17.3 | Omagh –Establishing A Gigabit Town | 63 |
| 17.4 | Councils as owners of Passive Infrastructure – for consideration..... | 68 |
| 17.4.1 | Stokab - A Socio-Economic Study..... | 71 |
| 17.5 | ICBAN response to BDUK consultation on State Aid..... | 75 |
| 17.6 | Terms of Reference..... | 77 |
| 17.7 | Profile of author..... | 77 |
| 17.8 | Glossary of Terms..... | 78 |

4 SUMMARY OF RECOMMENDATIONS

There are two sets of recommendations: one set reflecting BT's dominant position in Northern Ireland's rural marketplace; the second are opportunities for Councils as owners of passive infrastructure to encourage competition and assist in accelerating the adoption of direct fibre access services.

4.1 BT RELATED

4.1.1 Restating the Vision

The original goals of Best Broadband in Europe and the notion of a 'rural' broadband programme was lost in 2013. It occurred when BT withdrew Fibre to the Premise (FTTP), the Best in Europe ambition was mitigated to become slightly better than the French or Germans and 'rural' was lost from the title of the Broadband Delivery UK (BDUK) programme.

There is a need for Local and Regional leaders to reclaim and restate the vision and ambition, given FTTP as a product is being restored and nearly £1bn of the £1,7bn made available is still within the public procurement. This needs to be extracted and used to roll fibre out beyond the crossroads.

4.1.2 True up and reconciliation of costs and reinvestment of excess subsidy

The three contracts with BT in NI when completed amount to more than £50m of subsidies for some 1,800 fibre connected cabinets, approximately 500 of which are in the Central Border Region. There is an opportunity for excess subsidies from BT to be returned or reinvested under the state aid measure, for cabinets funded in urban areas.

It is recommended that a 'true up' is requested for Northern Ireland (NI) and estimates for excess subsidies be made available for reinvestment.

4.1.3 Universal Service Obligation based on Fibre Services

The current consultation process run by Ofcom for a Universal Service Obligation for Broadband should be based on an ability to order a fibre based service.

It is recommended that the detail of such a product worked up during this project is used as the basis for a long-term strategy for the Region.

4.2 COMPETITION AND THE GIGABIT VISION

4.2.1 'Sons of Kelvin'

A proof of concept proposal to create a Gigabit town in Omagh is outlined in the proposal to exploit existing assets such as Project Kelvin, while securing world-class connectivity for the new Strule Education Campus in Omagh. Other towns in the Central Border Region could also follow the formula outlined.

It is recommended that Omagh Enterprise Company is charged with developing the proof of concept into a business case, working with the local Fermanagh and Omagh District Council and ICBAN.

4.2.2 Councils as Owners of Passive Infrastructure

The report recommends that the A5/N2 key road project should be used by Councils to determine the case for Local Authorities to become an investor in passive infrastructure access (duct and cable), in exchange for a revenue share.

4.2.3 Securing 4G coverage for the Border Region

The report recommends that the fulfillment of the 4G coverage obligation by 2017 should include research in the border region by Ofcom. The specification of the research ought to be completed by DFE (Department for the Economy), working with the Local Authorities and ICBAN.

4.2.4 Rural Development Programme Opportunities

It will be necessary to align the delivery of Superfast Rollout Programme (SRP2) which is contracted at post code level, with any proposal to expend additional funds from the Rural Development Programme. The same logic applies to the Intervention Areas being considered under the National Broadband Plan in Ireland.

It is also recommended that Councils and Local Action Groups (LAGs) use an entity such as ICBAN to assist in helping plan fibre extensions within the postcodes specified in SRP2, so that USO solutions can be tried and tested, and to develop and help implement potential rural investment solutions such as the likes of those noted above.

Examples of potential interventions for the use of Rural Development Programme funding could include capital schemes and development opportunities such as:

- Capacity building for communities, rural businesses and local leaders on the values and uses of such technology
- Rural Community Broadband schemes
- Rural fibre rings
- Development of Social Innovation Hubs and broadcast centres using community facilities, amenities and focal points
- Creative Communities
- Measures to promote Digital Inclusion, etc.

5 INTRODUCTION

This report was commissioned by ICBAN in February 2016, working with the member Councils of Armagh City, Banbridge and Craigavon, Fermanagh and Omagh, and Mid-Ulster. It is hoped that on the other side of the Border that the ambitions of the National Broadband Plan for Ireland will help deliver world-class connectivity in the Council areas of Counties Donegal, Sligo, Leitrim, Cavan and Monaghan - the County Council areas also served by ICBAN as a cross-border partnership. The Management Board of ICBAN took the decision to help support similar ambitions in the Northern Ireland part of the Central Border Region, through focusing this report on scoping Infrastructure Solution to high speed internet connectivity.

The report was commissioned with two key aims in mind:

1. To report on the gap in broadband service while making recommendations, using examples, to show what could be done to achieve world-class connectivity;
2. To inform policy making and decision-making at a time when 90% coverage targets are being declared and further work is being planned.

The emerging gap in broadband services was stated at a time when central policy-makers were of the mind to declare the network upgrades finished, following the declaration that the 90% and 95% superfast targets were within reach and that anything left could be addressed with in-fill solutions of fixed wireless and satellite. This positioning is controversial.

This report comes at a time of change. The inquiry into Broadband by the Culture Media and Sport Select Committee at Westminster is examining what improvements can be gleaned from the existing program. Ofcom's focus in the Digital Communications Review is on the need for greater focus on Fibre to the Premises. It is also occurring when the Minister, Mr. Vaizey MP, has confirmed to the Committee that he expects BT to return more than £250m of the state aid provided so far. This is being reported alongside significant underspends in most UK County Council projects, suggesting deeper fibre coverage can be achieved if resources are kept in place and the required scrutiny on capital costs is maintained.

The roll out of fibre into rural areas is more controversial than it needs to be. The use by BT of commercial confidentiality agreements and significant public relations effort to portray 'investment' levels not supported in BT's published accounts, have contributed to the call by the UK Parliament on Ofcom to secure a greater separation of Openreach, BT's regulated access network division, from the rest of BT's operation. Such a call, given the years involved in such a process, is not a substitute for the detailed scrutiny and publication of the BT capital contribution. Some of the £258m in BT's accounts now owed to the UK Government as excess subsidies ought to be spent in rural Northern Ireland.

The report does reference the gaps in service but it focuses primarily on the solutions, strategies and policies to fill these gaps in the current network upgrade. Specific examples will be used to illustrate the progress to date and the gaps that remain. Indicative costs of completing the rollout are also provided. The latter are there to be challenged and improved upon.

5.1 WHY 'FIBRE AT A CROSSROADS'?

The 'crossroads' is a very emotive term for any rural dweller. It is the point where you leave your townland or return to it. It represents both a physical boundary and a mental one. The crossroads is where you get a bus to the nearest town to access resources not available to you from your home. You go to the crossroads to get a bus to go to the library, go to school, or visit a doctor.

The appearance of new green cabinets at many rural crossroads in the last four years holds much promise and much frustration. They hold the promise that if you live within 1km of the green 'superfast' cabinet you will have access using the existing phone line to the same information and the same choice of services as if you lived in a Town or City. You should also be able to run a business, place an order, submit bids for work or engage with your clients online. For those living within 1Km of a cabinet/fibre path you have an equality of service and choice which matches those in urban areas. It is a great and comparatively cheap means of establishing an equality of access to services and equality of opportunity and access to global markets and knowledge.

The 'crossroads' in rural folklore is also where services stop. The bus stop, the post box, the shop, petrol pump and the public house mark for many the beginning of civilization, or indeed the end of it if you step away from the crossroads. This reports shows, when it comes to placing optical fibre on poles, that there is no reason to stop at the 'crossroads'; indeed there were many unreported examples identified during the completion of this report of BT going further in some very remote areas of Northern Ireland.

Finally, in the Fermanagh and Omagh District, of some 208 cabinets recorded on the Superfast Northern Ireland website, 41 are recorded as being at a crossroads. It is a great engineering achievement to bring bundles of fibre cable this far, but it is not a place to stop or to plan to stop, given the amount of public funding being clawed back and the number of premises being excluded from getting the upgrades expected.

5.2 THE FOCUS ON FIBRE TO THE PREMISE (FTTP)

One of the principle learnings from the BDUK programme is that overlaying through existing duct and poles and connecting to mass produced Chinese made hardware is significantly cheaper than originally predicted. While the absolute cost is still subject to debate the BT evidence submitted to Parliament points at a cost of £26,000 per cabinet. The phase 1 cost of the BDUK project to some 4m homes passed will constitute some 20,000 cabinets where the Government has contributed over £600m pounds from a total budget available of £1.7bn. BT's own capital investment in c50,000 commercial cabinets is unlikely to have more than £1bn capital of the £2.5bn investment referenced in press releases. Much of the capital will be in the form of capitalised labour costs.

It is true to say that FTTP is expensive but the costs have dropped significantly and there is a good case to push ahead where customers can make contributions to the connection costs and self-provision duct over private land. Overlaying fibre on poles is comparatively cheap, so there is a good deal of room to challenge the costs. The latter is convenient as costs will be gamed high and other investment priorities,

be it purchasing a mobile operator or funding football broadcast rights, may well have precedence as long as BT is managed as a single entity.

It was common in 2008-2009 to portray individual FTTP costs at £3,000 a property. It is now more likely to be closer to £1,000 per property and less where there is some demand aggregation. Many of the efficiencies arise from the public investment already made as the fibre cables are now deep in rural areas.

The lower costs are evident in the Republic of Ireland and Cornwall, where beyond a particular point a hamlet is better served by FTTP than incurring the cost of delivering power to a cabinet too far away to serve enough customers. FTTP is more resource intensive but not always more expensive.

5.3 THE USE OF EXEMPLARS

The body of the report and the appendices make use of local Exemplar case studies to explain, inform and provide more detail on the nature of a particular issue to solve or an opportunity to grasp. It is proposed that these case study examples are used to test propositions and used to measure success, as these proposals are followed through. These are of differing scales and types and the learning and potential solutions developed can be transferable to other businesses, rural areas, villages and towns right across the Central Border Region and indeed beyond. Through implementation with ICBAN it is intended that challenges and successes would be shared with all the involved Councils and stakeholders through a Telecoms Forum being reconvened by ICBAN upon publication of this Report.

6 STRUCTURE OF THE REPORT

This report describes the progress of the network upgrades to date and the challenges that remain. The progress is substantial and much is to be admired - now this needs to be built upon and extended. The fibre connected cabinets in a rural setting are an interim solution. The technology brings meaningful upgrades to the download speed if your premise is within 1 km of the cabinet.

The challenge ahead is then outlined and reference is made to the solutions, costs, funding and the long-term policies needed to keep the connectivity infrastructure supporting the economy, education, health and culture inherent within the area.

The report focuses on extending existing fibre cables into rural areas, while explaining the role of other technologies. The quality of both Fixed Wireless services and 4G mobile services are reliant on accessing fibre based services adjacent to masts to create a quality user experience.

The report does not outline the benefits of connectivity, as this is largely understood, but focuses on how sufficient throughput and quality is delivered in these border areas.

7 FINDINGS AND PROPOSED STRATEGY

7.1 ACKNOWLEDGING THE PROGRESS MADE

It is important to acknowledge the very great progress that has been made by the Department for the Economy (DFE) and BT. Some 3,000 cabinets and optical fibre paths have been provisioned and activated since 2010. More than half of these cabinets and optical fibre paths have been subsidised using a variety of public funding sources delivered through DFE.

Of the 3,000 installed fibre cabinets connected in Northern Ireland, under 700 are installed in the ICBAN member Council areas of Fermanagh and Omagh District, Mid Ulster District and Armagh City, Banbridge and Craigavon Borough; 200 of which are commercially funded, the remainder are subsidised.

For many rural users, particularly those within 1km of a fibre enabled cabinet, this marks a significant improvement. However, for some 30% of all premises the real legacy will be gaining access to the publicly funded spare fibre cables in the chambers close to the crossroads cabinets and securing an extension of those fibre cables further into the distribution network. Securing an economic benefit from these existing publicly funded cables demands that they are extended closer to the customer. This aim is consistent with the service levels outlined in the DFE/BT contracts and the conditions of the state aid measure governing the monies paid to BT.

7.2 ACKNOWLEDGING THE GAPS

Northern Ireland has a total of some 800,000 premises. At the end of the SRP2 project it is being estimated that some 70,000 to 100,000 will be more than 1.5km from a fibre enabled green cabinet.

In the Region some 30% of premises will be unable to access a fixed line broadband service of more than 10Mbps upon completion of the current broadband programmes, a number DFE and this report suggest is too low for business needs. 30% amounts to 51,000 of the 175,000 premises in the area under study.

While the progress is visible, leaving 30% of the most rural areas without upgrade demands that every effort should be made to recover the subsidies arising from lower costs and a better than expected take up.

7.3 A 'TRUE UP' ON EXISTING DFE/BT PROGRAMME

The terms 'true up' is used by BT executives when referring to a reconciliation process of a UK Local Authority contract.

The progress of the existing programme and its cost effectiveness is unlikely to be fully appreciated until a full reconciliation report is published for Northern Ireland. The public funding of some 1,700 street cabinets and fibre paths, with a further 400 planned at a total cost to the public purse in Northern Ireland of more than £50m, is a significant investment. Overall, reports from the National Audit Office have shown the costs to be significantly less than originally portrayed.

The UK Minister for the Digital Economy in a recent representation stated that he expected that BT would now repay some £250m of the funds so far provided in the UK. He also positioned phase 1 BDUK funding more as a loan, as thus more coverage could be achieved. In May 2016, BT reported in its

published accounts a £258m capital accrual owed back to the Government from the subsidies paid to date.

It is essential that the amount owed to DFE is outlined and its return secured. The combined intervention area for DFE is estimated at 300,000 premises. On this basis BT's capital contribution to directly incurred costs associated with the project should be some £19.5m plus any operational costs BT may choose to allocate. Clawback on take-up above 20% should result in additional repayments to DFE.

It is recommended that a mid-term 'true up' is conducted so any excess funds can be identified and accrued by DFE. Councils can then work with DFE to plan for extending fibre based solutions deeper into the Region. It may be particularly beneficial to examine all cabinets funded in Belfast, Derry and the large towns and seek a return and reinvestment of excess subsidies.

7.4 FOCUSING THE SUPERFAST ROLLOUT PROGRAMME (SRP2)

The next round of BT funding is about to begin under SRP2. The £14m of subsidy has been allocated to some 38,000 premises. Given the number of cabinet upgrades is now exhausted, it is likely that BT must deliver solutions which bring fibre deeper in the distribution network. This will include putting fibre on poles and attaching manifolds to poles so the fibre can be delivered direct to the premise. Such an arrangement will deliver 300Mbps down and 30Mbps upload capacity.

Although the premises and postcodes are contracted for the Superfast Extension Project, it should be possible to demand more scrutiny from BT on the unit costs, so that any recycled funds can be better targeted or are triggered by a local demand registration process.

It would be particularly beneficial to align any Rural Development Programme funding on broadband to increase the depth of the fibre roll out, or support Fixed Wireless where that service is the dominant solution. This demands a process to be put in place between BT or the Fixed Wireless operators to provide greater granular detail of the fibre planning within a post code, along with a willingness by Councils to assist in demand aggregation in very specific locations.

7.5 RESOURCING THE AMBITION

Extending fibre cables out onto BT pole infrastructure is a resource intensive exercise. Most of the capital is in the form of capitalized labour. The most recent Northern Ireland Broadband Improvement Project (NIBIP) involving some £19.5m of subsidies for solutions in some 500 engineering areas has taken two years to complete. While this will have involved installing fibre spines deep into rural areas, it still amounts to no more than the resource needed to stand and connect 5 cabinets a week.

The task of installing fibre cables on a larger volume of poles is less complex, but will require more people. While it appears the resource may be available, the opportunity cost to BT of applying that resource to the task needed will require consultation.

If we are to convert the challenge of 51,000 premises into a set of deliverable engineering challenges where costs and demands are proportionate over five years, BT Northern Ireland would need to resource to plan and install a minimum of 10 fibre to the distribution point solutions a week. This estimate needs to be modelled properly but it highlights that a resource challenge and a possible capability issue exists for BT. BT has struggled to get to grips with FTTP, despite having at least £1.7bn

of funding available to do the task, or some £800m once the fibre to cabinet solutions have been fully funded.

An outline costing and resource exercise has been discussed with BT. It is recommended the Councils formalize the request and use it to make informed requests of the underspends and excess subsidy funds now emerging.

7.6 THE UNIVERSAL SERVICE OBLIGATION FOR BROADBAND

In March 2016, the Department for Culture, Media and Sport (DCMS) issued a consultation on the Universal Service Obligation for Broadband. In April 2016 Ofcom, the industry regulator, followed suit with a 'call for inputs' on the proposal that a USO for 10 Mbps should be formulated.

It is recommended that the Border Councils seek a USO based on a fibre based service. The details of this proposal are outlined in the report and a description of the product is outlined in appendix 17.1. This allows for Fixed Wireless Operators and Satellite providers to declare their interest in supporting a USO for Broadband.

7.7 FIBRE TO THE PREMISE — A STARTING POINT

This report recommends that each of the Councils adopt a set of Planning Guidelines which propose that all new developments and refurbishments are planned with Fibre to the Premise. The guidelines have been tried and tested elsewhere. They can be aligned with BT's recent reference offers and change in position. The proposed planning guidelines are cost neutral to developers and BT. The draft Planning Guidelines are enclosed in Appendix 17.2

7.8 USING PROJECT KELVIN FIBRE TO DRIVE A 'GIGABIT' AMBITION

It is recommended that the concept of a 'Gigabit Town' is progressed in Omagh, where access to Project Kelvin's fibres is available to exploit at Omagh Enterprise Company, where spare duct exists to Kelvin Avenue in the Town Centre, and where there is a need to equip the new Strule Education Campus with world-class connectivity. In this context world-class is defined as the ability of any entity being able to order a 100Mbps symmetrical service for less than £100 a month from more than one service provider.

Initial investigations suggest the components and the companies to create such a capability exist. Support though is needed to create the passive infrastructure and the conditions for such a proposal to progress using the IT and telecoms procurement for the new campus. This proposal is outlined in more detail in Appendix 17.3.

7.9 FIBRE TO THE PREMISE AT BUSINESS PARKS AND TOWN CENTRES

Many business parks and town centres, despite having duct present for fibre runs, have instead been provisioned with fibre to the cabinet solutions. For many businesses the limitations of the upload capability of what is an interim solution can be quickly found. This report has identified that businesses in the studied areas of Lisnaskea and Maghera are already discovering these limitations.

It is recommended that the 'Fibre on Demand' clauses, which form part of the BDUK technical requirements and the state aid measure, are more fully enforced. This will help ensure that the evident

shortcomings of the upload capacity of Fibre to the Cabinet (FTTC) will not inhibit companies who have a need for more upload capability.

7.10 THE A5/N2 AND INVESTING IN PASSIVE INFRASTRUCTURE

The A5/N2 cross-border road project should be used as an opportunity for ICBAN member Councils and the responsible government departments to work together to invest in passive communications infrastructure.

A technical description has been included in this report at Appendix 17.4, which is consistent with that used successfully in remote areas of Sweden. It is not uncommon for local authorities to glean 60% revenue share from the utilization of such passive infrastructure assets.

It is recommended the A5/N2 project is used to determine whether passive infrastructure could work for such an approach in the referenced Council areas.

7.11 FULFILLMENT OF THE 4G COVERAGE OBLIGATION

In May 2011, the House of Commons passed a motion demanding the then forthcoming spectrum auctions include a 98% coverage obligation on at least one of the licenses. This motion representing the unambiguous voice of Parliament was converted into a 95% coverage obligation for devolved nations where 95% of homes could achieve 2Mbps indoors. Ofcom purchased the spectrum.

This report recommends that Ofcom is formally requested by the Councils to report on how it intends enforcing the coverage obligation, particularly along the border.

A separate request should be placed to DCMS for the abandoned Mobile Infrastructure Project funding to be allocated to future projects for the Border area.

7.12 THE CROSS-BORDER AMBITION

This report recommends several areas of joint-working across the border.

7.12.1 The Gigabit towns

The proposal for Omagh, could be used to review the ENET owned (MANs) solutions in Monaghan, Sligo and Letterkenny. The proposed proof of concept should be used to trigger a restating of the ambition for world-class connectivity. Establishing a commonality of purpose is recommended and using the Omagh proof of concept project provides a means to achieve such a purpose.

7.12.2 Review A5/N2 passive infrastructure case, as per section 7.10.

7.12.3 4G Coverage in the Border Areas

The coverage obligations on either side of the border should be aligned. This includes measurement and reporting against that obligation. It is recommended that the request to Ofcom should be replicated by a similar request to the Irish Regulator, ComReg.

7.12.4 Rural Development Programme Opportunities

It will be necessary to align the delivery of Superfast Rollout Programme (SRP2) which is contracted at post code level, with any proposal to expend additional funds from the Rural Development

Programme. The same logic applies to the Intervention Areas being considered under the National Broadband Plan in Ireland.

Examples of potential interventions for the use of Rural Development Programme funding have been identified and could include capital schemes and development initiatives.

The new Rural Needs Act (Northern Ireland) 2016 will have an impact, setting out the requirement for the effective implementation of rural proofing. This is to help meet the NI Executive's Vision of 'A fair and inclusive rural society where rural dwellers enjoy the same quality of life as all others in the region'.

7.12.5 Value for Money

The quality of the connectivity upgrades delivered either side of the border will be driven by how well public money is deployed and used.

The dynamics for the upgrades in Northern Ireland have been determined by the lack of competition to BT and the decision to contract via a Framework Agreement one month before the 2012 London Olympics. This has led to four years and counting of investigations into various aspects of 'value for money'. The level of FTTP achieved in Northern Ireland will rely on officials' abilities to continue to challenge the level of transparency available while recycling the clawback of excess subsidies, gaining access to the capital accruals in BT's accounts and extracting the capital contributions demanded by the state aid measure.

The dynamic in the Republic of Ireland is very different. Eir and Voda/ESB are in competition to maximize their commercial rollout, thus reducing the intervention area under the National Broadband Plan. The Government's eventual intervention is benefitting from these competitive forces.

The County Councils within ICBAN should benefit from the technical detail of the projects in NI. Additionally those in NI should gain insight into the costs emerging from a competitive market in Ireland, even if this is temporary. Both parties should glean benefits from examining the resource requirements.

7.12.6 Crowd sourcing network performance data in the Region

Communities are well organized and keen to contribute what they can. This energy could be made a little more focused by standardising the means by which network performance data is collected and made available online.

The popularity of walking and cycling and the desire of folk to record everything on their GPS devices could be used to map the location of cabinets and pole attachments. Although mapping is a condition of state aid, it has not been enforced and yet ought to be the first piece of information visible to customers. Speed tests should also be recorded systematically. Thinkbroadband¹ have done some excellent work on this matter, but rely on individuals to conduct tests.

Similarly, free applications from Opensignal.com allow mobile signal strengths to be measured and tracked and provides a means to get Ofcom to enforce the 4G coverage obligation in Northern Ireland.

7.12.7 A common approach to a USO for Broadband.

There is room for all border counties to articulate a common approach to defining and legislating for a Broadband USO.

¹ www.thinkbroadband.com

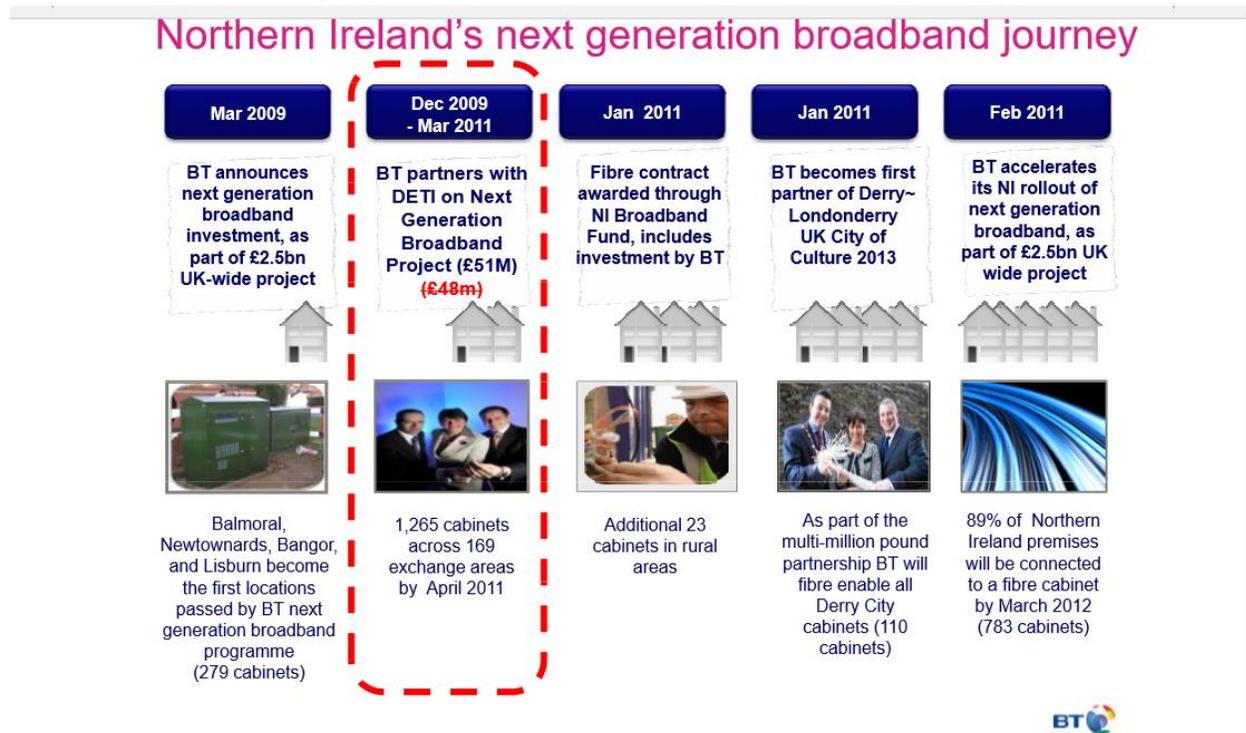
8 THE PROGRESS SO FAR AND THE EMERGING GAP

8.1 BT AND DFE - 2009 TO 2013

BT began its private investment programme in Broadband upgrades in 2009. The investment of some £2.5bn was subject to a ‘fair bet’ agreement with Ofcom, where BT would be free to charge what it thought the market could bear, subject to making available a suitable wholesale product. At the time it was not clear whether the £2.5bn would be new investment or come from existing capital envelopes. The original plans included a significant amount of FTTP in what BT described as a mixed economy solution.

BT Northern Ireland and DETI (now DFE, with DFE used herein for referencing) led the UK at this time. The original DFE sponsored programme of £18m including top-ups from DAERA (formerly DARD), funded an additional rollout of some 1,200 cabinets and fibre paths. The 2Mbps service was delivered through the deployment of BET (Broadband Enhancement Technology), which allowed signals to be boosted and lines to be added together. BT announced it was providing £30m matched funding. It was expected this would add a further estimated 260,000 premises to BT’s commercial rollout. These efforts were summarized in the BT slide below.

Figure 1: BT Slide summarising early progress.



A more recent slide is not available in the public domain but the following table (Table 1) has been compiled from both BT and DFE data and performance data from www.thinkbroadband.com. It will be useful to have all these numbers updated in a formal report, but we can start here to piece together the roll out and the gaps from data in the public domain.

Table 1: Estimated quantities and line speeds based on public domain sources.

| | Source: BT and DETI | | | | Source: Think Broadband | | |
|----------------------------|---------------------|-----------|---------------------|--------------------------|-------------------------|-----------|--------------|
| | Lines | Exchanges | Subsidised cabinets | BT Commercial Cabinets * | Coverage >24Mbps * | FTTP/FTTH | Below 10Mbps |
| Northern Ireland | 800,000 | 191 | 1,750 | 1,250 | 79.90% | 0.12% | 13.50% |
| Fermanagh and Omagh | 42,111 | 24 | 131 | 33 | 57.60% | 0 | 31% |
| Armagh Banbridge Craigavon | 77,520 | 18 | 194 | 135 | 66.60% | 0.50% | 22.10% |
| Mid-Ulster | 52,726 | 23 | 147 | 39 | 75.40% | 0 | 30% |

All measures are statistically based, so should only be used to guide decision-making. These are not a substitute for more detailed reports that should be available to public authorities, making and expected to invest public monies in, a privately owned network.

The endeavor and engineering achievement must be acknowledged. The pro-active and early programme initiated by DFE set a good precedent for others in the UK to follow. The indicative subsidy of some £14,000 a cabinet or approximately £65 a premise passed looked robust and set a good benchmark.

The most significant development appears to be BT's decision to pull away from its commitment to FTTP in 2013, while continuing to claim it was going to invest £2.5bn of its own funds. The lack of any FTTP in-fill by BT Northern Ireland in the 2011-13 period gave rise to gaps in service and capability. The public relations associated with achieving coverage excludes the detail that not all those passed can achieve a worthwhile upgrade.

The distance issue and the lack of in-fill also impacts BT commercial roll out, and where this is incomplete in urban areas it becomes apparent that some 12-15% of premises are either too far from a cabinet or the copper has not been maintained to support a good broadband connection. BT also have a need to protect their private circuit business, where margins are some 70%.

8.1.1 Investment levels and costs.

The absolute level of BT capital investment in Northern Ireland is not clear. The press releases supporting the initial DFE intervention stated BT was investing £30m in the intervention area on top of the total £18m DFE funding package.

In the most recent submission to the CMS Select Committee inquiry into Broadband, BT provided the following table where the first DFE project is referenced.

Table 2: BT Submission to CMS Select Committee Inquiry into Broadband – February 2016.²

| Total Contracted (June 15) | | | | | |
|----------------------------|-------------|---------------|----------------|---------------|---------------------------|
| | Contracts # | Funding £m | BT Capex £m | BT Opex £m | Total Investment £m |
| Cornwall | 1 | 50 | 40 | 20 | 110 |
| Northern Ireland (DETI) | 1 | 20 | 10 | 0 | 30 |
| BDUK | 45 | 1,180 | 330 | 380 | 1,890 |
| SEP | 42 | 300 | 60 | 70 | 430 |
| Total | 89 | 1,550 | 440 | 470 | 2,460 |

The capital element of BT's funding for BT Northern Ireland was recorded as £10m, close to £30 a premise passed. This looks low as BT promised to invest £30m. For the initial 1,300 subsidised cabinets installed the total average capital cost was circa £21,500³ per installed cab. For national infrastructure this is comparatively cheap and suggests more could have been planned if greater transparency was possible.

More transparency would also have driven more FTTP. Some counties like Herefordshire have opted not to accept cabinets at crossroads and instead to demand more FTTP. This has led them to withdraw areas from BT and place contracts with start-up provider Gigaclear, an option not available to DFE.

For reference it is worth highlighting that the £330m capital for BDUK if divided by the 4m phase 1 premises, suggests BT was willing to invest more than £80 capital a premise passed in the 45 BDUK projects. It is important to stress no audit has occurred on the BT capital contribution.

It would seem appropriate at least to get clarification on the funds given the level of state aid being committed, while also seeking a statement on any subsidy payments that can be returned and reinvested from the earlier programme.

8.1.2 BT Commercial Investment in Northern Ireland

BT has not made any definitive release as to the scale of its commercial investment in Northern Ireland. The National Audit Office have published a detailed costing for BDUK phase 1 cabinets costing some £26,000 each, while BT claim its costs are 14% higher. This implies the £21,500 average capital cost referenced is not far wrong and so it would suggest that to pass some 500,000 premises, BT would need to install a further 1,250 cabinets at some £27m. This excludes the 10 years of operational costs BT likes to include in its investment numbers. To the £27m needs to be added the £10m gap funding referred to in the CMS Select Committee evidence.

For this exercise it is also worth noting that state subsidies available in the three major contracts to BT in Northern Ireland are some £50.5m, while within the commercial areas it would not be unexpected to find 10-12% of premises out of reach of an improved service.

² Supplementary written evidence submitted by BT (EWC0097) February 2016.

³ 1300 cabinets, £18m from DFE and £10m from BT - £21,500. <https://www.economy-ni.gov.uk/articles/history-broadband-development-northern-ireland>

The CMS Select Committee Inquiry into Broadband is likely to conclude that BT's 'fair bet' investment deal with Ofcom did not mean new incremental investment, but investment created by BT changing priorities within its existing capital expenditure envelopes. This therefore means 'investment' numbers have to be treated with caution. Most of the capital allocation will be in the form of capitalized labour costs for BT staff and its contractors. The network upgrades are largely a civil engineering exercise where labour costs account for more than 80% of the costs.

8.1.3 Northern Ireland Broadband Improvement Project (NBIP) and Superfast Rollout Programme (SRP2). These two additional contracts are set to bring a further 45,000 premises (NBIP) and 38,000 (SEP) premises within reach of a cabinet and capable of ordering a 24Mbps service. Some of the monies come from central government and thus operate under the BDUK Framework agreement signed one month before 2012 London Olympics. Table 3 summarises the monies and the coverage.

Once completed DFE are still forecasting that some 70,000 to 100,000 premises will be unable to order a 10Mbps service.

The first thing to notice in Table 2 is that the subsidy available is much higher and reflects the inflated costs imbedded in the BDUK 2012 Framework. Although the areas become more rural and more expensive, BT evidence to the CMS Select Committee stated the cabinet costs for phase 2 is £27,000 a cabinet. This suggests that it will be possible for BT to do some FTTP based solutions as part of both NBIP and SRP2 and indeed this was evident during surveys of pole attachments in Galbally, Co Tyrone and on the road from Tulnacross exchange to Orritor in Cookstown, Co Tyrone.

It is worth asking then, given the evidence BT has provided to the CMS Select Committee in spring 2016, what additional coverage is possible from these funds? The greater than £300 per premise passed is more consistent with a plan for fibre to the pole than a plan for a cabinet, which by definition is unlikely to be useful in more rural settings given the lower customer densities.

Table 3: Summary of DFE subsidies for Broadband from public press releases.

| | Date | Public Funding | BT Investment | BT Capex | Cabinets | Premises passed | Public funding per premise passed | Indicative Subsidy per cabinet |
|-------|------|----------------|---------------|-------------|----------|-----------------|-----------------------------------|--------------------------------|
| DETI | 2011 | £18,000,000 | £30,000,000 | £10,000,000 | 1,178 | 260,000 | £79 | £15,280 |
| DARD | 2011 | £1,000,000 | £2,000,000 | | 90 | 18,000 | £56 | £11,111 |
| NIBIP | 2014 | £19,300,000 | £4,200,000 | | 500 | 45,000 | £429 | £38,600 |
| SRP2 | 2015 | £14,300,000 | £3,000,000 | | 400 | 38,000 | £376 | £35,750 |

Information in Table 3 is from data in the public domain. It is only as reliable as the data available to the public. For instance, the cabinet numbers may vary as BT may decide to do more FTTP. Similarly, the funding of the Satellite activity is not clear. It may have its own funding source or needs to be deducted from the NBIP and SRP2.

None of the existing FTTP effort is visible on the Superfast Northern Ireland website, and when checked by customers in Blackwatertown and Loughgall, no information was forthcoming on acquiring the solutions emerging on some telegraph poles in County Tyrone.

There does appear to be a justification in pushing for additional coverage from the existing programmes. This would also enable Councils to identify and prioritise areas not currently planned in the SRP2 programme, or modify plans within the postcode. The postcode data in the public domain seems insufficient for Councils to provide guidance on prioritisation, so there must be room to demand more areas to be funded by the underspends and excess subsidies arising from existing activity.

It would be appropriate to request a formal mid-term reconciliation of all contributions so that the underspends and excess subsidies to be returned can inform any resetting of targets for FTTP.

It would also be appropriate to request sight of the current resource allocations in terms of manpower and the changes needed, should a greater focus be placed on installing fibre on BT poles in the distribution network.

8.2 STATUS OF FIXED WIRELESS ACCESS, SATELLITE AND 4G MOBILE

This report focuses on the availability of fibre based services, as this provides the primary measure of success.

DFE have incentives in place for those wishing to use a Satellite service.

DFE have also assisted the Fixed Wireless solutions providers for some time and the Connection Voucher Scheme was availed of by Fixed Wireless providers active in Northern Ireland.

But what is their role or status in an overall plan to reach the final 10%?

8.2.1 Satellite Internet services

The national broadband plan states that Satellite Internet Services are needed for very remote locations and will always be needed for those where the costs of an alternative approach are disproportionate. This remains the case and DFE already have a comprehensive support package available for those needing or wishing to use satellite. While satellite has a role to play, satellite service providers are one of the first to highlight the differences in services levels arising from the greater than 70,000 km round trip time to one of the geo-stationary Satellites floating above the equator. The impact of atmospheric conditions and the need to manage the available transponder capacity over the lifetime of the asset, create a challenging business model. Satellite services will always play a part in any comprehensive Broadband plan, but the nature of the service level agreement is different and thus not to everyone's taste. Satellites are the most efficient way of delivering live Broadcast TV signals to an enormous footprint, but its parameters are not ideally suited to discrete on-demand TV data streams, unless the user works to schedule downloads. While satellite providers have many clever ways to reduce the impact of the round trip time, not all internet services such as Skype or You Tube have readied their applications to optimize the use of satellites resources. This tends to mean Satellite is less popular than it could be as inconsistent demand levels mean the customer experience is not fully optimized.

For this report it is assumed Satellite Internet Services are both needed and DFE has the appropriate support in place. Satellite Internet services are more than adequate to meet essential needs but the 'voice of the customer' suggests a growing business or a growing family aspire for more than a typical satellite internet packet can offer. This report therefore assumes the need for satellite continues no matter how far fibre can be eventually delivered. The level to which it is adopted will be a function of

how effective satellite providers can work to overcome the perceived concerns arising from their growing reliance on being connected.

8.2.2 Fixed Wireless Services

The option to use Fixed Wireless Services to cover large distances and few customers is a very real one. The Connecting Devon and Somerset Superfast Project has appointed a fixed wireless provider to provide service over a substantial amount of Dartmoor and Exmoor on the assumption that their BT contract would never reach that far. The decision was partially influenced by the need to meet a political timeline, but it is both viable and feasible to contract an area for this purpose. Other counties have since followed suit.

It is suggested that if this approach was to be pursued then some type of zoning would need to be considered. The allocation of a finite number of contiguous postcodes ought to be considered.

Although procurement processes prevent the notion of picking winners, the decision to award a Fixed Wireless contract for a given area demands a long-term commitment by both parties. The Fixed Wireless provider needs a critical mass of customers to create a sustainable service. It should be treated as a once in a generation infrastructure decision.

Fixed Wireless providers in Northern Ireland are encouraged to make clear their ambitions to be USO providers during the call for inputs by Ofcom on the Universal Service for Broadband. If a set of poorly served postcodes were to be allocated to a Fixed Wireless operator, then such a process presents a good time to discuss how a proposal might be encouraged or supported.

In the absence of establishing themselves as potential USO providers, Fixed Wireless providers play a significant, if not an unexpected role, in providing in-fill solutions. This is discussed further in Section 13 on Business Parks and Town Centres.

8.3 THE EMERGING GAP IN A MODIFIED BROADBAND PLAN

The 90% and 95% superfast coverage targets set by the UK government were articulated in such a way that provided a customer was within 1km of a VDSL cabinet, the boxes could be ticked, but there would be bundles of fibre capable of being extended further into the rural areas. If the service level was dropped to 15Mbps then that distance could be stretched to 1.5km. However, either target could be met by the simple deployment of circa 30,000 cabinets nationally, which would be in addition to the 55,000 to 60,000 cabinets BT would deploy at its own cost. The numbers in Northern Ireland suggest BT is paying for 1,250 cabinets and the state is funding the remaining 1,750 on a gap funding basis. However, the funding was made available to do significant amount of in-fill on a national basis. How much is actually possible could be as much as £1bn of the £1.7bn made available, but the lessons to date are that unusually for an infrastructure project the costs are less than originally portrayed. Getting this acknowledged has taken some three National Audit Reports on the costs and it now rests with the ingenuity of officials to extract these monies embedded in the process. The capital accruals of £258m⁴ in BT's accounts are just one pointer to the monies owed.

The gap in service emerging is not just caused by distance, but also through increasing and changing usage.

⁴ BT's published accounts for 2015/16. www.btplc.com results page.

The BT FTTC solution supports a good download service up to 1km from the cabinet. The Council areas featured in this report have more than 30% of premises further than 1.5km from the installed cabinet. The utility of a subsidised cabinet at a rural crossroads is not the cabinet itself but the spare fibre in the chamber next to the cabinet.

Once businesses and consumers begin to enhance their use of computing applications the importance of the uploading performance becomes more important. For a business the 2Mbps Universal Service Commitment target is now the minimum needed for a usable upload capacity. Once you begin to use the connectivity available, you begin to use it more, and soon uploading 10Mbps PDF files in support of business tenders or school projects means the upload limit from a location 1.5km from a cabinet, is quickly exposed. Multiply this by the number of people attempting to use the available connection and the frustrations only escalate.

The distance issue is well illustrated by the example of Leadon Timberframes in Cookstown, County Tyrone

8.3.1 Leadon Timberframes, Cookstown, Co. Tyrone - distance creates a problem

Leadon Timberframes specialise in timber framed homes. They currently employ 26 people, export half of their turnover and have plans to expand further.

Leadon Timberframes are based in the foothills of the Sperrin Mountains, and are near to a small telephone exchange in Tulnacross.

Leadon now rely on their Broadband connection for the exchange of house plans, the remote maintenance and programming of their timber cutting equipment and an increasing level of real-time communications. This thriving business took an FTTC upgrade as soon as it was available. However, by road the cabinet is some 1.3 miles or 2.1km away. 'Speed' or more appropriately 'throughput' tests show a capacity to download of 8.5Mbps and a capacity to upload of 950Kbps. This is consistent with the attenuation characteristics of the VDSL frequency plan, which determines how much signal and how far the signal will reach. The amount of signal dictates how much data can be carried in each direction. In this case the upload capacity becomes an issue as the Service Provider has also sold a VOIP (Voice over IP) service to the customer. VOIP is demanding in terms of the resources it needs and ideally each call needs 120Kbps of the upload capacity. Unless the VOIP can demonstrably support service with MOS scores of 4 or more, it should not be offering the service. Live video is more demanding on the available resources. MOS⁵ scores are a methodology for measuring the quality of a VOIP service.

Making do with what exists would point to Leadon turning off the VOIP service and reverting to the telephone line for voice communications, until the quality of service can be assured. This still leaves little capacity for uploading house plans and coping with any online discussion on the detail of those plans.

Fixing for the long-term is catered for in the BDUK contracts and is only beginning to be understood and exercised. The capacity to extend these fibre services was an integral requirement of the granting of state aid. References to Openreach's Fibre on Demand product is a taste of what is both needed and expected from the overall programme.

⁵ MOS – Mean Opinion Score https://en.wikipedia.org/wiki/Mean_opinion_score

Getting a fibre path on the Dunnamore Road is a significant engineering achievement and DFE and BT must be applauded for doing so. The plaudits need to be extended further as the recognition of the limitations of the cabinet based solution are acknowledged further down the same road at the junction of Flo Road/Tulnacross, where several poles have been equipped with Fibre Manifolds ready to support Fibre to the Premise. Very few rural communities in the world would have access to such resources and it was serendipitous to find them so close to Leadon's premises. If and when this solution is brought in the other direction, then Leadon will be able to order a full FTTP connection supporting 300Mbps and 30Mbps upload. BT will suggest that this customer may be better served with a business grade Ethernet product, but the cost of provision and the annual rentals may make this unreasonable for both the customer and for BT to sustain.

Originally it was hoped the Connection Voucher Scheme might help with fibre extensions in this scenario but the need for headlines meant many vouchers were spent on interim solutions.

The challenge of how we can get fibre extended is two-fold and lessons learned can be applied to any business where an FTTC service, while offering a reasonable upgrade, does not adequately grow with a company's need for and exploitation of connectivity resources. The limits on the upload capacity of the FTTC connection can be quickly exposed, given the symmetric nature of most business interactions.

The questions which arise are:

- How quickly can Leadon Timberframes order a FTTP service?
- Can this work be scheduled as part of SRP2?
- Is this a good use of the Rural Development Programme Funds available and which could act in support of SRP2?
- What will BT contribute?
- How do we systematise such a process for business customers so the order process becomes familiar and costs reduce?
- The underlying capability is already visible but how might limited resources be prioritised to best support economic priorities of the Council?

The alternative to this approach is to accept the limitations of the FTTC service and suggest ordering a second line or adding additional capacity using a Fixed Wireless solution. Both require spending money that could be used to deliver a long-term solution for this area where the process could then be copied for others.

In Leadon's case the proximity of the cabinet suggests fibre should be extended on the poles and they receive a direct fibre connection. Whether that fibre is configured to support an FTTP service as currently specified, or some new variant of a Business Ethernet product that is launched, is immaterial to the principle that fibre needs to be brought deeper into the distribution network.

The immediate step is to establish how and when can an order be placed by Leadon Timberframes? BT may wish to raise ECC - Extra Construction Charges. It is worth working through this example to determine whether RDP funding plays a part, underspends play a part, or returned subsidies play a part in delivering the extra work. A long-term solution is being proposed in Section 10 on the Universal Service Obligation but this case and others referenced could play a role in shaping such a requirement.

We checked with other case studies and found that the requirements raised in Blackwatertown and Loughgall, Co. Armagh had similar characteristics. However the notion of taking fibre onto poles was not considered to be an option by BT for these locations. The greater than 1km distance means the download capacity quickly drops to 10 Mbps or less, and this then acts as a trigger point for frustrations to begin for homes or businesses reliant on their connectivity. The frustrations escalate if customers need to use the upload capacity.

The case of Galbally, Co. Tyrone provides an interesting contrast to Blackwatertown and Loughgall. The location of the cabinets at crossroads in Galbally does look peculiar, in so far as there are few properties in the immediate vicinity but there is plenty of evidence of fibre being distributed on poles in what is a very rural location. Progress is clearly being made but the BT thinking supporting this activity is less than clear. The presence of such objects makes a huge difference nevertheless.

The challenges arising from more complex usage is outlined in Section 13 on Business Parks and Town Centres.

The next Chapter looks briefly at the technical solutions and provides some outline costings which can be used to determine at what pace and over what time the challenge should be addressed. The latter are there to be challenged. Due to the nature of the tasks in hand, BT will maximise the funding available. Its fiduciary duty to its shareholders demands it be so and the political economy of its relationship with Ofcom permits the cost gaming exercise to be legitimised. Local Authorities have to use whatever means that exist to challenge this orthodoxy by seeking increased transparency through multiple audits. The composition of the capital contribution may need to be challenged by those in Ofcom tasked with supervising BT regulated accounts. It is one of the few occasions where BT's cost allocation methodology can be challenged.

9 EXTENDING OPTICAL FIBRE CABLES INTO THE DISTRIBUTION NETWORK (D-SIDE)

The BT network in Northern Ireland consists of some 191 exchanges and 3,000 primary connection points, serving approximately 800,000 customer lines. Virgin Media have a separate network serving parts of the major conurbations, while the four mobile operators share two separate sets of mast and connecting backhaul infrastructure.

The BT network is hierarchical in nature and smaller exchanges connect to larger exchanges which form an interconnected ring. The larger exchanges form a core network with resilient links to the UK. This core network and links to the bigger exchanges will have used optical fibre since the 1980's. Figure 2 below is another BT slide confirming the quantities.

BT stated at a presentation to the Royal Society in the summer of 2015 that its core network had an inherent or design capacity of 10 Terabits a second between its principal nodes and that 3 terabits of this were lit or activated for use. Capacity in the core network is therefore not the issue.

BT will also have wide use of optical fibre as a medium to support their private circuit portfolio.

Figure 2: BT Northern Ireland – basic data

- Population of 1,789,000
- In 710,000 households and working in 80,000 business sites
- Approx 80% of the population is within 40 miles of Belfast
- 1st region in UK and Europe to offer 100% broadband availability
- 191 telephone exchanges
- 2,936 cabinets



BT's copper access network supports telephony upon which is overlaid a data transport service which uses higher frequencies to encode and carry our data. It is the broad range of higher frequencies used that gives rise to the name 'Broadband'. Signals using higher frequencies attenuate with distance creating a limitation on the volume of data carried. It is not a speed but the 'throughput' or volume possible.

The advent of Fibre to the Cabinet solution, takes optical fibre deeper into the network which solves the capacity issue to that point. The addition of the cabinet forms the link between the optical fibre and the existing copper network for the remaining journey. The electronics in the cabinet accept and receives signals composed of photons of light. The cabinet receives the light signals and processes these signals into electromagnetic waves to be transmitted over the existing copper. The last part of the telephone

network is called the D-side or distribution side. Telephone Exchanges tend to be within 10km of a premise. Fibre connected cabinets need to be within 1km of a premise to make a significant difference to a customer's experience. NI has 191 telephone exchanges and these are supplemented by some 3,000 installed cabinets. Figure 3 below provides an Openreach image of elements of the FTTC and FTTP network. It is best to see it as form of Lego build consisting of uniform components and uniform lengths for the most part. The uniformity of a telephone network has meant a high level of predictability in the costs of upgrading it. The latter breaks down the more rural the network but even here the total distances are contained within the planning rules of the old telephone network.

Figure 3: BT Fibre Access network

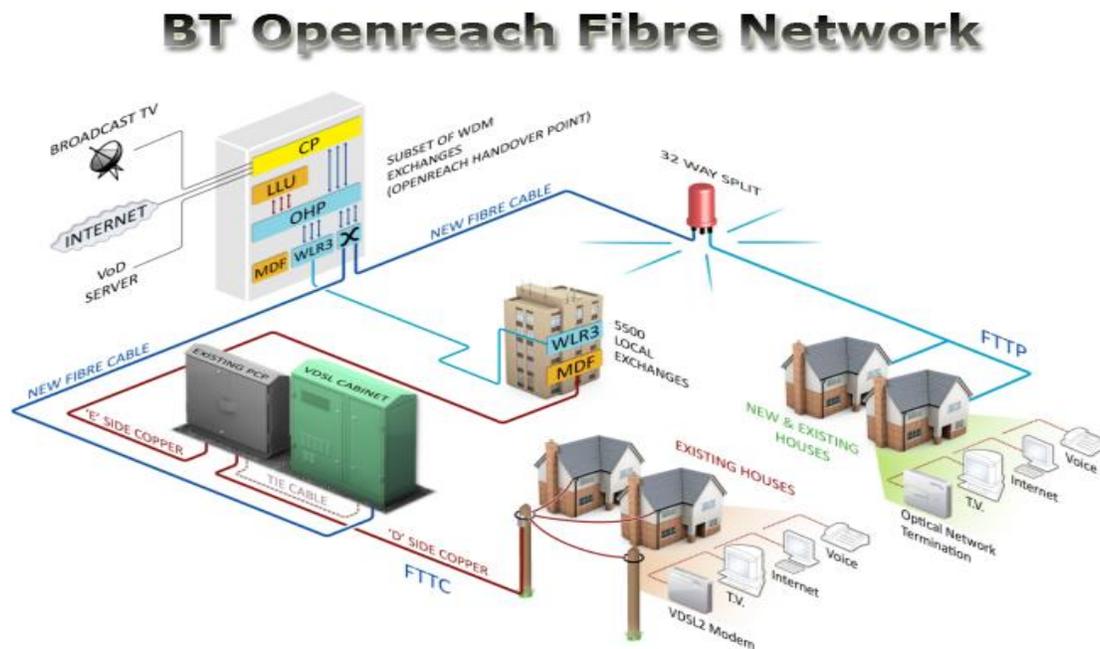


Figure 3 excludes two variants which are important to Northern Ireland, Fibre to the Remote Node and Fibre to the Distribution Point. These are just points in between the cabinet and the premise in the distribution network.

9.1 THE FIBRE TO THE CABINET (FTTC) SOLUTION

The Fibre to the Cabinet solution involves overlaying a fibre path over the existing telephone infrastructure to a large exchange in places like Omagh and Cookstown, bypassing or 'glassing' as it is termed through the smaller exchanges en route. You would expect that of 191 Northern Ireland telephone exchanges 30-40 would be used to process (collect, distribute and maintain) light signals to the 3,000 street cabinets.

Fibre as a medium has three advantages. Fibre signals (photons) using the equipment BT is installing can be transmitted some 70km before the signal begins to weaken or attenuate. This reduces the number of exchanges needed for all fibre networks. The fibre overlay fans out like a tree and branch system with

larger capacity fibre cables being spliced to smaller capacity cables as the rollout progresses. The upgrade has been relatively cheap as the fibre cables are being overlaid on existing infrastructure.

The capacity, i.e. the throughput possible of a single fibre is limited at present by the equipment being attached at the end of the fibre. The current rules show cabinets would be connected using 1 fibre from a bundle of 4 fibres. The equipment would be expected to support 1Gbps and 10Gbps throughput on a single fibre. Today's capacity is likely to be configured for 1 Gbps. This four fibre cable is connected or spliced in a nearby chamber to a large cable and this is joined to a larger cable at an aggregation node, which is then connected to one of the nominated handover points that reside in an existing exchange building. The handover point connects to BT's core network which carries traffic to a number of internet exchanges.

The capacity of each fibre can be expanded beyond 10Gbps by improvements in the equipment and the use of different coloured light. At this point the capacity, once it is in the locations you need, is not the issue but how that capacity is managed to deliver the lowest cost per bit delivered across the network.

BT's FTTC cabinets typically come in three sizes, supporting 2, 4 or 6 cards. Each card typically has 48 ports, one for each subscriber. The larger cabinets can support a maximum of 288 customers which is why you will begin to see BT adding more cabinets as capacity runs out in urban areas.

The FTTC cabinets do the same function as the ADSL equipment used to do in exchanges, but by virtue of being closer to your home, your premise can receive a greater signal and this carries more data.

Customers of small cabinet (2 cards / 96 ports) are sharing a 1Gbps connection to the telephone exchange / handover point. The provisioning of capacity from that point to the internet is the responsibility of your chosen ISP.

Fibre to the Cabinet creates little disturbance to the customer and is easy to order. However, FTTP demands a discrete installation of cable or duct.

The costs of FTTC have been controversial. In 2013 the CEO of Openreach claimed a cabinet's cost at £100,000, while in January 2015 the National Audit Office (NAO) reported costs of £21,000 on average for phase one of the rural project. BT evidence to the CMS Select Committee in February claimed phase 1 costs were £26,000 on average, but the presence of BT capital is not clear. A 'true up' of all payments is needed and should be pursued with whatever audit resource is available. The per premise passed cost of £130 before BT capital contribution for phase 1 would be reasonable benchmark but BT are still wishing claim costs of £230⁶ per premise passed.

9.2 FIBRE TO THE PREMISE (FTTP)

The fibre to the premise (FTTP) solution brings fibre all the way to the premise. This gives customers the option to cancel a telephone line and instead use a fibre line for a telephone voice service. The FTTP as currently configured supports a 300Mbps download and 30Mbps upload service.

⁶ See BT written evidence to CMS Select committee website -Supplementary written evidence submitted by BT (EWC0097) February 9th.

BT withdrew its large scale deployment plan for FTTP in 2013, but in April 2016 has now restated its commitment to begin deploying again, particularly in housing developments, where costs compared to telephony are neutral.

The unit costs are highly variable. Google Fibre are achieving a \$350 cost per premise connection charge in urban areas of the US. Gigaclear look to be able to achieve a less than £1,000 per premise connection cost for FTTP in rural UK, while the community based BARN project is claiming £800 per premise for final 5% properties in Lancashire. These are initial deployment costs and are referred to as first passed costs – subsequent deployments would be approximately half of this cost.

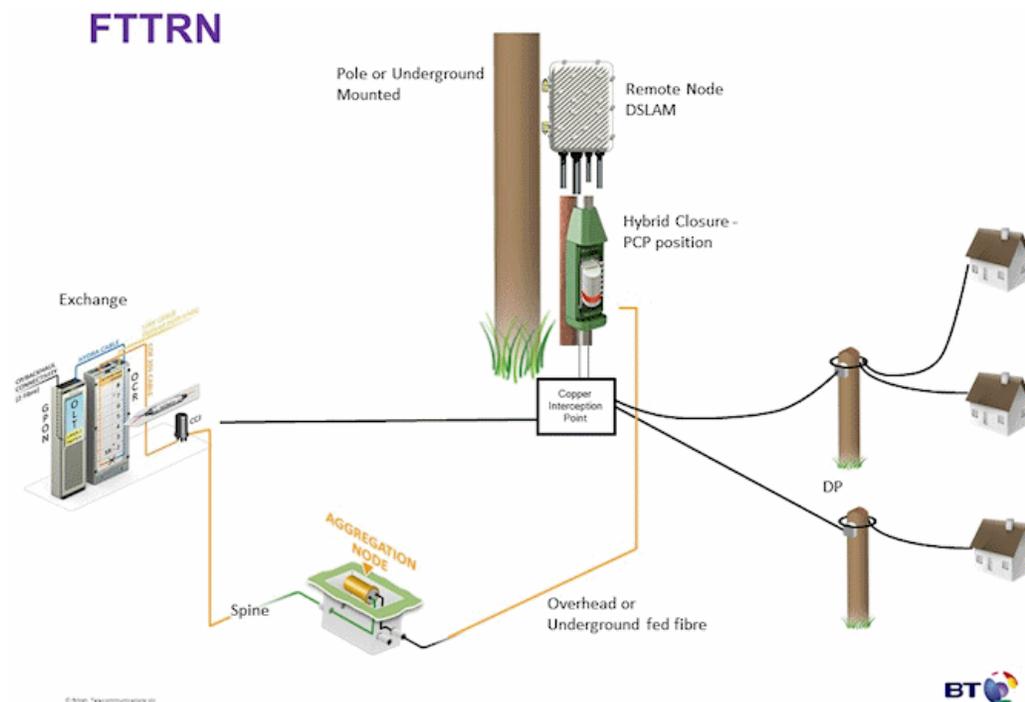
9.3 FIBRE TO THE REMOTE NODE (FTTRN)

This solution takes fibre deeper into the distribution network. BT also extend power from the cabinet. The intention is to install a smaller amount of electronics on a pole or a tiny cabinet and then serve up to 16 customers using their existing copper lines. It is FTTC installation but with a much smaller footprint.

The cost of such will be less than a cabinet as no power source is needed and electronic component will cost less than a cabinet installation. It is not unrealistic to budget a total of c£15,000 an installation for a 16 port device. Some of the pole fittings have been spotted in Galbally, (Camaghy Road South, Glenburrisk) but not the full installation. It is not clear what are BT’s plans for this solution. There is no reference on the Superfast NI website but the customer experience will be the same as FTTC. The existing phone line is used to complete the service.

The question does arise as to whether you invest in the power and electronics or should you not move to FTTP by bringing Fibre to the Distribution point (or final pole).

Figure 4: Fibre To The Remote Node



9.4 FIBRE TO THE DISTRIBUTION POINT (FTTDP)

Fibre to the Distribution Point, is delivering fibre over poles. A manifold is attached to a pole (see picture below), enabling customers to order a fibre line and cancel an existing phone line. It is a form of Fibre to the Premise.

While BT in response to queries was not acknowledging this solution in Northern Ireland, but referring to it as an innovation, these pictured components were attached to poles at the junction of Flo Road, in the Townland of Doons, near Orritor, outside Cookstown.

It is assumed that BT must be doing this work under NIBIP and thus it would be useful to know how much of this solution is expected to be delivered in NIBIP.



The unit cost will be less than FTTrn as there is no power lead and no electronics, however customers will be expected to pay a connection fee. When done individually customers may be expected to pay extra connection charges of some £4,000 as costs are recovered for the entire route from this first customer. A more systematic plan should allow Townlands to be upgraded if the need is clear and resources are applied accordingly.

9.5 INDICATIVE COST FOR DELIVERING FTTDP INFILL TO THE THREE COUNCIL AREAS

The following assumes customers will pay a contribution to the final drop cost. We should also assume that some minimum threshold is set before a Townland or seven digit post code outside the reach of a cabinet, would be considered for a FTTdp solution.

An initial estimate would have to look at £10k for an FTTdp solution serving an initial 5 connections but available to 25 others to use. The £10k is based on 2.5km overhead installation costs including the pole attachments. It also assumes the spare fibre is re-usable for this purpose. Estimates are based on 10 and 25 customers being able to connect to a 2.5Km overhead extension.

Table 4: Indicative costs for comprehensive FTTdp in-fill solution in Border Region

| | Premises | Below 10Mbps | Lines <10 Mbps | Cluster of 10 premises | Cluster of 25 premises |
|--------------------------------|----------|--------------|----------------|------------------------|------------------------|
| Fermanagh and Omagh | 42111 | 31% | 13054 | 1305 | 522 |
| Armagh Banbridge Craigavon | 77520 | 22.00% | 17054 | 1705 | 682 |
| Mid-Ulster | 52726 | 30% | 15818 | 1582 | 633 |
| Estimate FTTP clusters | | | | 4593 | 1837 |
| Unit Cost (indicative £10,000) | | | | £45,926,610 | £18,370,644 |
| Cosr per annum for 5years | | | | £9,185,322 | £3,674,129 |

It is important to request the same cost of BT, but this not an impossible task, as some of this work has started under NIBIP and will continue under the SRP2 programme. If we combine any funding from the Rural Development Programme, the clawback of excess subsidies, potential EU and national government project funds and any municipal contributions, then the task being requested is by no means insurmountable. This assumes BT is willing to commit the resource which is likely to be the biggest issue to be understood and addressed.

It should be pointed out that the use of any EU funds and the impact of State Aid measures are conditioned by the arrangements and timing of a UK withdrawal from the EU. At the time of this report there are still many unknowns involved.

£258m of state aid is waiting to be returned by BT or put to future deployments across the UK. The Northern Ireland portion of this would cover a significant amount of the costs needed, given that BT have already received funding for 300,000 premises in NI.

Across the border area 470 fibre cabinets have been subsidized. The above estimates may be overstated in terms of the volume needed, but it is equally clear BT will portray far higher unit charges until those in charge can prove otherwise.

The next chapter looks at how this ambition could be progressed in conjunction with the development of a Universal Service Obligation for Broadband.

10 THE UNIVERSAL SERVICE OBLIGATION AND FIBRE IN THE RURAL DISTRIBUTION NETWORK

In March this year (2016), The Department of Culture, Media and Sport (DCMS) opened a short consultation on a proposal for Universal Service Obligation for Broadband. In April, Ofcom issued a call for inputs on the same subject.

The Government are minded to declare that 10Mbps should be sufficient ambition at the edge of the network, the obligation should be proportionate to demand and cost. This is consistent with a view that the job of upgrading the network is complete and there is now a need to focus on something else. Ofcom would be charged with designing the Universal Service Obligation and enforcing it.

As currently articulated, the delivery of the 10Mbps service could be met by the current satellite offers. At a stretch deploying a 4G signal booster could also meet such a target if the customer was obliged to prove they could not get 10Mbps through any means available. The ambition as articulated does risk those currently on the margins of receiving good connectivity to remain there. It would be possible to declare the 10Mbps USO met by pointing to the availability of satellite internet services.

As part of this report, ICBAN has drafted a response to both the DCMS and Ofcom USO consultations and these are enclosed as Appendices 17.1 and 17.1.1. DFE have also responded to the Ofcom call for inputs. They are likely to also have grave reservations about the limitations imposed by 10Mbps.

As part of the engagement on this report, BT have been informally approached to cost a USO for Broadband based on an ability to order a fibre based product. The request is useful as it allows a concrete proposal to be discussed, improved and costed.

The detail of this is outlined below. This report recommends this request to BT is formalized and the response and modifications are submitted to Ofcom as the consultation on the USO advances. This should also be done in conjunction with DFE, perhaps joining forces with peers in Scotland and the Local Government Association. The requirement can be owned and supported by many Councils in a similar position.

The draft requirement as stated is consistent with the ambition of taking fibre deeper into rural areas and making the most of the funds available. In this effort we have used the Armagh City, Banbridge and Craigavon Council area because good detail was made available in support of specific costings in Blackwatertown, Loughgall, and Waringsford Road, near Banbridge. This initial request can be followed up with similar approaches for other Council areas.

10.1 CREATING A USO (UNIVERSAL SERVICE OBLIGATION) FOR BROADBAND WHERE THE CUSTOMER HAS THE RIGHT TO ORDER A FIBRE BASED PRODUCT.

10.1.1 A Draft Proposal for Discussion and Costing.

The following request for costing to BT in Northern Ireland has arisen from discussions taking place between ICBAN and member Councils in March and April 2016 as part of this report.

This request focuses on all of Armagh City, Banbridge and Craigavon Borough Council area for this costing exercise, and requests that specific costs are tested in a geographic area between Blackwatertown and Loughgall, where the current cabinet solutions fail to make a meaningful improvement to customers beyond the reach of the cabinets.

The following factors are shaping this request:

- It comes at a time when the UK Government is seeking to legislate for a minimum of a 10Mbps service. Ofcom in response to this action has opened with a 'call for inputs' on the same subject.
- BT has also recently announced a FTTH rate card for new developments. Prices are available for as few as 1-2 premises, however such costs are reduced where fibre rollout has already occurred. (See Appendix 17.2.1 for Rate Card)
- BT has invested c£27m⁷ capital in installing some 1,250 cabinets to pass some 500,000 premises.
- DFE and BT jointly funded in 2010-2012 some 1,200 cabinets supporting 260,000 additional premises.
- DFE and BT through NIBIP (Northern Ireland Broadband Improvement Programme) are investing a further £19.5m to bring improvements to 45,000 premises in 500 engineering areas. This includes some Fibre To The Remote Node (FTTrn) and initial fibre to the premises clusters.
- SRP2 (Superfast Rollout Project) is investing a further £14m of public funds from 2016. This will enable a further 38,000 premises to access a service reliant on fibre infrastructure.
- BT in their published accounts have referenced £258m in capital accruals for BDUK, while the Minister at the most recent CMS Select Committee appearance referenced that BT will be returning some £250m to support additional rollout. These funds need to be reinvested or handed back. These sums are likely to grow as the costs of installing FTTC cabinets were less than originally budgeted. The arrangements for the clawback of these excess subsidies are not known for Northern Ireland yet.
- BT in their written evidence to CMS Select Committee have made it clear that the final 10% of premises out of cabinet reach in rural areas will receive a significant amount of FTTP.
- It should be noted that Northern Ireland has a disproportionate number of lines more than 1.5km from a Primary Connection Point (PCP).
- The EU state aid measure SA33671 states a requirement for the BDUK supported network investments to be upgradable and extendable, and this is supported in section 6 of the BDUK standard technical and service requirements, first compiled with the help of rural communities in Cumbria in 2011.

The existing USO for telephony is bound by;

- BT's liability limited to the first £3,400 of costs.
- Customers pay a threshold of £130 connection charge.
- The need for cost proportionality.
- A definition of a reasonable request.

⁷ 1250 estimated fibre cabinets x £21,600 capital – BT in 2013 evidence to PAC stated NI costs were 14% less than UK mainland and commercial cabs are in easier to serve areas. This is to be used as reference point to help establish a truth. Only BT can decide to make available the actual numbers.

- Demand for a USO product.
- The impact on competition.

In this paper the satellite and wireless access options are ignored due to the differentials in the service level agreements supported and whose availability is not conditional on establishing a USO.

10.1.2 Armagh City, Banbridge and Craigavon Borough Council Area

The following has been gleaned from the Northern Ireland Broadband homepage in February 2016.

It shows a total of 77,520 lines⁸ connected to some 18 exchanges. Since 2010, some 268 VDSL cabinets were installed and a further 61 cabinets were added after 2014 as part of NIBIP. That is a total of 329 cabinets installed by February 2016.

10.1.3 Estimated Volumes

It is estimated that due to the geographic distribution of premises in this area, some 8,000 premises are outside the reach of a cabinet solution.

It is hypothesised that the 8,000 premises would be supported from the existing handover nodes, aggregation nodes and fibre spines used to install the FTTC cabinets.

It is estimated that the 8,000 premises connect to some 2,000 distribution points and demand or work could be scheduled over 5 years.

10.1.4 Cost Variations Due to Geographic Density

It should be noted that this exercise may not enable an accurate costing of the most extreme geography e.g. Fermanagh and Omagh District, where the geographic size is twice that of Armagh City, Banbridge and Craigavon Borough, while the total premises are some 42,000; being a little more than half of the Armagh City, Banbridge and Craigavon Borough. However the principles established should be able to be applied.

10.1.5 A USO Fibre Product.

It is assumed the existing infrastructure would be extended through either Fibre to the Remote Node, or Fibre to the Manifold or Distribution Point.

Fibre to the Remote Node involves extending a power feed and fibre deeper in the BT network and installing electronics on a roadside cabinet or pole mounted device, which is capable of supporting up to 16 customers from that point. Customers would continue to use their existing copper line.

Fibre to the Manifold, or Fibre to the Distribution Point products assumes fibre is taken to a distribution point and terminated on a manifold within 1-3 pole lengths of a customer's premise. Customers can then order a direct fibre connection and cancel their existing telephone service.

In the case of Fibre to the Manifold, it is suggested that those owning land could be responsible for laying communications duct from the premise to where that joins BT's infrastructure.

It seems appropriate that the notions of proportionality and reasonable demand allows for variable costs to be applied, depending upon whether 1 or 10 customers are ordering services.

⁸ <http://www.samknows.com> – BT exchange search

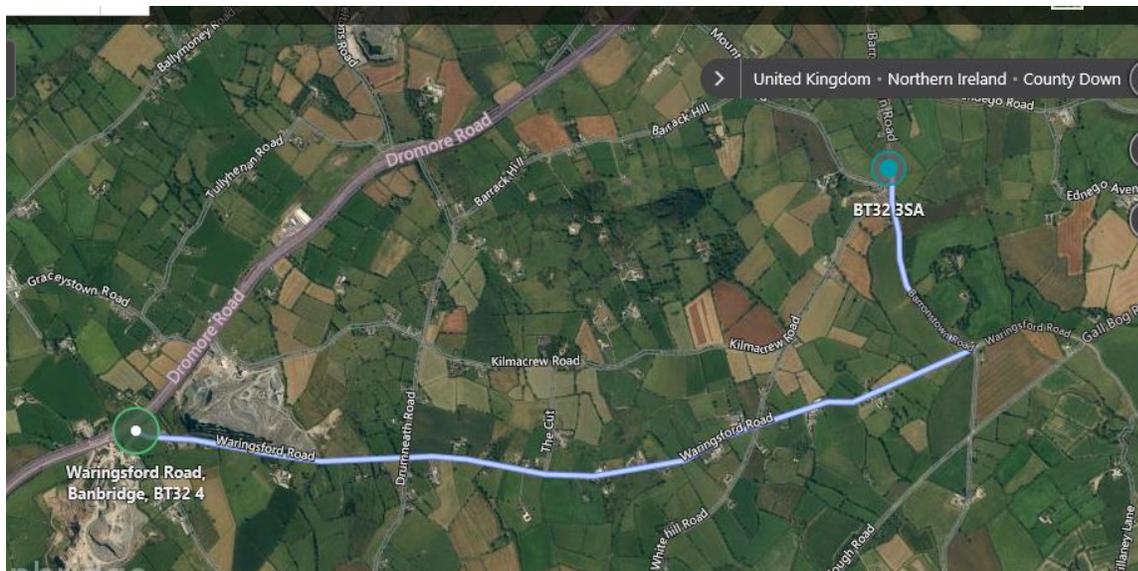
10.1.6 Blackwatertown, Loughgall, and Waringsford Road, near Banbridge.

We would welcome BT to cost an individual instance of the proposed USO solution between the Blackwatertown and Loughgall exchange areas.

BT with DFE funding have added three cabinets in the Blackwatertown area. There has also been extensive work in the Loughgall area.

However, this leaves those furthest from the cabinets excluded. Customers on some of Lisbofin Road can receive services well below the 10Mbps threshold being set, while customers on Causanagh Road connected to Loughgall Cabinet 3 are too far away. Two large exporting food producers in Loughgall, Gilfresh and Hewitt Meats, employing 230 people in the area between them, find their factories also too distant from the 3 cabinets to avail of world-class services which would be invaluable to their operations.

There is another example in Waringsford Road, near Banbridge off NIBIP cabinet 39 (BT32,4) which is another crossroads cabinet. More than ten businesses on this road, including Davidson Construction (BT 32 3SA), are too far from the cabinet. The Google map shows the fibre extensions needed along road paths highlighted in white. It is encouraging that new fibre cabling has been reported on half the route but no pole attachments have been reported. In the latter case customers are willing to dig towards the BT pole attachments.



We are suggesting that the fringes of these exchange areas would make a reasonable example to test the costing and process for a fibre based USO.

10.1.7 Next Steps.

This report proposes that the above request is formalized and progressed with BT. Locally these cases should be used to align any local community broadband activity with prioritising work within postcodes nominated for upgrades under further delivery programmes in NI.

11 PLANNING GUIDELINES FOR FTTP IN NEW DEVELOPMENTS

As part of the report, a set of Planning Guidelines have been drafted ready for use by each of the ICBAN member Councils. Rather than generate new original material, the guidelines contain detail already adopted in other counties in the UK. We have attached these as Appendix 17.2. Each Council needs to adjust these by making its own priorities clear.

These have been tried and tested by Colchester and Hampshire Councils, where the request by BT for subsidies for cabinets has been replaced by a process where developers get the passive infrastructure free from BT and sometimes Virgin.

The equivalence of the passive infrastructure components, duct and chambers, for both copper and fibre mean planning for fibre in new developments is cost neutral. This is an easy change to accelerate. The BT rate card for developers is also included in Appendix 17.2 1 but this will be subject to change. It is not clear if BT have communicated this yet to NI developers. It is worth noting that costs disappear for lower volume developments where it is considered fibre roll out has occurred. The definition of the latter is yet to be documented but is important for the USO costing exercise. Does a fibre cabinet represent a fibre rollout for the purposes of a developer building in a townland? It should do but it needs to be tied down. The latter would be very helpful in reinforcing the case for a Universal Service Obligation based on a fibre service.

At the time of writing Openreach confirmed that FTTP provision will now be free for developments of 100 properties.⁹ NI developers need to follow the guidelines in order to avail of this offer. The significance of the rate card is that it allows some of the costs of the USO to be bounded.

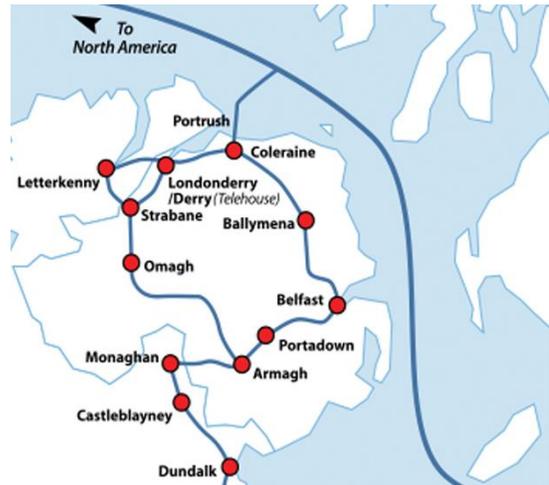
If the Irish County Councils in the Central Border Region wish to adopt these Guidelines, the technical elements and the EU references will remain the same. The planning peculiarities and contacts for Eir and Voda/ESB can be updated accordingly for Ireland.

⁹ <http://www.openreach-forsite.co.uk/issue-8/article/fttp-to-be-offered-free-to-all-new-build-sites-over-100-premises>

12 USING PROJECT KELVIN TO ESTABLISH GIGABIT TOWNS

Project Kelvin was an earlier DFE supported project to secure an optical fibre ring around Northern Ireland. It has sufficient fibres to support 1.9 Terabits per second of capacity. Only a fraction of this capacity is operational. 1.9Tbps can be compared with BT's UK core network which has a 10Tbps capacity of which 3Tbps is currently operational, which reflects the peak capacity available across the UK's data transport infrastructure.

The following is a proof of concept proposal, which if pursued could be copied by other towns in Ireland and Northern Ireland which are adjacent to the Kelvin asset (as 'Sons of Kelvin'). It uses tried and tested business models to establish a fully pro-competitive model using fibre access technology to deliver gigabit capable services to those within 75 metres of any established access node. The outline concept has been discussed with local stakeholders and has passed the first common sense tests. The participation of the local authority as an owner and investor in passive infrastructure (ducts, chambers, fibre cable) is regarded as key by local entrepreneurial companies interested in lighting the fibre and operating the network on a revenue share basis.



The objective from an economic development perspective is to show that, consistent with best worldwide practice, that it is possible to offer low contended 100Mbps 2-way symmetrical services for less than £100 retail a month, where the underlying capacity of the fibre access is capable of a least 1Gbps should a customer need it. This contrasts with the current private costs of £200 to £2,000 a month. Schools are paying some £9,000 a year each for a connection to the internet. Other public sector customers are paying similar amounts and this is one factor why BT has been slow in delivering FTTP. The margins on private circuit revenues are very large.

The proposal is centred around Omagh for a few reasons. Omagh Enterprise Company have already secured access to the Kelvin fibres and duct has been laid to the town centre. The new Strule Education Campus means there is a need to design connectivity for the future of what is a signature site. Omagh has also invested in a CCTV service in the town centre but it appears BT owns the ducts. The provenance and right to use these ducts or build new ones would form part of the proof of concept. Finally, within the informal grouping of Omagh Digital, there are people capable of exploiting the commercial opportunity.

The proposal for Omagh in slide form is summarized in Appendix 17.3. Such a project is likely to need a £250k investment to make happen and approximately six months for the business case and procurement to be resolved.

13 THE IMPORTANCE OF FTTP IN BUSINESS PARKS AND TOWN CENTRES

The notion of planning to upgrade business parks and town centres with direct fibre connections would seem a reasonably straightforward matter. Business Parks are ducted and thus it is as easy to pull fibre through these ducts as it would be to construct a cabinet, plan, power and arrange tie cables between the fibre cabinet and the bundles of copper adjacent to an old green cabinet.

It may be a little unfair to say that BT believes in these cases that service from a cabinet ought to be good enough for SME's, and should you need more you should buy a premium private circuit at several hundred pounds a month. This thinking appears to be changing in 2016 where BT has in effect reversed the decision to abandon its plans for FTTP. Ofcom were suggesting a rethink of some product definitions in their review of The Business Connectivity market, but the matter is still not resolved. BT has referenced a new Business Ethernet product at a lower cost but no final decisions have been taken as yet.

It is important to note that the BDUK technical¹⁰ requirements and a condition of the state aid¹¹ is that the fibre infrastructure is both extendable and affordable.

When the state invests huge amounts in infrastructure you do not expect the benefits to be withheld, yet in the following cases this is what is being witnessed to some degree. Some of this may be occurring because BT claims it is investing its resources. These examples show BT's position ought to be challenged.

The frustration that this creates is best outlined by the cases of Metro CCTV at Derryloran Industrial Estate in Cookstown, the Don Carragh Hotel in Lisnaskea, and Walsh's Hotel in Maghera. In each of these cases BT will rightly argue the cabinet based service is behaving as it should, and customers are doing more than they should with their lines. It is the customer's fault, would be the argument! However, this misses the point. The state has invested heavily in bringing fibre bundles to these locations and there is a condition in the contract that these will be extended where the need arises. The current practice is to punish the SME customer by providing a direct fibre access product but in the form of a private circuit, not in the cheaper form needed. FTTP provision is referenced in the BDUK contracts and is a condition of the state aid measure.

Overcoming these challenges demands that Councils work together to force bureaucratic functions to deliver what is in the contracts and was central to the granting of the state aid. The arguments need to be pursued and escalated through BT, DFE, BDUK and EU (DG Connect and DG Competition) and follow up through the Select Committee and national audit functions if that is needed.

The underlying potential of fibre access is being denied yet it exists in abundant form **close**¹² to each of these businesses and has been generously funded by the taxpayer. This is not a complex technical issue but an additional change in mentality is needed so that the growth of these businesses is not impacted. In every case these businesses are losing revenues today. This is not all BT's fault, as companies must

¹⁰ Section 6 outlines the services requirements.

¹¹ State aid measure reference: SA.33674. Extendibility and upgradability are central to the state aid condition.

¹² Less than 500m where duct is available.

take responsibility for insuring internal networks are configured correctly, but that argument can start once the fundamental issue of ordering an appropriate connection has been made possible from what are for the most part publicly funded fibre cables.

13.1 METRO CCTV –DERRYLORAN INDUSTRIAL ESTATE, COOKSTOWN

Metro CCTV in Cookstown have four FTTC connections connected to a BT cabinet 350m away at the entrance to the Derryloran Industrial Estate. Further enquiries suggest, but it is not certain, that this cabinet and fibre path was paid for by BT's commercial investment. The state has subsidised 30 of the 32 cabinets in Cookstown so it is unsure if this cabinet was paid for by BT. If BT did it would be unusual, as BT's network planning rules would either favour the sale of private circuits or the provision of fibre direct to the premise where functioning duct existed. Why would an engineer install a potential point of failure in the network where the golden rule remains never to introduce complexity? It may be that the cabinet was installed to serve the small housing estate on the other side of the road.

Metro CCTV are only 350m from the cabinet so the download speed is not the issue. Metro CCTV are using their broadband connectivity to monitor several hundred cameras where motion detectors trigger the streaming of live data.

The potential for such an application to grow is very large, and the connectivity requirement will grow exponentially. If you wish to see what is possible to do with a broadband connection and to take it beyond the limit for which it was designed, then Metro CCTV is worth studying.

The monitoring of several hundred cameras in real time and the recording and storing of all that data would normally be conducted on a dedicated CCTV network. The fact it is possible to do so much with a standard broadband connection with non-static IP addresses is wonderful to see, but Metro CCTV are growing and either need to get the connectivity to support a growing business or else move to a location where it can order the connectivity required. The supply of FTTP offering a 300/30Mbps in Republic of Ireland could attract such a customer.

There will be bundles of spare fibre in the chamber next to the Derryloran cabinet, on the same duct run that serves the premises of Metro CCTV. These fibres will connect to a handover point in Cookstown which has already been upgraded to support FTTP¹³.

The intention is to progress the query with BT and seek support from DFE and BDUK to enforce the BDUK contracts, so customers like Metro CCTV and others in industrial estates can order a direct fibre connection. Companies like Wilson Insurance Brokers at Lisnaskea Business Complex are another example of a flourishing SME business needing an affordable direct fibre connection.

13.2 WALSH'S HOTEL, MAGHERA

The town of Maghera in Mid Ulster has benefitted from an estimated total of 20 subsidised fibre connected cabinets. BT direct commercial investment in the area is not clear.

¹³ Confirmed on <https://www.samknows.com/broadband/exchange/NICK>

Walsh's Hotel have taken a FTTC service sufficient to support a 5 Mbps upload service and a 28Mbps download service. The FTTC service performs as you expect, but the Hotel's need is growing exponentially. Guests expect to make Skype calls to their families. Each event held at the hotel is becoming a social occasion which is broadcast live to the internet with guests uploading their own content to both record and glean a reaction from friends not at the event e.g. snapchatting. The latter is being orchestrated over a network of wifi connections and reliant on the capacity of the Broadband connection to upload data.

This is a good example where peoples' computing devices and applications are quickly proving just how interim a solution the cabinet solution is. It brings great utility, but users can quickly find its limitations.

Walsh's Hotel is less than 80m from the exchange in Maghera and so the limitation created by the cabinet is not necessary when Walsh's could and should be able to order a direct fibre connection. Instead of being able to do this, the Connection Voucher Scheme is being used to add a fixed Wireless connection. While this will add capacity and cost, it is peculiar that with fibre bundles so close and paid for in full by the state, another government scheme is being used to create a fixed wireless connection in the middle of a fibre enabled town. Several examples of this were found in Maghera Town.

The capacity to order a direct fibre connection from fibre enabled exchanges is a priority need. This has been recognized by BT in their April 2016 announcements but it cannot come sooner for a town centre business like Walsh's. Capacity is not the only issue but it is a major one. Internal networks will also need to be appropriately configured to support the amount of data being generated by the events held at the hotel.

13.3 DON CARRAGH HOTEL, LISNASKEA

The speed tests at the Don Carragh Hotel, Lisnaskea point to an ADSL 2 service supporting 17Mbps down and less than 1 Mbps up. The ADSL statement needs to be confirmed with BT.

Although Lisnaskea has benefitted from some 10 subsidised cabinets, it is possible that part of Main Street was close enough to the exchange that the existing ADSL service could meet the greater than 10 or 15Mbps service level threshold used to plan the roll out.

This is frustrating for both the businesses in Lisnaskea and DFE where the difficult job of getting fibre bundles to the Town has been done and subsidies paid, but some customers are still unable to access the benefit of that public investment.

Pressure must be brought to establish a systematic means of ordering direct fibre connections in town centres. BT has announced such an intention as part of its 2015/16 results announcements. This should now be pursued alongside the need to recover any overpayments of subsidies. The latter can be recycled to secure a timely fix to the issue outlined here.

It may be appropriate for Council development plans to make FTTP delivery a specific aim for each Business Park and Town Centre. The actions to deliver against this requires ongoing pressure on DCMS and the Regulator to hold BT to account, where its 'fair bet' investment has not converted into actual service coverage needed. The economic gaming of costs and the public relations on coverage has to be challenged in order to better deliver what is needed and for the most part has now been paid for in terms of the resources available at the exchange or at the chamber adjacent to the cabinet.

14 THE A5/N2 PROJECT AND THE POTENTIAL TO CREATE PASSIVE SHARED INFRASTRUCTURE

The section on establishing a Gigabit Town referenced the role of public authorities as owners and investors in passive infrastructure. Local authorities have an important role in championing the maintenance of roads and footpaths but do not have direct responsibilities. More thought could be given to the ownership of the ducts which are installed under the roads and pavements.

One of the examples we sought out in this work was that of Stockholm, where City Councillors tiring of continuous destruction to their pavement and roads by communication companies decided to include the passive infrastructure (ducts and fibres) needed for multiple operators in the design of the public works. The passive infrastructure in the form of dark fibres is sold to communications providers on an equivalent basis. There is no subsidy. Building in duct at time of the design allows Councils to secure improvements in service while fostering competition. While incumbents struggle with not managing their own duct, Telia the Swedish versions of BT and Eir, is now a major customer of Stokab, the Council supported infrastructure operator in Stockholm.

Telcos such as BT complain of the scale of the infrastructure investment but this model removes much of the capital cost, particularly any retrofitting cost.

Appendix 17.4 has more detail on the Stokab operation and it includes a technical design suitable for engineers. It represents a different way of seeing and solving future connectivity needs. It would also be recommended that some linkages be established to learn more about the processes used in Stockholm, as an example of world-leading best practice. It may also be helpful for stakeholders to see first-hand the successes that have been achieved in Stockholm and in rural areas of Sweden.

The model, which has been proven to work and is very effective elsewhere, needs championing and leadership within both Local Authorities and Government Departments.

15 THE 4G COVERAGE OBLIGATION

In May 2012 the House of Commons had a historic turnout, with 118 MPs showing their support for an early day motion called by Roy Stewart MP.

The motion called for a 98% coverage obligation. The motion was passed. The Government instructed Ofcom to include this requirement in one of the licenses to be granted in the 4G spectrum auction held in early 2013. It was in part in reaction to this call by Parliament, that the Mobile Infrastructure Project (MIP) was announced, so the impact of the 4G coverage obligation on the auction yield could be mitigated against.

The coverage was written by Ofcom to be 98%, however this was reduced to 95% for devolved nations, where 95% would be the number of premises which could receive a 2 Mbps download service indoors. A signal strength is defined sufficient to be able to carry 2MBps.

02 are the holders of the licence with the coverage obligation and that is to be fulfilled by the end of 2017.

It is not clear how Ofcom intend enforcing the obligation so it is worth requesting the study and to then provide some recommendations on how and where that study is conducted.

It is also worth documenting how radio spectrum regimes are organised to support reception on the border. If the inspection regime includes postcodes for the Border area it is more likely the mobile operators will ensure the service is available.

16 CROSS COUNCIL AND CROSS-BORDER WORKING.

This study has focused on the Northern Ireland area of the Central Border Region because of the concern emerging from gaps in service left by a cabinet based solution. While the National Broadband Plan rollout is yet to be concluded in the Irish border counties (by 2022 perhaps), the depth of the rollout in the form of FTTP delivered and planned appears much greater.

Connectivity is an enabler. It is not an end in itself. It permits people to form and maintain relationships at a distance, conduct business, access services and download information. It is the most affordable means of creating equality of access to services. Good connectivity allows people to realise their potential without the need to move to a big city. The need to travel is reduced. You can work anywhere.

While a number of very practical areas have been outlined where co-operation will yield benefits, the role of connectivity in assisting cross-border networking has not been addressed. The latter needs a vision, perhaps inspired by the likes of Yeats, Beckett and Heaney and many others, whose writing was profoundly impacted by the border landscape and people. Sport also plays a critical part in the local culture. Connectivity ought to be able to play a very significant role in providing people with the opportunity to allow many others to experience the same influences or learn more. Culture like sport creates and shapes identity. It is also a source of content.

The following areas will be of interest in exchanging experience and information between Councils and on a cross-border basis.

16.1 The Gigabit Towns

The proposal for Omagh, could be used to review the ENET owned (MANs) solutions in Monaghan, Sligo and Letterkenny. The proposed proof of concept should be used to trigger a restating of the ambition for world-class connectivity. Establishing a commonality of purpose is recommended. Using the Omagh proof of concept project provides a means to achieve such a purpose.

16.2 4G Coverage in the Border Areas

The coverage obligations on either side of the border should be aligned. This includes measurement and reporting against that obligation.

It is recommended that the request to Ofcom should be replicated by similar to the Irish Regulator, ComReg.

16.3 Rural Development Programme Opportunities

The Council area allocations for EU Rural Development Programme funding have a theme on 'Enhancing accessibility to, and use and quality of ICT in rural areas'. Specifically this focus area will look at addressing broadband and digital connectivity issues for rural areas. Groups of people representing defined geographical areas in the form of Local Action Groups (LAGs) are charged with identifying the challenges to development in their communities and developing initiatives to address these. Therefore these LAGs will be responsible for administering the funding in each Council area.

The total amount of funding that has been ring-fenced for rural broadband between the 3 LAGs in the NI Council areas being focused upon, amounts to some £780,000. Each of the 5 LAGs in the Irish Border Counties will also have related funding. Rural Broadband is considered an area of focus within each of the LAG programmes, and also under cross-Council and cross-border co-operation elements of the

overall Programme. This is essentially to support rural dwellers who cannot avail of broadband and to help address the very rural not spots that are not within the scope of any other government initiative. These funds will have administrative stipulations, which may vary by jurisdiction and local area, for example, some will have provision for small capital funding supports, whilst others will not.

ICBAN has been engaging with LAGs in each jurisdiction, with Leader Companies and with the responsible Departments, the Department for the Environment (DECLG) in Ireland and the Department of Agriculture, Environment and Rural Affairs (DAERA) in Northern Ireland. These discussions have noted the value and importance of regional considerations and the potential for cross-Council and cross-border (North-South) collaboration. What must also be factored is the alignment and consistency of these programme ambitions with existing infrastructure delivery plans in both jurisdictions, and with throughput / speed targets being set.

Examples of potential interventions for the use of Rural Development Programme funding can include capital schemes and development opportunities:

- Capacity building for communities, rural businesses and community leaders on the values and uses of such technology
- Rural Community Broadband schemes
- Rural fibre rings
- Development of Social Innovation Hubs and broadcast centres using community facilities, amenities and focal points
- Creative Communities
- Measures to promote Digital Inclusion, etc.

There are many examples of the above which have been successfully introduced across the EU and it would be advisable for the LAGs and Local Authorities to examine the transferability of these.

It will be necessary to align the delivery of Superfast Rollout Programme (SRP2) which is contracted at post code level, with any related proposal to expend funds under the Rural Development Programme. The same logic applies to the Intervention Areas being considered under the National Broadband Plan in Ireland.

It is also recommended that Councils and LAGs use an entity such as ICBAN to assist in helping plan fibre extensions within the postcodes specified in SRP2, so that USO solutions can be tried and tested, and to develop and help implement potential rural investment solutions such as the likes of those noted above.

The new Rural Needs Act (Northern Ireland) 2016 will have an impact, setting out the requirement for the effective implementation of rural proofing. This is to help meet the NI Executive's Vision of 'A fair and inclusive rural society where rural dwellers enjoy the same quality of life as all others in the region'.

16.4 Value for Money

The quality of the connectivity upgrades delivered either side of the border will be driven by how well public money is deployed and used.

The dynamics for the upgrades in Northern Ireland have been determined by the lack of competition to BT and the decision to contract via a Framework agreement one month before the 2012 London Olympics. This has led to four years and counting of investigations into various aspects of 'value for money'. The level of FTTP achieved in Northern Ireland will rely on officials' abilities to continue to

challenge the level of transparency available while recycling the clawback revenues, gaining access to the capital accruals in BT's accounts and extracting the capital contributions demanded by the state aid measure.

The dynamic in the Republic of Ireland is very different. Eir and Voda/ESB are in competition to maximize their commercial rollout, reducing the intervention area under the National Broadband Plan. The Government intervention is benefitting from more competitive forces.

The Irish County Councils within the ICBAN Partnership should benefit from the technical detail of the projects in Northern Ireland. Additionally those in Northern Ireland should gain insight into the costs emerging from a competitive market, even if this is temporary. Both parties should glean benefits from examining the resource requirements.

16.5 Crowd sourcing network performance data in the Region

Communities are well organised and are keen to contribute what they can. This energy could be made more focused by standardising the means by which network performance data is collected and made available online.

The popularity of walking and cycling and the desire of folk to record everything on their GPS devices could be used to map the location of BT cabinets and pole attachments on Google maps. Although mapping is a condition of state aid, it has not been enforced and yet ought to be the first piece of information visible to customers. Speed tests should also be recorded systematically. Thinkbroadband¹⁴ have done some excellent work on this matter, but rely on individuals to conduct speed tests.

Similarly, free applications from Opensignal.com allow mobile signal strengths to be measured and tracked and provides a means to support the effort to get Ofcom to enforce the 4G coverage obligation in Northern Ireland.

16.6 A common approach to a USO for Broadband

There is room for all border counties to articulate a common approach to defining and legislating for a Broadband USO.

¹⁴ www.thinkbroadband.com

17 APPENDICES

17.1 ICBAN RESPONSE TO DCMS BROADBAND USO CONSULTATION.

ICBAN response to DCMS Broadband USO Consultation, 14 April 2016

Thank you for the opportunity to respond to the Broadband USO consultation. Irish Central Border Area Network Ltd. (ICBAN) has been charged by its three local authority members in Northern Ireland to begin seeking answers and solutions to the gaps in service left by an over reliance on a fibre to the cabinet solution (FTTC) deployed and subsidised in Northern Ireland. We are a local authority development organisation which works in the cross-border areas of Northern Ireland and Ireland. The three local authorities member Councils from Northern Ireland area: Armagh City, Banbridge and Craigavon Borough Council; Fermanagh and Omagh District Council; and Mid-Ulster District Council, which are located on the border with the Republic of Ireland.

Located in the border Region of Northern Ireland / Ireland the area has a very low population density, so a FTTC without the effective ability to order extensions to the service is limiting.

Summary

ICBAN has outlined a more comprehensive alternative, building upon the good work that has occurred in the last four years by BDUK while working to extract the most from the very large remaining funds available and the potential to extend further what is now a heavily subsidised data transport infrastructure owned by BT. There has been greater transparency achieved on costs and related issues, and it would be vital that this must now be built upon.

The proposal outlines that BDUK states there are a 1m lines that need to be covered by USO. A full cost reconciliation of the BDUK/LA programme would reveal sufficient funding to support the wide scale use of FTTP (Fibre to the distribution point or manifold) to most of these locations, supporting as few as 5 premises per location. This seems too big and obvious a factor to fail to reference in this proposal.

Q1: Do you have any concerns about the approach that has been set out here?

1.1 The stated approach is politically pragmatic, but falls short in outlining what seems to be possible.

1.2 The political aspiration and the sentiment of 10 Mbps 'speed' at the edge of the network is understood. It is a reasonable way for those without technical knowledge to consider that 2Mbps may not be enough and thus more is needed. However the aspiration of 10 Mbps is not ambitious enough and this should not be lost from the consideration. However, converting a sentiment into a piece of legislation is highly problematic.

1.3 The USO for the telephone service was defined well after the engineers had finished defining and building a network to support a 'telephone' service. Legislators took something that was relatively stable and wrote law around an engineering specification and a set of features that could be described

in detail.

1.4 Using the telephone network to deliver access to the internet is not governed by any regulation or definitions, a contributing factor to a nomenclature unrelated to how the service actually works. The underlying access component used for the telephone service is a Metal Path Facility, which is defined in a manner that supports a telephone service and which does not guarantee the metal path will support the higher frequencies used by Broadband. These are distance (signal attenuation) and quality issues.

1.5 Access to the internet, using the best effort principles of IP networking and a mix of mediums to support a flow of data in the form of encoded zeros and ones (bits) continues to be a work in progress. It can be shown that the capacity issue for connectivity is but one of the challenges facing internet based services as we understand them today. The security of transactions, naming and addressing functions, scalability, even the software languages used in some key network elements, are in significant flux and will continue to be so. Yet none of these developments which will have a profound impact on the user experience, can be considered as part of the intended USO. The latter cannot be contained in a USO because the internet is a networks of networks and this includes the users own home network.

1.6 Thus the notion of creating a USO for the access component of a national data transport service, that we call 'Broadband', is highly problematic. The term 'Broadband' refers to a frequency range allocated in a copper access network and used to establish an electromagnetic path upon which the data we wish to have transferred is encoded. It would be easy to state the USO incorrectly in the form of some 'nominal' access speed, when what is in fact required is the right to order an access product which is capable of using all the potential connectivity made possible, even if we are not ready to exploit it all.

1.7 Even the term 'speed' is problematic. The speed of light is constant so the USO when defined cannot use 'speed', it will need to describe 'throughput' and avoid populist terms.

1.8 The proposed approach by DCMS could be enhanced at several levels to take advantage of the substantial groundwork done by BDUK. Particular attention should be paid to what are FTTP Hamlets, where it is cheaper to offer FTTP than it is to fund an FTTC solution.

1.9 The current approach is lacking any link to the original goal of being best in Europe, as opposed to being marginally better than the larger economies.

1.10 More detail could be outlined on what a Broadband service actually is. As implied but not described, the USO is a product which will enable access to what it is a best effort data transport service. The capacity available from such a core network is measured in Terabits per second, while the access networks can support Gigabit throughputs. Thus some effort should be made to begin to define what a national data transport service looks like, how it works, and how best to licence such an operator. Writing a USO in a way that such a facility can be accessed anywhere where the minimum throughput can be measured at 10Mbps is problematic and might be better served by focusing on what product needs to be ordered in order to achieve such an outcome.

1.11 There is no attempt to link the approach with a reconciliation of the £1.7bn of subsidies contracted by BDUK, particularly reporting underspends, clawback, and the payment by BT of its capital contribution. If BDUK Phase 1 and Phase 2 is little more than 25,000 cabinets and circa 40,000 FTTP connections, costing no more than £1bn in subsidies, then the management of the remaining public monies and BT capital contribution will have a profound impact on the quality of the service delivered in

the final 5% and the gaps that exist in every town and area of Northern Ireland. The approach to subsidise BT was a decision to extend the access to be BT's core optical fibre network, which has sufficient capacity to support 10Tbps while some 3Tbps is currently lit. BDUK has funded new handover points, aggregation nodes, fibre spines to cabinets and these can be extended further, and this was and remains a condition of the state aid measure SA33671. While the state aid measure has lapsed for new public subsidy, the conditions of the measure are there to be applied for at least the next 4 years. This aspect should be fully referenced and its significance explained in progressing a design for the USO.

1.12 There is no mention of the provision of fibre on demand, including fibre to the distribution node (or manifold) and fibre to the node (mini-DSLAM) as possible contributors to meeting the USO. These products were described in outline form in the BDUK requirements of 2012 and their role in helping to establish the USO should at least be referenced.

1.13 While technical neutrality is referenced, no mention is made that different technologies have different service levels. So called technology-neutrality is only upheld if published service parameters ignore the key differentiating properties of delay, jitter and packet loss during congested periods of the different technological options. Yet these cannot be ignored if a USO utilising a codified data transport service is to be set in a manner needed to support critical services.

1.14 DCMS continue to use BT's publicity on costs without stating BDUK's experience in delivering the FTTC elements at costs significantly under BT's estimates and before any examination has been done on the presence of BT's capital contribution in the BDUK programme. It should not be acceptable to use the 2008/9 BSG costs of £29bn for a FTTP transition when the unit costs for urban areas are being quoted at less than £300 a premise to connect. Even rural areas are managing to receive FTTP connections at less than a £1,000.

1.15 ICBAN recommends that the 2012 DCMS Vision and Strategy for Broadband is updated to include any changes in Government thinking. The 10Mbps line access speed could, in a simple way, be met with a satellite service. But the satellite industry will admit that satellite is designed as an in-fill solution where others services cannot reach. The delay characteristics and cost of peak hour capacity means while playing a valuable role in the nations data transport fabric, it is not a panacea. Should the quality of the USO therefore be sacrificed by seeking a lowest common denominator which has not been designed to have national capacity?

1.16 Similarly, fixed wireless solutions have different service level parameters and by their nature need more reconfiguring and capacity as customer volumes are added. Should the USO be bound by the limitations of fixed wireless services?

1.17 There is a '95% coverage obligation by nation' contained in the licence condition attached to O2's licence. 4G is an IP based data transport service and thus the 4G coverage obligation and the intended USO should be aligned or interworked in some way.

1.18 While stating the need for a USO is easy, defining it in suitable terms and how it is to be met is another matter.

1.19 ICBAN is suggesting that any USO needs to reference the full potential of the BDUK investment of £1.7bn in BT's network. Particular reference should be made to the clauses that support the extension of the service and right of individuals to seek extensions of the service. If examined DCMS could not at

least reference the full expectations of the BDUK Framework requirements and the consequences of the state aid measure being enforced. The proposal as it stands ignores the possibilities arising from the <£1bn subsidy spent so far. The remaining funds plus clawback, the BT capital and the recovered proxy costs from the early contracts, can have an even more significant impact on shaping the delivery of a meaningful USO. The proposal as it stands ignores this potential and misses the opportunity to report on some real achievements by Government, which includes the potential to go much further and deeper.

1.20 This would suggest, just as the USO for telephony can be reduced to a conditional right to order a telephone line defined in the form of a metal path facility, 'Broadband' could be defined as a right to order a medium (Wireless or fibre) capable of supporting the desired throughput. In this context limiting the USO to 10Mbps makes little sense.

1.21 Just passing the USO to Ofcom is probably not the answer, as Ofcom is principally a competition authority. Ofcom has a variety of roles, which need to be balanced.

1.22 Some definitions and guidelines are needed as to what services are expected to work and when. The latter needs to be the function of a licence of a 'data transport network provider'. Such an approach would be new and would need to be subject to peer review and public consultation. The USC of 2Mbps arose from the need to provide sufficient resources for one home worker (within a household) to be able to work from home. This definition would exclude a family of teenagers video streaming sites of their choice.

1.23 Clarity is required on the 10 Mbps referenced? How has this been calculated? Is it 5 home workers per premise pursuing work related activity, or it a more generous allowance for a household to do as it pleases? What happens if its 20 workers in an architectural practice in rural Northern Ireland? Is that now 20 times 10 Mbps for that location?

1.24 Perhaps we cannot define what the 10Mbps is for and how it was derived and thus we should not be bound by the limitation this implies.

1.25 Does this adequately consider the potential of various other technologies, including the options for FTTP in several forms? Are we realistically considering the future and our competitiveness in a digitally connected world?

1.26 ICBAN believe the capacity to order a direct fibre access service must feature for those who cannot get a 10Mbps service from the interim FTTC solution. The USO cannot be bound by any limit to access from heavily subsidised infrastructure – this has the capacity to be stretched even further.

1.27 In brief the proposed approach is not comprehensive enough, given the investments the Government has made and the very great potential to extract a great deal more from the existing BDUK initiative.

Q2: We do not propose to specify speed in primary legislation. Should speed be specified in primary or secondary legislation?

2.1 Access 'speed' be it described in 'superfast' or 'ultrafast' terms cannot adequately be used in any legislation of any sort. Legislation should firstly define broadband as a data transport capability and

make clear that operators should be licensed for this purpose. This appears to be a necessary step and a pre-condition to describing the medium to access this resource.

2.2 It needs to refer to investment Government has made in extending BT wholesale data transport facility, including the number of components added, handover points, aggregation nodes, splitting locations, cabinets. It should report on the monies remaining to further extend this facility using the clauses of the BDUK contract and the conditions of the state aid measure supporting that investment.

2.3 The legislation could refer to this minimum throughput figure but also refer to customer's right to order and pay for a direct fibre access connection should they wish.

2.4 Why would the Government make available £1.7bn of taxpayers money unless the contracts permitted the network to be extended? Why would a proposal on the USO ignore the detail of what the Government has paid for and the conditions under which that investment was allowed?

2.5 Perhaps the legislation would make explicit reference to customers not being bound by the properties of the existing Metal Path Facility supporting telephony, when a superior medium with a lower term cost is available. Perhaps the legislation could make specific reference to customers not being denied access to this potential. Expediency and short terms interests should not prevent this potential to be fully exploited.

2.6 In this context therefore the legislation should be defined by the properties of the best available medium and not around the convenience of what a dominant supplier might wish to provide.

2.7 ICBAN suggests the legislation could be used to instruct Ofcom to make provision to define and licence a wholesale data transport provider(s).

2.8 The legislation should also seek to support provision of the best medium. This would include the provision of fibre access product, and a customer's conditional right to order such a product.

2.9 The Legislation could grant Ofcom some discretion as to how and when such measures come into force, including the nature of the conditional right to order such a service.

2.10 The same legislation could also clarify and limit the use of commercial confidentiality, to ward against any withholding of basic project data on costs and coverage.

Q3: In terms of giving the Secretary of State a power to direct Ofcom to review the USO, should Government have a continuing role in the USO, or should this be a matter for Ofcom?

3.1 The Government must own the ambition and the policy to fulfil that ambition and not just pass a USO to Ofcom to define and enforce without instructions.

3.2 There is a fundamental issue with the information being used to inform public policy on this matter. The investment data for next generation access must be independently verified. BT claimed investment typically includes 10 years of future operational costs. BT bid data supporting requests for state aid was found by the NAO, BDUK and several Parliamentary Select Committees as unreliable. The latter has been a significant factor in the calls for BT to be broken up.

3.3 The Government should have the courage to enforce the BDUK requirements and the lapsed state aid measure as a contribution to realising the USO. This would build upon the work of local authorities where future proof connectivity is being included in their planning guidelines. The USO can build upon this practice and include support for a future proof product that can at least be ordered.

3.4 Ofcom's strategic review supporting dark fibre provision and orchestrating improved access to BT's duct and poles can increase competition. Ofcom can also use its powers to amend operators licences to capture, if needed, the requirement to codify a 'data transport service', its properties and any need for a minimum standard. Through government and Ofcom working together, this means a USO can be written to overcome any considerations to over rely upon a cheap interim solution, by establishing for customers the right to replace their telephone lines with an access line capable of much greater throughputs with a lower long term cost. Ofcom can use its powers to define what is a new market and then promote access to foster more competition. The Government should set the policy, and Ofcom then help determine the pace at which that policy is applied and enforced.

3.5 Ofcom on its own is unlikely to be able to bring to pass the requirement and ambition Parliament is seeking on behalf of the electorate. It needs to be a joint effort to counter the commercial considerations which limit the provision for rural Broadband.

Thank you again for the opportunity to reply to this consultation.

Shane Campbell, Chief Executive, ICBAN

shane@icban.com

15 April 2016

17.1.1 ICBAN RESPONSE TO OFCOM BROADBAND USO CONSULTATION: CALL FOR INPUTS

ICBAN Response to OFCOM's Call for Inputs – Designing the Broadband Universal Service Obligation

Thank you for the opportunity to respond to the Broadband USO Call for Inputs. Irish Central Border Area Network Ltd. (ICBAN) has been charged by its three local authority members in Northern Ireland to help seek answers and solutions to the gaps in service left by an over reliance on a fibre to the cabinet solution (FTTC) deployed and subsidised in Northern Ireland. We are a local authority development organisation which works in the cross-border areas of Northern Ireland and Ireland. The three local authorities member Councils from Northern Ireland are: Armagh City, Banbridge and Craigavon Borough Council; Fermanagh and Omagh District Council; and Mid-Ulster District Council, which are all located on the border with the Republic of Ireland.

Located in the border Region of Northern Ireland /Ireland the area has a very low population density, so a FTTC without the effective ability to order extensions to the service is limiting.

In our recent response to the DCMS consultation, the following points were made;

- 1) Defining a USO is highly problematic given the terminologies 'speed' and 'broadband' are not helpful in defining what is a wholesaler data transport service. The USO will not describe an end user experience like browsing or streaming but instead how applications should work. These include home owners network and equipment attached to it, how and where information is stored on the internet and how internet services are configured to work and the resources needed for this.
- 2) 'Speed', even access speed should not form the legal basis to define a connection to a data transport service. 10Mbps is no more than a sentiment relating to our current experience and expectation of how the copper access network behaves. The mode of expression is tied to the current distance limitations caused by the attenuation characteristics of the copper medium. It also assumes G.Fast might be relevant to rural areas where this is unlikely to be case. Signal attenuation (distance), low customer densities and power costs have dictated against BT deploying active equipment deep in the access network. For legislative purposes, the terminology around 'speed' needs to be dropped and replaced with the term 'throughput'.
- 3) The BDUK activity, if supported with the appropriate levels of transparency and continued scrutiny, still has as much as £1bn plus BT's capital contribution to delivering fibre bundles deep into rural areas and extending FTTdp.
- 4) The current fibre upgrade costs are significantly less than that outlined by the BSG/Analysys Mason report of 2009. A figure of £29bn is still quoted by BT as fundamental to their decision making. This is at odds with emerging experience and best practice. The number is not even discounted to reflect the comprehensive FTTC costs which the UK Government has provided generously towards.

ICBAN's response to Ofcom's Call for Inputs expands on these points.

1.0 How should the minimum technical performance of the USO be specified?

1.1 10Mbps 'speed' reflects a sentiment that this represents an overall acceptable user experience for a typical household. In that respects it is not different from the sentiment of 2Mbps for the Universal Service Commitment which was thought to be sufficient for a single homemaker to work from home. The former suggests the homemaker can now continue homeworking while any family members do what they wish to do online also.

1.2 The 10Mbps, like the 2 Mbps before it, is shorthand for something else. The requirement is to support sufficient connectivity (quality and quantity) to do as one needs at any time. 10Mbps is the new minimum to answer an instinctive question about 'how fast?' As all connectivity occurs at near the speed of light, the issue is about throughput.

1.3 10Mbps services are not quite the service for some and rural folk are seeking the same services, prices and choice experienced by users in towns and cities. While DCMS have pointed to the need for technical neutrality this has the consequence of avoiding some of the variations that matter to customers such as peak hour performance, delay, etc.

1.4 It is helpful to begin with by understanding what is Broadband. That may best be answered by stating firstly what this isn't. 'Broadband' is not a connectivity service, it is not access to the public internet and it is not the resources needed to maintain a suitably stable and working connection to the public internet. Broadband refers to the broad range of high frequencies used to form a connection. The more frequencies you have access to, the more data can be carried. To restate, this is not 'speed' but instead is 'throughput'.

1.5 A pre-condition of the USO points to the need to define a service and how it is accessed.

1.6 The USO for the telephone service combines a description of a service called 'telephony' and an obligation to provide a means of access to that service, through a 'telephone line'.

1.7 Regarding the geographic areas of coverage, Ofcom might wish to include a licence condition to reference the service and the coverage area. Does Ofcom impose wholesale access conditions? Does it impose price thresholds, or specify some international benchmarking for the wholesale prices?

1.8 Satellite providers can describe an access product of 10Mbps or more.

1.9 Fixed Wireless operators can describe the same for the areas they wish to register.

1.10 It is important to consider that requirements in stating a minimum can go out of date very quickly. The growth of on-demand TV means peak hour bandwidth allocations are likely to exceed any allowance set out in a generic requirement. Nevertheless writing a minimum requirement creates a useful set of thresholds to benchmark against should be updated and corrected as more is learned.

1.11 What sort of product do we write the USO around?

1.12 Currently telephone service is made technically possible through the provision of a Metal Path Facility or a copper connection. To improve service, you either move closer to the exchange or exchange equipment is put in cabinets and brought closer to the customer. The latter describes the Fibre to the Cabinet programme, where improvements in service are achieved by putting electronics closer to customers which shortens the distance of the metal path and increases the amount of the usable

frequencies available. In some cases, the metal path is replaced in its entirety by a fibre path and the constriction on throughput is effectively removed. This is called Fibre to the Premises.

1.13 The inside out (exchange to premise) approach has worked so far for cabinets but the main variables of cost are power and the overheads BT is applying to plan and project manage the development of its network, so in the case of BT, the time may have come to begin building towards the new fibre assets in the ground, most of which in rural areas have been publicly subsidised.

1.14 The requirement to support communities gaining access to affordable backhaul over subsidised access has been ignored, while the requirement to support an affordable fibre on demand product has not been enforced. In the circumstances BT can price the latter as a private circuit. There are contractual provisions and state aid provisions which if enforced would act as a proxy for a USO access product based on fibre. It is worth Ofcom's time investigating the option of fibre on demand which includes FTTP as a USO product. The existing cost or liability of £3,400 per provision of a new PSTN line is within the bounds of the possible, if the will is there to make it happen. If this was developed alongside other efforts to maximise and recycle BDUK expenditure then much of the USO could be met, if not be exceeded by 2020. BT's written evidence to the CMS Select Committee inquiry on Broadband made clear that,

"The remaining 1.1m premises to get the overall 5 million current planned total are expected to cost £1bn (or approximately £879 per premises) as we have completed the cheapest premises first. These remaining premises are planned to include a much large percentage of FTTP connections than the current build that will be reflected in the cost."

1.15 The sentiment is that a large percentage of FTTP will be provided in what is considered to be more difficult to reach areas. However, outside of the Select Committee setting BT relies more on its G.Fast strategy, which is yet to be proved to be viable for hard to reach areas. This is likely to be driven by decisions about resource allocation. More recent pronouncements by Clive Selley that new builds, business parks and town centres will benefit from FTTP should also be noted.

1.16 Due to resource issues it would be important to work through the changes Ofcom is planning for the provision of dark fibre, and a revised duct and pole access product. These are likely to be important contributions to third parties assisting in provisioning of a USO.

1.17 In summary for BT, the default position would be some additional subsidy to take electronics deeper into the network. The alternative would be to take the existing BDUK requirements for Fibre on Demand with the state aid requirements and push for this to be enforced and implemented using the £1bn of public funding left after funding phase 1 and phase 2 programmes.

2.0 Demand for the USO

2.1 There is proven demand in rural areas of Northern Ireland's border region for improved connectivity. The poorer the current service, the greater the demand.

2.2 We should consider the CEO of Openreach commitment to change BT's approach;

“Our approach has delivered affordable superfast services to the vast majority of the country in the fastest possible time. We want to build upon that by making ultrafast broadband available to most of the UK. We will do this using a mix of G.fast technology and Fibre-to-the-Premises (FTTP), with the latter focused mainly on new developments and small businesses in high streets and business parks.”

2.3 Ofcom may find pent up demand from the SME sector where improvements to broadband have been withheld, so that private circuits could be sold as a substitute for fixing broadband. Demand here is likely to be high but curtailed by the need for existing contracts to run their term.

3.0 Cost, proportionality and efficiency of the USO

3.1 Affordability has been defined by BDUK and this could be used at the beginning of the process and adjusted if needed.

3.2 To assess the likely cost BT will need to map, as per the state aid measure, all public funded assets. It is essential that handover points, aggregation nodes, Tij/Splitter locations are mapped so that spare fibre bundles can be seen.

3.3 The cost per customer could be bounded by the current PST limit of £3,400. However this may need to start at lower point or in a way that permits groups of customers to order a service together, so the cost of provision for a FTTdp can be divided between multiple benefitting customers.

3.3.1 A significant amount of FTTdp can be funded from existing BDUK underspends, BT capital and the return of clawback subsidies and proxy costs. With no active costs (power/electronics) and customers paying a connection charge, it is possible to introduce such a product and manage demand levels. It is important that the available funding is subject to a reconciliation process so the full amount available can be appreciated by all.

3.4 One significant factor is a possible shortage of BT resource. The BDUK constituted in more than 200 new live cabinets a week passing some 40,000 new customers a week. It is likely a discrete FTTdp manifold will support 3-8 customers in rural areas, so the resource implications do need consideration.

3.5 Ofcom will need to consider whether their plans for dark fibre access and a revised duct and pole product will aid those willing to offer a USO service in parts of the UK.

3.6 There are now many examples of entities in rural areas laying their own communication duct. There is no particular reason why customers cannot plan to bury their own communications duct on private land thus removing the Extra Connection Charges. BT Duct and chambers can be ordered online and installed consistent with BT's practices. Some guidance is needed but the civils are not a complex task.

4.0 The universal service provider or providers;

4.1 Clearly BT, as the owner of Openreach, will feature.

4.2 We believe it is up to other operators to respond to the emerging shape of the requirement and offer to become USO providers and outline the conditions for them under which that might work.

5.0 Funding of the USO and potential market distortions

5.1 ICBAN is suggesting that using the BDUK technical requirements, the large underspends per area rollout, and BT capital accruals for BDUK, provide a framework and product definitions for which Ofcom can build and develop.

5.2 Furthermore, the state aid requirements outlined in SA33671, particularly those on affordability, the mapping of publicly funded assets and transparency of costs provide a strong set of candidates for secondary legislation.

5.3 The existing telephony arrangements for funding could be taken as a starting point with supporting arrangements to minimum orders supporting for instance an FTTdp installation.

17.2 PLANNING GUIDELINES

These are designed to be copied and amended by Councils and communicated on the planning section of Council websites. They can also be printed out and sent to developers.

DRAFT - THE BENEFITS OF INSTALLING HIGH SPEED BROADBAND INFRASTRUCTURE IN NEW DEVELOPMENTS

Planning Guidelines for Broadband

Purpose of this Document

This document aims to highlight the benefits to developers of installing high speed broadband infrastructure in new developments. This forms part of the ICBAN Report on 'Infrastructure Solutions for High Speed Internet in the Central Border Region'. Comment and feedback is welcomed from the ICBAN member Councils.

The document provides some background on national policy and local aspirations for future broadband provision, the current "gap" between aspirations and reality at present and some helpful information and guidance on key aspects of the installation and ownership of broadband infrastructure. It also looks at the issue of future-proofing broadband provision in new developments.

Context

Access to broadband is a vital component of infrastructure in today's world. It is key to growing a sustainable local economy, vital for education and home working and an increasingly central part of community cohesion and resilience, particularly in rural areas. In addition, Local Authorities are increasingly reliant on digital infrastructure to provide services and interact with their customers.

Local Planning Authorities have a pivotal role to play in encouraging developers to 'future-proof' their developments by installing direct fibre access, wherever possible.

In addition to the reputational and wider economic benefits of ensuring that residents are able to access high speed broadband when they move into new developments, there is also the issue of avoiding the costs and frustrations to occupiers of future retrofitting if the infrastructure is not fit for purpose.

Enhanced broadband provision also has the potential to reduce the need for road, rail and air travel. Developers are key in determining how projects shape an area; therefore, the planning of telecommunications infrastructure in relation to development is vital.

National Policy and Guidance

The Government recognises that, reliable broadband internet access is essential for homes throughout the country to benefit from online services, and for UK businesses to compete globally. It aims to achieve a transformation in the country's broadband access, with everyone in the UK able to access broadband speeds of at least 2 megabits per second (Mbps) and 95% of the UK receiving far greater

speeds (at least 24Mbps) by 2017 and is also exploring options to extend the benefits of fast broadband to remaining areas. This is being executed by overlaying optical fibre over the existing telephone network. The closer fibre is brought to a development, the better the service. Direct fibre access is the most future proof option.

The National Planning Policy Framework (NPPF), which came into force in 2012, recognises the importance of infrastructure in delivering sustainable economic growth, and states that 'the development of high speed broadband technology and other communications networks also plays a vital role in enhancing the provision of local community facilities and services' (Paragraph 42). It also states that 'in preparing Local Plans, local planning authorities should support the expansion of electronic communications networks, including telecommunications and high speed broadband' (Paragraph 43).

Local Position

Although Government and the NPPF both support and encourage the inclusion of high speed broadband, there are no statutory requirements which support this aspiration. BT has discretion in what it offers and thus achieving the most future proof options has a longer planning cycle even though the long term costs are at best neutral or not cheaper for the newer technology.

From 2017 EU Legislation will specify that new build and major renovations of buildings will need to be high speed ready, however, exemptions will be allowed for historic buildings, holiday homes or where the cost to do this would be disproportionate, meaning that smaller and rural developments are likely to be excluded.

Traditionally building regulations state the minimum requirement and the current DCLG consultation R 1 consultation states 'at least 30Mbps'. This is problematic as BT can offer their legacy copper access and then request subsidies or direct payments for overlaying fibre to street cabinets, so the copper access offered meets the minimum requirement. There have been examples across the UK where developers have been approached for payments for adding additional cabinets once the original cabinet of typically 288 customers has been filled. This should not be occurring if competition was working and where BT is claiming it is investing £3bn in this infrastructure.

There are a number of options which Local Authorities (LAs) can adopt to encourage and support high speed broadband provision in new developments.

These include incorporating objectives and policies to support Broadband in local plans; referencing the issue in pre-application discussions and adding it to planning application validation lists as a consideration.

The inclusion of broadband in these policies and strategies ranges from a desire to grow the rural economy of the area, improve accessibility, reduce carbon emissions through the need to travel and improving social inclusion. However, none of these policies are mandatory and therefore cannot compel developers to install high speed broadband infrastructure on new developments.

While the Council will do all it can to encourage local developers to opt for future proof connectivity, we must also acknowledge that Planning Law, which is focused on land use and Building Regulations which are focused on minimum safety conditions and standards, are not a substitute for the regulator Ofcom, acknowledging in the form of appropriate market definitions the need to encourage BT to deliver the most efficient future proof access solution. This is especially the case given the more future proof solutions are cost neutral. To that end the Council will work with other stakeholders to make our views

known to Ofcom and government. Any changes will also need to support a pro-competitive delivery of fibre access. The market is unlikely to achieve this on its own.

Benefits and Opportunities

The key benefits in ensuring that planned development is ‘future proofed’ by providing high speed broadband infrastructure include:

1. As the take-up of broadband and associated data services has increased, it has become apparent that people will demand a data service with a property as a matter of course, considering it as important as other utilities.
2. Superfast speeds are increasingly important to prospective home buyers, and homes without broadband could be worth as much as 20% less than comparable properties with a good connection (1).
3. Given the market demand for broadband, and the fact that costs per unit for larger sites are usually cost neutral, it makes good business sense to ensure that new developments include high speed broadband infrastructure as a matter of course. Some developers are already recognising this and have publicly stated that they will install high speed broadband in all of their developments. Others are already implementing the practice.
4. Not only can developers who provide these services use them as a promotional tool, they will also avoid the negative reputational impacts of customers complaining in the press if their new home is not able to support high speed broadband.
5. Estate agents also report that an increasing number of buyers are willing to pull out of a deal if broadband is not available in that area. The property search website rightmove.co.uk has added a broadband speed checker to every one of its listings, alongside details of transport links and schools (2).
6. If broadband installation is integrated into the planning of developments as early as possible, it may be possible to mitigate costs of installation through electricity and broadband cables sharing the same infrastructure assets, routes or networks. Potential savings of 16-26% could be achieved where existing infrastructure is used to rollout broadband (3). From 2017, EU legislation will mean that network operators (e.g. telecoms, power, water) will have an obligation to offer access to their infrastructure if a reasonable request is made.
7. On more rural or isolated developments where the cost-per-site for other technologies will be over a few hundred pounds, it may be worthwhile considering the option of installing satellite broadband. The recent roll-out of more powerful equipment and use of higher frequencies now mean that an effective service can be offered at a reasonable subscription and competitive connection cost-per-site. Options include a mix of Satellite Distribution Nodes and individual Direct to Home technologies which can be deployed depending on the layout and geography of the area. The Superfast Satellite for Communities: the BDUK Pilot Project (Feb 2015) report provides further details of these options

1 <http://www.theguardian.com/technology/2014/mar/02/fast-broadband-vital-to-homebuyers>

2 <http://www.theguardian.com/technology/2014/mar/02/fast-broadband-vital-to-homebuyers>

3 <https://www.london.gov.uk/sites/default/files/London%20Infrastructure%20Plan%202050%20Consultation.pdf>

Working with a Network Provider

Given the sometimes complex nature of installing broadband in new developments, and the lead in times required, it is recommended that developers work with a network provider from the early stages of planning a development.

BT Openreach and Virgin Media are the two main providers in the UK and offer advice if you are planning a new development. Other local providers are also available.

Our developers experience of the established processes is at best indifferent and the Council will continue to seek from Network Providers a consistent process, consistent with delivering future proof options. In the interim we will share with our developers best practice and best contacts as these emerge on a case by case basis.

As part of this review process we have asked vendors to provide our developers with the appropriate contacts.

In the first instance developers in our areas should notify company representatives and notify them of their developments and need for connectivity. We are confident if contacted early, Developers will increase the chances of the competitive process delivering a good outcome.

BT have reviewed their process. The following changes are being introduced by BT and now need testing by developers.

The journey for developers starts here; <http://www.newdevelopments-openreach.co.uk/>

The site is due to include a new Connectivity Assessment Tool which looks at the size of the development and BT's existing assets.

There will also be a rate card for FTTC/P for developers to understand unit cost

The latter is new and need testing. We will update once BT has explained the relationship between this rate card and the existing offer to fund duct for telephony.

The Distribution Network

Another key issue that should be considered is that service delivery depends on "end-to-end connectivity", (i.e. a connection from the broadband supplier right through to the device situated within the home) and therefore needs both parts of the distribution system. The Government has produced detailed guidance on the installation of such infrastructure in new domestic developments which can be found in the document PAS 2016:2010 Next Generation Access for New Build Homes Guide.

In our response to the CLG consultation we are recommending the PAS 2016:2010 is updated to allow for the future proof solutions and not to be limited by the 'at least 30MBps'. The new guidelines are expected to be applicable from January 1st 2017 and so we will continue to press government for these changes to be made.

17.2.1 The BT Rate Card for supporting FTTP in new developments.

The following is subject to change as we have learned that developments of more than 100 premises are now free. It is attached so you will know what to look. Note in addition to this BT and Virgin have deals where they pay the developer a fee per premise, £140 has quoted and £50 per flat.

Developer contribution for fibre broadband infrastructure outside of existing coverage

Note: no charges apply on sites below 100 premises where a new site is deemed to be within existing Fibre Broadband Infrastructure coverage. New Infrastructure is required to serve New Sites of 100 or more new homes in all cases.

| New Site Band | Per Premise Developer Contribution* |
|---------------|--|
| 2-4 | £6,668 (4 premises) to £13,442 (2 premises) |
| 5-9 | £2,905 (9 premises) to £5,314 (5 premises) |
| 10-14 | £1,830 (14 premises) to £2,604 (10 premises) |
| 15-19 | £1,321 (19 premises) to £1,701 (15 premises) |
| 20-24 | £1,024 (24 premises) to £1,250 (20 premises) |
| 25-29 | £829 (29 premises) to £979 (25 premises) |
| 30-39 | £669 |
| 40-49 | £497 |
| 50-59 | £415 |
| 60-69 | £335 |
| 70-79 | £276 |
| 80-89 | £231 |
| 90-99 | £196 |
| 100-109 | £167 |
| 110-119 | £144 |
| 120-129 | £124 |
| 130-139 | £107 |
| 140-149 | £92 |
| 150-174 | £72 |
| 175-199 | £48 |
| 200-224 | £30 |
| 225-249 | £16 |
| 250+ | No Charge |

17.3 OMAGH –ESTABLISHING A GIGABIT TOWN

HIGH SPEED INTERNET EXEMPLAR PROJECT

ACCELERATING FTTP CONNECTIONS USING PROJECT KELVIN TO DELIVER GIGABIT CAPABILITY FOR A 'DIGITAL OMAGH'

Background and Context

This is draft proposal written by ICBAN and is subject to peer review by Omagh Enterprise Company Ltd. (OECL), North West Electronics, Computer Sales Direct (CSD), DFE Telecoms Unit, and Fermanagh and Omagh District Council.

ICBAN has been charged by its local authority membership with challenging the orthodoxy that the BT broadband cabinet based solution is somehow sufficient. The challenge is to include a report on the practical solutions to the limitations of a BT solution where it offers no visible uplift to any premise more than a 1,000 metres from a fibre enabled cabinet.

Since the commissioning of this work package, Ofcom have published a once in 10 year market review of the UK's Digital Communications Market. Its publication marks a significant shift in thinking by the Regulator and one assumes UK policy makers. The new thinking is no more than those representing rural constituents have known for some time - an over-reliance on a BT cabinet solution means significant numbers, a minimum of 12% of homes passed, will not see any benefit. The more dispersed a population the less relevant the cabinet solution becomes. An FTTC cabinet, at a crossroads in Northern Ireland one mile from the nearest village, does not constitute an upgrade, but the associated fibre path will be of use. A cabinet on the edge of a business park, where duct exists to permit a direct fibre access service, becomes redundant if indeed not wasteful, as soon as the first customer requests an FTTP service.

While this report was going to devote some time to outline the nature of the problem, this is no longer necessary. The obvious no longer needs to be explained. The work package will focus on how the existing effort and assets can be built upon, or as in the case of this work proposal, how alternative solutions can be built from existing assets.

Project Kelvin is an extensive submarine and terrestrial cable deployment that directly connects Northern Ireland to North America and UK internet exchanges. This cable connects to Hibernia Networks' terrestrial fiber optic ring consisting of 13 towns and cities, including Armagh, Ballymena, Belfast, Coleraine, Londonderry, Omagh, Portadown, Strabane, Letterkenny, Castleblayney, Dundalk, Drogheda and Monaghan.

Omagh Enterprise Company has already facilitated two local internet service providers to access the Kelvin fibre and begin to offer gigabit capable services. Furthermore, Omagh has invested in its own CCTV duct network through the town centre. A significant number of Government departments reside in the town and each including schools, and hospitals will be paying significant amounts for private circuits. The opportunity exists to use the existing assets and build a gigabit capable fibre ring utilizing the CCTV duct and connected to what is already a world class facility in Project Kelvin at Omagh Enterprise Company. It is thought the existing facilities would stretch to the schools complex. The critical success of the project is not based on the building of the network but working with existing service providers to secure their commitment to selling services.

Omagh Enterprise Company have ambitious and exciting plans to develop a Digital Business Park at Great Northern Road, capitalizing upon this world class fibre infrastructure to attract high-tech start-ups and established companies working in the creative and new technology sectors.

Proposal Next Step: is to build an outline business case using the following inputs.

- Quantification of public expenditure on private circuits from public sector sites in Omagh (ICBAN/Council)
- The CCTV network and the status of its ducts and chambers, we are seeking sufficient room to support a 3way14/10mm sub duct between each chamber. Each sub duct supports a minimum of 95 single mode fibre bundle (Omagh Safer Streets Ltd.)
- Discuss with NW electronics and CSD their appetite to act as service providers (OECL)
- Discuss the interconnect arrangement needed with Hibernia Networks (OECL)
- Two network extensions would be needed. A Kelvin chamber will exist on the Great Northern Road adjacent to Omagh Enterprise, and a duct is needed to connect to the CCTV duct network in the Town Centre. (Allow £57/metre for laying communications duct)
- The second extension would be to the new education complex at Lisanelly, and including access to the Council offices.
- Scope and develop plans and proposals for a Digital Business Park at Great Northern Road.

It is proposed the outline business model would work as follows. The District Council own the duct and the Dark fibre, (copy Stokab model in Stockholm) – and rent the dark fibre to Service Providers, who light the fibre (data centre at Omagh Enterprise) who would then create service and provide direct fibre connections to the schools and public buildings at a fraction of the current private circuit costs being paid in Omagh. The latter would include access to the buildings and the provision of routers.

The DC could then re-invest the dark fibre revenues to extend the network further.

(Note: Ofcom are seeking to make a dark fibre product available based on the cost of a BT EAD from April 2016)

DfE has already subsidised several FTTC cabinets in Omagh Town centre, so this may limit the opportunity of an FTTP service to the SME sector.

The creation of a Dark Fibre product in Omagh would not need to be subsidised, but we would need to show a separate set of accounts to prove the appropriate costs were allocated and the price charged would cover those costs. Precedents exist to be copied.

[There is potential to replicate this opportunity in Armagh / Portadown / Monaghan / Castleblayney as Kelvin has another point of presence available (discuss with ABC and Monaghan Councils).]

Timescale: review the above actions and this outline scope by March 18th.

End/ 8/3/2016 MK/SC-ICBAN



The following slides and a supporting business model (not published) are available for review. The supporting document for business cases, designs and procurement processes and documentation are available to ICBAN.



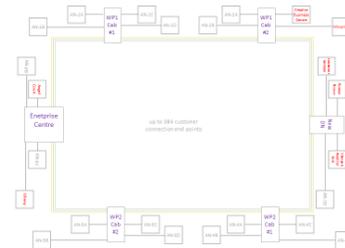
Omagh – A Gigabit Town

- Take existing connectivity assets. Kelvin (backhaul capacity), duct,
- The School campus, as an anchor tenant.
- Other public authorities replace private circuit payments.
- Council act as passive infrastructure provider taking 60% revenue share.
- Create a pro-competitive environment and let passive infrastructure to a wholesale network operator.
- Licence to use establishes worldclass benchmarks for products and pricing.

Service Provider Profiles

- Symmetrical high speed uncontended leased line provider - 100Mbps/100Mbps or 1Gbps/1Gbps uncontended
- Competitive high speed contended service provider - 100Mbps/100Mbps, 10:1 contended
- Dark Fibre connectivity provider
- Value added provider offering VoIP, cloud computing, remote storage, hosting services
- ICT support company managing all a businesses IT requirements buying wholesale Internet access from one of the other ISP Service Providers

Fibre Optic Ring Design



Access Node Schematic

- 16-way pre-connectorised splice joint with external connections to support up to 16 customer end-points

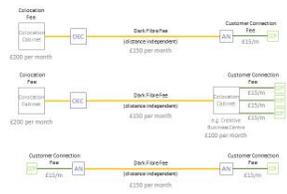


Products

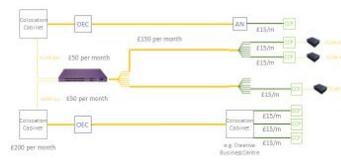
- Dark Fibre connection to an individual customer or building from Omagh Enterprise centre
- Dark Fibre connection to a remote colocation point from the Enterprise Centre to School Campus.
- Dark Fibre connection one "On Net" customer or building to another across town.
- Customer Connection Charge for each individual customer from an Access Node or Colocation Point
- Dedicated 100Mbps VLAN - either 1:1 or N:1 from Town Hall to individual customer or building
- Colocation Charge

Passive Product - Dark Fibre example

- 3 product variants:



Active Product – Dedicated VLAN example



Roles & Responsibilities - Operator

- Passive infrastructure Network Operator
- Responsibility for the entire passive fibre infrastructure from OEC Optical Distribution Frame (ODF) to Customer Connection Point
- Arranges civils construction works to connect new customers in conjunction with CBC and maintains entire fibre infrastructure
- Manages relationships and contracts with Open Access Service Providers and manages their connection to the passive infrastructure
- Provides a competitive active wholesale product to Service Providers
- Pays Omagh agreed percentage (60%) of wholesale revenue on a monthly basis

Roles & Responsibilities - Omagh

- Passive infrastructure Owner
- Promotes the network among local businesses
- Identifies areas for expansion of the network and assists with wayleaves/noticing etc.
- Provides colocation facilities (heat/light/power and cabinet accommodation/access) for Network Operator and Service Providers in the OEC.
- Funds incremental customer connections up to an agreed threshold beyond which Excess Construction Charges may apply

17.4 COUNCILS AS OWNERS OF PASSIVE INFRASTRUCTURE – FOR CONSIDERATION

INSTALLING MUNICIPALLY OWNED DUCT ON THE A5 / N2

– ICBAN BROADBAND EXEMPLAR PROJECT (DRAFT)

This is a draft proposal written by ICBAN and The Bit Commons, and is subject to peer review by the Councils of the A5/N2 route initially. This Exemplar project idea forms part of the ICBAN Report on 'Infrastructure Solutions for High Speed Internet in the Central Border Region'.

The concept of installing municipally owned duct along the A5 / N2 route has been raised as one way of contributing to creating the infrastructure needed to support the ambitions of the NI District Councils and RoI County Councils, namely for world-class internet connectivity across the Central Border Region. The following contribution has been compiled so that discussion could be taken from this initial idea and converted to a workable proposal. This note summarises a standard build, an indicative means of calculating the cost, and outline model.

The Concept of Municipally-Owned Duct and the Passive Infrastructure Model.

There is an acceptance that countries may need to plan a transition from telephony networks reliant on copper access networks to all fibre access networks.

The transition is not straight forward as incumbents wish to maximise their revenues from legacy assets. This tends to lead to programmes which take a long time, with regular requests for subsidies to complete the task. The presence of competition certainly spurs investment, but competition is often restricted to urban areas.

Local Authorities making provision for additional duct during road building has become popular in places like Sweden, where the shared infrastructure model is well established through entities like Stokab (Stockholm) (see separate case study paper completed by ICBAN for this project). The addition of duct during street and road repair activity and during large infrastructure projects creates an asset and earns income while also helping to secure world-class connectivity. Municipalities lease the duct on rates which recover costs and operate at rates which are below that experienced by the incumbent, so incumbents eventually become customers.

The model is simple: partitioned duct is laid down and fibre bundles installed for all operators to use on an equivalent basis. In so doing competition and investment is secured along the path enabled.

The change in thinking is quite small, the cost of doing so when coordinated with building work is quite low, but it marks a fundamental change to the status quo. The change is also consistent with objectives of the Infrastructure Sharing Directive, and consistent with both Ofcom's (UK and NI) new appetite for increased competition and investment in next generation access networks, ambitions being echoed by DCENR (RoI) through the National Broadband Plan.

To explain what is involved we have outlined a generic description of the standard requirement. It is for discussion purposes only at this stage and would be used by project managers as a generic statement of requirements to add communications duct to any road or street project.

Ducted Network Guidelines

In expanding a communication duct network for fibre access the following broad guidelines may be applied.

The duct should be green or white PVC-U with internal diameter of 90mm and nominal wall thickness of 3.25mm. Each duct length has a tapered socket at one end that will accept the barrel of the next duct.

It is advisable for the future flexibility of the network that 2no ("way") ducts are installed at 350mm (check local engineering guidelines) cover in footway or verge and 600mm (check local engineering practice) cover in carriageway and kept in as straight a line as possible. The depth of cover should be from final surface finish level of the roadway or footway.

The duct formation should be maintained between chambers or sites. Generally, only pre-formed 18° and 22° bends should be used and any 90° turn required: For example, road crossings would require a chamber or box to be installed.

In backfilling around the ducts, excavated earth free from stones (max size 14mm), may be used and compacted to a thickness of not less than 75mm. All further interim and permanent reinstatement should be in accordance with the provisions of The New Roads and Street Works Act 1991 and associated Highways Authorities Utilities Committee (HAUC) Specification for the Reinstatement of Openings in Highways.

On completion of the duct line (including compaction of the backfill) between any two jointing chambers the following test should be carried out. An appropriate cylindrical brush followed by an uPVC mandrel should both be passed once through each "way" - to test the duct and to remove any foreign matter that may have entered. The size of the brush and mandrel should be appropriate for the 90mm duct.

A draw rope should be threaded through and left in every "way" following the above duct laying operations and satisfactory tests. Any duct leading into any premises should be sealed against the entry of gas, water and vermin into the building.

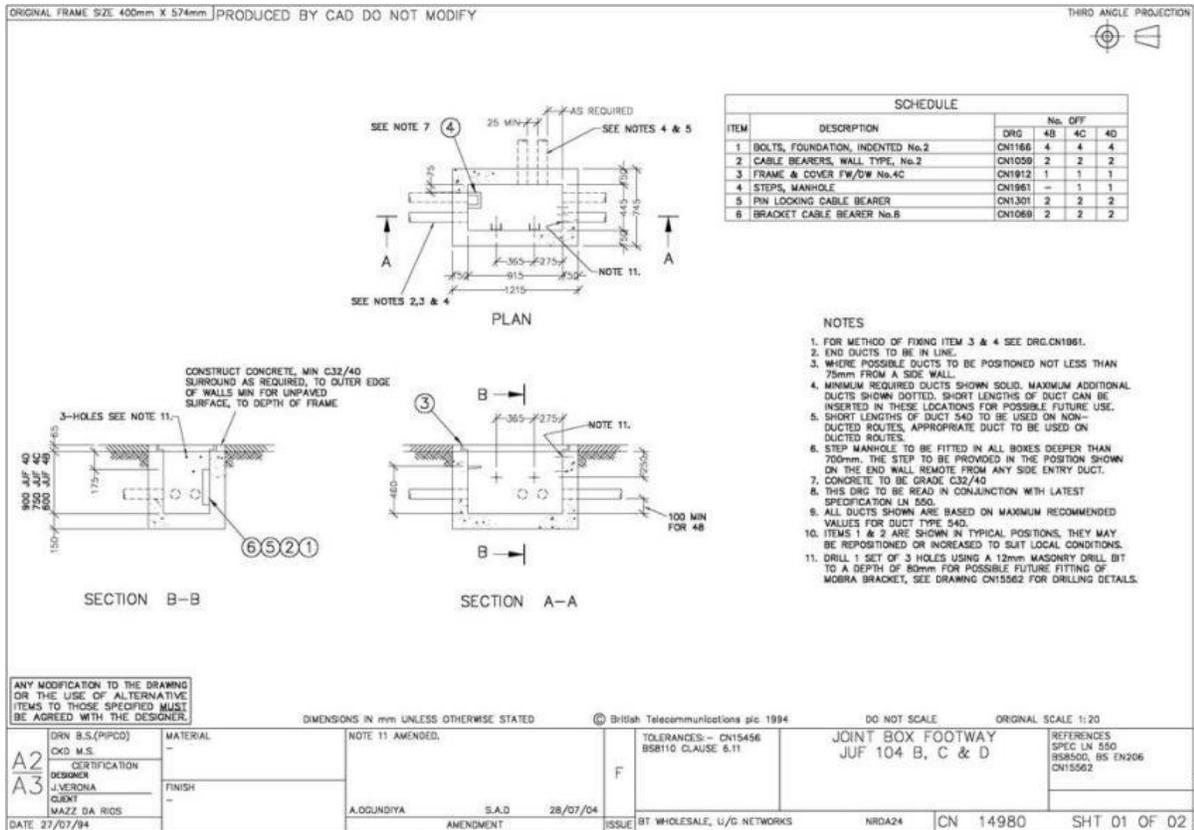
Again as a general guide chambers or boxes should be installed every 150m or thereabouts and ideally should be sited in safe and accessible locations in footway or verge. Wherever possible avoid the installation of chambers in the carriageway.

Proprietorial modular systems are the simplest means of installing boxes in footway and verge. The systems come in standard 150mm deep structural twin wall ring sections. Joint box Modular Footways 104 and 106 are generally approved by most telecoms providers. A 150mm concrete base has to be provided but box furniture items slot into moulded pockets within the chamber and duct entries are easily achieved using a standard 'hole saw' on a drill.

NB: The above is a broad outline only and it would be advisable to seek further detailed guidance from a reputable telecoms provider.

Please turn over to see CAD breakdowns of the 104 and 106.

Please see a breakdown of the Modular 104 and 106, respectively, below in CAD format.



17.4.1 STOKAB – A SOCIO-ECONOMIC STUDY

STOKAB-A SOCIO-ECONOMIC STUDY

“The Swedish analysis reinforces that good broadband connections create growth and prosperity in society and secures the future of welfare.”

For almost 20 years, the City of Stockholm, via the social enterprise Stokab, has invested **5.4 billion SEK** (over €600 million) in the development of an open, operator- neutral fibre network for everyone.

Stokab owns and is responsible for the passive fibre network, while market players operate and deliver services over the network. Stockholm city’s basic idea is that IT infrastructure should be available to the whole society, public sector, telecom operators, and other businesses alike. Therefore Stokab’s network is designed to facilitate competition and the fibre network is open to everyone on equal terms.

This vision differs from the prevailing opinion in the rest of Europe where fibre and broadband networks are often considered as a network for telecom operators. Stokab, has now inspired several municipal and regional fibre networks throughout Europe and the world. Stockholm is often cited as an IT world-class city.

Stokab’s fibre network connects almost all multi- dwelling units and commercial properties in the Stockholm municipality: about 90% of households and almost 100% of enterprises can sign up for a fibre connection.

An extensive backbone network connects industrial areas, all major healthcare facilities and urban centres in the region, with its 1.25 million kilometres of fibre.

Since the company’s inception in 1994, the passive network structure and the business model have been designed to enable all stakeholders to define their own network structure. In 2012, Stokab had over 100 telecom operators and more than 700 companies/organisations as customers. These can directly lease fibre from Stokab to deliver services in competition, without the services being related to the infrastructure. Virtually all telecom operators in Sweden have facilities in Stokab network nodes. National and international fibre connections reach Stokab nodes so that all operators can gain access to links throughout Sweden and the rest of the world, through virtually any operator.

Stockholm City

It is no exaggeration to state that Stokab has had great importance for Stockholm’s businesses and IT-development. Without Stokab’s fibre network, science parks like Kista, north of town, would probably not have developed into today’s success: Kista Science City, for instance, has more than 1,000 ICT companies and around 24,000 employees, as well as 6,800 university students and 1,100 researchers within ICT. The fibre network has also facilitated innovations and new enterprises such as Spotify, Klarna and Skype

Stockholm vs Copenhagen

Stockholm and Copenhagen are relatively similar in terms of size, population and economy. It is particularly interesting to compare the broadband situation in the two cities, since diametrically opposite conclusions were reached in connection with the deregulation of the telecom market, as to who should own the ICT.

Stockholm chose, as already described, to view the ICT infrastructure as something that should be accessible to everyone and be delivered by a neutral player in order to create competition. In 1993, Sweden was one of the first countries in the world that liberalised the telecom market. Copenhagen opted, like most of Europe, to see the ICT infrastructure as the direct prerogative of the market and telecom operators. This has resulted in the incumbent player TDC owning and controlling most of the ICT infrastructure in Copenhagen.

After about 20 years, it is interesting to see what differentiates the two cities. Regarding the development of the fibre network, barely 20% of multi-dwelling units in Copenhagen are connected, to be compared with more than 90% in Stockholm and nearly 100% of companies. This means that in Stockholm there are considerably more people that can get high speed broadband, and the cost for a broadband provider to reach customers is lower because the passive infrastructure (representing around 80% of total investment) is already there. Even dark fibre, the basic ICT infrastructure, is significantly cheaper in Stockholm.

While in Stockholm all those who need fibre can design their network structure themselves; in Copenhagen the design possibility is heavily limited because the dominant player chose to build the network frugally, and designed to meet their own delivery needs. The result is a fibre-poor network, which decreases flexibility and design possibility drastically for other operators. Hence, while broadband at 100 Mb/s speed both downstream and upstream is common for the majority of residents in Stockholm, it is virtually impossible in Copenhagen. Moreover, the price of an asymmetric broadband connection (with low upstream speed) in Copenhagen is almost twice the price of a symmetric connection (with high upstream) speed in Stockholm.

This has also a strong impact on the business climate, as the possibilities for data communication are crucial for business creation. It is symptomatic that more international enterprises have chosen to locate in Stockholm: in 2009, Stockholm had 69% more establishments than Copenhagen (compared to 10% in 2006).

Moreover, innovation power is unleashed when both small businesses and households have the same access to broadband connectivity which previously was only available to large companies.

The demand for symmetric high capacity broadband provided by FTTH is something that has developed strongly only in recent years in line with an ever-increasing range of services also to households.

Stokab's operation has also inspired many other municipalities to make broadband ventures. Even outside Sweden, the Stokab model has been applied, be it in locally adapted varieties and with different degrees of success. Singapore and Australia are just two examples that have taken inspiration.

The Stokab model is based on the persuasion that the fibre network constitutes an infrastructure for the entire community, the public sector, businesses and of course telecommunications. This vision differs from the prevailing opinion in the rest of Europe where fibre and broadband networks are often considered as a network for telecom operators.

In Sweden, there are now about 180 municipalities (out of 290) that share Stockholm's view that the public has a responsibility for the infrastructure and own or co-own a municipality fibre network.

Recapping the Benefits of High Speed Internet Access

- Advanced services such as high speed cloud-computing, video conferencing and tele-presence have a positive impact on e-learning with benefits for education and skills development and teleworking
- This in turn reduce the traffic impact, congestion, developing private enterprises and increasing public management efficiency
- Increased use of ICT services over high-speed FTTH increases the ICT maturity in the population resulting in new customers and a new human capital that is able to produce new services and products
- This in turn leads to the creation of new ICT enterprises that increase the level of entrepreneurship, creation of new enterprises, and improved management of existing businesses
- Business creation or increased production by existing ones can lead to increased employment
- FTTH represent a future-proof infrastructure, because the optical fibre offers orders-of-magnitude higher bandwidth and lower signal loss, when compared to radio- and microwave-frequency technologies. Therefore, deploying FTTH represents an investment leading to higher property value
- Reliable and high-quality e-health services reduce the need for expensive hospitalisation and home visits

- While e-government services increase efficiency and transparency in public administration, which in turn strengthens democracy, increases transparency and decreases corruption and the burden of bureaucracy.

17.5 ICBAN RESPONSE TO BDUK CONSULTATION ON STATE AID

Irish Central Border Area Network Ltd
 Units 4-6 Enniskillen Business Centre
 21 Lackaghboy Road
 Enniskillen
 Co Fermanagh
 BT74 4RL

Tel: (0)28 6634 0710

Email: info@icban.com

Website: www.icban.com



23 February 2016

National Competence Centre,
 Broadband Delivery UK,
 Department for Culture, Media & Sport,
 100 Parliament Street,
 London
 SW1A 2BQ

Dear Sirs,

Thank you for publishing the consultation on the revised state aid measure. We wish to take this opportunity and respond in the hope of assisting our colleagues in DETI (NI) to seek the level of transparency on BT's clawback mechanisms and BT capital contribution. We are a local authority development organisation which works in the cross-border areas of Northern Ireland and Ireland. Our local authority members in Northern Ireland are: Armagh City Banbridge and Craigavon Borough Council; Fermanagh and Omagh District Council, and Mid Ulster District Council.

As a cross-border organisation we are acutely aware that neighbouring towns in the Republic of Ireland are receiving the same FTTC solution without subsidy while many are also getting the FTTP option. This leaves the available subsidy for those actually living in rural areas.

We do appreciate the work done to date. The work by DETI through BT has to date secured cabinet upgrades across exchanges areas of the Region. Unfortunately, cabinets on their own means those living more than 1200 metres from the cabinet do not see a measurable improvement and thus complaints remain high. The upgrades need to continue and commitment is needed to bring fibre closer to peoples' homes.

The consultation documentation is set out without reconciling the existing activity and fails to outline how BT's capital contribution owed and the clawback revenues are to be re-covered and re-used to reach our most challenging geographic areas. The quality of the final outcome now rests to the extent to which BT's capital accruals to BDUK and clawback revenues are pursued and re-distributed. We think therefore that the proposed process would be much improved if a reconciliation process was completed as part of any new procurement. If this is not done, it is likely some of the money BT original earmarked for rural is likely to end up funding BT Sport for example.

World class connectivity provides an immediate means of remote areas being able to participate in the global economy. As it stands too many of our citizens and too much of our land mass remains poorly connected.

We are encouraged that the consultation on state aid for Broadband is seeking alternative approaches but these alternatives cannot emerge unless there is a reconciliation of existing costs and

Company Registration No: NI 40472

contributions. This has been referred to as a 'true up' by some UK local authorities. They have yet to occur and are much needed. Furthermore, we do not think the depth of coverage required will happen unless there is an unambiguous commitment to delivering Fibre to the Premise where it is needed. In re-stating the ambition, our Councils, stand ready to work with those excluded to assist in demand aggregation processes.

We would encourage BDUK to use the current consultation to re-state their commitment to insure the contractual clauses to support extensions by communities are enforced. The latter includes an affordable Fibre on Demand product from BT and mapping publicly funded assets.

At least 12-15% of our premises are failing to see any significant improvement from the fibre to the cabinet solution. We are concerned UK Ministers and Whitehall Officials will be tempted to declare victory where there is no none, where some hard yards need to be fought and won. We are delighted that DETI has received funding for SRP2, but this is still subject to BT's commercial confidentiality agreements. The latter gives BT the opportunity to game every cost and piece of capital. Any gaming of costs in the UK is then repeated in Northern Ireland. We hope this consultation process will respect and respond to public officials and their constituents' desire for more transparency on the existing contractual arrangements, so the existing funding pots can be recovered from BT for those who have not yet seen any improvement in service.

Sincerely yours,



Shane Campbell
CEO

17.6 TERMS OF REFERENCE

- 1) Identify deliverable infrastructure and business solutions;
- 2) Develop an Action Plan of Next Steps including targets and financing options;
- 3) Define and develop 2-3 exemplars;
- 4) Determine private sector interests;
- 5) consideration should be given to establishing regional solutions;
- 6) Analysis of existing cross border infrastructure that could enable high speed internet access for the Central Border Region;
- 7) Any affecting EU State aid considerations should be considered, taken into account and explained;
- 8) Some ongoing support and assistance from the appointed specialist in helping advance solutions on completion of the Paper

17.7 PROFILE OF AUTHOR

Mike Kiely, Founder Of The Bit Commons, has spent most of his working life working in the Communications. He had full 22 year career in BT rising to the senior ranks in the BT Consumer Division. He had a broad range of experiences from launching BT call answer 1571, to working dealing with complex regulatory issues like local loop unbundling and carrier pre-selection. His particular strength is leading teams solving complex issues.

He worked for HM Government (DCMS, BDUK) between April 2010 and September 2012 where he contributed to the National Broadband Strategy, BDUK's technical requirements and the formulation of the 4G coverage obligation. His time at BDUK included time with Cumbria County Council, using the communities in Eden to assist in defining the fibre extensions referenced in this report and which exist in the BDUK requirements, also referenced in this report.

Since leaving DCMS in 2012, he has helped companies, and local authorities in procuring optical fibre networks, championing and defining the passive infrastructure access model. This includes pro-competitive open access networks in Perseverance Works, Shoreditch and Colchesters' Town Centre.

17.8 GLOSSARY OF TERMS

4G - 4th generation of mobile services. The significance of 4G is the switch to a reliance on the same internet protocols (IP) as used on the fixed network. It means our voice and data calls are being transported more efficiently and thus more cheaply. The efficiency in measures in the number of bits per hertz which can be carried on a radio wave. 3G was once stated to stand for Gambling, Games and Girls, (the standards committee was chaired by a man) but no one has thought up of 4th use for their device beginning with a G.

4G Coverage Obligation - Parliament voted in record numbers for a 98% coverage obligation by premise. Ofcom for reasons yet to be explained converted that wish of Parliament into a 95% coverage obligation by nation, which Ofcom is yet to explain how they intend enforcing it.

ADSL - asynchronous digital subscriber line. The subscriber line is your phone line. Digital is confusing as it is Digital Encoding on a wave, and Asynchronous refers to the decision that the available frequencies are divided so more devoted to downloading than uploading. ADSL is best regarded as a standard defined the use of high frequencies over copper to send and received data.

xDSL – as above but we use different letters like V (Very) to describe to use of different frequencies or more frequencies or higher frequencies. The frequencies used are set by body called NICC.

BDUK – Broadband Delivery UK, a government department within the UK Department of Culture Media and Sport and reside in Whitehall, who are in charge of Framework contract used by Local Authorities, enforcing the state aid measure, and securing value for money from the contracts.

Broadband – a term which references a broad band of high radio frequencies used to send and receive signals over a copper line.

ComReg – The Republic of Ireland's regulator in charge of Communications.

Connection Voucher Scheme – A DCMS scheme used to pay incentives in the form of voucher. It ended in March 2015.

Connectivity – is a generic term to describe two devices which connect together using whatever medium is available. It gently alludes to the fact that all connectivity occurs at the speed of light without trying to explain the term 'throughput'. It also represents the idea that your Connectivity relates to what you need at the time and it is shared by those around you.

DAERA - A Northern Ireland government department -Department of Agriculture, Environment and Rural Affairs (DAERA). Previously known as Department of Agriculture and Rural Development (DARD). Located near Stormont, Belfast.

DCMS – UK government department - Department for Culture, Media & Sport (DCMS)

DFE – A Northern Ireland government department - Department for the Economy (DFE). Previously known as Department of Enterprise Trade and Investment (DETI). Located near Stormont, Belfast.

DSLAM – Digital Subscriber Line Access Multiplexer – this is the rack of equipment in the exchange or the cabinet or the node which gathers signals from lots of lines and joins them together to be transmitted to the next box in the chain. It also de-multiplexes or unravels signals for customers being received from the internet.

Economic Gaming of Costs – In a regulated environment like utilities, abstract models are used to model costs and returns. The economic gaming of costs refers to the practice of using such models to optimise a commercial position.

FTTC - Fibre to the cabinet. In simple terms it is a cabinet with fibre coming in and copper going out, with some electronics in the middle that gather, process and distribute signals to from the premises connected. A cabinet needs to be powered to perform all the processing of data through that point.

FTTdp – This describes the placing of fibres further in the network, typically a pole of distribution point, from which customers can order an FTTP connection, replacing your existing copper line.

FTTrn – rn stands for a remote node. It's where BT decide to place electronics and fibre deeper in the network and you get to continue using your existing copper line. The remote node can reside in a small box at the foot of a pole or sit at the top of the pole. Power is extended from an existing cabinet by extending cables to the node.

FTTP - Fibre to the premise. This represents a direct fibre connection between a premise and a handover point located in a large telephone exchange. It would typically permit you to remove your telephone line. It comes in two forms. Large telephone companies like BT would typically use an architecture allowing the fibres on route to be shared so the size of the fibre bundles are minimised. Smaller companies prefer to provide discrete fibre connections for each customer. The pros and cons of each are not the subject of this report.

Glassing Through – This refers to the practice of using optical fibre to by-pass typically smaller exchanges by connecting street cabinets back to a handover point established in a larger exchange. For example, it is likely the exchange at Tulnacross has been glassed through, connecting the fibre cabinet direct to a handover point in Cookstown.

Megabit/Gigabit/Terabit – Megabit refers to 1,000,000 bits, while Gigabit, 1,000,000,000 bits and Terabit 1,000,000,000,000 bits. Often used to provide an indication of speed, it is more accurately described as the 'throughput'. The data is download is encoded into a digital form and transported as bits.

Ofcom – The UK regulator with a multitude of tasks, varying from being HMG spectrum auctioneer, to independent competition regulator, to consumer protection, to enforcer of communication licences.

PCP - Primary Connections Point, or Primary Cross-connection Point. It is a street cabinet used to distribute copper telephone lines. In the context of the Broadband, a fibre enabled VDSL cabinet is located adjacent to a PCP cabinet, so the VDSL can use the existing copper connection for the last leg of the journey.

Superfast – a meaningless term but it is being associated with greater than 24Mbps throughputs of service. It means you can receive service from a fibre connected cabinet or a fixed wireless connection,

or a satellite. It marks an upgrade but how much an upgrade depends how close you are to a cabinet and the detail of any agreement you sign.

Throughput – This is the technically correct way to describe the volume of data being sent and received using the available mediums such as copper (radio waves over copper - electrons), radio waves (electrons) or fibre (a flow of photons). Although more accurate advertisers prefer 'Superfast' because, while wrong, it is easier to sell.

Ultrafast – another meaningless term much loved by advertisers but is now associated with a greater than 100Mbps service, so we cannot even associate it with a direct fibre connection.

USO – Universal Service obligation. In the context of the paper it is referring to the current Government and Regulatory discussions on the nature of an obligation to deliver a minimum level of broadband service.

VDSL – Very high bit rate Digital Subscriber Loop. This is a technology which permits the data transmission over existing telephone lines.

© ICBAN Ltd, 2016

All rights reserved. You may not, except with our express written permission, distribute or commercially exploit the content.